Adaptable. Intelligent.

PRODUCT BRIEF

ALVEO™ U25
2x10/25Gb Ethernet PCIe SmartNIC

OVERVIEW

For cloud architects building modern data centers, the Alveo U25 provides a comprehensive SmartNIC Platform that brings true convergence of network, storage, and compute acceleration functions onto a single platform.

The U25 SmartNIC platform is based on a powerful FPGA, enabling hardware acceleration and offload to happen in-line with maximum efficiency while avoiding unnecessary data movements and CPU processing. The U25 programming model supports both high-level network programming abstractions such as HLS and P4, as well compute acceleration frameworks such as Vitis™ to enable both Xilinx and 3rd party accelerated applications.

FEATURES AND BENEFITS

Enabling the Fastest, Most Secure Networks

> A Powerful SmartNIC
The U25 delivers ultra-high throughput, small packet performance and low-latency. The host interface supports standard NIC drivers as well as Onload® kernel bypass to provide both TCP and packet-based APIs for network application acceleration. IEEE1588v2 precision timing protocol (PTP) is provided for applications that require synchronized time stamping of packets with single-digit nanosecond accuracy.

> A Programmable Fabric
The U25 SmartNIC contains a programmable FPGA handling all network flows. Each flow can be individually delivered to the host and/or streamed in hardware through bump-in-the-wire network acceleration functions and/or compute acceleration kernels for application processing within the FPGA.

> A Platform for Hardware Accelerated Clouds
Cloud service providers are deploying SmartNIC fabrics to achieve virtual switching and micro-segmentation of services that scale linearly with CPU cores and network links. The U25 is a platform for the industry’s first converged SmartNIC fabric, including shrink-wrapped applications.

XILINX ADVANTAGE

> Combined bump-in-the-wire network, storage, and compute offload and acceleration
> Complete SmartNIC platform allows full FPGA programmability in HLS/RTL/P4
> Turnkey solutions and apps provided by Xilinx and 3rd Party
> Baseline NIC feature parity with market leading XtremeScale™ Ethernet controllers
> Onload® support for low latency kernel bypass with up to 400% improvement in cloud based applications
> High precision time-stamping and PTP support

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FEATURES

Acceleration
> SDx Compute Acceleration
> Universal Kernel Bypass
> DPDK Poll Mode Driver - Packet (Cloud, Telco)
> Onload® – TCP (Cloud, Telco, Enterprise)
> Onload®/ TCPDirect - TCP/UDP (Fintech)

Security
> Tamper resistant adapter – Digitally signed firmware

Time Synchronization and Hardware Timestamping
> Hardware timestamping for all packets
> On-board Stratum 3 stable oscillator
> Solarflare Software PTP Daemon delivers enhanced stability and clock synchronization accuracy and can be used to synchronize the adapter clock to external time source

Stateless Offloads
> TCP/UDP Checksum Offload (CSO) TCP Segmentation Offload (TSO) Giant Send Offload (GSO)
> Large Send Offload (LSO) Large Receive Offload (LRO) Receive Side Scaling (RSS)
> Receive Segment Coalescing (RSC)

Manageability and Remote Boot
> PXE and UEFI
> NC-SI over MCTP SMBus
> PLDM over MCTP SMBus MCTP PCIe VDM
> Management and Utilities
> Solarflare Boot Manager

Adapter Hardware
> 2x PCIe Gen 3 x8 (x16 connector in bifurcated mode)
> 2x10/25G SFP28 DA copper or optical transceiver;
> XtremeScale™ Ethernet Controller
> Zynq® UltraScale™ XC25 FPGA
> 1x 2GB x 40 DDR4-2400
> 1x 4GB x 72 DDR4-2400

Hardware Certifications
> FCC, UL, CE
> RoHS - Complies with EU directive 2011/65/EU

Traffic Engineering
> XtremePacket™ Engine for parsing, filtering, and flow steering
> TCP/UDP/IP, MAC, VLAN, RSS filtering Accelerated Receive Flow Steering (ARFS) Transmit Packet Steering

Virtualization
> Linux Multiqueue
> SR-IOV: 16 physical functions; 240 virtual functions 2048 Guest OS protected vNICS
> VXLAN, tunneling offload; adaptable to custom overlays.
> VLAN and VLAN Q-in-Q Insertion/Stripping

Ethernet Standards
> IEEE802.3-2018 Ethernet Base Standard
> IEEE 802.3by Ethernet consortium 25 Gigabit Ethernet
> IEEE 802.3ad, 802.1AX Link Aggregation
> IEEE 802.1Q, 802.1P VLAN Tags and Priority IEEE 1588-2008 PTPv2
> Jumbo Frame support (9000 bytes)

OS Support
> Red Hat RHEL and Linux variants

Physical Dimensions
> L: 6.60 inch (167.65 mm)
> W: 2.54 inch (64.4mm)

Environmental Requirements
Temperature:
> Operating: 0°C to 55°C (32°F to 131°F)
> Storage: −40°C to 65°C (−40°F to 149°F)
Humidity:
> Operating: 10% to 80%
> Storage: 5% to 90%

TAKING THE NEXT STEP
Learn more about the Xilinx Alveo U25, www.xilinx.com/Alveo