

ALVEO™ U25

2x10/25Gb Ethernet PCIe SmartNIC

DRAFT

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

- > **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. The U25 also supports tamper resistance and secure flow monitoring with enforcement. 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

Acceleration

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

Security

- Local Hardware Filtering - Monitor, report, analyze, filter and enforce policies
- Tamper resistant adapter – Digitally signed firmware and secured private keys

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

- Ethtool Support vCenter Plug-in
- Solarflare Boot Manager

Adapter Hardware

- 2x PCIe Gen 3.1 x 8
- 2x10/25G SFP28 DA copper or optical transceiver;
- XtremeScale™ Ethernet Controller
- Zynq® UltraScale+™ XCU25 FPGA
- 1x 2GB x 40 DDR4-2666
- 2x 4GB x 72 DDR4-2666

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
- VMware NetQueue
- Microsoft Hyper-V
- Virtual Machine Queue (VMQ) SR-IOV: 16 physical functions; 240 virtual functions 2048 Guest OS protected vNICs
- VXLAN, NVGRE, tunneling offloads; 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%

TAKE THE NEXT STEP

Learn more about the Xilinx Alveo U25, www.xilinx.com/U25

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