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SMARTNIC+IPU SOLUTIONS

PRODUCT OVERVIEW

SmartNIC and IPU Hardware Portfolio

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SMARTNIC+IPU SOLUTIONS

SOLUTIONS

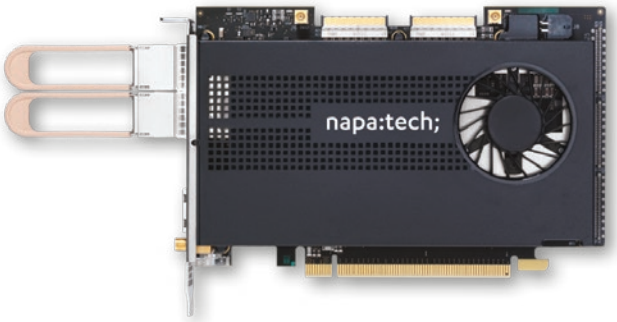
Application and network performance monitoring
Subscriber monitoring
Capture to disk, replay from disk
Latency measurments
Cybersecurity threat detection
Network test and measurement
Cybersecurity threat prevention
5G User Plane Function (UPF) offlload
Full host CPU offload
OpenStack Infrastructure-as-a-Service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

PLATFORMS

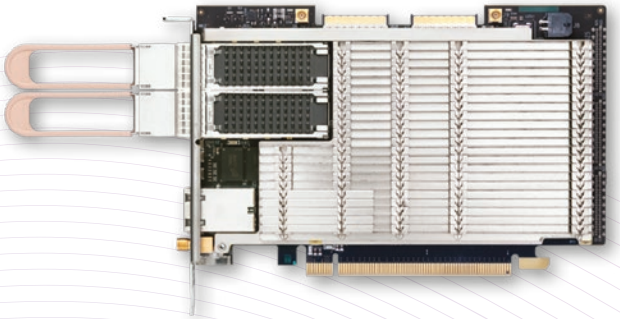
Link-Capture™ Software
Link-Inline™ Software
Link-Virtualization™ Software
Link-Storage™ Software
Link-Security™ Software
Link-Programmable™
Smart Network Interface Cards (SmartNICs)
Infrastructure Processing Units (IPUs)

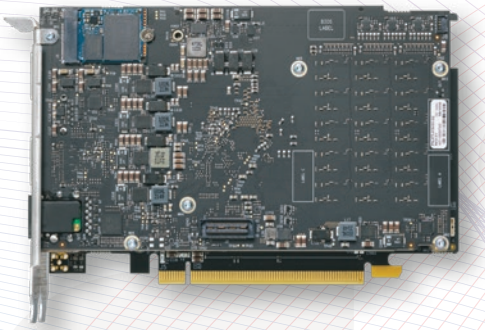
SERVICES

Professional Services
Custom Development



NT200A02-SCC


NT200A02-NEBS


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), our 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, the passively cooled solutions 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 our 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 Hardware for COTS Servers

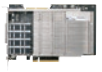
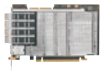
	NT20E3-2-SCC	NT40E3-4/ NT40A01-SCC	NT50B0x	NT40A1x-SCC	NT100A0x-SCC	NT200A0x-SCC	NT400D1x-SCC	F207?X
								
General Hardware Specifications	**SmartNIC**	**SmartNIC**	**SmartNIC**	**SmartNIC**	**SmartNIC**	**SmartNIC**	**SmartNIC**	**IPU**
Height	Full	Full	Half	Full	Full	Full	Full	Full
Length	Half	Half	Half	Half	Half	Half	Half	Half
Width	Single-Slot	Single-Slot	Single-Slot	Single-Slot	Single-Slot	Single-Slot	Single-Slot	Dual-Slot
FPGA technology	XC7VX330T	XC7VX330T	XCKU11P [1] XCKU15P [1]	XCKU11P [1] XCKU15P [1]	XCVU5P [1] XCVU7P [1] XCVU9P [1]	XCVU5P [1] XCVU7P [1] XCVU9P [1]	AGF014 [1] AGF019 [1] AGF022 [1] AGF023 [1] AGF027 [1]	AGF022 [1] AGF023 [1] AGF027 [1]
- Embedded SoC							Quad-core Arm Cortex-A53 [1]	Quad-core Arm Cortex-A53 [1]
- Crypto								AES and SM4 [1]
System on Chip (SoC)								Intel® Xeon® D-1700 Series [1]
SDRAM FPGA	DDR3	DDR3	DDR4	DDR4	DDR4	DDR4	DDR4 ECC	DDR4 ECC
- Density	1x4 GB	1x4 GB	2x5 GB [1] 2x10 GB [1]	1x4 GB	2x4 GB [1] 2x8 GB [1]	3x4 GB [1] 3x8 GB [1]	3x4 GB [1] 3x8 GB [1] 4x4 GB [1]	4x4 GB [1] 3x4 + 1x8 GB [1]
- Bandwidth (Number of memory controllers)	120 Gbps	120 Gbps	427 Gbps	154 Gbps	341 Gbps	512 Gbps	512 Gbps (3x) [1] 683 Gbps (4x) [1]	341 Gbps 512 Gbps
SDRAM SoC								DDR4 ECC
- Density								2x8 GB [1] 3x8 GB [1] 3x16 GB [1]
QSPI Flash memory	2×128 Mbit	2×128 Mbit	2×512 Mbit	2×512 Mbit	2×512 Mbit	2×512 Mbit	2×1024 Mbit	2×2048 Mbit
M.2 NVMe x4 (2230/2242) expansion slot for SSD								Up to 2 TB
Host Interface	PCIe3 x8	PCIe3 x8	PCIe3 x16	PCIe3 x 8	PCIe3 x16	PCIe3 x16	PCIe4 x16	PCIe4 x16
Network Ports and Link Speeds								
Network ports	2 × SFP+	4 × SFP+	2 × SFP28	4 × SFP+	4 × SFP28	2 × QSFP28	2 × QSFP56	2 × QSFP56
1G [2]	√	√	√	√	√	√ [3]	√ [3]	√ [3]
10G [2]	√	√ [7]	√	√	√	√ [3]	√ [3]	√ [3]
25G [2]			√		√	√ [3]	√ [3]	√ [3]
40G [2]						√	√	√
50G [2]						√ [4]	√ [4]	√ [4]
100G [2]						√	√	√
200G [2]							√	√
Management Port								
RJ45-F 1000BASE-T (on PCI bracket)	√	√						1
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	2	2 [1]	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]	1 [1]

SmartNIC Hardware for COTS Servers

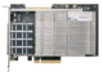
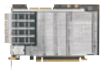
	NT20E3-2-SCC	NT40E3-4/ NT40A01-SCC	NT50B0x	NT40A1x-SCC	NT100A0x-SCC	NT200A0x-SCC	NT400D1x-SCC	F207?X
								
	SmartNIC	**SmartNIC**	**SmartNIC**	**SmartNIC**	**SmartNIC**	**SmartNIC**	**SmartNIC**	**IPU**
Time Synchronization Support								
Stratum 3 compliant TCXO	√ [6]	√ [6]	√ [1] [6]	√ [1] [6]	√ [6]	√ [6]	√ [6]	√ [6]
Synchronous Ethernet (SyncE) over RJ45 port [2]	√	√				√	√ [1]	√ [1]
Synchronous Ethernet (SyncE) over network ports							√ [1]	
High-Speed Interconnect Port [2]								
Maximum bidirectional bandwidth	180 Gbps	180 Gbps	900 Gbps	822 Gbps	900 Gbps	900 Gbps	TBD	
Board Management								
MCTP over SMBus					√	√	√	√
MCTP over PCIe VDM					√ [2]	√ [2]	√ [2]	√
PLDM for Monitor and Control					√	√	√	√
NCSI RBT							√	√
FPGA temperature	√	√	√	√	√	√	√	√
Pluggable module temperature	√	√	√	√	√	√	√	√
Ambient temperature	√	√	√	√	√	√	√	√
Power sensors	√	√	√	√	√	√	√	√
Fan	√	√		√	√	√	√	
Power and Cooling								
Cooling solution	Active	Active	Passive	Active	Active	Active	Active	Passive
Max. power dissipation [5]	45 W	45 W	55 W	58 W	75 W	120 W	TBD W	250 W
Idle power dissipation [5]	10 W	10 W	10 W	10 W	15 W	15 W	TBD W	TBD
Airflow requirement	None	None	>= 2.5 m/s	None	None	None	None	>= 2.5 m/s
General Hardware Properties								
Operating temperature	0 °C to 45 °C (32 °F to 113 °F)							-5 °C to 45 °C (23 °F to 113 °F)
Operating humidity	20% to 80%							
MTBF (hours)	297,993	297,993	991,182	317,821	317,821	317,821	-	TBD
Weight	260 g	260 g	350 g	355 g	355 g	355 g	-	TBD
Regulatory compliance (common)	PCI-SIG®, CE, CB, RoHS, REACH, cURus (UL), FCC, ICES, VCCI, RCM							PCI-SIG®, CE, CB, RoHS, REACH, cURus (UL), FCC, ICES, VCCI, RCM
Regulatory compliance (product-specific)	KCC	KCC	KCC [8]	KCC [8]	KCC	KCC	KCC [8]	KCC [8]

[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.
[6] Stratum 3E compliant TCXO option supported by HW
[7] NT40E3-4 only
[8] Contact Napatech

SmartNIC and IPU Hardware NEBS-Compliant

	NT20E3-2-NEBS	NT40E3-4/ NT40A01-NEBS	NT50B0x	NT40A1x- NEBS	NT100A0x- NEBS	NT200A0x- NEBS	NT400D1x- NEBS	F207?X
								
General Hardware Specifications	**SmartNIC**	**SmartNIC**	**SmartNIC**	**SmartNIC**	**SmartNIC**	**SmartNIC**	**SmartNIC**	**IPU**
Height	Full	Full	Half	Full	Full	Full	Full	Full
Length	Half	Half	Half	Half	Half	Half	Half	Half
Width	Single-Slot	Single-Slot	Single-Slot	Single-Slot	Single-Slot	Single-Slot	Single-Slot	Dual-Slot
FPGA technology	XC7VX330T	XC7VX330T	XCKU11P [1] XCKU15P [1]	XCKU11P [1] XCKU15P [1]	XCVU5P [1] XCVU7P [1] XCVU9P [1]	XCVU5P [1] XCVU7P [1] XCVU9P [1]	AGF014 [1] AGF019 [1] AGF022 [1] AGF023 [1] AGF027 [1]	AGF022 [1] AGF023 [1] AGF027 [1]
- Embedded SoC							Quad-core Arm Cortex-A53	Quad-core Arm Cortex-A53 [1]
- Crypto								AES and SM4 [1]
System on Chip (SoC)								Intel® Xeon® D-1700 Series [1]
SDRAM FPGA	DDR3	DDR3	DDR4	DDR4	DDR4	DDR4	DDR4 ECC	DDR4 ECC
- Density	1x4 GB	1x4 GB	2x5 GB [1] 2x10 GB [1]	1x4 GB	2x4 GB [1] 2x8 GB [1]	3x4 GB [1] 3x8 GB [1]	3x4 GB [1] 3x8 GB [1] 4x4 GB [1]	4x4 GB [1] 3x4 + 1x8 GB [1]
- Bandwidth (Number of memory controllers)	120 Gbps	120 Gbps	427 Gbps	154 Gbps	341 Gbps	512 Gbps	512 Gbps (3x) [1] 683 Gbps (4x) [1]	341 Gbps 512 Gbps
QSPI Flash memory	2×128 Mbit	2×128 Mbit	2×512 Mbit	2×512 Mbit	2×512 Mbit	2×512 Mbit	2×1024 Mbit	2×2048 Mbit
M.2 NVMe x4 (2230/2242) expansion slot for SSD								Up to 2 TB
Host Interface	PCIe3 x8	PCIe3 x8	PCIe3 x16	PCIe3 x 8	PCIe3 x16	PCIe3 x16	PCIe4 x16	PCIe4 x16
Network Ports and Link Speeds								
Network ports	2 × SFP+	4 × SFP+	2 × SFP28	4 × SFP+	4 × SFP28	2 × QSFP28	2 × QSFP56	2 × QSFP56
1G [2]	√	√	√	√	√	√ [3]	√ [3]	√ [3]
10G [2]	√	√ [7]	√	√	√	√ [3]	√ [3]	√ [3]
25G [2]			√		√	√ [3]	√ [3]	√ [3]
40G [2]						√	√	√
50G [2]						√ [4]	√ [4]	√ [4]
100G [2]						√	√	√
200G [2]							√	√
Management Port								
RJ45-F 1000BASE-T (on PCI bracket)	√	√						1
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	2	2 [1]	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]	1 [1]
Time Synchronization Support								
Stratum 3 compliant TCXO	√ [6]	√ [6]	√ [1] [6]	√ [1] [6]	√ [6]	√ [6]	√ [6]	√ [6]
Synchronous Ethernet (SyncE) over RJ45 port [2]	√	√				√	√ [1]	√ [1]
Synchronous Ethernet (SyncE) over network ports							√ [1]	

SmartNIC and IPU Hardware NEBS-Compliant

	NT20E3-2-NEBS	NT40E3-4/ NT40A01-NEBS	NT50B0x	NT40A1x-NEBS	NT100A0x- NEBS	NT200A0x-NEBS	NT400D1x-NEBS	F207?X
								
	SmartNIC	**SmartNIC**	**SmartNIC**	**SmartNIC**	**SmartNIC**	**SmartNIC**	**SmartNIC**	**IPU**
High-Speed Interconnect Port [2]								
Maximum bidirectional bandwidth	180 Gbps	180 Gbps	900 Gbps	822 Gbps	900 Gbps	900 Gbps	TBD	
Board Management								
MCTP over SMBus					√	√	√	√
MCTP over PCIe VDM					√ [2]	√ [2]	√ [2]	√
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
Max. power dissipation [5]	45 W	45 W	55 W	58 W	75 W	120 W	TBD W	250 W
Idle power dissipation [5]	10 W	10 W	10 W	10 W	15 W	15 W	TBD W	TBD
Airflow requirement	>= 2.5 m/s	>= 2.5 m/s	>= 3.5 m/s	>= 2.5 m/s	>= 2.5 m/s	>= 2.5 m/s	>= 2.5 m/s	>= 2.5 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)	367,807	367,807	991,182	398,565	398,565	398,565	TBD	TBD
Weight	285 g	285 g	350 g	350 g	350 g	350 g	TBD	TBD
Regulatory compliance (common)	PCI-SIG®, NEBS level 3, CE, CB, RoHS, REACH, cURus (UL), FCC, ICES, VCCI, RCM							
Regulatory compliance (product-specific)	KCC [8]	KCC [8]	KCC [8]	KCC [8]	KCC [8]	KCC [8]	KCC [8]	KCC [8]

[1] Mount option supported by HW
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[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
[6] Stratum 3E compliant TCXO option supported by HW
[7] NT40E3-4 only
[8] Contact Napatech

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SMARTNIC+IPU SOLUTIONS

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

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