napa:tech;
RECONFIGURABLE COMPUTING

PRODUCT OVERVIEW

FPGA-based SmartNIC Hardware Portfolio

napa:tech;
RECONFIGURABLE COMPUTING

SOLUTIONS

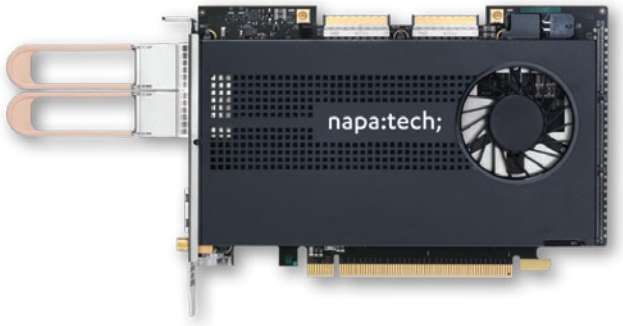
Application and network performance monitoring
Subscriber monitoring
Capture to disk, replay from disk
Latency measurments
Cybersecurity threat detection
Network test and measurement
Cybersecurity threat prevention
5G User Plane Function (UPF) offlload
Full host CPU offload
OpenStack Infrastructure-as-a-Service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

PLATFORMS

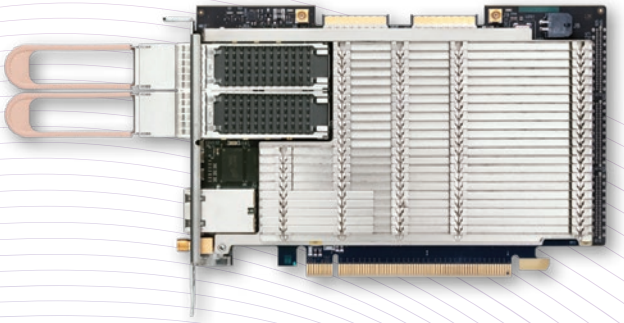
Link-Capture™ Software
Link-Inline™ Software
Link-Virtualization™ Software
Link-Programmable™
SmartNICs

SERVICES

Professional Services
Custom Development



NT200A02-SCC



NT200A02-NEBS

FPGA-based SmartNIC 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 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 FPGA technology 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 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.

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 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.

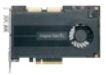
Typical Applications
Napatech offers a range of FPGA software options for the SmartNIC hardware, addressing use cases within:

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

SmartNIC Hardware for COTS Servers

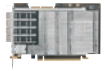
	NT20E3-2-SCC	NT40E3-4/ NT40A01-SCC	NT50B0x	NT40A1x-SCC	NT100A0x-SCC	NT200A0x-SCC	NT400D1x-SCC
							
General Hardware Specifications							
Height	Full	Full	Half	Full	Full	Full	Full
Length	Half	Half	Half	Half	Half	Half	Half
FPGA technology	XC7VX330T	XC7VX330T	XCKU11P [1] XCKU15P [1]	XCKU11P [1] XCKU15P [1]	XCVU5P [1] XCVU7P [1] XCVU9P [1]	XCVU5P [1] XCVU7P [1] XCVU9P [1]	AGF014 [1] AGF019 [1] AGF022 [1] AGF023 [1] AGF027 [1]
- Embedded SoC							Quad-core Arm Cortex-A53 [1]
SoC							
SDRAM FPGA	DDR3	DDR3	DDR4	DDR4	DDR4	DDR4	DDR4 ECC
- Density (Number of memory controllers)	4 GB (1)	4 GB (1)	10 GB (2) [1] 20 GB (2) [1]	4 GB (1)	8 GB (2) [1] 16 GB (2) [1]	12 GB (3) [1] 24 GB (3) [1]	12 GB (3) [1] 24 GB (3) [1] 16 GB(4) [1] 32 GB (4) [1]
- Bandwidth (Number of memory controllers)	120 Gbps (1)	120 Gbps (1)	427 Gbps (2)	154 Gbps (1)	341 Gbps (2)	512 Gbps (3)	512 Gbps (3) [1] 683 Gbps (4) [1]
SDRAM SoC							
- Density							
QSPI Flash memory	2 × 128 Mbit	2 × 128 Mbit	2 × 512 Mbit	2 × 512 Mbit	2 × 512 Mbit	2 × 512 Mbit	2 × 1024 Mbit
Host Interface	PCIe3 x8	PCIe3 x8	PCIe3 x16	PCIe3 x 8	PCIe3 x16	PCIe3 x16	PCIe4 x16
Network Ports and Link Speeds							
Network ports	2 × SFP+	4 × SFP+	2 × SFP28	4 × SFP+	4 × SFP28	2 × QSFP28	2 × QSFP56
1G [2]	√	√	√	√	√	√ [3]	√ [3]
10G [2]	√	√ [7]	√	√	√	√ [3]	√ [3]
25G [2]			√		√	√ [3]	√ [3]
40G [2]						√	√
50G [2]						√ [4]	√ [4]
100G [2]						√	√
200G [2]							√
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]
RJ45-F Management port and IEEE1588 PTP (on PCI bracket)					1	1	1 [1]
SMA-F for PPS & 10Mhz (on PCI bracket)			1 [1]		1	1	2 [1]

SmartNIC Hardware for COTS Servers

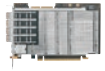
	NT20E3-2-SCC	NT40E3-4/ NT40A01-SCC	NT50B0x	NT40A1x-SCC	NT100A0x-SCC	NT200A0x-SCC	NT400D1x-SCC
							
Time Synchronization Support							
Stratum 3 compliant TCXO	√ [6]	√ [6]	√ [1] [6]	√ [1] [6]	√ [6]	√ [6]	√ [6]
Synchronous Ethernet (SyncE) over RJ45 port [2]	√	√				√	√ [1]
Synchronous Ethernet (SyncE) over network ports							√ [1]
High-Speed Interconnect Port [2]							
Maximum bidirectional bandwidth	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
Max. power dissipation [5]	45 W	45 W	55 W	58 W	75 W	120 W	TBD W
Idle power dissipation [5]	10 W	10 W	10 W	10 W	15 W	15 W	TBD W
Airflow requirement	None	None	>= 2.5 m/s	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)	297,993	297,993	991,182	317,821	317,821	317,821	-
Weight	260 g	260 g	350 g	355 g	355 g	355 g	-
Regulatory compliance (common)	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]

[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 Hardware
NEBS-Compliant

	NT20E3-2-NEBS	NT40E3-4/ NT40A01-NEBS	NT50B0x	NT40A1x-NEBS	NT100A0x-NEBS	NT200A0x-NEBS	NT400D1x-NEBS
							
General Hardware Specifications							
Height	Full	Full	Half	Full	Full	Full	Full
Length	Half	Half	Half	Half	Half	Half	Half
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]
- Embedded SoC							Quad-core Arm Cortex-A53
SDRAM FPGA	DDR3	DDR3	DDR4	DDR4	DDR4	DDR4	DDR4
- Density (Number of memory controllers)	4 GB (1)	4 GB (1)	10 GB (2) [1] 20 GB (2) [1]	4 GB (1)	8 GB (2) [1] 16 GB (2) [1]	12 GB (3) [1] 24 GB (3) [1]	12 GB (3) [1] 24 GB (3) [1] 16 GB(4) [1] 32 GB (4) [1]
- Bandwidth (Number of memory controllers)	120 Gbps (1)	120 Gbps (1)	427 Gbps (2)	154 Gbps (1)	341 Gbps (2)	512 Gbps (3)	512 Gbps (3) [1] 683 Gbps (4) [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
Host Interface	PCIe3 x8	PCIe3 x8	PCIe3 x16	PCIe3 x 8	PCIe3 x16	PCIe3 x16	PCIe4 x16
Network Ports and Link Speeds							
Network ports	2 × SFP+	4 × SFP+	2 × SFP28	4 × SFP+	4 × SFP28	2 × QSFP28	2 × QSFP56
1G [2]	√	√	√	√	√	√ [3]	√ [3]
10G [2]	√	√ [7]	√	√	√	√ [3]	√ [3]
25G [2]			√		√	√ [3]	√ [3]
40G [2]						√	√
50G [2]						√ [4]	√ [4]
100G [2]						√	√
200G [2]							√
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]
RJ45-F Management port and IEEE1588 PTP (on PCI bracket)					1	1	1 [1]
SMA-F for PPS & 10Mhz (on PCI bracket)			1 [1]		1	1	2 [1]
Time Synchronization Support							
Stratum 3 compliant TCXO	√ [6]	√ [6]	√ [1] [6]	√ [1] [6]	√ [6]	√ [6]	√ [6]
Synchronous Ethernet (SyncE) over RJ45 port [2]	√	√				√	√ [1]
Synchronous Ethernet (SyncE) over network ports							√ [1]

SmartNIC Hardware
NEBS-Compliant

	NT20E3-2-NEBS	NT40E3-4/ NT40A01-NEBS	NT50B0x	NT40A1x-NEBS	NT100A0x-NEBS	NT200A0x-NEBS	NT400D1x-NEBS
							
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
Max. power dissipation [5]	45 W	45 W	55 W	58 W	75 W	120 W	TBD W
Idle power dissipation [5]	10 W	10 W	10 W	10 W	15 W	15 W	TBD W
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
General Hardware Properties							
Operating temperature	–5 °C to 55 °C (23 °F to 131 °F)						
Operating humidity	5% to 85%						
MTBF (hours)	367,807	367,807	991,182	398,565	398,565	398,565	TBD
Weight	285 g	285 g	350 g	350 g	350 g	350 g	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]

[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

napa:tech;
RECONFIGURABLE COMPUTING

Napatech is the leading supplier of programmable FPGA-based SmartNIC solutions used in telecom, cloud, enterprise, cybersecurity and financial applications worldwide.

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

Additional information is available at:
www.napatech.com

NAPATECH RECONFIGURABLE COMPUTING

EUROPE, MIDDLE EAST AND AFRICA
Napatech A/S
Copenhagen, Denmark

Tel. +45 45 96 15 00
info@napatech.com
www.napatech.com

NORTH AMERICA
Napatech Inc.
Portsmouth, New Hampshire, USA

Tel. +1 888 318 8288
info@napatech.com
www.napatech.com

APAC
ntapacsales@napatech.com
www.napatech.com

DN-0251 Rev 50