Addressing Diversity in Data Center Networks.

Yaniv Kopelman, Networking CTO, Marvell Semiconductor
Mega Scale Data Center

- SPINE
- SPINE
- TOR
- TOR

- EOR
- EOR

- SPEED

- SPINE
- SPINE
- TOR
- TOR
- TOR
- TOR
Mega Scale Data Center

- Mega Scale DC Requirements:
  - Very high throughput
    - Compute: 50G -> 100G -> 200G
    - Network: 100G -> 400G -> 800G
  - Storage and Compute Convergence
  - Analytics
  - High radix
  - Large forwarding tables
  - One-Size-Fits-All
Enterprise and Private Cloud

• Enterprise DC and Private DC, typically try to duplicate MSDC architecture

• Enterprise and Private DC Requirements:
  – Lower throughput:
    • Compute: 1G -> 10G -> 25G
    • Network: 10G -> 40G -> 100G
  – Higher density racks
  – Feature rich
Edge and uEdge Cloud

- Edge DC – DC closer to the premises
- uEdge DC – DC in a Rack or DC in a Box
- Edge DC Requirement
  - Real Time response for mission critical tasks
  - Security
  - Roaming
  - Low Power
  - Smaller form factor
DC Hubs - Colocation

- Exchange hubs for Cloud Service Providers
- Colocation DC Requirements:
  - Security
  - Diverse I/O configuration
  - Automatic Reconfiguration
  - Seamless migration from one CSP to another
  - Resiliency for disaster recovery
  - SLA's different QoS and service levels
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Diversity

M A R V E L L
Chips for Networking and Storage Infrastructure

Switch

Embedded Processor

PHY

Storage
Full Portfolio of Products

Private Cloud
- Processor
- Storage
- Switch
- Phy

Public Cloud (MSDC)
- Processor
- Storage
- Switch
- Phy

Edge
- Processor
- Storage
- Switch
- Phy

AC3
Aldrin
PIPE
A7K
NR2241
X2340
X3340
E2180

Armstrong
LP
A8K
NR2241
X3340
X5113

A8K
SS1098
X5123
X7120

BC3
Armstrong
NR2241
Introducing Modularity
Marvell Prestera Switch – Modular Architecture

- Enables different I/O configuration
- Different I/O speeds
- Optimized configuration per market segment
- Fully featured packet processor

Addressing Diversity
- Diverse Bandwidth solutions
- Diverse I/O portfolio
- Rich Features set: e.g. Roaming, Security
- Enhanced Analytics
- Low Latency
- Advanced QoS
<table>
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<tr>
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<td>Open System Firmware</td>
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<tr>
<td>Open Chip Interconnect</td>
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System Modularity – Prestera Port Extenders

- **PIPE** – Passive Intelligent Port Extender
- Replacing TOR switches with Passive Port Extenders
- Simpler management
- Plug and Play between vendors using standard 802.1BR protocol

- **Addressing Diversity**
  - Smaller network scale
  - Lower Power
  - Lower TCO

**30% of the RBOM**

**40% of the Power – Fan less design**
PHY Solutions

- 16 Port 50GbE PHY
- Dual 400GbE Retimer
- Quad 100GbE Reverse Gearbox
- Fully compliant to IEEE 802.3cd and 802.3bs standards
- Optimized for QSFP-DD and OSFP applications
ARM Based Modular Compute Nodes

• QUAD CORE ARM A72
  – 2 Clusters of 2xCA72
  – High performance Coherent interconnect
  – Virtualization support (Core and IO)
  – Secured boot support

• ARM Based Embedded processor for TOR and SPINE
  – SONIC and ONIE ported to ARM
Address Future Trends

- Artificial Intelligence driving even higher Bandwidth
- Convergence of Storage Compute and Networking
- Larger Networks -> drive larger scales of switches
- Optical Interfaces directly from the Server
Marvell is the ONE company that can deliver a complete portfolio of Networking and Storage Infrastructure for all Data Centers.

**Experience**
- Experienced veteran networking team
- Execution track record

**End to End Product Portfolio**
- Multiple generations of Eth Switch, embedded processors and Phy products
- Complementary products (e.g. Storage) from Marvell rich portfolio

**Innovation**
- Differentiating, feature rich, highest capacity DC switch
- Modular architecture and scalable design
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