# Release Note for 3GD Linux Driver Version 3.7.4

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|---|---|
| **Release date** | 17-Nov-2017 |
| **Description** | This release note applies to version 3.7.4 of the SW driver package for Napatech Accelerators. |
| **Accelerators supported** | NT200A01-2x100<br>NT200A01-2x40<br>NT200A01-2x100/40<br>NT100E3-1-PTP<br>NT80E3-2-PTP<br>NT40E3-4-PTP<br>NT20E3-2-PTP<br>NT40A01-4x1<br>NT40A01-4x10/1-SLB<br>NT40E2-1<br>NT40E2-4<br>NT20E2<br>NT20E2-PTP<br>NT4E2-4-PTP<br>NT20E<br>NT4E-4<br>NT4E-4T<br>NT4E-4-STD<br>NT4E-4T-STD |
| **FPGA compatibility** | 200-9015-42-08 (NT4E)<br>200-9015-42-14 (NT4E)<br>200-9017-42-09 (NT4E-STD)<br>200-9017-42-10 (NT4E-STD)<br>200-9226-46-12 (NT4E2-4-PTP)<br>200-9226-46-13 (NT4E2-4-PTP)<br>200-9226-48-05 (NT4E2-4-PTP)<br>200-9226-50-03 (NT4E2-4-PTP)<br>200-9226-50-04 (NT4E2-4-PTP)<br>200-9226-51-03 (NT4E2-4-PTP)<br>200-9226-51-04 (NT4E2-4-PTP)<br>200-9220-44-10 (NT20E2)<br>200-9220-44-12 (NT20E2)<br>200-9220-45-06 (NT20E2)<br>200-9220-46-09 (NT20E2)<br>200-9220-50-03 (NT20E2)<br>200-9220-50-04 (NT20E2)<br>200-9220-50-05 (NT20E2)<br>200-9227-51-04 (NT20E2-PTP)<br>200-9227-51-03 (NT20E2-PTP)<br>200-9227-50-03 (NT20E2-PTP)<br>200-9233-53-01 (NT20E3-2-PTP)<br>200-9233-52-13 (NT20E3-2-PTP)<br>200-9501-04-04 (NT20E3-2-PTP)<br>200-9501-02-16 (NT20E3-2-PTP)<br>200-9501-06-06 (NT20E3-2-PTP)<br>200-9501-08-50 (NT20E3-2-PTP)<br>200-9501-08-06 (NT20E3-2-PTP)<br>200-9501-09-08 (NT20E3-2-PTP)<br>200-9232-53-01 (NT40E3-4-PTP)<br>200-9232-52-13 (NT40E3-4-PTP)<br>200-9232-51-07 (NT40E3-4-PTP)<br>200-9232-51-04 (NT40E3-4-PTP)<br>200-9232-50-04 (NT40E3-4-PTP)<br>200-9502-04-04 (NT40E3-4-PTP)<br>200-9502-02-16 (NT40E3-4-PTP)<br>200-9502-06-06 (NT40E3-4-PTP)<br>200-9502-06-07 (NT40E3-4-PTP)<br>200-9502-08-06 (NT40E3-4-PTP)<br>200-9502-09-08 (NT40E3-4-PTP) |

200-9503-04-04 (NT80E3-2-PTP)
200-9503-02-16 (NT80E3-2-PTP)
200-9503-06-05 (NT80E3-2-PTP)
200-9503-08-50 (NT80E3-2-PTP)
200-9503-08-06 (NT80E3-2-PTP)
200-9503-09-08 (NT80E3-2-PTP)
200-9508-05-17 (NT200A01-2x100)
200-9508-05-08 (NT200A01-2x100)
200-9508-06-06 (NT200A01-2x100)
200-9508-07-06 (NT200A01-2x100)
200-9608-07-07 (NT200A01-2x100)
200-9515-09-02 (NT200A01-2x100)
200-9516-09-03 (NT200A01-2x100)
200-8002-09-01 (NT200A01-2x100)
200-8002-09-02 (NT200A01-2x100)
200-9500-06-06 (NT40A01-4x1)
200-9500-06-07 (NT40A01-4x1)
200-9500-08-06 (NT40A01-4x1)
200-9500-09-08 (NT40A01-4x1)
200-9504-01-10 (NT100E3-1-PTP)
200-9504-01-12 (NT100E3-1-PTP)
200-9505-04-04 (NT100E3-1-PTP)
200-9505-02-16 (NT100E3-1-PTP)
200-9505-06-05 (NT100E3-1-PTP)
200-9505-08-03 (NT100E3-1-PTP)
200-9505-08-05 (NT100E3-1-PTP)
200-9505-08-06 (NT100E3-1-PTP)
200-9505-09-08 (NT100E3-1-PTP)
200-9222-52-05 (NT40E2-1)
200-9221-44-13 (NT40E2-4)
200-9221-50-04 (NT40E2-4)
200-9512-07-02 (NT200A01-2x40)
200-9512-08-05 (NT200A01-2x40)
200-9512-08-08 (NT200A01-2x40)
200-9512-09-08 (NT200A01-2x40)
200-8001-08-00 (NT200A01-2x100/40)
200-8001-08-01 (NT200A01-2x100/40)
200-8003-09-01 (NT200A01-2x100/40)
200-9517-09-08 (NT40A01-4x10/1-SLB)

**XFP compatibility**

XFP management is qualified for the following modules:
Further information is found in DN-0244 Pluggable Modules 10 Gbps.

- Avago Technologies AFBR-720XPDZ, 10GBASE-SR
- Avago Technologies AFCT-721XPDZ, 10GBASE-LR
- Cisco XFP-10GLR-OC192SR, 10GBASE-LR
- Finisar FTLX8511D3BTL, 10GBASE-SR
- Finisar FTLX8512D3BCL, 10GBASE-SR
- Finisar FTLX1411D3, 10GBASE-LR
- Finisar FTLX1412D3BCL, 10GBASE-LR
- Finisar FTRX1411D3, 10GBASE-LR
- Finisar FTLX1412M3BTL, 10GBASE-LR
- MergeOptics TRX10GVP2001, 10GBASE-SR
- MergeOptics TRX10GEP0301, 10GBASE-LR
- MergeOptics TRX10GEP0501, 10GBASE-LR
- Picolight PL-XXL-SCS45-22, 10GBASE-SR
- Picolight PLRXXL-SC-S43-C1, 10GBASE-SR
- Picolight JXPR01SWDC2, 10GBASE-SR
- Sumitomo SXP3100SX-M, 10GBASE-SR
- Sumitomo SXP3100SX, 10GBASE-SR
- Sumitomo SXP3100LX, 10GBASE-LR
- Sumitomo SXP3100NV, 10GBASE-LR
- Sumitomo SXP3101LX, 10GBASE-LR
- Sumitomo SXP3101LX-02, 10GBASE-LR
- Sumitomo SXP3103LX, 10GBASE-LR
- Sumitomo SXP3101EX-02, 10GBASE-ER
- Sumitomo SXP3101SV-02, 10GBASE-ER
- Sumitomo SXP3100SV, 10GBASE-ER

**SFP compatibility**

SFP is qualified for the following modules.
Further information is found in DN-0191 Pluggable Modules 1 Gbps.

- Avago Technologies AFBR-57L5APZ, 1000BASE-SX
- Avago Technologies AFBR-739DMZ, 1000GBASE-LX
- Avago Technologies AFCT-5715PZ, 1000BASE-LX
- Avago Technologies ABCU-5740RZ, 1000Base-T
- Finisar FCLF-8521-3, 10/100/1000 Base-T
- Finisar FCLF8521P2BTL, 10/100/1000 Base-T
- Finisar FTLF1318P2BTL, 1000BASE-LX
- Finisar FTLF1318P3BTL, 1000BASE-LX
- Finisar FTLF1619P1BCL, 1000BASE-ZX
- Finisar FTLX1471D3BCV, 1000BASE-LX
- Finisar FTLX8571D3BCV, 1000BASE-SX
- Picolight/JDSU PLRXPL-VI-S24-22, 1000BASE-SX
- Excelight/Sumitomo SCP6F44-GL-AWH, 1000BASE-LX

SFP is also qualified for the following modules for NT4E-4 and NT4E-4-STD accelerators.

- Avago Technologies HBCU-5710R, 1000BASE-T
- Avago Technologies ABCU-5710RZ, 1000BASE-T
- Eoptolink EOLT-C12-02A, 10/100/1000 Base-T
- Finisar FTLF1318P2BTL, 1000BASE-LX

**SFP+ compatibility**

SFP+ is qualified for the following modules.
Further information is found in DN-0244 Pluggable Modules 10 Gbps.

- Avago Technologies AFBR-703SDZ, 10GBASE-SR
- Avago Technologies AFBR-703SDDZ, 10GBASE-SR
- Avago Technologies AFBR-709SMZ, 10GBASE-SR
- Avago Technologies AFBR-739DMZ, 10GBASE-LR
- Avago Technologies AFCT-701SDDZ, 10GBASE-LR
- Avago Technologies AFCT-701SDZ, 10GBASE-LR
- CoreTek CT-A000NPP-SB1L-D, 10GBASE-SR
- CoreTek CT-A000TPP-NB4L-D, 10GBASE-LR
- Excelight/Sumitomo SPP5100SR-GL, 10GBASE-SR
- Excelight/Sumitomo SPP5100LR-GL, 10GBASE-LR
- Excelight/Sumitomo SPP5200LR-GL, 10GBASE-LR
- Excelight/Sumitomo SPP5200LR-GL-M, 10GBASE-LR
- Excelight/Sumitomo SPP5100ER-GL, 10GBASE-ER
- Finisar FTLX8571D3BCL, 10GBASE-SR
- Finisar FTLX8571D3BCV, 10GBASE-SR
- Finisar FTLX8574D3BCL, 10GBASE-SR
- Finisar FTLX8574D3BCV, 10GBASE-SR
- Finisar FTLX1471D3BCL, 10GBASE-LR
- Finisar FTLX1471D3BCV, 10GBASE-LR
- JDSU PLRXPL-SC-S43-22-N, 10GBASE-SR
- JDSU PLRXPL-VC-S43-23-N, 10GBASE-SR
- JDSU JSH-01LWAA1, 10GBASE-LR

**SFP/SFP+ compatibility**

SFP/SFP+ is qualified for the following modules.
Further information is found in DN-0935 Pluggable Modules 1/10 Gbps.

- Avago Technologies AFBR-709DMZ, 10GBASE-SR
- Avago Technologies AFBR-739DMZ, 10GBASE-LR
- Finisar FTLX8571D3BCV, 10GBASE-SR
- Finisar FTLX8574D3BCV, 10GBASE-SR
- Finisar FTLX1471D3BCV, 10GBASE-LR

**QSFP+ compatibility**

QSFP+ is qualified for the following modules.
Further information is found in DN-0509 Pluggable Modules 40 Gbps.

- Avago Technologies AFBR-79E4Z, 40GBASE-SR4
- Avago Technologies AFBR-79E4Z-D, 40GBASE-SR4
- Finisar FTL410QE1C, 40GBASE-SR4
- Finisar FTL4C1QE1C, 40GBASE-LR4

**QSFP28 compatibility**

QSFP28 is qualified for the following modules.
Further information is found in DN-0860 Pluggable Modules 100 Gbps.

- Avago Technologies AFBR-89CDDZ 100GBASE-SR4

- Finisar FTLC9551REPM 100GBASE-SR4
- Innolight TR-FC85S-NVS 100GBASE-SR4
- Sumitomo SQF1001L4LNGG01B 100GBASE-LR4
- Sumitomo SQF1002L4LNGG01B 100GBASE-LR4
- Fujitsu FIM37700/171 100GBASE-LR4
- Innolight TR-FC13L-NVS 100GBASE-LR4

**CFP4 compatibility**

CFP4 is qualified for the following modules.
Further information is found in DN-0860 Pluggable Modules 100 Gbps.

- Finisar FTLC9141RENM 100GBASE-SR4
- Sumitomo SFF1400L4LNGG01B 100GBASE-LR4
- Sumitomo SFF1400L4LNNP01B 100GBASE-LR4
- Sumitomo SFF1401L4LNNP01B 100GBASE-LR4
- Lumentum JC4-10LR4AA1 100GBASE-LR4
- Finisar FTLC1141RDNL 100GBASE-LR4

**Operating systems**

The Napatech software applies to these operating systems:

- Linux 2.6.18 -> 2.6.x (64-bit)
- Linux 3.0 -> 3.19 (64-bit)
- Linux 4.0 -> 4.11 (64-bit)

The software has been qualified on: CentOS 6, Ubuntu 16.04LTS and Fedora 18/23

**Software Compliance**

The SW driver include files comply with:

- C99
- GCC 4.4.3

**Test status**

Complete test plan.

**Notes**

None.

**Documentation**

See the Documentation Portal, WebHelp or DN-0449 for reference documentation on Napatech Software Suite

**Known issues**

#38364: The performance of host based transmission may be degraded in the following scenario:
1. Local retransmit is taking place at full line rate on a subset of the ports of the adapter.
2. In parallel with 1., host based transmission is taking place on a separate port of the adapter (i.e. the combined host and local retransmit functionality is not used.)

#32765: When using the GlobalSync feature, link down/up events could cause the port to enter 'unknown' state

#14086: If NUMA node zero is offline and /opt/napatech3/config/ntservice.ini does not exist, the driver cannot start because it fails to allocate memory for the default host buffer set-up. Workaround: Use an existing ntservice.ini or specify the host buffer set-up on an online NUMA node: '/opt/napatech3/bin/start.sh -o adapter0.BusId=0000:04:00.0 -o adapter0.AdapterType=NT40E3_4_PTP -o adapter0.HostBuffersRx=[4,32,1] -o adapter0.HostBuffersTx=[2,16,1]'. BusId and AdapterType are only required if there are multiple adapters in the server; the BusId can be obtained with 'lspci | grep Napa'.

#10740: When using a Cisco DAC pluggable, link is detected even if the other end of the cable is unplugged.

#9189: The Linux kernel v3.8->v3.12 has a bug in the NUMA balancing code which was introduced in v3.8. See https://bugzilla.kernel.org/show_bug.cgi?id=60734
The issue causes high execution delays on cores running on other than NUMA 0 if the feature is enabled.
To work around the problem, disable the NUMA balancing by adding "numa_balancing=disable" to the kernel command line.
The Linux kernel 3.13 received significant NUMA updates which fixes this issue.
The 3.10 kernel in RHEL 7, CentOS 7 and Oracle Linux 7 (not the 3.8.13 uek kernel) contains a fix for this, thus the work around is not needed.

#8719: Setting TimeSyncTimeJumpThreshold for OS timesync to values > 0, will enable the time jump feature and results in a jump threshold of 1 second.

#4324: 3GD requires at least gcc 4.0 to build and at least glibc 2.5 to run.

**Release history** The next pages list the differences between this release and previous releases.

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## From version 03.07.03 to version 03.07.04 (this release)

### New features

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

### Resolved issues

#38568: (Support-ID 38561) Faulty string comparison causes erroneous duplicate macro error.

#38553: (Support-ID 38504) Incompliant NtNetRxCmd_e definition

#38551: (Support-ID 38519(Support)) Driver crashes when applying key match test with two keys.

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## From version 03.07.02 to version 03.07.04 (this release)

### New features

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

### Resolved issues

#38568: (Support-ID 38561) Faulty string comparison causes erroneous duplicate macro error.

#38553: (Support-ID 38504) Incompliant NtNetRxCmd_e definition

#38551: (Support-ID 38519(Support)) Driver crashes when applying key match test with two keys.

#38503: Writing data directly from NT_NetRxGet buffers to files opened with O_DIRECT fails with -EFAULT.

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## From version 03.07.01 to version 03.07.04 (this release)

### New features

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

### Resolved issues

#38568: (Support-ID 38561) Faulty string comparison causes erroneous duplicate macro error.

#38553: (Support-ID 38504) Incompliant NtNetRxCmd_e definition

#38551: (Support-ID 38519(Support)) Driver crashes when applying key match test with two keys.

#38503: Writing data directly from NT_NetRxGet buffers to files opened with O_DIRECT fails with -EFAULT.

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# From version 03.06.12 to version 03.07.04 (this release)

### New features

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

### Resolved issues

#37291: Data test using wide fields (i.e. mac address or ipv6) in combination with "!=" operator does not work correctly.

#37279: Data test does not behave the same way on 3GA and 4GA adapters when DynOffset and != operator is used.

#37072: (Support-ID 37067) "Main feature mask defaults to zero (0x00000000 - 0x00000000)" in ntlog output.

This will look like:
..
07/18/17 16:51:03.389524 | 18680 | INFO | OSS | 179-02a87 | Adapter 0: Front feature mask defaults to zero (0x00000001 - 0x00000001)
07/18/17 16:51:03.548446 | 18680 | INFO | OSS | 179-02a87 | Adapter 0: Main feature mask defaults to zero (0x00000001 - 0x00000001)
..

#37069: Warning log issued with SFP-PLUS modules: "manual.speed setting is zero but capability member count > 1"

#37068: NTAPI user may lack search guidance to look into either the 3GA or 4GA inline example.

#37042: (Support-ID 36962) NT_NetRxGet returns ”NT_ERROR_HOSTBUFFER_MERGE” forever, when "timestamp jumps backward" and packet reference remains NULL

#36896: Doxygen documentation does not explain that the macro is only supported on NT4GA adapters configured to static segment size emulation mode while on NT4GA adapters configured for dynamic segment size this macro will always return 0.

#36821: ntservice TX threads consumes CPU cycles even when no TX hostbuffers are configured.

#36586: (Support-ID 36585) Duplicate key matcher keys causes unexpected matches.

#36512: Resource allocation problem when setting up filter specifying a value list in a data test.

#36305: HW errors that lead to erroneous clock signals might make ntservice hang forever.

#28559: NTAPI optimizations: internal structures reorganized for better cache-population and -utilization.

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# From version 03.06.11 to version 03.07.04 (this release)

### New features

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

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#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

### Resolved issues

#38468: (Support-ID 38443) supportinfo crashes with a segmentation fault if run on a system that does not contain any 4GArch adapters (95XX series FPGA)

#37291: Data test using wide fields (i.e. mac address or ipv6) in combination with "!=" operator does not work correctly.

#37279: Data test does not behave the same way on 3GA and 4GA adapters when DynOffset and != operator is used.

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#37069: Warning log issued with SFP-PLUS modules: "manual.speed setting is zero but capability member count > 1"

#37068: NTAPI user may lack search guidance to look into either the 3GA or 4GA inline example.

#37042: (Support-ID 36962) NT_NetRxGet returns ”NT_ERROR_HOSTBUFFER_MERGE” forever, when "timestamp jumps backward" and packet reference remains NULL

#36896: Doxygen documentation does not explain that the macro is only supported on NT4GA adapters configured to static segment size emulation mode while on NT4GA adapters configured for dynamic segment size this macro will always return 0.

#36821: ntservice TX threads consumes CPU cycles even when no TX hostbuffers are configured.

#36586: (Support-ID 36585) Duplicate key matcher keys causes unexpected matches.

#36512: Resource allocation problem when setting up filter specifying a value list in a data test.

#36305: HW errors that lead to erroneous clock signals might make ntservice hang forever.

#28559: NTAPI optimizations: internal structures reorganized for better cache-population and -utilization.

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## From version 03.06.10 to version 03.07.04 (this release)

### New features

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

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#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

### Resolved issues

#38468: (Support-ID 38443) supportinfo crashes with a segmentation fault if run on a system that does not contain any 4GArch adapters (95XX series FPGA)

#38311: (Support-ID 37285) 3-speed NIMs do not start up correctly on specific GreenBay FPGA image (NT40E3-4, 200-9232-52-13)

#37291: Data test using wide fields (i.e. mac address or ipv6) in combination with "!=" operator does not work correctly.

#37279: Data test does not behave the same way on 3GA and 4GA adapters when DynOffset and != operator is used.

#37072: (Support-ID 37067) "Main feature mask defaults to zero (0x00000000 - 0x00000000)" in ntlog output.

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#36512: Resource allocation problem when setting up filter specifying a value list in a data test.

#36305: HW errors that lead to erroneous clock signals might make ntservice hang forever.

#28559: NTAPI optimizations: internal structures reorganized for better cache-population and -utilization.

napatech

## From version 03.06.08 to version 03.07.04 (this release)

### New features

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

### Resolved issues

#38311: (Support-ID 37285) 3-speed NIMs do not start up correctly on specific GreenBay FPGA image (NT40E3-4, 200-9232-52-13)

#37291: Data test using wide fields (i.e. mac address or ipv6) in combination with "!=" operator does not work correctly.

#37279: Data test does not behave the same way on 3GA and 4GA adapters when DynOffset and != operator is used.

#37123: (Support-ID 37119) The NT200A01-2x40 is not able to sync to OSTime. When OSTime is selected, synchronisation is never achieved. The absolute value of the skew reported in monitoring just keeps increasing.
This affects all releases where NT200A01-2x40 is supported.

#37072: (Support-ID 37067) "Main feature mask defaults to zero (0x00000000 - 0x00000000)" in ntlog output.

This will look like:
..
07/18/17 16:51:03.389524 | 18680 | INFO | OSS | 179-02a87 | Adapter 0: Front feature mask defaults to zero (0x00000001 - 0x00000001)
07/18/17 16:51:03.548446 | 18680 | INFO | OSS | 179-02a87 | Adapter 0: Main feature mask defaults to zero (0x00000001 - 0x00000001)
..

#37069: Warning log issued with SFP-PLUS modules: "manual.speed setting is zero but capability member count > 1"

#37068: NTAPI user may lack search guidance to look into either the 3GA or 4GA inline example.

#37042: (Support-ID 36962) NT_NetRxGet returns ”NT_ERROR_HOSTBUFFER_MERGE” forever, when "timestamp jumps backward" and packet reference remains NULL

#37017: (Support-ID 36973) The NT20E adapter is marked as a 4 ported adapter even though it only contains 2 ports. This prevents the adapter from starting.

#37014: (Support-ID 37008) Unplugging a 1G NIM might on rare occasions lead to a driver crash. This can happen if the link - due to latency - is reported as up after the NIM has been unplugged.

#37007: (Support-ID 36971) The log will contain entries stating that there was an error during WriteDataAndSetCache. The limits for the QSFP+ sensors are likely to be wrong so that alarms in e.g. the monitoring tool are generated.

#36896: Doxygen documentation does not explain that the macro is only supported on NT4GA adapters configured to static segment size emulation mode while on NT4GA adapters configured for dynamic segment size this macro will always return 0.

#36821: ntservice TX threads consumes CPU cycles even when no TX hostbuffers are configured.

#36586: (Support-ID 36585) Duplicate key matcher keys causes unexpected matches.

#36512: Resource allocation problem when setting up filter specifying a value list in a data test.

#36305: HW errors that lead to erroneous clock signals might make ntservice hang forever.

#28559: NTAPI optimizations: internal structures reorganized for better cache-population and -utilization.

napatech

## From version 03.06.06 to version 03.07.04 (this release)

### New features

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

### Resolved issues

#38311: (Support-ID 37285) 3-speed NIMs do not start up correctly on specific GreenBay FPGA image (NT40E3-4, 200-9232-52-13)

#37279: Data test does not behave the same way on 3GA and 4GA adapters when DynOffset and != operator is used.

#37123: (Support-ID 37119) The NT200A01-2x40 is not able to sync to OSTime. When OSTime is selected, synchronisation is never achieved. The absolute value of the skew reported in monitoring just keeps increasing.
This affects all releases where NT200A01-2x40 is supported.

#37072: (Support-ID 37067) "Main feature mask defaults to zero (0x00000000 - 0x00000000)" in ntlog output.

This will look like:

..
07/18/17 16:51:03.389524 | 18680 | INFO | OSS | 179-02a87 | Adapter 0: Front feature mask defaults to zero (0x00000001 - 0x00000001)
07/18/17 16:51:03.548446 | 18680 | INFO | OSS | 179-02a87 | Adapter 0: Main feature mask defaults to zero (0x00000001 - 0x00000001)
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#37069: Warning log issued with SFP-PLUS modules: "manual.speed setting is zero but capability member count > 1"

#37042: (Support-ID 36962) NT_NetRxGet returns ”NT_ERROR_HOSTBUFFER_MERGE” forever, when "timestamp jumps backward" and packet reference remains NULL

#37014: (Support-ID 37008) Unplugging a 1G NIM might on rare occasions lead to a driver crash. This can happen if the link - due to latency - is reported as up after the NIM has been unplugged.

#37007: (Support-ID 36971) The log will contain entries stating that there was an error during WriteDataAndSetCache. The limits for the QSFP+ sensors are likely to be wrong so that alarms in e.g. the monitoring tool are generated.

#36943: When starting the driver and with a port connected to a link partner it can happen that the link never comes up, that the link goes up and down or that the link comes up but packets with CRC errors are received. This can also have the effect that the link LED is turned on and off in a rather random way.

#36929: Data tests do not work when negative tests (!=) are combined with OR.

#36896: Doxygen documentation does not explain that the macro is only supported on NT4GA adapters configured to static segment size emulation mode while on NT4GA adapters configured for dynamic segment size this macro will always return 0.

#36886: DN-0449: Documentation/Files containing info about nested structures and unions are missing (dead links)

#36821: ntservice TX threads consumes CPU cycles even when no TX hostbuffers are configured.

#36586: (Support-ID 36585) Duplicate key matcher keys causes unexpected matches.

#36512: Resource allocation problem when setting up filter specifying a value list in a data test.

#36305: HW errors that lead to erroneous clock signals might make ntservice hang forever.

#28559: NTAPI optimizations: internal structures reorganized for better cache-population and -utilization.

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## From version 03.06.02 to version 03.07.04 (this release)

### New features

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36723: Added VXLAN support.

#36661: Added full throughput in-line support

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

### Resolved issues

#38311: (Support-ID 37285) 3-speed NIMs do not start up correctly on specific GreenBay FPGA image (NT40E3-4, 200-9232-52-13)

#37279: Data test does not behave the same way on 3GA and 4GA adapters when DynOffset and != operator is used.

#37072: (Support-ID 37067) "Main feature mask defaults to zero (0x00000000 - 0x00000000)" in ntlog output.

This will look like:

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07/18/17 16:51:03.389524 | 18680 | INFO | OSS | 179-02a87 | Adapter 0: Front feature mask defaults to zero (0x00000001 - 0x00000001)
07/18/17 16:51:03.548446 | 18680 | INFO | OSS | 179-02a87 | Adapter 0: Main feature mask defaults to zero (0x00000001 - 0x00000001)
..

#37042: (Support-ID 36962) NT_NetRxGet returns ”NT_ERROR_HOSTBUFFER_MERGE” forever, when "timestamp jumps backward" and packet reference remains NULL

#37014: (Support-ID 37008) Unplugging a 1G NIM might on rare occasions lead to a driver crash. This can happen if the link - due to latency - is reported as up after the NIM has been unplugged.

#37007: (Support-ID 36971) The log will contain entries stating that there was an error during WriteDataAndSetCache. The limits for the QSFP+ sensors are likely to be wrong so that alarms in e.g. the monitoring tool are generated.

#36896: Doxygen documentation does not explain that the macro is only supported on NT4GA adapters configured to static segment size emulation mode while on NT4GA adapters configured for dynamic segment size this macro will always return 0.

#36893: Sometimes when starting ntservice with a NT200A01-2x40G adapter (9512), it is not possible to get link on one or both ports.

#36886: DN-0449: Documentation/Files containing info about nested structures and unions are missing (dead links)

#36851: Log level for some messages is misleading.

#36821: ntservice TX threads consumes CPU cycles even when no TX hostbuffers are configured.

#36586: (Support-ID 36585) Duplicate key matcher keys causes unexpected matches.

#36512: Resource allocation problem when setting up filter specifying a value list in a data test.

#36305: HW errors that lead to erroneous clock signals might make ntservice hang forever.

#28559: NTAPI optimizations: internal structures reorganized for better cache-population and -utilization.

napatech

## From version 03.05.03 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36212: Ntservice is now shielded from OOM kills

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

**Resolved issues**

#38311: (Support-ID 37285) 3-speed NIMs do not start up correctly on specific GreenBay FPGA image (NT40E3-4, 200-9232-52-13)

#37279: Data test does not behave the same way on 3GA and 4GA adapters when DynOffset and != operator is used.

#37042: (Support-ID 36962) NT_NetRxGet returns ”NT_ERROR_HOSTBUFFER_MERGE” forever, when "timestamp jumps backward" and packet reference remains NULL

#37014: (Support-ID 37008) Unplugging a 1G NIM might on rare occasions lead to a driver crash. This can happen if the link - due to latency - is reported as up after the NIM has been unplugged.

#36851: Log level for some messages is misleading.

#36821: ntservice TX threads consumes CPU cycles even when no TX hostbuffers are configured.

#36591: Support for 4k byte alignment added to 4GA FPGAs

#36586: (Support-ID 36585) Duplicate key matcher keys causes unexpected matches.

#36520: (Support-ID 36394) Added support for 4G architecture in ntinfo tool and added documentation.

#36512: Resource allocation problem when setting up filter specifying a value list in a data test.

#36511: (Support-ID 36459) Ntservice crashes when setting up filter specifying a value list in a data test.

#36348: (Support-ID 36332) Misleading bandwidth message in log for NT200A01

#36345: PCIe Gen1 adapters reports 0Mbps measured bandwith during initialization

#36305: HW errors that lead to erroneous clock signals might make ntservice hang forever.

#36244: Applying NTPL setup commands in-between NTPL assign commands may change the host buffer selection criteria. The result is that host buffers already assigned to streams may now be selected for a wrong reason.

#28559: NTAPI optimizations: internal structures reorganized for better cache-population and -utilization.

napatech

## From version 03.05.02 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36212: Ntservice is now shielded from OOM kills

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

**Resolved issues**

#37279: Data test does not behave the same way on 3GA and 4GA adapters when DynOffset and != operator is used.

#37042: (Support-ID 36962) NT_NetRxGet returns ”NT_ERROR_HOSTBUFFER_MERGE” forever, when "timestamp jumps backward" and packet reference remains NULL

#37014: (Support-ID 37008) Unplugging a 1G NIM might on rare occasions lead to a driver crash. This can happen if the link - due to latency - is reported as up after the NIM has been unplugged.

#36851: Log level for some messages is misleading.

#36604: (Support-ID 36588) Some NTPL fails with "All ports on adapter must be specified" when more than 4 NT80E3-2 or 4 NT100E3-1 adapters are configured.

#36591: Support for 4k byte alignment added to 4GA FPGAs

#36589: (Support-ID 36540) ntservice fails to start with "Adapter N: Init failed. Code: 0x20000006, Desc: Module 'MAC' (mod_id=35 mod_instance=1) not found in ..." when more than 4 NT80E3-2 or 4 NT100E3-1 adapters are configured.

#36586: (Support-ID 36585) Duplicate key matcher keys causes unexpected matches.

#36520: (Support-ID 36394) Added support for 4G architecture in ntinfo tool and added documentation.

#36512: Resource allocation problem when setting up filter specifying a value list in a data test.

#36511: (Support-ID 36459) Ntservice crashes when setting up filter specifying a value list in a data test.

#36348: (Support-ID 36332) Misleading bandwidth message in log for NT200A01

#36345: PCIe Gen1 adapters reports 0Mbps measured bandwith during initialization

#36305: HW errors that lead to erroneous clock signals might make ntservice hang forever.

#36244: Applying NTPL setup commands in-between NTPL assign commands may change the host buffer selection criteria. The result is that host buffers already assigned to streams may now be selected for a wrong reason.

#28559: NTAPI optimizations: internal structures reorganized for better cache-population and -utilization.

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## From version 03.05.00 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36212: Ntservice is now shielded from OOM kills

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

**Resolved issues**

#37279: Data test does not behave the same way on 3GA and 4GA adapters when DynOffset and != operator is used.

#37042: (Support-ID 36962) NT_NetRxGet returns ”NT_ERROR_HOSTBUFFER_MERGE” forever, when "timestamp jumps backward" and packet reference remains NULL

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#36604: (Support-ID 36588) Some NTPL fails with "All ports on adapter must be specified" when more than 4 NT80E3-2 or 4 NT100E3-1 adapters are configured.

#36591: Support for 4k byte alignment added to 4GA FPGAs

#36589: (Support-ID 36540) ntservice fails to start with "Adapter N: Init failed. Code: 0x20000006, Desc: Module 'MAC' (mod_id=35 mod_instance=1) not found in ..." when more than 4 NT80E3-2 or 4 NT100E3-1 adapters are configured.

#36586: (Support-ID 36585) Duplicate key matcher keys causes unexpected matches.

#36520: (Support-ID 36394) Added support for 4G architecture in ntinfo tool and added documentation.

#36512: Resource allocation problem when setting up filter specifying a value list in a data test.

#36511: (Support-ID 36459) Ntservice crashes when setting up filter specifying a value list in a data test.

#36348: (Support-ID 36332) Misleading bandwidth message in log for NT200A01

#36345: PCIe Gen1 adapters reports 0Mbps measured bandwith during initialization

#36305: HW errors that lead to erroneous clock signals might make ntservice hang forever.

#36244: Applying NTPL setup commands in-between NTPL assign commands may change the host buffer selection criteria. The result is that host buffers already assigned to streams may now be selected for a wrong reason.

#28559: NTAPI optimizations: internal structures reorganized for better cache-population and -utilization.

napatech

## From version 03.04.02 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

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#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36212: Ntservice is now shielded from OOM kills

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

**Resolved issues**

#37279: Data test does not behave the same way on 3GA and 4GA adapters when DynOffset and != operator is used.

#37042: (Support-ID 36962) NT_NetRxGet returns ”NT_ERROR_HOSTBUFFER_MERGE” forever, when "timestamp jumps backward" and packet reference remains NULL

#36851: Log level for some messages is misleading.

#36604: (Support-ID 36588) Some NTPL fails with "All ports on adapter must be specified" when more than 4 NT80E3-2 or 4 NT100E3-1 adapters are configured.

#36591: Support for 4k byte alignment added to 4GA FPGAs

#36589: (Support-ID 36540) ntservice fails to start with "Adapter N: Init failed. Code: 0x20000006, Desc: Module 'MAC' (mod_id=35 mod_instance=1) not found in ..." when more than 4 NT80E3-2 or 4 NT100E3-1 adapters are configured.

#36586: (Support-ID 36585) Duplicate key matcher keys causes unexpected matches.

#36520: (Support-ID 36394) Added support for 4G architecture in ntinfo tool and added documentation.

#36512: Resource allocation problem when setting up filter specifying a value list in a data test.

#36511: (Support-ID 36459) Ntservice crashes when setting up filter specifying a value list in a data test.

#36348: (Support-ID 36332) Misleading bandwidth message in log for NT200A01

#36345: PCIe Gen1 adapters reports 0Mbps measured bandwith during initialization

#36305: HW errors that lead to erroneous clock signals might make ntservice hang forever.

#36244: Applying NTPL setup commands in-between NTPL assign commands may change the host buffer selection criteria. The result is that host buffers already assigned to streams may now be selected for a wrong reason.

#36138: With Marvell 88E1111 rev B0 (1G/100M) modules CRC errors in the RMON statistics has been observed for a few frames while the diagnostic tool did not see any errors in content of the frame.

#28559: NTAPI optimizations: internal structures reorganized for better cache-population and -utilization.

napatech

## From version 03.04.01 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36212: Ntservice is now shielded from OOM kills

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

**Resolved issues**

#37279: Data test does not behave the same way on 3GA and 4GA adapters when DynOffset and != operator is used.

#37042: (Support-ID 36962) NT_NetRxGet returns ”NT_ERROR_HOSTBUFFER_MERGE” forever, when "timestamp jumps backward" and packet reference remains NULL

#36591: Support for 4k byte alignment added to 4GA FPGAs

#36586: (Support-ID 36585) Duplicate key matcher keys causes unexpected matches.

#36520: (Support-ID 36394) Added support for 4G architecture in ntinfo tool and added documentation.

#36348: (Support-ID 36332) Misleading bandwidth message in log for NT200A01

#36345: PCIe Gen1 adapters reports 0Mbps measured bandwith during initialization

#36305: HW errors that lead to erroneous clock signals might make ntservice hang forever.

#36294: When deleting all filters a few packets could be sent to the wrong streams.

#36283: (Support-ID 36253,) Race condition in host buffer handling can lead to corrupt packet traversal and wrong reference counts.

#36244: Applying NTPL setup commands in-between NTPL assign commands may change the host buffer selection criteria. The result is that host buffers already assigned to streams may now be selected for a wrong reason.

#36138: With Marvell 88E1111 rev B0 (1G/100M) modules CRC errors in the RMON statistics has been observed for a few frames while the diagnostic tool did not see any errors in content of the frame.

#28559: NTAPI optimizations: internal structures reorganized for better cache-population and -utilization.

napatech

## From version 03.03.01 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
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- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

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#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

**Resolved issues**

#37042: (Support-ID 36962) NT_NetRxGet returns ”NT_ERROR_HOSTBUFFER_MERGE” forever, when "timestamp jumps backward" and packet reference remains NULL

#36520: (Support-ID 36394) Added support for 4G architecture in ntinfo tool and added documentation.

#36348: (Support-ID 36332) Misleading bandwidth message in log for NT200A01

#36226: (Support-ID 36221) NT4E2-4-PTP adapter reacts to pause frames even though flow control is not supported.

#35053: Added definitions for commonly used fields in FilterMacros.txt

#35051: Added support for MAC, IPv4 and IPv6 types in pattern match test when using 4'th generation FPGAs.

#35037: Profiling segfaults in a number of low memory conditions.

#35019: (Support-ID 34974) memory leak when calling NT_Init()/NT_Done() in a loop

#34879: Color statistics fails to count packets that have explicitly been dropped.

#34804: The packet classification for GTPv1v2-C can only check the UDP destination port. It should also be possible to check the source port for GTPv1v2-C.

#34758: SDRAM fill level events is not supported for NT4GA adapters

#28559: NTAPI optimizations: internal structures reorganized for better cache-population and -utilization.

napatech

## From version 03.02.03 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

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#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

**Resolved issues**

#37042: (Support-ID 36962) NT_NetRxGet returns ”NT_ERROR_HOSTBUFFER_MERGE” forever, when "timestamp jumps backward" and packet reference remains NULL

#36520: (Support-ID 36394) Added support for 4G architecture in ntinfo tool and added documentation.

#36226: (Support-ID 36221) NT4E2-4-PTP adapter reacts to pause frames even though flow control is not supported.

#35053: Added definitions for commonly used fields in FilterMacros.txt

#35051: Added support for MAC, IPv4 and IPv6 types in pattern match test when using 4'th generation FPGAs.

#35037: Profiling segfaults in a number of low memory conditions.

#35019: (Support-ID 34974) memory leak when calling NT_Init()/NT_Done() in a loop

#34972: Deadlock can occur when a failure happens during driver start-up in QPI-bypass mode.

#34967: Infinite loop condition can occur when recovering from internal CRC errors in the bypass link.

#34913: Incorrect hashing when using Layer3Type=IP with HashMode command

#34879: Color statistics fails to count packets that have explicitly been dropped.

#34804: The packet classification for GTPv1v2-C can only check the UDP destination port. It should also be possible to check the source port for GTPv1v2-C.

#34758: SDRAM fill level events is not supported for NT4GA adapters

#34609: Fixed a race condition in TX host buffer handling.

#28559: NTAPI optimizations: internal structures reorganized for better cache-population and -utilization.

napatech

## From version 03.02.02 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

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#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

**Resolved issues**

#37042: (Support-ID 36962) NT_NetRxGet returns ”NT_ERROR_HOSTBUFFER_MERGE” forever, when "timestamp jumps backward" and packet reference remains NULL

#36520: (Support-ID 36394) Added support for 4G architecture in ntinfo tool and added documentation.

#36226: (Support-ID 36221) NT4E2-4-PTP adapter reacts to pause frames even though flow control is not supported.

#35019: (Support-ID 34974) memory leak when calling NT_Init()/NT_Done() in a loop

#34879: Color statistics fails to count packets that have explicitly been dropped.

#34851: Applications are sometimes not notified properly when driver stops.

#34826: NT_STATISTICS_READ_CMD_USAGE_DATA_V0 returns incorrect SDRAM utilization

#34820: Driver can sometimes not shut down properly when QPI-bypass is configured.

#34808: Driver crashes during startup when wrong FPGA images used in connection with QPI-bypass.

#34804: The packet classification for GTPv1v2-C can only check the UDP destination port. It should also be possible to check the source port for GTPv1v2-C.

#34797: Packets are dropped/buffered after application is terminated.

#34792: Driver can sometimes hang during startup when QPI-bypass is configured.

#34760: NT_STATISTICS_READ_CMD_USAGE_DATA_V0 returns incorrect host buffer and SDRAM utilization information when used in QPI-bypass setup

#34759: Profiling tool is not QPI-bypass aware

#34758: SDRAM fill level events is not supported for NT4GA adapters

#34670: Optimization issue in pattern match filter leads to excessive resource usage.

#34609: Fixed a race condition in TX host buffer handling.

#28559: NTAPI optimizations: internal structures reorganized for better cache-population and -utilization.

napatech

## From version 03.01.04 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

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#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
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The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
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#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

**Resolved issues**

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#34851: Applications are sometimes not notified properly when driver stops.

#34820: Driver can sometimes not shut down properly when QPI-bypass is configured.

#34808: Driver crashes during startup when wrong FPGA images used in connection with QPI-bypass.

#34797: Packets are dropped/buffered after application is terminated.

#34792: Driver can sometimes hang during startup when QPI-bypass is configured.

#34759: Profiling tool is not QPI-bypass aware

#34758: SDRAM fill level events is not supported for NT4GA adapters

#34632: (Support-ID 33366) Systems with a total of >256 streams will experience packet drops and potential frozen streams.

#33399: (Support-ID 33349) The hash distribution applies hash masking before tuple-swapping (should be opposite).

#33099: Only assigning an ipmatch filter can cause all received packets to be matched even if the packets IP addresses have not been added to the ip-matcher.

Work around: Add a non-ipmatch filter such as a catch-all filter (e.g. Assign[StreamId=0;Priority=62] = all).
When IP adresses have been added, this filter can be removed.

#28559: NTAPI optimizations: internal structures reorganized for better cache-population and -utilization.

napatech

## From version 03.01.02 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
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Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

**Resolved issues**

#37042: (Support-ID 36962) NT_NetRxGet returns ”NT_ERROR_HOSTBUFFER_MERGE” forever, when "timestamp jumps backward" and packet reference remains NULL

#36520: (Support-ID 36394) Added support for 4G architecture in ntinfo tool and added documentation.

#36226: (Support-ID 36221) NT4E2-4-PTP adapter reacts to pause frames even though flow control is not supported.

#34851: Applications are sometimes not notified properly when driver stops.

#34820: Driver can sometimes not shut down properly when QPI-bypass is configured.

#34808: Driver crashes during startup when wrong FPGA images used in connection with QPI-bypass.

#34797: Packets are dropped/buffered after application is terminated.

#34792: Driver can sometimes hang during startup when QPI-bypass is configured.

#34758: SDRAM fill level events is not supported for NT4GA adapters

#33309: (Support-ID 33303) Using the macro NT_NET_GET_PKT_RXPORT on packets from other adapters than adapter 0 (zero) results in a wrong port number.

#33308: When the link goes down on a NT80E3 adapter, a lot of messages are written to the log.

#33282: (Support-ID 33252) Using the NT80E3 in an adapter position other than adapter 0 (zero), causes a segfault.

#33198: When using a NT80E3 accelerator, "rab_read32: PhysicalAdapter 0: RAB: timeout" messages are written to the log.

#33099: Only assigning an ipmatch filter can cause all received packets to be matched even if the packets IP addresses have not been added to the ip-matcher.

Work around: Add a non-ipmatch filter such as a catch-all filter (e.g. Assign[StreamId=0;Priority=62] = all).
When IP adresses have been added, this filter can be removed.

#32928: Rare occasions of packet loss at upstart when distributing small packet sizes to one stream per port at full rate

#28559: NTAPI optimizations: internal structures reorganized for better cache-population and -utilization.

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## From version 03.00.09 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

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#34626: The IP Fragment handler is now available as described in DN-1011.

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#33498: Support for Linux 4.x kernels have been added

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

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#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

**Resolved issues**

#36520: (Support-ID 36394) Added support for 4G architecture in ntinfo tool and added documentation.

#36226: (Support-ID 36221) NT4E2-4-PTP adapter reacts to pause frames even though flow control is not supported.

#34758: SDRAM fill level events is not supported for NT4GA adapters

#28559: NTAPI optimizations: internal structures reorganized for better cache-population and -utilization.

#22901: Host buffer allowance performance limited. In some situations, when utilizing host buffer allowance, a slow client application may cause package drops for a fast client application.

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## From version 03.00.08 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

**Resolved issues**

#36520: (Support-ID 36394) Added support for 4G architecture in ntinfo tool and added documentation.

#36226: (Support-ID 36221) NT4E2-4-PTP adapter reacts to pause frames even though flow control is not supported.

#34758: SDRAM fill level events is not supported for NT4GA adapters

#28559: NTAPI optimizations: internal structures reorganized for better cache-population and -utilization.

#22901: Host buffer allowance performance limited. In some situations, when utilizing host buffer allowance, a slow client application may cause package drops for a fast client application.

napatech

## From version 03.00.07 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

**Resolved issues**

#36520: (Support-ID 36394) Added support for 4G architecture in ntinfo tool and added documentation.

#36226: (Support-ID 36221) NT4E2-4-PTP adapter reacts to pause frames even though flow control is not supported.

#34758: SDRAM fill level events is not supported for NT4GA adapters

#28559: NTAPI optimizations: internal structures reorganized for better cache-population and -utilization.

#22901: Host buffer allowance performance limited. In some situations, when utilizing host buffer allowance, a slow client application may cause package drops for a fast client application.

napatech

## From version 03.00.05 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
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#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

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#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

**Resolved issues**

#36520: (Support-ID 36394) Added support for 4G architecture in ntinfo tool and added documentation.

#36226: (Support-ID 36221) NT4E2-4-PTP adapter reacts to pause frames even though flow control is not supported.

#34758: SDRAM fill level events is not supported for NT4GA adapters

#30510: Memory mapping of certain memory regions was not checked for errors - in case of an (undetected) error - this could lead to an illegal memory mapping.

#30509: In certain situations hosts buffer allocation errors was not propagated correctly.
Memory mapping of certain memory regions was not checked for errors - in case of an (undetected) error - this could lead to an illegal memory mapping.
A combination of the two above could lead to a operational (running) driver with a improper host buffer setup - which in turn could lead to the system instability.

Documentation section "Tips..." updated with recommendations for Large Host Buffer Memory Configurations (Linux)

#30128: Multiget scenario: NT_NetRxGet() does not return proper segment information when called multiple times in a row without release of segments.

#30126: NTservice sometimes hang during initialization of the PTP port due to insufficient handling of DDR3 PLL initialization in certain situations

#28559: NTAPI optimizations: internal structures reorganized for better cache-population and -utilization.

#22901: Host buffer allowance performance limited. In some situations, when utilizing host buffer allowance, a slow client application may cause package drops for a fast client application.

napatech

## From version 03.00.04 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

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The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

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#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

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The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
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#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
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#33436: Time skew added to log message when adapter goes out of sync

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#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

**Resolved issues**

#36520: (Support-ID 36394) Added support for 4G architecture in ntinfo tool and added documentation.

#36226: (Support-ID 36221) NT4E2-4-PTP adapter reacts to pause frames even though flow control is not supported.

#34758: SDRAM fill level events is not supported for NT4GA adapters

#30510: Memory mapping of certain memory regions was not checked for errors - in case of an (undetected) error - this could lead to an illegal memory mapping.

#30128: Multiget scenario: NT_NetRxGet() does not return proper segment information when called multiple times in a row without release of segments.

#30126: NTservice sometimes hang during initialization of the PTP port due to insufficient handling of DDR3 PLL initialization in certain situations

#25420: (Support-ID 25314) If statistic counters are cleared during live traffic, then the RMON1 packet counters and the RMON1 octet counters gets out of sync, ie. octet counters does not equal packet counters x packet size (presuming constant packet sizes).

#23068: If you have two NT100E3 accelerators bonded together and run supportinfo tool, the driver will crash.

#23063: Timestamp on statistics data related to accelerators is not always correct, This has the effect that a calculated rx rate (as shown in the monitoring tool) will fluctuate up and down in spite the rate is stable.
This affects all supported accelerators, with the exception of NT100E3-1 with 9504 series FPGA loaded.

#22901: Host buffer allowance performance limited. In some situations, when utilizing host buffer allowance, a slow client application may cause package drops for a fast client application.

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## From version 03.00.03 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

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The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

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#36212: Ntservice is now shielded from OOM kills

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**Resolved issues**

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#23011: Only affects NT100E3-1 with 9504 series FPGA firmware loaded. RMON statistics counters for pkts and bytes was incorrectly reported on the input of the packet processing pipeline. Has been corrected to report directly on the PHY/MAC

#22901: Host buffer allowance performance limited. In some situations, when utilizing host buffer allowance, a slow client application may cause package drops for a fast client application.

#21623: Host buffers sized a multipla of 4 GB causes data corruption and time stamp merge errors

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## From version 03.00.01 to version 03.07.04 (this release)

**New features**

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#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

**Resolved issues**

#36520: (Support-ID 36394) Added support for 4G architecture in ntinfo tool and added documentation.

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#23011: Only affects NT100E3-1 with 9504 series FPGA firmware loaded. RMON statistics counters for pkts and bytes was incorrectly reported on the input of the packet processing pipeline. Has been corrected to report directly on the PHY/MAC

#22890: (Support-ID 21428) Packet drops and time-stamp merge errors occurs, when using large host buffers (> 32 MB)

#21338: (Support-ID 21641) When using the segment interface, keep-alive segments (segment with no packet data, only timestamp) are not provided by the driver.

#20484: Sharing of a stream across multiple applications causes NTService crash.

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## From version 02.12.01 to version 03.07.04 (this release)

**New features**

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**Resolved issues**

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## From version 02.12.00 to version 03.07.04 (this release)

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#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

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**Resolved issues**

#36226: (Support-ID 36221) NT4E2-4-PTP adapter reacts to pause frames even though flow control is not supported.

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## From version 02.11.12 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
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#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

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#36725: Added NVGRE support.

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#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

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#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

**Resolved issues**

#36226: (Support-ID 36221) NT4E2-4-PTP adapter reacts to pause frames even though flow control is not supported.

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## From version 02.11.11 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

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Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
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#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

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#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

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#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

**Resolved issues**

#36226: (Support-ID 36221) NT4E2-4-PTP adapter reacts to pause frames even though flow control is not supported.

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## From version 02.11.08 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

**Resolved issues**

#38347: Suboptimal resource allocation causes "filter is too big" error.

#36820: (Support-ID 36659) Documentation incorrectly states that the "TxPort" parameter is optional in in-line scenarios.

#36403: Half duplex can not be manually configured for NT4E

#36310: (Support-ID 36158) Reverse IP ranges are not supported, but are not rejected.

#36226: (Support-ID 36221) NT4E2-4-PTP adapter reacts to pause frames even though flow control is not supported.

#36170: Missing documentation relating to de-duplication combined with local retransmit.

#34654: (Support-ID 34605) Memory allocation failure causes kernel driver to hang.

#33427: (Support-ID 33318) Missing filter resource allocation causes different behavior for equivalent filters.

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## From version 02.11.07 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

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The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
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#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
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This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

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#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

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#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

**Resolved issues**

#36820: (Support-ID 36659) Documentation incorrectly states that the "TxPort" parameter is optional in in-line scenarios.

#36647: (Support-ID 36530) Lacking synchronization between driver and application(s) can lead to frozen streams when continuously re-applying NTPL.

#36403: Half duplex can not be manually configured for NT4E

#36310: (Support-ID 36158) Reverse IP ranges are not supported, but are not rejected.

#36226: (Support-ID 36221) NT4E2-4-PTP adapter reacts to pause frames even though flow control is not supported.

#36170: Missing documentation relating to de-duplication combined with local retransmit.

#34654: (Support-ID 34605) Memory allocation failure causes kernel driver to hang.

#33427: (Support-ID 33318) Missing filter resource allocation causes different behavior for equivalent filters.

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## From version 02.11.06 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
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- Innolight Technology TR-FC85S-NVS
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#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

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#36341: Line loopback on NT200A01-2x100 now work correctly.

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The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
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#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

**Resolved issues**

#36820: (Support-ID 36659) Documentation incorrectly states that the "TxPort" parameter is optional in in-line scenarios.

#36626: (Support-ID 36530) Rx streams enter infinite loop when running with real time priority.

#36403: Half duplex can not be manually configured for NT4E

#36310: (Support-ID 36158) Reverse IP ranges are not supported, but are not rejected.

#36226: (Support-ID 36221) NT4E2-4-PTP adapter reacts to pause frames even though flow control is not supported.

#36170: Missing documentation relating to de-duplication combined with local retransmit.

#34654: (Support-ID 34605) Memory allocation failure causes kernel driver to hang.

#33427: (Support-ID 33318) Missing filter resource allocation causes different behavior for equivalent filters.

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## From version 02.11.03 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

**Resolved issues**

#36820: (Support-ID 36659) Documentation incorrectly states that the "TxPort" parameter is optional in in-line scenarios.

#36626: (Support-ID 36530) Rx streams enter infinite loop when running with real time priority.

#36521: (Support-ID 36480) When running productinfo on a NT4E-PORT adapter no VPD data is dumped instead "Not Applicable" is stated.

#36403: Half duplex can not be manually configured for NT4E

#36310: (Support-ID 36158) Reverse IP ranges are not supported, but are not rejected.

#36226: (Support-ID 36221) NT4E2-4-PTP adapter reacts to pause frames even though flow control is not supported.

#36170: Missing documentation relating to de-duplication combined with local retransmit.

#34654: (Support-ID 34605) Memory allocation failure causes kernel driver to hang.

#33427: (Support-ID 33318) Missing filter resource allocation causes different behavior for equivalent filters.

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## From version 02.11.02 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30308: (Support-ID 30301) Updated description of streams in doxygen

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#9444: Doxygen documentation updated in NTPL data section

**Resolved issues**

#36820: (Support-ID 36659) Documentation incorrectly states that the "TxPort" parameter is optional in in-line scenarios.

#36521: (Support-ID 36480) When running productinfo on a NT4E-PORT adapter no VPD data is dumped instead "Not Applicable" is stated.

#36403: Half duplex can not be manually configured for NT4E

#36310: (Support-ID 36158) Reverse IP ranges are not supported, but are not rejected.

#33144: (Support-ID 32998) Using a filter with a combination of AND and OR expressions could trigger an NTPL confilicting filter error

#32946: Filtering behavior is different when two expressions are applied separately or combined using OR

#31674: (Support-ID 30412) In certain situations events related to a stream are processed after the stream has been closed - causing the NTAPI library to fail.
This situation can arise in the very rare situation of opening a stream and then closing it again immediately.

#20205: Packets received which is same size or smaller than DiscardSize, where counted in "Drop events" under "RX RMON1 counters" and "Mac bandwidth" under "RX extended drop counters".
Now only "Drop events" will be counted.

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## From version 02.11.00 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#9444: Doxygen documentation updated in NTPL data section

**Resolved issues**

#36820: (Support-ID 36659) Documentation incorrectly states that the "TxPort" parameter is optional in in-line scenarios.

#36403: Half duplex can not be manually configured for NT4E

#32946: Filtering behavior is different when two expressions are applied separately or combined using OR

#31674: (Support-ID 30412) In certain situations events related to a stream are processed after the stream has been closed - causing the NTAPI library to fail.
This situation can arise in the very rare situation of opening a stream and then closing it again immediately.

#30359: No link on a NT40E3-4-PTP adapter when used with FPGA 51-07 or older FPGAs.

#30347: (Support-ID 30201) Enabling global sync causes "Link state error" on all ports if one or more ports has link down.

#20205: Packets received which is same size or smaller than DiscardSize, where counted in "Drop events" under "RX RMON1 counters" and "Mac bandwidth" under "RX extended drop counters".
Now only "Drop events" will be counted.

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## From version 02.09.05 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
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- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

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#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

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#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

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The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

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#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

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#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document. This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

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This situation can arise in the very rare situation of opening a stream and then closing it again immediately.

#30347: (Support-ID 30201) Enabling global sync causes "Link state error" on all ports if one or more ports has link down.

#30277: (Support-ID 30270) The returned value for flow control: port_v7.data.flow is undefined, and may not return 0 despite flow control is not supported.

#30138: (Support-ID 30090) Unable to switch off autonegotiation for SFP-TRI on the adapter NT4E-STD.

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Does not affect NT100E3-1-PTP with an FPGA in the 200-9504-series loaded.

#20414: (Support-ID 20199) Wrong conflicting filter error when using Data tests

#20205: Packets received which is same size or smaller than DiscardSize, where counted in "Drop events" under "RX RMON1 counters" and "Mac bandwidth" under "RX extended drop counters".
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#16510: Protocol filter "Layer3Protocol" could not take a list of protocols as described in the documentation DN-0449.

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#9694: (Support-ID 9691) The config tool cannot configure triple speed copper SFPs on a NT4E-4 adapter.

#9481: "Port number out of range" error when enabling IPFMode

#3635: Driver cannot load on IOMMU enabled systems

napatech

## From version 02.09.03 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

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#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

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#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
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#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

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#30138: (Support-ID 30090) Unable to switch off autonegotiation for SFP-TRI on the adapter NT4E-STD.

#29076: (Support-ID 28889) Some configuration parameters in the .ini file does not work properly when specified in an adapter-type section instead of an adapter-specific section.

#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#28863: The driver may fail to start up if the system time jumps while the driver is initializing. The system time may jump if ntpdate runs while the driver is initializing.

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napatech

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#21218: Running the tool "supportinfo" repeatedly and at the same time using the driver in a normal scenario, may make the driver crash.

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napatech

## From version 02.08.08 to version 03.07.04 (this release)

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#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

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Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

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#36403: Half duplex can not be manually configured for NT4E

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#28863: The driver may fail to start up if the system time jumps while the driver is initializing. The system time may jump if ntpdate runs while the driver is initializing.

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#28534: (Support-ID 15699) The driver may fail to load in CentOS-5.x (NUMA) machines that have multiple CPUs.

#25293: (Support-ID 22900) ntservice.ini file location does not appear in ntlog.

#25270: Data test does not work when target field were not fully located within offset 1023

#21218: Running the tool "supportinfo" repeatedly and at the same time using the driver in a normal scenario, may make the driver crash.

#20479: (Support-ID 20358) HashMask options HASHWORD8_HI and HASHWORD8_LO used in combination gives wrong hash mask. Workaround it to use HASHWORD8.
Does not affect NT100E3-1-PTP with an FPGA in the 200-9504-series loaded.

#20414: (Support-ID 20199) Wrong conflicting filter error when using Data tests

#20205: Packets received which is same size or smaller than DiscardSize, where counted in "Drop events" under "RX RMON1 counters" and "Mac bandwidth" under "RX extended drop counters".
Now only "Drop events" will be counted.

#20183: The PCIe3 EPRC (and associated RCEP) errors indicate that there during the PCIe link training and/or PCIe bandwidth measurement have been observed (correctable) errors.
Previously these errors would prevent NTservice from starting - and in order to clear these counters a power-cycle was needed.
The PCIe3 EPRC/RCEP sanity-checks have been changed so that only errors occouring during the PCIe bandwidth measurement will prevent NTservice from starting

#16551: (Support-ID 16512) Unable to allocate hostbuffer memory after a huge file copy.

#16510: Protocol filter "Layer3Protocol" could not take a list of protocols as described in the documentation DN-0449.

#15914: (Support-ID 14231) When using the PTP module, running in PTP master mode, the sync UDP messages contained invalid UDP checksum.

#15668: If having more than one NT100E3-1 adapter in a server, all FPGA temperatures and the power measurements for all adapters, will be from the adapter with the highest adapter number.
It is not possible to see these measurement for the other adapters.

#15667: If having more than one NT40E3-4 adapter in a server, all FPGA temperatures and the power measurements for all adapters, will be from the adapter with the highest adapter number.
It is not possible to see these measurement for the other adapters.

#14078: No description regards to number of ports can be specified on NTPL Port Test

#12563: (Support-ID 11947) Spelling error throughout Warnings and Errors

#12482: Make of example c files is not working if installed in alternative path

#12481: Pasadena linux release failed doing ntstart.sh when using alternative path and keeping older software

#9694: (Support-ID 9691) The config tool cannot configure triple speed copper SFPs on a NT4E-4 adapter.

#9481: "Port number out of range" error when enabling IPFMode

#3635: Driver cannot load on IOMMU enabled systems

napatech

## From version 02.08.06 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
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#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

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#16567: When running pktgen at full speed, the transmitted traffic is sent at 10M despite that the link speed indicated is 1G. Also diagnostics tool indicates that no packets were received.

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napatech

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#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

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#28534: (Support-ID 15699) The driver may fail to load in CentOS-5.x (NUMA) machines that have multiple CPUs.

#25293: (Support-ID 22900) ntservice.ini file location does not appear in ntlog.

#25270: Data test does not work when target field were not fully located within offset 1023

#21218: Running the tool "supportinfo" repeatedly and at the same time using the driver in a normal scenario, may make the driver crash.

#20479: (Support-ID 20358) HashMask options HASHWORD8_HI and HASHWORD8_LO used in combination gives wrong hash mask. Workaround it to use HASHWORD8.
Does not affect NT100E3-1-PTP with an FPGA in the 200-9504-series loaded.

#20414: (Support-ID 20199) Wrong conflicting filter error when using Data tests

#20392: When plugging a JDSU CFP4 module "JC4-10LR4AA1" it will manifest itself as a RxOnly module while it in fact is Rx/Tx

#20205: Packets received which is same size or smaller than DiscardSize, where counted in "Drop events" under "RX RMON1 counters" and "Mac bandwidth" under "RX extended drop counters".
Now only "Drop events" will be counted.

#16567: When running pktgen at full speed, the transmitted traffic is sent at 10M despite that the link speed indicated is 1G. Also diagnostics tool indicates that no packets were received.

#16551: (Support-ID 16512) Unable to allocate hostbuffer memory after a huge file copy.

#16510: Protocol filter "Layer3Protocol" could not take a list of protocols as described in the documentation DN-0449.

#15914: (Support-ID 14231) When using the PTP module, running in PTP master mode, the sync UDP messages contained invalid UDP checksum.

#15668: If having more than one NT100E3-1 adapter in a server, all FPGA temperatures and the power measurements for all adapters, will be from the adapter with the highest adapter number.
It is not possible to see these measurement for the other adapters.

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#14078: No description regards to number of ports can be specified on NTPL Port Test

#12563: (Support-ID 11947) Spelling error throughout Warnings and Errors

#12482: Make of example c files is not working if installed in alternative path

#12481: Pasadena linux release failed doing ntstart.sh when using alternative path and keeping older software

#9694: (Support-ID 9691) The config tool cannot configure triple speed copper SFPs on a NT4E-4 adapter.

#9481: "Port number out of range" error when enabling IPFMode

#3635: Driver cannot load on IOMMU enabled systems

napatech

## From version 02.08.04 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

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#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
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napatech

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#9694: (Support-ID 9691) The config tool cannot configure triple speed copper SFPs on a NT4E-4 adapter.

#9481: "Port number out of range" error when enabling IPFMode

#3635: Driver cannot load on IOMMU enabled systems

napatech

## From version 02.07.07 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#9444: Doxygen documentation updated in NTPL data section

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#28863: The driver may fail to start up if the system time jumps while the driver is initializing. The system time may jump if ntpdate runs while the driver is initializing.

#28844: The driver may fail to start up if the system time jumps while the driver is initializing. The system time may jump if ntpdate runs while the driver is initializing.

#15667: If having more than one NT40E3-4 adapter in a server, all FPGA temperatures and the power measurements for all adapters, will be from the adapter with the highest adapter number.
It is not possible to see these measurement for the other adapters.

#14065: When logging to a file (by setting LogToFile=1 in the [Logging] section in the configuration file) and setting a log mask that includes 'debug' (for example by setting LogMask=0xf in the [Logging] in the configuration file), the driver may hang during start-up. The workaround is to avoid the 'debug' level, for instance by setting LogMask=0x7. Refer to the help output from the command 'ntlog -h', which states the available log masks.

#13999: (Support-ID 13958) Offline NUMA nodes may prevent the driver from starting up. A NUMA node is either online or offline; a NUMA node is usually offline when it has no memory assigned. The driver will not start when at least one offline NUMA node creates a hole in the sequence of NUMA nodes. For instance, in a server with two NUMA nodes, where NUMA node zero is offline and NUMA node one is online, the driver will not start.

#13167: (Support-ID 13149) On Napatech Gen2 adapters loaded with an AVR version below 2.0, the diagnostics tool with the --idd option sometimes report Intf-SM errors, where it actually is not an error.

#12970: Detailed Stream Info in Profiling shows the ID as xxx?^

#12941: Ntservice can be corrupted in Inline scenarios resulting in freeze of the service

#12851: (Support-ID 12708) The OS timesync algorithm indicates "in-sync" too early before the system is stable

#12563: (Support-ID 11947) Spelling error throughout Warnings and Errors

#12482: Make of example c files is not working if installed in alternative path

#12481: Pasadena linux release failed doing ntstart.sh when using alternative path and keeping older software

#12287: Although it is possible to define TX host buffers that are two gigabytes or larger in the ntservice.ini file, it is impossible to request a TX host buffer that is two gigabytes or larger via NTAPI.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#12022: (Support-ID 11495) When compiling the capture_example file and having the adapter configured for packet descriptor PCAP and time stamp method PCAP_NS, the generated output file cannot be read by e.g. wireshark.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11915: It is not possible to deactivate streams for IPF mode unmatched fragments using NTPL.

#11649: Setting user defined VPD section with the vpd tool caused certain VPD sections to become invalid.

#11621: Setting user defined VPD section with the vpd tool caused certain VPD sections to become invalid.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#11458: The driver sets the default interframe-gap maximum (ifgmax) value to 23 milli-seconds for the NT40E2-1 adapter, which is less than the intended value (which is approximately 2.6 seconds). It is possible to use the config tool to set the interframe-gap maximum value after the driver has started. Please refer to the help text available with /opt/napatech3/bin/config -h.

#9825: (Support-ID 8867) If an adapter found in the system is missing from the .ini file a warning entry is given in the log

#9694: (Support-ID 9691) The config tool cannot configure triple speed copper SFPs on a NT4E-4 adapter.

#9493: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#9481: "Port number out of range" error when enabling IPFMode

#8099: When ntstart.sh fails, you are required to run ntstop.sh before trying again

#3635: Driver cannot load on IOMMU enabled systems

napatech

## From version 02.07.05 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

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#36866: Macros can now also be constructed using the NTPL "Define" command.

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#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

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#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

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#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
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#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

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#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

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This functionality depends on FPGA support for the feature.

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#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

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#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

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#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

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#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
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#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#9444: Doxygen documentation updated in NTPL data section

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#28863: The driver may fail to start up if the system time jumps while the driver is initializing. The system time may jump if ntpdate runs while the driver is initializing.

#28844: The driver may fail to start up if the system time jumps while the driver is initializing. The system time may jump if ntpdate runs while the driver is initializing.

#15667: If having more than one NT40E3-4 adapter in a server, all FPGA temperatures and the power measurements for all adapters, will be from the adapter with the highest adapter number.
It is not possible to see these measurement for the other adapters.

#14065: When logging to a file (by setting LogToFile=1 in the [Logging] section in the configuration file) and setting a log mask that includes 'debug' (for example by setting LogMask=0xf in the [Logging] in the configuration file), the driver may hang during start-up. The workaround is to avoid the 'debug' level, for instance by setting LogMask=0x7. Refer to the help output from the command 'ntlog -h', which states the available log masks.

#13999: (Support-ID 13958) Offline NUMA nodes may prevent the driver from starting up. A NUMA node is either online or offline; a NUMA node is usually offline when it has no memory assigned. The driver will not start when at least one offline NUMA node creates a hole in the sequence of NUMA nodes. For instance, in a server with two NUMA nodes, where NUMA node zero is offline and NUMA node one is online, the driver will not start.

#13167: (Support-ID 13149) On Napatech Gen2 adapters loaded with an AVR version below 2.0, the diagnostics tool with the --idd option sometimes report Intf-SM errors, where it actually is not an error.

#12970: Detailed Stream Info in Profiling shows the ID as xxx?^

#12941: Ntservice can be corrupted in Inline scenarios resulting in freeze of the service

#12851: (Support-ID 12708) The OS timesync algorithm indicates "in-sync" too early before the system is stable

#12563: (Support-ID 11947) Spelling error throughout Warnings and Errors

#12482: Make of example c files is not working if installed in alternative path

#12481: Pasadena linux release failed doing ntstart.sh when using alternative path and keeping older software

#12287: Although it is possible to define TX host buffers that are two gigabytes or larger in the ntservice.ini file, it is impossible to request a TX host buffer that is two gigabytes or larger via NTAPI.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#12022: (Support-ID 11495) When compiling the capture_example file and having the adapter configured for packet descriptor PCAP and time stamp method PCAP_NS, the generated output file cannot be read by e.g. wireshark.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11915: It is not possible to deactivate streams for IPF mode unmatched fragments using NTPL.

#11649: Setting user defined VPD section with the vpd tool caused certain VPD sections to become invalid.

#11621: Setting user defined VPD section with the vpd tool caused certain VPD sections to become invalid.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#11458: The driver sets the default interframe-gap maximum (ifgmax) value to 23 milli-seconds for the NT40E2-1 adapter, which is less than the intended value (which is approximately 2.6 seconds). It is possible to use the config tool to set the interframe-gap maximum value after the driver has started. Please refer to the help text available with /opt/napatech3/bin/config -h.

#9825: (Support-ID 8867) If an adapter found in the system is missing from the .ini file a warning entry is given in the log

#9694: (Support-ID 9691) The config tool cannot configure triple speed copper SFPs on a NT4E-4 adapter.

#9493: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#9481: "Port number out of range" error when enabling IPFMode

#8099: When ntstart.sh fails, you are required to run ntstop.sh before trying again

#3635: Driver cannot load on IOMMU enabled systems

napatech

## From version 02.07.04 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#9444: Doxygen documentation updated in NTPL data section

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#28863: The driver may fail to start up if the system time jumps while the driver is initializing. The system time may jump if ntpdate runs while the driver is initializing.

#28844: The driver may fail to start up if the system time jumps while the driver is initializing. The system time may jump if ntpdate runs while the driver is initializing.

#15667: If having more than one NT40E3-4 adapter in a server, all FPGA temperatures and the power measurements for all adapters, will be from the adapter with the highest adapter number.
It is not possible to see these measurement for the other adapters.

#14065: When logging to a file (by setting LogToFile=1 in the [Logging] section in the configuration file) and setting a log mask that includes 'debug' (for example by setting LogMask=0xf in the [Logging] in the configuration file), the driver may hang during start-up. The workaround is to avoid the 'debug' level, for instance by setting LogMask=0x7. Refer to the help output from the command 'ntlog -h', which states the available log masks.

#13999: (Support-ID 13958) Offline NUMA nodes may prevent the driver from starting up. A NUMA node is either online or offline; a NUMA node is usually offline when it has no memory assigned. The driver will not start when at least one offline NUMA node creates a hole in the sequence of NUMA nodes. For instance, in a server with two NUMA nodes, where NUMA node zero is offline and NUMA node one is online, the driver will not start.

#13167: (Support-ID 13149) On Napatech Gen2 adapters loaded with an AVR version below 2.0, the diagnostics tool with the --idd option sometimes report Intf-SM errors, where it actually is not an error.

#12970: Detailed Stream Info in Profiling shows the ID as xxx?^

#12851: (Support-ID 12708) The OS timesync algorithm indicates "in-sync" too early before the system is stable

#12601: (Support-ID 12250) Using many concurrent running NTAPI applications, calling NT_NetRxOpen and NT_NetRxClose continuously may lead to a driver crash

#12563: (Support-ID 11947) Spelling error throughout Warnings and Errors

#12482: Make of example c files is not working if installed in alternative path

#12481: Pasadena linux release failed doing ntstart.sh when using alternative path and keeping older software

#12287: Although it is possible to define TX host buffers that are two gigabytes or larger in the ntservice.ini file, it is impossible to request a TX host buffer that is two gigabytes or larger via NTAPI.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#12022: (Support-ID 11495) When compiling the capture_example file and having the adapter configured for packet descriptor PCAP and time stamp method PCAP_NS, the generated output file cannot be read by e.g. wireshark.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11915: It is not possible to deactivate streams for IPF mode unmatched fragments using NTPL.

#11649: Setting user defined VPD section with the vpd tool caused certain VPD sections to become invalid.

#11621: Setting user defined VPD section with the vpd tool caused certain VPD sections to become invalid.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#11458: The driver sets the default interframe-gap maximum (ifgmax) value to 23 milli-seconds for the NT40E2-1 adapter, which is less than the intended value (which is approximately 2.6 seconds). It is possible to use the config tool to set the interframe-gap maximum value after the driver has started. Please refer to the help text available with /opt/napatech3/bin/config -h.

#9825: (Support-ID 8867) If an adapter found in the system is missing from the .ini file a warning entry is given in the log

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#9481: "Port number out of range" error when enabling IPFMode

#8099: When ntstart.sh fails, you are required to run ntstop.sh before trying again

#3635: Driver cannot load on IOMMU enabled systems

napatech

## From version 02.07.03 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

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#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

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#30183: The NT driver now supports Intel IOMMU (VT-d).

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For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#9444: Doxygen documentation updated in NTPL data section

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#28863: The driver may fail to start up if the system time jumps while the driver is initializing. The system time may jump if ntpdate runs while the driver is initializing.

#28844: The driver may fail to start up if the system time jumps while the driver is initializing. The system time may jump if ntpdate runs while the driver is initializing.

#15667: If having more than one NT40E3-4 adapter in a server, all FPGA temperatures and the power measurements for all adapters, will be from the adapter with the highest adapter number.
It is not possible to see these measurement for the other adapters.

#14065: When logging to a file (by setting LogToFile=1 in the [Logging] section in the configuration file) and setting a log mask that includes 'debug' (for example by setting LogMask=0xf in the [Logging] in the configuration file), the driver may hang during start-up. The workaround is to avoid the 'debug' level, for instance by setting LogMask=0x7. Refer to the help output from the command 'ntlog -h', which states the available log masks.

#13999: (Support-ID 13958) Offline NUMA nodes may prevent the driver from starting up. A NUMA node is either online or offline; a NUMA node is usually offline when it has no memory assigned. The driver will not start when at least one offline NUMA node creates a hole in the sequence of NUMA nodes. For instance, in a server with two NUMA nodes, where NUMA node zero is offline and NUMA node one is online, the driver will not start.

#13167: (Support-ID 13149) On Napatech Gen2 adapters loaded with an AVR version below 2.0, the diagnostics tool with the --idd option sometimes report Intf-SM errors, where it actually is not an error.

#12970: Detailed Stream Info in Profiling shows the ID as xxx?^

#12851: (Support-ID 12708) The OS timesync algorithm indicates "in-sync" too early before the system is stable

#12601: (Support-ID 12250) Using many concurrent running NTAPI applications, calling NT_NetRxOpen and NT_NetRxClose continuously may lead to a driver crash

#12563: (Support-ID 11947) Spelling error throughout Warnings and Errors

#12482: Make of example c files is not working if installed in alternative path

#12481: Pasadena linux release failed doing ntstart.sh when using alternative path and keeping older software

#12287: Although it is possible to define TX host buffers that are two gigabytes or larger in the ntservice.ini file, it is impossible to request a TX host buffer that is two gigabytes or larger via NTAPI.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#12022: (Support-ID 11495) When compiling the capture_example file and having the adapter configured for packet descriptor PCAP and time stamp method PCAP_NS, the generated output file cannot be read by e.g. wireshark.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11711: In some situations, when establishing link between two NT40E2-1 adapters, the port can be set in errorstate and the error message "ERROR: FPGA submld link NOT OK! - NT_REG_SUBMLD_40G_PCS_STAT_1 reg: 00000000" is submitted to the ntlog.

#11649: Setting user defined VPD section with the vpd tool caused certain VPD sections to become invalid.

#11621: Setting user defined VPD section with the vpd tool caused certain VPD sections to become invalid.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#11458: The driver sets the default interframe-gap maximum (ifgmax) value to 23 milli-seconds for the NT40E2-1 adapter, which is less than the intended value (which is approximately 2.6 seconds). It is possible to use the config tool

to set the interframe-gap maximum value after the driver has started. Please refer to the help text available with /opt/napatech3/bin/config -h.

#9825: (Support-ID 8867) If an adapter found in the system is missing from the .ini file a warning entry is given in the log

#9694: (Support-ID 9691) The config tool cannot configure triple speed copper SFPs on a NT4E-4 adapter.

#9493: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#9481: "Port number out of range" error when enabling IPFMode

#8099: When ntstart.sh fails, you are required to run ntstop.sh before trying again

#3635: Driver cannot load on IOMMU enabled systems

napatech

## From version 02.07.02 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

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#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

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#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11515: Added support for NT4E2-4-PTP FPGA image: 200-9226-50-04

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
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NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#9444: Doxygen documentation updated in NTPL data section

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**Resolved issues**

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#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#28863: The driver may fail to start up if the system time jumps while the driver is initializing. The system time may jump if ntpdate runs while the driver is initializing.

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#15667: If having more than one NT40E3-4 adapter in a server, all FPGA temperatures and the power measurements for all adapters, will be from the adapter with the highest adapter number.
It is not possible to see these measurement for the other adapters.

#14065: When logging to a file (by setting LogToFile=1 in the [Logging] section in the configuration file) and setting a log mask that includes 'debug' (for example by setting LogMask=0xf in the [Logging] in the configuration file), the driver may hang during start-up. The workaround is to avoid the 'debug' level, for instance by setting LogMask=0x7. Refer to the help output from the command 'ntlog -h', which states the available log masks.

#13999: (Support-ID 13958) Offline NUMA nodes may prevent the driver from starting up. A NUMA node is either online or offline; a NUMA node is usually offline when it has no memory assigned. The driver will not start when at least one offline NUMA node creates a hole in the sequence of NUMA nodes. For instance, in a server with two NUMA nodes, where NUMA node zero is offline and NUMA node one is online, the driver will not start.

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#12970: Detailed Stream Info in Profiling shows the ID as xxx?^

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#12601: (Support-ID 12250) Using many concurrent running NTAPI applications, calling NT_NetRxOpen and NT_NetRxClose continuously may lead to a driver crash

#12563: (Support-ID 11947) Spelling error throughout Warnings and Errors

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#12481: Pasadena linux release failed doing ntstart.sh when using alternative path and keeping older software

#12287: Although it is possible to define TX host buffers that are two gigabytes or larger in the ntservice.ini file, it is impossible to request a TX host buffer that is two gigabytes or larger via NTAPI.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#12022: (Support-ID 11495) When compiling the capture_example file and having the adapter configured for packet descriptor PCAP and time stamp method PCAP_NS, the generated output file cannot be read by e.g. wireshark.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11711: In some situations, when establishing link between two NT40E2-1 adapters, the port can be set in errorstate and the error message "ERROR: FPGA submld link NOT OK! - NT_REG_SUBMLD_40G_PCS_STAT_1 reg: 00000000" is submitted to the ntlog.

#11649: Setting user defined VPD section with the vpd tool caused certain VPD sections to become invalid.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#11458: The driver sets the default interframe-gap maximum (ifgmax) value to 23 milli-seconds for the NT40E2-1 adapter, which is less than the intended value (which is approximately 2.6 seconds). It is possible to use the config tool

to set the interframe-gap maximum value after the driver has started. Please refer to the help text available with /opt/napatech3/bin/config -h.

#9825: (Support-ID 8867) If an adapter found in the system is missing from the .ini file a warning entry is given in the log

#9694: (Support-ID 9691) The config tool cannot configure triple speed copper SFPs on a NT4E-4 adapter.

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#9481: "Port number out of range" error when enabling IPFMode

#8099: When ntstart.sh fails, you are required to run ntstop.sh before trying again

#3635: Driver cannot load on IOMMU enabled systems

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## From version 02.06.03 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

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#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

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#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
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Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

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#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

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#12421: Statistics can now be delivered every 100ms or every 500ms

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Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
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The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

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#11310: For an adapter using the INLINE profile, an attempt to use the NTAPI to look up the RX/TX path delays returns the status code NOT_SUPPORTED even if the path delays are known. This restriction is no longer present, and it is possible to request the path delays for an adapter using the INLINE profile. Note that the driver returns NOT_SUPPORTED if the delays are unknown.

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Supported by following adapters and FPGAs:
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NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

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Info text: Adapter 0: PpsIn is defined for this adapter. Use an external PPS tool or application to start PPS time sync.

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#9586: Alarms are now generated when the status of an external NT-TSU or NT-TSE looses the synchronization signal, synchronization or Time of Day information. The alarms are sent as events:
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NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_OUT_OF_SYNC
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_TIME_OF_DAY
This information is still logged as INFO in the ntlog.

#9444: Doxygen documentation updated in NTPL data section

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

**Resolved issues**

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#14065: When logging to a file (by setting LogToFile=1 in the [Logging] section in the configuration file) and setting a log mask that includes 'debug' (for example by setting LogMask=0xf in the [Logging] in the configuration file), the driver may hang during start-up. The workaround is to avoid the 'debug' level, for instance by setting LogMask=0x7. Refer to the help output from the command 'ntlog -h', which states the available log masks.

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#12601: (Support-ID 12250) Using many concurrent running NTAPI applications, calling NT_NetRxOpen and NT_NetRxClose continuously may lead to a driver crash

#12563: (Support-ID 11947) Spelling error throughout Warnings and Errors

#12287: Although it is possible to define TX host buffers that are two gigabytes or larger in the ntservice.ini file, it is impossible to request a TX host buffer that is two gigabytes or larger via NTAPI.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#12022: (Support-ID 11495) When compiling the capture_example file and having the adapter configured for packet descriptor PCAP and time stamp method PCAP_NS, the generated output file cannot be read by e.g. wireshark.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11711: In some situations, when establishing link between two NT40E2-1 adapters, the port can be set in errorstate and the error message "ERROR: FPGA submld link NOT OK! - NT_REG_SUBMLD_40G_PCS_STAT_1 reg: 00000000" is submitted to the ntlog.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#10941: (Support-ID 10916) Error when using port lists in dedup NTPL on port adapter.
"Deduplication[Timeout = 10; DynOffset = Layer2HeaderSize; Offset = 12] = Port == 0,1,2,3,4,5,6,7" will fail with error Error: 0x2000100A
Ports not on same adapter

#10723: When configuring the PTP port manually, i.e., when auto negotiation is disabled, the MDI pairs must be normal (not crossed) in order to get link. It is not possible to get a valid link in manual mode when the MDI pairs are crossed. The default behavior for the PTP port is to run in auto negotiation mode and here the adapter automatically handles MDIX.

#10627: Documentation of HostBufferHandlerAffinity parameter in ntservice.ini is missing

#10624: Max 255 TX hostbuffers are supported despite documentation says 4096.
Specifying more than 255 TX hostbuffers will most likely result in less than 255 TX hostbuffers being available.

#9825: (Support-ID 8867) If an adapter found in the system is missing from the .ini file a warning entry is given in the log

#9694: (Support-ID 9691) The config tool cannot configure triple speed copper SFPs on a NT4E-4 adapter.

#9493: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#9481: "Port number out of range" error when enabling IPFMode

#8099: When ntstart.sh fails, you are required to run ntstop.sh before trying again

#3635: Driver cannot load on IOMMU enabled systems

napatech

## From version 02.06.02 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

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#10627: Documentation of HostBufferHandlerAffinity parameter in ntservice.ini is missing

#10624: Max 255 TX hostbuffers are supported despite documentation says 4096.
Specifying more than 255 TX hostbuffers will most likely result in less than 255 TX hostbuffers being available.

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napatech

## From version 02.06.01 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

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#36866: Macros can now also be constructed using the NTPL "Define" command.

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Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

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#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

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The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

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The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
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#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

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#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

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#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

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#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

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#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11515: Added support for NT4E2-4-PTP FPGA image: 200-9226-50-04

#11310: For an adapter using the INLINE profile, an attempt to use the NTAPI to look up the RX/TX path delays returns the status code NOT_SUPPORTED even if the path delays are known. This restriction is no longer present, and it is possible to request the path delays for an adapter using the INLINE profile. Note that the driver returns NOT_SUPPORTED if the delays are unknown.

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11030: A screen dump feature is added to the tools monitoring and profiling. By hitting the key 'F' a copy of the screen is saved to disk. The screen dump is appended to the saved screen dump. The names of the screen dump files are monitoring.scn and profiling.scn respectively.

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#10899: An Info log has been added for each adapter that has PpsIn defined and where it should be used to do PPS time sync. The log is not written if the PpsIn are only used for sampling.
Info text: Adapter 0: PpsIn is defined for this adapter. Use an external PPS tool or application to start PPS time sync.

#10787: (Support-ID 10551) FPGA feature level can now be read using the API. It is a part of the NtInfoAdapter_v5_s structure and can be read using the info stream.

#10714: Added new command line option (-l, --logmsg) to ntlog tool to write a custom line of text to the ntservice log system.

#10687: Added the ability to filter on inner tunnel layer 3 and layer 4 though the NTPL Data filter. This feature requires matching FPGA feature set. See filter documentation for details.

#10684: Added the ability to slice packets within a tunnel though the NTPL assign command. This feature requires matching FPGA feature set. See filter documentation for details.

#10501: Wis mode can now be enabled pr port by using the wisModeMask parameter which has been added to ntservice,ini

#9586: Alarms are now generated when the status of an external NT-TSU or NT-TSE looses the synchronization signal, synchronization or Time of Day information. The alarms are sent as events:
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_SYNC_SIGNAL
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_OUT_OF_SYNC
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_TIME_OF_DAY
This information is still logged as INFO in the ntlog.

#9444: Doxygen documentation updated in NTPL data section

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#14065: When logging to a file (by setting LogToFile=1 in the [Logging] section in the configuration file) and setting a log mask that includes 'debug' (for example by setting LogMask=0xf in the [Logging] in the configuration file), the driver may hang during start-up. The workaround is to avoid the 'debug' level, for instance by setting LogMask=0x7. Refer to the help output from the command 'ntlog -h', which states the available log masks.

#13999: (Support-ID 13958) Offline NUMA nodes may prevent the driver from starting up. A NUMA node is either online or offline; a NUMA node is usually offline when it has no memory assigned. The driver will not start when at least one offline NUMA node creates a hole in the sequence of NUMA nodes. For instance, in a server with two NUMA nodes, where NUMA node zero is offline and NUMA node one is online, the driver will not start.

#13167: (Support-ID 13149) On Napatech Gen2 adapters loaded with an AVR version below 2.0, the diagnostics tool with the --idd option sometimes report Intf-SM errors, where it actually is not an error.

#12851: (Support-ID 12708) The OS timesync algorithm indicates "in-sync" too early before the system is stable

#12601: (Support-ID 12250) Using many concurrent running NTAPI applications, calling NT_NetRxOpen and NT_NetRxClose continuously may lead to a driver crash

#12563: (Support-ID 11947) Spelling error throughout Warnings and Errors

#12287: Although it is possible to define TX host buffers that are two gigabytes or larger in the ntservice.ini file, it is impossible to request a TX host buffer that is two gigabytes or larger via NTAPI.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#12022: (Support-ID 11495) When compiling the capture_example file and having the adapter configured for packet descriptor PCAP and time stamp method PCAP_NS, the generated output file cannot be read by e.g. wireshark.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11711: In some situations, when establishing link between two NT40E2-1 adapters, the port can be set in errorstate and the error message "ERROR: FPGA submld link NOT OK! - NT_REG_SUBMLD_40G_PCS_STAT_1 reg: 00000000" is submitted to the ntlog.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#11080: (Support-ID 11011) The driver lacks information about the RX path delay for adapters with FPGA identifier 9226-48. An attempt to retrieve the RX path delay for this type of adapter causes the system to return the status NOT_SUPPORTED.

#10966: Merging from multiple host buffers in a stream-id may return packets out of time stamp order. No packets are lost.
The host buffer merging apply when running the INLINE profile and receiving from multiple ports to the same stream-id or running any profile and receiving traffic from ports on multiple adapters into the same stream-id

#10941: (Support-ID 10916) Error when using port lists in dedup NTPL on port adapter.
"Deduplication[Timeout = 10; DynOffset = Layer2HeaderSize; Offset = 12] = Port == 0,1,2,3,4,5,6,7" will fail with error Error: 0x2000100A
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Specifying more than 255 TX hostbuffers will most likely result in less than 255 TX hostbuffers being available.

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#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11711: In some situations, when establishing link between two NT40E2-1 adapters, the port can be set in errorstate and the error message "ERROR: FPGA submld link NOT OK! - NT_REG_SUBMLD_40G_PCS_STAT_1 reg: 00000000" is submitted to the ntlog.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#10723: When configuring the PTP port manually, i.e., when auto negotiation is disabled, the MDI pairs must be normal (not crossed) in order to get link. It is not possible to get a valid link in manual mode when the MDI pairs are crossed. The default behavior for the PTP port is to run in auto negotiation mode and here the adapter automatically handles MDIX.

#10596: The DHCP implementation on the PTP port does not renew its DHCP lease after link down.

#10530: ntservice may crash while shutting down when applications using the NTAPI are still running.

#10524: It can happen that the SDRAM calibration fails in some rare situations

#10423: In the documentation the internal unit for sensor voltage is wrongly stated as 10mV. The correct voltage is 1mV.

#10386: (Support-ID 10173) Network streams are not properly terminated causing a memory leak and a memory over-write when "profiling" is retrieving streams info

#10384: Memory leak when Network streams are terminated.

#10353: When using RX/TX host buffers that are larger than one gigabyte, the profiling tool may leave stale digits in the panes that show the numbers 'dequeued', 'enqueued driver', and 'enqueued adapter'.

#10344: It is not possible to set a minimum host buffer size above 2 gigabytes with an NTPL expression similar to "Setup[minhostbuffersize=2056]=Streamid==0", which is an error. The highest possible value is 2048, where it should have been the maximum size of all RX host buffers defined in ntservice.ini.

#10245: The "profiling" tool doesn't show correct host buffer usage when used in a multi-get scenario

#10124: (Support-ID 9781) The driver may give false fan speed warnings for GEN2 adapters. Use the monitoring tool to view the current fan speed range in the Sensors pane. The allowed fan speed range is [5270;7440].

#9985: If a DMA memory allocation fails, all DMA memory is released, instead of restoring the previous state in case of a DMA memory allocation failure.

#9911: NT_NET_UPDATE_PKT_L2_PTR macro fails when compiled in a .cpp file

#9825: (Support-ID 8867) If an adapter found in the system is missing from the .ini file a warning entry is given in the log

#9814: (Support-ID 8749) Missing return type documentation for macro NT_NET_GET_PKT_L2_PTR

#9714: StreamId mismatch in API logging in NT_NetRxOpen()/NT_NetRxClose()

#9694: (Support-ID 9691) The config tool cannot configure triple speed copper SFPs on a NT4E-4 adapter.

#9577: For NT4E_STD adapters that do not have any timesync connectors, the monitoring tool shows that TimeSyncConnectorExt1 is equal to NttsIn.

#9548: (Support-ID 9539) NTPL fails NUMA Setup the first time the expression is executed but only if all host buffers available are specified.

#9493: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#9481: "Port number out of range" error when enabling IPFMode

#9479: Default HashMode is not initialized to use the correct Hash Mask

#9411: (Support-ID 9343) StringDef with mask in NTPL doesn't work

#9388: When using NT-TS out, the connector LED may not always reflect the signal.

#9080: When using OS timesync on an NT-TS master adapter, and using older Gen1 adapters, the NT-TS slave adapter may not get into sync.

#8820: (Support-ID 8774) valgrind warnings in _nt_net_get_next_packet

#8785: TimeSyncInSyncStatus and latest Skew read from InfoStream may sometimes be slighty out of sync when close to the in-sync threshold value.

#8099: When ntstart.sh fails, you are required to run ntstop.sh before trying again

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#3635: Driver cannot load on IOMMU enabled systems

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## From version 02.05.00 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

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#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#10723: When configuring the PTP port manually, i.e., when auto negotiation is disabled, the MDI pairs must be normal (not crossed) in order to get link. It is not possible to get a valid link in manual mode when the MDI pairs are crossed. The default behavior for the PTP port is to run in auto negotiation mode and here the adapter automatically handles MDIX.

#10596: The DHCP implementation on the PTP port does not renew its DHCP lease after link down.

#10530: ntservice may crash while shutting down when applications using the NTAPI are still running.

#10524: It can happen that the SDRAM calibration fails in some rare situations

#10423: In the documentation the internal unit for sensor voltage is wrongly stated as 10mV. The correct voltage is 1mV.

#10386: (Support-ID 10173) Network streams are not properly terminated causing a memory leak and a memory over-write when "profiling" is retrieving streams info

#10384: Memory leak when Network streams are terminated.

#10353: When using RX/TX host buffers that are larger than one gigabyte, the profiling tool may leave stale digits in the panes that show the numbers 'dequeued', 'enqueued driver', and 'enqueued adapter'.

#10344: It is not possible to set a minimum host buffer size above 2 gigabytes with an NTPL expression similar to "Setup[minhostbuffersize=2056]=Streamid==0", which is an error. The highest possible value is 2048, where it should have been the maximum size of all RX host buffers defined in ntservice.ini.

#10139: (Support-ID 10003) Error in Pattern filter optimizer when two expressions are or'ed where DataType is equal and offset or dynoffset differs. The optimizer optimizes this to use one filter resource, when two are actually required.

#10124: (Support-ID 9781) The driver may give false fan speed warnings for GEN2 adapters. Use the monitoring tool to view the current fan speed range in the Sensors pane. The allowed fan speed range is [5270;7440].

#9985: If a DMA memory allocation fails, all DMA memory is released, instead of restoring the previous state in case of a DMA memory allocation failure.

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#3635: Driver cannot load on IOMMU enabled systems

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## From version 02.04.05 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11515: Added support for NT4E2-4-PTP FPGA image: 200-9226-50-04

#11310: For an adapter using the INLINE profile, an attempt to use the NTAPI to look up the RX/TX path delays returns the status code NOT_SUPPORTED even if the path delays are known. This restriction is no longer present, and it is possible to request the path delays for an adapter using the INLINE profile. Note that the driver returns NOT_SUPPORTED if the delays are unknown.

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11030: A screen dump feature is added to the tools monitoring and profiling. By hitting the key 'F' a copy of the screen is saved to disk. The screen dump is appended to the saved screen dump. The names of the screen dump files are monitoring.scn and profiling.scn respectively.

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#10899: An Info log has been added for each adapter that has PpsIn defined and where it should be used to do PPS time sync. The log is not written if the PpsIn are only used for sampling.
Info text: Adapter 0: PpsIn is defined for this adapter. Use an external PPS tool or application to start PPS time sync.

#10787: (Support-ID 10551) FPGA feature level can now be read using the API. It is a part of the NtInfoAdapter_v5_s structure and can be read using the info stream.

#10714: Added new command line option (-l, --logmsg) to ntlog tool to write a custom line of text to the ntservice log system.

#10687: Added the ability to filter on inner tunnel layer 3 and layer 4 though the NTPL Data filter. This feature requires matching FPGA feature set. See filter documentation for details.

#10684: Added the ability to slice packets within a tunnel though the NTPL assign command. This feature requires matching FPGA feature set. See filter documentation for details.

#10501: Wis mode can now be enabled pr port by using the wisModeMask parameter which has been added to ntservice,ini

#10400: If TxTiming=RELATIVE the max inter-frame gap is set to 2.6sec.

#10168: NTPORT4E now supported

#10109: (Support-ID 10105) The example program named info_example.c now retrieves and prints basic product (adapter) information, such as the serial number, based on information in the NtInfoProductInfo_s structure.

#10046: The execution of a timesync hard reset to a reference initiated by an application through the NTAPI interface, has changed to execute a hard reset (time jump) for which the execution is unaffected by the current time skew and the hard reset threshold value (i.e. immediately executed). In earlier versions the current time skew was compared to the hard reset threshold value to determine if the hard reset should occur or not.

#9962: Enable swapping of hashdata from tunnels when connecting to a SPAN port

#9937: Support for NTBPE removed.

#9880: Added driver support for the following legacy FPGA images:
NT20E2: 200-9220-44-10 and 200-9220-44-12
NT40E2-4: 200-9221-44-12 and 200-9221-44-13
NT40E2-1: 200-9222-44-06 and 200-9222-44-08

#9586: Alarms are now generated when the status of an external NT-TSU or NT-TSE looses the synchronization signal, synchronization or Time of Day information. The alarms are sent as events:
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_SYNC_SIGNAL
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_OUT_OF_SYNC
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_TIME_OF_DAY
This information is still logged as INFO in the ntlog.

#9494: There is a small delay from the time a frame enters a network port and until the adapter time-stamps it. An application can now query the driver for this RX path delay and subtract it from the time stamp in the packet descriptor. See DN-0449 section Path Delay for more information.

#9492: Added option "--installpath PATH" to ".run" files to change default installation folder.

#9491: Added option to run an ntpl.config file with ntstart.sh.

#9490: Deduplication supports padded frames and IP header masks of i.e. TTL and checksum fields. Moreover a dedup CRC can be forwarded to host application using extended descriptor 9 to support a hardware-accelerated deduplication application. This feature can be enable/disabled using the NTPL Deduplication options IPLengthLimit and IPv4/IPv6. This feature requires a matching FPGA version.

#9447: (Support-ID 8890) Added inline bump in the wire example to DN-0449

#9444: Doxygen documentation updated in NTPL data section

#9147: The delay asymmetry configuration option is added to the PTP protocol.

#9088: TimeSyncFrequencyReferencePriority added to the ntservice.ini file

#9074: On the PTP port, statistics including CRC errors are displayed in the monitoring tool for debug purposes. All the information can be obtained using NTAPI

#9027: TX host buffers can now be prefilled with data and replayed continuously without needing to memcpy packets.

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

#7719: The data filter hardware supports up to 255 values for each 1 byte filter, however the NTPL limits this to specifying 8 values or one range. This is changed to support up to 32 values or 16 ranges or a mix of the two. When using a range it will take up the space of 2 values. When specifying 8 ranges only 16 values can be used.

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#14065: When logging to a file (by setting LogToFile=1 in the [Logging] section in the configuration file) and setting a log mask that includes 'debug' (for example by setting LogMask=0xf in the [Logging] in the configuration file), the driver may hang during start-up. The workaround is to avoid the 'debug' level, for instance by setting LogMask=0x7. Refer to the help output from the command 'ntlog -h', which states the available log masks.

#13999: (Support-ID 13958) Offline NUMA nodes may prevent the driver from starting up. A NUMA node is either online or offline; a NUMA node is usually offline when it has no memory assigned. The driver will not start when at least one offline NUMA node creates a hole in the sequence of NUMA nodes. For instance, in a server with two NUMA nodes, where NUMA node zero is offline and NUMA node one is online, the driver will not start.

#13167: (Support-ID 13149) On Napatech Gen2 adapters loaded with an AVR version below 2.0, the diagnostics tool with the --idd option sometimes report Intf-SM errors, where it actually is not an error.

#12601: (Support-ID 12250) Using many concurrent running NTAPI applications, calling NT_NetRxOpen and NT_NetRxClose continuously may lead to a driver crash

#12563: (Support-ID 11947) Spelling error throughout Warnings and Errors

#12287: Although it is possible to define TX host buffers that are two gigabytes or larger in the ntservice.ini file, it is impossible to request a TX host buffer that is two gigabytes or larger via NTAPI.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11711: In some situations, when establishing link between two NT40E2-1 adapters, the port can be set in errorstate and the error message "ERROR: FPGA submld link NOT OK! - NT_REG_SUBMLD_40G_PCS_STAT_1 reg: 00000000" is submitted to the ntlog.

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#9985: If a DMA memory allocation fails, all DMA memory is released, instead of restoring the previous state in case of a DMA memory allocation failure.

#9911: NT_NET_UPDATE_PKT_L2_PTR macro fails when compiled in a .cpp file

#9877: (Support-ID 9622) The supportinfo "hostbuffer info" part is not sampled atomic, the lastTxOff was captured after RdOff and WrOff causing it to look like lastTxOff is exceeding its limits.

#9825: (Support-ID 8867) If an adapter found in the system is missing from the .ini file a warning entry is given in the log

#9814: (Support-ID 8749) Missing return type documentation for macro NT_NET_GET_PKT_L2_PTR

#9714: StreamId mismatch in API logging in NT_NetRxOpen()/NT_NetRxClose()

#9713: (Support-ID 9704) HBH crash on kernels with CONFIG_HZ_5000=y.

#9703: When OS time is set back in time, PTP may be disturbed for a period of time.

#9695: If the Event requesting the absolut time in PPS or the reply arrives delayed, this could cause the adapter to errornously fall out of sync for a number of seconds.

#9694: (Support-ID 9691) The config tool cannot configure triple speed copper SFPs on a NT4E-4 adapter.

#9577: For NT4E_STD adapters that do not have any timesync connectors, the monitoring tool shows that TimeSyncConnectorExt1 is equal to NttsIn.

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#9481: "Port number out of range" error when enabling IPFMode

#9479: Default HashMode is not initialized to use the correct Hash Mask

#9411: (Support-ID 9343) StringDef with mask in NTPL doesn't work

#9398: When using pattern filters on multiple adapters the "Delete=all" command fails with: NTPL Parser reports "Error: Parsing line "Delete=all" failed with unknown error"

#9388: When using NT-TS out, the connector LED may not always reflect the signal.

#9383: (Support-ID 9335) The NTAPI finction NT_NetFileOpen() is unable to process capture files containing only a valid file header and no capture payload.

#9350: (Support-ID 9135) Napatech PCIGen1 adapters caused misplaced messages in the log during ntservice startup: "FPGA module REG_TXPP version -1 is not supported by function nthw_reg_txpp_supportinfo"
This was caused by the driver attempting to handle the adapter as a Napatech PCIGen2 adapter.
This has now been resolved. There was never any negative functional side effect of these log entries, besides the log entry itself.

#9329: PPS timestamp samples can be wrongly read from NTAPI info stream when running on a Napatech Gen1 adapter.

#9326: (Support-ID 9300) The driver issues a wrong error message if driver load fails due to insufficient contiguous DMA memory.

#9250: Unknown config event 4 can be received if global sync configuration is performed.

#9182: Code examples should use NT_ERRBUF_SIZE

#9167: (Support-ID 9163) When the adapter is sync'ed to the OS time, changing the adapter time back in time will not be detected and the time is set incorrectly.

#9157: If the PTP transitions from slave to master when it was in slave mode, and it has received a valid UTC offset, the UTC offset adjustment is not corrected.

#9142: PTP adapter time jumps even though TimeSyncHardReset is set to DISABLE

#9080: When using OS timesync on an NT-TS master adapter, and using older Gen1 adapters, the NT-TS slave adapter may not get into sync.

#9069: PCIe GEN1 adapters running the capture image, had inconsistent max tx transmit size using the packet/segment interface. This has been harmonized to use 1522 as max in both cases. If a segment is transmits packets larger than 1522 then they will be sliced.

#9017: When a leap second is added or subtracted to the PTP UTC offset information while synchronizing to a PTP master clock, the adapter clock is always hard reset to the new time without checking theTimeSyncHardReset setting.

#8820: (Support-ID 8774) valgrind warnings in _nt_net_get_next_packet

#8791: The PPS can not be sampled when the adapter is in failover mode.

#8785: TimeSyncInSyncStatus and latest Skew read from InfoStream may sometimes be slighty out of sync when close to the in-sync threshold value.

#8750: When NT20E2-PTP is running in SyncE mode, an error will occur if Ethernet port (for PTP) is disconnected. Temporary loss/phase-shift of the reference clock will cause the FPGA's internal time sync clock to go to reset. If this happens an error log "The timesync module has been reset (adapter = 0)" will be created. Driver reload is needed to restart.

#8329: When wrong timesync parameters in ntservice.ini file is configured, the driver may erroneously fail with an IOCTL_LOCKS_GET_SHARED error.

#8099: When ntstart.sh fails, you are required to run ntstop.sh before trying again

#3635: Driver cannot load on IOMMU enabled systems

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**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
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Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

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The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

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The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
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#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

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#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11515: Added support for NT4E2-4-PTP FPGA image: 200-9226-50-04

#11310: For an adapter using the INLINE profile, an attempt to use the NTAPI to look up the RX/TX path delays returns the status code NOT_SUPPORTED even if the path delays are known. This restriction is no longer present, and it is possible to request the path delays for an adapter using the INLINE profile. Note that the driver returns NOT_SUPPORTED if the delays are unknown.

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11030: A screen dump feature is added to the tools monitoring and profiling. By hitting the key 'F' a copy of the screen is saved to disk. The screen dump is appended to the saved screen dump. The names of the screen dump files are monitoring.scn and profiling.scn respectively.

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#10899: An Info log has been added for each adapter that has PpsIn defined and where it should be used to do PPS time sync. The log is not written if the PpsIn are only used for sampling.
Info text: Adapter 0: PpsIn is defined for this adapter. Use an external PPS tool or application to start PPS time sync.

#10787: (Support-ID 10551) FPGA feature level can now be read using the API. It is a part of the NtInfoAdapter_v5_s structure and can be read using the info stream.

#10714: Added new command line option (-l, --logmsg) to ntlog tool to write a custom line of text to the ntservice log system.

#10687: Added the ability to filter on inner tunnel layer 3 and layer 4 though the NTPL Data filter. This feature requires matching FPGA feature set. See filter documentation for details.

#10684: Added the ability to slice packets within a tunnel though the NTPL assign command. This feature requires matching FPGA feature set. See filter documentation for details.

#10501: Wis mode can now be enabled pr port by using the wisModeMask parameter which has been added to ntservice,ini

#10400: If TxTiming=RELATIVE the max inter-frame gap is set to 2.6sec.

#10168: NTPORT4E now supported

#10109: (Support-ID 10105) The example program named info_example.c now retrieves and prints basic product (adapter) information, such as the serial number, based on information in the NtInfoProductInfo_s structure.

#10046: The execution of a timesync hard reset to a reference initiated by an application through the NTAPI interface, has changed to execute a hard reset (time jump) for which the execution is unaffected by the current time skew and the hard reset threshold value (i.e. immediately executed). In earlier versions the current time skew was compared to the hard reset threshold value to determine if the hard reset should occur or not.

#9962: Enable swapping of hashdata from tunnels when connecting to a SPAN port

#9937: Support for NTBPE removed.

#9880: Added driver support for the following legacy FPGA images:
NT20E2: 200-9220-44-10 and 200-9220-44-12
NT40E2-4: 200-9221-44-12 and 200-9221-44-13
NT40E2-1: 200-9222-44-06 and 200-9222-44-08

#9586: Alarms are now generated when the status of an external NT-TSU or NT-TSE looses the synchronization signal, synchronization or Time of Day information. The alarms are sent as events:
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_SYNC_SIGNAL
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_OUT_OF_SYNC
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_TIME_OF_DAY
This information is still logged as INFO in the ntlog.

#9494: There is a small delay from the time a frame enters a network port and until the adapter time-stamps it. An application can now query the driver for this RX path delay and subtract it from the time stamp in the packet descriptor. See DN-0449 section Path Delay for more information.

#9492: Added option "--installpath PATH" to ".run" files to change default installation folder.

#9491: Added option to run an ntpl.config file with ntstart.sh.

#9490: Deduplication supports padded frames and IP header masks of i.e. TTL and checksum fields. Moreover a dedup CRC can be forwarded to host application using extended descriptor 9 to support a hardware-accelerated deduplication application. This feature can be enable/disabled using the NTPL Deduplication options IPLengthLimit and IPv4/IPv6. This feature requires a matching FPGA version.

#9447: (Support-ID 8890) Added inline bump in the wire example to DN-0449

#9444: Doxygen documentation updated in NTPL data section

#9232: (Support-ID 9105) NT_NetFileGet() now automatically rewinds the file when NT_STATUS_END_OF_FILE is returned. This will allow NT_NetFileGet() to be called after NT_STATUS_END_OF_FILE and return to the start of the file.

#9147: The delay asymmetry configuration option is added to the PTP protocol.

#9088: TimeSyncFrequencyReferencePriority added to the ntservice.ini file

#9074: On the PTP port, statistics including CRC errors are displayed in the monitoring tool for debug purposes. All the information can be obtained using NTAPI

#9027: TX host buffers can now be prefilled with data and replayed continuously without needing to memcpy packets.

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

#7719: The data filter hardware supports up to 255 values for each 1 byte filter, however the NTPL limits this to specifying 8 values or one range. This is changed to support up to 32 values or 16 ranges or a mix of the two. When using a range it will take up the space of 2 values. When specifying 8 ranges only 16 values can be used.

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#14065: When logging to a file (by setting LogToFile=1 in the [Logging] section in the configuration file) and setting a log mask that includes 'debug' (for example by setting LogMask=0xf in the [Logging] in the configuration file), the driver may hang during start-up. The workaround is to avoid the 'debug' level, for instance by setting LogMask=0x7. Refer to the help output from the command 'ntlog -h', which states the available log masks.

#13999: (Support-ID 13958) Offline NUMA nodes may prevent the driver from starting up. A NUMA node is either online or offline; a NUMA node is usually offline when it has no memory assigned. The driver will not start when at least one offline NUMA node creates a hole in the sequence of NUMA nodes. For instance, in a server with two NUMA nodes, where NUMA node zero is offline and NUMA node one is online, the driver will not start.

#13167: (Support-ID 13149) On Napatech Gen2 adapters loaded with an AVR version below 2.0, the diagnostics tool with the --idd option sometimes report Intf-SM errors, where it actually is not an error.

#12601: (Support-ID 12250) Using many concurrent running NTAPI applications, calling NT_NetRxOpen and NT_NetRxClose continuously may lead to a driver crash

#12563: (Support-ID 11947) Spelling error throughout Warnings and Errors

#12287: Although it is possible to define TX host buffers that are two gigabytes or larger in the ntservice.ini file, it is impossible to request a TX host buffer that is two gigabytes or larger via NTAPI.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11711: In some situations, when establishing link between two NT40E2-1 adapters, the port can be set in errorstate and the error message "ERROR: FPGA submld link NOT OK! - NT_REG_SUBMLD_40G_PCS_STAT_1 reg: 00000000" is submitted to the ntlog.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#10596: The DHCP implementation on the PTP port does not renew its DHCP lease after link down.

#10530: ntservice may crash while shutting down when applications using the NTAPI are still running.

#10386: (Support-ID 10173) Network streams are not properly terminated causing a memory leak and a memory over-write when "profiling" is retrieving streams info

#10384: Memory leak when Network streams are terminated.

#10353: When using RX/TX host buffers that are larger than one gigabyte, the profiling tool may leave stale digits in the panes that show the numbers 'dequeued', 'enqueued driver', and 'enqueued adapter'.

#10344: It is not possible to set a minimum host buffer size above 2 gigabytes with an NTPL expression similar to "Setup[minhostbuffersize=2056]=Streamid==0", which is an error. The highest possible value is 2048, where it should have been the maximum size of all RX host buffers defined in ntservice.ini.

#10124: (Support-ID 9781) The driver may give false fan speed warnings for GEN2 adapters. Use the monitoring tool to view the current fan speed range in the Sensors pane. The allowed fan speed range is [5270;7440].

#9985: If a DMA memory allocation fails, all DMA memory is released, instead of restoring the previous state in case of a DMA memory allocation failure.

#9911: NT_NET_UPDATE_PKT_L2_PTR macro fails when compiled in a .cpp file

#9877: (Support-ID 9622) The supportinfo "hostbuffer info" part is not sampled atomic, the lastTxOff was captured after RdOff and WrOff causing it to look like lastTxOff is exceeding its limits.

#9814: (Support-ID 8749) Missing return type documentation for macro NT_NET_GET_PKT_L2_PTR

#9714: StreamId mismatch in API logging in NT_NetRxOpen()/NT_NetRxClose()

#9713: (Support-ID 9704) HBH crash on kernels with CONFIG_HZ_5000=y.

#9703: When OS time is set back in time, PTP may be disturbed for a period of time.

#9695: If the Event requesting the absolut time in PPS or the reply arrives delayed, this could cause the adapter to errornously fall out of sync for a number of seconds.

#9694: (Support-ID 9691) The config tool cannot configure triple speed copper SFPs on a NT4E-4 adapter.

#9682: Log reports rxaui errors and port ends up in error state after being disabled/enabled.

#9577: For NT4E_STD adapters that do not have any timesync connectors, the monitoring tool shows that TimeSyncConnectorExt1 is equal to NttsIn.

#9548: (Support-ID 9539) NTPL fails NUMA Setup the first time the expression is executed but only if all host buffers available are specified.

#9493: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#9481: "Port number out of range" error when enabling IPFMode

#9479: Default HashMode is not initialized to use the correct Hash Mask

#9411: (Support-ID 9343) StringDef with mask in NTPL doesn't work

#9398: When using pattern filters on multiple adapters the "Delete=all" command fails with: NTPL Parser reports "Error: Parsing line "Delete=all" failed with unknown error"

#9388: When using NT-TS out, the connector LED may not always reflect the signal.

#9383: (Support-ID 9335) The NTAPI finction NT_NetFileOpen() is unable to process capture files containing only a valid file header and no capture payload.

#9350: (Support-ID 9135) Napatech PCIGen1 adapters caused misplaced messages in the log during ntservice startup: "FPGA module REG_TXPP version -1 is not supported by function nthw_reg_txpp_supportinfo"
This was caused by the driver attempting to handle the adapter as a Napatech PCIGen2 adapter.
This has now been resolved. There was never any negative functional side effect of these log entries, besides the log entry itself.

#9329: PPS timestamp samples can be wrongly read from NTAPI info stream when running on a Napatech Gen1 adapter.

#9326: (Support-ID 9300) The driver issues a wrong error message if driver load fails due to insufficient contiguous DMA memory.

#9182: Code examples should use NT_ERRBUF_SIZE

#9167: (Support-ID 9163) When the adapter is sync'ed to the OS time, changing the adapter time back in time will not be detected and the time is set incorrectly.

#9157: If the PTP transitions from slave to master when it was in slave mode, and it has received a valid UTC offset, the UTC offset adjustment is not corrected.

#9142: PTP adapter time jumps even though TimeSyncHardReset is set to DISABLE

#9102: Autonegotiation in the phy is disabled, if the Link Sync is detected but the PCS link is down. This makes it possible to establish a link on a port which only has the rx cable connected. When the link goes down autoneg is enabled again to ensure that link can be detected using autonegotiation.

#9080: When using OS timesync on an NT-TS master adapter, and using older Gen1 adapters, the NT-TS slave adapter may not get into sync.

#9069: PCIe GEN1 adapters running the capture image, had inconsistent max tx transmit size using the packet/segment interface. This has been harmonized to use 1522 as max in both cases. If a segment is transmits packets larger than 1522 then they will be sliced.

#9017: When a leap second is added or subtracted to the PTP UTC offset information while synchronizing to a PTP master clock, the adapter clock is always hard reset to the new time without checking theTimeSyncHardReset setting.

#8820: (Support-ID 8774) valgrind warnings in _nt_net_get_next_packet

#8791: The PPS can not be sampled when the adapter is in failover mode.

#8785: TimeSyncInSyncStatus and latest Skew read from InfoStream may sometimes be slighty out of sync when close to the in-sync threshold value.

#8750: When NT20E2-PTP is running in SyncE mode, an error will occur if Ethernet port (for PTP) is disconnected. Temporary loss/phase-shift of the reference clock will cause the FPGA's internal time sync clock to go to reset. If this happens an error log "The timesync module has been reset (adapter = 0)" will be created. Driver reload is needed to restart.

#8329: When wrong timesync parameters in ntservice.ini file is configured, the driver may erroneously fail with an IOCTL_LOCKS_GET_SHARED error.

#8099: When ntstart.sh fails, you are required to run ntstop.sh before trying again

#3635: Driver cannot load on IOMMU enabled systems

napatech

## From version 02.04.02 to version 03.07.04 (this release)

**New features**

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- Innolight Technology TR-FC85S-NVS
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This functionality depends on FPGA support for the feature.

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Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

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Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11515: Added support for NT4E2-4-PTP FPGA image: 200-9226-50-04

#11310: For an adapter using the INLINE profile, an attempt to use the NTAPI to look up the RX/TX path delays returns the status code NOT_SUPPORTED even if the path delays are known. This restriction is no longer present, and it is possible to request the path delays for an adapter using the INLINE profile. Note that the driver returns NOT_SUPPORTED if the delays are unknown.

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11030: A screen dump feature is added to the tools monitoring and profiling. By hitting the key 'F' a copy of the screen is saved to disk. The screen dump is appended to the saved screen dump. The names of the screen dump files are monitoring.scn and profiling.scn respectively.

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#10899: An Info log has been added for each adapter that has PpsIn defined and where it should be used to do PPS time sync. The log is not written if the PpsIn are only used for sampling.
Info text: Adapter 0: PpsIn is defined for this adapter. Use an external PPS tool or application to start PPS time sync.

#10787: (Support-ID 10551) FPGA feature level can now be read using the API. It is a part of the NtInfoAdapter_v5_s structure and can be read using the info stream.

#10714: Added new command line option (-l, --logmsg) to ntlog tool to write a custom line of text to the ntservice log system.

#10687: Added the ability to filter on inner tunnel layer 3 and layer 4 though the NTPL Data filter. This feature requires matching FPGA feature set. See filter documentation for details.

#10684: Added the ability to slice packets within a tunnel though the NTPL assign command. This feature requires matching FPGA feature set. See filter documentation for details.

#10501: Wis mode can now be enabled pr port by using the wisModeMask parameter which has been added to ntservice,ini

#10400: If TxTiming=RELATIVE the max inter-frame gap is set to 2.6sec.

#10168: NTPORT4E now supported

#10109: (Support-ID 10105) The example program named info_example.c now retrieves and prints basic product (adapter) information, such as the serial number, based on information in the NtInfoProductInfo_s structure.

#10046: The execution of a timesync hard reset to a reference initiated by an application through the NTAPI interface, has changed to execute a hard reset (time jump) for which the execution is unaffected by the current time skew and the hard reset threshold value (i.e. immediately executed). In earlier versions the current time skew was compared to the hard reset threshold value to determine if the hard reset should occur or not.

#9962: Enable swapping of hashdata from tunnels when connecting to a SPAN port

#9937: Support for NTBPE removed.

#9880: Added driver support for the following legacy FPGA images:
NT20E2: 200-9220-44-10 and 200-9220-44-12
NT40E2-4: 200-9221-44-12 and 200-9221-44-13
NT40E2-1: 200-9222-44-06 and 200-9222-44-08

#9586: Alarms are now generated when the status of an external NT-TSU or NT-TSE looses the synchronization signal, synchronization or Time of Day information. The alarms are sent as events:
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_SYNC_SIGNAL
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_OUT_OF_SYNC
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_TIME_OF_DAY
This information is still logged as INFO in the ntlog.

#9494: There is a small delay from the time a frame enters a network port and until the adapter time-stamps it. An application can now query the driver for this RX path delay and subtract it from the time stamp in the packet descriptor. See DN-0449 section Path Delay for more information.

#9492: Added option "--installpath PATH" to ".run" files to change default installation folder.

#9491: Added option to run an ntpl.config file with ntstart.sh.

#9490: Deduplication supports padded frames and IP header masks of i.e. TTL and checksum fields. Moreover a dedup CRC can be forwarded to host application using extended descriptor 9 to support a hardware-accelerated deduplication application. This feature can be enable/disabled using the NTPL Deduplication options IPLengthLimit and IPv4/IPv6. This feature requires a matching FPGA version.

#9447: (Support-ID 8890) Added inline bump in the wire example to DN-0449

#9444: Doxygen documentation updated in NTPL data section

#9232: (Support-ID 9105) NT_NetFileGet() now automatically rewinds the file when NT_STATUS_END_OF_FILE is returned. This will allow NT_NetFileGet() to be called after NT_STATUS_END_OF_FILE and return to the start of the file.

#9147: The delay asymmetry configuration option is added to the PTP protocol.

#9088: TimeSyncFrequencyReferencePriority added to the ntservice.ini file

#9074: On the PTP port, statistics including CRC errors are displayed in the monitoring tool for debug purposes. All the information can be obtained using NTAPI

#9027: TX host buffers can now be prefilled with data and replayed continuously without needing to memcpy packets.

#8984: Support for NT20E enabled

#8500: PDV filter has been implemented in order to increase performance in non-PTP aware network

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

#7719: The data filter hardware supports up to 255 values for each 1 byte filter, however the NTPL limits this to specifying 8 values or one range. This is changed to support up to 32 values or 16 ranges or a mix of the two. When using a range it will take up the space of 2 values. When specifying 8 ranges only 16 values can be used.

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#14065: When logging to a file (by setting LogToFile=1 in the [Logging] section in the configuration file) and setting a log mask that includes 'debug' (for example by setting LogMask=0xf in the [Logging] in the configuration file), the driver may hang during start-up. The workaround is to avoid the 'debug' level, for instance by setting LogMask=0x7. Refer to the help output from the command 'ntlog -h', which states the available log masks.

#13999: (Support-ID 13958) Offline NUMA nodes may prevent the driver from starting up. A NUMA node is either online or offline; a NUMA node is usually offline when it has no memory assigned. The driver will not start when at least one offline NUMA node creates a hole in the sequence of NUMA nodes. For instance, in a server with two NUMA nodes, where NUMA node zero is offline and NUMA node one is online, the driver will not start.

#13167: (Support-ID 13149) On Napatech Gen2 adapters loaded with an AVR version below 2.0, the diagnostics tool with the --idd option sometimes report Intf-SM errors, where it actually is not an error.

#12601: (Support-ID 12250) Using many concurrent running NTAPI applications, calling NT_NetRxOpen and NT_NetRxClose continuously may lead to a driver crash

#12563: (Support-ID 11947) Spelling error throughout Warnings and Errors

#12287: Although it is possible to define TX host buffers that are two gigabytes or larger in the ntservice.ini file, it is impossible to request a TX host buffer that is two gigabytes or larger via NTAPI.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11711: In some situations, when establishing link between two NT40E2-1 adapters, the port can be set in errorstate and the error message "ERROR: FPGA submld link NOT OK! - NT_REG_SUBMLD_40G_PCS_STAT_1 reg: 00000000" is submitted to the ntlog.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#10530: ntservice may crash while shutting down when applications using the NTAPI are still running.

#10386: (Support-ID 10173) Network streams are not properly terminated causing a memory leak and a memory over-write when "profiling" is retrieving streams info

#10384: Memory leak when Network streams are terminated.

#10353: When using RX/TX host buffers that are larger than one gigabyte, the profiling tool may leave stale digits in the panes that show the numbers 'dequeued', 'enqueued driver', and 'enqueued adapter'.

#10344: It is not possible to set a minimum host buffer size above 2 gigabytes with an NTPL expression similar to "Setup[minhostbuffersize=2056]=Streamid==0", which is an error. The highest possible value is 2048, where it should have been the maximum size of all RX host buffers defined in ntservice.ini.

#10124: (Support-ID 9781) The driver may give false fan speed warnings for GEN2 adapters. Use the monitoring tool to view the current fan speed range in the Sensors pane. The allowed fan speed range is [5270;7440].

#9985: If a DMA memory allocation fails, all DMA memory is released, instead of restoring the previous state in case of a DMA memory allocation failure.

#9911: NT_NET_UPDATE_PKT_L2_PTR macro fails when compiled in a .cpp file

#9877: (Support-ID 9622) The supportinfo "hostbuffer info" part is not sampled atomic, the lastTxOff was captured after RdOff and WrOff causing it to look like lastTxOff is exceeding its limits.

#9814: (Support-ID 8749) Missing return type documentation for macro NT_NET_GET_PKT_L2_PTR

#9714: StreamId mismatch in API logging in NT_NetRxOpen()/NT_NetRxClose()

#9713: (Support-ID 9704) HBH crash on kernels with CONFIG_HZ_5000=y.

#9695: If the Event requesting the absolut time in PPS or the reply arrives delayed, this could cause the adapter to errornously fall out of sync for a number of seconds.

#9694: (Support-ID 9691) The config tool cannot configure triple speed copper SFPs on a NT4E-4 adapter.

#9682: Log reports rxaui errors and port ends up in error state after being disabled/enabled.

#9548: (Support-ID 9539) NTPL fails NUMA Setup the first time the expression is executed but only if all host buffers available are specified.

#9493: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#9479: Default HashMode is not initialized to use the correct Hash Mask

#9398: When using pattern filters on multiple adapters the "Delete=all" command fails with: NTPL Parser reports "Error: Parsing line "Delete=all" failed with unknown error"

#9388: When using NT-TS out, the connector LED may not always reflect the signal.

#9350: (Support-ID 9135) Napatech PCIGen1 adapters caused misplaced messages in the log during ntservice startup: "FPGA module REG_TXPP version -1 is not supported by function nthw_reg_txpp_supportinfo"
This was caused by the driver attempting to handle the adapter as a Napatech PCIGen2 adapter.
This has now been resolved. There was never any negative functional side effect of these log entries, besides the log entry itself.

#9329: PPS timestamp samples can be wrongly read from NTAPI info stream when running on a Napatech Gen1 adapter.

#9326: (Support-ID 9300) The driver issues a wrong error message if driver load fails due to insufficient contiguous DMA memory.

#9182: Code examples should use NT_ERRBUF_SIZE

#9167: (Support-ID 9163) When the adapter is sync'ed to the OS time, changing the adapter time back in time will not be detected and the time is set incorrectly.

#9102: Autonegotiation in the phy is disabled, if the Link Sync is detected but the PCS link is down. This makes it possible to establish a link on a port which only has the rx cable connected. When the link goes down autoneg is enabled again to ensure that link can be detected using autonegotiation.

#9080: When using OS timesync on an NT-TS master adapter, and using older Gen1 adapters, the NT-TS slave adapter may not get into sync.

#8871: GEN2 adapters could potentially overwrite memory when ntservice is restarted.

#8820: (Support-ID 8774) valgrind warnings in _nt_net_get_next_packet

#8791: The PPS can not be sampled when the adapter is in failover mode.

#8785: TimeSyncInSyncStatus and latest Skew read from InfoStream may sometimes be slighty out of sync when close to the in-sync threshold value.

#8750: When NT20E2-PTP is running in SyncE mode, an error will occur if Ethernet port (for PTP) is disconnected. Temporary loss/phase-shift of the reference clock will cause the FPGA’s internal time sync clock to go to reset. If this happens an error log "The timesync module has been reset (adapter = 0)" will be created. Driver reload is needed to restart.

#8329: When wrong timesync parameters in ntservice.ini file is configured, the driver may erroneously fail with an IOCTL_LOCKS_GET_SHARED error.

#8099: When ntstart.sh fails, you are required to run ntstop.sh before trying again

#3635: Driver cannot load on IOMMU enabled systems

napatech

## From version 02.03.07 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

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#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

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#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

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#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11515: Added support for NT4E2-4-PTP FPGA image: 200-9226-50-04

#11310: For an adapter using the INLINE profile, an attempt to use the NTAPI to look up the RX/TX path delays returns the status code NOT_SUPPORTED even if the path delays are known. This restriction is no longer present, and it is possible to request the path delays for an adapter using the INLINE profile. Note that the driver returns NOT_SUPPORTED if the delays are unknown.

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11030: A screen dump feature is added to the tools monitoring and profiling. By hitting the key 'F' a copy of the screen is saved to disk. The screen dump is appended to the saved screen dump. The names of the screen dump files are monitoring.scn and profiling.scn respectively.

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#10899: An Info log has been added for each adapter that has PpsIn defined and where it should be used to do PPS time sync. The log is not written if the PpsIn are only used for sampling.
Info text: Adapter 0: PpsIn is defined for this adapter. Use an external PPS tool or application to start PPS time sync.

#10787: (Support-ID 10551) FPGA feature level can now be read using the API. It is a part of the NtInfoAdapter_v5_s structure and can be read using the info stream.

#10714: Added new command line option (-l, --logmsg) to ntlog tool to write a custom line of text to the ntservice log system.

#10687: Added the ability to filter on inner tunnel layer 3 and layer 4 though the NTPL Data filter. This feature requires matching FPGA feature set. See filter documentation for details.

#10684: Added the ability to slice packets within a tunnel though the NTPL assign command. This feature requires matching FPGA feature set. See filter documentation for details.

#10501: Wis mode can now be enabled pr port by using the wisModeMask parameter which has been added to ntservice,ini

#10400: If TxTiming=RELATIVE the max inter-frame gap is set to 2.6sec.

#10168: NTPORT4E now supported

#10109: (Support-ID 10105) The example program named info_example.c now retrieves and prints basic product (adapter) information, such as the serial number, based on information in the NtInfoProductInfo_s structure.

#10046: The execution of a timesync hard reset to a reference initiated by an application through the NTAPI interface, has changed to execute a hard reset (time jump) for which the execution is unaffected by the current time skew and the hard reset threshold value (i.e. immediately executed). In earlier versions the current time skew was compared to the hard reset threshold value to determine if the hard reset should occur or not.

#9962: Enable swapping of hashdata from tunnels when connecting to a SPAN port

#9937: Support for NTBPE removed.

#9880: Added driver support for the following legacy FPGA images:
NT20E2: 200-9220-44-10 and 200-9220-44-12
NT40E2-4: 200-9221-44-12 and 200-9221-44-13
NT40E2-1: 200-9222-44-06 and 200-9222-44-08

#9586: Alarms are now generated when the status of an external NT-TSU or NT-TSE looses the synchronization signal, synchronization or Time of Day information. The alarms are sent as events:
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_SYNC_SIGNAL
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_OUT_OF_SYNC
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_TIME_OF_DAY
This information is still logged as INFO in the ntlog.

#9494: There is a small delay from the time a frame enters a network port and until the adapter time-stamps it. An application can now query the driver for this RX path delay and subtract it from the time stamp in the packet descriptor. See DN-0449 section Path Delay for more information.

#9492: Added option "--installpath PATH" to ".run" files to change default installation folder.

#9491: Added option to run an ntpl.config file with ntstart.sh.

#9490: Deduplication supports padded frames and IP header masks of i.e. TTL and checksum fields. Moreover a dedup CRC can be forwarded to host application using extended descriptor 9 to support a hardware-accelerated deduplication application. This feature can be enable/disabled using the NTPL Deduplication options IPLengthLimit and IPv4/IPv6. This feature requires a matching FPGA version.

#9447: (Support-ID 8890) Added inline bump in the wire example to DN-0449

#9444: Doxygen documentation updated in NTPL data section

#9232: (Support-ID 9105) NT_NetFileGet() now automatically rewinds the file when NT_STATUS_END_OF_FILE is returned. This will allow NT_NetFileGet() to be called after NT_STATUS_END_OF_FILE and return to the start of the file.

#9147: The delay asymmetry configuration option is added to the PTP protocol.

#9088: TimeSyncFrequencyReferencePriority added to the ntservice.ini file

#9074: On the PTP port, statistics including CRC errors are displayed in the monitoring tool for debug purposes. All the information can be obtained using NTAPI

#9027: TX host buffers can now be prefilled with data and replayed continuously without needing to memcpy packets.

#8984: Support for NT20E enabled

#8760: Added NUMA node information to info stream.

#8604: NT_NetRxOpenMulti() has been added to the API to enable merging traffic from multiple stream-ids

#8500: PDV filter has been implemented in order to increase performance in non-PTP aware network

#8437: The installation now honors the TMPDIR environment setting during the installation to specify an alternative temporary directory.

#8340: Added the ability to reuse the protocol filters to have more than 8 filters using a protocol

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

#8052: Stream-id based statistics are now available via the statistics stream and can be monitored using the monitoring tool. Stream-ids can be activated/deactivated using NTPL, to control the sync point when packets starts entering the stream-id host-buffers and when statistics should count them, see the streamidstatistics.c example.

#7975: It has been made possible to run will multiple tx streams addressing the same port when using the TrafficGen profile. The rule is that packets has be to sent with NT_NET_SET_PKT_TXNOW(1) otherwise the behavior is unpredictable.

#7931: A define NT_ERRBUF_SIZE added to indicate the maximum error length size that can be delivered by the driver. This define should be used when allocating a buffer for reading an error message.

#7928: npcap.ini added to the supportinfo archive.

#7894: Added support for per filter descriptor selection. The feature is available through the "Assign" command in NTPL. This feature requires matching FPGA.

#7823: Configuration parameter TimeSyncTimeOffset now has a limit of 1000000 ns (1 ms)

#7807: (Support-ID 7327) NTAPI NT_NetFile...() functions do not connect to NTservice anymore - and thus do not require NTservice to be running.
This change is to allow an user application to process captured files through the NTAPI NT_NetFile...() functions on systems that do not have NTservice running nor a Napatech adapter installed.

NTAPI functions affected by the change:

NT_NetFileOpen()
NT_NetFileGet()
NT_NetFileRelease()
NT_NetFileClose()

The example readcapfile (examples/net/readcapfile/readcapfile.c) demonstrates a possible use.

#7805: Alarms have been added to monitor when an external NTTSU or NTTSE connected through NT-TS timesync looses synchronization with it's time source. The possible alarms are:
NT-TS: External device lost synchronization signal
NT-TS: External device is out of synchronization
NT-TS: External device lost time of day information

#7792: Changing the hash seed is now possible in ntservice.ini using the HashSeed option. Changing the hash seed will effect the data distribution on the streams.

#7758: The info stream has been extended to contain information of:
SDRAM present and SDRAM size
PCI bus information
Adapter features - Bypass support.

#7732: It is now possible to synchronize the operating system's clock with (to) the clock of a designated adapter. The feature is enabled by setting the configuration parameter TimeSyncOsTimeReference in the System section. For instance to synchronize the server clock with adapter zero, specify TimeSyncOsTimeReference=adapter-0. It requires an FPGA with support for synchronization of OS time.

#7730: An event and a log will be generated when the adapter's time stamp clock is set by the system.

#7728: IEEE1588 support is implemented on NT4E2_PTP and NT20E2_PTP adapter. (dedicated RJ45)

#7719: The data filter hardware supports up to 255 values for each 1 byte filter, however the NTPL limits this to specifying 8 values or one range. This is changed to support up to 32 values or 16 ranges or a mix of the two. When using a range it will take up the space of 2 values. When specifying 8 ranges only 16 values can be used.

#7715: A new feature - host loopback - has been added to the port settings structure. Applying loopback to a port means that data transmitted from the host on the port is looped back to the same port. Since the loopback is applied inside the adapter, it will work independently of whether a NIM is actually present or not, and the link will always be reported as up.
If put in loopback mode, the monitoring tool will show the link state as "Loopback". The config tool can be used to apply loopback, and the diagnostics tool can be used to test loopback if using a new feature: single- port- loop.

#7703: Added support for swapping the source and destination IP address regardless of value before calculating hash value. This enables traffic to/from the entire subnets to be balanced between streams. See Hash Mode command documentation for more details. This feature requires a matching FPGA.

#7699: Added 2 and 5 tuple sorted and unsorted hash modes on IPv4 and IPv6 encapsulated IP traffic. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7694: Added 2 and 5 tuple hash (sorted and unsorted) modes on IPv4 and IPv6 traffic inside a GTPv1 tunnel. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7433: The command to setup numanodes, "Setup[numanode=0]=streamid==x,y,z" can now contain up 32 streamids.

#7406: The driver now supports up to 8 adapters in one server.

#7397: (Support-ID 7435) Added support for filtering on decode error e.g "Assign[StreamId = 1] = DecodeError == TRUE" will redirect all packages with decode errors to stream 1.

#7392: (Support-ID 7333) Check for mismatching version of NTService and version of the low level driver has been added.

#7222: Check if IOMMU is enabled are added for kernels larger or equal to version 3.2. Driver fails if IOMMU is enabled.

#7169: Added support for Linux 3.x

#7167: Added support for the NT40E2_1 adapter.

#7141: (Support-ID 6797) The description of NT_NetRxGet timeout functionality in DN-0449 has been improved

#7065: The adapter will now be able to identify connected NT-TS synched adapters, NT-TSUs and NT-TSEs. The information can be seen through the API or using the monitoring tool.

#7062: Added support for Customer specific User data in the VPD.

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#13999: (Support-ID 13958) Offline NUMA nodes may prevent the driver from starting up. A NUMA node is either online or offline; a NUMA node is usually offline when it has no memory assigned. The driver will not start when at least one offline NUMA node creates a hole in the sequence of NUMA nodes. For instance, in a server with two NUMA nodes, where NUMA node zero is offline and NUMA node one is online, the driver will not start.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#10530: ntservice may crash while shutting down when applications using the NTAPI are still running.

#10353: When using RX/TX host buffers that are larger than one gigabyte, the profiling tool may leave stale digits in the panes that show the numbers 'dequeued', 'enqueued driver', and 'enqueued adapter'.

#9911: NT_NET_UPDATE_PKT_L2_PTR macro fails when compiled in a .cpp file

#9877: (Support-ID 9622) The supportinfo "hostbuffer info" part is not sampled atomic, the lastTxOff was captured after RdOff and WrOff causing it to look like lastTxOff is exceeding its limits.

#9814: (Support-ID 8749) Missing return type documentation for macro NT_NET_GET_PKT_L2_PTR

#9714: StreamId mismatch in API logging in NT_NetRxOpen()/NT_NetRxClose()

#9713: (Support-ID 9704) HBH crash on kernels with CONFIG_HZ_5000=y.

#9695: If the Event requesting the absolut time in PPS or the reply arrives delayed, this could cause the adapter to errornously fall out of sync for a number of seconds.

#9694: (Support-ID 9691) The config tool cannot configure triple speed copper SFPs on a NT4E-4 adapter.

#9326: (Support-ID 9300) The driver issues a wrong error message if driver load fails due to insufficient contiguous DMA memory.

#8901: (Support-ID 8886) HashMask command is setting all HashWords to '00'. Work around is to insure that all HashMask words are defined in the NTPL expression. e.g HashWord0 = 0xffffffff; HashWord1 = 0xffffffff …

#8871: GEN2 adapters could potentially overwrite memory when ntservice is restarted.

#8699: Running with NT_NET_INTERFACE_SEGMENT while deleting/assigning filters could cause a deadlock

#8343: Combining 2 filters into 1 filter results in all packets being forwarded.

#8100: (Support-ID 8041) ntservice stops responding if system runs out of memory.

#8099: When ntstart.sh fails, you are required to run ntstop.sh before trying again

#7984: When restarting a PPS application the adapter could take up to a minute to get in sync.

#7968: (Support-ID 7962) Statistic example is clearing the statistic in every loop. Intro description about NT_StatRead() is wrong.

#7930: (Support-ID 7900) The total number of hostbuffers allocated for one adapter for systems with more than one numanode can exceed 32.

#7740: The ntservice.ini parameter "OsTimeSync" is not supported by NT40E2-4, but ntstart.sh succeeds

#7466: (Support-ID 7422) The hashmode example in the reference documentation DN-0449 is wrong.
HashMode = Hash5Tuple
Assign[StreamId = 1; Priority = 0; StreamId=(0..6)] = Layer4Protocol == UDP, TCP
Assign[StreamId = 1; Priority = 2; StreamId=7] = All

#7398: (Support-ID 7388) >>ERROR | SRV | 20411 - SPIv1[0:1500]: Opcode 0120 returned error 80. Is the opcode supported by this AVR version?
May appear if the driver is run on an adapter fitted with an AVR version prior to 1.1.

#7368: NTBPE as virtual adapter 0 cause statistics stall

#7345: (Support-ID 7906) Running with multiple streamids all starting at the same time can cause time stamp merge errors and ntservice hang.

#7342: (Support-ID 7332) Just after start of ntservice the link state (and NIM state) might be reported as unknown since it has not been read yet. This might also be the case after a NIM has been plugged into a port.

#7290: If the NTBPE programming switch is engaged, ntservice will start, but all access to the adapter will fail.

#7289: (Support-ID 7220) Confusing error messages like "IOCTL for IOCTL_LOCKS_GET_SHARED failed with errno 14 [Bad address]" are printed if the ntservice is not loaded or ready.

#7279: NT_NetRxGet() will return NT_SUCCESS even when there is no data on the segment interface.

#7241: (Support-ID 7230) The ntpl tool does not expand macros when run with -v option.

#7238: (Support-ID 7120) Latency might have high variation on default configurations:
To achieve latency stability the use of affinity is needed. On linux a combination of kernel boot parameter ISOLCPUS, sched_setaffinity() and sched_setscheduler() is needed to achieve optimal latency stability.
As example the following setup could be used:
*) Set kernel boot parameter: isolcpus=2,3,6,7
*) Start 3GD limiting it to use core 2 and 3: taskset -pc 2,3 /opt/napatech3/bin/ntstart.sh
*)Run application on core 6,7 with SCHED_RR

#7142: Host buffer poll method auto detection is failing for kernels < 2.6.24 causing packet loss.

#7127: (Support-ID 7093) Unexpected behavior of SliceOffset=0 in NTPL command

#7033: (Support-ID 6901) HashAllVLANIds gives valid hash even though there are no VLAN tags in the packets

#7001: The version of the NT-TSE or NT-TSU cannot be read from the driver. This does not affect the functionality, only visibility.

#3635: Driver cannot load on IOMMU enabled systems

napatech

## From version 02.03.05 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

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#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11515: Added support for NT4E2-4-PTP FPGA image: 200-9226-50-04

#11310: For an adapter using the INLINE profile, an attempt to use the NTAPI to look up the RX/TX path delays returns the status code NOT_SUPPORTED even if the path delays are known. This restriction is no longer present, and it is possible to request the path delays for an adapter using the INLINE profile. Note that the driver returns NOT_SUPPORTED if the delays are unknown.

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11030: A screen dump feature is added to the tools monitoring and profiling. By hitting the key 'F' a copy of the screen is saved to disk. The screen dump is appended to the saved screen dump. The names of the screen dump files are monitoring.scn and profiling.scn respectively.

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#10899: An Info log has been added for each adapter that has PpsIn defined and where it should be used to do PPS time sync. The log is not written if the PpsIn are only used for sampling.
Info text: Adapter 0: PpsIn is defined for this adapter. Use an external PPS tool or application to start PPS time sync.

#10787: (Support-ID 10551) FPGA feature level can now be read using the API. It is a part of the NtInfoAdapter_v5_s structure and can be read using the info stream.

#10714: Added new command line option (-l, --logmsg) to ntlog tool to write a custom line of text to the ntservice log system.

#10687: Added the ability to filter on inner tunnel layer 3 and layer 4 though the NTPL Data filter. This feature requires matching FPGA feature set. See filter documentation for details.

#10684: Added the ability to slice packets within a tunnel though the NTPL assign command. This feature requires matching FPGA feature set. See filter documentation for details.

#10501: Wis mode can now be enabled pr port by using the wisModeMask parameter which has been added to ntservice,ini

#10400: If TxTiming=RELATIVE the max inter-frame gap is set to 2.6sec.

#10168: NTPORT4E now supported

#10109: (Support-ID 10105) The example program named info_example.c now retrieves and prints basic product (adapter) information, such as the serial number, based on information in the NtInfoProductInfo_s structure.

#10046: The execution of a timesync hard reset to a reference initiated by an application through the NTAPI interface, has changed to execute a hard reset (time jump) for which the execution is unaffected by the current time skew and the hard reset threshold value (i.e. immediately executed). In earlier versions the current time skew was compared to the hard reset threshold value to determine if the hard reset should occur or not.

#9962: Enable swapping of hashdata from tunnels when connecting to a SPAN port

#9937: Support for NTBPE removed.

#9880: Added driver support for the following legacy FPGA images:
NT20E2: 200-9220-44-10 and 200-9220-44-12
NT40E2-4: 200-9221-44-12 and 200-9221-44-13
NT40E2-1: 200-9222-44-06 and 200-9222-44-08

#9586: Alarms are now generated when the status of an external NT-TSU or NT-TSE looses the synchronization signal, synchronization or Time of Day information. The alarms are sent as events:
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_SYNC_SIGNAL
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_OUT_OF_SYNC
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_TIME_OF_DAY
This information is still logged as INFO in the ntlog.

#9494: There is a small delay from the time a frame enters a network port and until the adapter time-stamps it. An application can now query the driver for this RX path delay and subtract it from the time stamp in the packet descriptor. See DN-0449 section Path Delay for more information.

#9492: Added option "--installpath PATH" to ".run" files to change default installation folder.

#9491: Added option to run an ntpl.config file with ntstart.sh.

#9490: Deduplication supports padded frames and IP header masks of i.e. TTL and checksum fields. Moreover a dedup CRC can be forwarded to host application using extended descriptor 9 to support a hardware-accelerated deduplication application. This feature can be enable/disabled using the NTPL Deduplication options IPLengthLimit and IPv4/IPv6. This feature requires a matching FPGA version.

#9447: (Support-ID 8890) Added inline bump in the wire example to DN-0449

#9444: Doxygen documentation updated in NTPL data section

#9232: (Support-ID 9105) NT_NetFileGet() now automatically rewinds the file when NT_STATUS_END_OF_FILE is returned. This will allow NT_NetFileGet() to be called after NT_STATUS_END_OF_FILE and return to the start of the file.

#9147: The delay asymmetry configuration option is added to the PTP protocol.

#9088: TimeSyncFrequencyReferencePriority added to the ntservice.ini file

#9074: On the PTP port, statistics including CRC errors are displayed in the monitoring tool for debug purposes. All the information can be obtained using NTAPI

#9027: TX host buffers can now be prefilled with data and replayed continuously without needing to memcpy packets.

#8984: Support for NT20E enabled

#8760: Added NUMA node information to info stream.

#8604: NT_NetRxOpenMulti() has been added to the API to enable merging traffic from multiple stream-ids

#8500: PDV filter has been implemented in order to increase performance in non-PTP aware network

#8437: The installation now honors the TMPDIR environment setting during the installation to specify an alternative temporary directory.

#8340: Added the ability to reuse the protocol filters to have more than 8 filters using a protocol

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

#8052: Stream-id based statistics are now available via the statistics stream and can be monitored using the monitoring tool. Stream-ids can be activated/deactivated using NTPL, to control the sync point when packets starts entering the stream-id host-buffers and when statistics should count them, see the streamidstatistics.c example.

#7975: It has been made possible to run will multiple tx streams addressing the same port when using the TrafficGen profile. The rule is that packets has be to sent with NT_NET_SET_PKT_TXNOW(1) otherwise the behavior is unpredictable.

#7931: A define NT_ERRBUF_SIZE added to indicate the maximum error length size that can be delivered by the driver. This define should be used when allocating a buffer for reading an error message.

#7928: npcap.ini added to the supportinfo archive.

#7894: Added support for per filter descriptor selection. The feature is available through the "Assign" command in NTPL. This feature requires matching FPGA.

#7823: Configuration parameter TimeSyncTimeOffset now has a limit of 1000000 ns (1 ms)

#7807: (Support-ID 7327) NTAPI NT_NetFile...() functions do not connect to NTservice anymore - and thus do not require NTservice to be running.
This change is to allow an user application to process captured files through the NTAPI NT_NetFile...() functions on systems that do not have NTservice running nor a Napatech adapter installed.

NTAPI functions affected by the change:

NT_NetFileOpen()
NT_NetFileGet()
NT_NetFileRelease()
NT_NetFileClose()

The example readcapfile (examples/net/readcapfile/readcapfile.c) demonstrates a possible use.

#7805: Alarms have been added to monitor when an external NTTSU or NTTSE connected through NT-TS timesync looses synchronization with it's time source. The possible alarms are:
NT-TS: External device lost synchronization signal
NT-TS: External device is out of synchronization
NT-TS: External device lost time of day information

#7792: Changing the hash seed is now possible in ntservice.ini using the HashSeed option. Changing the hash seed will effect the data distribution on the streams.

#7758: The info stream has been extended to contain information of:
SDRAM present and SDRAM size
PCI bus information
Adapter features - Bypass support.

#7732: It is now possible to synchronize the operating system's clock with (to) the clock of a designated adapter. The feature is enabled by setting the configuration parameter TimeSyncOsTimeReference in the System section. For instance to synchronize the server clock with adapter zero, specify TimeSyncOsTimeReference=adapter-0. It requires an FPGA with support for synchronization of OS time.

#7730: An event and a log will be generated when the adapter's time stamp clock is set by the system.

#7728: IEEE1588 support is implemented on NT4E2_PTP and NT20E2_PTP adapter. (dedicated RJ45)

#7719: The data filter hardware supports up to 255 values for each 1 byte filter, however the NTPL limits this to specifying 8 values or one range. This is changed to support up to 32 values or 16 ranges or a mix of the two. When using a range it will take up the space of 2 values. When specifying 8 ranges only 16 values can be used.

#7715: A new feature - host loopback - has been added to the port settings structure. Applying loopback to a port means that data transmitted from the host on the port is looped back to the same port. Since the loopback is applied inside the adapter, it will work independently of whether a NIM is actually present or not, and the link will always be reported as up.
If put in loopback mode, the monitoring tool will show the link state as "Loopback". The config tool can be used to apply loopback, and the diagnostics tool can be used to test loopback if using a new feature: single- port- loop.

#7703: Added support for swapping the source and destination IP address regardless of value before calculating hash value. This enables traffic to/from the entire subnets to be balanced between streams. See Hash Mode command documentation for more details. This feature requires a matching FPGA.

#7699: Added 2 and 5 tuple sorted and unsorted hash modes on IPv4 and IPv6 encapsulated IP traffic. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7694: Added 2 and 5 tuple hash (sorted and unsorted) modes on IPv4 and IPv6 traffic inside a GTPv1 tunnel. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7433: The command to setup numanodes, "Setup[numanode=0]=streamid==x,y,z" can now contain up 32 streamids.

#7406: The driver now supports up to 8 adapters in one server.

#7397: (Support-ID 7435) Added support for filtering on decode error e.g "Assign[StreamId = 1] = DecodeError == TRUE" will redirect all packages with decode errors to stream 1.

#7392: (Support-ID 7333) Check for mismatching version of NTService and version of the low level driver has been added.

#7222: Check if IOMMU is enabled are added for kernels larger or equal to version 3.2. Driver fails if IOMMU is enabled.

#7169: Added support for Linux 3.x

#7167: Added support for the NT40E2_1 adapter.

#7141: (Support-ID 6797) The description of NT_NetRxGet timeout functionality in DN-0449 has been improved

#7065: The adapter will now be able to identify connected NT-TS synched adapters, NT-TSUs and NT-TSEs. The information can be seen through the API or using the monitoring tool.

#7062: Added support for Customer specific User data in the VPD.

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#13999: (Support-ID 13958) Offline NUMA nodes may prevent the driver from starting up. A NUMA node is either online or offline; a NUMA node is usually offline when it has no memory assigned. The driver will not start when at least one offline NUMA node creates a hole in the sequence of NUMA nodes. For instance, in a server with two NUMA nodes, where NUMA node zero is offline and NUMA node one is online, the driver will not start.

#13461: (Support-ID 13419) When using TimeSyncProtocol = NT and OsTimeSyncFailover = ENABLED, then NT-TS may never be activated.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#10530: ntservice may crash while shutting down when applications using the NTAPI are still running.

#10353: When using RX/TX host buffers that are larger than one gigabyte, the profiling tool may leave stale digits in the panes that show the numbers 'dequeued', 'enqueued driver', and 'enqueued adapter'.

#9911: NT_NET_UPDATE_PKT_L2_PTR macro fails when compiled in a .cpp file

#9877: (Support-ID 9622) The supportinfo "hostbuffer info" part is not sampled atomic, the lastTxOff was captured after RdOff and WrOff causing it to look like lastTxOff is exceeding its limits.

#9814: (Support-ID 8749) Missing return type documentation for macro NT_NET_GET_PKT_L2_PTR

#9714: StreamId mismatch in API logging in NT_NetRxOpen()/NT_NetRxClose()

#9713: (Support-ID 9704) HBH crash on kernels with CONFIG_HZ_5000=y.

#9695: If the Event requesting the absolut time in PPS or the reply arrives delayed, this could cause the adapter to errornously fall out of sync for a number of seconds.

#9694: (Support-ID 9691) The config tool cannot configure triple speed copper SFPs on a NT4E-4 adapter.

#9326: (Support-ID 9300) The driver issues a wrong error message if driver load fails due to insufficient contiguous DMA memory.

#8901: (Support-ID 8886) HashMask command is setting all HashWords to '00'. Work around is to insure that all HashMask words are defined in the NTPL expression. e.g HashWord0 = 0xffffffff; HashWord1 = 0xffffffff ...

#8871: GEN2 adapters could potentially overwrite memory when ntservice is restarted.

#8699: Running with NT_NET_INTERFACE_SEGMENT while deleting/assigning filters could cause a deadlock

#8343: Combining 2 filters into 1 filter results in all packets being forwarded.

#8100: (Support-ID 8041) ntservice stops responding if system runs out of memory.

#8099: When ntstart.sh fails, you are required to run ntstop.sh before trying again

#7984: When restarting a PPS application the adapter could take up to a minute to get in sync.

#7968: (Support-ID 7962) Statistic example is clearing the statistic in every loop. Intro description about NT_StatRead() is wrong.

#7930: (Support-ID 7900) The total number of hostbuffers allocated for one adapter for systems with more than one numanode can exceed 32.

#7740: The ntservice.ini parameter "OsTimeSync" is not supported by NT40E2-4, but ntstart.sh succeeds

#7466: (Support-ID 7422) The hashmode example in the reference documentation DN-0449 is wrong.
HashMode = Hash5Tuple
Assign[StreamId = 1; Priority = 0; StreamId=(0..6)] = Layer4Protocol == UDP, TCP
Assign[StreamId = 1; Priority = 2; StreamId=7] = All

#7398: (Support-ID 7388) >>ERROR | SRV | 20411 - SPIv1[0:1500]: Opcode 0120 returned error 80. Is the opcode supported by this AVR version?
May appear if the driver is run on an adapter fitted with an AVR version prior to 1.1.

#7368: NTBPE as virtual adapter 0 cause statistics stall

#7345: (Support-ID 7906) Running with multiple streamids all starting at the same time can cause time stamp merge errors and ntservice hang.

#7342: (Support-ID 7332) Just after start of ntservice the link state (and NIM state) might be reported as unknown since it has not been read yet. This might also be the case after a NIM has been plugged into a port.

#7290: If the NTBPE programming switch is engaged, ntservice will start, but all access to the adapter will fail.

#7289: (Support-ID 7220) Confusing error messages like "IOCTL for IOCTL_LOCKS_GET_SHARED failed with errno 14 [Bad address]" are printed if the ntservice is not loaded or ready.

#7279: NT_NetRxGet() will return NT_SUCCESS even when there is no data on the segment interface.

#7241: (Support-ID 7230) The ntpl tool does not expand macros when run with -v option.

#7238: (Support-ID 7120) Latency might have high variation on default configurations:
To achieve latency stability the use of affinity is needed. On linux a combination of kernel boot parameter ISOLCPUS, sched_setaffinity() and sched_setscheduler() is needed to achieve optimal latency stability.
As example the following setup could be used:
*) Set kernel boot parameter: isolcpus=2,3,6,7
*) Start 3GD limiting it to use core 2 and 3: taskset -pc 2,3 /opt/napatech3/bin/ntstart.sh
*)Run application on core 6,7 with SCHED_RR

#7142: Host buffer poll method auto detection is failing for kernels < 2.6.24 causing packet loss.

#7127: (Support-ID 7093) Unexpected behavior of SliceOffset=0 in NTPL command

#7033: (Support-ID 6901) HashAllVLANIds gives valid hash even though there are no VLAN tags in the packets

#7001: The version of the NT-TSE or NT-TSU cannot be read from the driver. This does not affect the functionality, only visibility.

#3635: Driver cannot load on IOMMU enabled systems

napatech

## From version 02.03.04 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11515: Added support for NT4E2-4-PTP FPGA image: 200-9226-50-04

#11310: For an adapter using the INLINE profile, an attempt to use the NTAPI to look up the RX/TX path delays returns the status code NOT_SUPPORTED even if the path delays are known. This restriction is no longer present, and it is possible to request the path delays for an adapter using the INLINE profile. Note that the driver returns NOT_SUPPORTED if the delays are unknown.

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

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NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11030: A screen dump feature is added to the tools monitoring and profiling. By hitting the key 'F' a copy of the screen is saved to disk. The screen dump is appended to the saved screen dump. The names of the screen dump files are monitoring.scn and profiling.scn respectively.

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#10899: An Info log has been added for each adapter that has PpsIn defined and where it should be used to do PPS time sync. The log is not written if the PpsIn are only used for sampling.
Info text: Adapter 0: PpsIn is defined for this adapter. Use an external PPS tool or application to start PPS time sync.

#10787: (Support-ID 10551) FPGA feature level can now be read using the API. It is a part of the NtInfoAdapter_v5_s structure and can be read using the info stream.

#10714: Added new command line option (-l, --logmsg) to ntlog tool to write a custom line of text to the ntservice log system.

#10687: Added the ability to filter on inner tunnel layer 3 and layer 4 though the NTPL Data filter. This feature requires matching FPGA feature set. See filter documentation for details.

#10684: Added the ability to slice packets within a tunnel though the NTPL assign command. This feature requires matching FPGA feature set. See filter documentation for details.

#10501: Wis mode can now be enabled pr port by using the wisModeMask parameter which has been added to ntservice,ini

#10400: If TxTiming=RELATIVE the max inter-frame gap is set to 2.6sec.

#10168: NTPORT4E now supported

#10109: (Support-ID 10105) The example program named info_example.c now retrieves and prints basic product (adapter) information, such as the serial number, based on information in the NtInfoProductInfo_s structure.

#10046: The execution of a timesync hard reset to a reference initiated by an application through the NTAPI interface, has changed to execute a hard reset (time jump) for which the execution is unaffected by the current time skew and the hard reset threshold value (i.e. immediately executed). In earlier versions the current time skew was compared to the hard reset threshold value to determine if the hard reset should occur or not.

#9962: Enable swapping of hashdata from tunnels when connecting to a SPAN port

#9937: Support for NTBPE removed.

#9880: Added driver support for the following legacy FPGA images:
NT20E2: 200-9220-44-10 and 200-9220-44-12
NT40E2-4: 200-9221-44-12 and 200-9221-44-13
NT40E2-1: 200-9222-44-06 and 200-9222-44-08

#9586: Alarms are now generated when the status of an external NT-TSU or NT-TSE looses the synchronization signal, synchronization or Time of Day information. The alarms are sent as events:
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_SYNC_SIGNAL
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_OUT_OF_SYNC
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_TIME_OF_DAY
This information is still logged as INFO in the ntlog.

#9494: There is a small delay from the time a frame enters a network port and until the adapter time-stamps it. An application can now query the driver for this RX path delay and subtract it from the time stamp in the packet descriptor. See DN-0449 section Path Delay for more information.

#9492: Added option "--installpath PATH" to ".run" files to change default installation folder.

#9491: Added option to run an ntpl.config file with ntstart.sh.

#9490: Deduplication supports padded frames and IP header masks of i.e. TTL and checksum fields. Moreover a dedup CRC can be forwarded to host application using extended descriptor 9 to support a hardware-accelerated deduplication application. This feature can be enable/disabled using the NTPL Deduplication options IPLengthLimit and IPv4/IPv6. This feature requires a matching FPGA version.

#9447: (Support-ID 8890) Added inline bump in the wire example to DN-0449

#9444: Doxygen documentation updated in NTPL data section

#9232: (Support-ID 9105) NT_NetFileGet() now automatically rewinds the file when NT_STATUS_END_OF_FILE is returned. This will allow NT_NetFileGet() to be called after NT_STATUS_END_OF_FILE and return to the start of the file.

#9147: The delay asymmetry configuration option is added to the PTP protocol.

#9088: TimeSyncFrequencyReferencePriority added to the ntservice.ini file

#9074: On the PTP port, statistics including CRC errors are displayed in the monitoring tool for debug purposes. All the information can be obtained using NTAPI

#9027: TX host buffers can now be prefilled with data and replayed continuously without needing to memcpy packets.

#8984: Support for NT20E enabled

#8760: Added NUMA node information to info stream.

#8604: NT_NetRxOpenMulti() has been added to the API to enable merging traffic from multiple stream-ids

#8500: PDV filter has been implemented in order to increase performance in non-PTP aware network

#8437: The installation now honors the TMPDIR environment setting during the installation to specify an alternative temporary directory.

#8369: Time jumps in OS timesync mode has been implemented.

TimeSyncTimeJumpThreshold = 0, enables smooth sliding
TimeSyncTimeJumpThreshold = <any integer value different from 0> enables time jumps with threshold of 1 sec. If offset is more than 1 sec, a hard time jump will occur.

The default setting is TimeSyncTimeJumpThreshold = 1. This is the default setting used in the ini file in this and previous releases. If you are running with the default ini file, time jumps are default enabled. In previous releases the setting of TimeSyncTimeJumpThreshold had no effect in OS timesync mode.

#8340: Added the ability to reuse the protocol filters to have more than 8 filters using a protocol

#8305: (Support-ID 7892) Enabled possibility to tweak the NT4E-INL and NT4E-STD-INL adapter Tx engine to transmit faster when running with the TrafficGen-profile. Add this to the inifile to achieve it:
[Debug]
nt4etxadjust=8

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

#8052: Stream-id based statistics are now available via the statistics stream and can be monitored using the monitoring tool. Stream-ids can be activated/deactivated using NTPL, to control the sync point when packets starts entering the stream-id host-buffers and when statistics should count them, see the streamidstatistics.c example.

#7975: It has been made possible to run will multiple tx streams addressing the same port when using the TrafficGen profile. The rule is that packets has be to sent with NT_NET_SET_PKT_TXNOW(1) otherwise the behavior is unpredictable.

#7931: A define NT_ERRBUF_SIZE added to indicate the maximum error length size that can be delivered by the driver. This define should be used when allocating a buffer for reading an error message.

#7928: npcap.ini added to the supportinfo archive.

#7894: Added support for per filter descriptor selection. The feature is available through the "Assign" command in NTPL. This feature requires matching FPGA.

#7823: Configuration parameter TimeSyncTimeOffset now has a limit of 1000000 ns (1 ms)

#7807: (Support-ID 7327) NTAPI NT_NetFile...() functions do not connect to NTservice anymore - and thus do not require NTservice to be running.
This change is to allow an user application to process captured files through the NTAPI NT_NetFile...() functions on systems that do not have NTservice running nor a Napatech adapter installed.

NTAPI functions affected by the change:

NT_NetFileOpen()
NT_NetFileGet()
NT_NetFileRelease()
NT_NetFileClose()

The example readcapfile (examples/net/readcapfile/readcapfile.c) demonstrates a possible use.

#7805: Alarms have been added to monitor when an external NTTSU or NTTSE connected through NT-TS timesync looses synchronization with it's time source. The possible alarms are:
NT-TS: External device lost synchronization signal
NT-TS: External device is out of synchronization
NT-TS: External device lost time of day information

#7792: Changing the hash seed is now possible in ntservice.ini using the HashSeed option. Changing the hash seed will effect the data distribution on the streams.

#7758: The info stream has been extended to contain information of:
SDRAM present and SDRAM size
PCI bus information
Adapter features - Bypass support.

#7732: It is now possible to synchronize the operating system's clock with (to) the clock of a designated adapter. The feature is enabled by setting the configuration parameter TimeSyncOsTimeReference in the System section. For instance to synchronize the server clock with adapter zero, specify TimeSyncOsTimeReference=adapter-0. It requires an FPGA with support for synchronization of OS time.

#7730: An event and a log will be generated when the adapter's time stamp clock is set by the system.

#7728: IEEE1588 support is implemented on NT4E2_PTP and NT20E2_PTP adapter. (dedicated RJ45)

#7719: The data filter hardware supports up to 255 values for each 1 byte filter, however the NTPL limits this to specifying 8 values or one range. This is changed to support up to 32 values or 16 ranges or a mix of the two. When using a range it will take up the space of 2 values. When specifying 8 ranges only 16 values can be used.

#7715: A new feature - host loopback - has been added to the port settings structure. Applying loopback to a port means that data transmitted from the host on the port is looped back to the same port. Since the loopback is applied inside the adapter, it will work independently of whether a NIM is actually present or not, and the link will always be reported as up.
If put in loopback mode, the monitoring tool will show the link state as "Loopback". The config tool can be used to apply loopback, and the diagnostics tool can be used to test loopback if using a new feature: single- port- loop.

#7703: Added support for swapping the source and destination IP address regardless of value before calculating hash value. This enables traffic to/from the entire subnets to be balanced between streams. See Hash Mode command documentation for more details. This feature requires a matching FPGA.

#7699: Added 2 and 5 tuple sorted and unsorted hash modes on IPv4 and IPv6 encapsulated IP traffic. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7694: Added 2 and 5 tuple hash (sorted and unsorted) modes on IPv4 and IPv6 traffic inside a GTPv1 tunnel. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7433: The command to setup numanodes, "Setup[numanode=0]=streamid==x,y,z" can now contain up 32 streamids.

#7406: The driver now supports up to 8 adapters in one server.

#7397: (Support-ID 7435) Added support for filtering on decode error e.g "Assign[StreamId = 1] = DecodeError == TRUE" will redirect all packages with decode errors to stream 1.

#7392: (Support-ID 7333) Check for mismatching version of NTService and version of the low level driver has been added.

#7222: Check if IOMMU is enabled are added for kernels larger or equal to version 3.2. Driver fails if IOMMU is enabled.

#7169: Added support for Linux 3.x

#7167: Added support for the NT40E2_1 adapter.

#7141: (Support-ID 6797) The description of NT_NetRxGet timeout functionality in DN-0449 has been improved

#7065: The adapter will now be able to identify connected NT-TS synched adapters, NT-TSUs and NT-TSEs. The information can be seen through the API or using the monitoring tool.

#7062: Added support for Customer specific User data in the VPD.

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#13999: (Support-ID 13958) Offline NUMA nodes may prevent the driver from starting up. A NUMA node is either online or offline; a NUMA node is usually offline when it has no memory assigned. The driver will not start when at least one offline NUMA node creates a hole in the sequence of NUMA nodes. For instance, in a server with two NUMA nodes, where NUMA node zero is offline and NUMA node one is online, the driver will not start.

#13461: (Support-ID 13419) When using TimeSyncProtocol = NT and OsTimeSyncFailover = ENABLED, then NT-TS may never be activated.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#10530: ntservice may crash while shutting down when applications using the NTAPI are still running.

#9911: NT_NET_UPDATE_PKT_L2_PTR macro fails when compiled in a .cpp file

#9877: (Support-ID 9622) The supportinfo "hostbuffer info" part is not sampled atomic, the lastTxOff was captured after RdOff and WrOff causing it to look like lastTxOff is exceeding its limits.

#9814: (Support-ID 8749) Missing return type documentation for macro NT_NET_GET_PKT_L2_PTR

#9714: StreamId mismatch in API logging in NT_NetRxOpen()/NT_NetRxClose()

#9713: (Support-ID 9704) HBH crash on kernels with CONFIG_HZ_5000=y.

#9695: If the Event requesting the absolut time in PPS or the reply arrives delayed, this could cause the adapter to errornously fall out of sync for a number of seconds.

#9694: (Support-ID 9691) The config tool cannot configure triple speed copper SFPs on a NT4E-4 adapter.

#9326: (Support-ID 9300) The driver issues a wrong error message if driver load fails due to insufficient contiguous DMA memory.

#8901: (Support-ID 8886) HashMask command is setting all HashWords to '00'. Work around is to insure that all HashMask words are defined in the NTPL expression. e.g HashWord0 = 0xffffffff; HashWord1 = 0xffffffff ...

#8871: GEN2 adapters could potentially overwrite memory when ntservice is restarted.

#8699: Running with NT_NET_INTERFACE_SEGMENT while deleting/assigning filters could cause a deadlock

#8375: Multi get usage of NT_NetTxGet() can cause a dead lock when the entire host buffer is get.

#8343: Combining 2 filters into 1 filter results in all packets being forwarded.

#8100: (Support-ID 8041) ntservice stops responding if system runs out of memory.

#8099: When ntstart.sh fails, you are required to run ntstop.sh before trying again

#7984: When restarting a PPS application the adapter could take up to a minute to get in sync.

#7973: (Support-ID 7925) If transmitting on ports that have not had link, the transmit rate on NT4e is 10Mbps

#7968: (Support-ID 7962) Statistic example is clearing the statistic in every loop. Intro description about NT_StatRead() is wrong.

#7930: (Support-ID 7900) The total number of hostbuffers allocated for one adapter for systems with more than one numanode can exceed 32.

#7740: The ntservice.ini parameter "OsTimeSync" is not supported by NT40E2-4, but ntstart.sh succeeds

#7466: (Support-ID 7422) The hashmode example in the reference documentation DN-0449 is wrong.
HashMode = Hash5Tuple
Assign[StreamId = 1; Priority = 0; StreamId=(0..6)] = Layer4Protocol == UDP, TCP
Assign[StreamId = 1; Priority = 2; StreamId=7] = All

#7398: (Support-ID 7388) >>ERROR | SRV | 20411 - SPIv1[0:1500]: Opcode 0120 returned error 80. Is the opcode supported by this AVR version?
May appear if the driver is run on an adapter fitted with an AVR version prior to 1.1.

#7368: NTBPE as virtual adapter 0 cause statistics stall

#7345: (Support-ID 7906) Running with multiple streamids all starting at the same time can cause time stamp merge errors and ntservice hang.

#7342: (Support-ID 7332) Just after start of ntservice the link state (and NIM state) might be reported as unknown since it has not been read yet. This might also be the case after a NIM has been plugged into a port.

#7290: If the NTBPE programming switch is engaged, ntservice will start, but all access to the adapter will fail.

#7289: (Support-ID 7220) Confusing error messages like "IOCTL for IOCTL_LOCKS_GET_SHARED failed with errno 14 [Bad address]" are printed if the ntservice is not loaded or ready.

#7279: NT_NetRxGet() will return NT_SUCCESS even when there is no data on the segment interface.

#7241: (Support-ID 7230) The ntpl tool does not expand macros when run with -v option.

#7238: (Support-ID 7120) Latency might have high variation on default configurations:
To achieve latency stability the use of affinity is needed. On linux a combination of kernel boot parameter ISOLCPUS, sched_setaffinity() and sched_setscheduler() is needed to achieve optimal latency stability.
As example the following setup could be used:
*) Set kernel boot parameter: isolcpus=2,3,6,7
*) Start 3GD limiting it to use core 2 and 3: taskset -pc 2,3 /opt/napatech3/bin/ntstart.sh
*)Run application on core 6,7 with SCHED_RR

#7142: Host buffer poll method auto detection is failing for kernels < 2.6.24 causing packet loss.

#7127: (Support-ID 7093) Unexpected behavior of SliceOffset=0 in NTPL command

#7033: (Support-ID 6901) HashAllVLANIds gives valid hash even though there are no VLAN tags in the packets

#7001: The version of the NT-TSE or NT-TSU cannot be read from the driver. This does not affect the functionality, only visibility.

#3635: Driver cannot load on IOMMU enabled systems

napatech

## From version 02.03.02 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11515: Added support for NT4E2-4-PTP FPGA image: 200-9226-50-04

#11310: For an adapter using the INLINE profile, an attempt to use the NTAPI to look up the RX/TX path delays returns the status code NOT_SUPPORTED even if the path delays are known. This restriction is no longer present, and it is possible to request the path delays for an adapter using the INLINE profile. Note that the driver returns NOT_SUPPORTED if the delays are unknown.

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11030: A screen dump feature is added to the tools monitoring and profiling. By hitting the key 'F' a copy of the screen is saved to disk. The screen dump is appended to the saved screen dump. The names of the screen dump files are monitoring.scn and profiling.scn respectively.

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#10899: An Info log has been added for each adapter that has PpsIn defined and where it should be used to do PPS time sync. The log is not written if the PpsIn are only used for sampling.
Info text: Adapter 0: PpsIn is defined for this adapter. Use an external PPS tool or application to start PPS time sync.

#10787: (Support-ID 10551) FPGA feature level can now be read using the API. It is a part of the NtInfoAdapter_v5_s structure and can be read using the info stream.

#10714: Added new command line option (-l, --logmsg) to ntlog tool to write a custom line of text to the ntservice log system.

#10687: Added the ability to filter on inner tunnel layer 3 and layer 4 though the NTPL Data filter. This feature requires matching FPGA feature set. See filter documentation for details.

#10684: Added the ability to slice packets within a tunnel though the NTPL assign command. This feature requires matching FPGA feature set. See filter documentation for details.

#10501: Wis mode can now be enabled pr port by using the wisModeMask parameter which has been added to ntservice,ini

#10400: If TxTiming=RELATIVE the max inter-frame gap is set to 2.6sec.

#10168: NTPORT4E now supported

#10109: (Support-ID 10105) The example program named info_example.c now retrieves and prints basic product (adapter) information, such as the serial number, based on information in the NtInfoProductInfo_s structure.

#10046: The execution of a timesync hard reset to a reference initiated by an application through the NTAPI interface, has changed to execute a hard reset (time jump) for which the execution is unaffected by the current time skew and the hard reset threshold value (i.e. immediately executed). In earlier versions the current time skew was compared to the hard reset threshold value to determine if the hard reset should occur or not.

#9962: Enable swapping of hashdata from tunnels when connecting to a SPAN port

#9937: Support for NTBPE removed.

#9880: Added driver support for the following legacy FPGA images:
NT20E2: 200-9220-44-10 and 200-9220-44-12
NT40E2-4: 200-9221-44-12 and 200-9221-44-13
NT40E2-1: 200-9222-44-06 and 200-9222-44-08

#9586: Alarms are now generated when the status of an external NT-TSU or NT-TSE looses the synchronization signal, synchronization or Time of Day information. The alarms are sent as events:
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_SYNC_SIGNAL
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_OUT_OF_SYNC
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_TIME_OF_DAY
This information is still logged as INFO in the ntlog.

#9494: There is a small delay from the time a frame enters a network port and until the adapter time-stamps it. An application can now query the driver for this RX path delay and subtract it from the time stamp in the packet descriptor. See DN-0449 section Path Delay for more information.

#9492: Added option "--installpath PATH" to ".run" files to change default installation folder.

#9491: Added option to run an ntpl.config file with ntstart.sh.

#9490: Deduplication supports padded frames and IP header masks of i.e. TTL and checksum fields. Moreover a dedup CRC can be forwarded to host application using extended descriptor 9 to support a hardware-accelerated deduplication application. This feature can be enable/disabled using the NTPL Deduplication options IPLengthLimit and IPv4/IPv6. This feature requires a matching FPGA version.

#9447: (Support-ID 8890) Added inline bump in the wire example to DN-0449

#9444: Doxygen documentation updated in NTPL data section

#9232: (Support-ID 9105) NT_NetFileGet() now automatically rewinds the file when NT_STATUS_END_OF_FILE is returned. This will allow NT_NetFileGet() to be called after NT_STATUS_END_OF_FILE and return to the start of the file.

#9147: The delay asymmetry configuration option is added to the PTP protocol.

#9088: TimeSyncFrequencyReferencePriority added to the ntservice.ini file

#9074: On the PTP port, statistics including CRC errors are displayed in the monitoring tool for debug purposes. All the information can be obtained using NTAPI

#9027: TX host buffers can now be prefilled with data and replayed continuously without needing to memcpy packets.

#8984: Support for NT20E enabled

#8760: Added NUMA node information to info stream.

#8604: NT_NetRxOpenMulti() has been added to the API to enable merging traffic from multiple stream-ids

#8500: PDV filter has been implemented in order to increase performance in non-PTP aware network

#8437: The installation now honors the TMPDIR environment setting during the installation to specify an alternative temporary directory.

#8369: Time jumps in OS timesync mode has been implemented.

TimeSyncTimeJumpThreshold = 0, enables smooth sliding
TimeSyncTimeJumpThreshold = <any integer value different from 0> enables time jumps with threshold of 1 sec. If offset is more than 1 sec, a hard time jump will occur.

The default setting is TimeSyncTimeJumpThreshold = 1. This is the default setting used in the ini file in this and previous releases. If you are running with the default ini file, time jumps are default enabled. In previous releases the setting of TimeSyncTimeJumpThreshold had no effect in OS timesync mode.

#8340: Added the ability to reuse the protocol filters to have more than 8 filters using a protocol

#8305: (Support-ID 7892) Enabled possibility to tweak the NT4E-INL and NT4E-STD-INL adapter Tx engine to transmit faster when running with the TrafficGen-profile. Add this to the inifile to achieve it:
[Debug]
nt4etxadjust=8

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

#8052: Stream-id based statistics are now available via the statistics stream and can be monitored using the monitoring tool. Stream-ids can be activated/deactivated using NTPL, to control the sync point when packets starts entering the stream-id host-buffers and when statistics should count them, see the streamidstatistics.c example.

#7975: It has been made possible to run will multiple tx streams addressing the same port when using the TrafficGen profile. The rule is that packets has be to sent with NT_NET_SET_PKT_TXNOW(1) otherwise the behavior is unpredictable.

#7931: A define NT_ERRBUF_SIZE added to indicate the maximum error length size that can be delivered by the driver. This define should be used when allocating a buffer for reading an error message.

#7928: npcap.ini added to the supportinfo archive.

#7894: Added support for per filter descriptor selection. The feature is available through the "Assign" command in NTPL. This feature requires matching FPGA.

#7823: Configuration parameter TimeSyncTimeOffset now has a limit of 1000000 ns (1 ms)

#7807: (Support-ID 7327) NTAPI NT_NetFile...() functions do not connect to NTservice anymore - and thus do not require NTservice to be running.
This change is to allow an user application to process captured files through the NTAPI NT_NetFile...() functions on systems that do not have NTservice running nor a Napatech adapter installed.

NTAPI functions affected by the change:

NT_NetFileOpen()
NT_NetFileGet()
NT_NetFileRelease()
NT_NetFileClose()

The example readcapfile (examples/net/readcapfile/readcapfile.c) demonstrates a possible use.

#7805: Alarms have been added to monitor when an external NTTSU or NTTSE connected through NT-TS timesync looses synchronization with it's time source. The possible alarms are:
NT-TS: External device lost synchronization signal
NT-TS: External device is out of synchronization
NT-TS: External device lost time of day information

#7792: Changing the hash seed is now possible in ntservice.ini using the HashSeed option. Changing the hash seed will effect the data distribution on the streams.

#7758: The info stream has been extended to contain information of:
SDRAM present and SDRAM size
PCI bus information
Adapter features - Bypass support.

#7732: It is now possible to synchronize the operating system's clock with (to) the clock of a designated adapter. The feature is enabled by setting the configuration parameter TimeSyncOsTimeReference in the System section. For instance to synchronize the server clock with adapter zero, specify TimeSyncOsTimeReference=adapter-0. It requires an FPGA with support for synchronization of OS time.

#7730: An event and a log will be generated when the adapter's time stamp clock is set by the system.

#7728: IEEE1588 support is implemented on NT4E2_PTP and NT20E2_PTP adapter. (dedicated RJ45)

#7719: The data filter hardware supports up to 255 values for each 1 byte filter, however the NTPL limits this to specifying 8 values or one range. This is changed to support up to 32 values or 16 ranges or a mix of the two. When using a range it will take up the space of 2 values. When specifying 8 ranges only 16 values can be used.

#7715: A new feature - host loopback - has been added to the port settings structure. Applying loopback to a port means that data transmitted from the host on the port is looped back to the same port. Since the loopback is applied inside the adapter, it will work independently of whether a NIM is actually present or not, and the link will always be reported as up.
If put in loopback mode, the monitoring tool will show the link state as "Loopback". The config tool can be used to apply loopback, and the diagnostics tool can be used to test loopback if using a new feature: single- port- loop.

#7703: Added support for swapping the source and destination IP address regardless of value before calculating hash value. This enables traffic to/from the entire subnets to be balanced between streams. See Hash Mode command documentation for more details. This feature requires a matching FPGA.

#7699: Added 2 and 5 tuple sorted and unsorted hash modes on IPv4 and IPv6 encapsulated IP traffic. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7694: Added 2 and 5 tuple hash (sorted and unsorted) modes on IPv4 and IPv6 traffic inside a GTPv1 tunnel. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7433: The command to setup numanodes, "Setup[numanode=0]=streamid==x,y,z" can now contain up 32 streamids.

#7406: The driver now supports up to 8 adapters in one server.

#7397: (Support-ID 7435) Added support for filtering on decode error e.g "Assign[StreamId = 1] = DecodeError == TRUE" will redirect all packages with decode errors to stream 1.

#7392: (Support-ID 7333) Check for mismatching version of NTService and version of the low level driver has been added.

#7222: Check if IOMMU is enabled are added for kernels larger or equal to version 3.2. Driver fails if IOMMU is enabled.

#7169: Added support for Linux 3.x

#7167: Added support for the NT40E2_1 adapter.

#7141: (Support-ID 6797) The description of NT_NetRxGet timeout functionality in DN-0449 has been improved

#7065: The adapter will now be able to identify connected NT-TS synched adapters, NT-TSUs and NT-TSEs. The information can be seen through the API or using the monitoring tool.

#7062: Added support for Customer specific User data in the VPD.

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#13999: (Support-ID 13958) Offline NUMA nodes may prevent the driver from starting up. A NUMA node is either online or offline; a NUMA node is usually offline when it has no memory assigned. The driver will not start when at least one offline NUMA node creates a hole in the sequence of NUMA nodes. For instance, in a server with two NUMA nodes, where NUMA node zero is offline and NUMA node one is online, the driver will not start.

#13461: (Support-ID 13419) When using TimeSyncProtocol = NT and OsTimeSyncFailover = ENABLED, then NT-TS may never be activated.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#10530: ntservice may crash while shutting down when applications using the NTAPI are still running.

#9911: NT_NET_UPDATE_PKT_L2_PTR macro fails when compiled in a .cpp file

#9877: (Support-ID 9622) The supportinfo "hostbuffer info" part is not sampled atomic, the lastTxOff was captured after RdOff and WrOff causing it to look like lastTxOff is exceeding its limits.

#9814: (Support-ID 8749) Missing return type documentation for macro NT_NET_GET_PKT_L2_PTR

#9714: StreamId mismatch in API logging in NT_NetRxOpen()/NT_NetRxClose()

#9713: (Support-ID 9704) HBH crash on kernels with CONFIG_HZ_5000=y.

#9695: If the Event requesting the absolut time in PPS or the reply arrives delayed, this could cause the adapter to errornously fall out of sync for a number of seconds.

#9694: (Support-ID 9691) The config tool cannot configure triple speed copper SFPs on a NT4E-4 adapter.

#9326: (Support-ID 9300) The driver issues a wrong error message if driver load fails due to insufficient contiguous DMA memory.

#8901: (Support-ID 8886) HashMask command is setting all HashWords to '00'. Work around is to insure that all HashMask words are defined in the NTPL expression. e.g HashWord0 = 0xffffffff; HashWord1 = 0xffffffff ...

#8871: GEN2 adapters could potentially overwrite memory when ntservice is restarted.

#8699: Running with NT_NET_INTERFACE_SEGMENT while deleting/assigning filters could cause a deadlock

#8375: Multi get usage of NT_NetTxGet() can cause a dead lock when the entire host buffer is get.

#8343: Combining 2 filters into 1 filter results in all packets being forwarded.

#8100: (Support-ID 8041) ntservice stops responding if system runs out of memory.

#7984: When restarting a PPS application the adapter could take up to a minute to get in sync.

#7973: (Support-ID 7925) If transmitting on ports that have not had link, the transmit rate on NT4e is 10Mbps

#7968: (Support-ID 7962) Statistic example is clearing the statistic in every loop. Intro description about NT_StatRead() is wrong.

#7930: (Support-ID 7900) The total number of hostbuffers allocated for one adapter for systems with more than one numanode can exceed 32.

#7922: (Support-ID 7620) If the time reference is delayed in the PPS absolute timesync function, this may give an un-expected glitch in the timesync precision.

#7880: Running with a profile != INLINE the ntservice CPU load is dependent on the host buffer size

#7740: The ntservice.ini parameter "OsTimeSync" is not supported by NT40E2-4, but ntstart.sh succeeds

#7466: (Support-ID 7422) The hashmode example in the reference documentation DN-0449 is wrong. HashMode = Hash5Tuple

Assign[StreamId = 1; Priority = 0; StreamId=(0..6)] = Layer4Protocol == UDP, TCP
Assign[StreamId = 1; Priority = 2; StreamId=7] = All

#7398: (Support-ID 7388) >>ERROR | SRV | 20411 - SPIv1[0:1500]: Opcode 0120 returned error 80. Is the opcode supported by this AVR version?
May appear if the driver is run on an adapter fitted with an AVR version prior to 1.1.

#7368: NTBPE as virtual adapter 0 cause statistics stall

#7345: (Support-ID 7906) Running with multiple streamids all starting at the same time can cause time stamp merge errors and ntservice hang.

#7342: (Support-ID 7332) Just after start of ntservice the link state (and NIM state) might be reported as unknown since it has not been read yet. This might also be the case after a NIM has been plugged into a port.

#7290: If the NTBPE programming switch is engaged, ntservice will start, but all access to the adapter will fail.

#7289: (Support-ID 7220) Confusing error messages like "IOCTL for IOCTL_LOCKS_GET_SHARED failed with errno 14 [Bad address]" are printed if the ntservice is not loaded or ready.

#7279: NT_NetRxGet() will return NT_SUCCESS even when there is no data on the segment interface.

#7241: (Support-ID 7230) The ntpl tool does not expand macros when run with -v option.

#7238: (Support-ID 7120) Latency might have high variation on default configurations:
To achieve latency stability the use of affinity is needed. On linux a combination of kernel boot parameter ISOLCPUS, sched_setaffinity() and sched_setscheduler() is needed to achieve optimal latency stability.
As example the following setup could be used:
*) Set kernel boot parameter: isolcpus=2,3,6,7
*) Start 3GD limiting it to use core 2 and 3: taskset -pc 2,3 /opt/napatech3/bin/ntstart.sh
*)Run application on core 6,7 with SCHED_RR

#7142: Host buffer poll method auto detection is failing for kernels < 2.6.24 causing packet loss.

#7127: (Support-ID 7093) Unexpected behavior of SliceOffset=0 in NTPL command

#7033: (Support-ID 6901) HashAllVLANIds gives valid hash even though there are no VLAN tags in the packets

#7001: The version of the NT-TSE or NT-TSU cannot be read from the driver. This does not affect the functionality, only visibility.

#3635: Driver cannot load on IOMMU enabled systems

napatech

## From version 02.03.01 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11515: Added support for NT4E2-4-PTP FPGA image: 200-9226-50-04

#11310: For an adapter using the INLINE profile, an attempt to use the NTAPI to look up the RX/TX path delays returns the status code NOT_SUPPORTED even if the path delays are known. This restriction is no longer present, and it is possible to request the path delays for an adapter using the INLINE profile. Note that the driver returns NOT_SUPPORTED if the delays are unknown.

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11030: A screen dump feature is added to the tools monitoring and profiling. By hitting the key 'F' a copy of the screen is saved to disk. The screen dump is appended to the saved screen dump. The names of the screen dump files are monitoring.scn and profiling.scn respectively.

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#10899: An Info log has been added for each adapter that has PpsIn defined and where it should be used to do PPS time sync. The log is not written if the PpsIn are only used for sampling.
Info text: Adapter 0: PpsIn is defined for this adapter. Use an external PPS tool or application to start PPS time sync.

#10787: (Support-ID 10551) FPGA feature level can now be read using the API. It is a part of the NtInfoAdapter_v5_s structure and can be read using the info stream.

#10714: Added new command line option (-l, --logmsg) to ntlog tool to write a custom line of text to the ntservice log system.

#10687: Added the ability to filter on inner tunnel layer 3 and layer 4 though the NTPL Data filter. This feature requires matching FPGA feature set. See filter documentation for details.

#10684: Added the ability to slice packets within a tunnel though the NTPL assign command. This feature requires matching FPGA feature set. See filter documentation for details.

#10501: Wis mode can now be enabled pr port by using the wisModeMask parameter which has been added to ntservice,ini

#10400: If TxTiming=RELATIVE the max inter-frame gap is set to 2.6sec.

#10168: NTPORT4E now supported

#10109: (Support-ID 10105) The example program named info_example.c now retrieves and prints basic product (adapter) information, such as the serial number, based on information in the NtInfoProductInfo_s structure.

#10046: The execution of a timesync hard reset to a reference initiated by an application through the NTAPI interface, has changed to execute a hard reset (time jump) for which the execution is unaffected by the current time skew and the hard reset threshold value (i.e. immediately executed). In earlier versions the current time skew was compared to the hard reset threshold value to determine if the hard reset should occur or not.

#9962: Enable swapping of hashdata from tunnels when connecting to a SPAN port

#9937: Support for NTBPE removed.

#9880: Added driver support for the following legacy FPGA images:
NT20E2: 200-9220-44-10 and 200-9220-44-12
NT40E2-4: 200-9221-44-12 and 200-9221-44-13
NT40E2-1: 200-9222-44-06 and 200-9222-44-08

#9586: Alarms are now generated when the status of an external NT-TSU or NT-TSE looses the synchronization signal, synchronization or Time of Day information. The alarms are sent as events:
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_SYNC_SIGNAL
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_OUT_OF_SYNC
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_TIME_OF_DAY
This information is still logged as INFO in the ntlog.

#9494: There is a small delay from the time a frame enters a network port and until the adapter time-stamps it. An application can now query the driver for this RX path delay and subtract it from the time stamp in the packet descriptor. See DN-0449 section Path Delay for more information.

#9492: Added option "--installpath PATH" to ".run" files to change default installation folder.

#9491: Added option to run an ntpl.config file with ntstart.sh.

#9490: Deduplication supports padded frames and IP header masks of i.e. TTL and checksum fields. Moreover a dedup CRC can be forwarded to host application using extended descriptor 9 to support a hardware-accelerated deduplication application. This feature can be enable/disabled using the NTPL Deduplication options IPLengthLimit and IPv4/IPv6. This feature requires a matching FPGA version.

#9447: (Support-ID 8890) Added inline bump in the wire example to DN-0449

#9444: Doxygen documentation updated in NTPL data section

#9232: (Support-ID 9105) NT_NetFileGet() now automatically rewinds the file when NT_STATUS_END_OF_FILE is returned. This will allow NT_NetFileGet() to be called after NT_STATUS_END_OF_FILE and return to the start of the file.

#9147: The delay asymmetry configuration option is added to the PTP protocol.

#9088: TimeSyncFrequencyReferencePriority added to the ntservice.ini file

#9074: On the PTP port, statistics including CRC errors are displayed in the monitoring tool for debug purposes. All the information can be obtained using NTAPI

#9027: TX host buffers can now be prefilled with data and replayed continuously without needing to memcpy packets.

#8984: Support for NT20E enabled

#8760: Added NUMA node information to info stream.

#8604: NT_NetRxOpenMulti() has been added to the API to enable merging traffic from multiple stream-ids

#8500: PDV filter has been implemented in order to increase performance in non-PTP aware network

#8437: The installation now honors the TMPDIR environment setting during the installation to specify an alternative temporary directory.

#8369: Time jumps in OS timesync mode has been implemented.

TimeSyncTimeJumpThreshold = 0, enables smooth sliding
TimeSyncTimeJumpThreshold = <any integer value different from 0> enables time jumps with threshold of 1 sec. If offset is more than 1 sec, a hard time jump will occur.

The default setting is TimeSyncTimeJumpThreshold = 1. This is the default setting used in the ini file in this and previous releases. If you are running with the default ini file, time jumps are default enabled. In previous releases the setting of TimeSyncTimeJumpThreshold had no effect in OS timesync mode.

#8340: Added the ability to reuse the protocol filters to have more than 8 filters using a protocol

#8305: (Support-ID 7892) Enabled possibility to tweak the NT4E-INL and NT4E-STD-INL adapter Tx engine to transmit faster when running with the TrafficGen-profile. Add this to the inifile to achieve it:
[Debug]
nt4etxadjust=8

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

#8052: Stream-id based statistics are now available via the statistics stream and can be monitored using the monitoring tool. Stream-ids can be activated/deactivated using NTPL, to control the sync point when packets starts entering the stream-id host-buffers and when statistics should count them, see the streamidstatistics.c example.

#7975: It has been made possible to run will multiple tx streams addressing the same port when using the TrafficGen profile. The rule is that packets has be to sent with NT_NET_SET_PKT_TXNOW(1) otherwise the behavior is unpredictable.

#7931: A define NT_ERRBUF_SIZE added to indicate the maximum error length size that can be delivered by the driver. This define should be used when allocating a buffer for reading an error message.

#7928: npcap.ini added to the supportinfo archive.

#7894: Added support for per filter descriptor selection. The feature is available through the "Assign" command in NTPL. This feature requires matching FPGA.

#7823: Configuration parameter TimeSyncTimeOffset now has a limit of 1000000 ns (1 ms)

#7807: (Support-ID 7327) NTAPI NT_NetFile...() functions do not connect to NTservice anymore - and thus do not require NTservice to be running.
This change is to allow an user application to process captured files through the NTAPI NT_NetFile...() functions on systems that do not have NTservice running nor a Napatech adapter installed.

NTAPI functions affected by the change:

NT_NetFileOpen()
NT_NetFileGet()
NT_NetFileRelease()
NT_NetFileClose()

The example readcapfile (examples/net/readcapfile/readcapfile.c) demonstrates a possible use.

#7805: Alarms have been added to monitor when an external NTTSU or NTTSE connected through NT-TS timesync looses synchronization with it's time source. The possible alarms are:
NT-TS: External device lost synchronization signal
NT-TS: External device is out of synchronization
NT-TS: External device lost time of day information

#7792: Changing the hash seed is now possible in ntservice.ini using the HashSeed option. Changing the hash seed will effect the data distribution on the streams.

#7758: The info stream has been extended to contain information of:
SDRAM present and SDRAM size
PCI bus information
Adapter features - Bypass support.

#7732: It is now possible to synchronize the operating system's clock with (to) the clock of a designated adapter. The feature is enabled by setting the configuration parameter TimeSyncOsTimeReference in the System section. For instance to synchronize the server clock with adapter zero, specify TimeSyncOsTimeReference=adapter-0. It requires an FPGA with support for synchronization of OS time.

#7730: An event and a log will be generated when the adapter's time stamp clock is set by the system.

#7728: IEEE1588 support is implemented on NT4E2_PTP and NT20E2_PTP adapter. (dedicated RJ45)

#7719: The data filter hardware supports up to 255 values for each 1 byte filter, however the NTPL limits this to specifying 8 values or one range. This is changed to support up to 32 values or 16 ranges or a mix of the two. When using a range it will take up the space of 2 values. When specifying 8 ranges only 16 values can be used.

#7715: A new feature - host loopback - has been added to the port settings structure. Applying loopback to a port means that data transmitted from the host on the port is looped back to the same port. Since the loopback is applied inside the adapter, it will work independently of whether a NIM is actually present or not, and the link will always be reported as up.
If put in loopback mode, the monitoring tool will show the link state as "Loopback". The config tool can be used to apply loopback, and the diagnostics tool can be used to test loopback if using a new feature: single- port- loop.

#7703: Added support for swapping the source and destination IP address regardless of value before calculating hash value. This enables traffic to/from the entire subnets to be balanced between streams. See Hash Mode command documentation for more details. This feature requires a matching FPGA.

#7699: Added 2 and 5 tuple sorted and unsorted hash modes on IPv4 and IPv6 encapsulated IP traffic. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7694: Added 2 and 5 tuple hash (sorted and unsorted) modes on IPv4 and IPv6 traffic inside a GTPv1 tunnel. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7603: Support for FPGA images:
- 200-9220-45-07 (NT20E2)
- 200-9221-45-09 (NT40E2-4)

#7433: The command to setup numanodes, "Setup[numanode=0]=streamid==x,y,z" can now contain up 32 streamids.

#7406: The driver now supports up to 8 adapters in one server.

#7397: (Support-ID 7435) Added support for filtering on decode error e.g "Assign[StreamId = 1] = DecodeError == TRUE" will redirect all packages with decode errors to stream 1.

#7392: (Support-ID 7333) Check for mismatching version of NTService and version of the low level driver has been added.

#7222: Check if IOMMU is enabled are added for kernels larger or equal to version 3.2. Driver fails if IOMMU is enabled.

#7169: Added support for Linux 3.x

#7167: Added support for the NT40E2_1 adapter.

#7141: (Support-ID 6797) The description of NT_NetRxGet timeout functionality in DN-0449 has been improved

#7065: The adapter will now be able to identify connected NT-TS synched adapters, NT-TSUs and NT-TSEs. The information can be seen through the API or using the monitoring tool.

#7062: Added support for Customer specific User data in the VPD.

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#13999: (Support-ID 13958) Offline NUMA nodes may prevent the driver from starting up. A NUMA node is either online or offline; a NUMA node is usually offline when it has no memory assigned. The driver will not start when at least one offline NUMA node creates a hole in the sequence of NUMA nodes. For instance, in a server with two NUMA nodes, where NUMA node zero is offline and NUMA node one is online, the driver will not start.

#13461: (Support-ID 13419) When using TimeSyncProtocol = NT and OsTimeSyncFailover = ENABLED, then NT-TS may never be activated.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#10530: ntservice may crash while shutting down when applications using the NTAPI are still running.

#9911: NT_NET_UPDATE_PKT_L2_PTR macro fails when compiled in a .cpp file

#9877: (Support-ID 9622) The supportinfo "hostbuffer info" part is not sampled atomic, the lastTxOff was captured after RdOff and WrOff causing it to look like lastTxOff is exceeding its limits.

#9814: (Support-ID 8749) Missing return type documentation for macro NT_NET_GET_PKT_L2_PTR

#9714: StreamId mismatch in API logging in NT_NetRxOpen()/NT_NetRxClose()

#9713: (Support-ID 9704) HBH crash on kernels with CONFIG_HZ_5000=y.

#9695: If the Event requesting the absolut time in PPS or the reply arrives delayed, this could cause the adapter to errornously fall out of sync for a number of seconds.

#9694: (Support-ID 9691) The config tool cannot configure triple speed copper SFPs on a NT4E-4 adapter.

#9326: (Support-ID 9300) The driver issues a wrong error message if driver load fails due to insufficient contiguous DMA memory.

#8901: (Support-ID 8886) HashMask command is setting all HashWords to '00'. Work around is to insure that all HashMask words are defined in the NTPL expression. e.g HashWord0 = 0xffffffff; HashWord1 = 0xffffffff ...

#8871: GEN2 adapters could potentially overwrite memory when ntservice is restarted.

#8699: Running with NT_NET_INTERFACE_SEGMENT while deleting/assigning filters could cause a deadlock

#8375: Multi get usage of NT_NetTxGet() can cause a dead lock when the entire host buffer is get.

#8343: Combining 2 filters into 1 filter results in all packets being forwarded.

#8100: (Support-ID 8041) ntservice stops responding if system runs out of memory.

#7984: When restarting a PPS application the adapter could take up to a minute to get in sync.

#7973: (Support-ID 7925) If transmitting on ports that have not had link, the transmit rate on NT4e is 10Mbps

#7968: (Support-ID 7962) Statistic example is clearing the statistic in every loop. Intro description about NT_StatRead() is wrong.

#7930: (Support-ID 7900) The total number of hostbuffers allocated for one adapter for systems with more than one numanode can exceed 32.

#7922: (Support-ID 7620) If the time reference is delayed in the PPS absolute timesync function, this may give an un-expected glitch in the timesync precision.

#7880: Running with a profile != INLINE the ntservice CPU load is dependent on the host buffer size

#7740: The ntservice.ini parameter "OsTimeSync" is not supported by NT40E2-4, but ntstart.sh succeeds

#7466: (Support-ID 7422) The hashmode example in the reference documentation DN-0449 is wrong.
HashMode = Hash5Tuple
Assign[StreamId = 1; Priority = 0; StreamId=(0..6)] = Layer4Protocol == UDP, TCP
Assign[StreamId = 1; Priority = 2; StreamId=7] = All

#7398: (Support-ID 7388) >>ERROR | SRV | 20411 - SPIv1[0:1500]: Opcode 0120 returned error 80. Is the opcode supported by this AVR version?
May appear if the driver is run on an adapter fitted with an AVR version prior to 1.1.

#7368: NTBPE as virtual adapter 0 cause statistics stall

#7345: (Support-ID 7906) Running with multiple streamids all starting at the same time can cause time stamp merge errors and ntservice hang.

#7342: (Support-ID 7332) Just after start of ntservice the link state (and NIM state) might be reported as unknown since it has not been read yet. This might also be the case after a NIM has been plugged into a port.

#7290: If the NTBPE programming switch is engaged, ntservice will start, but all access to the adapter will fail.

#7289: (Support-ID 7220) Confusing error messages like "IOCTL for IOCTL_LOCKS_GET_SHARED failed with errno 14 [Bad address]" are printed if the ntservice is not loaded or ready.

#7279: NT_NetRxGet() will return NT_SUCCESS even when there is no data on the segment interface.

#7241: (Support-ID 7230) The ntpl tool does not expand macros when run with -v option.

#7238: (Support-ID 7120) Latency might have high variation on default configurations:
To achieve latency stability the use of affinity is needed. On linux a combination of kernel boot parameter ISOLCPUS, sched_setaffinity() and sched_setscheduler() is needed to achieve optimal latency stability.
As example the following setup could be used:
*) Set kernel boot parameter: isolcpus=2,3,6,7
*) Start 3GD limiting it to use core 2 and 3: taskset -pc 2,3 /opt/napatech3/bin/ntstart.sh
*)Run application on core 6,7 with SCHED_RR

#7142: Host buffer poll method auto detection is failing for kernels < 2.6.24 causing packet loss.

#7127: (Support-ID 7093) Unexpected behavior of SliceOffset=0 in NTPL command

#7033: (Support-ID 6901) HashAllVLANIds gives valid hash even though there are no VLAN tags in the packets

#7001: The version of the NT-TSE or NT-TSU cannot be read from the driver. This does not affect the functionality, only visibility.

#3635: Driver cannot load on IOMMU enabled systems

napatech

## From version 02.03.00 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11515: Added support for NT4E2-4-PTP FPGA image: 200-9226-50-04

#11310: For an adapter using the INLINE profile, an attempt to use the NTAPI to look up the RX/TX path delays returns the status code NOT_SUPPORTED even if the path delays are known. This restriction is no longer present, and it is possible to request the path delays for an adapter using the INLINE profile. Note that the driver returns NOT_SUPPORTED if the delays are unknown.

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11030: A screen dump feature is added to the tools monitoring and profiling. By hitting the key 'F' a copy of the screen is saved to disk. The screen dump is appended to the saved screen dump. The names of the screen dump files are monitoring.scn and profiling.scn respectively.

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#10899: An Info log has been added for each adapter that has PpsIn defined and where it should be used to do PPS time sync. The log is not written if the PpsIn are only used for sampling.
Info text: Adapter 0: PpsIn is defined for this adapter. Use an external PPS tool or application to start PPS time sync.

#10787: (Support-ID 10551) FPGA feature level can now be read using the API. It is a part of the NtInfoAdapter_v5_s structure and can be read using the info stream.

#10714: Added new command line option (-l, --logmsg) to ntlog tool to write a custom line of text to the ntservice log system.

#10687: Added the ability to filter on inner tunnel layer 3 and layer 4 though the NTPL Data filter. This feature requires matching FPGA feature set. See filter documentation for details.

#10684: Added the ability to slice packets within a tunnel though the NTPL assign command. This feature requires matching FPGA feature set. See filter documentation for details.

#10501: Wis mode can now be enabled pr port by using the wisModeMask parameter which has been added to ntservice,ini

#10400: If TxTiming=RELATIVE the max inter-frame gap is set to 2.6sec.

#10168: NTPORT4E now supported

#10109: (Support-ID 10105) The example program named info_example.c now retrieves and prints basic product (adapter) information, such as the serial number, based on information in the NtInfoProductInfo_s structure.

#10046: The execution of a timesync hard reset to a reference initiated by an application through the NTAPI interface, has changed to execute a hard reset (time jump) for which the execution is unaffected by the current time skew and the hard reset threshold value (i.e. immediately executed). In earlier versions the current time skew was compared to the hard reset threshold value to determine if the hard reset should occur or not.

#9962: Enable swapping of hashdata from tunnels when connecting to a SPAN port

#9937: Support for NTBPE removed.

#9880: Added driver support for the following legacy FPGA images:
NT20E2: 200-9220-44-10 and 200-9220-44-12
NT40E2-4: 200-9221-44-12 and 200-9221-44-13
NT40E2-1: 200-9222-44-06 and 200-9222-44-08

#9586: Alarms are now generated when the status of an external NT-TSU or NT-TSE looses the synchronization signal, synchronization or Time of Day information. The alarms are sent as events:
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_SYNC_SIGNAL
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_OUT_OF_SYNC
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_TIME_OF_DAY
This information is still logged as INFO in the ntlog.

#9494: There is a small delay from the time a frame enters a network port and until the adapter time-stamps it. An application can now query the driver for this RX path delay and subtract it from the time stamp in the packet descriptor. See DN-0449 section Path Delay for more information.

#9492: Added option "--installpath PATH" to ".run" files to change default installation folder.

#9491: Added option to run an ntpl.config file with ntstart.sh.

#9490: Deduplication supports padded frames and IP header masks of i.e. TTL and checksum fields. Moreover a dedup CRC can be forwarded to host application using extended descriptor 9 to support a hardware-accelerated deduplication application. This feature can be enable/disabled using the NTPL Deduplication options IPLengthLimit and IPv4/IPv6. This feature requires a matching FPGA version.

#9447: (Support-ID 8890) Added inline bump in the wire example to DN-0449

#9444: Doxygen documentation updated in NTPL data section

#9232: (Support-ID 9105) NT_NetFileGet() now automatically rewinds the file when NT_STATUS_END_OF_FILE is returned. This will allow NT_NetFileGet() to be called after NT_STATUS_END_OF_FILE and return to the start of the file.

#9147: The delay asymmetry configuration option is added to the PTP protocol.

#9088: TimeSyncFrequencyReferencePriority added to the ntservice.ini file

#9074: On the PTP port, statistics including CRC errors are displayed in the monitoring tool for debug purposes. All the information can be obtained using NTAPI

#9027: TX host buffers can now be prefilled with data and replayed continuously without needing to memcpy packets.

#8984: Support for NT20E enabled

#8760: Added NUMA node information to info stream.

#8604: NT_NetRxOpenMulti() has been added to the API to enable merging traffic from multiple stream-ids

#8500: PDV filter has been implemented in order to increase performance in non-PTP aware network

#8437: The installation now honors the TMPDIR environment setting during the installation to specify an alternative temporary directory.

#8369: Time jumps in OS timesync mode has been implemented.

TimeSyncTimeJumpThreshold = 0, enables smooth sliding
TimeSyncTimeJumpThreshold = <any integer value different from 0> enables time jumps with threshold of 1 sec. If offset is more than 1 sec, a hard time jump will occur.

The default setting is TimeSyncTimeJumpThreshold = 1. This is the default setting used in the ini file in this and previous releases. If you are running with the default ini file, time jumps are default enabled. In previous releases the setting of TimeSyncTimeJumpThreshold had no effect in OS timesync mode.

#8340: Added the ability to reuse the protocol filters to have more than 8 filters using a protocol

#8305: (Support-ID 7892) Enabled possibility to tweak the NT4E-INL and NT4E-STD-INL adapter Tx engine to transmit faster when running with the TrafficGen-profile. Add this to the inifile to achieve it:
[Debug]
nt4etxadjust=8

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

#8052: Stream-id based statistics are now available via the statistics stream and can be monitored using the monitoring tool. Stream-ids can be activated/deactivated using NTPL, to control the sync point when packets starts entering the stream-id host-buffers and when statistics should count them, see the streamidstatistics.c example.

#7975: It has been made possible to run will multiple tx streams addressing the same port when using the TrafficGen profile. The rule is that packets has be to sent with NT_NET_SET_PKT_TXNOW(1) otherwise the behavior is unpredictable.

#7931: A define NT_ERRBUF_SIZE added to indicate the maximum error length size that can be delivered by the driver. This define should be used when allocating a buffer for reading an error message.

#7928: npcap.ini added to the supportinfo archive.

#7894: Added support for per filter descriptor selection. The feature is available through the "Assign" command in NTPL. This feature requires matching FPGA.

#7823: Configuration parameter TimeSyncTimeOffset now has a limit of 1000000 ns (1 ms)

#7807: (Support-ID 7327) NTAPI NT_NetFile...() functions do not connect to NTservice anymore - and thus do not require NTservice to be running.
This change is to allow an user application to process captured files through the NTAPI NT_NetFile...() functions on systems that do not have NTservice running nor a Napatech adapter installed.

NTAPI functions affected by the change:

NT_NetFileOpen()
NT_NetFileGet()
NT_NetFileRelease()
NT_NetFileClose()

The example readcapfile (examples/net/readcapfile/readcapfile.c) demonstrates a possible use.

#7805: Alarms have been added to monitor when an external NTTSU or NTTSE connected through NT-TS timesync looses synchronization with it's time source. The possible alarms are:
NT-TS: External device lost synchronization signal
NT-TS: External device is out of synchronization
NT-TS: External device lost time of day information

#7792: Changing the hash seed is now possible in ntservice.ini using the HashSeed option. Changing the hash seed will effect the data distribution on the streams.

#7758: The info stream has been extended to contain information of:
SDRAM present and SDRAM size
PCI bus information
Adapter features - Bypass support.

#7732: It is now possible to synchronize the operating system's clock with (to) the clock of a designated adapter. The feature is enabled by setting the configuration parameter TimeSyncOsTimeReference in the System section. For instance to synchronize the server clock with adapter zero, specify TimeSyncOsTimeReference=adapter-0. It requires an FPGA with support for synchronization of OS time.

#7730: An event and a log will be generated when the adapter's time stamp clock is set by the system.

#7728: IEEE1588 support is implemented on NT4E2_PTP and NT20E2_PTP adapter. (dedicated RJ45)

#7719: The data filter hardware supports up to 255 values for each 1 byte filter, however the NTPL limits this to specifying 8 values or one range. This is changed to support up to 32 values or 16 ranges or a mix of the two. When using a range it will take up the space of 2 values. When specifying 8 ranges only 16 values can be used.

#7715: A new feature - host loopback - has been added to the port settings structure. Applying loopback to a port means that data transmitted from the host on the port is looped back to the same port. Since the loopback is applied inside the adapter, it will work independently of whether a NIM is actually present or not, and the link will always be reported as up.
If put in loopback mode, the monitoring tool will show the link state as "Loopback". The config tool can be used to apply loopback, and the diagnostics tool can be used to test loopback if using a new feature: single- port- loop.

#7703: Added support for swapping the source and destination IP address regardless of value before calculating hash value. This enables traffic to/from the entire subnets to be balanced between streams. See Hash Mode command documentation for more details. This feature requires a matching FPGA.

#7699: Added 2 and 5 tuple sorted and unsorted hash modes on IPv4 and IPv6 encapsulated IP traffic. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7694: Added 2 and 5 tuple hash (sorted and unsorted) modes on IPv4 and IPv6 traffic inside a GTPv1 tunnel. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7603: Support for FPGA images:
- 200-9220-45-07 (NT20E2)
- 200-9221-45-09 (NT40E2-4)

#7433: The command to setup numanodes, "Setup[numanode=0]=streamid==x,y,z" can now contain up 32 streamids.

#7406: The driver now supports up to 8 adapters in one server.

#7397: (Support-ID 7435) Added support for filtering on decode error e.g "Assign[StreamId = 1] = DecodeError == TRUE" will redirect all packages with decode errors to stream 1.

#7392: (Support-ID 7333) Check for mismatching version of NTService and version of the low level driver has been added.

#7222: Check if IOMMU is enabled are added for kernels larger or equal to version 3.2. Driver fails if IOMMU is enabled.

#7169: Added support for Linux 3.x

#7167: Added support for the NT40E2_1 adapter.

#7141: (Support-ID 6797) The description of NT_NetRxGet timeout functionality in DN-0449 has been improved

#7065: The adapter will now be able to identify connected NT-TS synched adapters, NT-TSUs and NT-TSEs. The information can be seen through the API or using the monitoring tool.

#7062: Added support for Customer specific User data in the VPD.

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#13461: (Support-ID 13419) When using TimeSyncProtocol = NT and OsTimeSyncFailover = ENABLED, then NT-TS may never be activated.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#10530: ntservice may crash while shutting down when applications using the NTAPI are still running.

#9911: NT_NET_UPDATE_PKT_L2_PTR macro fails when compiled in a .cpp file

#9877: (Support-ID 9622) The supportinfo "hostbuffer info" part is not sampled atomic, the lastTxOff was captured after RdOff and WrOff causing it to look like lastTxOff is exceeding its limits.

#9814: (Support-ID 8749) Missing return type documentation for macro NT_NET_GET_PKT_L2_PTR

#9714: StreamId mismatch in API logging in NT_NetRxOpen()/NT_NetRxClose()

#9713: (Support-ID 9704) HBH crash on kernels with CONFIG_HZ_5000=y.

#9695: If the Event requesting the absolut time in PPS or the reply arrives delayed, this could cause the adapter to errornously fall out of sync for a number of seconds.

#9694: (Support-ID 9691) The config tool cannot configure triple speed copper SFPs on a NT4E-4 adapter.

#9326: (Support-ID 9300) The driver issues a wrong error message if driver load fails due to insufficient contiguous DMA memory.

#8901: (Support-ID 8886) HashMask command is setting all HashWords to '00'. Work around is to insure that all HashMask words are defined in the NTPL expression. e.g HashWord0 = 0xffffffff; HashWord1 = 0xffffffff ...

#8871: GEN2 adapters could potentially overwrite memory when ntservice is restarted.

#8699: Running with NT_NET_INTERFACE_SEGMENT while deleting/assigning filters could cause a deadlock

#8375: Multi get usage of NT_NetTxGet() can cause a dead lock when the entire host buffer is get.

#8343: Combining 2 filters into 1 filter results in all packets being forwarded.

#8100: (Support-ID 8041) ntservice stops responding if system runs out of memory.

#7973: (Support-ID 7925) If transmitting on ports that have not had link, the transmit rate on NT4e is 10Mbps

#7968: (Support-ID 7962) Statistic example is clearing the statistic in every loop. Intro description about NT_StatRead() is wrong.

#7922: (Support-ID 7620) If the time reference is delayed in the PPS absolute timesync function, this may give an un-expected glitch in the timesync precision.

#7880: Running with a profile != INLINE the ntservice CPU load is dependent on the host buffer size

#7466: (Support-ID 7422) The hashmode example in the reference documentation DN-0449 is wrong.
HashMode = Hash5Tuple
Assign[StreamId = 1; Priority = 0; StreamId=(0..6)] = Layer4Protocol == UDP, TCP
Assign[StreamId = 1; Priority = 2; StreamId=7] = All

#7398: (Support-ID 7388) >>ERROR | SRV | 20411 - SPIv1[0:1500]: Opcode 0120 returned error 80. Is the opcode supported by this AVR version?
May appear if the driver is run on an adapter fitted with an AVR version prior to 1.1.

#7368: NTBPE as virtual adapter 0 cause statistics stall

#7345: (Support-ID 7906) Running with multiple streamids all starting at the same time can cause time stamp merge errors and ntservice hang.

#7342: (Support-ID 7332) Just after start of ntservice the link state (and NIM state) might be reported as unknown since it has not been read yet. This might also be the case after a NIM has been plugged into a port.

#7299: The driver returns error code 0x20002056 (The parameter is not valid) when turning tx laser on/off on the NT20E adapter

#7290: If the NTBPE programming switch is engaged, ntservice will start, but all access to the adapter will fail.

#7289: (Support-ID 7220) Confusing error messages like "IOCTL for IOCTL_LOCKS_GET_SHARED failed with errno 14 [Bad address]" are printed if the ntservice is not loaded or ready.

#7279: NT_NetRxGet() will return NT_SUCCESS even when there is no data on the segment interface.

#7241: (Support-ID 7230) The ntpl tool does not expand macros when run with -v option.

#7224: When turning TX laser off, the laser will only stay off for a fraction of a second and is then turned on again.

#7142: Host buffer poll method auto detection is failing for kernels < 2.6.24 causing packet loss.

#7134: Linkspeeds other than 1 Gbps on all ports when running with SOF enabled can make adapter crash unexpectedly (NT4E).

#7133: Linkspeeds other than 1 Gbps on all ports when running with SOF enabled can make adapter crash unexpectedly (NT4E2-4T-BP).

#7127: (Support-ID 7093) Unexpected behavior of SliceOffset=0 in NTPL command

#7105: (Support-ID 7082) The NTBPE adapter does not work in some servers when placed in a PCI slot using a shared interrupt.

#7089: (Support-ID 7050) With the default ntservice.ini it happens that ntservice locks up for 10 seconds.

#7079: (Support-ID 7037) The reference documentation DS-0449 does not document the Assign TxPort option functionality for the different profiles

#7033: (Support-ID 6901) HashAllVLANIds gives valid hash even though there are no VLAN tags in the packets

#7001: The version of the NT-TSE or NT-TSU cannot be read from the driver. This does not affect the functionality, only visibility.

#6942: (Support-ID 6919) Setting IPv4 address mask using [FF.FF.FF.00] instead of [0xFF.0xFF.0xFF.0x00] like shown below fails.
Assign[StreamId=1] = Data[DynOffset = DynOffIPv4Frame; Offset = 12; DataType = IPv4Addr] == {[FF.FF.FF.00]:[239.10.50.0]}

#3635: Driver cannot load on IOMMU enabled systems

napatech

## From version 02.02.00 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11515: Added support for NT4E2-4-PTP FPGA image: 200-9226-50-04

#11310: For an adapter using the INLINE profile, an attempt to use the NTAPI to look up the RX/TX path delays returns the status code NOT_SUPPORTED even if the path delays are known. This restriction is no longer present, and it is possible to request the path delays for an adapter using the INLINE profile. Note that the driver returns NOT_SUPPORTED if the delays are unknown.

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11030: A screen dump feature is added to the tools monitoring and profiling. By hitting the key 'F' a copy of the screen is saved to disk. The screen dump is appended to the saved screen dump. The names of the screen dump files are monitoring.scn and profiling.scn respectively.

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#10899: An Info log has been added for each adapter that has PpsIn defined and where it should be used to do PPS time sync. The log is not written if the PpsIn are only used for sampling.
Info text: Adapter 0: PpsIn is defined for this adapter. Use an external PPS tool or application to start PPS time sync.

#10787: (Support-ID 10551) FPGA feature level can now be read using the API. It is a part of the NtInfoAdapter_v5_s structure and can be read using the info stream.

#10714: Added new command line option (-l, --logmsg) to ntlog tool to write a custom line of text to the ntservice log system.

#10687: Added the ability to filter on inner tunnel layer 3 and layer 4 though the NTPL Data filter. This feature requires matching FPGA feature set. See filter documentation for details.

#10684: Added the ability to slice packets within a tunnel though the NTPL assign command. This feature requires matching FPGA feature set. See filter documentation for details.

#10501: Wis mode can now be enabled pr port by using the wisModeMask parameter which has been added to ntservice,ini

#10400: If TxTiming=RELATIVE the max inter-frame gap is set to 2.6sec.

#10168: NTPORT4E now supported

#10109: (Support-ID 10105) The example program named info_example.c now retrieves and prints basic product (adapter) information, such as the serial number, based on information in the NtInfoProductInfo_s structure.

#10046: The execution of a timesync hard reset to a reference initiated by an application through the NTAPI interface, has changed to execute a hard reset (time jump) for which the execution is unaffected by the current time skew and the hard reset threshold value (i.e. immediately executed). In earlier versions the current time skew was compared to the hard reset threshold value to determine if the hard reset should occur or not.

#9962: Enable swapping of hashdata from tunnels when connecting to a SPAN port

#9937: Support for NTBPE removed.

#9880: Added driver support for the following legacy FPGA images:
NT20E2: 200-9220-44-10 and 200-9220-44-12
NT40E2-4: 200-9221-44-12 and 200-9221-44-13
NT40E2-1: 200-9222-44-06 and 200-9222-44-08

#9586: Alarms are now generated when the status of an external NT-TSU or NT-TSE looses the synchronization signal, synchronization or Time of Day information. The alarms are sent as events:
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_SYNC_SIGNAL
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_OUT_OF_SYNC
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_TIME_OF_DAY
This information is still logged as INFO in the ntlog.

#9494: There is a small delay from the time a frame enters a network port and until the adapter time-stamps it. An application can now query the driver for this RX path delay and subtract it from the time stamp in the packet descriptor. See DN-0449 section Path Delay for more information.

#9492: Added option "--installpath PATH" to ".run" files to change default installation folder.

#9491: Added option to run an ntpl.config file with ntstart.sh.

#9490: Deduplication supports padded frames and IP header masks of i.e. TTL and checksum fields. Moreover a dedup CRC can be forwarded to host application using extended descriptor 9 to support a hardware-accelerated deduplication application. This feature can be enable/disabled using the NTPL Deduplication options IPLengthLimit and IPv4/IPv6. This feature requires a matching FPGA version.

#9447: (Support-ID 8890) Added inline bump in the wire example to DN-0449

#9444: Doxygen documentation updated in NTPL data section

#9232: (Support-ID 9105) NT_NetFileGet() now automatically rewinds the file when NT_STATUS_END_OF_FILE is returned. This will allow NT_NetFileGet() to be called after NT_STATUS_END_OF_FILE and return to the start of the file.

#9147: The delay asymmetry configuration option is added to the PTP protocol.

#9088: TimeSyncFrequencyReferencePriority added to the ntservice.ini file

#9074: On the PTP port, statistics including CRC errors are displayed in the monitoring tool for debug purposes. All the information can be obtained using NTAPI

#9027: TX host buffers can now be prefilled with data and replayed continuously without needing to memcpy packets.

#8984: Support for NT20E enabled

#8760: Added NUMA node information to info stream.

#8604: NT_NetRxOpenMulti() has been added to the API to enable merging traffic from multiple stream-ids

#8500: PDV filter has been implemented in order to increase performance in non-PTP aware network

#8437: The installation now honors the TMPDIR environment setting during the installation to specify an alternative temporary directory.

#8369: Time jumps in OS timesync mode has been implemented.

TimeSyncTimeJumpThreshold = 0, enables smooth sliding
TimeSyncTimeJumpThreshold = <any integer value different from 0> enables time jumps with threshold of 1 sec. If offset is more than 1 sec, a hard time jump will occur.

The default setting is TimeSyncTimeJumpThreshold = 1. This is the default setting used in the ini file in this and previous releases. If you are running with the default ini file, time jumps are default enabled. In previous releases the setting of TimeSyncTimeJumpThreshold had no effect in OS timesync mode.

#8340: Added the ability to reuse the protocol filters to have more than 8 filters using a protocol

#8305: (Support-ID 7892) Enabled possibility to tweak the NT4E-INL and NT4E-STD-INL adapter Tx engine to transmit faster when running with the TrafficGen-profile. Add this to the inifile to achieve it:
[Debug]
nt4etxadjust=8

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

#8052: Stream-id based statistics are now available via the statistics stream and can be monitored using the monitoring tool. Stream-ids can be activated/deactivated using NTPL, to control the sync point when packets starts entering the stream-id host-buffers and when statistics should count them, see the streamidstatistics.c example.

#7975: It has been made possible to run will multiple tx streams addressing the same port when using the TrafficGen profile. The rule is that packets has be to sent with NT_NET_SET_PKT_TXNOW(1) otherwise the behavior is unpredictable.

#7931: A define NT_ERRBUF_SIZE added to indicate the maximum error length size that can be delivered by the driver. This define should be used when allocating a buffer for reading an error message.

#7928: npcap.ini added to the supportinfo archive.

#7894: Added support for per filter descriptor selection. The feature is available through the "Assign" command in NTPL. This feature requires matching FPGA.

#7823: Configuration parameter TimeSyncTimeOffset now has a limit of 1000000 ns (1 ms)

#7807: (Support-ID 7327) NTAPI NT_NetFile...() functions do not connect to NTservice anymore - and thus do not require NTservice to be running.
This change is to allow an user application to process captured files through the NTAPI NT_NetFile...() functions on systems that do not have NTservice running nor a Napatech adapter installed.

NTAPI functions affected by the change:

NT_NetFileOpen()
NT_NetFileGet()
NT_NetFileRelease()
NT_NetFileClose()

The example readcapfile (examples/net/readcapfile/readcapfile.c) demonstrates a possible use.

#7805: Alarms have been added to monitor when an external NTTSU or NTTSE connected through NT-TS timesync looses synchronization with it's time source. The possible alarms are:
NT-TS: External device lost synchronization signal
NT-TS: External device is out of synchronization
NT-TS: External device lost time of day information

#7792: Changing the hash seed is now possible in ntservice.ini using the HashSeed option. Changing the hash seed will effect the data distribution on the streams.

#7758: The info stream has been extended to contain information of:
SDRAM present and SDRAM size
PCI bus information
Adapter features - Bypass support.

#7732: It is now possible to synchronize the operating system's clock with (to) the clock of a designated adapter. The feature is enabled by setting the configuration parameter TimeSyncOsTimeReference in the System section. For instance to synchronize the server clock with adapter zero, specify TimeSyncOsTimeReference=adapter-0. It requires an FPGA with support for synchronization of OS time.

#7730: An event and a log will be generated when the adapter's time stamp clock is set by the system.

#7728: IEEE1588 support is implemented on NT4E2_PTP and NT20E2_PTP adapter. (dedicated RJ45)

#7719: The data filter hardware supports up to 255 values for each 1 byte filter, however the NTPL limits this to specifying 8 values or one range. This is changed to support up to 32 values or 16 ranges or a mix of the two. When using a range it will take up the space of 2 values. When specifying 8 ranges only 16 values can be used.

#7715: A new feature - host loopback - has been added to the port settings structure. Applying loopback to a port means that data transmitted from the host on the port is looped back to the same port. Since the loopback is applied inside the adapter, it will work independently of whether a NIM is actually present or not, and the link will always be reported as up.
If put in loopback mode, the monitoring tool will show the link state as "Loopback". The config tool can be used to apply loopback, and the diagnostics tool can be used to test loopback if using a new feature: single- port- loop.

#7703: Added support for swapping the source and destination IP address regardless of value before calculating hash value. This enables traffic to/from the entire subnets to be balanced between streams. See Hash Mode command documentation for more details. This feature requires a matching FPGA.

#7699: Added 2 and 5 tuple sorted and unsorted hash modes on IPv4 and IPv6 encapsulated IP traffic. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7694: Added 2 and 5 tuple hash (sorted and unsorted) modes on IPv4 and IPv6 traffic inside a GTPv1 tunnel. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7603: Support for FPGA images:
- 200-9220-45-07 (NT20E2)
- 200-9221-45-09 (NT40E2-4)

#7433: The command to setup numanodes, "Setup[numanode=0]=streamid==x,y,z" can now contain up 32 streamids.

#7406: The driver now supports up to 8 adapters in one server.

#7397: (Support-ID 7435) Added support for filtering on decode error e.g "Assign[StreamId = 1] = DecodeError == TRUE" will redirect all packages with decode errors to stream 1.

#7392: (Support-ID 7333) Check for mismatching version of NTService and version of the low level driver has been added.

#7222: Check if IOMMU is enabled are added for kernels larger or equal to version 3.2. Driver fails if IOMMU is enabled.

#7169: Added support for Linux 3.x

#7167: Added support for the NT40E2_1 adapter.

#7141: (Support-ID 6797) The description of NT_NetRxGet timeout functionality in DN-0449 has been improved

#7065: The adapter will now be able to identify connected NT-TS synched adapters, NT-TSUs and NT-TSEs. The information can be seen through the API or using the monitoring tool.

#7062: Added support for Customer specific User data in the VPD.

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#10530: ntservice may crash while shutting down when applications using the NTAPI are still running.

#9911: NT_NET_UPDATE_PKT_L2_PTR macro fails when compiled in a .cpp file

#9877: (Support-ID 9622) The supportinfo "hostbuffer info" part is not sampled atomic, the lastTxOff was captured after RdOff and WrOff causing it to look like lastTxOff is exceeding its limits.

#9814: (Support-ID 8749) Missing return type documentation for macro NT_NET_GET_PKT_L2_PTR

#9714: StreamId mismatch in API logging in NT_NetRxOpen()/NT_NetRxClose()

#9713: (Support-ID 9704) HBH crash on kernels with CONFIG_HZ_5000=y.

#9326: (Support-ID 9300) The driver issues a wrong error message if driver load fails due to insufficient contiguous DMA memory.

#8871: GEN2 adapters could potentially overwrite memory when ntservice is restarted.

#8699: Running with NT_NET_INTERFACE_SEGMENT while deleting/assigning filters could cause a deadlock

#8375: Multi get usage of NT_NetTxGet() can cause a dead lock when the entire host buffer is get.

#8343: Combining 2 filters into 1 filter results in all packets being forwarded.

#8100: (Support-ID 8041) ntservice stops responding if system runs out of memory.

#7973: (Support-ID 7925) If transmitting on ports that have not had link, the transmit rate on NT4e is 10Mbps

#7968: (Support-ID 7962) Statistic example is clearing the statistic in every loop. Intro description about NT_StatRead() is wrong.

#7880: Running with a profile != INLINE the ntservice CPU load is dependent on the host buffer size

#7398: (Support-ID 7388) >>ERROR | SRV | 20411 - SPIv1[0:1500]: Opcode 0120 returned error 80. Is the opcode supported by this AVR version?
May appear if the driver is run on an adapter fitted with an AVR version prior to 1.1.

#7345: (Support-ID 7906) Running with multiple streamids all starting at the same time can cause time stamp merge errors and ntservice hang.

#7241: (Support-ID 7230) The ntpl tool does not expand macros when run with -v option.

#7134: Linkspeeds other than 1 Gbps on all ports when running with SOF enabled can make adapter crash unexpectedly (NT4E).

#7127: (Support-ID 7093) Unexpected behavior of SliceOffset=0 in NTPL command

#7079: (Support-ID 7037) The reference documentation DS-0449 does not document the Assign TxPort option functionality for the different profiles

#7033: (Support-ID 6901) HashAllVLANIds gives valid hash even though there are no VLAN tags in the packets

#7001: The version of the NT-TSE or NT-TSU cannot be read from the driver. This does not affect the functionality, only visibility.

#6942: (Support-ID 6919) Setting IPv4 address mask using [FF.FF.FF.00] instead of [0xFF.0xFF.0xFF.0x00] like shown below fails.

Assign[StreamId=1] = Data[DynOffset = DynOffIPv4Frame; Offset = 12; DataType = IPv4Addr] == {[FF.FF.FF.00]:[239.10.50.0]}

#6915: (Support-ID 6903) If ntservice is not running, more than one failing call to the NTAPI library function NT_Init() will crash the application

#6904: (Support-ID 6882) The shared memory files placed in /tmp are in risk of being deleted by a cleanup Cron job. When the files are deleted it is not possible to start any apps. Apps already running is not affected.

#6819: Cannot merge received traffic between gen1 and gen2 capture adapters

#6769: The name field in NtInfoSensor_s will be wrong, if it belongs to an NT20E2 adapter that has a higher adapter index than a NT40E2-4 adapter also present in the machine.

#6763: (Support-ID 6727) When using a DATA filter with datatype=bytestr4 the datamask is wrongly set to [32:0]. This causes the filter not to work.

#3635: Driver cannot load on IOMMU enabled systems

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## From version 02.01.03 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11515: Added support for NT4E2-4-PTP FPGA image: 200-9226-50-04

#11310: For an adapter using the INLINE profile, an attempt to use the NTAPI to look up the RX/TX path delays returns the status code NOT_SUPPORTED even if the path delays are known. This restriction is no longer present, and it is possible to request the path delays for an adapter using the INLINE profile. Note that the driver returns NOT_SUPPORTED if the delays are unknown.

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11030: A screen dump feature is added to the tools monitoring and profiling. By hitting the key 'F' a copy of the screen is saved to disk. The screen dump is appended to the saved screen dump. The names of the screen dump files are monitoring.scn and profiling.scn respectively.

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#10899: An Info log has been added for each adapter that has PpsIn defined and where it should be used to do PPS time sync. The log is not written if the PpsIn are only used for sampling.
Info text: Adapter 0: PpsIn is defined for this adapter. Use an external PPS tool or application to start PPS time sync.

#10787: (Support-ID 10551) FPGA feature level can now be read using the API. It is a part of the NtInfoAdapter_v5_s structure and can be read using the info stream.

#10714: Added new command line option (-l, --logmsg) to ntlog tool to write a custom line of text to the ntservice log system.

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#10400: If TxTiming=RELATIVE the max inter-frame gap is set to 2.6sec.

#10168: NTPORT4E now supported

#10109: (Support-ID 10105) The example program named info_example.c now retrieves and prints basic product (adapter) information, such as the serial number, based on information in the NtInfoProductInfo_s structure.

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NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_SYNC_SIGNAL
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_OUT_OF_SYNC
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_TIME_OF_DAY
This information is still logged as INFO in the ntlog.

#9494: There is a small delay from the time a frame enters a network port and until the adapter time-stamps it. An application can now query the driver for this RX path delay and subtract it from the time stamp in the packet descriptor. See DN-0449 section Path Delay for more information.

#9492: Added option "--installpath PATH" to ".run" files to change default installation folder.

#9491: Added option to run an ntpl.config file with ntstart.sh.

#9490: Deduplication supports padded frames and IP header masks of i.e. TTL and checksum fields. Moreover a dedup CRC can be forwarded to host application using extended descriptor 9 to support a hardware-accelerated deduplication application. This feature can be enable/disabled using the NTPL Deduplication options IPLengthLimit and IPv4/IPv6. This feature requires a matching FPGA version.

#9447: (Support-ID 8890) Added inline bump in the wire example to DN-0449

#9444: Doxygen documentation updated in NTPL data section

#9232: (Support-ID 9105) NT_NetFileGet() now automatically rewinds the file when NT_STATUS_END_OF_FILE is returned. This will allow NT_NetFileGet() to be called after NT_STATUS_END_OF_FILE and return to the start of the file.

#9147: The delay asymmetry configuration option is added to the PTP protocol.

#9088: TimeSyncFrequencyReferencePriority added to the ntservice.ini file

#9074: On the PTP port, statistics including CRC errors are displayed in the monitoring tool for debug purposes. All the information can be obtained using NTAPI

#9027: TX host buffers can now be prefilled with data and replayed continuously without needing to memcpy packets.

#8984: Support for NT20E enabled

#8760: Added NUMA node information to info stream.

#8604: NT_NetRxOpenMulti() has been added to the API to enable merging traffic from multiple stream-ids

#8500: PDV filter has been implemented in order to increase performance in non-PTP aware network

#8437: The installation now honors the TMPDIR environment setting during the installation to specify an alternative temporary directory.

#8369: Time jumps in OS timesync mode has been implemented.

TimeSyncTimeJumpThreshold = 0, enables smooth sliding
TimeSyncTimeJumpThreshold = <any integer value different from 0> enables time jumps with threshold of 1 sec. If offset is more than 1 sec, a hard time jump will occur.

The default setting is TimeSyncTimeJumpThreshold = 1. This is the default setting used in the ini file in this and previous releases. If you are running with the default ini file, time jumps are default enabled. In previous releases the setting of TimeSyncTimeJumpThreshold had no effect in OS timesync mode.

#8340: Added the ability to reuse the protocol filters to have more than 8 filters using a protocol

#8305: (Support-ID 7892) Enabled possibility to tweak the NT4E-INL and NT4E-STD-INL adapter Tx engine to transmit faster when running with the TrafficGen-profile. Add this to the inifile to achieve it:
[Debug]
nt4etxadjust=8

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

#8052: Stream-id based statistics are now available via the statistics stream and can be monitored using the monitoring tool. Stream-ids can be activated/deactivated using NTPL, to control the sync point when packets starts entering the stream-id host-buffers and when statistics should count them, see the streamidstatistics.c example.

#7975: It has been made possible to run will multiple tx streams addressing the same port when using the TrafficGen profile. The rule is that packets has be to sent with NT_NET_SET_PKT_TXNOW(1) otherwise the behavior is unpredictable.

#7931: A define NT_ERRBUF_SIZE added to indicate the maximum error length size that can be delivered by the driver. This define should be used when allocating a buffer for reading an error message.

#7928: npcap.ini added to the supportinfo archive.

#7894: Added support for per filter descriptor selection. The feature is available through the "Assign" command in NTPL. This feature requires matching FPGA.

#7823: Configuration parameter TimeSyncTimeOffset now has a limit of 1000000 ns (1 ms)

#7807: (Support-ID 7327) NTAPI NT_NetFile...() functions do not connect to NTservice anymore - and thus do not require NTservice to be running.
This change is to allow an user application to process captured files through the NTAPI NT_NetFile...() functions on systems that do not have NTservice running nor a Napatech adapter installed.

NTAPI functions affected by the change:

NT_NetFileOpen()
NT_NetFileGet()
NT_NetFileRelease()
NT_NetFileClose()

The example readcapfile (examples/net/readcapfile/readcapfile.c) demonstrates a possible use.

#7805: Alarms have been added to monitor when an external NTTSU or NTTSE connected through NT-TS timesync looses synchronization with it's time source. The possible alarms are:
NT-TS: External device lost synchronization signal
NT-TS: External device is out of synchronization
NT-TS: External device lost time of day information

#7792: Changing the hash seed is now possible in ntservice.ini using the HashSeed option. Changing the hash seed will effect the data distribution on the streams.

#7758: The info stream has been extended to contain information of:
SDRAM present and SDRAM size
PCI bus information
Adapter features - Bypass support.

#7732: It is now possible to synchronize the operating system's clock with (to) the clock of a designated adapter. The feature is enabled by setting the configuration parameter TimeSyncOsTimeReference in the System section. For instance to synchronize the server clock with adapter zero, specify TimeSyncOsTimeReference=adapter-0. It requires an FPGA with support for synchronization of OS time.

#7730: An event and a log will be generated when the adapter's time stamp clock is set by the system.

#7728: IEEE1588 support is implemented on NT4E2_PTP and NT20E2_PTP adapter. (dedicated RJ45)

#7719: The data filter hardware supports up to 255 values for each 1 byte filter, however the NTPL limits this to specifying 8 values or one range. This is changed to support up to 32 values or 16 ranges or a mix of the two. When using a range it will take up the space of 2 values. When specifying 8 ranges only 16 values can be used.

#7715: A new feature - host loopback - has been added to the port settings structure. Applying loopback to a port means that data transmitted from the host on the port is looped back to the same port. Since the loopback is applied inside the adapter, it will work independently of whether a NIM is actually present or not, and the link will always be reported as up.
If put in loopback mode, the monitoring tool will show the link state as "Loopback". The config tool can be used to apply loopback, and the diagnostics tool can be used to test loopback if using a new feature: single- port- loop.

#7703: Added support for swapping the source and destination IP address regardless of value before calculating hash value. This enables traffic to/from the entire subnets to be balanced between streams. See Hash Mode command documentation for more details. This feature requires a matching FPGA.

#7699: Added 2 and 5 tuple sorted and unsorted hash modes on IPv4 and IPv6 encapsulated IP traffic. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7694: Added 2 and 5 tuple hash (sorted and unsorted) modes on IPv4 and IPv6 traffic inside a GTPv1 tunnel. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7603: Support for FPGA images:
- 200-9220-45-07 (NT20E2)
- 200-9221-45-09 (NT40E2-4)

#7433: The command to setup numanodes, "Setup[numanode=0]=streamid==x,y,z" can now contain up 32 streamids.

#7406: The driver now supports up to 8 adapters in one server.

#7397: (Support-ID 7435) Added support for filtering on decode error e.g "Assign[StreamId = 1] = DecodeError == TRUE" will redirect all packages with decode errors to stream 1.

#7392: (Support-ID 7333) Check for mismatching version of NTService and version of the low level driver has been added.

#7222: Check if IOMMU is enabled are added for kernels larger or equal to version 3.2. Driver fails if IOMMU is enabled.

#7169: Added support for Linux 3.x

#7167: Added support for the NT40E2_1 adapter.

#7141: (Support-ID 6797) The description of NT_NetRxGet timeout functionality in DN-0449 has been improved

#7065: The adapter will now be able to identify connected NT-TS synched adapters, NT-TSUs and NT-TSEs. The information can be seen through the API or using the monitoring tool.

#7062: Added support for Customer specific User data in the VPD.

#6781: This release adds a new configuration parameter OsTimeSyncFailover that can be set to DISABLE or ENABLE; the default value is DISABLE. When OsTimeSyncFailover is set to ENABLE and TimeSyncProtocol is set to NT for a given adapter, then the adapter automatically switches to OS Time synchronization if the incoming NT-TS signal fails, and when the NT time synchronization signal is restored, the adapter reverts to NT time synchronization.

#6780: This release adds support for OC-192c for the NT20E2 and NT40E2_4 adapters. A new configuration setting WisMode enables or disables WIS/OC-192c mode. The setting is set for an adapter, and the legal values are DISABLE and ENABLE. The default value is DISABLE, which disables WIS/OC-192c mode.

#6778: This release adds a new configuration parameter CancelTxOnCloseMask, which is a bitmask that enables cancellation of pending transmission segments for the ports designated by the mask: bit 0 = port 0, bit 1 = port 1, etc. Note that each bit represents an adapter local port, not a virtual (global) port across adapters. When a transmission stream is closed, and if the port bit is set for any of the affected ports, all pending data is cancelled and transmission of data stops immediately.

#6777: This release adds support for higher frequency time sampling. A new configuration parameter HighFrequencySampling can be set to DISABLE or ENABLE, and the default value is DISABLE. When high frequency sampling is enabled (HighFrequencySampling=ENABLE), the time is sampled every 20 microseconds.

#6776: This release includes support for a new FPGA feature "IPF", configurable via NTPL and observable via Statistics. Hardware assisted IP-Fragmentation support is a novel approach to accelerating reassembly by identifying which

feed receives fragments for a particular IP flow. This module is able to process both IPv4 and IPv6. See NTPL command "IPFMode" for information about how to use the module. See example demo "net/ipfdemo" for a working example.

#6718: The time it takes to initialize a NIM module in a PCI GEN2 adapter (NTxxE2) has been improved from about 4.6 seconds to about 0.8 seconds.

#6612: Inline profile documentation has been improved.

#6500: Hardware accelerated PCAP packet descriptor is now supported. With this feature comes some restrictions. The TimestampFormat "PCAP" and "PCAP_NS" can only be configured with PacketDescriptor "PCAP". The NTAPI packet interface is not supported when using PCAP headers. To make use of this new feature use the NTAPI segment interface. Note: This feature is not supported on in-line adapters and entry level adapters.

#6494: The standard format of the Time string from an Endrun PPS device has been changed. Both the old and the new format are supported. No configuration is required.

#6458: (Support-ID 6424) The log can now be read in most cases after ntservice crashes, as the shared memory containing the log survives. If ntservice is restarted the log is deleted.
The ntservice binary and the ntservice.ini is now added to the supportinfo archive.

#6432: Added version number of the DN-0449 reference manual to the footer of all pages in the manual.

#6380: (Support-ID 6285) It is now possible to read raw NIM data like it has been possible in 2GD using the NimConfig tool.

#6361: Coordinated time-synchronized transmit has been implemented. More information can be found in the reference manual DN-449 and in the replayGS example.

#6239: Timestamp Inject mode has been added.
Two ini-file keys have been implemented to control the timestamp inject:
1. TimestampMethod = SOF | EOF: System parameter. Used both to control RX and TX.
2. TimestampInjectOffset = SOF | EOF: Adapter parameter.. Used to control TX.

#6143: Info stream extended with info to tell whether the adapter supports 64 bit time stamping or not. The information is found in the featureMask in the capabilities in the port settings port_v1 (Command NT_INFO_CMD_READ_PORT_V1).
Additionally, the transmitSegment example has been changed to support 64 bit timestamp. It is now possible to use tx rates as low as 1 Kilobit per second.

#6128: The profile tool documentation has been updated to explain where the host buffer is currently in use with regards to enqueued/dequeued in app/driver/adapter.

#6125: (Support-ID 6086) Added DN-0449 document as part of the documentation in the complete package.

#6116: (Support-ID 5742) NT_Init can now be called continuously until the service is ready. If the service is not ready the code NT_STATUS_TRYAGAIN is returned.
If any other code is returned an error has occured and it is not possible to continue.

#6103: Port disable implemented for the NT4E2-4T-BP, NT20E2 and NT40E2-4 adapters.
The ports can be disabled and enabled by using the config tool or they can be disabled at startup by setting a PortDisableMask in the ini-file.

#5992: Auto generation of the ini-file.
If the ini-file does not exists or it is empty a new ini-file is auto generated. The auto generated ini-file will contain default values for all installed adapters.
In order to auto generate an ini-file for all adapters, the driver must be started and stopped with an empty or deleted ini-file. Afterwards the ini-file can be edited to fit costumer needs.

#5919: Absolute TX timing mode has been added.
An adapter is either in relative or absolute timing mode. When in relative timing mode, an adapter transmits packets such that the inter-frame gap (IFG) between pairs of packets is correct. When in absolute timing mode, the adapter transmits packets at the time stipulated by the time stamp in the packet descriptor.

#5900: API log improved. The logs from the API now contains process ID and application name for each log message.

#5754: The profiling tool has been moved from the tools package to the driver package. Therefore it is important to install the driver package after the tools package, as the uninstall procedure will delete the old profiling tool.
The tool has been enhanced with two new pages - Streams and StreamIds that can be shown for the cursor selected entry in the main page (Host buffers).

#5624: A warning entry is now created in the log when the FPGA temperature reaches 90 degrees. Additionally, the adapter is configured to switch off its own power supply in case the FPGA temperature reaches 95 degrees.

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#10530: ntservice may crash while shutting down when applications using the NTAPI are still running.

#9911: NT_NET_UPDATE_PKT_L2_PTR macro fails when compiled in a .cpp file

#9877: (Support-ID 9622) The supportinfo "hostbuffer info" part is not sampled atomic, the lastTxOff was captured after RdOff and WrOff causing it to look like lastTxOff is exceeding its limits.

#9814: (Support-ID 8749) Missing return type documentation for macro NT_NET_GET_PKT_L2_PTR

#9713: (Support-ID 9704) HBH crash on kernels with CONFIG_HZ_5000=y.

#9326: (Support-ID 9300) The driver issues a wrong error message if driver load fails due to insufficient contiguous DMA memory.

#8871: GEN2 adapters could potentially overwrite memory when ntservice is restarted.

#8699: Running with NT_NET_INTERFACE_SEGMENT while deleting/assigning filters could cause a deadlock

#8375: Multi get usage of NT_NetTxGet() can cause a dead lock when the entire host buffer is get.

#8343: Combining 2 filters into 1 filter results in all packets being forwarded.

#8100: (Support-ID 8041) ntservice stops responding if system runs out of memory.

#7973: (Support-ID 7925) If transmitting on ports that have not had link, the transmit rate on NT4e is 10Mbps

#7968: (Support-ID 7962) Statistic example is clearing the statistic in every loop. Intro description about NT_StatRead() is wrong.

#7880: Running with a profile != INLINE the ntservice CPU load is dependent on the host buffer size

#7398: (Support-ID 7388) >>ERROR | SRV | 20411 - SPIv1[0:1500]: Opcode 0120 returned error 80. Is the opcode supported by this AVR version?
May appear if the driver is run on an adapter fitted with an AVR version prior to 1.1.

#7134: Linkspeeds other than 1 Gbps on all ports when running with SOF enabled can make adapter crash unexpectedly (NT4E).

#7127: (Support-ID 7093) Unexpected behavior of SliceOffset=0 in NTPL command

#7001: The version of the NT-TSE or NT-TSU cannot be read from the driver. This does not affect the functionality, only visibility.

#6904: (Support-ID 6882) The shared memory files placed in /tmp are in risk of being deleted by a cleanup Cron job. When the files are deleted it is not possible to start any apps. Apps already running is not affected.

#6763: (Support-ID 6727) When using a DATA filter with datatype=bytestr4 the datamask is wrongly set to [32:0]. This causes the filter not to work.

#6712: (Support-ID 6645) Using the FilterMacros.txt could cause the ntservice to crash on a 32bit linux platform. The right behavior is that an error should be returned with the message "Filter is to big"

#6642: (Support-ID 6546) Ntstart driver error dumps useless INFO messages from adapters not present in the ini-file.

#6631: (Support-ID 6438) The documentation about streams (NtInfoStreams_s) in the reference documentation DN-0449 is misleading.

#6625: (Support-ID 6516) The alarm is disabled for Level1 NIM sensors.

#6623: Setting an NT20E2 inline adapter to a TrafficGen profile is causing a lot of unnecessary error logs.
Note: The NT20E2 inline does not support the TrafficGen profile.

#6616: (Support-ID 6601) Packet forwarding fails with 4096MB host buffers.

#6613: (Support-ID 6512) A macro cannot be deleted by using and NTPL ID like described in the reference manual DN-0449, but must be deleted by issuing an empty macro.

#6611: (Support-ID 6579) Priority 62 is not working for the assign command. For example ntpl -e "Assign[Priority=62 ; StreamID=3] = All" is not working. All other values work fine.

#6531: (Support-ID 6320) The ntpl tool documentation and help message say "ntpl -file FilterMacros.txt" whereas it should be "ntpl -f FilterMacros.txt"

#6530: (Support-ID 6435) Missing information about adapterinfo and productinfo and their purpose.

#6460: Centos reports "Archive Type Not Supported" when trying to open output from supportinfo tool.

#6459: (Support-ID 6423) Running supportinfo when ntservice is stopped generates error messages

#6433: package_install.sh script deletes /opt/napatech3/bin even when when user input specifies "no"

#6418: (Support-ID 6321) It is quite difficult to find the NTPL description in reference documentation DN-0449.

#6410: (Support-ID 6401) NT_NetTxGet() does not work in a multiget scenario

#6382: (Support-ID 6300) NT_NetTxGet() does not work in a multi-get scenario with timeout

#6378: (Support-ID 6253) The Profiling is showing invalid values for hostbuffer sizes when used with hostbuffers larger than 4GB.

#6317: (Support-ID 6247) With regard to NtInfoSensor_s the origin of the values in the limitLow and limitHigh fields and a general more thorough explanation is missing.

#6265: (Support-ID 6011) Sensor limits.
Log report incorrect sensor low limit value when resetting to default.

#6117: (Support-ID 6106) NT_NET_GET_PKT_TXPORT() does not return correct virtual port info is issued on a NetBuf_t returned via NT_NetTxGet(). There is no functional error in this, the packet is still transmitted onto the port specified via NT_NetTxGet()

#6114: (Support-ID 5910) SDRAM Fill Level warning event does not describe whether the event covers all active hostbuffers or just a single hostbuffer.

#6113: (Support-ID 6033) The SDRAMFillLevelWarning description does not describe whether or not the following syntaxes are legal.
SDRAMFillLevelWarning =
SDRAMFillLevelWarning = ,
SDRAMFillLevelWarning = ,,
SDRAMFillLevelWarning = ,20

#6043: NT_NetFileGet() returns NT_ERROR_NO_MORE_DATA on EOF (end of file). This indicates an error situation, which is not the case! Would be better to return something like NT_STATUS_END_OF_FILE instead.

#5994: Event Mask functionality not documented

#3717: OS Timesync should not work for timestampformat NATIVE, but currently it behaves as if NATIVE_UNIX was used.

#3635: Driver cannot load on IOMMU enabled systems

napatech

## From version 02.01.01 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11515: Added support for NT4E2-4-PTP FPGA image: 200-9226-50-04

#11310: For an adapter using the INLINE profile, an attempt to use the NTAPI to look up the RX/TX path delays returns the status code NOT_SUPPORTED even if the path delays are known. This restriction is no longer present, and it is possible to request the path delays for an adapter using the INLINE profile. Note that the driver returns NOT_SUPPORTED if the delays are unknown.

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11030: A screen dump feature is added to the tools monitoring and profiling. By hitting the key 'F' a copy of the screen is saved to disk. The screen dump is appended to the saved screen dump. The names of the screen dump files are monitoring.scn and profiling.scn respectively.

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#10899: An Info log has been added for each adapter that has PpsIn defined and where it should be used to do PPS time sync. The log is not written if the PpsIn are only used for sampling.
Info text: Adapter 0: PpsIn is defined for this adapter. Use an external PPS tool or application to start PPS time sync.

#10787: (Support-ID 10551) FPGA feature level can now be read using the API. It is a part of the NtInfoAdapter_v5_s structure and can be read using the info stream.

#10714: Added new command line option (-l, --logmsg) to ntlog tool to write a custom line of text to the ntservice log system.

#10687: Added the ability to filter on inner tunnel layer 3 and layer 4 though the NTPL Data filter. This feature requires matching FPGA feature set. See filter documentation for details.

#10684: Added the ability to slice packets within a tunnel though the NTPL assign command. This feature requires matching FPGA feature set. See filter documentation for details.

#10501: Wis mode can now be enabled pr port by using the wisModeMask parameter which has been added to ntservice,ini

#10400: If TxTiming=RELATIVE the max inter-frame gap is set to 2.6sec.

#10168: NTPORT4E now supported

#10109: (Support-ID 10105) The example program named info_example.c now retrieves and prints basic product (adapter) information, such as the serial number, based on information in the NtInfoProductInfo_s structure.

#10046: The execution of a timesync hard reset to a reference initiated by an application through the NTAPI interface, has changed to execute a hard reset (time jump) for which the execution is unaffected by the current time skew and the hard reset threshold value (i.e. immediately executed). In earlier versions the current time skew was compared to the hard reset threshold value to determine if the hard reset should occur or not.

#9962: Enable swapping of hashdata from tunnels when connecting to a SPAN port

#9937: Support for NTBPE removed.

#9880: Added driver support for the following legacy FPGA images:
NT20E2: 200-9220-44-10 and 200-9220-44-12
NT40E2-4: 200-9221-44-12 and 200-9221-44-13
NT40E2-1: 200-9222-44-06 and 200-9222-44-08

#9586: Alarms are now generated when the status of an external NT-TSU or NT-TSE looses the synchronization signal, synchronization or Time of Day information. The alarms are sent as events:
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_SYNC_SIGNAL
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_OUT_OF_SYNC
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_TIME_OF_DAY
This information is still logged as INFO in the ntlog.

#9494: There is a small delay from the time a frame enters a network port and until the adapter time-stamps it. An application can now query the driver for this RX path delay and subtract it from the time stamp in the packet descriptor. See DN-0449 section Path Delay for more information.

#9492: Added option "--installpath PATH" to ".run" files to change default installation folder.

#9491: Added option to run an ntpl.config file with ntstart.sh.

#9490: Deduplication supports padded frames and IP header masks of i.e. TTL and checksum fields. Moreover a dedup CRC can be forwarded to host application using extended descriptor 9 to support a hardware-accelerated deduplication application. This feature can be enable/disabled using the NTPL Deduplication options IPLengthLimit and IPv4/IPv6. This feature requires a matching FPGA version.

#9447: (Support-ID 8890) Added inline bump in the wire example to DN-0449

#9444: Doxygen documentation updated in NTPL data section

#9232: (Support-ID 9105) NT_NetFileGet() now automatically rewinds the file when NT_STATUS_END_OF_FILE is returned. This will allow NT_NetFileGet() to be called after NT_STATUS_END_OF_FILE and return to the start of the file.

#9147: The delay asymmetry configuration option is added to the PTP protocol.

#9088: TimeSyncFrequencyReferencePriority added to the ntservice.ini file

#9074: On the PTP port, statistics including CRC errors are displayed in the monitoring tool for debug purposes. All the information can be obtained using NTAPI

#9027: TX host buffers can now be prefilled with data and replayed continuously without needing to memcpy packets.

#8984: Support for NT20E enabled

#8760: Added NUMA node information to info stream.

#8604: NT_NetRxOpenMulti() has been added to the API to enable merging traffic from multiple stream-ids

#8500: PDV filter has been implemented in order to increase performance in non-PTP aware network

#8437: The installation now honors the TMPDIR environment setting during the installation to specify an alternative temporary directory.

#8369: Time jumps in OS timesync mode has been implemented.

TimeSyncTimeJumpThreshold = 0, enables smooth sliding
TimeSyncTimeJumpThreshold = <any integer value different from 0> enables time jumps with threshold of 1 sec. If offset is more than 1 sec, a hard time jump will occur.

The default setting is TimeSyncTimeJumpThreshold = 1. This is the default setting used in the ini file in this and previous releases. If you are running with the default ini file, time jumps are default enabled. In previous releases the setting of TimeSyncTimeJumpThreshold had no effect in OS timesync mode.

#8340: Added the ability to reuse the protocol filters to have more than 8 filters using a protocol

#8305: (Support-ID 7892) Enabled possibility to tweak the NT4E-INL and NT4E-STD-INL adapter Tx engine to transmit faster when running with the TrafficGen-profile. Add this to the inifile to achieve it:
[Debug]
nt4etxadjust=8

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

#8052: Stream-id based statistics are now available via the statistics stream and can be monitored using the monitoring tool. Stream-ids can be activated/deactivated using NTPL, to control the sync point when packets starts entering the stream-id host-buffers and when statistics should count them, see the streamidstatistics.c example.

#7975: It has been made possible to run will multiple tx streams addressing the same port when using the TrafficGen profile. The rule is that packets has be to sent with NT_NET_SET_PKT_TXNOW(1) otherwise the behavior is unpredictable.

#7931: A define NT_ERRBUF_SIZE added to indicate the maximum error length size that can be delivered by the driver. This define should be used when allocating a buffer for reading an error message.

#7928: npcap.ini added to the supportinfo archive.

#7894: Added support for per filter descriptor selection. The feature is available through the "Assign" command in NTPL. This feature requires matching FPGA.

#7823: Configuration parameter TimeSyncTimeOffset now has a limit of 1000000 ns (1 ms)

#7807: (Support-ID 7327) NTAPI NT_NetFile...() functions do not connect to NTservice anymore - and thus do not require NTservice to be running.
This change is to allow an user application to process captured files through the NTAPI NT_NetFile...() functions on systems that do not have NTservice running nor a Napatech adapter installed.

NTAPI functions affected by the change:

NT_NetFileOpen()
NT_NetFileGet()
NT_NetFileRelease()
NT_NetFileClose()

The example readcapfile (examples/net/readcapfile/readcapfile.c) demonstrates a possible use.

#7805: Alarms have been added to monitor when an external NTTSU or NTTSE connected through NT-TS timesync looses synchronization with it's time source. The possible alarms are:
NT-TS: External device lost synchronization signal
NT-TS: External device is out of synchronization
NT-TS: External device lost time of day information

#7792: Changing the hash seed is now possible in ntservice.ini using the HashSeed option. Changing the hash seed will effect the data distribution on the streams.

#7758: The info stream has been extended to contain information of:
SDRAM present and SDRAM size
PCI bus information
Adapter features - Bypass support.

#7732: It is now possible to synchronize the operating system's clock with (to) the clock of a designated adapter. The feature is enabled by setting the configuration parameter TimeSyncOsTimeReference in the System section. For instance to synchronize the server clock with adapter zero, specify TimeSyncOsTimeReference=adapter-0. It requires an FPGA with support for synchronization of OS time.

#7730: An event and a log will be generated when the adapter's time stamp clock is set by the system.

#7728: IEEE1588 support is implemented on NT4E2_PTP and NT20E2_PTP adapter. (dedicated RJ45)

#7719: The data filter hardware supports up to 255 values for each 1 byte filter, however the NTPL limits this to specifying 8 values or one range. This is changed to support up to 32 values or 16 ranges or a mix of the two. When using a range it will take up the space of 2 values. When specifying 8 ranges only 16 values can be used.

#7715: A new feature - host loopback - has been added to the port settings structure. Applying loopback to a port means that data transmitted from the host on the port is looped back to the same port. Since the loopback is applied inside the adapter, it will work independently of whether a NIM is actually present or not, and the link will always be reported as up.
If put in loopback mode, the monitoring tool will show the link state as "Loopback". The config tool can be used to apply loopback, and the diagnostics tool can be used to test loopback if using a new feature: single- port- loop.

#7703: Added support for swapping the source and destination IP address regardless of value before calculating hash value. This enables traffic to/from the entire subnets to be balanced between streams. See Hash Mode command documentation for more details. This feature requires a matching FPGA.

#7699: Added 2 and 5 tuple sorted and unsorted hash modes on IPv4 and IPv6 encapsulated IP traffic. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7694: Added 2 and 5 tuple hash (sorted and unsorted) modes on IPv4 and IPv6 traffic inside a GTPv1 tunnel. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7603: Support for FPGA images:
- 200-9220-45-07 (NT20E2)
- 200-9221-45-09 (NT40E2-4)

#7433: The command to setup numanodes, "Setup[numanode=0]=streamid==x,y,z" can now contain up 32 streamids.

#7406: The driver now supports up to 8 adapters in one server.

#7397: (Support-ID 7435) Added support for filtering on decode error e.g "Assign[StreamId = 1] = DecodeError == TRUE" will redirect all packages with decode errors to stream 1.

#7392: (Support-ID 7333) Check for mismatching version of NTService and version of the low level driver has been added.

#7222: Check if IOMMU is enabled are added for kernels larger or equal to version 3.2. Driver fails if IOMMU is enabled.

#7169: Added support for Linux 3.x

#7167: Added support for the NT40E2_1 adapter.

#7141: (Support-ID 6797) The description of NT_NetRxGet timeout functionality in DN-0449 has been improved

#7065: The adapter will now be able to identify connected NT-TS synched adapters, NT-TSUs and NT-TSEs. The information can be seen through the API or using the monitoring tool.

#7062: Added support for Customer specific User data in the VPD.

#6781: This release adds a new configuration parameter OsTimeSyncFailover that can be set to DISABLE or ENABLE; the default value is DISABLE. When OsTimeSyncFailover is set to ENABLE and TimeSyncProtocol is set to NT for a given adapter, then the adapter automatically switches to OS Time synchronization if the incoming NT-TS signal fails, and when the NT time synchronization signal is restored, the adapter reverts to NT time synchronization.

#6780: This release adds support for OC-192c for the NT20E2 and NT40E2_4 adapters. A new configuration setting WisMode enables or disables WIS/OC-192c mode. The setting is set for an adapter, and the legal values are DISABLE and ENABLE. The default value is DISABLE, which disables WIS/OC-192c mode.

#6778: This release adds a new configuration parameter CancelTxOnCloseMask, which is a bitmask that enables cancellation of pending transmission segments for the ports designated by the mask: bit 0 = port 0, bit 1 = port 1, etc. Note that each bit represents an adapter local port, not a virtual (global) port across adapters. When a transmission stream is closed, and if the port bit is set for any of the affected ports, all pending data is cancelled and transmission of data stops immediately.

#6777: This release adds support for higher frequency time sampling. A new configuration parameter HighFrequencySampling can be set to DISABLE or ENABLE, and the default value is DISABLE. When high frequency sampling is enabled (HighFrequencySampling=ENABLE), the time is sampled every 20 microseconds.

#6776: This release includes support for a new FPGA feature "IPF", configurable via NTPL and observable via Statistics. Hardware assisted IP-Fragmentation support is a novel approach to accelerating reassembly by identifying which

feed receives fragments for a particular IP flow. This module is able to process both IPv4 and IPv6. See NTPL command "IPFMode" for information about how to use the module. See example demo "net/ipfdemo" for a working example.

#6718: The time it takes to initialize a NIM module in a PCI GEN2 adapter (NTxxE2) has been improved from about 4.6 seconds to about 0.8 seconds.

#6612: Inline profile documentation has been improved.

#6584: (Support-ID 6469) A new inifile parameter has been added to ntservice.ini. This parameter can only be used by the inline profile on NT adapters. The parameter, "HostBufferPollInterval" can take 4 values "Default | 100 | 250 | 500" and it will control how often ntservice will poll for host buffer data both ingress and egress. The higher a value the lower ntservice CPU utilization but the higher latency. The parameters comes handy in configurations where ntservice consume too much CPU and where latency is not so important.

#6500: Hardware accelerated PCAP packet descriptor is now supported. With this feature comes some restrictions. The TimestampFormat "PCAP" and "PCAP_NS" can only be configured with PacketDescriptor "PCAP". The NTAPI packet interface is not supported when using PCAP headers. To make use of this new feature use the NTAPI segment interface. Note: This feature is not supported on in-line adapters and entry level adapters.

#6494: The standard format of the Time string from an Endrun PPS device has been changed. Both the old and the new format are supported. No configuration is required.

#6458: (Support-ID 6424) The log can now be read in most cases after ntservice crashes, as the shared memory containing the log survives. If ntservice is restarted the log is deleted.
The ntservice binary and the ntservice.ini is now added to the supportinfo archive.

#6432: Added version number of the DN-0449 reference manual to the footer of all pages in the manual.

#6380: (Support-ID 6285) It is now possible to read raw NIM data like it has been possible in 2GD using the NimConfig tool.

#6361: Coordinated time-synchronized transmit has been implemented. More information can be found in the reference manual DN-449 and in the replayGS example.

#6239: Timestamp Inject mode has been added.
Two ini-file keys have been implemented to control the timestamp inject:
1. TimestampMethod = SOF | EOF: System parameter. Used both to control RX and TX.
2. TimestampInjectOffset = SOF | EOF: Adapter parameter.. Used to control TX.

#6143: Info stream extended with info to tell whether the adapter supports 64 bit time stamping or not. The information is found in the featureMask in the capabilities in the port settings port_v1 (Command NT_INFO_CMD_READ_PORT_V1).
Additionally, the transmitSegment example has been changed to support 64 bit timestamp. It is now possible to use tx rates as low as 1 Kilobit per second.

#6128: The profile tool documentation has been updated to explain where the host buffer is currently in use with regards to enqueued/dequeued in app/driver/adapter.

#6125: (Support-ID 6086) Added DN-0449 document as part of the documentation in the complete package.

#6116: (Support-ID 5742) NT_Init can now be called continuously until the service is ready. If the service is not ready the code NT_STATUS_TRYAGAIN is returned.
If any other code is returned an error has occured and it is not possible to continue.

#6103: Port disable implemented for the NT4E2-4T-BP, NT20E2 and NT40E2-4 adapters.
The ports can be disabled and enabled by using the config tool or they can be disabled at startup by setting a PortDisableMask in the ini-file.

#5992: Auto generation of the ini-file.
If the ini-file does not exists or it is empty a new ini-file is auto generated. The auto generated ini-file will contain default values for all installed adapters.
In order to auto generate an ini-file for all adapters, the driver must be started and stopped with an empty or deleted ini-file. Afterwards the ini-file can be edited to fit costumer needs.

#5919: Absolute TX timing mode has been added.
An adapter is either in relative or absolute timing mode. When in relative timing mode, an adapter transmits packets such that the inter-frame gap (IFG) between pairs of packets is correct. When in absolute timing mode, the adapter transmits packets at the time stipulated by the time stamp in the packet descriptor.

#5900: API log improved. The logs from the API now contains process ID and application name for each log message.

#5754: The profiling tool has been moved from the tools package to the driver package. Therefore it is important to install the driver package after the tools package, as the uninstall procedure will delete the old profiling tool.
The tool has been enhanced with two new pages - Streams and StreamIds that can be shown for the cursor selected entry in the main page (Host buffers).

#5624: A warning entry is now created in the log when the FPGA temperature reaches 90 degrees. Additionally, the adapter is configured to switch off its own power supply in case the FPGA temperature reaches 95 degrees.

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#13105: (Support-ID 11627) FAN speed values can be wrong when server CPU load is high. In cases of high CPU load a percentage of the FAN speed measurements ought to be skipped.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#12144: (Support-ID 11627) The FAN speed sensor range is too wide. The FAN speed sensor range must be changed to 5270-7440.
FAN speed values can be wrong when server CPU load is high. In cases of high CPU load a percentage of the FAN speed measurements ought to be skipped.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#10530: ntservice may crash while shutting down when applications using the NTAPI are still running.

#9911: NT_NET_UPDATE_PKT_L2_PTR macro fails when compiled in a .cpp file

#9877: (Support-ID 9622) The supportinfo "hostbuffer info" part is not sampled atomic, the lastTxOff was captured after RdOff and WrOff causing it to look like lastTxOff is exceeding its limits.

#9814: (Support-ID 8749) Missing return type documentation for macro NT_NET_GET_PKT_L2_PTR

#9713: (Support-ID 9704) HBH crash on kernels with CONFIG_HZ_5000=y.

#9326: (Support-ID 9300) The driver issues a wrong error message if driver load fails due to insufficient contiguous DMA memory.

#8871: GEN2 adapters could potentially overwrite memory when ntservice is restarted.

#8699: Running with NT_NET_INTERFACE_SEGMENT while deleting/assigning filters could cause a deadlock

#8375: Multi get usage of NT_NetTxGet() can cause a dead lock when the entire host buffer is get.

#8343: Combining 2 filters into 1 filter results in all packets being forwarded.

#8100: (Support-ID 8041) ntservice stops responding if system runs out of memory.

#7973: (Support-ID 7925) If transmitting on ports that have not had link, the transmit rate on NT4e is 10Mbps

#7968: (Support-ID 7962) Statistic example is clearing the statistic in every loop. Intro description about NT_StatRead() is wrong.

#7880: Running with a profile != INLINE the ntservice CPU load is dependent on the host buffer size

#7398: (Support-ID 7388) >>ERROR | SRV | 20411 - SPIv1[0:1500]: Opcode 0120 returned error 80. Is the opcode supported by this AVR version?
May appear if the driver is run on an adapter fitted with an AVR version prior to 1.1.

#7134: Linkspeeds other than 1 Gbps on all ports when running with SOF enabled can make adapter crash unexpectedly (NT4E).

#7127: (Support-ID 7093) Unexpected behavior of SliceOffset=0 in NTPL command

#7001: The version of the NT-TSE or NT-TSU cannot be read from the driver. This does not affect the functionality, only visibility.

#6904: (Support-ID 6882) The shared memory files placed in /tmp are in risk of being deleted by a cleanup Cron job. When the files are deleted it is not possible to start any apps. Apps already running is not affected.

#6763: (Support-ID 6727) When using a DATA filter with datatype=bytestr4 the datamask is wrongly set to [32:0]. This causes the filter not to work.

#6712: (Support-ID 6645) Using the FilterMacros.txt could cause the ntservice to crash on a 32bit linux platform. The right behavior is that an error should be returned with the message "Filter is to big"

#6642: (Support-ID 6546) Ntstart driver error dumps useless INFO messages from adapters not present in the ini-file.

#6631: (Support-ID 6438) The documentation about streams (NtInfoStreams_s) in the reference documentation DN-0449 is misleading.

#6625: (Support-ID 6516) The alarm is disabled for Level1 NIM sensors.

#6623: Setting an NT20E2 inline adapter to a TrafficGen profile is causing a lot of unnecessary error logs.
Note: The NT20E2 inline does not support the TrafficGen profile.

#6616: (Support-ID 6601) Packet forwarding fails with 4096MB host buffers.

#6613: (Support-ID 6512) A macro cannot be deleted by using and NTPL ID like described in the reference manual DN-0449, but must be deleted by issuing an empty macro.

#6611: (Support-ID 6579) Priority 62 is not working for the assign command. For example ntpl -e "Assign[Priority=62 ; StreamID=3] = All" is not working. All other values work fine.

#6531: (Support-ID 6320) The ntpl tool documentation and help message say "ntpl -file FilterMacros.txt" whereas it should be "ntpl -f FilterMacros.txt"

#6530: (Support-ID 6435) Missing information about adapterinfo and productinfo and their purpose.

#6460: Centos reports "Archive Type Not Supported" when trying to open output from supportinfo tool.

#6459: (Support-ID 6423) Running supportinfo when ntservice is stopped generates error messages

#6433: package_install.sh script deletes /opt/napatech3/bin even when when user input specifies "no"

#6418: (Support-ID 6321) It is quite difficult to find the NTPL description in reference documentation DN-0449.

#6410: (Support-ID 6401) NT_NetTxGet() does not work in a multiget scenario

#6382: (Support-ID 6300) NT_NetTxGet() does not work in a multi-get scenario with timeout

#6378: (Support-ID 6253) The Profiling is showing invalid values for hostbuffer sizes when used with hostbuffers larger than 4GB.

#6317: (Support-ID 6247) With regard to NtInfoSensor_s the origin of the values in the limitLow and limitHigh fields and a general more thorough explanation is missing.

#6265: (Support-ID 6011) Sensor limits.
Log report incorrect sensor low limit value when resetting to default.

#6117: (Support-ID 6106) NT_NET_GET_PKT_TXPORT() does not return correct virtual port info is issued on a NetBuf_t returned via NT_NetTxGet(). There is no functional error in this, the packet is still transmitted onto the port specified via NT_NetTxGet()

#6114: (Support-ID 5910) SDRAM Fill Level warning event does not describe whether the event covers all active hostbuffers or just a single hostbuffer.

#6113: (Support-ID 6033) The SDRAMFillLevelWarning description does not describe whether or not the following syntaxes are legal.
SDRAMFillLevelWarning =
SDRAMFillLevelWarning = ,
SDRAMFillLevelWarning = ,,
SDRAMFillLevelWarning = ,20

#6043: NT_NetFileGet() returns NT_ERROR_NO_MORE_DATA on EOF (end of file). This indicates an error situation, which is not the case! Would be better to return something like NT_STATUS_END_OF_FILE instead.

#5994: Event Mask functionality not documented

#3717: OS Timesync should not work for timestampformat NATIVE, but currently it behaves as if NATIVE_UNIX was used.

#3635: Driver cannot load on IOMMU enabled systems

napatech

## From version 02.01.00 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11515: Added support for NT4E2-4-PTP FPGA image: 200-9226-50-04

#11310: For an adapter using the INLINE profile, an attempt to use the NTAPI to look up the RX/TX path delays returns the status code NOT_SUPPORTED even if the path delays are known. This restriction is no longer present, and it is possible to request the path delays for an adapter using the INLINE profile. Note that the driver returns NOT_SUPPORTED if the delays are unknown.

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11030: A screen dump feature is added to the tools monitoring and profiling. By hitting the key 'F' a copy of the screen is saved to disk. The screen dump is appended to the saved screen dump. The names of the screen dump files are monitoring.scn and profiling.scn respectively.

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#10899: An Info log has been added for each adapter that has PpsIn defined and where it should be used to do PPS time sync. The log is not written if the PpsIn are only used for sampling.
Info text: Adapter 0: PpsIn is defined for this adapter. Use an external PPS tool or application to start PPS time sync.

#10787: (Support-ID 10551) FPGA feature level can now be read using the API. It is a part of the NtInfoAdapter_v5_s structure and can be read using the info stream.

#10714: Added new command line option (-l, --logmsg) to ntlog tool to write a custom line of text to the ntservice log system.

#10687: Added the ability to filter on inner tunnel layer 3 and layer 4 though the NTPL Data filter. This feature requires matching FPGA feature set. See filter documentation for details.

#10684: Added the ability to slice packets within a tunnel though the NTPL assign command. This feature requires matching FPGA feature set. See filter documentation for details.

#10501: Wis mode can now be enabled pr port by using the wisModeMask parameter which has been added to ntservice,ini

#10400: If TxTiming=RELATIVE the max inter-frame gap is set to 2.6sec.

#10168: NTPORT4E now supported

#10109: (Support-ID 10105) The example program named info_example.c now retrieves and prints basic product (adapter) information, such as the serial number, based on information in the NtInfoProductInfo_s structure.

#10046: The execution of a timesync hard reset to a reference initiated by an application through the NTAPI interface, has changed to execute a hard reset (time jump) for which the execution is unaffected by the current time skew and the hard reset threshold value (i.e. immediately executed). In earlier versions the current time skew was compared to the hard reset threshold value to determine if the hard reset should occur or not.

#9962: Enable swapping of hashdata from tunnels when connecting to a SPAN port

#9937: Support for NTBPE removed.

#9880: Added driver support for the following legacy FPGA images:
NT20E2: 200-9220-44-10 and 200-9220-44-12
NT40E2-4: 200-9221-44-12 and 200-9221-44-13
NT40E2-1: 200-9222-44-06 and 200-9222-44-08

#9586: Alarms are now generated when the status of an external NT-TSU or NT-TSE looses the synchronization signal, synchronization or Time of Day information. The alarms are sent as events:
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_SYNC_SIGNAL
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_OUT_OF_SYNC
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_TIME_OF_DAY
This information is still logged as INFO in the ntlog.

#9494: There is a small delay from the time a frame enters a network port and until the adapter time-stamps it. An application can now query the driver for this RX path delay and subtract it from the time stamp in the packet descriptor. See DN-0449 section Path Delay for more information.

#9492: Added option "--installpath PATH" to ".run" files to change default installation folder.

#9491: Added option to run an ntpl.config file with ntstart.sh.

#9490: Deduplication supports padded frames and IP header masks of i.e. TTL and checksum fields. Moreover a dedup CRC can be forwarded to host application using extended descriptor 9 to support a hardware-accelerated deduplication application. This feature can be enable/disabled using the NTPL Deduplication options IPLengthLimit and IPv4/IPv6. This feature requires a matching FPGA version.

#9447: (Support-ID 8890) Added inline bump in the wire example to DN-0449

#9444: Doxygen documentation updated in NTPL data section

#9232: (Support-ID 9105) NT_NetFileGet() now automatically rewinds the file when NT_STATUS_END_OF_FILE is returned. This will allow NT_NetFileGet() to be called after NT_STATUS_END_OF_FILE and return to the start of the file.

#9147: The delay asymmetry configuration option is added to the PTP protocol.

#9088: TimeSyncFrequencyReferencePriority added to the ntservice.ini file

#9074: On the PTP port, statistics including CRC errors are displayed in the monitoring tool for debug purposes. All the information can be obtained using NTAPI

#9027: TX host buffers can now be prefilled with data and replayed continuously without needing to memcpy packets.

#8984: Support for NT20E enabled

#8760: Added NUMA node information to info stream.

#8604: NT_NetRxOpenMulti() has been added to the API to enable merging traffic from multiple stream-ids

#8500: PDV filter has been implemented in order to increase performance in non-PTP aware network

#8437: The installation now honors the TMPDIR environment setting during the installation to specify an alternative temporary directory.

#8369: Time jumps in OS timesync mode has been implemented.

TimeSyncTimeJumpThreshold = 0, enables smooth sliding
TimeSyncTimeJumpThreshold = <any integer value different from 0> enables time jumps with threshold of 1 sec. If offset is more than 1 sec, a hard time jump will occur.

The default setting is TimeSyncTimeJumpThreshold = 1. This is the default setting used in the ini file in this and previous releases. If you are running with the default ini file, time jumps are default enabled. In previous releases the setting of TimeSyncTimeJumpThreshold had no effect in OS timesync mode.

#8340: Added the ability to reuse the protocol filters to have more than 8 filters using a protocol

#8305: (Support-ID 7892) Enabled possibility to tweak the NT4E-INL and NT4E-STD-INL adapter Tx engine to transmit faster when running with the TrafficGen-profile. Add this to the inifile to achieve it:
[Debug]
nt4etxadjust=8

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

#8052: Stream-id based statistics are now available via the statistics stream and can be monitored using the monitoring tool. Stream-ids can be activated/deactivated using NTPL, to control the sync point when packets starts entering the stream-id host-buffers and when statistics should count them, see the streamidstatistics.c example.

#7975: It has been made possible to run will multiple tx streams addressing the same port when using the TrafficGen profile. The rule is that packets has be to sent with NT_NET_SET_PKT_TXNOW(1) otherwise the behavior is unpredictable.

#7931: A define NT_ERRBUF_SIZE added to indicate the maximum error length size that can be delivered by the driver. This define should be used when allocating a buffer for reading an error message.

#7928: npcap.ini added to the supportinfo archive.

#7894: Added support for per filter descriptor selection. The feature is available through the "Assign" command in NTPL. This feature requires matching FPGA.

#7823: Configuration parameter TimeSyncTimeOffset now has a limit of 1000000 ns (1 ms)

#7807: (Support-ID 7327) NTAPI NT_NetFile...() functions do not connect to NTservice anymore - and thus do not require NTservice to be running.
This change is to allow an user application to process captured files through the NTAPI NT_NetFile...() functions on systems that do not have NTservice running nor a Napatech adapter installed.

NTAPI functions affected by the change:

NT_NetFileOpen()
NT_NetFileGet()
NT_NetFileRelease()
NT_NetFileClose()

The example readcapfile (examples/net/readcapfile/readcapfile.c) demonstrates a possible use.

#7805: Alarms have been added to monitor when an external NTTSU or NTTSE connected through NT-TS timesync looses synchronization with it's time source. The possible alarms are:
NT-TS: External device lost synchronization signal
NT-TS: External device is out of synchronization
NT-TS: External device lost time of day information

#7792: Changing the hash seed is now possible in ntservice.ini using the HashSeed option. Changing the hash seed will effect the data distribution on the streams.

#7758: The info stream has been extended to contain information of:
SDRAM present and SDRAM size
PCI bus information
Adapter features - Bypass support.

#7732: It is now possible to synchronize the operating system's clock with (to) the clock of a designated adapter. The feature is enabled by setting the configuration parameter TimeSyncOsTimeReference in the System section. For instance to synchronize the server clock with adapter zero, specify TimeSyncOsTimeReference=adapter-0. It requires an FPGA with support for synchronization of OS time.

#7730: An event and a log will be generated when the adapter's time stamp clock is set by the system.

#7728: IEEE1588 support is implemented on NT4E2_PTP and NT20E2_PTP adapter. (dedicated RJ45)

#7719: The data filter hardware supports up to 255 values for each 1 byte filter, however the NTPL limits this to specifying 8 values or one range. This is changed to support up to 32 values or 16 ranges or a mix of the two. When using a range it will take up the space of 2 values. When specifying 8 ranges only 16 values can be used.

#7715: A new feature - host loopback - has been added to the port settings structure. Applying loopback to a port means that data transmitted from the host on the port is looped back to the same port. Since the loopback is applied inside the adapter, it will work independently of whether a NIM is actually present or not, and the link will always be reported as up.
If put in loopback mode, the monitoring tool will show the link state as "Loopback". The config tool can be used to apply loopback, and the diagnostics tool can be used to test loopback if using a new feature: single- port- loop.

#7703: Added support for swapping the source and destination IP address regardless of value before calculating hash value. This enables traffic to/from the entire subnets to be balanced between streams. See Hash Mode command documentation for more details. This feature requires a matching FPGA.

#7699: Added 2 and 5 tuple sorted and unsorted hash modes on IPv4 and IPv6 encapsulated IP traffic. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7694: Added 2 and 5 tuple hash (sorted and unsorted) modes on IPv4 and IPv6 traffic inside a GTPv1 tunnel. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7603: Support for FPGA images:
- 200-9220-45-07 (NT20E2)
- 200-9221-45-09 (NT40E2-4)

#7433: The command to setup numanodes, "Setup[numanode=0]=streamid==x,y,z" can now contain up 32 streamids.

#7406: The driver now supports up to 8 adapters in one server.

#7397: (Support-ID 7435) Added support for filtering on decode error e.g "Assign[StreamId = 1] = DecodeError == TRUE" will redirect all packages with decode errors to stream 1.

#7392: (Support-ID 7333) Check for mismatching version of NTService and version of the low level driver has been added.

#7222: Check if IOMMU is enabled are added for kernels larger or equal to version 3.2. Driver fails if IOMMU is enabled.

#7169: Added support for Linux 3.x

#7167: Added support for the NT40E2_1 adapter.

#7141: (Support-ID 6797) The description of NT_NetRxGet timeout functionality in DN-0449 has been improved

#7065: The adapter will now be able to identify connected NT-TS synched adapters, NT-TSUs and NT-TSEs. The information can be seen through the API or using the monitoring tool.

#7062: Added support for Customer specific User data in the VPD.

#6781: This release adds a new configuration parameter OsTimeSyncFailover that can be set to DISABLE or ENABLE; the default value is DISABLE. When OsTimeSyncFailover is set to ENABLE and TimeSyncProtocol is set to NT for a given adapter, then the adapter automatically switches to OS Time synchronization if the incoming NT-TS signal fails, and when the NT time synchronization signal is restored, the adapter reverts to NT time synchronization.

#6780: This release adds support for OC-192c for the NT20E2 and NT40E2_4 adapters. A new configuration setting WisMode enables or disables WIS/OC-192c mode. The setting is set for an adapter, and the legal values are DISABLE and ENABLE. The default value is DISABLE, which disables WIS/OC-192c mode.

#6778: This release adds a new configuration parameter CancelTxOnCloseMask, which is a bitmask that enables cancellation of pending transmission segments for the ports designated by the mask: bit 0 = port 0, bit 1 = port 1, etc. Note that each bit represents an adapter local port, not a virtual (global) port across adapters. When a transmission stream is closed, and if the port bit is set for any of the affected ports, all pending data is cancelled and transmission of data stops immediately.

#6777: This release adds support for higher frequency time sampling. A new configuration parameter HighFrequencySampling can be set to DISABLE or ENABLE, and the default value is DISABLE. When high frequency sampling is enabled (HighFrequencySampling=ENABLE), the time is sampled every 20 microseconds.

#6776: This release includes support for a new FPGA feature "IPF", configurable via NTPL and observable via Statistics. Hardware assisted IP-Fragmentation support is a novel approach to accelerating reassembly by identifying which

feed receives fragments for a particular IP flow. This module is able to process both IPv4 and IPv6. See NTPL command "IPFMode" for information about how to use the module. See example demo "net/ipfdemo" for a working example.

#6718: The time it takes to initialize a NIM module in a PCI GEN2 adapter (NTxxE2) has been improved from about 4.6 seconds to about 0.8 seconds.

#6612: Inline profile documentation has been improved.

#6584: (Support-ID 6469) A new inifile parameter has been added to ntservice.ini. This parameter can only be used by the inline profile on NT adapters. The parameter, "HostBufferPollInterval" can take 4 values "Default | 100 | 250 | 500" and it will control how often ntservice will poll for host buffer data both ingress and egress. The higher a value the lower ntservice CPU utilization but the higher latency. The parameters comes handy in configurations where ntservice consume too much CPU and where latency is not so important.

#6500: Hardware accelerated PCAP packet descriptor is now supported. With this feature comes some restrictions. The TimestampFormat "PCAP" and "PCAP_NS" can only be configured with PacketDescriptor "PCAP". The NTAPI packet interface is not supported when using PCAP headers. To make use of this new feature use the NTAPI segment interface. Note: This feature is not supported on in-line adapters and entry level adapters.

#6494: The standard format of the Time string from an Endrun PPS device has been changed. Both the old and the new format are supported. No configuration is required.

#6458: (Support-ID 6424) The log can now be read in most cases after ntservice crashes, as the shared memory containing the log survives. If ntservice is restarted the log is deleted.
The ntservice binary and the ntservice.ini is now added to the supportinfo archive.

#6432: Added version number of the DN-0449 reference manual to the footer of all pages in the manual.

#6380: (Support-ID 6285) It is now possible to read raw NIM data like it has been possible in 2GD using the NimConfig tool.

#6361: Coordinated time-synchronized transmit has been implemented. More information can be found in the reference manual DN-449 and in the replayGS example.

#6239: Timestamp Inject mode has been added.
Two ini-file keys have been implemented to control the timestamp inject:
1. TimestampMethod = SOF | EOF: System parameter. Used both to control RX and TX.
2. TimestampInjectOffset = SOF | EOF: Adapter parameter.. Used to control TX.

#6143: Info stream extended with info to tell whether the adapter supports 64 bit time stamping or not. The information is found in the featureMask in the capabilities in the port settings port_v1 (Command NT_INFO_CMD_READ_PORT_V1).
Additionally, the transmitSegment example has been changed to support 64 bit timestamp. It is now possible to use tx rates as low as 1 Kilobit per second.

#6128: The profile tool documentation has been updated to explain where the host buffer is currently in use with regards to enqueued/dequeued in app/driver/adapter.

#6125: (Support-ID 6086) Added DN-0449 document as part of the documentation in the complete package.

#6116: (Support-ID 5742) NT_Init can now be called continuously until the service is ready. If the service is not ready the code NT_STATUS_TRYAGAIN is returned.
If any other code is returned an error has occured and it is not possible to continue.

#6103: Port disable implemented for the NT4E2-4T-BP, NT20E2 and NT40E2-4 adapters.
The ports can be disabled and enabled by using the config tool or they can be disabled at startup by setting a PortDisableMask in the ini-file.

#6096: SDRAMFillLevel event log now includes streamID and number of streams.

#5992: Auto generation of the ini-file.
If the ini-file does not exists or it is empty a new ini-file is auto generated. The auto generated ini-file will contain default values for all installed adapters.
In order to auto generate an ini-file for all adapters, the driver must be started and stopped with an empty or deleted ini-file. Afterwards the ini-file can be edited to fit costumer needs.

#5966: Logging to syslog has been changed to only logging errors, warnings, information and events.
This has been done as syslog has proven to be very time consuming. Logging to syslog with
all logs enabled can cause the communication between NTAPI and NTService to timeout
and thereby causing an application to fail.

#5919: Absolute TX timing mode has been added.
An adapter is either in relative or absolute timing mode. When in relative timing mode, an adapter transmits packets such that the inter-frame gap (IFG) between pairs of packets is correct. When in absolute timing mode, the adapter transmits packets at the time stipulated by the time stamp in the packet descriptor.

#5900: API log improved. The logs from the API now contains process ID and application name for each log message.

#5754: The profiling tool has been moved from the tools package to the driver package. Therefore it is important to install the driver package after the tools package, as the uninstall procedure will delete the old profiling tool.
The tool has been enhanced with two new pages - Streams and StreamIds that can be shown for the cursor selected entry in the main page (Host buffers).

#5624: A warning entry is now created in the log when the FPGA temperature reaches 90 degrees. Additionally, the adapter is configured to switch off its own power supply in case the FPGA temperature reaches 95 degrees.

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#13105: (Support-ID 11627) FAN speed values can be wrong when server CPU load is high. In cases of high CPU load a percentage of the FAN speed measurements ought to be skipped.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#12144: (Support-ID 11627) The FAN speed sensor range is too wide. The FAN speed sensor range must be changed to 5270-7440.
FAN speed values can be wrong when server CPU load is high. In cases of high CPU load a percentage of the FAN speed measurements ought to be skipped.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#10530: ntservice may crash while shutting down when applications using the NTAPI are still running.

#9911: NT_NET_UPDATE_PKT_L2_PTR macro fails when compiled in a .cpp file

#9877: (Support-ID 9622) The supportinfo "hostbuffer info" part is not sampled atomic, the lastTxOff was captured after RdOff and WrOff causing it to look like lastTxOff is exceeding its limits.

#9814: (Support-ID 8749) Missing return type documentation for macro NT_NET_GET_PKT_L2_PTR

#9713: (Support-ID 9704) HBH crash on kernels with CONFIG_HZ_5000=y.

#9326: (Support-ID 9300) The driver issues a wrong error message if driver load fails due to insufficient contiguous DMA memory.

#8871: GEN2 adapters could potentially overwrite memory when ntservice is restarted.

#8699: Running with NT_NET_INTERFACE_SEGMENT while deleting/assigning filters could cause a deadlock

#8375: Multi get usage of NT_NetTxGet() can cause a dead lock when the entire host buffer is get.

#8343: Combining 2 filters into 1 filter results in all packets being forwarded.

#8100: (Support-ID 8041) ntservice stops responding if system runs out of memory.

#7973: (Support-ID 7925) If transmitting on ports that have not had link, the transmit rate on NT4e is 10Mbps

#7968: (Support-ID 7962) Statistic example is clearing the statistic in every loop. Intro description about NT_StatRead() is wrong.

#7880: Running with a profile != INLINE the ntservice CPU load is dependent on the host buffer size

#7398: (Support-ID 7388) >>ERROR | SRV | 20411 - SPIv1[0:1500]: Opcode 0120 returned error 80. Is the opcode supported by this AVR version?
May appear if the driver is run on an adapter fitted with an AVR version prior to 1.1.

#7134: Linkspeeds other than 1 Gbps on all ports when running with SOF enabled can make adapter crash unexpectedly (NT4E).

#7127: (Support-ID 7093) Unexpected behavior of SliceOffset=0 in NTPL command

#7001: The version of the NT-TSE or NT-TSU cannot be read from the driver. This does not affect the functionality, only visibility.

#6904: (Support-ID 6882) The shared memory files placed in /tmp are in risk of being deleted by a cleanup Cron job. When the files are deleted it is not possible to start any apps. Apps already running is not affected.

#6763: (Support-ID 6727) When using a DATA filter with datatype=bytestr4 the datamask is wrongly set to [32:0]. This causes the filter not to work.

#6642: (Support-ID 6546) Ntstart driver error dumps useless INFO messages from adapters not present in the ini-file.

#6631: (Support-ID 6438) The documentation about streams (NtInfoStreams_s) in the reference documentation DN-0449 is misleading.

#6625: (Support-ID 6516) The alarm is disabled for Level1 NIM sensors.

#6623: Setting an NT20E2 inline adapter to a TrafficGen profile is causing a lot of unnecessary error logs.
Note: The NT20E2 inline does not support the TrafficGen profile.

#6616: (Support-ID 6601) Packet forwarding fails with 4096MB host buffers.

#6613: (Support-ID 6512) A macro cannot be deleted by using and NTPL ID like described in the reference manual DN-0449, but must be deleted by issuing an empty macro.

#6611: (Support-ID 6579) Priority 62 is not working for the assign command. For example ntpl -e "Assign[Priority=62 ; StreamID=3] = All" is not working. All other values work fine.

#6531: (Support-ID 6320) The ntpl tool documentation and help message say "ntpl -file FilterMacros.txt" whereas it should be "ntpl -f FilterMacros.txt"

#6530: (Support-ID 6435) Missing information about adapterinfo and productinfo and their purpose.

#6460: Centos reports "Archive Type Not Supported" when trying to open output from supportinfo tool.

#6459: (Support-ID 6423) Running supportinfo when ntservice is stopped generates error messages

#6433: package_install.sh script deletes /opt/napatech3/bin even when when user input specifies "no"

#6418: (Support-ID 6321) It is quite difficult to find the NTPL description in reference documentation DN-0449.

#6410: (Support-ID 6401) NT_NetTxGet() does not work in a multiget scenario

#6382: (Support-ID 6300) NT_NetTxGet() does not work in a multi-get scenario with timeout

#6378: (Support-ID 6253) The Profiling is showing invalid values for hostbuffer sizes when used with hostbuffers larger than 4GB.

#6265: (Support-ID 6011) Sensor limits.
Log report incorrect sensor low limit value when resetting to default.

#6177: The TxLaser on/off command does not write directly to the NIM. The consequence hereof is:
- The programmed laser state can differ from the physical laser state
- The laser state read via the ConfigRead does not always reflect the actual physical state
- An error code will not be returned when turning off the laser on a NIM that does not have this option

#6156: ntstart.sh completes before adapter NIM initialization is complete. The consequence hereof is:
- The status for a port, where a SFP+ is present, is initially returned as NOT_PRESENT
- It can take up to 10sec before port 1 is ready

#6126: Hostbuffers up to 128GByte should be supported, but Hostbuffers with the size of 4GByte and larger cause NTService to exhaust all available memory and eventually crash.

#6117: (Support-ID 6106) NT_NET_GET_PKT_TXPORT() does not return correct virtual port info is issued on a NetBuf_t returned via NT_NetTxGet(). There is no functional error in this, the packet is still transmitted onto the port specified via NT_NetTxGet()

#6114: (Support-ID 5910) SDRAM Fill Level warning event does not describe whether the event covers all active hostbuffers or just a single hostbuffer.

#6113: (Support-ID 6033) The SDRAMFillLevelWarning description does not describe whether or not the following syntaxes are legal.
SDRAMFillLevelWarning =
SDRAMFillLevelWarning = ,

SDRAMFillLevelWarning = ,,
SDRAMFillLevelWarning = ,20

#6107: NT20E2 fanspeed rpm calculation is based on a delta time calculation, which is vulnerable to external adjustments of system time such at ntpdate and ntp etc.

#6097: ProductInfo tool not correctly displaying factory FPGA image information on new adapters, but correctly displaying FPGA image information on adapters which have been user programmed by ImgCtrl.
This issue relates to a dedicated function in the driver, not exposed to the user application. Hence, only the ProcductInfo tool is impacted.

#6043: NT_NetFileGet() returns NT_ERROR_NO_MORE_DATA on EOF (end of file). This indicates an error situation, which is not the case! Would be better to return something like NT_STATUS_END_OF_FILE instead.

#5994: Event Mask functionality not documented

#5991: Due to a PCI write to an unsupported FPGA register when stopping NTService, the adapter generates an NMI on systems which are configured to catch NMI

#5958: For a NT20E2 adapter in the event that NTService is started without a SFP+ module plugged in, the monitor tool shows the temperature as "Initializing" and config -sensors shows it as "0" instead of indicating that it is not present. Plugging in the module later has no effect on these readings, these readings remain constant: that is, temperature continues to report as ‘initializing’ and sensors continue to report as ‘0’, and the values do not update to reflect the current state unless you restart NTService.

#5957: The initial no NIM present value for port type was incorrectly returned as NT_PORT_TYPE_XFP_NOT_PRESENT instead of NT_PORT_TYPE_SFP_PLUS_NOT_PRESENT.

#3717: OS Timesync should not work for timestampformat NATIVE, but currently it behaves as if NATIVE_UNIX was used.

#3635: Driver cannot load on IOMMU enabled systems

napatech

## From version 02.00.00 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11515: Added support for NT4E2-4-PTP FPGA image: 200-9226-50-04

#11310: For an adapter using the INLINE profile, an attempt to use the NTAPI to look up the RX/TX path delays returns the status code NOT_SUPPORTED even if the path delays are known. This restriction is no longer present, and it is possible to request the path delays for an adapter using the INLINE profile. Note that the driver returns NOT_SUPPORTED if the delays are unknown.

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11030: A screen dump feature is added to the tools monitoring and profiling. By hitting the key 'F' a copy of the screen is saved to disk. The screen dump is appended to the saved screen dump. The names of the screen dump files are monitoring.scn and profiling.scn respectively.

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#10899: An Info log has been added for each adapter that has PpsIn defined and where it should be used to do PPS time sync. The log is not written if the PpsIn are only used for sampling.
Info text: Adapter 0: PpsIn is defined for this adapter. Use an external PPS tool or application to start PPS time sync.

#10787: (Support-ID 10551) FPGA feature level can now be read using the API. It is a part of the NtInfoAdapter_v5_s structure and can be read using the info stream.

#10714: Added new command line option (-l, --logmsg) to ntlog tool to write a custom line of text to the ntservice log system.

#10687: Added the ability to filter on inner tunnel layer 3 and layer 4 though the NTPL Data filter. This feature requires matching FPGA feature set. See filter documentation for details.

#10684: Added the ability to slice packets within a tunnel though the NTPL assign command. This feature requires matching FPGA feature set. See filter documentation for details.

#10501: Wis mode can now be enabled pr port by using the wisModeMask parameter which has been added to ntservice,ini

#10400: If TxTiming=RELATIVE the max inter-frame gap is set to 2.6sec.

#10168: NTPORT4E now supported

#10109: (Support-ID 10105) The example program named info_example.c now retrieves and prints basic product (adapter) information, such as the serial number, based on information in the NtInfoProductInfo_s structure.

#10046: The execution of a timesync hard reset to a reference initiated by an application through the NTAPI interface, has changed to execute a hard reset (time jump) for which the execution is unaffected by the current time skew and the hard reset threshold value (i.e. immediately executed). In earlier versions the current time skew was compared to the hard reset threshold value to determine if the hard reset should occur or not.

#9962: Enable swapping of hashdata from tunnels when connecting to a SPAN port

#9937: Support for NTBPE removed.

#9880: Added driver support for the following legacy FPGA images:
NT20E2: 200-9220-44-10 and 200-9220-44-12
NT40E2-4: 200-9221-44-12 and 200-9221-44-13
NT40E2-1: 200-9222-44-06 and 200-9222-44-08

#9586: Alarms are now generated when the status of an external NT-TSU or NT-TSE looses the synchronization signal, synchronization or Time of Day information. The alarms are sent as events:
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_SYNC_SIGNAL
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_OUT_OF_SYNC
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_TIME_OF_DAY
This information is still logged as INFO in the ntlog.

#9494: There is a small delay from the time a frame enters a network port and until the adapter time-stamps it. An application can now query the driver for this RX path delay and subtract it from the time stamp in the packet descriptor. See DN-0449 section Path Delay for more information.

#9492: Added option "--installpath PATH" to ".run" files to change default installation folder.

#9491: Added option to run an ntpl.config file with ntstart.sh.

#9490: Deduplication supports padded frames and IP header masks of i.e. TTL and checksum fields. Moreover a dedup CRC can be forwarded to host application using extended descriptor 9 to support a hardware-accelerated deduplication application. This feature can be enable/disabled using the NTPL Deduplication options IPLengthLimit and IPv4/IPv6. This feature requires a matching FPGA version.

#9447: (Support-ID 8890) Added inline bump in the wire example to DN-0449

#9444: Doxygen documentation updated in NTPL data section

#9232: (Support-ID 9105) NT_NetFileGet() now automatically rewinds the file when NT_STATUS_END_OF_FILE is returned. This will allow NT_NetFileGet() to be called after NT_STATUS_END_OF_FILE and return to the start of the file.

#9147: The delay asymmetry configuration option is added to the PTP protocol.

#9088: TimeSyncFrequencyReferencePriority added to the ntservice.ini file

#9074: On the PTP port, statistics including CRC errors are displayed in the monitoring tool for debug purposes. All the information can be obtained using NTAPI

#9027: TX host buffers can now be prefilled with data and replayed continuously without needing to memcpy packets.

#8984: Support for NT20E enabled

#8760: Added NUMA node information to info stream.

#8604: NT_NetRxOpenMulti() has been added to the API to enable merging traffic from multiple stream-ids

#8500: PDV filter has been implemented in order to increase performance in non-PTP aware network

#8437: The installation now honors the TMPDIR environment setting during the installation to specify an alternative temporary directory.

#8369: Time jumps in OS timesync mode has been implemented.

TimeSyncTimeJumpThreshold = 0, enables smooth sliding
TimeSyncTimeJumpThreshold = <any integer value different from 0> enables time jumps with threshold of 1 sec. If offset is more than 1 sec, a hard time jump will occur.

The default setting is TimeSyncTimeJumpThreshold = 1. This is the default setting used in the ini file in this and previous releases. If you are running with the default ini file, time jumps are default enabled. In previous releases the setting of TimeSyncTimeJumpThreshold had no effect in OS timesync mode.

#8340: Added the ability to reuse the protocol filters to have more than 8 filters using a protocol

#8305: (Support-ID 7892) Enabled possibility to tweak the NT4E-INL and NT4E-STD-INL adapter Tx engine to transmit faster when running with the TrafficGen-profile. Add this to the inifile to achieve it:
[Debug]
nt4etxadjust=8

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

#8052: Stream-id based statistics are now available via the statistics stream and can be monitored using the monitoring tool. Stream-ids can be activated/deactivated using NTPL, to control the sync point when packets starts entering the stream-id host-buffers and when statistics should count them, see the streamidstatistics.c example.

#7975: It has been made possible to run will multiple tx streams addressing the same port when using the TrafficGen profile. The rule is that packets has be to sent with NT_NET_SET_PKT_TXNOW(1) otherwise the behavior is unpredictable.

#7931: A define NT_ERRBUF_SIZE added to indicate the maximum error length size that can be delivered by the driver. This define should be used when allocating a buffer for reading an error message.

#7928: npcap.ini added to the supportinfo archive.

#7894: Added support for per filter descriptor selection. The feature is available through the "Assign" command in NTPL. This feature requires matching FPGA.

#7823: Configuration parameter TimeSyncTimeOffset now has a limit of 1000000 ns (1 ms)

#7807: (Support-ID 7327) NTAPI NT_NetFile...() functions do not connect to NTservice anymore - and thus do not require NTservice to be running.
This change is to allow an user application to process captured files through the NTAPI NT_NetFile...() functions on systems that do not have NTservice running nor a Napatech adapter installed.

NTAPI functions affected by the change:

NT_NetFileOpen()
NT_NetFileGet()
NT_NetFileRelease()
NT_NetFileClose()

The example readcapfile (examples/net/readcapfile/readcapfile.c) demonstrates a possible use.

#7805: Alarms have been added to monitor when an external NTTSU or NTTSE connected through NT-TS timesync looses synchronization with it's time source. The possible alarms are:
NT-TS: External device lost synchronization signal
NT-TS: External device is out of synchronization
NT-TS: External device lost time of day information

#7792: Changing the hash seed is now possible in ntservice.ini using the HashSeed option. Changing the hash seed will effect the data distribution on the streams.

#7758: The info stream has been extended to contain information of:
SDRAM present and SDRAM size
PCI bus information
Adapter features - Bypass support.

#7732: It is now possible to synchronize the operating system's clock with (to) the clock of a designated adapter. The feature is enabled by setting the configuration parameter TimeSyncOsTimeReference in the System section. For instance to synchronize the server clock with adapter zero, specify TimeSyncOsTimeReference=adapter-0. It requires an FPGA with support for synchronization of OS time.

#7730: An event and a log will be generated when the adapter's time stamp clock is set by the system.

#7728: IEEE1588 support is implemented on NT4E2_PTP and NT20E2_PTP adapter. (dedicated RJ45)

#7719: The data filter hardware supports up to 255 values for each 1 byte filter, however the NTPL limits this to specifying 8 values or one range. This is changed to support up to 32 values or 16 ranges or a mix of the two. When using a range it will take up the space of 2 values. When specifying 8 ranges only 16 values can be used.

#7715: A new feature - host loopback - has been added to the port settings structure. Applying loopback to a port means that data transmitted from the host on the port is looped back to the same port. Since the loopback is applied inside the adapter, it will work independently of whether a NIM is actually present or not, and the link will always be reported as up.
If put in loopback mode, the monitoring tool will show the link state as "Loopback". The config tool can be used to apply loopback, and the diagnostics tool can be used to test loopback if using a new feature: single- port- loop.

#7703: Added support for swapping the source and destination IP address regardless of value before calculating hash value. This enables traffic to/from the entire subnets to be balanced between streams. See Hash Mode command documentation for more details. This feature requires a matching FPGA.

#7699: Added 2 and 5 tuple sorted and unsorted hash modes on IPv4 and IPv6 encapsulated IP traffic. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7694: Added 2 and 5 tuple hash (sorted and unsorted) modes on IPv4 and IPv6 traffic inside a GTPv1 tunnel. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7603: Support for FPGA images:
- 200-9220-45-07 (NT20E2)
- 200-9221-45-09 (NT40E2-4)

#7433: The command to setup numanodes, "Setup[numanode=0]=streamid==x,y,z" can now contain up 32 streamids.

#7406: The driver now supports up to 8 adapters in one server.

#7397: (Support-ID 7435) Added support for filtering on decode error e.g "Assign[StreamId = 1] = DecodeError == TRUE" will redirect all packages with decode errors to stream 1.

#7392: (Support-ID 7333) Check for mismatching version of NTService and version of the low level driver has been added.

#7222: Check if IOMMU is enabled are added for kernels larger or equal to version 3.2. Driver fails if IOMMU is enabled.

#7169: Added support for Linux 3.x

#7167: Added support for the NT40E2_1 adapter.

#7141: (Support-ID 6797) The description of NT_NetRxGet timeout functionality in DN-0449 has been improved

#7065: The adapter will now be able to identify connected NT-TS synched adapters, NT-TSUs and NT-TSEs. The information can be seen through the API or using the monitoring tool.

#7062: Added support for Customer specific User data in the VPD.

#6781: This release adds a new configuration parameter OsTimeSyncFailover that can be set to DISABLE or ENABLE; the default value is DISABLE. When OsTimeSyncFailover is set to ENABLE and TimeSyncProtocol is set to NT for a given adapter, then the adapter automatically switches to OS Time synchronization if the incoming NT-TS signal fails, and when the NT time synchronization signal is restored, the adapter reverts to NT time synchronization.

#6780: This release adds support for OC-192c for the NT20E2 and NT40E2_4 adapters. A new configuration setting WisMode enables or disables WIS/OC-192c mode. The setting is set for an adapter, and the legal values are DISABLE and ENABLE. The default value is DISABLE, which disables WIS/OC-192c mode.

#6778: This release adds a new configuration parameter CancelTxOnCloseMask, which is a bitmask that enables cancellation of pending transmission segments for the ports designated by the mask: bit 0 = port 0, bit 1 = port 1, etc. Note that each bit represents an adapter local port, not a virtual (global) port across adapters. When a transmission stream is closed, and if the port bit is set for any of the affected ports, all pending data is cancelled and transmission of data stops immediately.

#6777: This release adds support for higher frequency time sampling. A new configuration parameter HighFrequencySampling can be set to DISABLE or ENABLE, and the default value is DISABLE. When high frequency sampling is enabled (HighFrequencySampling=ENABLE), the time is sampled every 20 microseconds.

#6776: This release includes support for a new FPGA feature "IPF", configurable via NTPL and observable via Statistics. Hardware assisted IP-Fragmentation support is a novel approach to accelerating reassembly by identifying which

feed receives fragments for a particular IP flow. This module is able to process both IPv4 and IPv6. See NTPL command "IPFMode" for information about how to use the module. See example demo "net/ipfdemo" for a working example.

#6718: The time it takes to initialize a NIM module in a PCI GEN2 adapter (NTxxE2) has been improved from about 4.6 seconds to about 0.8 seconds.

#6612: Inline profile documentation has been improved.

#6584: (Support-ID 6469) A new inifile parameter has been added to ntservice.ini. This parameter can only be used by the inline profile on NT adapters. The parameter, "HostBufferPollInterval" can take 4 values "Default | 100 | 250 | 500" and it will control how often ntservice will poll for host buffer data both ingress and egress. The higher a value the lower ntservice CPU utilization but the higher latency. The parameters comes handy in configurations where ntservice consume too much CPU and where latency is not so important.

#6500: Hardware accelerated PCAP packet descriptor is now supported. With this feature comes some restrictions. The TimestampFormat "PCAP" and "PCAP_NS" can only be configured with PacketDescriptor "PCAP". The NTAPI packet interface is not supported when using PCAP headers. To make use of this new feature use the NTAPI segment interface. Note: This feature is not supported on in-line adapters and entry level adapters.

#6494: The standard format of the Time string from an Endrun PPS device has been changed. Both the old and the new format are supported. No configuration is required.

#6458: (Support-ID 6424) The log can now be read in most cases after ntservice crashes, as the shared memory containing the log survives. If ntservice is restarted the log is deleted.
The ntservice binary and the ntservice.ini is now added to the supportinfo archive.

#6432: Added version number of the DN-0449 reference manual to the footer of all pages in the manual.

#6380: (Support-ID 6285) It is now possible to read raw NIM data like it has been possible in 2GD using the NimConfig tool.

#6361: Coordinated time-synchronized transmit has been implemented. More information can be found in the reference manual DN-449 and in the replayGS example.

#6239: Timestamp Inject mode has been added.
Two ini-file keys have been implemented to control the timestamp inject:
1. TimestampMethod = SOF | EOF: System parameter. Used both to control RX and TX.
2. TimestampInjectOffset = SOF | EOF: Adapter parameter.. Used to control TX.

#6143: Info stream extended with info to tell whether the adapter supports 64 bit time stamping or not. The information is found in the featureMask in the capabilities in the port settings port_v1 (Command NT_INFO_CMD_READ_PORT_V1).
Additionally, the transmitSegment example has been changed to support 64 bit timestamp. It is now possible to use tx rates as low as 1 Kilobit per second.

#6128: The profile tool documentation has been updated to explain where the host buffer is currently in use with regards to enqueued/dequeued in app/driver/adapter.

#6125: (Support-ID 6086) Added DN-0449 document as part of the documentation in the complete package.

#6116: (Support-ID 5742) NT_Init can now be called continuously until the service is ready. If the service is not ready the code NT_STATUS_TRYAGAIN is returned.
If any other code is returned an error has occured and it is not possible to continue.

#6103: Port disable implemented for the NT4E2-4T-BP, NT20E2 and NT40E2-4 adapters.
The ports can be disabled and enabled by using the config tool or they can be disabled at startup by setting a PortDisableMask in the ini-file.

#6096: SDRAMFillLevel event log now includes streamID and number of streams.

#5992: Auto generation of the ini-file.
If the ini-file does not exists or it is empty a new ini-file is auto generated. The auto generated ini-file will contain default values for all installed adapters.
In order to auto generate an ini-file for all adapters, the driver must be started and stopped with an empty or deleted ini-file. Afterwards the ini-file can be edited to fit costumer needs.

#5966: Logging to syslog has been changed to only logging errors, warnings, information and events.
This has been done as syslog has proven to be very time consuming. Logging to syslog with
all logs enabled can cause the communication between NTAPI and NTService to timeout
and thereby causing an application to fail.

#5919: Absolute TX timing mode has been added.
An adapter is either in relative or absolute timing mode. When in relative timing mode, an adapter transmits packets such that the inter-frame gap (IFG) between pairs of packets is correct. When in absolute timing mode, the adapter transmits packets at the time stipulated by the time stamp in the packet descriptor.

#5900: API log improved. The logs from the API now contains process ID and application name for each log message.

#5754: The profiling tool has been moved from the tools package to the driver package. Therefore it is important to install the driver package after the tools package, as the uninstall procedure will delete the old profiling tool.
The tool has been enhanced with two new pages - Streams and StreamIds that can be shown for the cursor selected entry in the main page (Host buffers).

#5624: A warning entry is now created in the log when the FPGA temperature reaches 90 degrees. Additionally, the adapter is configured to switch off its own power supply in case the FPGA temperature reaches 95 degrees.

#5613: The Diagnostics tool now makes traffic tests in both directions on each 2 port loops.

#5591: FilterInfo commands now also accepts 'All' as argument (FilterInfo = All). FilterInfo result is now split per adapter.

#5586: It is now possible to specify multiple txport's when assigning data to multiple streamId's (E.g. "Assign[StreamId=(0..3); TxPort=(4..7)] = All")

#5581: The DN-0449 (doxygen) section on Host Buffer Allowance (previously known as Hysteresis) has been extended with a general high level description on how Host Buffer Allowance works and how it should be configured.

#5540: ntservice.ini now has "PacketDescriptor=NT" as default since all adapters support this type.

#5482: The ini-file name is changed to "SDRAMFillLevelWarning".
SDRAM level empty 0% and SDRAM level full 100% triggers an event.
Valid level values are 1% to 100%. Using level value 0 disables the warning.

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#28943: (Support-ID 28916) FCS errors seen in Wireshark on PTP Delay Response packages sent from PTP stack on adapter in master mode.

#13105: (Support-ID 11627) FAN speed values can be wrong when server CPU load is high. In cases of high CPU load a percentage of the FAN speed measurements ought to be skipped.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#12144: (Support-ID 11627) The FAN speed sensor range is too wide. The FAN speed sensor range must be changed to 5270-7440.
FAN speed values can be wrong when server CPU load is high. In cases of high CPU load a percentage of the FAN speed measurements ought to be skipped.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#10530: ntservice may crash while shutting down when applications using the NTAPI are still running.

#9911: NT_NET_UPDATE_PKT_L2_PTR macro fails when compiled in a .cpp file

#9877: (Support-ID 9622) The supportinfo "hostbuffer info" part is not sampled atomic, the lastTxOff was captured after RdOff and WrOff causing it to look like lastTxOff is exceeding its limits.

#9814: (Support-ID 8749) Missing return type documentation for macro NT_NET_GET_PKT_L2_PTR

#9713: (Support-ID 9704) HBH crash on kernels with CONFIG_HZ_5000=y.

#9326: (Support-ID 9300) The driver issues a wrong error message if driver load fails due to insufficient contiguous DMA memory.

#8871: GEN2 adapters could potentially overwrite memory when ntservice is restarted.

#8699: Running with NT_NET_INTERFACE_SEGMENT while deleting/assigning filters could cause a deadlock

#8375: Multi get usage of NT_NetTxGet() can cause a dead lock when the entire host buffer is get.

#8343: Combining 2 filters into 1 filter results in all packets being forwarded.

#7973: (Support-ID 7925) If transmitting on ports that have not had link, the transmit rate on NT4e is 10Mbps

#7968: (Support-ID 7962) Statistic example is clearing the statistic in every loop. Intro description about NT_StatRead() is wrong.

#7880: Running with a profile != INLINE the ntservice CPU load is dependent on the host buffer size

#7398: (Support-ID 7388) >>ERROR | SRV | 20411 - SPIv1[0:1500]: Opcode 0120 returned error 80. Is the opcode supported by this AVR version?
May appear if the driver is run on an adapter fitted with an AVR version prior to 1.1.

#7134: Linkspeeds other than 1 Gbps on all ports when running with SOF enabled can make adapter crash unexpectedly (NT4E).

#7127: (Support-ID 7093) Unexpected behavior of SliceOffset=0 in NTPL command

#7001: The version of the NT-TSE or NT-TSU cannot be read from the driver. This does not affect the functionality, only visibility.

#6904: (Support-ID 6882) The shared memory files placed in /tmp are in risk of being deleted by a cleanup Cron job. When the files are deleted it is not possible to start any apps. Apps already running is not affected.

#6763: (Support-ID 6727) When using a DATA filter with datatype=bytestr4 the datamask is wrongly set to [32:0]. This causes the filter not to work.

#6631: (Support-ID 6438) The documentation about streams (NtInfoStreams_s) in the reference documentation DN-0449 is misleading.

#6625: (Support-ID 6516) The alarm is disabled for Level1 NIM sensors.

#6623: Setting an NT20E2 inline adapter to a TrafficGen profile is causing a lot of unnecessary error logs.
Note: The NT20E2 inline does not support the TrafficGen profile.

#6616: (Support-ID 6601) Packet forwarding fails with 4096MB host buffers.

#6613: (Support-ID 6512) A macro cannot be deleted by using and NTPL ID like described in the reference manual DN-0449, but must be deleted by issuing an empty macro.

#6611: (Support-ID 6579) Priority 62 is not working for the assign command. For example ntpl -e "Assign[Priority=62 ; StreamID=3] = All" is not working. All other values work fine.

#6530: (Support-ID 6435) Missing information about adapterinfo and productinfo and their purpose.

#6177: The TxLaser on/off command does not write directly to the NIM. The consequence hereof is:
- The programmed laser state can differ from the physical laser state
- The laser state read via the ConfigRead does not always reflect the actual physical state
- An error code will not be returned when turning off the laser on a NIM that does not have this option

#6156: ntstart.sh completes before adapter NIM initialization is complete. The consequence hereof is:
- The status for a port, where a SFP+ is present, is initially returned as NOT_PRESENT
- It can take up to 10sec before port 1 is ready

#6107: NT20E2 fanspeed rpm calculation is based on a delta time calculation, which is vulnerable to external adjustments of system time such at ntpdate and ntp etc.

#6097: ProductInfo tool not correctly displaying factory FPGA image information on new adapters, but correctly displaying FPGA image information on adapters which have been user programmed by ImgCtrl.
This issue relates to a dedicated function in the driver, not exposed to the user application. Hence, only the ProcductInfo tool is impacted.

#6043: NT_NetFileGet() returns NT_ERROR_NO_MORE_DATA on EOF (end of file). This indicates an error situation, which is not the case! Would be better to return something like NT_STATUS_END_OF_FILE instead.

#5991: Due to a PCI write to an unsupported FPGA register when stopping NTService, the adapter generates an NMI on systems which are configured to catch NMI

#5647: When the service is shutdown and file logging is enabled a segmentation fault error or a PCI bus error occur. The error can be reproduced by enabling file logging in the ini-file. Then start and stop the service.

#5646: Running with full log level can cause a deadlock in the logging system causing the applications to shutdown. The issue can be reproduced by selecting full log level LogMask=0xFF and the start 10 instances of the monitor tool with sensor monitoring enabled. After running a while (It is not possible to say how long) the deadlock occurs and the monitoring instances starts shutting down.

#5610: On NT4E-4 adapter with a copper SPF Finistar FCLF-8521-3, the link speed and duplex cannot be configured, before link has been detected once.

#5592: Link stays up on NT20E2 adapter when ntservice and driver is unloaded.

#5589: NTPL Retransmit doxygen documentation DN-0449 indicates that it is supported in feature set N-INL4.

#5572: NT_NET_SET_PKT_TX_CHANNEL() has been replaced with NT_NET_SET_PKT_TXPORT() for naming consistency reasons

#5547: NTPL error codes are printed in decimal. Should be converted to hexadecimal to lookup the error code.

#5546: Deduplication without parameters like: "Deduplication = Port == 1" is not allowed even though it is described in the documentation.

#5545: Every 18 hours the FAN sensors caused first an "enter alarm state" and then an "exit alarm state" event to be triggered.

#5541: NTservice should fail if PacketDescriptor for NT4STD is set to Ext7.

#5536: Slicing (NTPL) is allowed on NT4E In-line adapter that does not support slicing

#5527: HashMask command (NTPL) succeeds even without any adapters that support HashMask in the system.

#5521: HashMask Command: HashModeSpec not defined in documentation DN-0449.

#5485: Doxygen documentation for the NT_NetRxGetNextPacket is wrong. NetRxRelease MUST not be called when using this command. Causes a segmentation fault.

#5477: Filters expression that are not supported are accepted on NT4E-STD adapter. E.g: "Assign[streamid=0] = Layer3Protocol=IPv4"

#5474: NTPL color commands are accepted, but no colors are assigned on NT4-STD card.

#5469: Setup a hashmask like: HashMask[hashWord0=FFFFFF00]=Hash5Tuple
Delete the hashmask just setup and try to set the HashMask again for the same hashmode (Hash5Tuple)
This will not work if you have a adapter that does not support hashing in the server (like NT4E_STD)

#5435: ntstop.sh now prints that ntservice is not running if that is the case.

#5391: DefineMacro failed when using the valid characters: !<>,

#5072: The 3GD segment interface has too high CPU utilization.

#5064: Doxygen documentation on using NTPL colors should explain how to guarantee unique colors making the color statistics predictable

#4871: A pair of hostbuffers merged to stream 0 are getting saturated over time even when throughput is launched with nice -20. When you stop throughput handling stream 0, the stream 1 hostbuffers start filling up and so on until there is only one instance of throughput left.

#4791: NT4E capture card cannot send packets larger than 1522 bytes.

#4730: It is not possible to capture traffic from an NT4E-STD adapter unless it is configured as the first adapter in the range.

#4692: Hysteresis causes unnecessary packet drops.

#4677: Local Retransmit is not accepted on NT20E2 inline

#4584: An alternative VLAN TPID can not be configured as described in the technical specification

#4568: It is not clear from documentation what NTPL options/commands that is supported on each adapter type

#4481: Bug in hashmasks. The command HashMask[HashWord0=F0F0F0F0]=HashRoundRobin" fails with the error: Hashmask already set for the specified hashmode.

#4477: Ini-file: A key could be defined several time within a section. The last key defined is the one used. An error should be returned if a duplicate key exists.

#4293: Retransmit only works on adapter 0 in a multi adapter setup for all other adapters it fails

#4195: Deduplication does only support == compare operator. For example Deduplication[timeout=100] = Port <=1 works in the parser but it will result in Port == 1.

#4188: A 32bit installation on a 64bit Linux system cannot run.

#4163: 3GD wrongfully accepts FPGA 200-9220-42-10 (NT20E2), hence no error information is given despite it is NOT recommended to use FPGA 200-9220-42-10 with the 3GD driver.

#3717: OS Timesync should not work for timestampformat NATIVE, but currently it behaves as if NATIVE_UNIX was used.

#3635: Driver cannot load on IOMMU enabled systems

#3473: Setting up duplicate filters with different stream IDs is not allowed, but does currrently not return an error. This can cause a crash in NTService when trying to retreive data using NT_NetRxGet.

napatech

## From version 01.03.03 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11515: Added support for NT4E2-4-PTP FPGA image: 200-9226-50-04

#11310: For an adapter using the INLINE profile, an attempt to use the NTAPI to look up the RX/TX path delays returns the status code NOT_SUPPORTED even if the path delays are known. This restriction is no longer present, and it is possible to request the path delays for an adapter using the INLINE profile. Note that the driver returns NOT_SUPPORTED if the delays are unknown.

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11030: A screen dump feature is added to the tools monitoring and profiling. By hitting the key 'F' a copy of the screen is saved to disk. The screen dump is appended to the saved screen dump. The names of the screen dump files are monitoring.scn and profiling.scn respectively.

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#10899: An Info log has been added for each adapter that has PpsIn defined and where it should be used to do PPS time sync. The log is not written if the PpsIn are only used for sampling.
Info text: Adapter 0: PpsIn is defined for this adapter. Use an external PPS tool or application to start PPS time sync.

#10787: (Support-ID 10551) FPGA feature level can now be read using the API. It is a part of the NtInfoAdapter_v5_s structure and can be read using the info stream.

#10714: Added new command line option (-l, --logmsg) to ntlog tool to write a custom line of text to the ntservice log system.

#10687: Added the ability to filter on inner tunnel layer 3 and layer 4 though the NTPL Data filter. This feature requires matching FPGA feature set. See filter documentation for details.

#10684: Added the ability to slice packets within a tunnel though the NTPL assign command. This feature requires matching FPGA feature set. See filter documentation for details.

#10501: Wis mode can now be enabled pr port by using the wisModeMask parameter which has been added to ntservice,ini

#10400: If TxTiming=RELATIVE the max inter-frame gap is set to 2.6sec.

#10168: NTPORT4E now supported

#10109: (Support-ID 10105) The example program named info_example.c now retrieves and prints basic product (adapter) information, such as the serial number, based on information in the NtInfoProductInfo_s structure.

#10046: The execution of a timesync hard reset to a reference initiated by an application through the NTAPI interface, has changed to execute a hard reset (time jump) for which the execution is unaffected by the current time skew and the hard reset threshold value (i.e. immediately executed). In earlier versions the current time skew was compared to the hard reset threshold value to determine if the hard reset should occur or not.

#9962: Enable swapping of hashdata from tunnels when connecting to a SPAN port

#9937: Support for NTBPE removed.

#9880: Added driver support for the following legacy FPGA images:
NT20E2: 200-9220-44-10 and 200-9220-44-12
NT40E2-4: 200-9221-44-12 and 200-9221-44-13
NT40E2-1: 200-9222-44-06 and 200-9222-44-08

#9586: Alarms are now generated when the status of an external NT-TSU or NT-TSE looses the synchronization signal, synchronization or Time of Day information. The alarms are sent as events:
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_SYNC_SIGNAL
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_OUT_OF_SYNC
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_TIME_OF_DAY
This information is still logged as INFO in the ntlog.

#9494: There is a small delay from the time a frame enters a network port and until the adapter time-stamps it. An application can now query the driver for this RX path delay and subtract it from the time stamp in the packet descriptor. See DN-0449 section Path Delay for more information.

#9492: Added option "--installpath PATH" to ".run" files to change default installation folder.

#9491: Added option to run an ntpl.config file with ntstart.sh.

#9490: Deduplication supports padded frames and IP header masks of i.e. TTL and checksum fields. Moreover a dedup CRC can be forwarded to host application using extended descriptor 9 to support a hardware-accelerated deduplication application. This feature can be enable/disabled using the NTPL Deduplication options IPLengthLimit and IPv4/IPv6. This feature requires a matching FPGA version.

#9447: (Support-ID 8890) Added inline bump in the wire example to DN-0449

#9444: Doxygen documentation updated in NTPL data section

#9232: (Support-ID 9105) NT_NetFileGet() now automatically rewinds the file when NT_STATUS_END_OF_FILE is returned. This will allow NT_NetFileGet() to be called after NT_STATUS_END_OF_FILE and return to the start of the file.

#9147: The delay asymmetry configuration option is added to the PTP protocol.

#9088: TimeSyncFrequencyReferencePriority added to the ntservice.ini file

#9074: On the PTP port, statistics including CRC errors are displayed in the monitoring tool for debug purposes. All the information can be obtained using NTAPI

#9027: TX host buffers can now be prefilled with data and replayed continuously without needing to memcpy packets.

#8984: Support for NT20E enabled

#8760: Added NUMA node information to info stream.

#8604: NT_NetRxOpenMulti() has been added to the API to enable merging traffic from multiple stream-ids

#8500: PDV filter has been implemented in order to increase performance in non-PTP aware network

#8437: The installation now honors the TMPDIR environment setting during the installation to specify an alternative temporary directory.

#8369: Time jumps in OS timesync mode has been implemented.

TimeSyncTimeJumpThreshold = 0, enables smooth sliding
TimeSyncTimeJumpThreshold = <any integer value different from 0> enables time jumps with threshold of 1 sec. If offset is more than 1 sec, a hard time jump will occur.

The default setting is TimeSyncTimeJumpThreshold = 1. This is the default setting used in the ini file in this and previous releases. If you are running with the default ini file, time jumps are default enabled. In previous releases the setting of TimeSyncTimeJumpThreshold had no effect in OS timesync mode.

#8340: Added the ability to reuse the protocol filters to have more than 8 filters using a protocol

#8305: (Support-ID 7892) Enabled possibility to tweak the NT4E-INL and NT4E-STD-INL adapter Tx engine to transmit faster when running with the TrafficGen-profile. Add this to the inifile to achieve it:
[Debug]
nt4etxadjust=8

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

#8052: Stream-id based statistics are now available via the statistics stream and can be monitored using the monitoring tool. Stream-ids can be activated/deactivated using NTPL, to control the sync point when packets starts entering the stream-id host-buffers and when statistics should count them, see the streamidstatistics.c example.

#7975: It has been made possible to run will multiple tx streams addressing the same port when using the TrafficGen profile. The rule is that packets has be to sent with NT_NET_SET_PKT_TXNOW(1) otherwise the behavior is unpredictable.

#7931: A define NT_ERRBUF_SIZE added to indicate the maximum error length size that can be delivered by the driver. This define should be used when allocating a buffer for reading an error message.

#7928: npcap.ini added to the supportinfo archive.

#7894: Added support for per filter descriptor selection. The feature is available through the "Assign" command in NTPL. This feature requires matching FPGA.

#7823: Configuration parameter TimeSyncTimeOffset now has a limit of 1000000 ns (1 ms)

#7807: (Support-ID 7327) NTAPI NT_NetFile...() functions do not connect to NTservice anymore - and thus do not require NTservice to be running.
This change is to allow an user application to process captured files through the NTAPI NT_NetFile...() functions on systems that do not have NTservice running nor a Napatech adapter installed.

NTAPI functions affected by the change:

NT_NetFileOpen()
NT_NetFileGet()
NT_NetFileRelease()
NT_NetFileClose()

The example readcapfile (examples/net/readcapfile/readcapfile.c) demonstrates a possible use.

#7805: Alarms have been added to monitor when an external NTTSU or NTTSE connected through NT-TS timesync looses synchronization with it's time source. The possible alarms are:
NT-TS: External device lost synchronization signal
NT-TS: External device is out of synchronization
NT-TS: External device lost time of day information

#7792: Changing the hash seed is now possible in ntservice.ini using the HashSeed option. Changing the hash seed will effect the data distribution on the streams.

#7758: The info stream has been extended to contain information of:
SDRAM present and SDRAM size
PCI bus information
Adapter features - Bypass support.

#7732: It is now possible to synchronize the operating system's clock with (to) the clock of a designated adapter. The feature is enabled by setting the configuration parameter TimeSyncOsTimeReference in the System section. For instance to synchronize the server clock with adapter zero, specify TimeSyncOsTimeReference=adapter-0. It requires an FPGA with support for synchronization of OS time.

#7730: An event and a log will be generated when the adapter's time stamp clock is set by the system.

#7728: IEEE1588 support is implemented on NT4E2_PTP and NT20E2_PTP adapter. (dedicated RJ45)

#7719: The data filter hardware supports up to 255 values for each 1 byte filter, however the NTPL limits this to specifying 8 values or one range. This is changed to support up to 32 values or 16 ranges or a mix of the two. When using a range it will take up the space of 2 values. When specifying 8 ranges only 16 values can be used.

#7715: A new feature - host loopback - has been added to the port settings structure. Applying loopback to a port means that data transmitted from the host on the port is looped back to the same port. Since the loopback is applied inside the adapter, it will work independently of whether a NIM is actually present or not, and the link will always be reported as up.
If put in loopback mode, the monitoring tool will show the link state as "Loopback". The config tool can be used to apply loopback, and the diagnostics tool can be used to test loopback if using a new feature: single- port- loop.

#7703: Added support for swapping the source and destination IP address regardless of value before calculating hash value. This enables traffic to/from the entire subnets to be balanced between streams. See Hash Mode command documentation for more details. This feature requires a matching FPGA.

#7699: Added 2 and 5 tuple sorted and unsorted hash modes on IPv4 and IPv6 encapsulated IP traffic. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7694: Added 2 and 5 tuple hash (sorted and unsorted) modes on IPv4 and IPv6 traffic inside a GTPv1 tunnel. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7603: Support for FPGA images:
- 200-9220-45-07 (NT20E2)
- 200-9221-45-09 (NT40E2-4)

#7433: The command to setup numanodes, "Setup[numanode=0]=streamid==x,y,z" can now contain up 32 streamids.

#7406: The driver now supports up to 8 adapters in one server.

#7397: (Support-ID 7435) Added support for filtering on decode error e.g "Assign[StreamId = 1] = DecodeError == TRUE" will redirect all packages with decode errors to stream 1.

#7392: (Support-ID 7333) Check for mismatching version of NTService and version of the low level driver has been added.

#7222: Check if IOMMU is enabled are added for kernels larger or equal to version 3.2. Driver fails if IOMMU is enabled.

#7169: Added support for Linux 3.x

#7167: Added support for the NT40E2_1 adapter.

#7141: (Support-ID 6797) The description of NT_NetRxGet timeout functionality in DN-0449 has been improved

#7065: The adapter will now be able to identify connected NT-TS synched adapters, NT-TSUs and NT-TSEs. The information can be seen through the API or using the monitoring tool.

#7062: Added support for Customer specific User data in the VPD.

#6781: This release adds a new configuration parameter OsTimeSyncFailover that can be set to DISABLE or ENABLE; the default value is DISABLE. When OsTimeSyncFailover is set to ENABLE and TimeSyncProtocol is set to NT for a given adapter, then the adapter automatically switches to OS Time synchronization if the incoming NT-TS signal fails, and when the NT time synchronization signal is restored, the adapter reverts to NT time synchronization.

#6780: This release adds support for OC-192c for the NT20E2 and NT40E2_4 adapters. A new configuration setting WisMode enables or disables WIS/OC-192c mode. The setting is set for an adapter, and the legal values are DISABLE and ENABLE. The default value is DISABLE, which disables WIS/OC-192c mode.

#6778: This release adds a new configuration parameter CancelTxOnCloseMask, which is a bitmask that enables cancellation of pending transmission segments for the ports designated by the mask: bit 0 = port 0, bit 1 = port 1, etc. Note that each bit represents an adapter local port, not a virtual (global) port across adapters. When a transmission stream is closed, and if the port bit is set for any of the affected ports, all pending data is cancelled and transmission of data stops immediately.

#6777: This release adds support for higher frequency time sampling. A new configuration parameter HighFrequencySampling can be set to DISABLE or ENABLE, and the default value is DISABLE. When high frequency sampling is enabled (HighFrequencySampling=ENABLE), the time is sampled every 20 microseconds.

#6776: This release includes support for a new FPGA feature "IPF", configurable via NTPL and observable via Statistics. Hardware assisted IP-Fragmentation support is a novel approach to accelerating reassembly by identifying which

feed receives fragments for a particular IP flow. This module is able to process both IPv4 and IPv6. See NTPL command "IPFMode" for information about how to use the module. See example demo "net/ipfdemo" for a working example.

#6718: The time it takes to initialize a NIM module in a PCI GEN2 adapter (NTxxE2) has been improved from about 4.6 seconds to about 0.8 seconds.

#6612: Inline profile documentation has been improved.

#6584: (Support-ID 6469) A new inifile parameter has been added to ntservice.ini. This parameter can only be used by the inline profile on NT adapters. The parameter, "HostBufferPollInterval" can take 4 values "Default | 100 | 250 | 500" and it will control how often ntservice will poll for host buffer data both ingress and egress. The higher a value the lower ntservice CPU utilization but the higher latency. The parameters comes handy in configurations where ntservice consume too much CPU and where latency is not so important.

#6500: Hardware accelerated PCAP packet descriptor is now supported. With this feature comes some restrictions. The TimestampFormat "PCAP" and "PCAP_NS" can only be configured with PacketDescriptor "PCAP". The NTAPI packet interface is not supported when using PCAP headers. To make use of this new feature use the NTAPI segment interface. Note: This feature is not supported on in-line adapters and entry level adapters.

#6494: The standard format of the Time string from an Endrun PPS device has been changed. Both the old and the new format are supported. No configuration is required.

#6458: (Support-ID 6424) The log can now be read in most cases after ntservice crashes, as the shared memory containing the log survives. If ntservice is restarted the log is deleted.
The ntservice binary and the ntservice.ini is now added to the supportinfo archive.

#6432: Added version number of the DN-0449 reference manual to the footer of all pages in the manual.

#6380: (Support-ID 6285) It is now possible to read raw NIM data like it has been possible in 2GD using the NimConfig tool.

#6361: Coordinated time-synchronized transmit has been implemented. More information can be found in the reference manual DN-449 and in the replayGS example.

#6239: Timestamp Inject mode has been added.
Two ini-file keys have been implemented to control the timestamp inject:
1. TimestampMethod = SOF | EOF: System parameter. Used both to control RX and TX.
2. TimestampInjectOffset = SOF | EOF: Adapter parameter.. Used to control TX.

#6143: Info stream extended with info to tell whether the adapter supports 64 bit time stamping or not. The information is found in the featureMask in the capabilities in the port settings port_v1 (Command NT_INFO_CMD_READ_PORT_V1).
Additionally, the transmitSegment example has been changed to support 64 bit timestamp. It is now possible to use tx rates as low as 1 Kilobit per second.

#6128: The profile tool documentation has been updated to explain where the host buffer is currently in use with regards to enqueued/dequeued in app/driver/adapter.

#6125: (Support-ID 6086) Added DN-0449 document as part of the documentation in the complete package.

#6116: (Support-ID 5742) NT_Init can now be called continuously until the service is ready. If the service is not ready the code NT_STATUS_TRYAGAIN is returned.
If any other code is returned an error has occured and it is not possible to continue.

#6103: Port disable implemented for the NT4E2-4T-BP, NT20E2 and NT40E2-4 adapters.
The ports can be disabled and enabled by using the config tool or they can be disabled at startup by setting a PortDisableMask in the ini-file.

#6096: SDRAMFillLevel event log now includes streamID and number of streams.

#5992: Auto generation of the ini-file.
If the ini-file does not exists or it is empty a new ini-file is auto generated. The auto generated ini-file will contain default values for all installed adapters.
In order to auto generate an ini-file for all adapters, the driver must be started and stopped with an empty or deleted ini-file. Afterwards the ini-file can be edited to fit costumer needs.

#5966: Logging to syslog has been changed to only logging errors, warnings, information and events.
This has been done as syslog has proven to be very time consuming. Logging to syslog with
all logs enabled can cause the communication between NTAPI and NTService to timeout
and thereby causing an application to fail.

#5919: Absolute TX timing mode has been added.
An adapter is either in relative or absolute timing mode. When in relative timing mode, an adapter transmits packets such that the inter-frame gap (IFG) between pairs of packets is correct. When in absolute timing mode, the adapter transmits packets at the time stipulated by the time stamp in the packet descriptor.

#5900: API log improved. The logs from the API now contains process ID and application name for each log message.

#5754: The profiling tool has been moved from the tools package to the driver package. Therefore it is important to install the driver package after the tools package, as the uninstall procedure will delete the old profiling tool.
The tool has been enhanced with two new pages - Streams and StreamIds that can be shown for the cursor selected entry in the main page (Host buffers).

#5624: A warning entry is now created in the log when the FPGA temperature reaches 90 degrees. Additionally, the adapter is configured to switch off its own power supply in case the FPGA temperature reaches 95 degrees.

#5613: The Diagnostics tool now makes traffic tests in both directions on each 2 port loops.

#5591: FilterInfo commands now also accepts 'All' as argument (FilterInfo = All). FilterInfo result is now split per adapter.

#5586: It is now possible to specify multiple txport's when assigning data to multiple streamId's (E.g. "Assign[StreamId=(0..3); TxPort=(4..7)] = All")

#5581: The DN-0449 (doxygen) section on Host Buffer Allowance (previously known as Hysteresis) has been extended with a general high level description on how Host Buffer Allowance works and how it should be configured.

#5540: ntservice.ini now has "PacketDescriptor=NT" as default since all adapters support this type.

#5482: The ini-file name is changed to "SDRAMFillLevelWarning".
SDRAM level empty 0% and SDRAM level full 100% triggers an event.
Valid level values are 1% to 100%. Using level value 0 disables the warning.

#5445: Sensor Limits for NT20E2: The diagnostic sensors (level1) do not use the high/low limit in the NtInfoSensor_s structure eventhough the high/low limit value is a part of the structure. The diagnostic sensors are virtual sensors and are only to inform about power usage.

#5443: SDRAM Fill level warning event is added. It is now possible to define up to 4 SDRAM fill levels in percent. If the fill level of the SDRAM raises above one of the fill levels defined a fill level warning event is triggered and if the fill level goes below one of the fill levels a fill level warning is also triggered. The SDRAM Fill level warning deprecate the "NT_NET_GET_STREAM_DATA_PENDING()" macro, hence it has been removed.

#5408: Sensors are now described in a seperate chapter in the doxygen documentation DN-0449.

#5377: A chapter describing logging and how it works is added to the doxygen documentation DN-0449.

#5308: A parameter for clearing the statistical information after read is added to the statistic stream. It will not clear the HW counters but will only clear statistics for the current stream.

#5058: The log message format is described in the logging chapter in the doxygen documentation DN-0449.

#5050: The size of the circular log buffer is described in the logging chapter in the doxygen documentation DN-0449.

#4938: A possibility for adding data and time to the log file name when logging to a file has been added.
If the file name contains a %s this will be expanded with the current data and time for when the service is started.
Example:
/tmp/test.log will not be expanded
/tmp/test_%s.log will be expanded to /tmp/test_11_10_28_11_23_21.log

The %s can be placed anywhere in the file name string.

#4693: All messages are written both to the internal log and to the syslog. How to read the syslog is different from system to system.
For debugging purposes it is also possible to start the ntservice in non deamon mode, by not using the ntstart.sh script, but calling ntservice directly . Then all messages will be printed to the screen.

#4516: The possibility to choose minimum host buffer size has been added. This feature is available through the NT_NetTxOpen function call for Tx host buffers and though NTPL for Rx host buffers. The smallest hostbuffer found that is larger or equal to requested host buffer size is used.

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#13105: (Support-ID 11627) FAN speed values can be wrong when server CPU load is high. In cases of high CPU load a percentage of the FAN speed measurements ought to be skipped.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#12144: (Support-ID 11627) The FAN speed sensor range is too wide. The FAN speed sensor range must be changed to 5270-7440.
FAN speed values can be wrong when server CPU load is high. In cases of high CPU load a percentage of the FAN speed measurements ought to be skipped.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#10530: ntservice may crash while shutting down when applications using the NTAPI are still running.

#9713: (Support-ID 9704) HBH crash on kernels with CONFIG_HZ_5000=y.

#9326: (Support-ID 9300) The driver issues a wrong error message if driver load fails due to insufficient contiguous DMA memory.

#8871: GEN2 adapters could potentially overwrite memory when ntservice is restarted.

#8699: Running with NT_NET_INTERFACE_SEGMENT while deleting/assigning filters could cause a deadlock

#8343: Combining 2 filters into 1 filter results in all packets being forwarded.

#7398: (Support-ID 7388) >>ERROR | SRV | 20411 - SPIv1[0:1500]: Opcode 0120 returned error 80. Is the opcode supported by this AVR version?
May appear if the driver is run on an adapter fitted with an AVR version prior to 1.1.

#7134: Linkspeeds other than 1 Gbps on all ports when running with SOF enabled can make adapter crash unexpectedly (NT4E).

#7001: The version of the NT-TSE or NT-TSU cannot be read from the driver. This does not affect the functionality, only visibility.

#6904: (Support-ID 6882) The shared memory files placed in /tmp are in risk of being deleted by a cleanup Cron job. When the files are deleted it is not possible to start any apps. Apps already running is not affected.

#6616: (Support-ID 6601) Packet forwarding fails with 4096MB host buffers.

#6107: NT20E2 fanspeed rpm calculation is based on a delta time calculation, which is vulnerable to external adjustments of system time such at ntpdate and ntp etc.

#6097: ProductInfo tool not correctly displaying factory FPGA image information on new adapters, but correctly displaying FPGA image information on adapters which have been user programmed by ImgCtrl.
This issue relates to a dedicated function in the driver, not exposed to the user application. Hence, only the ProcductInfo tool is impacted.

#6043: NT_NetFileGet() returns NT_ERROR_NO_MORE_DATA on EOF (end of file). This indicates an error situation, which is not the case! Would be better to return something like NT_STATUS_END_OF_FILE instead.

#5991: Due to a PCI write to an unsupported FPGA register when stopping NTService, the adapter generates an NMI on systems which are configured to catch NMI

#5647: When the service is shutdown and file logging is enabled a segmentation fault error or a PCI bus error occur. The error can be reproduced by enabling file logging in the ini-file. Then start and stop the service.

#5610: On NT4E-4 adapter with a copper SPF Finistar FCLF-8521-3, the link speed and duplex cannot be configured, before link has been detected once.

#5592: Link stays up on NT20E2 adapter when ntservice and driver is unloaded.

#5589: NTPL Retransmit doxygen documentation DN-0449 indicates that it is supported in feature set N-INL4.

#5547: NTPL error codes are printed in decimal. Should be converted to hexadecimal to lookup the error code.

#5546: Deduplication without parameters like: "Deduplication = Port == 1" is not allowed even though it is described in the documentation.

#5545: Every 18 hours the FAN sensors caused first an "enter alarm state" and then an "exit alarm state" event to be triggered.

#5452: Sometimes NTService is crashing when used with a NT4E adapter. It happens when stopping the driver using ntstop.sh.

#5402: Deduplication doesn't work with certain NTPL configuration

#5400: The NTPL deduplication command is not functioning properly in setups with multiple adapters.

#5373: Setting log level to 0xFF in the ini-file causes to log information to be printed to stdout/stderr in the profiling and the monitoring tool making the tools unusable.

Note: This applies to all applications.

#5172: NTPL Data test: Cannot specify a range of IP adresses like:
Data[DynOffset=DynOffIPv4Frame;Offset=12;DataType=IPv4Addr] == ([10.10.0.0]..[10.10.255.255])

#5166: DataMask is not working with decimal number.
For example:
Assign [ StreamId = 0 ] = Data[DynOffset=DynOffIPv4Frame;Offset=6;DataType=ByteStr1;DataMask=[5:5]] == 1
was failing while:
Assign[StreamId = 0] = Data[DynOffset=DynOffIPv4Frame;Offset=6;DataType=ByteStr1;DataMask=[0x5:0x5]] == 1
was working.

#5077: On a NT20E2 adapter the message:
 11/02/11 15:24:23.150545 | INFO | SRV | 13184 - Sensor 16:0:11 "SFP+1" enter alarm state with value 0
 11/02/11 15:24:30.876483 | INFO | SRV | 13184 - Sensor 16:0:11 "SFP+1" exit alarm state with value 1016
was sometimes logged continuously due to a to low resolution in the sensor. The sensor is a virtual power sensor calculated from reading the voltage and the current. It is changed to not to generate any alarms.

#5072: The 3GD segment interface has too high CPU utilization.

#5064: Doxygen documentation on using NTPL colors should explain how to guarantee unique colors making the color statistics predictable

#5063: PCI bandwidth testing is not done for all NUMA nodes. When ntservice starts it should test PCI bandwidth for all available NUMA nodes and not just NUMA node 0. If bandwidth is below the value required for full line rate performance, the warning should be given.

#5062: PCI bandwidth is not detected correctely on Cisco UCS server (C210M2).

#4930: The enum values in NtPortSettings_s is not described in the doxygen documentation DN-0449.

#4909: structure NtNetBuf_s is documented in the doxygen documentation even though it is only to be used by internal Napatech tools.

#4847: Running applications as non-root will fail with IPC error

#4791: NT4E capture card cannot send packets larger than 1522 bytes.

#4730: It is not possible to capture traffic from an NT4E-STD adapter unless it is configured as the first adapter in the range.

#4703: NTPL: Data value parsing fails e.g. Assign[Priority=0; streamId=0; txport=0; TxIgnore=True] = Data[DynOffset=DynOffEtherTypeLen; Offset=5] == {FF: 11} fails. Expects whitespace before '}'.

#4698: ./ntpl -e "HashMask[HashWord0=F0F0F0F0]=None" causes an internal error.

#4692: Hysteresis causes unnecessary packet drops.

#4677: Local Retransmit is not accepted on NT20E2 inline

#4669: Packet interface not able to handle line rate (20G) traffic for small packet sizes on standard servers.

#4637: It not possible to transmit and receive at the same time on a capture adapter.

#4632: RX packets do always have timestamps at start of frame and TX packets do always have timestamps at end of frame.

#4584: An alternative VLAN TPID can not be configured as described in the technical specification

#4568: It is not clear from documentation what NTPL options/commands that is supported on each adapter type

#4486: '.' (period) is not accepted in macro name.

#4481: Bug in hashmasks. The command HashMask[HashWord0=F0F0F0F0]=HashRoundRobin" fails with the error: Hashmask already set for the specified hashmode.

#4477: Ini-file: A key could be defined several time within a section. The last key defined is the one used. An error should be returned if a duplicate key exists.

#4293: Retransmit only works on adapter 0 in a multi adapter setup for all other adapters it fails

#4286: Timesync LED lights red when ntservices is loaded

#4243: The ini-file ntservice.ini must not contain any tabs. A tab causes ntservice to fail when reading the ini-file.

#4195: Deduplication does only support == compare operator. For example Deduplication[timeout=100] = Port <=1 works in the parser but it will result in Port == 1.

#4188: A 32bit installation on a 64bit Linux system cannot run.

#4163: 3GD wrongfully accepts FPGA 200-9220-42-10 (NT20E2), hence no error information is given despite it is NOT recommended to use FPGA 200-9220-42-10 with the 3GD driver.

#3635: Driver cannot load on IOMMU enabled systems

#3473: Setting up duplicate filters with different stream IDs is not allowed, but does currrently not return an error. This can cause a crash in NTService when trying to retreive data using NT_NetRxGet.

napatech

## From version 01.03.00 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11515: Added support for NT4E2-4-PTP FPGA image: 200-9226-50-04

#11310: For an adapter using the INLINE profile, an attempt to use the NTAPI to look up the RX/TX path delays returns the status code NOT_SUPPORTED even if the path delays are known. This restriction is no longer present, and it is possible to request the path delays for an adapter using the INLINE profile. Note that the driver returns NOT_SUPPORTED if the delays are unknown.

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11030: A screen dump feature is added to the tools monitoring and profiling. By hitting the key 'F' a copy of the screen is saved to disk. The screen dump is appended to the saved screen dump. The names of the screen dump files are monitoring.scn and profiling.scn respectively.

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#10899: An Info log has been added for each adapter that has PpsIn defined and where it should be used to do PPS time sync. The log is not written if the PpsIn are only used for sampling.
Info text: Adapter 0: PpsIn is defined for this adapter. Use an external PPS tool or application to start PPS time sync.

#10787: (Support-ID 10551) FPGA feature level can now be read using the API. It is a part of the NtInfoAdapter_v5_s structure and can be read using the info stream.

#10714: Added new command line option (-l, --logmsg) to ntlog tool to write a custom line of text to the ntservice log system.

#10687: Added the ability to filter on inner tunnel layer 3 and layer 4 though the NTPL Data filter. This feature requires matching FPGA feature set. See filter documentation for details.

#10684: Added the ability to slice packets within a tunnel though the NTPL assign command. This feature requires matching FPGA feature set. See filter documentation for details.

#10501: Wis mode can now be enabled pr port by using the wisModeMask parameter which has been added to ntservice,ini

#10400: If TxTiming=RELATIVE the max inter-frame gap is set to 2.6sec.

#10168: NTPORT4E now supported

#10109: (Support-ID 10105) The example program named info_example.c now retrieves and prints basic product (adapter) information, such as the serial number, based on information in the NtInfoProductInfo_s structure.

#10046: The execution of a timesync hard reset to a reference initiated by an application through the NTAPI interface, has changed to execute a hard reset (time jump) for which the execution is unaffected by the current time skew and the hard reset threshold value (i.e. immediately executed). In earlier versions the current time skew was compared to the hard reset threshold value to determine if the hard reset should occur or not.

#9962: Enable swapping of hashdata from tunnels when connecting to a SPAN port

#9937: Support for NTBPE removed.

#9880: Added driver support for the following legacy FPGA images:
NT20E2: 200-9220-44-10 and 200-9220-44-12
NT40E2-4: 200-9221-44-12 and 200-9221-44-13
NT40E2-1: 200-9222-44-06 and 200-9222-44-08

#9586: Alarms are now generated when the status of an external NT-TSU or NT-TSE looses the synchronization signal, synchronization or Time of Day information. The alarms are sent as events:
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_SYNC_SIGNAL
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_OUT_OF_SYNC
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_TIME_OF_DAY
This information is still logged as INFO in the ntlog.

#9494: There is a small delay from the time a frame enters a network port and until the adapter time-stamps it. An application can now query the driver for this RX path delay and subtract it from the time stamp in the packet descriptor. See DN-0449 section Path Delay for more information.

#9492: Added option "--installpath PATH" to ".run" files to change default installation folder.

#9491: Added option to run an ntpl.config file with ntstart.sh.

#9490: Deduplication supports padded frames and IP header masks of i.e. TTL and checksum fields. Moreover a dedup CRC can be forwarded to host application using extended descriptor 9 to support a hardware-accelerated deduplication application. This feature can be enable/disabled using the NTPL Deduplication options IPLengthLimit and IPv4/IPv6. This feature requires a matching FPGA version.

#9447: (Support-ID 8890) Added inline bump in the wire example to DN-0449

#9444: Doxygen documentation updated in NTPL data section

#9232: (Support-ID 9105) NT_NetFileGet() now automatically rewinds the file when NT_STATUS_END_OF_FILE is returned. This will allow NT_NetFileGet() to be called after NT_STATUS_END_OF_FILE and return to the start of the file.

#9147: The delay asymmetry configuration option is added to the PTP protocol.

#9088: TimeSyncFrequencyReferencePriority added to the ntservice.ini file

#9074: On the PTP port, statistics including CRC errors are displayed in the monitoring tool for debug purposes. All the information can be obtained using NTAPI

#9027: TX host buffers can now be prefilled with data and replayed continuously without needing to memcpy packets.

#8984: Support for NT20E enabled

#8760: Added NUMA node information to info stream.

#8604: NT_NetRxOpenMulti() has been added to the API to enable merging traffic from multiple stream-ids

#8500: PDV filter has been implemented in order to increase performance in non-PTP aware network

#8437: The installation now honors the TMPDIR environment setting during the installation to specify an alternative temporary directory.

#8369: Time jumps in OS timesync mode has been implemented.

TimeSyncTimeJumpThreshold = 0, enables smooth sliding
TimeSyncTimeJumpThreshold = <any integer value different from 0> enables time jumps with threshold of 1 sec. If offset is more than 1 sec, a hard time jump will occur.

The default setting is TimeSyncTimeJumpThreshold = 1. This is the default setting used in the ini file in this and previous releases. If you are running with the default ini file, time jumps are default enabled. In previous releases the setting of TimeSyncTimeJumpThreshold had no effect in OS timesync mode.

#8340: Added the ability to reuse the protocol filters to have more than 8 filters using a protocol

#8305: (Support-ID 7892) Enabled possibility to tweak the NT4E-INL and NT4E-STD-INL adapter Tx engine to transmit faster when running with the TrafficGen-profile. Add this to the inifile to achieve it:
[Debug]
nt4etxadjust=8

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

#8052: Stream-id based statistics are now available via the statistics stream and can be monitored using the monitoring tool. Stream-ids can be activated/deactivated using NTPL, to control the sync point when packets starts entering the stream-id host-buffers and when statistics should count them, see the streamidstatistics.c example.

#7975: It has been made possible to run will multiple tx streams addressing the same port when using the TrafficGen profile. The rule is that packets has be to sent with NT_NET_SET_PKT_TXNOW(1) otherwise the behavior is unpredictable.

#7931: A define NT_ERRBUF_SIZE added to indicate the maximum error length size that can be delivered by the driver. This define should be used when allocating a buffer for reading an error message.

#7928: npcap.ini added to the supportinfo archive.

#7894: Added support for per filter descriptor selection. The feature is available through the "Assign" command in NTPL. This feature requires matching FPGA.

#7823: Configuration parameter TimeSyncTimeOffset now has a limit of 1000000 ns (1 ms)

#7807: (Support-ID 7327) NTAPI NT_NetFile...() functions do not connect to NTservice anymore - and thus do not require NTservice to be running.
This change is to allow an user application to process captured files through the NTAPI NT_NetFile...() functions on systems that do not have NTservice running nor a Napatech adapter installed.

NTAPI functions affected by the change:

NT_NetFileOpen()
NT_NetFileGet()
NT_NetFileRelease()
NT_NetFileClose()

The example readcapfile (examples/net/readcapfile/readcapfile.c) demonstrates a possible use.

#7805: Alarms have been added to monitor when an external NTTSU or NTTSE connected through NT-TS timesync looses synchronization with it's time source. The possible alarms are:
NT-TS: External device lost synchronization signal
NT-TS: External device is out of synchronization
NT-TS: External device lost time of day information

#7792: Changing the hash seed is now possible in ntservice.ini using the HashSeed option. Changing the hash seed will effect the data distribution on the streams.

#7758: The info stream has been extended to contain information of:
SDRAM present and SDRAM size
PCI bus information
Adapter features - Bypass support.

#7732: It is now possible to synchronize the operating system's clock with (to) the clock of a designated adapter. The feature is enabled by setting the configuration parameter TimeSyncOsTimeReference in the System section. For instance to synchronize the server clock with adapter zero, specify TimeSyncOsTimeReference=adapter-0. It requires an FPGA with support for synchronization of OS time.

#7730: An event and a log will be generated when the adapter's time stamp clock is set by the system.

#7728: IEEE1588 support is implemented on NT4E2_PTP and NT20E2_PTP adapter. (dedicated RJ45)

#7719: The data filter hardware supports up to 255 values for each 1 byte filter, however the NTPL limits this to specifying 8 values or one range. This is changed to support up to 32 values or 16 ranges or a mix of the two. When using a range it will take up the space of 2 values. When specifying 8 ranges only 16 values can be used.

#7715: A new feature - host loopback - has been added to the port settings structure. Applying loopback to a port means that data transmitted from the host on the port is looped back to the same port. Since the loopback is applied inside the adapter, it will work independently of whether a NIM is actually present or not, and the link will always be reported as up.
If put in loopback mode, the monitoring tool will show the link state as "Loopback". The config tool can be used to apply loopback, and the diagnostics tool can be used to test loopback if using a new feature: single- port- loop.

#7703: Added support for swapping the source and destination IP address regardless of value before calculating hash value. This enables traffic to/from the entire subnets to be balanced between streams. See Hash Mode command documentation for more details. This feature requires a matching FPGA.

#7699: Added 2 and 5 tuple sorted and unsorted hash modes on IPv4 and IPv6 encapsulated IP traffic. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7694: Added 2 and 5 tuple hash (sorted and unsorted) modes on IPv4 and IPv6 traffic inside a GTPv1 tunnel. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7603: Support for FPGA images:
- 200-9220-45-07 (NT20E2)
- 200-9221-45-09 (NT40E2-4)

#7433: The command to setup numanodes, "Setup[numanode=0]=streamid==x,y,z" can now contain up 32 streamids.

#7406: The driver now supports up to 8 adapters in one server.

#7397: (Support-ID 7435) Added support for filtering on decode error e.g "Assign[StreamId = 1] = DecodeError == TRUE" will redirect all packages with decode errors to stream 1.

#7392: (Support-ID 7333) Check for mismatching version of NTService and version of the low level driver has been added.

#7222: Check if IOMMU is enabled are added for kernels larger or equal to version 3.2. Driver fails if IOMMU is enabled.

#7169: Added support for Linux 3.x

#7167: Added support for the NT40E2_1 adapter.

#7141: (Support-ID 6797) The description of NT_NetRxGet timeout functionality in DN-0449 has been improved

#7065: The adapter will now be able to identify connected NT-TS synched adapters, NT-TSUs and NT-TSEs. The information can be seen through the API or using the monitoring tool.

#7062: Added support for Customer specific User data in the VPD.

#6781: This release adds a new configuration parameter OsTimeSyncFailover that can be set to DISABLE or ENABLE; the default value is DISABLE. When OsTimeSyncFailover is set to ENABLE and TimeSyncProtocol is set to NT for a given adapter, then the adapter automatically switches to OS Time synchronization if the incoming NT-TS signal fails, and when the NT time synchronization signal is restored, the adapter reverts to NT time synchronization.

#6780: This release adds support for OC-192c for the NT20E2 and NT40E2_4 adapters. A new configuration setting WisMode enables or disables WIS/OC-192c mode. The setting is set for an adapter, and the legal values are DISABLE and ENABLE. The default value is DISABLE, which disables WIS/OC-192c mode.

#6778: This release adds a new configuration parameter CancelTxOnCloseMask, which is a bitmask that enables cancellation of pending transmission segments for the ports designated by the mask: bit 0 = port 0, bit 1 = port 1, etc. Note that each bit represents an adapter local port, not a virtual (global) port across adapters. When a transmission stream is closed, and if the port bit is set for any of the affected ports, all pending data is cancelled and transmission of data stops immediately.

#6777: This release adds support for higher frequency time sampling. A new configuration parameter HighFrequencySampling can be set to DISABLE or ENABLE, and the default value is DISABLE. When high frequency sampling is enabled (HighFrequencySampling=ENABLE), the time is sampled every 20 microseconds.

#6776: This release includes support for a new FPGA feature "IPF", configurable via NTPL and observable via Statistics. Hardware assisted IP-Fragmentation support is a novel approach to accelerating reassembly by identifying which

feed receives fragments for a particular IP flow. This module is able to process both IPv4 and IPv6. See NTPL command "IPFMode" for information about how to use the module. See example demo "net/ipfdemo" for a working example.

#6718: The time it takes to initialize a NIM module in a PCI GEN2 adapter (NTxxE2) has been improved from about 4.6 seconds to about 0.8 seconds.

#6612: Inline profile documentation has been improved.

#6584: (Support-ID 6469) A new inifile parameter has been added to ntservice.ini. This parameter can only be used by the inline profile on NT adapters. The parameter, "HostBufferPollInterval" can take 4 values "Default | 100 | 250 | 500" and it will control how often ntservice will poll for host buffer data both ingress and egress. The higher a value the lower ntservice CPU utilization but the higher latency. The parameters comes handy in configurations where ntservice consume too much CPU and where latency is not so important.

#6500: Hardware accelerated PCAP packet descriptor is now supported. With this feature comes some restrictions. The TimestampFormat "PCAP" and "PCAP_NS" can only be configured with PacketDescriptor "PCAP". The NTAPI packet interface is not supported when using PCAP headers. To make use of this new feature use the NTAPI segment interface. Note: This feature is not supported on in-line adapters and entry level adapters.

#6494: The standard format of the Time string from an Endrun PPS device has been changed. Both the old and the new format are supported. No configuration is required.

#6458: (Support-ID 6424) The log can now be read in most cases after ntservice crashes, as the shared memory containing the log survives. If ntservice is restarted the log is deleted.
The ntservice binary and the ntservice.ini is now added to the supportinfo archive.

#6432: Added version number of the DN-0449 reference manual to the footer of all pages in the manual.

#6380: (Support-ID 6285) It is now possible to read raw NIM data like it has been possible in 2GD using the NimConfig tool.

#6361: Coordinated time-synchronized transmit has been implemented. More information can be found in the reference manual DN-449 and in the replayGS example.

#6239: Timestamp Inject mode has been added.
Two ini-file keys have been implemented to control the timestamp inject:
1. TimestampMethod = SOF | EOF: System parameter. Used both to control RX and TX.
2. TimestampInjectOffset = SOF | EOF: Adapter parameter.. Used to control TX.

#6143: Info stream extended with info to tell whether the adapter supports 64 bit time stamping or not. The information is found in the featureMask in the capabilities in the port settings port_v1 (Command NT_INFO_CMD_READ_PORT_V1).
Additionally, the transmitSegment example has been changed to support 64 bit timestamp. It is now possible to use tx rates as low as 1 Kilobit per second.

#6128: The profile tool documentation has been updated to explain where the host buffer is currently in use with regards to enqueued/dequeued in app/driver/adapter.

#6125: (Support-ID 6086) Added DN-0449 document as part of the documentation in the complete package.

#6116: (Support-ID 5742) NT_Init can now be called continuously until the service is ready. If the service is not ready the code NT_STATUS_TRYAGAIN is returned.
If any other code is returned an error has occured and it is not possible to continue.

#6103: Port disable implemented for the NT4E2-4T-BP, NT20E2 and NT40E2-4 adapters.
The ports can be disabled and enabled by using the config tool or they can be disabled at startup by setting a PortDisableMask in the ini-file.

#6096: SDRAMFillLevel event log now includes streamID and number of streams.

#5992: Auto generation of the ini-file.
If the ini-file does not exists or it is empty a new ini-file is auto generated. The auto generated ini-file will contain default values for all installed adapters.
In order to auto generate an ini-file for all adapters, the driver must be started and stopped with an empty or deleted ini-file. Afterwards the ini-file can be edited to fit costumer needs.

#5966: Logging to syslog has been changed to only logging errors, warnings, information and events.
This has been done as syslog has proven to be very time consuming. Logging to syslog with
all logs enabled can cause the communication between NTAPI and NTService to timeout
and thereby causing an application to fail.

#5919: Absolute TX timing mode has been added.
An adapter is either in relative or absolute timing mode. When in relative timing mode, an adapter transmits packets such that the inter-frame gap (IFG) between pairs of packets is correct. When in absolute timing mode, the adapter transmits packets at the time stipulated by the time stamp in the packet descriptor.

#5900: API log improved. The logs from the API now contains process ID and application name for each log message.

#5754: The profiling tool has been moved from the tools package to the driver package. Therefore it is important to install the driver package after the tools package, as the uninstall procedure will delete the old profiling tool.
The tool has been enhanced with two new pages - Streams and StreamIds that can be shown for the cursor selected entry in the main page (Host buffers).

#5624: A warning entry is now created in the log when the FPGA temperature reaches 90 degrees. Additionally, the adapter is configured to switch off its own power supply in case the FPGA temperature reaches 95 degrees.

#5613: The Diagnostics tool now makes traffic tests in both directions on each 2 port loops.

#5591: FilterInfo commands now also accepts 'All' as argument (FilterInfo = All). FilterInfo result is now split per adapter.

#5586: It is now possible to specify multiple txport's when assigning data to multiple streamId's (E.g. "Assign[StreamId=(0..3); TxPort=(4..7)] = All")

#5581: The DN-0449 (doxygen) section on Host Buffer Allowance (previously known as Hysteresis) has been extended with a general high level description on how Host Buffer Allowance works and how it should be configured.

#5540: ntservice.ini now has "PacketDescriptor=NT" as default since all adapters support this type.

#5482: The ini-file name is changed to "SDRAMFillLevelWarning".
SDRAM level empty 0% and SDRAM level full 100% triggers an event.
Valid level values are 1% to 100%. Using level value 0 disables the warning.

#5445: Sensor Limits for NT20E2: The diagnostic sensors (level1) do not use the high/low limit in the NtInfoSensor_s structure eventhough the high/low limit value is a part of the structure. The diagnostic sensors are virtual sensors and are only to inform about power usage.

#5443: SDRAM Fill level warning event is added. It is now possible to define up to 4 SDRAM fill levels in percent. If the fill level of the SDRAM raises above one of the fill levels defined a fill level warning event is triggered and if the fill level goes below one of the fill levels a fill level warning is also triggered. The SDRAM Fill level warning deprecate the "NT_NET_GET_STREAM_DATA_PENDING()" macro, hence it has been removed.

#5408: Sensors are now described in a seperate chapter in the doxygen documentation DN-0449.

#5377: A chapter describing logging and how it works is added to the doxygen documentation DN-0449.

#5308: A parameter for clearing the statistical information after read is added to the statistic stream. It will not clear the HW counters but will only clear statistics for the current stream.

#5058: The log message format is described in the logging chapter in the doxygen documentation DN-0449.

#5050: The size of the circular log buffer is described in the logging chapter in the doxygen documentation DN-0449.

#4938: A possibility for adding data and time to the log file name when logging to a file has been added.
If the file name contains a %s this will be expanded with the current data and time for when the service is started.
Example:
/tmp/test.log will not be expanded
/tmp/test_%s.log will be expanded to /tmp/test_11_10_28_11_23_21.log

The %s can be placed anywhere in the file name string.

#4693: All messages are written both to the internal log and to the syslog. How to read the syslog is different from system to system.
For debugging purposes it is also possible to start the ntservice in non deamon mode, by not using the ntstart.sh script, but calling ntservice directly . Then all messages will be printed to the screen.

#4516: The possibility to choose minimum host buffer size has been added. This feature is available through the NT_NetTxOpen function call for Tx host buffers and though NTPL for Rx host buffers. The smallest hostbuffer found that is larger or equal to requested host buffer size is used.

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#13105: (Support-ID 11627) FAN speed values can be wrong when server CPU load is high. In cases of high CPU load a percentage of the FAN speed measurements ought to be skipped.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#12144: (Support-ID 11627) The FAN speed sensor range is too wide. The FAN speed sensor range must be changed to 5270-7440.
FAN speed values can be wrong when server CPU load is high. In cases of high CPU load a percentage of the FAN speed measurements ought to be skipped.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#10530: ntservice may crash while shutting down when applications using the NTAPI are still running.

#9713: (Support-ID 9704) HBH crash on kernels with CONFIG_HZ_5000=y.

#9326: (Support-ID 9300) The driver issues a wrong error message if driver load fails due to insufficient contiguous DMA memory.

#8871: GEN2 adapters could potentially overwrite memory when ntservice is restarted.

#8699: Running with NT_NET_INTERFACE_SEGMENT while deleting/assigning filters could cause a deadlock

#8343: Combining 2 filters into 1 filter results in all packets being forwarded.

#7398: (Support-ID 7388) >>ERROR | SRV | 20411 - SPIv1[0:1500]: Opcode 0120 returned error 80. Is the opcode supported by this AVR version?
May appear if the driver is run on an adapter fitted with an AVR version prior to 1.1.

#7134: Linkspeeds other than 1 Gbps on all ports when running with SOF enabled can make adapter crash unexpectedly (NT4E).

#7001: The version of the NT-TSE or NT-TSU cannot be read from the driver. This does not affect the functionality, only visibility.

#6904: (Support-ID 6882) The shared memory files placed in /tmp are in risk of being deleted by a cleanup Cron job. When the files are deleted it is not possible to start any apps. Apps already running is not affected.

#6616: (Support-ID 6601) Packet forwarding fails with 4096MB host buffers.

#6107: NT20E2 fanspeed rpm calculation is based on a delta time calculation, which is vulnerable to external adjustments of system time such at ntpdate and ntp etc.

#6097: ProductInfo tool not correctly displaying factory FPGA image information on new adapters, but correctly displaying FPGA image information on adapters which have been user programmed by ImgCtrl.
This issue relates to a dedicated function in the driver, not exposed to the user application. Hence, only the ProcductInfo tool is impacted.

#6043: NT_NetFileGet() returns NT_ERROR_NO_MORE_DATA on EOF (end of file). This indicates an error situation, which is not the case! Would be better to return something like NT_STATUS_END_OF_FILE instead.

#5991: Due to a PCI write to an unsupported FPGA register when stopping NTService, the adapter generates an NMI on systems which are configured to catch NMI

#5610: On NT4E-4 adapter with a copper SPF Finistar FCLF-8521-3, the link speed and duplex cannot be configured, before link has been detected once.

#5592: Link stays up on NT20E2 adapter when ntservice and driver is unloaded.

#5589: NTPL Retransmit doxygen documentation DN-0449 indicates that it is supported in feature set N-INL4.

#5547: NTPL error codes are printed in decimal. Should be converted to hexadecimal to lookup the error code.

#5546: Deduplication without parameters like: "Deduplication = Port == 1" is not allowed even though it is described in the documentation.

#5545: Every 18 hours the FAN sensors caused first an "enter alarm state" and then an "exit alarm state" event to be triggered.

#5452: Sometimes NTService is crashing when used with a NT4E adapter. It happens when stopping the driver using ntstop.sh.

#5402: Deduplication doesn't work with certain NTPL configuration

#5400: The NTPL deduplication command is not functioning properly in setups with multiple adapters.

#5373: Setting log level to 0xFF in the ini-file causes to log information to be printed to stdout/stderr in the profiling and the monitoring tool making the tools unusable.

Note: This applies to all applications.

#5172: NTPL Data test: Cannot specify a range of IP adresses like:
Data[DynOffset=DynOffIPv4Frame;Offset=12;DataType=IPv4Addr] == ([10.10.0.0]..[10.10.255.255])

#5166: DataMask is not working with decimal number.
For example:
Assign [ StreamId = 0 ] = Data[DynOffset=DynOffIPv4Frame;Offset=6;DataType=ByteStr1;DataMask=[5:5]] == 1
was failing while:
Assign[StreamId = 0] = Data[DynOffset=DynOffIPv4Frame;Offset=6;DataType=ByteStr1;DataMask=[0x5:0x5]] == 1
was working.

#5077: On a NT20E2 adapter the message:
 11/02/11 15:24:23.150545 | INFO | SRV | 13184 - Sensor 16:0:11 "SFP+1" enter alarm state with value 0
 11/02/11 15:24:30.876483 | INFO | SRV | 13184 - Sensor 16:0:11 "SFP+1" exit alarm state with value 1016
was sometimes logged continuously due to a to low resolution in the sensor. The sensor is a virtual power sensor calculated from reading the voltage and the current. It is changed to not to generate any alarms.

#5072: The 3GD segment interface has too high CPU utilization.

#5064: Doxygen documentation on using NTPL colors should explain how to guarantee unique colors making the color statistics predictable

#5063: PCI bandwidth testing is not done for all NUMA nodes. When ntservice starts it should test PCI bandwidth for all available NUMA nodes and not just NUMA node 0. If bandwidth is below the value required for full line rate performance, the warning should be given.

#5062: PCI bandwidth is not detected correctely on Cisco UCS server (C210M2).

#4930: The enum values in NtPortSettings_s is not described in the doxygen documentation DN-0449.

#4909: structure NtNetBuf_s is documented in the doxygen documentation even though it is only to be used by internal Napatech tools.

#4847: Running applications as non-root will fail with IPC error

#4791: NT4E capture card cannot send packets larger than 1522 bytes.

#4730: It is not possible to capture traffic from an NT4E-STD adapter unless it is configured as the first adapter in the range.

#4703: NTPL: Data value parsing fails e.g. Assign[Priority=0; streamId=0; txport=0; TxIgnore=True] = Data[DynOffset=DynOffEtherTypeLen; Offset=5] == {FF: 11} fails. Expects whitespace before '}'.

#4698: ./ntpl -e "HashMask[HashWord0=F0F0F0F0]=None" causes an internal error.

#4692: Hysteresis causes unnecessary packet drops.

#4677: Local Retransmit is not accepted on NT20E2 inline

#4669: Packet interface not able to handle line rate (20G) traffic for small packet sizes on standard servers.

#4637: It not possible to transmit and receive at the same time on a capture adapter.

#4632: RX packets do always have timestamps at start of frame and TX packets do always have timestamps at end of frame.

#4584: An alternative VLAN TPID can not be configured as described in the technical specification

#4568: It is not clear from documentation what NTPL options/commands that is supported on each adapter type

#4486: '.' (period) is not accepted in macro name.

#4481: Bug in hashmasks. The command HashMask[HashWord0=F0F0F0F0]=HashRoundRobin" fails with the error: Hashmask already set for the specified hashmode.

#4477: Ini-file: A key could be defined several time within a section. The last key defined is the one used. An error should be returned if a duplicate key exists.

#4293: Retransmit only works on adapter 0 in a multi adapter setup for all other adapters it fails

#4286: Timesync LED lights red when ntservices is loaded

#4243: The ini-file ntservice.ini must not contain any tabs. A tab causes ntservice to fail when reading the ini-file.

#4195: Deduplication does only support == compare operator. For example Deduplication[timeout=100] = Port <=1 works in the parser but it will result in Port == 1.

#4188: A 32bit installation on a 64bit Linux system cannot run.

#4163: 3GD wrongfully accepts FPGA 200-9220-42-10 (NT20E2), hence no error information is given despite it is NOT recommended to use FPGA 200-9220-42-10 with the 3GD driver.

#3635: Driver cannot load on IOMMU enabled systems

#3473: Setting up duplicate filters with different stream IDs is not allowed, but does currrently not return an error. This can cause a crash in NTService when trying to retreive data using NT_NetRxGet.

napatech

## From version 01.01.00 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11515: Added support for NT4E2-4-PTP FPGA image: 200-9226-50-04

#11310: For an adapter using the INLINE profile, an attempt to use the NTAPI to look up the RX/TX path delays returns the status code NOT_SUPPORTED even if the path delays are known. This restriction is no longer present, and it is possible to request the path delays for an adapter using the INLINE profile. Note that the driver returns NOT_SUPPORTED if the delays are unknown.

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11030: A screen dump feature is added to the tools monitoring and profiling. By hitting the key 'F' a copy of the screen is saved to disk. The screen dump is appended to the saved screen dump. The names of the screen dump files are monitoring.scn and profiling.scn respectively.

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#10899: An Info log has been added for each adapter that has PpsIn defined and where it should be used to do PPS time sync. The log is not written if the PpsIn are only used for sampling.
Info text: Adapter 0: PpsIn is defined for this adapter. Use an external PPS tool or application to start PPS time sync.

#10787: (Support-ID 10551) FPGA feature level can now be read using the API. It is a part of the NtInfoAdapter_v5_s structure and can be read using the info stream.

#10714: Added new command line option (-l, --logmsg) to ntlog tool to write a custom line of text to the ntservice log system.

#10687: Added the ability to filter on inner tunnel layer 3 and layer 4 though the NTPL Data filter. This feature requires matching FPGA feature set. See filter documentation for details.

#10684: Added the ability to slice packets within a tunnel though the NTPL assign command. This feature requires matching FPGA feature set. See filter documentation for details.

#10501: Wis mode can now be enabled pr port by using the wisModeMask parameter which has been added to ntservice,ini

#10400: If TxTiming=RELATIVE the max inter-frame gap is set to 2.6sec.

#10168: NTPORT4E now supported

#10109: (Support-ID 10105) The example program named info_example.c now retrieves and prints basic product (adapter) information, such as the serial number, based on information in the NtInfoProductInfo_s structure.

#10046: The execution of a timesync hard reset to a reference initiated by an application through the NTAPI interface, has changed to execute a hard reset (time jump) for which the execution is unaffected by the current time skew and the hard reset threshold value (i.e. immediately executed). In earlier versions the current time skew was compared to the hard reset threshold value to determine if the hard reset should occur or not.

#9962: Enable swapping of hashdata from tunnels when connecting to a SPAN port

#9937: Support for NTBPE removed.

#9880: Added driver support for the following legacy FPGA images:
NT20E2: 200-9220-44-10 and 200-9220-44-12
NT40E2-4: 200-9221-44-12 and 200-9221-44-13
NT40E2-1: 200-9222-44-06 and 200-9222-44-08

#9586: Alarms are now generated when the status of an external NT-TSU or NT-TSE looses the synchronization signal, synchronization or Time of Day information. The alarms are sent as events:
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_SYNC_SIGNAL
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_OUT_OF_SYNC
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_TIME_OF_DAY
This information is still logged as INFO in the ntlog.

#9494: There is a small delay from the time a frame enters a network port and until the adapter time-stamps it. An application can now query the driver for this RX path delay and subtract it from the time stamp in the packet descriptor. See DN-0449 section Path Delay for more information.

#9492: Added option "--installpath PATH" to ".run" files to change default installation folder.

#9491: Added option to run an ntpl.config file with ntstart.sh.

#9490: Deduplication supports padded frames and IP header masks of i.e. TTL and checksum fields. Moreover a dedup CRC can be forwarded to host application using extended descriptor 9 to support a hardware-accelerated deduplication application. This feature can be enable/disabled using the NTPL Deduplication options IPLengthLimit and IPv4/IPv6. This feature requires a matching FPGA version.

#9447: (Support-ID 8890) Added inline bump in the wire example to DN-0449

#9444: Doxygen documentation updated in NTPL data section

#9232: (Support-ID 9105) NT_NetFileGet() now automatically rewinds the file when NT_STATUS_END_OF_FILE is returned. This will allow NT_NetFileGet() to be called after NT_STATUS_END_OF_FILE and return to the start of the file.

#9147: The delay asymmetry configuration option is added to the PTP protocol.

#9088: TimeSyncFrequencyReferencePriority added to the ntservice.ini file

#9074: On the PTP port, statistics including CRC errors are displayed in the monitoring tool for debug purposes. All the information can be obtained using NTAPI

#9027: TX host buffers can now be prefilled with data and replayed continuously without needing to memcpy packets.

#8984: Support for NT20E enabled

#8760: Added NUMA node information to info stream.

#8604: NT_NetRxOpenMulti() has been added to the API to enable merging traffic from multiple stream-ids

#8500: PDV filter has been implemented in order to increase performance in non-PTP aware network

#8437: The installation now honors the TMPDIR environment setting during the installation to specify an alternative temporary directory.

#8369: Time jumps in OS timesync mode has been implemented.

TimeSyncTimeJumpThreshold = 0, enables smooth sliding
TimeSyncTimeJumpThreshold = <any integer value different from 0> enables time jumps with threshold of 1 sec. If offset is more than 1 sec, a hard time jump will occur.

The default setting is TimeSyncTimeJumpThreshold = 1. This is the default setting used in the ini file in this and previous releases. If you are running with the default ini file, time jumps are default enabled. In previous releases the setting of TimeSyncTimeJumpThreshold had no effect in OS timesync mode.

#8340: Added the ability to reuse the protocol filters to have more than 8 filters using a protocol

#8305: (Support-ID 7892) Enabled possibility to tweak the NT4E-INL and NT4E-STD-INL adapter Tx engine to transmit faster when running with the TrafficGen-profile. Add this to the inifile to achieve it:
[Debug]
nt4etxadjust=8

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

#8052: Stream-id based statistics are now available via the statistics stream and can be monitored using the monitoring tool. Stream-ids can be activated/deactivated using NTPL, to control the sync point when packets starts entering the stream-id host-buffers and when statistics should count them, see the streamidstatistics.c example.

#7975: It has been made possible to run will multiple tx streams addressing the same port when using the TrafficGen profile. The rule is that packets has be to sent with NT_NET_SET_PKT_TXNOW(1) otherwise the behavior is unpredictable.

#7931: A define NT_ERRBUF_SIZE added to indicate the maximum error length size that can be delivered by the driver. This define should be used when allocating a buffer for reading an error message.

#7928: npcap.ini added to the supportinfo archive.

#7894: Added support for per filter descriptor selection. The feature is available through the "Assign" command in NTPL. This feature requires matching FPGA.

#7823: Configuration parameter TimeSyncTimeOffset now has a limit of 1000000 ns (1 ms)

#7807: (Support-ID 7327) NTAPI NT_NetFile...() functions do not connect to NTservice anymore - and thus do not require NTservice to be running.
This change is to allow an user application to process captured files through the NTAPI NT_NetFile...() functions on systems that do not have NTservice running nor a Napatech adapter installed.

NTAPI functions affected by the change:

NT_NetFileOpen()
NT_NetFileGet()
NT_NetFileRelease()
NT_NetFileClose()

The example readcapfile (examples/net/readcapfile/readcapfile.c) demonstrates a possible use.

#7805: Alarms have been added to monitor when an external NTTSU or NTTSE connected through NT-TS timesync looses synchronization with it's time source. The possible alarms are:
NT-TS: External device lost synchronization signal
NT-TS: External device is out of synchronization
NT-TS: External device lost time of day information

#7792: Changing the hash seed is now possible in ntservice.ini using the HashSeed option. Changing the hash seed will effect the data distribution on the streams.

#7758: The info stream has been extended to contain information of:
SDRAM present and SDRAM size
PCI bus information
Adapter features - Bypass support.

#7732: It is now possible to synchronize the operating system's clock with (to) the clock of a designated adapter. The feature is enabled by setting the configuration parameter TimeSyncOsTimeReference in the System section. For instance to synchronize the server clock with adapter zero, specify TimeSyncOsTimeReference=adapter-0. It requires an FPGA with support for synchronization of OS time.

#7730: An event and a log will be generated when the adapter's time stamp clock is set by the system.

#7728: IEEE1588 support is implemented on NT4E2_PTP and NT20E2_PTP adapter. (dedicated RJ45)

#7719: The data filter hardware supports up to 255 values for each 1 byte filter, however the NTPL limits this to specifying 8 values or one range. This is changed to support up to 32 values or 16 ranges or a mix of the two. When using a range it will take up the space of 2 values. When specifying 8 ranges only 16 values can be used.

#7715: A new feature - host loopback - has been added to the port settings structure. Applying loopback to a port means that data transmitted from the host on the port is looped back to the same port. Since the loopback is applied inside the adapter, it will work independently of whether a NIM is actually present or not, and the link will always be reported as up.
If put in loopback mode, the monitoring tool will show the link state as "Loopback". The config tool can be used to apply loopback, and the diagnostics tool can be used to test loopback if using a new feature: single- port- loop.

#7703: Added support for swapping the source and destination IP address regardless of value before calculating hash value. This enables traffic to/from the entire subnets to be balanced between streams. See Hash Mode command documentation for more details. This feature requires a matching FPGA.

#7699: Added 2 and 5 tuple sorted and unsorted hash modes on IPv4 and IPv6 encapsulated IP traffic. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7694: Added 2 and 5 tuple hash (sorted and unsorted) modes on IPv4 and IPv6 traffic inside a GTPv1 tunnel. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7603: Support for FPGA images:
- 200-9220-45-07 (NT20E2)
- 200-9221-45-09 (NT40E2-4)

#7433: The command to setup numanodes, "Setup[numanode=0]=streamid==x,y,z" can now contain up 32 streamids.

#7406: The driver now supports up to 8 adapters in one server.

#7397: (Support-ID 7435) Added support for filtering on decode error e.g "Assign[StreamId = 1] = DecodeError == TRUE" will redirect all packages with decode errors to stream 1.

#7392: (Support-ID 7333) Check for mismatching version of NTService and version of the low level driver has been added.

#7222: Check if IOMMU is enabled are added for kernels larger or equal to version 3.2. Driver fails if IOMMU is enabled.

#7169: Added support for Linux 3.x

#7167: Added support for the NT40E2_1 adapter.

#7141: (Support-ID 6797) The description of NT_NetRxGet timeout functionality in DN-0449 has been improved

#7065: The adapter will now be able to identify connected NT-TS synched adapters, NT-TSUs and NT-TSEs. The information can be seen through the API or using the monitoring tool.

#7062: Added support for Customer specific User data in the VPD.

#6781: This release adds a new configuration parameter OsTimeSyncFailover that can be set to DISABLE or ENABLE; the default value is DISABLE. When OsTimeSyncFailover is set to ENABLE and TimeSyncProtocol is set to NT for a given adapter, then the adapter automatically switches to OS Time synchronization if the incoming NT-TS signal fails, and when the NT time synchronization signal is restored, the adapter reverts to NT time synchronization.

#6780: This release adds support for OC-192c for the NT20E2 and NT40E2_4 adapters. A new configuration setting WisMode enables or disables WIS/OC-192c mode. The setting is set for an adapter, and the legal values are DISABLE and ENABLE. The default value is DISABLE, which disables WIS/OC-192c mode.

#6778: This release adds a new configuration parameter CancelTxOnCloseMask, which is a bitmask that enables cancellation of pending transmission segments for the ports designated by the mask: bit 0 = port 0, bit 1 = port 1, etc. Note that each bit represents an adapter local port, not a virtual (global) port across adapters. When a transmission stream is closed, and if the port bit is set for any of the affected ports, all pending data is cancelled and transmission of data stops immediately.

#6777: This release adds support for higher frequency time sampling. A new configuration parameter HighFrequencySampling can be set to DISABLE or ENABLE, and the default value is DISABLE. When high frequency sampling is enabled (HighFrequencySampling=ENABLE), the time is sampled every 20 microseconds.

#6776: This release includes support for a new FPGA feature "IPF", configurable via NTPL and observable via Statistics. Hardware assisted IP-Fragmentation support is a novel approach to accelerating reassembly by identifying which

feed receives fragments for a particular IP flow. This module is able to process both IPv4 and IPv6. See NTPL command "IPFMode" for information about how to use the module. See example demo "net/ipfdemo" for a working example.

#6718: The time it takes to initialize a NIM module in a PCI GEN2 adapter (NTxxE2) has been improved from about 4.6 seconds to about 0.8 seconds.

#6612: Inline profile documentation has been improved.

#6584: (Support-ID 6469) A new inifile parameter has been added to ntservice.ini. This parameter can only be used by the inline profile on NT adapters. The parameter, "HostBufferPollInterval" can take 4 values "Default | 100 | 250 | 500" and it will control how often ntservice will poll for host buffer data both ingress and egress. The higher a value the lower ntservice CPU utilization but the higher latency. The parameters comes handy in configurations where ntservice consume too much CPU and where latency is not so important.

#6500: Hardware accelerated PCAP packet descriptor is now supported. With this feature comes some restrictions. The TimestampFormat "PCAP" and "PCAP_NS" can only be configured with PacketDescriptor "PCAP". The NTAPI packet interface is not supported when using PCAP headers. To make use of this new feature use the NTAPI segment interface. Note: This feature is not supported on in-line adapters and entry level adapters.

#6494: The standard format of the Time string from an Endrun PPS device has been changed. Both the old and the new format are supported. No configuration is required.

#6458: (Support-ID 6424) The log can now be read in most cases after ntservice crashes, as the shared memory containing the log survives. If ntservice is restarted the log is deleted.
The ntservice binary and the ntservice.ini is now added to the supportinfo archive.

#6432: Added version number of the DN-0449 reference manual to the footer of all pages in the manual.

#6380: (Support-ID 6285) It is now possible to read raw NIM data like it has been possible in 2GD using the NimConfig tool.

#6361: Coordinated time-synchronized transmit has been implemented. More information can be found in the reference manual DN-449 and in the replayGS example.

#6239: Timestamp Inject mode has been added.
Two ini-file keys have been implemented to control the timestamp inject:
1. TimestampMethod = SOF | EOF: System parameter. Used both to control RX and TX.
2. TimestampInjectOffset = SOF | EOF: Adapter parameter.. Used to control TX.

#6143: Info stream extended with info to tell whether the adapter supports 64 bit time stamping or not. The information is found in the featureMask in the capabilities in the port settings port_v1 (Command NT_INFO_CMD_READ_PORT_V1).
Additionally, the transmitSegment example has been changed to support 64 bit timestamp. It is now possible to use tx rates as low as 1 Kilobit per second.

#6128: The profile tool documentation has been updated to explain where the host buffer is currently in use with regards to enqueued/dequeued in app/driver/adapter.

#6125: (Support-ID 6086) Added DN-0449 document as part of the documentation in the complete package.

#6116: (Support-ID 5742) NT_Init can now be called continuously until the service is ready. If the service is not ready the code NT_STATUS_TRYAGAIN is returned.
If any other code is returned an error has occured and it is not possible to continue.

#6103: Port disable implemented for the NT4E2-4T-BP, NT20E2 and NT40E2-4 adapters.
The ports can be disabled and enabled by using the config tool or they can be disabled at startup by setting a PortDisableMask in the ini-file.

#6096: SDRAMFillLevel event log now includes streamID and number of streams.

#5992: Auto generation of the ini-file.
If the ini-file does not exists or it is empty a new ini-file is auto generated. The auto generated ini-file will contain default values for all installed adapters.
In order to auto generate an ini-file for all adapters, the driver must be started and stopped with an empty or deleted ini-file. Afterwards the ini-file can be edited to fit costumer needs.

#5966: Logging to syslog has been changed to only logging errors, warnings, information and events.
This has been done as syslog has proven to be very time consuming. Logging to syslog with
all logs enabled can cause the communication between NTAPI and NTService to timeout
and thereby causing an application to fail.

#5919: Absolute TX timing mode has been added.
An adapter is either in relative or absolute timing mode. When in relative timing mode, an adapter transmits packets such that the inter-frame gap (IFG) between pairs of packets is correct. When in absolute timing mode, the adapter transmits packets at the time stipulated by the time stamp in the packet descriptor.

#5900: API log improved. The logs from the API now contains process ID and application name for each log message.

#5754: The profiling tool has been moved from the tools package to the driver package. Therefore it is important to install the driver package after the tools package, as the uninstall procedure will delete the old profiling tool.
The tool has been enhanced with two new pages - Streams and StreamIds that can be shown for the cursor selected entry in the main page (Host buffers).

#5624: A warning entry is now created in the log when the FPGA temperature reaches 90 degrees. Additionally, the adapter is configured to switch off its own power supply in case the FPGA temperature reaches 95 degrees.

#5613: The Diagnostics tool now makes traffic tests in both directions on each 2 port loops.

#5591: FilterInfo commands now also accepts 'All' as argument (FilterInfo = All). FilterInfo result is now split per adapter.

#5586: It is now possible to specify multiple txport's when assigning data to multiple streamId's (E.g. "Assign[StreamId=(0..3); TxPort=(4..7)] = All")

#5581: The DN-0449 (doxygen) section on Host Buffer Allowance (previously known as Hysteresis) has been extended with a general high level description on how Host Buffer Allowance works and how it should be configured.

#5540: ntservice.ini now has "PacketDescriptor=NT" as default since all adapters support this type.

#5482: The ini-file name is changed to "SDRAMFillLevelWarning".
SDRAM level empty 0% and SDRAM level full 100% triggers an event.
Valid level values are 1% to 100%. Using level value 0 disables the warning.

#5445: Sensor Limits for NT20E2: The diagnostic sensors (level1) do not use the high/low limit in the NtInfoSensor_s structure eventhough the high/low limit value is a part of the structure. The diagnostic sensors are virtual sensors and are only to inform about power usage.

#5443: SDRAM Fill level warning event is added. It is now possible to define up to 4 SDRAM fill levels in percent. If the fill level of the SDRAM raises above one of the fill levels defined a fill level warning event is triggered and if the fill level goes below one of the fill levels a fill level warning is also triggered. The SDRAM Fill level warning deprecate the "NT_NET_GET_STREAM_DATA_PENDING()" macro, hence it has been removed.

#5408: Sensors are now described in a seperate chapter in the doxygen documentation DN-0449.

#5377: A chapter describing logging and how it works is added to the doxygen documentation DN-0449.

#5308: A parameter for clearing the statistical information after read is added to the statistic stream. It will not clear the HW counters but will only clear statistics for the current stream.

#5058: The log message format is described in the logging chapter in the doxygen documentation DN-0449.

#5050: The size of the circular log buffer is described in the logging chapter in the doxygen documentation DN-0449.

#4938: A possibility for adding data and time to the log file name when logging to a file has been added.
If the file name contains a %s this will be expanded with the current data and time for when the service is started.
Example:
/tmp/test.log will not be expanded
/tmp/test_%s.log will be expanded to /tmp/test_11_10_28_11_23_21.log

The %s can be placed anywhere in the file name string.

#4693: All messages are written both to the internal log and to the syslog. How to read the syslog is different from system to system.
For debugging purposes it is also possible to start the ntservice in non deamon mode, by not using the ntstart.sh script, but calling ntservice directly . Then all messages will be printed to the screen.

#4636: Possibility to merge from 42 Host Buffers

#4516: The possibility to choose minimum host buffer size has been added. This feature is available through the NT_NetTxOpen function call for Tx host buffers and though NTPL for Rx host buffers. The smallest hostbuffer found that is larger or equal to requested host buffer size is used.

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#13105: (Support-ID 11627) FAN speed values can be wrong when server CPU load is high. In cases of high CPU load a percentage of the FAN speed measurements ought to be skipped.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#12144: (Support-ID 11627) The FAN speed sensor range is too wide. The FAN speed sensor range must be changed to 5270-7440.
FAN speed values can be wrong when server CPU load is high. In cases of high CPU load a percentage of the FAN speed measurements ought to be skipped.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#10530: ntservice may crash while shutting down when applications using the NTAPI are still running.

#9713: (Support-ID 9704) HBH crash on kernels with CONFIG_HZ_5000=y.

#9326: (Support-ID 9300) The driver issues a wrong error message if driver load fails due to insufficient contiguous DMA memory.

#8871: GEN2 adapters could potentially overwrite memory when ntservice is restarted.

#8699: Running with NT_NET_INTERFACE_SEGMENT while deleting/assigning filters could cause a deadlock

#8343: Combining 2 filters into 1 filter results in all packets being forwarded.

#7398: (Support-ID 7388) >>ERROR | SRV | 20411 - SPIv1[0:1500]: Opcode 0120 returned error 80. Is the opcode supported by this AVR version?
May appear if the driver is run on an adapter fitted with an AVR version prior to 1.1.

#7134: Linkspeeds other than 1 Gbps on all ports when running with SOF enabled can make adapter crash unexpectedly (NT4E).

#7001: The version of the NT-TSE or NT-TSU cannot be read from the driver. This does not affect the functionality, only visibility.

#6904: (Support-ID 6882) The shared memory files placed in /tmp are in risk of being deleted by a cleanup Cron job. When the files are deleted it is not possible to start any apps. Apps already running is not affected.

#6616: (Support-ID 6601) Packet forwarding fails with 4096MB host buffers.

#6107: NT20E2 fanspeed rpm calculation is based on a delta time calculation, which is vulnerable to external adjustments of system time such at ntpdate and ntp etc.

#6097: ProductInfo tool not correctly displaying factory FPGA image information on new adapters, but correctly displaying FPGA image information on adapters which have been user programmed by ImgCtrl.
This issue relates to a dedicated function in the driver, not exposed to the user application. Hence, only the ProcductInfo tool is impacted.

#5610: On NT4E-4 adapter with a copper SPF Finistar FCLF-8521-3, the link speed and duplex cannot be configured, before link has been detected once.

#5592: Link stays up on NT20E2 adapter when ntservice and driver is unloaded.

#5589: NTPL Retransmit doxygen documentation DN-0449 indicates that it is supported in feature set N-INL4.

#5072: The 3GD segment interface has too high CPU utilization.

#5064: Doxygen documentation on using NTPL colors should explain how to guarantee unique colors making the color statistics predictable

#4692: Hysteresis causes unnecessary packet drops.

#4675: NTPL parser does not return error when option -e is omitted.

#4670: Packet interface not performance optimized - only able to handle 20Mpps (64 bytes packets) on standard servers

#4669: Packet interface not able to handle line rate (20G) traffic for small packet sizes on standard servers.

#4632: RX packets do always have timestamps at start of frame and TX packets do always have timestamps at end of frame.

#4568: It is not clear from documentation what NTPL options/commands that is supported on each adapter type

#4567: The examples in the NTPL documentation is incorrect several places (wrong syntax is used)

#4557: Retransmit fails with "feature not supported" on NT20E2 Capture adapter

#4543: If NT_NetTxGet and NT_NetTxRelease are called from different threads, then NT_NetTxGet hangs.

#4534: Information about installation options is missing in driver readme file

#4531: _nt_net_create_segment_netbuf function is not documented in DN-0449

#4530: Missing documentation on the segment interface for Tx.

#4477: Ini-file: A key could be defined several time within a section. The last key defined is the one used. An error should be returned if a duplicate key exists.

#4473: NTPL parser ignores the -v (validate) option and creates a macro, where it shouldn't have.

#4452: The Linux kernel driver creates the cdev slightly before it is properly initialized, which ultimately could lead to ioctl's from ntservice are sent before the kernel driver actually is ready. Same problem can be seen during kernel driver teardown, where the cdev is not removed as the very first thing.

#4448: Inconsistent documentation of how to specify hostbuffer size

#4447: NT Service fails parsing host buffer definitions larger than 10 characters, e.g. [10, 1024, 0] in ntservice.ini

#4293: Retransmit only works on adapter 0 in a multi adapter setup for all other adapters it fails

#4286: Timesync LED lights red when ntservices is loaded

#4277: It is not possible to delete a Retransmit filter.

#4243: The ini-file ntservice.ini must not contain any tabs. A tab causes ntservice to fail when reading the ini-file.

#4195: Deduplication does only support == compare operator. For example Deduplication[timeout=100] = Port <=1 works in the parser but it will result in Port == 1.

#4188: A 32bit installation on a 64bit Linux system cannot run.

#4163: 3GD wrongfully accepts FPGA 200-9220-42-10 (NT20E2), hence no error information is given despite it is NOT recommended to use FPGA 200-9220-42-10 with the 3GD driver.

#3635: Driver cannot load on IOMMU enabled systems

#3473: Setting up duplicate filters with different stream IDs is not allowed, but does currrently not return an error. This can cause a crash in NTService when trying to retreive data using NT_NetRxGet.

napatech

## From version 01.00.00 to version 03.07.04 (this release)

**New features**

#38577: Added support for these NIMs:
- Innolight Technology TR-FC13L-NVS
- Innolight Technology TR-FC85S-NVS
- Finisar FTLC9551REPM

#38541: (Support-ID 38367) Documentation updated to reflect that the UDP checksum is not updated after Tx timestamp has been injected.

#38505: NTPL option "ColorInherit" added to "IPFMode" command to increase flexibility when coloring IP fragments.

#38458: Added support for pseudowire (RFC 4448, Ethernet over MPLS).

#38337: Added support for CPU socket load balancer on NT40A01-4x10/1-SLB.

#38336: PTP support added on NT200A01

#38325: Added support for local retransmit

#38314: Support for configurable TX segment size added.

#37193: Added support for transmit on time stamp.

#37191: Supportinfo default behaviour has changed. Binary files are no longer by default included into the supportinfo tar-ball archive. Previous behaviour can be selected by invoking supportinfo with option -b

#37029: Makefile updated to allow for compilation against other than current running Linux kernel version

#36961: Enable the capfileconvert tool to write output to stdout via a "-o -" option.

#36866: Macros can now also be constructed using the NTPL "Define" command.

#36725: Added NVGRE support.

#36723: Added VXLAN support.

#36666: The 3G driver supports applications in a Docker container.
Each container can have its own dependencies and will be able to be distributed without including the 3GD driver or library files.
The 3GD API version must be the same in all containers.

#36661: Added full throughput in-line support

#36543: Inline memory allocation support for dynamic descriptors added.

#36474: Support for Linux kernel 4.9 - 4.11 has been added

#36440: Added support for a 2x40G image on NT200A01

#36420: Added support for 40GBASE-SR-BiDi (tested only on Avago AFBR-79EBRZ (Rx only)).

#36402: Added support for time stamp clock sampled on software generated PPS on NT40E3-4, NT80E3-2, and NT100E3-1.

#36361: Capture can now utilize the packet interface, allowing it to capture from more advanced stream configurations. The packet interface is activated by the "-P" option.

#36357: Added support for a 1G variant of NT40E3-4. The 1G limitation is a software limitation. I.e., the HW and FPGA image is identical to NT40E3-4.

#36342: Added support for ClassifyUnmatched=All option to the IPFMode command.

#36341: Line loopback on NT200A01-2x100 now work correctly.

#36309: (Support-ID 36155) Support for Linux kernel 4.8 has been added

#36274: RPM source packages are generated for nt_driver_3gd_linux and nt_tool_3gd_linux.

#36258: A new eye scanning option has been added to the diagnostic tool. It is intended for testing the cables used when bonding two NT100E3-1. This could be relevant after installation of adapters and cables.
The scanning is started by specifying one of the bonded adapters since this will automatically involve both. All cable lanes are tested, and the result will indicate for each lane, if it passed the test or not.
The eye scanning resolution can be set but it is recommended in general to use the default settings.

#36257: The driver now supports boths 4GA and 3GA accelerators and accelerators with PCIe Gen 1, 2, and 3.

#36212: Ntservice is now shielded from OOM kills

#36194: Added support for TX from multiple host buffers

#36151: NT_NetRxRead has been extended with the command NT_NETRX_READ_CMD_PCAP_FCS.
The command will tell whether or not there is FCS included in a PCAP packet (descriptor=PCAP and Timestampformat=PCAP | PCAP_NS).
Note: The command must be called after NT_NetRxOpen is called and after the first packet is fetched (NT_NetRxGet is called).
This is necessary as all filters must be assigned before calling the command.

#36108: Each port can be configured to 100Mbit/s, 1Gbit/s or 10Gbit/s.

#35027: Added driver support for NT200A01

#35026: MPLS documentation in NTPL. protocol tests section has been updated with examples and new macros. FilterMacros.txt has been updated with documented macros.

#34959: Silent option added to package_install.sh install script

#34626: The IP Fragment handler is now available as described in DN-1011.

#34625: The Pattern compare function is now available as described in DN-1011.

#34624: The length compare function is now available as described in DN-1011.

#33545: (Support-ID 33291) NTAPI NetRx out-of-order release is now supported for NT4GA adapters

#33498: Support for Linux 4.x kernels have been added

#33488: Implemented support for Symmetric Load Balancing on a pair of NT40E3-4-PTP accelerators. This feature is only supported together with FPGA firmware 200-9232-55-05

#33436: Time skew added to log message when adapter goes out of sync

#33406: (Support-ID 33352) Added a new mode to the "FilterInfo" NTPL command that shows filter resource usage.

#33394: New statistic command NT_STATISTICS_READ_CMD_USAGE_DATA_V0 added. The command will return information about hostbuffer, streamid and SDRAM usage.

#33305: Added Timestamp sampling executed by application. By writing an Event and then read Timesync information from infostream. Timestamp samples can be read in combination with CPU tsc values before and after sampling event.

#33218: Linux 4.3 and 4.4 kernels are now supported by the driver

#32960: Doxygen documentation updated on Global time sync clock in the Coordinated Time-Synchronized Transmit section

#30437: Added support for Fedora 23 (Linux kernel version 4.2)

#30433: NDA reference in include files has been replaced with reference to Napatech Software License Agreement.

#30308: (Support-ID 30301) Updated description of streams in doxygen

#30183: The NT driver now supports Intel IOMMU (VT-d).

#28976: Avago ABCU-5740RZ SFP has been qualified with this driver

#28809: It has been made possible to use NTPL to classify both outer and inner IP fragments as "unmatched", thus directing such fragments to a certain stream (or set of streams). This feature relieves an application from identifying IP fragments.
For additional information, please refer to the description of the NTPL IPFMode command in the DN-0449 document.
This functionality depends on FPGA support for the feature.

#28738: (Support-ID 28663) Adapter Merge section of DN-0449 updated with information about required time synchronization between adapters when merging data between different adapters.

#28692: General pcap and pcap-ng feature added to NTAPI NetFile API.

#25849: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#21540: Updated NtNetBuf_s structure definition, and increased NTAPI_VERSION to 2.
Application code will need to be recompiled, and tools from earlier driver releases will no longer work. Eventually, if the NtNetBuf_s structure is accessed directly from application code (not utilizing the provided macros), update to application code may be needed.

#21320: Added support for 2 x 100G capture and hardware merge.

#20793: Included support for new fan and fan-ranges on NT100E3-1, to support improved thermal solution.

#20780: If a “napatech” system group account exists on the system, ntservice will use it and regular user must me members of this group to use tools and API.

#20247: Automatic kernel driver rebuild after kernel upgrade is now supported and the kernel driver source is now included in /opt/napatech3/driver/src/. A rebuild can also be forced by calling "ntload.sh --rebuild"

#20220: Each port on the NT40E3-4 and NT20E3-2 can now be configured to either 1Gbit/s or 10Gbit/s.

#16038: Systemd unit configuration file for controlling ntservice has been added to examples.

#16029: Optimized IPMatchlist filter configuration time when using masks. Before optimization an additional 4.5ms per byte masked was consumed. This has been optimized to 100us per byte masked.

#15884: (Support-ID 14190) The OS Timesync thread has previously been pinned to core 4. This has been changed so that the OS Timesync thread now uses the highest available core.

#14320: NTPL IPMatchlist has been optimized when adding/deleting entries using masks by reusing previously used masks.

#14315: New NTAPI function added to initialize a NtNetBuf_s structure using a copied segment.

#14277: A new parameter HostBufferSegmentSizeRx has been introduced to select between segment sizes of 1,2,4 MB.
The HostbufferSegmentTimeout value range has been extended to include 10000, 25000, 50000, 100000 us.
If the HostBufferSegmentSizeRx is changed and HostBufferSegmentTimeout is kept default the segment timeout will be calculated based on the HostBufferSegmentSizeRx

#14145: Optimized deletion of single IPMatchList entries using the NTPL "delete" command. Deletion of one IPv4 entry is now approx. 400us. per adapter.

#14113: The IPMatchList capacity has been extended and can for adapters with feature set N-ANL3 contain 864 IPv4 addresses and 216 IPv6 addresses.

#14112: Retransmit from one port to multiple ports is now supported for the NT40E3-4-PTP and the NT20E3-2-PTP accelerators .

#14088: New adapter NT20E3-2-PTP and the NEBS version of NT20E3-2-PTP are supported.

#13997: MPLS Decapsulation:
Purpose MPLS decapsulation enables MPLS-unaware applications to monitor MPLS networks by stripping the frames of all MPLS labels and delivering valid Ethernet frames.

#13803: Support for the NEBS version of NT100E3-1-PTP.

#13779: Support for the NEBS version of NT40E3-4-PTP.

#12949: The diagnostics driver tool has been extended to include an -f option (first-error-stop) and returns more specific error codes. This is done to make the diagnostics tool scripting more user friendly.

#12890: Added new 'OuterOnlyIP' and 'InnerOnlyIP' arguments to the 'ListType' option in the NTPL command 'IPMatchList'. Using the new arguments to 'ListType' enables matching 288 IPv4 addresses and 72 IPv6 addresses on either outer IP addresses or inner tunnel IP addresses.

#12591: SofLinkSpeed parameter has been added to ntservice.ini to support link speeds other than 1G when SOF timestamp mode is enabled.

#12421: Statistics can now be delivered every 100ms or every 500ms

#12024: This release provides a C language utility library named libntutil that contains software implementations of the hashing functionality used by Napatech adapters. Please refer to DN-0449 "Napatech Software Suite Reference Documentation" in the section named "Utility Library libntuil" for additional information.

#11971: Adds support for Linux kernel version 3.16 (64 bit)

#11764: HostBufferPollInterval values 50, 750 and 2000 removed as they were only used for debugging purposes and did return an error if used with a released driver.

#11668: The busID is not used anymore if there is only one adapter present.
Neither is it generated in the ini-file.

#11633: (Support-ID 11242) Ini-file parameters can now be overwritten from the command line,
Syntax:
./ntstart.sh -o SECTION.KEY=VALUE
Example:
./ntstart.sh -o adapter0.profile=capture -o discardsize=20 logging.logmask=0xff
The section can be omitted. Any adapter keys will the default to adapter 0.

#11538: The IPMatchList NTPL command has been optimized to consume approximately 1ms for simple IPMatchList expressions (no IP masks or IP ranges).

#11515: Added support for NT4E2-4-PTP FPGA image: 200-9226-50-04

#11310: For an adapter using the INLINE profile, an attempt to use the NTAPI to look up the RX/TX path delays returns the status code NOT_SUPPORTED even if the path delays are known. This restriction is no longer present, and it is possible to request the path delays for an adapter using the INLINE profile. Note that the driver returns NOT_SUPPORTED if the delays are unknown.

#11235: New feature added to give a better time synchronization performance overview. The feature is called Timesync Statistics and includes counter for signal loss, synchronization loss and calculated statistical numbers of the time synchronization performance. See DN-0428 for more detailed description.

Supported by following adapters and FPGAs:
NT20E2-PTP: 51.03
NT4E2-4-PTP: 51.03
NT40E2-1: 51.03
NT40E3-4-PTP:51.04
NT100E3-1-PTP: 51.16

#11030: A screen dump feature is added to the tools monitoring and profiling. By hitting the key 'F' a copy of the screen is saved to disk. The screen dump is appended to the saved screen dump. The names of the screen dump files are monitoring.scn and profiling.scn respectively.

#11007: The NTPL Setup command option MinHostBufferSize now ensures that the smallest HostBuffer which is larger than or equal to MinHostBufferSize is chosen.

#10899: An Info log has been added for each adapter that has PpsIn defined and where it should be used to do PPS time sync. The log is not written if the PpsIn are only used for sampling.
Info text: Adapter 0: PpsIn is defined for this adapter. Use an external PPS tool or application to start PPS time sync.

#10787: (Support-ID 10551) FPGA feature level can now be read using the API. It is a part of the NtInfoAdapter_v5_s structure and can be read using the info stream.

#10714: Added new command line option (-l, --logmsg) to ntlog tool to write a custom line of text to the ntservice log system.

#10687: Added the ability to filter on inner tunnel layer 3 and layer 4 though the NTPL Data filter. This feature requires matching FPGA feature set. See filter documentation for details.

#10684: Added the ability to slice packets within a tunnel though the NTPL assign command. This feature requires matching FPGA feature set. See filter documentation for details.

#10501: Wis mode can now be enabled pr port by using the wisModeMask parameter which has been added to ntservice,ini

#10400: If TxTiming=RELATIVE the max inter-frame gap is set to 2.6sec.

#10168: NTPORT4E now supported

#10109: (Support-ID 10105) The example program named info_example.c now retrieves and prints basic product (adapter) information, such as the serial number, based on information in the NtInfoProductInfo_s structure.

#10046: The execution of a timesync hard reset to a reference initiated by an application through the NTAPI interface, has changed to execute a hard reset (time jump) for which the execution is unaffected by the current time skew and the hard reset threshold value (i.e. immediately executed). In earlier versions the current time skew was compared to the hard reset threshold value to determine if the hard reset should occur or not.

#9962: Enable swapping of hashdata from tunnels when connecting to a SPAN port

#9937: Support for NTBPE removed.

#9880: Added driver support for the following legacy FPGA images:
NT20E2: 200-9220-44-10 and 200-9220-44-12
NT40E2-4: 200-9221-44-12 and 200-9221-44-13
NT40E2-1: 200-9222-44-06 and 200-9222-44-08

#9586: Alarms are now generated when the status of an external NT-TSU or NT-TSE looses the synchronization signal, synchronization or Time of Day information. The alarms are sent as events:
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_SYNC_SIGNAL
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_OUT_OF_SYNC
NT_EVENT_TIMESYNC_EXTERNAL_DEVICE_LOST_TIME_OF_DAY
This information is still logged as INFO in the ntlog.

#9494: There is a small delay from the time a frame enters a network port and until the adapter time-stamps it. An application can now query the driver for this RX path delay and subtract it from the time stamp in the packet descriptor. See DN-0449 section Path Delay for more information.

#9492: Added option "--installpath PATH" to ".run" files to change default installation folder.

#9491: Added option to run an ntpl.config file with ntstart.sh.

#9490: Deduplication supports padded frames and IP header masks of i.e. TTL and checksum fields. Moreover a dedup CRC can be forwarded to host application using extended descriptor 9 to support a hardware-accelerated deduplication application. This feature can be enable/disabled using the NTPL Deduplication options IPLengthLimit and IPv4/IPv6. This feature requires a matching FPGA version.

#9447: (Support-ID 8890) Added inline bump in the wire example to DN-0449

#9444: Doxygen documentation updated in NTPL data section

#9232: (Support-ID 9105) NT_NetFileGet() now automatically rewinds the file when NT_STATUS_END_OF_FILE is returned. This will allow NT_NetFileGet() to be called after NT_STATUS_END_OF_FILE and return to the start of the file.

#9147: The delay asymmetry configuration option is added to the PTP protocol.

#9088: TimeSyncFrequencyReferencePriority added to the ntservice.ini file

#9074: On the PTP port, statistics including CRC errors are displayed in the monitoring tool for debug purposes. All the information can be obtained using NTAPI

#9027: TX host buffers can now be prefilled with data and replayed continuously without needing to memcpy packets.

#8984: Support for NT20E enabled

#8760: Added NUMA node information to info stream.

#8604: NT_NetRxOpenMulti() has been added to the API to enable merging traffic from multiple stream-ids

#8500: PDV filter has been implemented in order to increase performance in non-PTP aware network

#8437: The installation now honors the TMPDIR environment setting during the installation to specify an alternative temporary directory.

#8369: Time jumps in OS timesync mode has been implemented.

TimeSyncTimeJumpThreshold = 0, enables smooth sliding
TimeSyncTimeJumpThreshold = <any integer value different from 0> enables time jumps with threshold of 1 sec. If offset is more than 1 sec, a hard time jump will occur.

The default setting is TimeSyncTimeJumpThreshold = 1. This is the default setting used in the ini file in this and previous releases. If you are running with the default ini file, time jumps are default enabled. In previous releases the setting of TimeSyncTimeJumpThreshold had no effect in OS timesync mode.

#8340: Added the ability to reuse the protocol filters to have more than 8 filters using a protocol

#8305: (Support-ID 7892) Enabled possibility to tweak the NT4E-INL and NT4E-STD-INL adapter Tx engine to transmit faster when running with the TrafficGen-profile. Add this to the inifile to achieve it:
[Debug]
nt4etxadjust=8

#8098: More explicit error output when AdapterType is mis-spelled or wrong

#8097: An explicit error entry will appear in the log if an adapter is not of the expected type

#8052: Stream-id based statistics are now available via the statistics stream and can be monitored using the monitoring tool. Stream-ids can be activated/deactivated using NTPL, to control the sync point when packets starts entering the stream-id host-buffers and when statistics should count them, see the streamidstatistics.c example.

#7975: It has been made possible to run will multiple tx streams addressing the same port when using the TrafficGen profile. The rule is that packets has be to sent with NT_NET_SET_PKT_TXNOW(1) otherwise the behavior is unpredictable.

#7931: A define NT_ERRBUF_SIZE added to indicate the maximum error length size that can be delivered by the driver. This define should be used when allocating a buffer for reading an error message.

#7928: npcap.ini added to the supportinfo archive.

#7894: Added support for per filter descriptor selection. The feature is available through the "Assign" command in NTPL. This feature requires matching FPGA.

#7823: Configuration parameter TimeSyncTimeOffset now has a limit of 1000000 ns (1 ms)

#7807: (Support-ID 7327) NTAPI NT_NetFile...() functions do not connect to NTservice anymore - and thus do not require NTservice to be running.
This change is to allow an user application to process captured files through the NTAPI NT_NetFile...() functions on systems that do not have NTservice running nor a Napatech adapter installed.

NTAPI functions affected by the change:

NT_NetFileOpen()
NT_NetFileGet()
NT_NetFileRelease()
NT_NetFileClose()

The example readcapfile (examples/net/readcapfile/readcapfile.c) demonstrates a possible use.

#7805: Alarms have been added to monitor when an external NTTSU or NTTSE connected through NT-TS timesync looses synchronization with it's time source. The possible alarms are:
NT-TS: External device lost synchronization signal
NT-TS: External device is out of synchronization
NT-TS: External device lost time of day information

#7792: Changing the hash seed is now possible in ntservice.ini using the HashSeed option. Changing the hash seed will effect the data distribution on the streams.

#7758: The info stream has been extended to contain information of:
SDRAM present and SDRAM size
PCI bus information
Adapter features - Bypass support.

#7732: It is now possible to synchronize the operating system's clock with (to) the clock of a designated adapter. The feature is enabled by setting the configuration parameter TimeSyncOsTimeReference in the System section. For instance to synchronize the server clock with adapter zero, specify TimeSyncOsTimeReference=adapter-0. It requires an FPGA with support for synchronization of OS time.

#7730: An event and a log will be generated when the adapter's time stamp clock is set by the system.

#7728: IEEE1588 support is implemented on NT4E2_PTP and NT20E2_PTP adapter. (dedicated RJ45)

#7719: The data filter hardware supports up to 255 values for each 1 byte filter, however the NTPL limits this to specifying 8 values or one range. This is changed to support up to 32 values or 16 ranges or a mix of the two. When using a range it will take up the space of 2 values. When specifying 8 ranges only 16 values can be used.

#7715: A new feature - host loopback - has been added to the port settings structure. Applying loopback to a port means that data transmitted from the host on the port is looped back to the same port. Since the loopback is applied inside the adapter, it will work independently of whether a NIM is actually present or not, and the link will always be reported as up.
If put in loopback mode, the monitoring tool will show the link state as "Loopback". The config tool can be used to apply loopback, and the diagnostics tool can be used to test loopback if using a new feature: single- port- loop.

#7703: Added support for swapping the source and destination IP address regardless of value before calculating hash value. This enables traffic to/from the entire subnets to be balanced between streams. See Hash Mode command documentation for more details. This feature requires a matching FPGA.

#7699: Added 2 and 5 tuple sorted and unsorted hash modes on IPv4 and IPv6 encapsulated IP traffic. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7694: Added 2 and 5 tuple hash (sorted and unsorted) modes on IPv4 and IPv6 traffic inside a GTPv1 tunnel. This works in combination with the IP fragmentation solution. This feature requires a matching FPGA.

#7603: Support for FPGA images:
- 200-9220-45-07 (NT20E2)
- 200-9221-45-09 (NT40E2-4)

#7433: The command to setup numanodes, "Setup[numanode=0]=streamid==x,y,z" can now contain up 32 streamids.

#7406: The driver now supports up to 8 adapters in one server.

#7397: (Support-ID 7435) Added support for filtering on decode error e.g "Assign[StreamId = 1] = DecodeError == TRUE" will redirect all packages with decode errors to stream 1.

#7392: (Support-ID 7333) Check for mismatching version of NTService and version of the low level driver has been added.

#7222: Check if IOMMU is enabled are added for kernels larger or equal to version 3.2. Driver fails if IOMMU is enabled.

#7169: Added support for Linux 3.x

#7167: Added support for the NT40E2_1 adapter.

#7141: (Support-ID 6797) The description of NT_NetRxGet timeout functionality in DN-0449 has been improved

#7065: The adapter will now be able to identify connected NT-TS synched adapters, NT-TSUs and NT-TSEs. The information can be seen through the API or using the monitoring tool.

#7062: Added support for Customer specific User data in the VPD.

#6781: This release adds a new configuration parameter OsTimeSyncFailover that can be set to DISABLE or ENABLE; the default value is DISABLE. When OsTimeSyncFailover is set to ENABLE and TimeSyncProtocol is set to NT for a given adapter, then the adapter automatically switches to OS Time synchronization if the incoming NT-TS signal fails, and when the NT time synchronization signal is restored, the adapter reverts to NT time synchronization.

#6780: This release adds support for OC-192c for the NT20E2 and NT40E2_4 adapters. A new configuration setting WisMode enables or disables WIS/OC-192c mode. The setting is set for an adapter, and the legal values are DISABLE and ENABLE. The default value is DISABLE, which disables WIS/OC-192c mode.

#6778: This release adds a new configuration parameter CancelTxOnCloseMask, which is a bitmask that enables cancellation of pending transmission segments for the ports designated by the mask: bit 0 = port 0, bit 1 = port 1, etc. Note that each bit represents an adapter local port, not a virtual (global) port across adapters. When a transmission stream is closed, and if the port bit is set for any of the affected ports, all pending data is cancelled and transmission of data stops immediately.

#6777: This release adds support for higher frequency time sampling. A new configuration parameter HighFrequencySampling can be set to DISABLE or ENABLE, and the default value is DISABLE. When high frequency sampling is enabled (HighFrequencySampling=ENABLE), the time is sampled every 20 microseconds.

#6776: This release includes support for a new FPGA feature "IPF", configurable via NTPL and observable via Statistics. Hardware assisted IP-Fragmentation support is a novel approach to accelerating reassembly by identifying which

feed receives fragments for a particular IP flow. This module is able to process both IPv4 and IPv6. See NTPL command "IPFMode" for information about how to use the module. See example demo "net/ipfdemo" for a working example.

#6718: The time it takes to initialize a NIM module in a PCI GEN2 adapter (NTxxE2) has been improved from about 4.6 seconds to about 0.8 seconds.

#6612: Inline profile documentation has been improved.

#6584: (Support-ID 6469) A new inifile parameter has been added to ntservice.ini. This parameter can only be used by the inline profile on NT adapters. The parameter, "HostBufferPollInterval" can take 4 values "Default | 100 | 250 | 500" and it will control how often ntservice will poll for host buffer data both ingress and egress. The higher a value the lower ntservice CPU utilization but the higher latency. The parameters comes handy in configurations where ntservice consume too much CPU and where latency is not so important.

#6500: Hardware accelerated PCAP packet descriptor is now supported. With this feature comes some restrictions. The TimestampFormat "PCAP" and "PCAP_NS" can only be configured with PacketDescriptor "PCAP". The NTAPI packet interface is not supported when using PCAP headers. To make use of this new feature use the NTAPI segment interface. Note: This feature is not supported on in-line adapters and entry level adapters.

#6494: The standard format of the Time string from an Endrun PPS device has been changed. Both the old and the new format are supported. No configuration is required.

#6458: (Support-ID 6424) The log can now be read in most cases after ntservice crashes, as the shared memory containing the log survives. If ntservice is restarted the log is deleted.
The ntservice binary and the ntservice.ini is now added to the supportinfo archive.

#6432: Added version number of the DN-0449 reference manual to the footer of all pages in the manual.

#6380: (Support-ID 6285) It is now possible to read raw NIM data like it has been possible in 2GD using the NimConfig tool.

#6361: Coordinated time-synchronized transmit has been implemented. More information can be found in the reference manual DN-449 and in the replayGS example.

#6239: Timestamp Inject mode has been added.
Two ini-file keys have been implemented to control the timestamp inject:
1. TimestampMethod = SOF | EOF: System parameter. Used both to control RX and TX.
2. TimestampInjectOffset = SOF | EOF: Adapter parameter.. Used to control TX.

#6143: Info stream extended with info to tell whether the adapter supports 64 bit time stamping or not. The information is found in the featureMask in the capabilities in the port settings port_v1 (Command NT_INFO_CMD_READ_PORT_V1).
Additionally, the transmitSegment example has been changed to support 64 bit timestamp. It is now possible to use tx rates as low as 1 Kilobit per second.

#6128: The profile tool documentation has been updated to explain where the host buffer is currently in use with regards to enqueued/dequeued in app/driver/adapter.

#6125: (Support-ID 6086) Added DN-0449 document as part of the documentation in the complete package.

#6116: (Support-ID 5742) NT_Init can now be called continuously until the service is ready. If the service is not ready the code NT_STATUS_TRYAGAIN is returned.
If any other code is returned an error has occured and it is not possible to continue.

#6103: Port disable implemented for the NT4E2-4T-BP, NT20E2 and NT40E2-4 adapters.
The ports can be disabled and enabled by using the config tool or they can be disabled at startup by setting a PortDisableMask in the ini-file.

#6096: SDRAMFillLevel event log now includes streamID and number of streams.

#5992: Auto generation of the ini-file.
If the ini-file does not exists or it is empty a new ini-file is auto generated. The auto generated ini-file will contain default values for all installed adapters.
In order to auto generate an ini-file for all adapters, the driver must be started and stopped with an empty or deleted ini-file. Afterwards the ini-file can be edited to fit costumer needs.

#5966: Logging to syslog has been changed to only logging errors, warnings, information and events.
This has been done as syslog has proven to be very time consuming. Logging to syslog with
all logs enabled can cause the communication between NTAPI and NTService to timeout
and thereby causing an application to fail.

#5919: Absolute TX timing mode has been added.
An adapter is either in relative or absolute timing mode. When in relative timing mode, an adapter transmits packets such that the inter-frame gap (IFG) between pairs of packets is correct. When in absolute timing mode, the adapter transmits packets at the time stipulated by the time stamp in the packet descriptor.

#5900: API log improved. The logs from the API now contains process ID and application name for each log message.

#5754: The profiling tool has been moved from the tools package to the driver package. Therefore it is important to install the driver package after the tools package, as the uninstall procedure will delete the old profiling tool.
The tool has been enhanced with two new pages - Streams and StreamIds that can be shown for the cursor selected entry in the main page (Host buffers).

#5624: A warning entry is now created in the log when the FPGA temperature reaches 90 degrees. Additionally, the adapter is configured to switch off its own power supply in case the FPGA temperature reaches 95 degrees.

#5613: The Diagnostics tool now makes traffic tests in both directions on each 2 port loops.

#5591: FilterInfo commands now also accepts 'All' as argument (FilterInfo = All). FilterInfo result is now split per adapter.

#5586: It is now possible to specify multiple txport's when assigning data to multiple streamId's (E.g. "Assign[StreamId=(0..3); TxPort=(4..7)] = All")

#5581: The DN-0449 (doxygen) section on Host Buffer Allowance (previously known as Hysteresis) has been extended with a general high level description on how Host Buffer Allowance works and how it should be configured.

#5540: ntservice.ini now has "PacketDescriptor=NT" as default since all adapters support this type.

#5482: The ini-file name is changed to "SDRAMFillLevelWarning".
SDRAM level empty 0% and SDRAM level full 100% triggers an event.
Valid level values are 1% to 100%. Using level value 0 disables the warning.

#5445: Sensor Limits for NT20E2: The diagnostic sensors (level1) do not use the high/low limit in the NtInfoSensor_s structure eventhough the high/low limit value is a part of the structure. The diagnostic sensors are virtual sensors and are only to inform about power usage.

#5443: SDRAM Fill level warning event is added. It is now possible to define up to 4 SDRAM fill levels in percent. If the fill level of the SDRAM raises above one of the fill levels defined a fill level warning event is triggered and if the fill level goes below one of the fill levels a fill level warning is also triggered. The SDRAM Fill level warning deprecate the "NT_NET_GET_STREAM_DATA_PENDING()" macro, hence it has been removed.

#5408: Sensors are now described in a seperate chapter in the doxygen documentation DN-0449.

#5377: A chapter describing logging and how it works is added to the doxygen documentation DN-0449.

#5308: A parameter for clearing the statistical information after read is added to the statistic stream. It will not clear the HW counters but will only clear statistics for the current stream.

#5058: The log message format is described in the logging chapter in the doxygen documentation DN-0449.

#5050: The size of the circular log buffer is described in the logging chapter in the doxygen documentation DN-0449.

#4938: A possibility for adding data and time to the log file name when logging to a file has been added.
If the file name contains a %s this will be expanded with the current data and time for when the service is started.
Example:
/tmp/test.log will not be expanded
/tmp/test_%s.log will be expanded to /tmp/test_11_10_28_11_23_21.log

The %s can be placed anywhere in the file name string.

#4693: All messages are written both to the internal log and to the syslog. How to read the syslog is different from system to system.
For debugging purposes it is also possible to start the ntservice in non deamon mode, by not using the ntstart.sh script, but calling ntservice directly . Then all messages will be printed to the screen.

#4636: Possibility to merge from 42 Host Buffers

#4516: The possibility to choose minimum host buffer size has been added. This feature is available through the NT_NetTxOpen function call for Tx host buffers and though NTPL for Rx host buffers. The smallest hostbuffer found that is larger or equal to requested host buffer size is used.

#4156: NTAPI changes from v1.0.0 to v1.1.0. The changes are made in the include files found under 'include/ntapi'.
They are:
* Functions have been prefixed with 'NT_'
* Structs have been prefixed with 'Nt'
* Unions have been prefixed with 'Nt'
* Typedefs have been prefixed with 'Nt'
* Enumeration types have been prefixed with 'Nt'
* Enumeration elements have been prefixes with 'NT_'
* Macro defines have been prefixed with 'NT_'

**Resolved issues**

#36403: Half duplex can not be manually configured for NT4E

#13105: (Support-ID 11627) FAN speed values can be wrong when server CPU load is high. In cases of high CPU load a percentage of the FAN speed measurements ought to be skipped.

#12274: Running a large number of NTPL commands could cause NtService to crash and become unresponsive.

#12144: (Support-ID 11627) The FAN speed sensor range is too wide. The FAN speed sensor range must be changed to 5270-7440.
FAN speed values can be wrong when server CPU load is high. In cases of high CPU load a percentage of the FAN speed measurements ought to be skipped.

#11992: Unfair round-robin algorithm when running with multiple TX host buffers.

#11581: Dead links for nested C structures/unions in Doxygen/WebHelp output.

#10530: ntservice may crash while shutting down when applications using the NTAPI are still running.

#9713: (Support-ID 9704) HBH crash on kernels with CONFIG_HZ_5000=y.

#9326: (Support-ID 9300) The driver issues a wrong error message if driver load fails due to insufficient contiguous DMA memory.

#8871: GEN2 adapters could potentially overwrite memory when ntservice is restarted.

#8699: Running with NT_NET_INTERFACE_SEGMENT while deleting/assigning filters could cause a deadlock

#8343: Combining 2 filters into 1 filter results in all packets being forwarded.

#7398: (Support-ID 7388) >>ERROR | SRV | 20411 - SPIv1[0:1500]: Opcode 0120 returned error 80. Is the opcode supported by this AVR version?
May appear if the driver is run on an adapter fitted with an AVR version prior to 1.1.

#7134: Linkspeeds other than 1 Gbps on all ports when running with SOF enabled can make adapter crash unexpectedly (NT4E).

#7001: The version of the NT-TSE or NT-TSU cannot be read from the driver. This does not affect the functionality, only visibility.

#6904: (Support-ID 6882) The shared memory files placed in /tmp are in risk of being deleted by a cleanup Cron job. When the files are deleted it is not possible to start any apps. Apps already running is not affected.

#6616: (Support-ID 6601) Packet forwarding fails with 4096MB host buffers.

#6107: NT20E2 fanspeed rpm calculation is based on a delta time calculation, which is vulnerable to external adjustments of system time such at ntpdate and ntp etc.

#6097: ProductInfo tool not correctly displaying factory FPGA image information on new adapters, but correctly displaying FPGA image information on adapters which have been user programmed by ImgCtrl.
This issue relates to a dedicated function in the driver, not exposed to the user application. Hence, only the ProcductInfo tool is impacted.

#5610: On NT4E-4 adapter with a copper SPF Finistar FCLF-8521-3, the link speed and duplex cannot be configured, before link has been detected once.

#5592: Link stays up on NT20E2 adapter when ntservice and driver is unloaded.

#4692: Hysteresis causes unnecessary packet drops.

#4675: NTPL parser does not return error when option -e is omitted.

#4670: Packet interface not performance optimized - only able to handle 20Mpps (64 bytes packets) on standard servers

#4669: Packet interface not able to handle line rate (20G) traffic for small packet sizes on standard servers.

#4632: RX packets do always have timestamps at start of frame and TX packets do always have timestamps at end of frame.

#4543: If NT_NetTxGet and NT_NetTxRelease are called from different threads, then NT_NetTxGet hangs.

#4188: A 32bit installation on a 64bit Linux system cannot run.

#4139: DN-0293 Napatech Software Suite, Migration Document is not included in the documentation package.

#3952: The maximum number of host buffers to assign to one stream is 5. This means that it is possible to merge from 5 NTxxx adapters or 5 ports on NTxxx_EL adapters. But in this release there is only check on a per assign command so it is possible to assign more host buffers to a stream if done in multiple assign commands. But it will still not work !

#3775: Messages for unsupported adapter is only shown if the debug log level is enabled in ntservice.ini file.

#3635: Driver cannot load on IOMMU enabled systems

#3473: Setting up duplicate filters with different stream IDs is not allowed, but does currrently not return an error. This can cause a crash in NTService when trying to retreive data using NT_NetRxGet.