Company Overview

Making Truly Programmable Networks a Reality

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Disclaimer

Ethernity Networks Limited

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About Us

- Leading innovator of network processing technology and products
  - System-on-Chips (SoCs) for telecom networking platforms – IP licensing
  - SmartNICs and innovative server-based network appliances
- Over 500,000 systems already deployed with Ethernity’s data processing technology
  - Connecting more than 100M end users
- Unique patented networking technology, FPGA-based
- Founded in 2004, public company traded on AIM of the London Stock Exchange
- HQ in Israel, sales offices in North America and Asia
Our Management

Barak Perlman
CTO
- Expert in SDN/NFV
- Prior to Ethernity was Sr. NFV Chief Architect at ConteXtream, which was acquired by Hewlett Packard Enterprise

David Levi
Founder and CEO
- Over 25 years in the telecom and networking industries
- Prior to Ethernity, was Product Marketing director at ECI Telecom, and founder of Broadlight, which was acquired by Broadcom for $230M

Mark Reichenberg
CFO
- Formerly Group Financial Director of a JSE listed tech company and
- Financial Director in wholesale, and logistics companies

Shavit Baruch
Founder and VP R&D
- Over 25 years in the telecom and datacom industry
- Prior to Ethernity was R&D Director at ECI Telecom and Chief Architect at Native Networks, which was acquired by Alcatel

Rob O’Hara
VP Worldwide Sales
- Over 30 years of sales leadership in the networking and semiconductor market
- Prior to Ethernity was VP Sales at EZchip, which was acquired by Mellanox for $800M
Truly Programmable Network with Ethernity’s Data Processing Solutions

- Applications using ENET SoCs
- Applications using ACE-NICs
Growing SoC Opportunities

- Telecom SoC opportunities is growing
  - G.fast ports\(^1,3\): from 6.8M in 2018 to 21M ports in 2022
  - XGS-PON market\(^1,3\): from $81.9M in 2018 to $3.5B in 2022, 156% CAGR
    - Contract signed with Tier 1 U.S OEM, Oct. 2018
  - EAD market\(^2\): from $987M in 2017 to $1.47B in 2021, 8% CAGR

- Avionics and military
  - Required FPGA use to allow proper platform certification

- Significant future opportunities in IoT, autonomous cars, smart cities, etc.

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1. GPON blog post, IEEE communication society technology blog, May 2017
2. Ethernet access device (EAD), IEEE communication society technology blog, April 2018
3. Ethernity announced a new DPU with XGS-PON and G.fast support, Oct 2018
Telecom Undergoes Fundamental Revolution

ASIC Appliances
Closed, proprietary

Core/Edge Cloud
Open, agile

Virtualization

✓ Improves service agility and network efficiency

X SW-only cannot economically handle the growing amount of users, devices, and services (Programable data acceleration is needed)

Our FPGA-based solutions accelerate SW infrastructure, allowing telco/cloud networks to meet their service requirements economically.
The Race to the Edge

Lambda@Edge

Moving the cloud closer to the user

Access Network

Transport Network

Virtualized Edge

Physical

Virtual

NFV @ edge

Smart phones

Businesses

Residential

Cloud

Carrier Data Center

Physical

Virtual

NFV @ edge

Lambda@Edge

Moving the cloud closer to the user

Access Network

Transport Network

Virtualized Edge

Physical

Virtual

NFV @ edge

Cloud
Worldwide Telecom NFVI Revenues*

- Networking growth: 59.3% CAGR, with virtualized Edge a major driver

*Worldwide Telecom Network Functions Virtualization Infrastructure Forecast, 2018–2022, IDC, June 2018
SmartNIC Market Forecast
Ethernity Networks Model, for 10G and Higher Speeds

- SmartNIC market 2018
  - $140M, 10% of overall NIC market
  - $110M in T1 data centers
  - $10M for telco/cloud edge, embryonic

- SmartNIC market 2021
  - $600M, 27% of overall NIC market
  - $225M in data centers
  - $275M for telco/cloud edge, 200% CAGR 2018-2021
Switch/Router and Security Device Options

- Multicore
- NPUs
- FPGAs
- ASICs

Flexibility vs. Efficiency

Discontinued

Switch/Router SW & FW running on XILINX.
FPGA Outshines Other Options

- FPGA prices are continually dropping
- All-programmable, future-ready
- Open, Intel and Xilinx, fast porting
- HW programmability at the pace of SW development
- Multiple applications on single FPGA platform
FPGAs demonstrate the “... performance characteristics of an ASIC, but the programmability and reconfigurability inherent in a software solution like a SoC.”

“We stopped burning CPU cores to run the network datapath... Host cores show less than 1% utilization...” after implementing FPGA SmartNICs
Why Ethernity’s FPGA solution?

- Fastest time-to-market with complete hardware and software solutions
  - Carrier Ethernet Switch Router, traffic management and security
- Affordable small FPGA
  - 80% smaller die-size, patented technology
- Flexible, with experience to address our customers’ unique pain points

ENET – be ahead of the competition!
Just released: ACE-NIC100 FPGA SmartNIC

PR: Ethernity Networks Releases the 100G ACE-NIC100 FPGA-based SmartNIC

- FH/HL
- FPGA-based
- 10G, 25G, 40G, 100G ports
- Intel I/O controller, simplifying integration
- PCIe Gen3 x16, DDR4 for packet buffering
- ENET complete networking acceleration for the edge: vCPE, vEPC, vBNG/vBRAS, vFW, SecGW, SD-WAN
- E2E solution: FPGA-based HW + ENET SDK SW suite
- Carrier-class DPDK acceleration
ENET DPDK for NFV Today

- FPGA-based DPDK acceleration for Telco applications
- Open source-based solution
- Flexible number of physical and virtual ports
- ENET traffic management queues access, controlled by the application

- Supports multiple tables, e.g., transferring ServiceID, FilterID, and ForwardingID all at once
- Supports DPDK representer port
- Set on each virtual port: myMac, VLAN add/remove, VLAN accept, and other tunnels (VXLAN, MPLS, GRE, GTP...)

ENET DPDK Acceleration
Seamless DPDK acceleration by utilizing standard DPDK APIs
Example: Accelerated vs. SW-Only vBNGs

- This analysis is based on Intel’s figures and Ethernity Networks’ tests.
- Assuming 3Mbps user rates and 8,300 users in the 50Gbps case. Higher user rates are significantly more challenging for server-only solutions.
- Not covered above, server-only consumes more real estate and has over 100microsec delay and large delay variation (EANTC and Nokia tests). Deterministic performances with less than 15microsec are assured by ACE-NIC HW acceleration.

ACE-NICs make vBNG realistic!
Multi-Access Edge Computing (MEC)

- 1U server-based solution with Programmable HW acceleration
- Optimal for network edge deployment
- High performance, fully programmable, future-ready
Ethernity Networks’ Growth Plan

- 2017-2018 – in transition from IP-only to complete solutions provider
- Early SmartNIC revenues by 2018, over 10% market share already by 2020
In Conclusion...

✓ The telecom industry is undergoing a fundamental revolution toward open, agile, programmable platforms
✓ FPGA-based hardware offloading is especially effective
✓ Ethernity Networks is best positioned to take a significant share of the evolving virtualized edge NFVI opportunity
  ✓ Compelling networking processing technology with clear business advantages
  ✓ Solutions meeting market demands
  ✓ Leaders, not followers
  ✓ Over 14 years of experience
Thank you
For your attention