

## ACE-NIC100/ACE-NIC100sec

### Carrier-Grade SmartNIC for VNF and IPSec Acceleration

Ethernity's ACE-NIC100 SmartNIC with 10/25/40/100 Gigabit Ethernet connectivity, built using the FPGA-based carrier-grade ENET Flow Processor technology, provides best-in-class performance and an unsurpassed feature set for virtualized telco and enterprise networks.

Cloud and multi-access edge computing (MEC) infrastructures require that equipment be optimized for carrier-level quality of experience, performance, and power at scale. The ACE-NIC100 can achieve these goals by moving specific workloads onto a low-power, highly optimized adapter equipped with an FPGA-based flow processor, leaving the host server to run more standard compute functions. By offloading QoS, Policer, OAM, overlay, and many other functions, including security, CSPs can dramatically reduce operating and capital expenses, and provide a new spin for mass deployment of virtual solutions.

The ACE-NIC100 provides flexible network interface capabilities, advanced network and security hardware accelerators, and a comprehensive software suite, all of which are easily integrated in both Telco and enterprise customer environments.

#### Product Highlights

- Ideal for telco and enterprise solutions with performance-hungry applications connecting high speed networks: 10/25/40/100G interfaces
- DPDK accelerating workloads for easy integration with VNF or NFVi
- IPSec high-speed tunnel offload
- Multi-tenant environment to maximize VNO density
- Carrier-grade, scalable, multiple NIC platform covers solutions from CO to MEC



The growing demand for security in the cloud and at the network edge requires both crypto and filters to be integrated for various types of data. The ACE-NIC100sec delivers security acceleration with IPsec tunnel offload that works together with additional overlay methods, such as VxLAN and NVGRE inline processing, freeing the CPU from intense security processing and thereby improving performance.

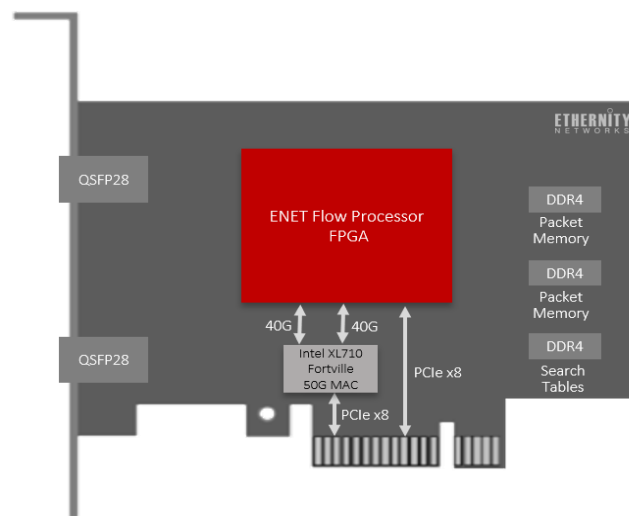


Figure 1: ACE-NIC100 with optional Intel XL710 controller

## ACE-NIC100 Product Features

### 10/25/40G/100G SmartNIC

Ethernity's ACE-NIC100 offers flexible 10/25/40G/100G Ethernet connectivity and the programmable FPGA-based ENET Flow Processor in a single standard adapter card, providing best-in-class NFV and security acceleration for CSPs, enterprise data centers, and standalone solutions. The ACE-NIC100 provides flexible IO capabilities with hardware acceleration to optimize virtual infrastructure for performance, scalability, power, and cost, while offloading VNF, security, and overlay networks to reduce OPEX and CAPEX.

## **Accelerating NFV Workloads**

Network functions have traditionally been handled by dedicated hardware, such as routers, load balancers, and firewalls. Network Function Virtualization has decoupled such services from the hardware, but at the expense of CPU efficiency. The ACE-NIC100 uses FPGA programmability to handle NFV on multi-purpose smart hardware that accelerates performance, improves agility, and reduces expenses.

## **Quality of Service**

The ACE-NIC100 manages, prioritizes, and steers traffic flow based on hierarchical Quality of Service (QoS) levels and supports dedicated queues in hardware to shape and schedule traffic based on priority.

## **DPDK Acceleration**

In most Carrier cloud infrastructures, packet switching is handled on top of DPDK. This requires dedicated CPU cores to manage the flow, increasing CPU usage and reducing scalability. The ACE-NIC100 offloads the DPDK functions onto the NIC, reducing CPU overhead and enabling carrier-grade QoE for virtual functions, providing performance improvements and scalability for network virtualization. A comprehensive list of high-end HW acceleration functions is provided in the DPDK package. The functionality includes H-QoS, filters, policer, IPSec, and many other functions to be offloaded.

## **Security Offload**

Ethernity's leading technology delivers security acceleration through IPSec offload with and without tunneling, to reduce CPU overhead. Traditional offloads, such as checksum, are maintained, while implementing end-to-end encryption for security in virtualized environments. The ACE-NIC100 also can handle customized offload functionalities and crypto engines through full programmability of the FPGA hardware.

## **Overlay Network Offload**

The ACE-NIC100 offloads encapsulation/decapsulation of overlay network traffic (VxLAN, NVGRE, etc.) to the adapter to efficiently manage VM traffic, ensure VM isolation in shared network infrastructure, and reduce overhead on the CPU.

## Specifications

### Connectors

- SFP+ / SFP28 / QSFP+ / QSFP28 (100G)
- Copper: SFP+ Direct Attached Twinax Copper

### Interfaces

- PCIe Gen3 x 16 (2 x 8) or Gen3 x8
- 1 PPS for precision time stamping
- DPDK
- SR-IOV
  - 8 PFs (physical functions)
  - 128 VFs (virtual functions)

### Ethernet

- Jumbo frame support
- IP packet fragmentation
- RMON, sFlow

### Stateless offloads

- TSO / LSO
- Enhanced RSS

### Network Functions offloads

- L2/L3 Forwarding, NAT/NAPT
- Segment Routing with MPLS label editing
- VxLAN, NVGRE
- GTP for Mobile backhaul solutions
- L2TP and L2TPv3, PPPoE tunnels
- PTP (IEEE 1588) (one-step or two-step)

### ACE-NIC100sec security offloads

- IPsec tunneling with/without overlay:
 

<u>Encryption:</u>	<u>Authentication:</u>
3DES CBC	MD5
AES CBC 128/192/256	SHA1 / SHA256 / SHA384 /
AES CTR 128/192/256	SHA512
AES CCM 128	AES XCBC
AES GCM 128/192/256 (t)	AES CMAC
(t) GCM up to 40Gbps	AES GMAC 128/192/256

- Firewall and DDoS mitigation engine

### Compliance

- IEEE Std 802.3 clause 49, base KR, 802.3ae 10G Ethernet
- IEEE Std 100GbE
- IEEE Std 40GbE
- IEEE Std 802.3 Clause 49, 802.3by 25GbE
- IEEE 802.3ad Link Aggregation & Failover
- IEEE 802.1Q.1p VLAN Tags & Priority
- IEEE 802.1Qbb PFC
- MEF10 (10.3) compliance
- IETF unicast and multicast routing

### MEF, BBF and Carrier Ethernet

- TR-101, TR-156, TR-301, TR-167
- MEF Policer 2r3c and WRED
- H-QoS supporting WFQ and SP
- OAM and BFD, with 3.3ms CFM
- Performance monitoring and data capture engine
- High precision packet stamping

### SW KIT

- ENET Driver, HAL coming with ENET CLI with Application Guide
- ENET DPDK (eDPDK) component
- Full Router-Switch network protocol suite

### Customization

- Can be customized with additional functions required by VNF or NFVi

Physical Specifications	
Standard Interface	PCI-Express Base Specification Revision x16
Board Size	Standard height, half length (FHHL): 167.65 x 111.20mm (6.7" x 4.376")
Minimum Server Requirements	
CPU	At least 2.0-2.5 GHz @ 1CPU @ 8 cores
PCIe	Gen3 x8 + x8 bifurcation or x8
OS	At least CentOS 7.5 / Ubuntu 14.04

### ACE-NIC100 Ordering Options

Product Name	Product Number	Product Description*
ACE-NIC100	ENA2100F	2 x 100G (1+1) SmartNIC with PCIe Gen3 x16, FH/HL
	ENA2080F	2 x 40G SmartNIC with PCIe Gen3 x16, FH/HL
ACE-NIC100sec	ENA2100FS	2 x 100G (1+1) SmartNIC with PCIe Gen3 x16, 40G IPsec, FH/HL
	ENA2080FS	2 x 40G SmartNIC with PCIe Gen3 x16, 40G IPsec, FH/HL

\*Additional options with different port densities are available upon request.