NAPATECH SMARTNIC SOLUTIONS FOR HIGH-PERFORMANCE NETWORKING APPLICATIONS

OVERVIEW

For cloud service providers, telecom operators, and enterprise data centers, efficient infrastructure utilization is key to maximizing overall ROI and energy efficiency. In virtualized environments as well as appliances, precious CPU cycles are consumed on infrastructure management tasks instead of running business-critical applications and revenue generating services.

Napatech's integrated SmartNIC solutions combine high-performance AMD Xilinx FPGA-based SmartNICs with commercial-grade software to offload virtualization, networking and security functions from server CPUs. The result is optimized server utilization, improved overall performance and reduced CAPEX and OPEX.

Napatech's solutions deliver a genuine "IT" experience, where an end-user can install a card, load a driver and achieve seamless acceleration without custom programming at the application- or FPGA- level. The platform also allows OEMs and end users to develop custom solutions and FPGA IP.

HIGHLIGHTS

Hardware Acceleration at Up to 200Gb/s Performance

- Accelerated offload at up to 200Gb/s network speed without packet loss
- Accelerates workloads concurrently (e.g., OVS + VLAN + Traffic Mirroring)

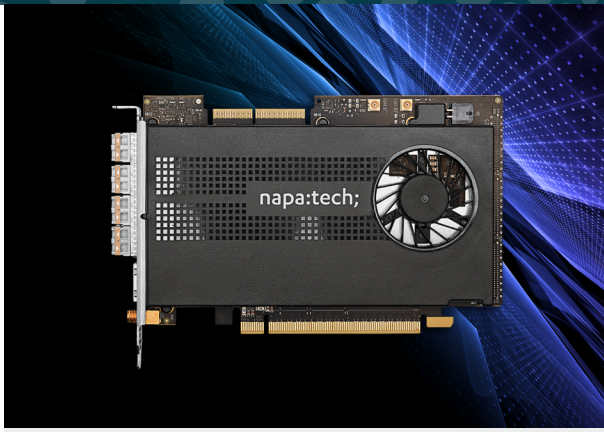
Flexibility to Support a Breadth of Workloads and Use Cases

- Diverse use cases for virtualization, networking and security
- Upgradeable to new features, protocols and offloads for future use cases

Commercial Grade Software Stacks to Accelerate Time-to-Market

- Software stacks for capture, virtualized, inline and custom applications
- Broad support for open-source and third-party software packages

Over 80% CAPEX and OPEX Reduction†



KEY APPLICATIONS

DATA CENTER INFRASTRUCTURE

- Virtual Switch
- Telemetry

NETWORK INFRASTRUCTURE

- Load Balancer
- Packet Broker
- Intelligent Gateways

NETWORK MONITORING

- Passive Capture
- Packet Analysis

CYBERSECURITY

- Intrusion Detection Systems (IDS)
- Intrusion Prevention Systems (IPS)
- Virtual Firewall

MOBILE INFRASTRUCTURE

- Packet Core
- Signaling Gateways
- Lawful Interception

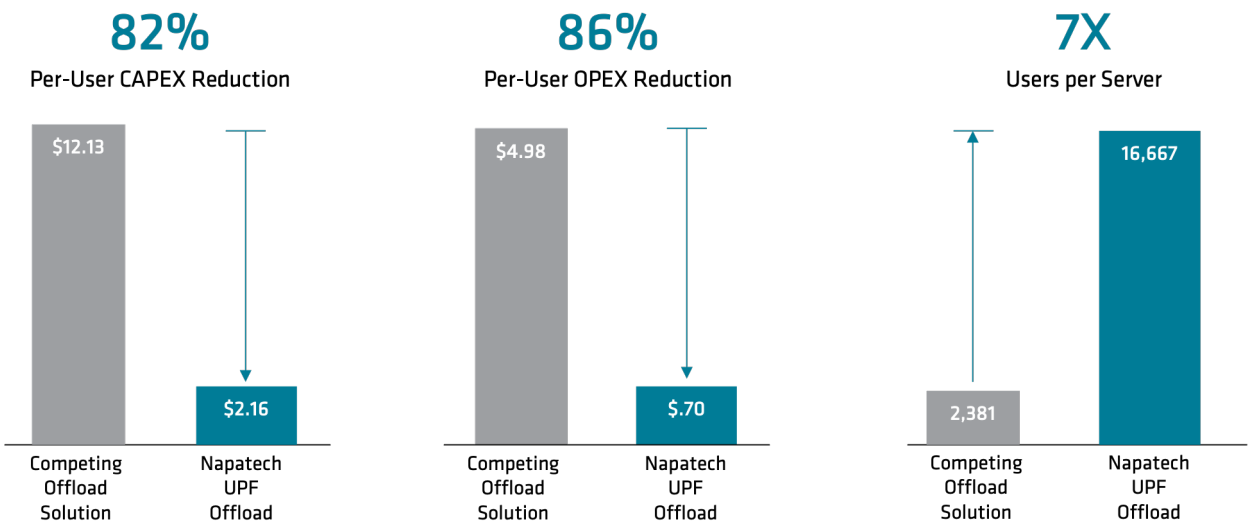
FINTECH

- High Frequency Trading
- Stock Market Simulation

HARDWARE ACCELERATION FOR OVER 80% CAPEX AND OPEX REDUCTION

Napatech's integrated solutions combine high-performance AMD Xilinx FPGA-based SmartNICs with commercial-grade software to offload CPUs from infrastructure tasks and thereby minimize CAPEX and OPEX.

For example, as communications service providers (CSPs) and enterprises scale their deployment of 5G networks, two key metrics that influence the profitability of their core infrastructure are the cost per user and the number of users that can be supported per server. In a pure software implementation, host CPU cycles are dominated by packet processing functions associated with connecting user and device traffic from the Radio Access Network (RAN) to the Data Network (DN). These include functions such as packet inspection, packet routing, packet forwarding, and QoS handling. Napatech's User Plane Function (UPF) offload solution frees up CPU resources to achieve up to 82% reduction in per-user CAPEX and 86% reduction in per-user OPEX, and enables 7X more users per server†, compared to an ASIC-based offload solution.



FLEXIBILITY TO SUPPORT A BREADTH OF WORKLOADS AND USE CASES

Napatech delivers end-to-end solutions across a breadth of use cases, ranging from infrastructure virtualization, network monitoring, and inline acceleration of networking and security functions.

- **Virtualization** solutions are designed specifically for virtual environments, enabling enterprises to help maximize capacity and performance in a cost-effective manner. **Learn More**
- **Network management** solutions to help maximize system uptime and performance by providing the right intelligence to manage networks in real time, at any speed. **Learn More**
- **Cybersecurity** solutions correlate data from different parts of the network, so the right defense measures can be deployed where they are needed. **Learn More**
- **Telecom** solutions apply to the core and network edge, enabling cloud service providers and telco operators to help maximize the cost-efficiency and operational reliability of their infrastructure. **Learn More**
- **Financial Services** solutions transport critical market data with ultra-low latency and enable independent network monitoring systems to visualize transactions in real time. **Learn More**

In addition, the SmartNICs' hardware adaptability and reconfigurability allow users to customize the platform for their unique requirements, e.g., OVS with a custom protocol.

COMMERCIAL GRADE SOFTWARE STACKS TO ACCELERATE TIME-TO-MARKET

Napatech's Link Software solutions are feature-rich and shrink-wrapped for a turnkey user experience, bringing hyperscale compute benefits to IT organizations of any size. Software packages are tailored and optimized to uses cases and supported with an agile, high-velocity roadmap.

- **Link-Capture™ Software** is ideal for performing high-speed packet capture with nanosecond timestamping and replay with precise inter-frame gap control. **Learn More**
- **Link-Inline™ Software** boosts applications by offloading packet and flow processing, providing exceptional visibility and performance. **Learn More**
- **Link-Virtualization™ Software** offloads and accelerates the virtualized data plane to enhance CPU efficiency, scalability and network performance. **Learn More**
- **Link-Programmable™ Software** enables end users and OEMs to deploy their own custom solution and FPGA IP on Napatech's industry-proven SmartNIC hardware. **Learn More**

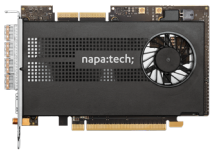
Napatech's software can be integrated with both commercial and open-source applications using either Napatech's proprietary APIs or industry-standard APIs. In the latter case, no changes are required to the applications themselves, so migration is seamless. Supported frameworks, APIs, operating systems, and 3rd party applications are shown below.

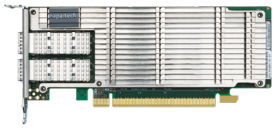
FEATURES

SOFTWARE SUPPORT	
Frameworks	• Open vSwitch (OVS) • OpenStack
API's	• Data Plane Development Kit (DPDK) • Linux NetDev • VirtIO, vDPA • NTAPI (Napatech API)
OS and Orchestration	• Red Hat Enterprise Linux • Ubuntu Linux Server (Upon Request) • Kubernetes • OpenShift
Open-source applications	• Suricata (Intrusion detection and prevention) • Zeek (network security monitoring) • ntop - n2disk boost (network traffic recorder) • Snort (intrusion detection and prevention) • TRex (traffic generator) • Wireshark (Protocol analyzer)

SMARTNIC PORTFOLIO AND SPECIFICATIONS

Napatech SmartNICs are designed to meet the standards of modern servers, with the rapidly changing world of data center and hyperscale deployments in mind. All hardware solutions support the standard PCI-Express form-factor for deployment in standard servers located in on-premise or cloud data centers. A range of software options and use cases are supported for each SmartNIC, with the ability to receive upgrades after deployment to improve performance, add functionality, or implement software changes.





	NT200A2	NT100A01	NT50B01
SPECIFICATIONS			
Network Performance	• 200Gb/s	• 100Gb/s	• 50Gb/s
Port Configurations	• 2× 1/10G | 8x10G | 2×10/25G • 4×10/25G | 2x40G | 2x100G	• 4× 1/10G | 4x 10/25G	• 2× 1/10G | 2x 10/25G
Form Factor	• FHHL	• FHHL	• HHHL
Host Interface	• Gen3 x16	• Gen3 x16	• Gen3 x16
Max SDRAM Density (DDR4)	• 24GB	• 20GB	• 16GB
TARGET WORKLOADS			
Virtual Data Plane (inc. OVS)	●	●	●
Packet Capture	●	●	●
5G User Plane Function Offload	●		
Custom Workloads	●	●	●

TAKE THE NEXT STEP

- Learn more at **www.xilinx.com/napatech** or visit **www.napatech.com**
- Contact your local AMD representative or fill out the **Product Inquiry Form** to learn how a Napatech solution can fit your application
- Use the **vSwitch Offload ROI Analysis Tool** to estimate the benefits your use case can expect when using Napatech SmartNICs
- Visit the **Napatech Resource Library** to learn more Napatech solutions and use cases

† Cost analysis based on metro edge data center running a 5G Packet Core to support 50,000 5G users. Operational expenses (OPEX) were calculated over a five-year period and include the cost of power as well as server OPEX. Servers were assumed to be industry-standard platforms with two PCIe slots. All performance and cost savings claims are provided by Napatech and have not been independently verified by AMD. Performance and cost benefits are impacted by a variety of variables. Results are specific to Napatech and may not be typical. GD-181