Switch Chip panel discussion

Moderator: Yoshihiro Nakajima (NTT)
Goal

• To share vision and direction of future switch chip for next generation networking
  • Requirements
  • Movement on whitebox switch and network OS
  • open API and SDK
Panelist

• Eli Karpilovski  
  (Director, Product Marketing, SDN/Cloud Eco-System, Infrastructure and Networking/XGS, Broadcom)

• Benny Koren  
  (VP of Architecture, Mellanox)

• Prem Jonnalagadda  
  (Product line manager, Barefoot)

• Sachin Gandhi  
  (Director of Marketing, Cavium)
Agenda

• Switch panel introduction (Yoshihiro)
  • Trend and movement
  • Market and application
• Switch chip company introduction
  • Broadcom (Eli)
  • Mellanox (Benny)
  • Barefoot (Prem)
  • Cavium (Sachin)
• Discussion
  • Requirements for next generation switch chip
  • SDN features support on switch chip
  • Supporting emerging applications
  • Whitebox switch and switch APIs
Switch panel introduction

Yoshihiro Nakajima
What is switch chip?

A whitebox ToR switch
Gartner Networking Hype Cycle 2015

Ethernet roadmap

Source: Ethernet alliance http://www.ethernetalliance.org/roadmap/
Target 1/3 (Hyperscale datacenter)

More Tbit-class bandwidth and port density. Less latency (100 ns level).

Source: Ethernet alliance
http://www.ethernetalliance.org/roadmap/
Target 2/3 (Service Provider)

Packet Encap/Decap

Increase # of route and MAC entry

Source: Ethernet alliance
http://www.ethernetalliance.org/roadmap/
Target 3/3 (Enterprise and campus)

Enterprises consume more Ethernet ports than the other environments by connecting desktop computers, devices and Voice over IP (VoIP) phones. The wired Ethernet networks are supplemented with wireless access points (WAPs) that are connected to Ethernet cables. 802.11ac WAPs are driving the need for 2.5 and 5GBASE T and eventually 10GBASE T. Most enterprise data centers are less than 10,000 sq ft and use Cat "x" cabling to connect to servers.

Source: Ethernet alliance
http://www.ethernetalliance.org/roadmap/
Market trends of networking infrastructure for servers

- **CPU:** Increasing # of CPU cores
  - Intel Haswell E5 Xeon 18 cores / CPU socket
  - Cavium ThunderX 48 cores / CPU socket

- **Memory:** Increasing size and speed
  - Size: up to 2 TB
  - Speed: 400Gbps class

- **NIC:** Increasing interface speed
  - From 10GbE to 40GbE or multiple 25GbE or 50GbE on single node configuration
  - 100GbE on multiple-node configuration
Future Switch Chip?

- Future?
- NOW
- Future?
- Future?

Bandwidth:
- 10 M route
- 100K route
- 1 Tbps
- 40 Gbps
- 10 Tbps
white box switch and open source network operating system

• Many ODM vendors provide whitebox switch hardware
• Network operating system and tools for whitebox switch
  • Cumulus
  • OcNOS
  • OpenSwitch
  • Open Network Linux
  • ONIE
  • FBOSS
Switch abstraction for NOS and network control management system

• Open API and SDK for network operating system
  • OpenFlow
  • OCP SAI
  • Open Ethernet
  • Broadcom OpenNSL, OF-DPA
  • Linux kernel netlink
Switch ASIC company introduction
Switch ASIC company introduction (5-10 min by each company)

• Presentation on vision and direction of switch ASIC for next generation networking
  • high performance
  • improving functions and programmability
• Products
  • APIs and SDK

• Broadcom (Eli)
• Mellanox (Benny)
• Barefoot (Prem)
• Cavium (Sachin)
Discussion
1. New requirements for next generation networking

• What is most significant aspects for ASIC/silicon chip set on networking switches in next 5 years?
  • High-performance (Bandwidth, scalability, latency)
  • functionality and protocol supports
  • Data plane programmability
  • Open API and SDK
2. SDN aspects

• Evolution of cloud computing and NFV are pushing networking trends to SDN strongly. What features are you planning to add to switch ASIC in the next 3 years?

• The switch ASIC design and implementation may be affected by new applications, such Internet of Things (IoT) and innovated big data analysis. What kind of changes happen in the next 3 years in switch ASIC design?
3. Network virtualization

• Server virtualization technologies recently leverages overlay-typed networking virtualizations. Lots of changes in tunnel protocol formats have happened in these last 5 years, but it is so difficult to acquire deep knowledge of so many protocol formats which are rapidly developed.

• How do you catch up them immediately?
• How do you realize high-performance and scalability with tunnel protocol processing such as VxLAN, NSH, GRE, and MPLS on switch chip?
• What strategy do you have for emerging technologies such as SD-WAN, SDN applications, WAN optimization and service function chaining?
4. White box switch and Switch APIs

• What level of switch abstraction (API, SDK) is better for network OS developer and engineers from the network operating system point of view?

• What is interoperability in era of whitebox switch and open-API?

• What's next target or potential area of whitebox switch?