



PRODUCT BRIEF

Link™ Virtualization Software for FPGA-based SmartNICs

The Rise of Network Virtualization

Network operators are turning to virtualized solutions as key components in their next network architecture designs for many reasons. Virtualization of physical resources offers the ability to deploy applications and services as software on open and standard computing platforms – promising to save time and money by optimizing equipment costs and operational expenses. For cloud data centers, service providers and enterprises, virtualization can optimize server utilization, accelerate applications, enable rapid deployment, provide scalability, and live migration of resources.

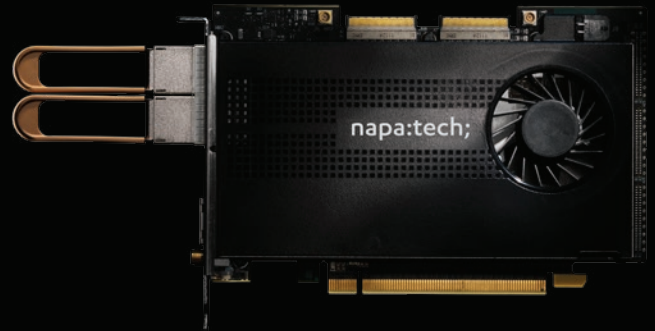
Network Virtualization Challenges

With the increasing volume and complexity of network traffic, IT infrastructures are constantly under pressure to maintain the necessary networking performance and required security posture that customers demand. The challenge is to do so affordably, while keeping as much compute resource in the smallest form factor as possible. Operators must extract the maximum output per application or virtual machine (VM) with the lowest networking costs defined by packet processing per CPU, per Watt, and per Dollar, which are all critical to the success of a scalable data center to lower TCO.

Dedicated network appliances are increasingly being replaced by standard COTS server platforms to keep costs down. Napatech supports this COTS vision by providing flexible data plane processing options for application acceleration via reconfigurable SmartNICs for dedicated offloads. Our programmable SmartNICs offer accelerated 200 Gbps networking throughput for varied software-defined data planes, combining the flexibility of CPUs and FPGA SmartNICs in supporting this COTS vision.

Full Open vSwitch Offload

Open vSwitch (OVS) is the default data plane solution that operators leverage for demultiplexing traffic from the network into, out of, and between virtualized applications, virtual networking functions running in VMs or containers. A software-only implementation of OVS, however, fails to meet



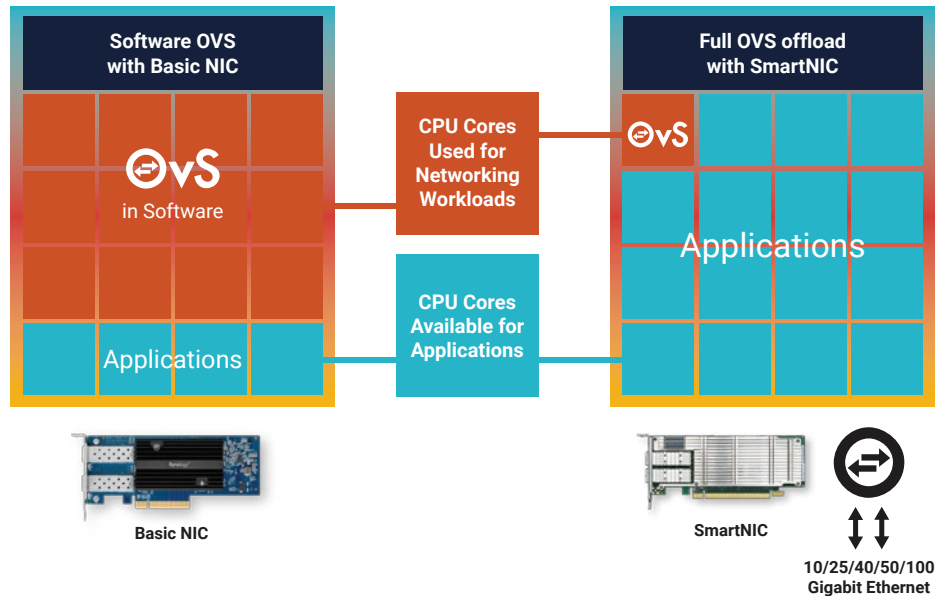
the performance and scale of virtualized applications without significant CPU utilization. The result is less performance per server, and the need to add more servers to achieve the required performance. A SmartNIC with Napatech Link™ Virtualization Software, however, provides an ultra-fast virtualization solution for full OVS offload, offering a 60X performance gain compared to OVS kernel and 6X gain compared to OVS-DPDK, while reducing CPU consumption by as much as 90% compared to alternatives.

While kernel-based or user space (DPDK) versions of OVS are costly from a CPU utilization perspective, SmartNICs with Link™ Virtualization Software accelerate OVS and provide much better CPU efficiency, lower complexity, enhanced scalability and increased network performance.

The Napatech offload solution for OVS-DPDK is open and upstreamed. Not only does it meet the performance goals for carriers, enterprises, and data center operators, but does so at the price goals that the idea of network function virtualization promises.

Key Features

- Line-rate forwarding up to 200 Gbps and 60 Mpps.
- More than 90% reduction in server utilization
- Reconfigurable and programmable
- 5X lower TCO
- Supported on 10/25/40/100 GbE



Features

- Full OVS-DPDK offload (OVS 2.12/DPDK 18.11)
 - 130 Mpps switching performance @ 64B
 - 100 Gbps switching capacity
- OpenStack (DevStack) support
- VirtIO
 - 1.1 vDPA full offload (one CPU core)
 - 0.95/1.0 through RelayCores
- DPDK+vDPA support
- Live Migration (VirtIO 1.1)
- OVS statistics
- 12K megaflows (wildcarded flows) offload
- Up to billions of individual flows
- Extensive and configurable match processing for L2, L3, L4 packet headers
- VLAN/VXLAN encapsulation/decapsulation
- Q-in-Q
- Hash-based load balancing
- Link aggregation
 - active/standby
 - active/active
- Traffic port mirroring
- 63 datapath VFs/VMs
- Jumbo frame support
- Quality of Service (QoS)
- IPv4/v6
- 10/25 GbE support

Supported Operating Systems

- CentOS 8
- RedHat 8
- Ubuntu Server LTS

Client VMs Supported APIs

- Data Plane Development Kit (DPDK)
- Linux NetDev (Kernel 5.0+)

Hardware & Transceiver Support

Napatech Link™ Virtualization software is a production-grade, turn-key solution that harnesses the capabilities pioneered by hyperscale cloud service providers, and makes them readily available to cloud, 5G telecom, and enterprise datacenter networks of every size.

Napatech Link™ Virtualization software is supported on the following hardware and transceivers:

Napatech

- **NT200A02:**
 - 10GBASE-SR, CR, LR, ER
 - 25GBASE-SR, LR, LR-BiDi
- **NT50B01:**
 - 10GBASE-SR, CR, LR, ER
 - 25GBASE-SR, LR, LR-BiDi

SmartNICs based on Intel® FPGA technology

- Silicom FPGA SmartNIC C5010X
- Silicom FPGA SmartNIC N5010