

PRODUCT OVERVIEW

SmartNIC and IPU Hardware Portfolio

SOLUTIONS

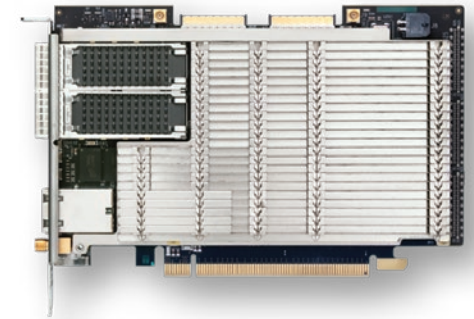
- Application and network performance monitoring
- Subscriber monitoring
- Capture to disk, replay from disk
- Latency measurements
- Cybersecurity threat detection
- Network test and measurement
- Cybersecurity threat prevention
- 5G User Plane Function (UPF) offload
- Full host CPU offload
- OpenStack Infrastructure-as-a-Service (IaaS)
- Bare metal cloud platform IaaS with tenant isolation

PLATFORMS

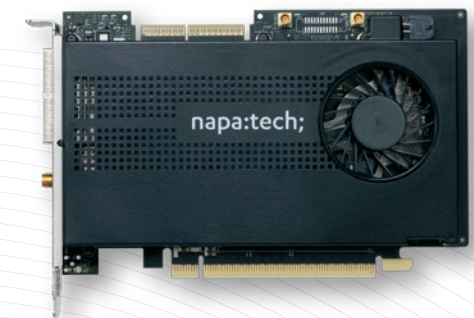
- Link-Capture™ Software
- Link-Inline™ Software
- Link-Virtualization™ Software
- Link-Storage™ Software
- Link-Security™ Software
- Link-Programmable™
- Smart Network Interface Cards (SmartNICs)
- Infrastructure Processing Units (IPUs)

SERVICES

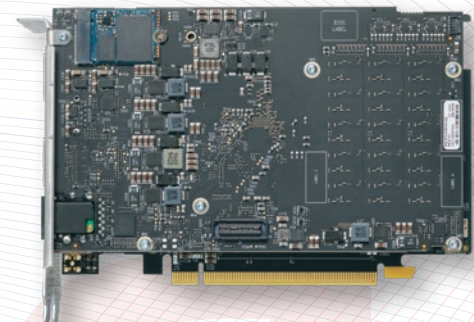
- Professional Services
- Custom Development



NT200A02-NEBS



NT400D11-SCC



F2070X IPU

SmartNIC and IPU Hardware

In a world of reconfigurable computing, it is the software that defines the use case functionality. However, the wrong choice of hardware can severely downgrade the overall value and reliability of the solution.

Napatech SmartNICs and Infrastructure Processing Units (IPU) are designed to meet the standards of modern servers, with the rapidly changing world of data center and hyperscale deployments in mind.

Industry-Leading Reliability

When selecting a hardware solution, reliability is of the utmost importance. Software can be patched if faulty, but hardware needs a physical replacement, which is costly and complex.

For all Napatech designs, performance and reliability are unconditional tenets. With ~300,000 hours of mean time between failures (MTBF), Napatech hardware ensures uninterrupted, error-free operation for many years ahead – as validated by our long-term loyal customer base.

Superior Thermal Design

The power of SmartNIC and IPU technologies is only of value if it can be harnessed – and that requires cooling. An efficient cooling solution allows you to fit more compute power into your rack space, which translates into substantial TCO benefits.

Napatech SmartNICs and IPUs are designed with active and passive cooling. The active solution provides 100% self-contained cooling with no requirements for a specific server airflow. This solution exhales most of the dissipated energy outside the server through front plate cutouts, which gives customers the freedom to choose server designs without worrying about cooling capacity.

To meet telco requirements, Napatech provides passively cooled solutions which are NEBS-compliant. A proprietary full body heatsink has been developed securing optimal cooling performance in the challenging NEBS applications for all critical components in the SmartNIC or IPU.

Hardware Resilience

Modern servers have quick-release PCI fastening mechanisms that allow for easy card replacement. Some of these designs, however, expose the card to vibration during transportation. Napatech SmartNICs and IPUs are designed specifically to ensure hardware resilience in this environment.

Standards of Excellence

Network appliances often require exceptions and compromises to fit a certain form factor or price point. In complex data center environments, it is therefore extremely beneficial if the hardware adheres to established industry standards, as this will make it easier for customers to integrate it in their solution.






As a certified PCI-SIG member, Napatech has completed the meticulous compliance test, which demonstrates high standards of excellence.

Typical Applications






Napatech offers a range of software options for the SmartNIC and IPU hardware, addressing use cases within:

- Cybersecurity
- Network quality of experience assurance
- Network & security forensics
- Application performance management
- Network test & measurement
- Cyber defense
- vSwitch acceleration
- Virtual network monitoring
- Storage offload
- Network security offload

SmartNIC and IPU Hardware Active Cooling Models

	NT40A1x-SCC	NT100A0x-SCC	NT200A0x-SCC	NT400D11-SCC	NT400D1x-SCC
					
General Hardware Specifications	SmartNIC	SmartNIC	SmartNIC	SmartNIC	SmartNIC
Height	Full	Full	Full	Full	Full
Length	Half	Half	Half	Half	3/4
Width	Single-Slot	Single-Slot	Single-Slot	Single-Slot	Single-Slot
FPGA technology	XCKU11P ^[1] XCKU15P ^[1]	XCVU5P ^[1] XCVU7P ^[1] XCVU9P ^[1]	XCVU5P ^[1] XCVU7P ^[1] XCVU9P ^[1]	AGF014	AGF019 ^[1] AGF022 ^[1] AGF023 ^[1] AGF027 ^[1]
- Embedded SoC					Quad-core Arm Cortex-A53 ^[1]
- Crypto					AES and SM4 ^[1]
System on Chip (SoC)					
SDRAM FPGA	DDR4 1x4 GB	DDR4 2x4 GB ^[1] 2x8 GB ^[1]	DDR4 3x4 GB ^[1] 3x8 GB ^[1]	DDR4 3x4 GB	DDR4 ECC 3x4 GB ^[1] 3x8 GB ^[1] 4x4 GB ^[1] 4x8 GB ^[1]
SDRAM SoC					
QSPI Flash memory	2x512 Mbit	2x512 Mbit	2x512 Mbit	2x1024 Mbit	2x1024 Mbit
M.2 NVMe x4 (2230/2242) expansion slot for SSD					
Host Interface	PCIe3 x 8	PCIe3 x16	PCIe3 x16	PCIe4 x16	PCIe4 x16
Network Ports and Link Speeds					
Network ports	4 x SFP+	4 x SFP28	2 x QSFP28	2 x QSFP56	2 x QSFP56
1G ^[2]	✓	✓	✓ ^[3]	✓ ^[3]	✓ ^[3]
10G ^[2]	✓	✓	✓ ^[3]	✓ ^[3]	✓ ^[3]
25G ^[2]		✓	✓ ^[3]	✓ ^[3]	✓ ^[3]
40G ^[2]			✓	✓	✓
50G ^[2]					✓ ^[4]
100G ^[2]			✓	✓	✓
200G ^[2]					✓
Management Port					
RJ45-F 1000BASE-T (on PCI bracket)					
Time Synchronization Ports ^[2]					
Tyco Mini female for RJ45-F/ SMA-F adapter (on PCI bracket)					
Internal MCX-F for PPS and NT-TS		2	2		2 ^[1]
RJ45-F 1000BASE-T IEEE1588 PTP (on PCI bracket)		1	1	1 ^[1]	1 ^[1]
SMA-F for PPS & 10Mhz (on PCI bracket)		1	1	1 ^[1]	2 ^[1]

SmartNIC and IPU Hardware Active Cooling Models

	NT40A1x-SCC	NT100A0x-SCC	NT200A0x-SCC	NT400D11-SCC	NT400D1x-SCC
					
Time Synchronization Support	SmartNIC	SmartNIC	SmartNIC	SmartNIC	SmartNIC
Stratum 3 compliant TCXO	✓ ^[1] ^[6]	✓ ^[6]	✓ ^[6]	✓ ^[6]	✓ ^[6]
Synchronous Ethernet (SyncE) over RJ45 port ^[2]			✓		✓ ^[1]
Synchronous Ethernet (SyncE) over network ports					✓ ^[1]
High-Speed Interconnect Port ^[2]					
Maximum bidirectional bandwidth	822 Gbps	900 Gbps	900 Gbps	900 Gbps	900 Gbps
Board Management					
MCTP over SMBus		✓	✓	✓	✓
PLDM for Monitor and Control		✓	✓	✓	✓
NCSI RBT				✓	✓
FPGA temperature	✓	✓	✓	✓	✓
Pluggable module temperature	✓	✓	✓	✓	✓
Ambient temperature	✓	✓	✓	✓	✓
Power sensors	✓	✓	✓	✓	✓
Fan	✓	✓	✓	✓	✓
Power and Cooling					
Cooling solution	Active	Active	Active	Active	Active
Max. power dissipation ^[5]	58 W	75 W	120 W	120 W	120 W
Airflow requirement	None	None	None	None	None
General Hardware Properties					
Operating temperature	0 °C to 45 °C (32 °F to 113 °F)				
Operating humidity	20% to 80%				
MTBF (hours)	317,821	317,821	317,821	497,216	497,216
Weight	355 g	355 g	355 g	340 g	TBD
Regulatory compliance (common)	PCI-SIG®, CE, CB, RoHS, REACH, cURus (UL), FCC, ICES, VCCI, RCM				
Regulatory compliance (product-specific)	KCC ^[7]	KCC	KCC	KCC ^[7]	KCC ^[7]

^[1] Mount option supported by HW

^[2] Features depend on software support, please refer to product briefs for Link Software

^[3] Breakout or QSFP28 to SFP28 adapter










^[4] Breakout

^[5] The power dissipation values indicate the capabilities of the hardware platform; the actual power consumption is dependent on the FPGA software payload. Refer to the Napatech product/feature data sheets for actual power consumption.







^[6] Stratum 3E compliant TCXO option supported by HW

^[7] Contact Napatech

SmartNIC and IPU Hardware Passive Cooling Models

	NT50B0x	NT40A1x-NEBS	NT100A0x-NEBS	NT200A0x-NEBS	NT400D11x-NEBS	NT400D1x-PC	N3070X	F207xX	F307xX
									
General Hardware Specifications	SmartNIC	SmartNIC	SmartNIC	SmartNIC	SmartNIC	SmartNIC	SmartNIC	IPU	IPU
Height	Half	Full	Full	Full	Full	Full	Full	Full	Full
Length	Half	Half	Half	Half	Half	Half	3/4	Half	3/4
Width	Single-Slot	Single-Slot	Single-Slot	Single-Slot	Single-Slot	Single-Slot	Single-Slot	Dual-Slot	Dual-Slot
FPGA technology	XCKU11P ^[1] XCKU15P ^[1]	XCKU11P ^[1] XCKU15P ^[1]	XCVU5P ^[1] XCVU7P ^[1] XCVU9P ^[1]	XCVU5P ^[1] XCVU7P ^[1] XCVU9P ^[1]	AGF014	AGF019 ^[1] AGF022 ^[1] AGF023 ^[1] AGF027 ^[1]	AGI022 ^[1] AGI027 ^[1] AGI041 ^[1]	AGF022 ^[1] AGF023 ^[1] AGF027 ^[1]	AGI022 ^[1] AGI027 ^[1] AGI041 ^[1]
- Embedded SoC						Quad-core Arm Cortex-A53 ^[1]	Quad-core Arm Cortex-A53 ^[1]	Quad-core Arm Cortex-A53 ^[1]	Quad-core Arm Cortex-A53 ^[1]
- Crypto						AES and SM4 ^[1]	AES and SM4 ^[1]	AES and SM4 ^[1]	AES and SM4 ^[1]
System on Chip (SoC)								Intel® Xeon® D-1700 Series ^[1] 8 – 10 cores	Intel® Xeon® D-99CMA3 32 cores
SDRAM FPGA	DDR4 2x5 GB ^[1] 2x10 GB ^[1]	DDR4 1x4 GB	DDR4 2x4 GB ^[1] 2x8 GB ^[1]	DDR4 3x4 GB ^[1] 3x8 GB ^[1]	DDR4 3x4 GB ^[1]	DDR4 ECC 3x4 GB ^[1] 3x8 GB ^[1] 4x4 GB ^[1] 4x8 GB ^[1]	DDR4 ECC 4x4 GB ^[1]	DDR4 ECC 4x4 GB ^[1] 3x4 + 1x8 GB ^[1]	DDR4 ECC 4x4 GB ^[1]
SDRAM SoC								DDR4 ECC 2x8 GB ^[1] 3x8 GB ^[1] 3x16 GB ^[1]	DDR5 ECC 2x12 GB
QSPI Flash memory	2x512 Mbit	2x512 Mbit	2x512 Mbit	2x512 Mbit	2x1024 Mbit	2x1024 Mbit	2x2048 Mbit	2x2048 Mbit	2x2048 Mbit
M.2 NVMe x4 (2230/2242) expansion slot for SSD								Up to 2 TB	Up to 2 TB
Host Interface	PCIe3 x16	PCIe3 x 8	PCIe3 x16	PCIe3 x16	PCIe4 x16	PCIe4 x16	PCIe5 x16	PCIe4 x16	PCIe5 x16
Network Ports and Link Speeds									
Network ports	2 x SFP28	4 x SFP+	4 x SFP28	2 x QSFP28	2 x QSFP56	2 x QSFP56	2 x QSFP-DD	2 x QSFP56	2 x QSFP-DD
1G ^[2]	✓	✓	✓	✓ ^[3]	✓ ^[3]	✓ ^[3]		✓ ^[3]	
10G ^[2]	✓	✓	✓	✓ ^[3]	✓ ^[3]	✓ ^[3]	✓ ^[3]	✓ ^[3]	✓ ^[3]
25G ^[2]	✓		✓	✓ ^[3]	✓ ^[3]	✓ ^[3]	✓ ^[3]	✓ ^[3]	✓ ^[3]
40G ^[2]				✓	✓	✓	✓	✓	✓
50G ^[2]						✓ ^[4]	✓ ^[4]	✓ ^[4]	✓ ^[4]
100G ^[2]				✓	✓	✓	✓	✓	✓
200G ^[2]						✓	✓	✓	✓
Management Port									
RJ45-F 1000BASE-T (on PCI bracket)								✓	✓
Time Synchronization Ports ^[2]									
Tyco Mini female for RJ45-F/ SMA-F adapter (on PCI bracket)									
Internal MCX-F for PPS and NT-TS									
RJ45-F 1000BASE-T IEEE1588 PTP (on PCI bracket)			2	2		2 ^[1]		2 ^[1]	
SMA-F for PPS & 10Mhz (on PCI bracket)	1 ^[1]		1	1	1 ^[1]	1 ^[1]		1 ^[1]	

SmartNIC and IPU Hardware Passive Cooling Models

SmartNIC and IPU Hardware Passive Cooling Models									
Time Synchronization Support	SmartNIC	SmartNIC	SmartNIC	SmartNIC	SmartNIC	SmartNIC	SmartNIC	IPU	IPU
Stratum 3 compliant TCXO	✓ ^[1] [6]	✓ ^[1] [6]	✓ [6]	✓ [6]	✓ [6]	✓ [6]	✓ [6]	✓ [6]	✓ [6]
Synchronous Ethernet (SyncE) over RJ45 port ^[2]				✓	✓ ^[1]	✓ ^[1]		✓ ^[1]	
Synchronous Ethernet (SyncE) over network ports					✓ ^[1]	✓ ^[1]			
High-Speed Interconnect Port ^[2]									
Maximum bidirectional bandwidth	900 Gbps	822 Gbps	900 Gbps	900 Gbps	900 Gbps	900 Gbps			
Board Management									
MCTP over SMBus			✓	✓	✓	✓	✓	✓	✓
PLDM for Monitor and Control			✓	✓	✓	✓	✓	✓	✓
NCSI RBT					✓	✓	✓	✓	✓
FPGA temperature	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pluggable module temperature	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ambient temperature	✓	✓	✓	✓	✓	✓	✓	✓	✓
Power sensors	✓	✓	✓	✓	✓	✓	✓	✓	✓
Power and Cooling									
Cooling solution	Passive	Passive	Passive	Passive	Passive	Passive	Passive	Passive	Passive
Max. power dissipation supported by platform ^[5]	55 W	58 W	75 W	120 W	120 W	120 W	150 W	250 W	375 W
Airflow requirement at max power dissipation	>= 3.5 m/s	>= 2.5 m/s	>= 2.5 m/s	>= 2.5 m/s	>= 3.5 m/s	>= 3.5 m/s	>= 4.0 m/s	>= 2.5 m/s	>= 4.0 m/s
General Hardware Properties									
Operating temperature	−5 °C to 55 °C (23 °F to 131 °F)					−5 °C to 45 °C (23 °F to 113 °F)			
Operating humidity	5% to 85%								
MTBF (hours)	991,182	398,565	398,565	398,565	593,730	593,730	TBD	286,313	TBD
Weight	204 g	317 g	350 g	350 g	340 g	340 g	TBD	682 g	953 g
Regulatory compliance (common)	PCI-SIG®, CE, CB, RoHS, REACH, cURus (UL), FCC, ICES, VCCI, RCM								
Regulatory compliance (product-specific)	NEBS, KCC ^[7]	NEBS, KCC ^[7]	NEBS, KCC ^[7]	NEBS, KCC ^[7]	NEBS, KCC ^[7]	KCC ^[7]	KCC	KCC	KCC

^[1] Mount option supported by HW

^[2] Features depend on software support, please refer to product briefs for Link Software

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^[6] Stratum 3E compliant TCXO option supported by HW

^[7] Contact Napatech



Napatech is the leading supplier of Smart Network Interface Card (SmartNIC) and Infrastructure Processing Unit (IPU) solutions used in cloud, enterprise, and telecom datacenters.

Through commercial-grade software suites integrated with high-performance hardware, Napatech accelerates network infrastructure and security workloads to deliver best-in-class system-level performance while maximizing the availability of server compute resources for applications and services.

Additional information is available at:
www.napatech.com

NAPATECH SMARTNIC + IPU SOLUTIONS

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