

# Agilio<sup>®</sup> CX SmartNIC for Open Compute Project

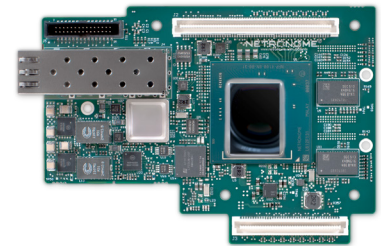
## SMALLEST, LOWEST POWER 25/50 GIGABIT ETHERNET SINGLE AND MULTI-HOST PROGRAMMABLE SMARTNICS SUPPORTING HIGH-DENSITY OPEN COMPUTE SERVERS

The innovative multi-host Agilio CX SmartNIC for OCP disaggregates the network and enables deployment of scale-out heterogeneous compute and storage racks with direct connectivity from multiple hosts to a single network controller. More compute and storage capacity per rack can be achieved with reliable and lossless packet delivery; a unique feature enabled by large on-chip processing memories available on the Agilio OCP v2 SmartNICs.

The Agilio SmartNIC platform fully and transparently offloads eBPF, virtual switch, virtual router, and P4-based datapath processing for networking functions such as overlays, security, load balancing and telemetry, enabling cloud and SDN-enabled compute and storage servers to free up critical server CPU cores for application processing while delivering significantly higher performance.

Data centers have always faced the challenge of massive storage and compute growth. Now with cloud-enabled, on-demand usage models, both cloud providers and traditional data centers face the added requirements of agility and rapid time to market. Software-based solutions can provide agility; although only Netronome SmartNICs provide the network agility and rapid time-to-market that data centers need for server-based networking.

In the recent years, server-based networking and intelligent end points have evolved rapidly to enable scale and preserve costs. Typical inline network functions include tunnel encapsulation, load balancing and metering, exact match, wild card match, action-based stateless and stateful flow processing. However, with 25 and 50GbE connectivity in servers the number of CPU cores and power needed for such inline functions becomes prohibitive. To add to the problem, cache misses can cause undesired server performance hits and jitter. Agilio CX SmartNICs are purpose-built to solve such performance and scaling challenges. Agilio CX SmartNICs improve performance and lower CAPEX by freeing up valuable server CPU cores, enabling improved network performance and reducing OPEX by enabling server-based SDN and NFV at higher scale and performance.



### HIGHLIGHTS

- 60 processor cores for full programmability
- SR-IOV, zero-copy, packet-direct and stateless offloads
- Industry-leading intelligent data plane architecture
- Flexible and scalable tunneling policies
- Supports Enhanced Berkeley Packet Filter (eBPF)
- Fully and transparently offloads eBPF, virtual switch, virtual router and P4-based datapath processing for networking functions

### APPLICATIONS

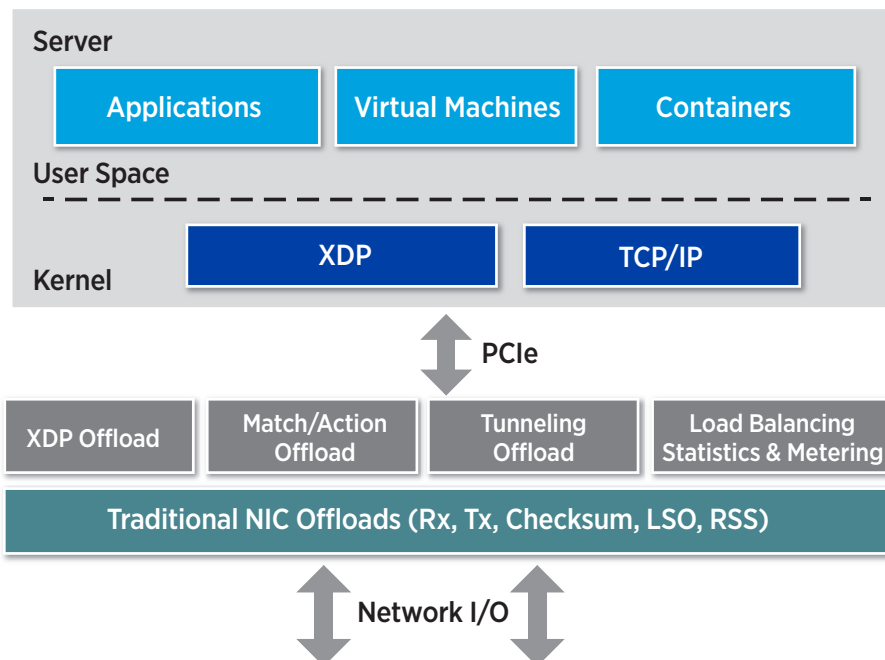
- Cloud IaaS/PaaS
- Network congestion smoothing
- Network telemetry
- Denial of service



SPECIFICATIONS	
Interfaces	1-port 25GbE (SFP28), 1-port 50GbE (QSFP28)
PCIe Express	PCIe Gen3 compliant (up to 32 lanes) Auto-negotiates to x8, x4, x2
Operating System	CentOS, Ubuntu
Ethernet	PCIe Gen3 compliant, OCP Mezzanine version 2
Connectivity	IEEE Std 802.3ae 10 Gigabit Ethernet IEEE Std 802.3by 25 Gigabit Ethernet IEEE Std 802.3cd 50 Gigabit Ethernet IEEE Std 802.1Qlp VLAN tags and priority IEEE Std 802.Xwg Explicit Congestion Notification IEEE 802.1P VLAN tags and priority
Protocol Support	TCP/UDP, MPLS, VxLAN*
Remote Boot	PXE UEFI
Offloads	Large Send Offload (LSO) TCP Segmentation Offload (TSO) Large Receive Offload (LRO) Checksum Offload Receive Side Scaling (RSS)
Management and Control Interfaces	NC-SI, Network Controller Sideband Interface I <sup>2</sup> C interface for device control and configuration
Open Cloud Server	Mezzanine v2 Spec

ENVIRONMENTAL REQUIREMENTS	
Operating Temp.	0 to 50°C
Storage Temp.	-40 to 70°C
Relative Humidity	5% to 95%, non-condensing
Air Flow	300 LFM (Min.)

Agilio CX for OCP Offload Diagram



## FEATURES

### Network Acceleration and Offloads

- TCP/UDP/IP stateless offload
- Receive-side Scaling (RSS)
- DPDK, zero-copy, kernel bypass, packet direct

### Acceleration of Compute-Intensive Functions

- Deep packet Inspection (DPI)
- Atomic operations
- Per-flow real-time statistics

### Virtual Switch Data Plane Offload

- VXLAN, MPLS tunnel encapsulation and de-encapsulation
- Programmable for custom tunnel types
- Flexible match/action and wildcard policy offloads
- Per-flow metering and QoS

## NETRONOME

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