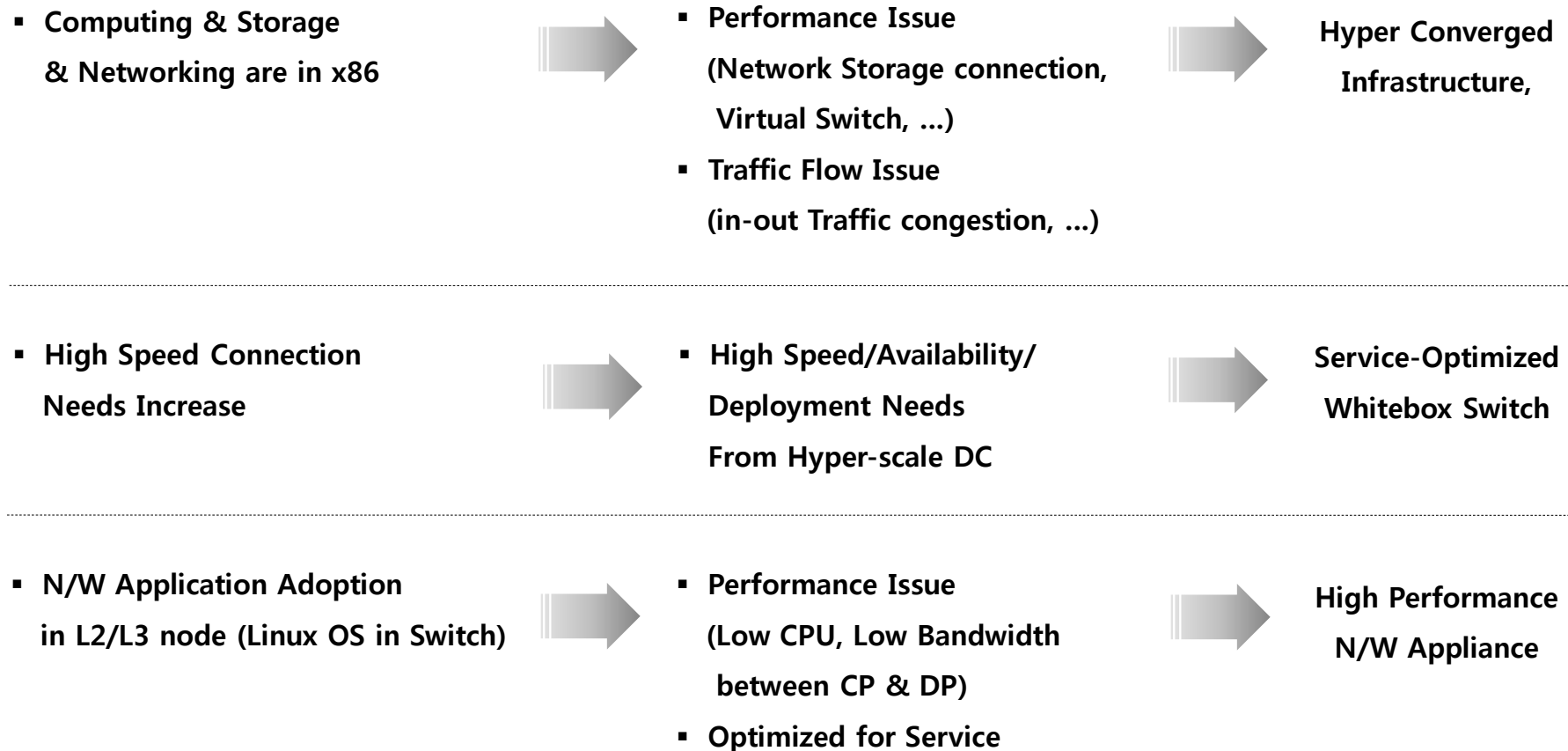


T-CAP (Converged Appliance Platform)

2016. 6

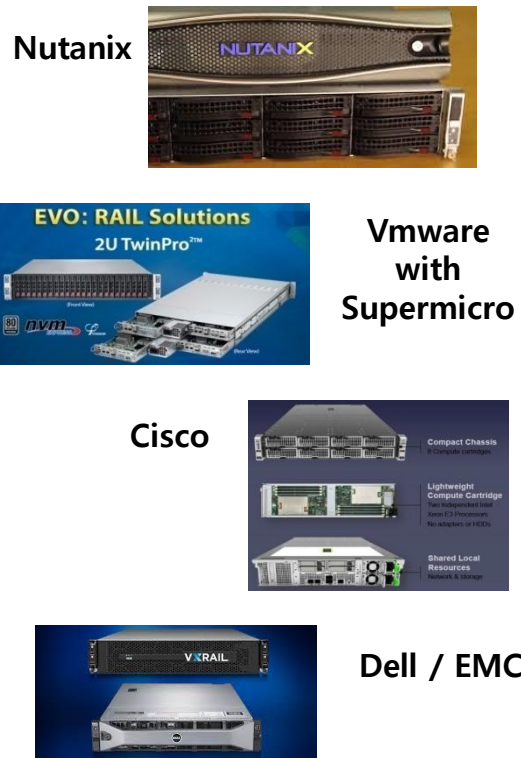
Data Center Networking is changing.

→ New Architecture for Virtualization, Big Storage, Overlay N/W, ...



Open Hardware Architecture for Software defined & Service optimized Infra

Hyper-Converged System



Service-Optimized Whitebox Switch

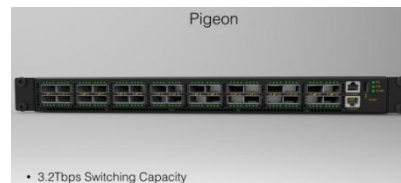
Facebook



Google



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High Performance N/W Appliance

Znyx, Pluribus, ...





**Converged N/W Appliance, with High Performance Server & Data Center Switch,
as a Flexible & Cost-effective NFV Solution & Service-optimized Hybrid N/W Solution**

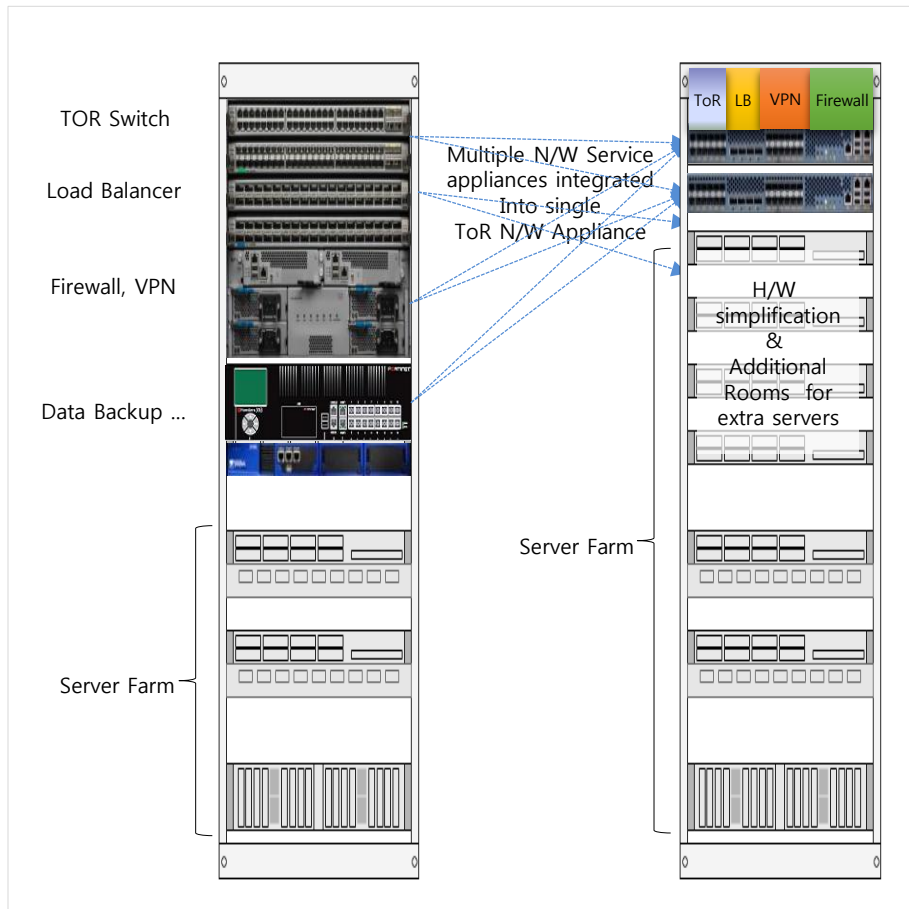


Converged Network Appliance
(CNA-SSX2RC)

- **Provides L2/L3 Functions & N/W Application Services**
 - L4, Security, Network Analytics, etc.
 - extensible based on 3rd Party Applications
- **Supports multi-OS & Virtualization Environment**
 - Linux KVM, Vmware ESXi for x86 Server Environment

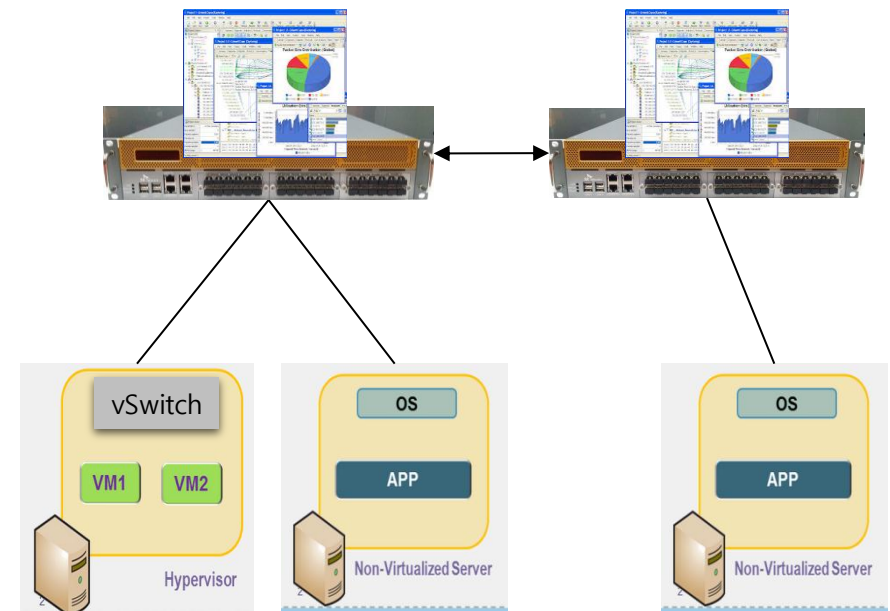


Integrated Network Service Appliance



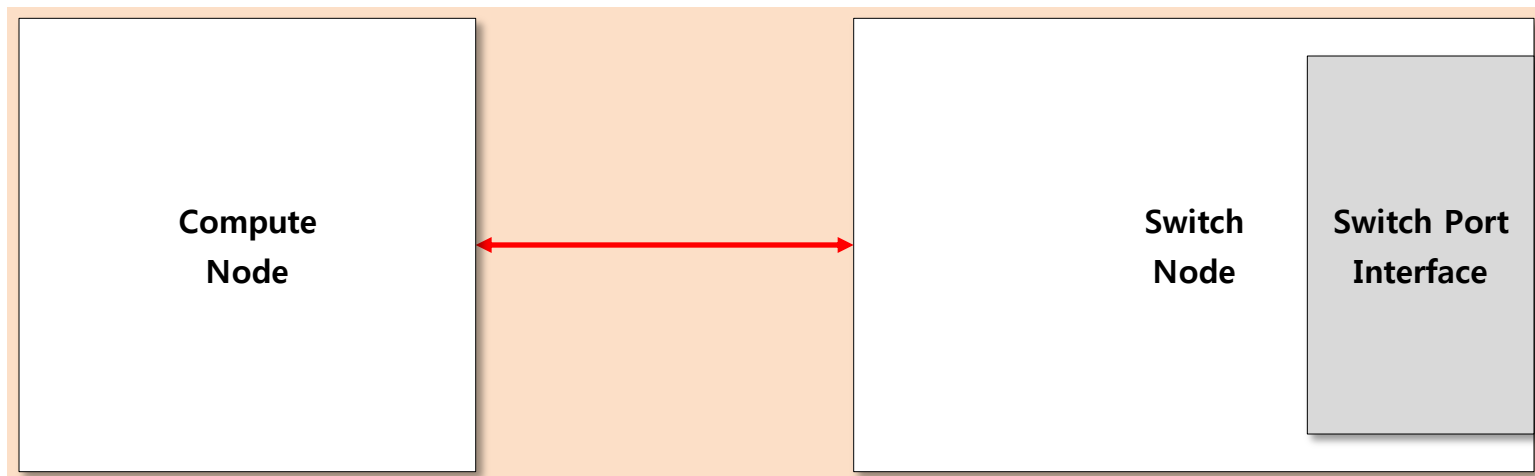
Network Analysis

Performs Inline Analytics for the traffic through ToR switch





Appliance H/W Architecture Requirements



- **High Speed Xeon CPUs**
- **Multi Host Option**
- **PCIe Slots for Options**
(Flash Accelerator,
HBA for Storage, etc)
- **Internal Storage Option**

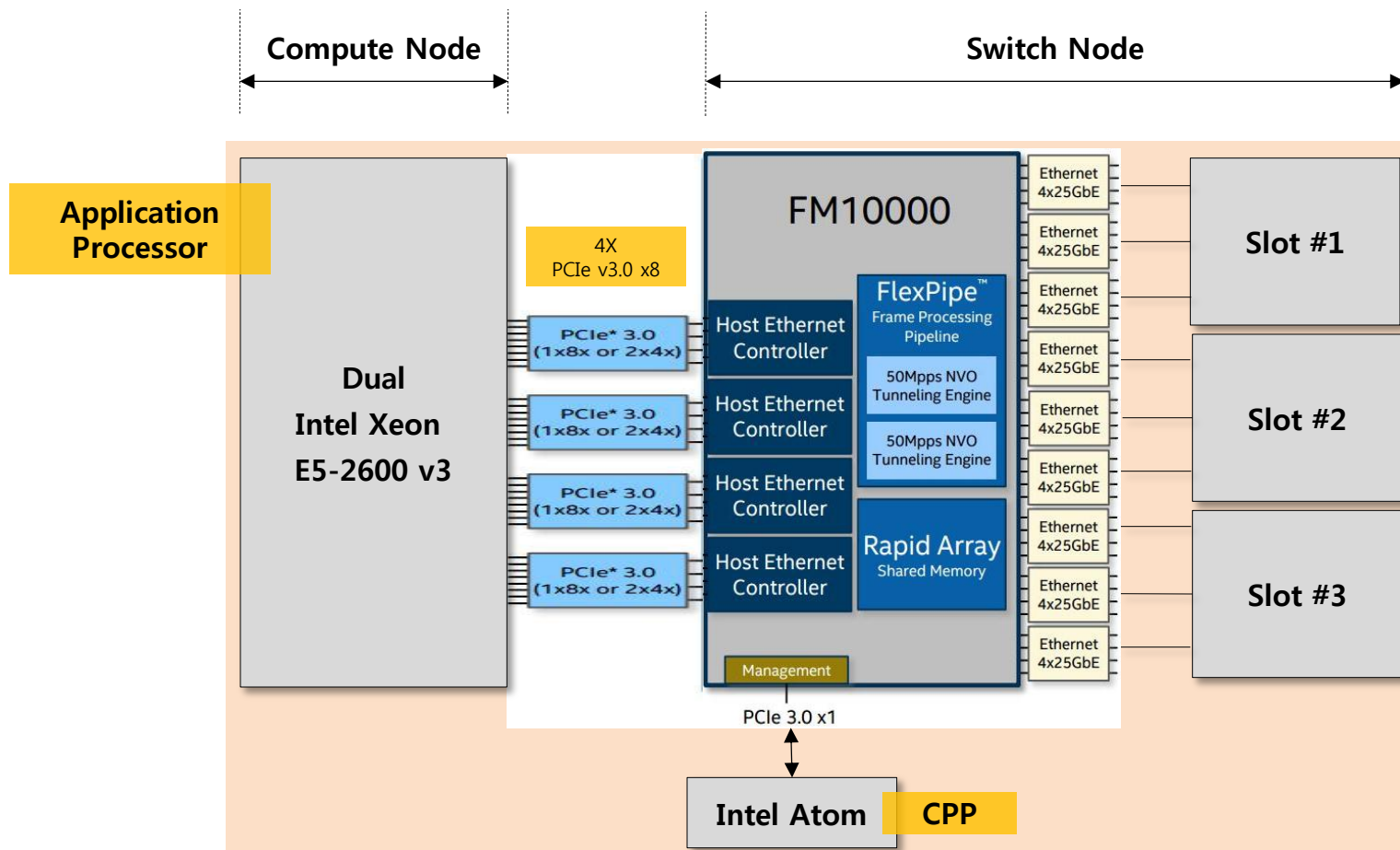
- **High Bandwidth**
Between
Compute node &
Switch node

- **Data Center grade**
Switching Capacity
- **Dedicated CPP**

- **10G/40G Interface**
- **25/50G Standard**
supported
- **Modular Architecture**

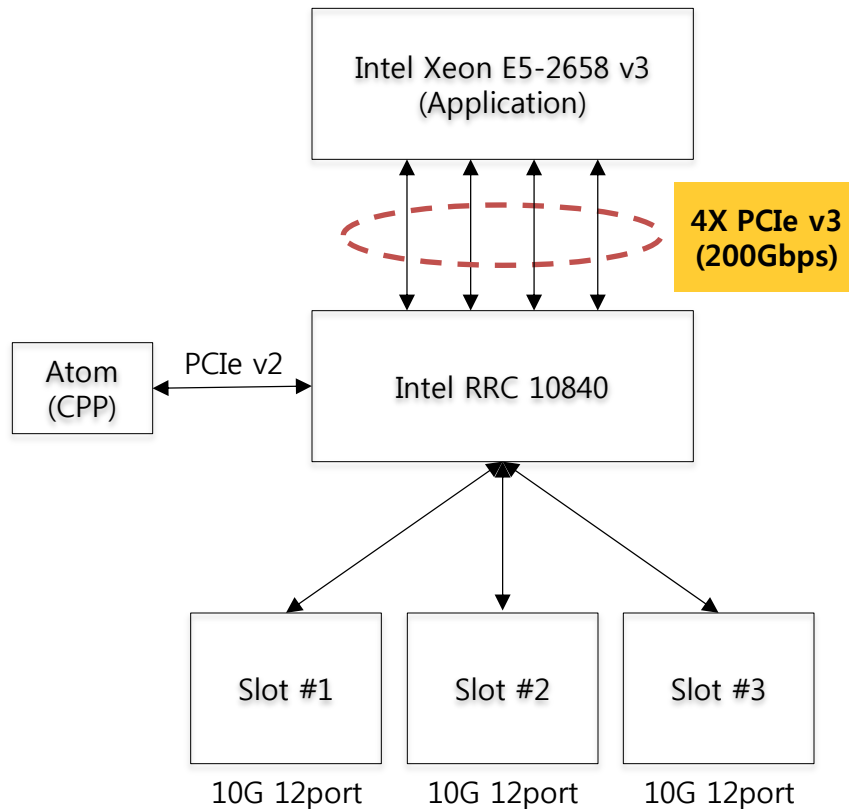


Dual Xeon E5 Compute Node + Intel RRC based Switch Node

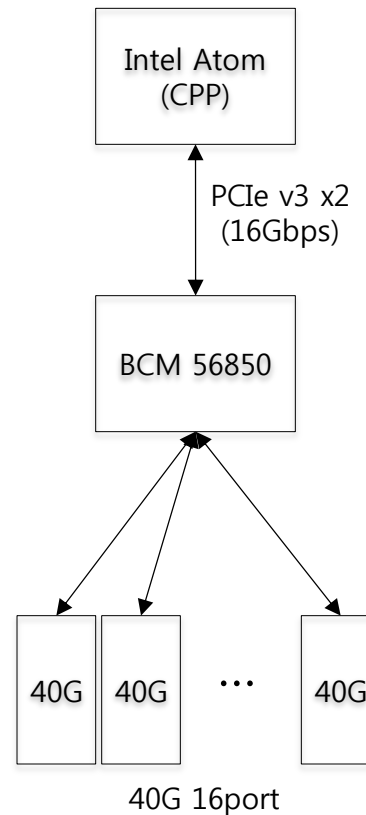




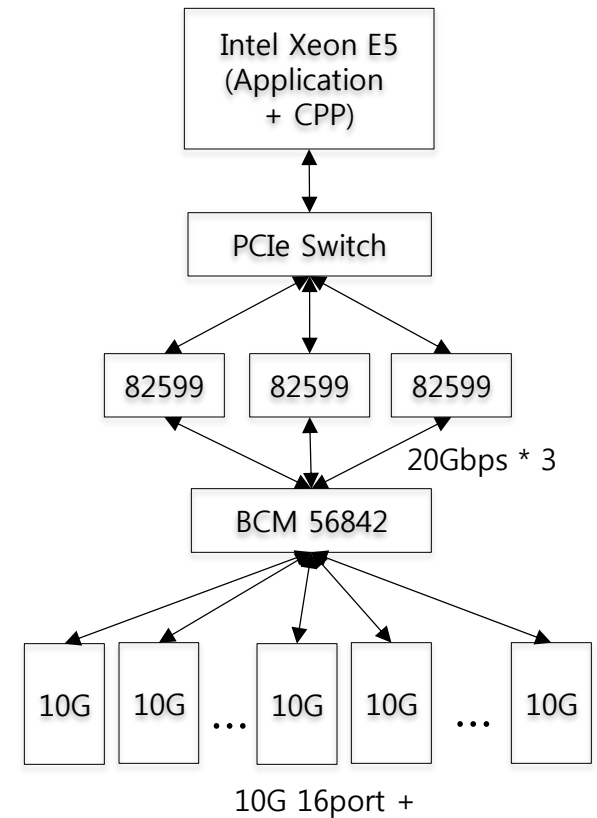
**T-CAP
(RRC based)**



**40G Switch
(Trident2 based)**



**N/W Appliance
(Trident+ based)**

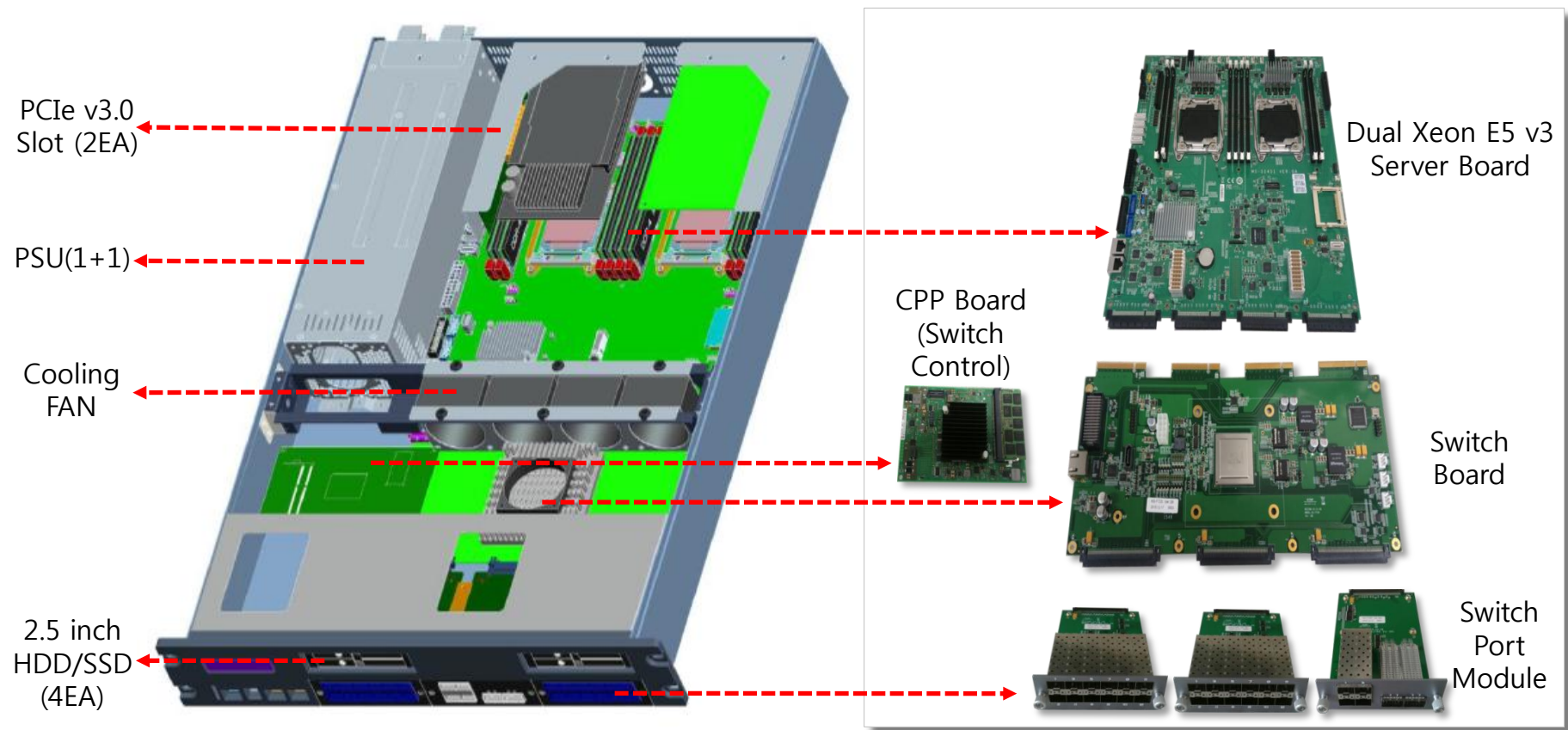




H/W Specifications

- 2U / 19 inch Rack-mount type
- Dual Intel Xeon E5-2600 v3 CPU (Haswell-EP) Compute Node + Intel RRC based Switch Node
- Front Loading Switch Port Module모듈 (10G 12 Port / 10G 4 Port + 40G 2 Port)
- 4x 2.5 inch SATA HDD/SSD Front Hot-swap Bay
- 2x PCIe Gen3 Slots as rear side (Flash Accelerator, HBA, RAID card and more, supported)
- 1+1 Redundant PSU (Power Supply Unit)
- Front & Rear Panel Air hole, Internal Flow Guide for Cooling Optimization







Server Mainboard

- Intel Xeon E5-2600 v3 Processor (Dual Socket)
- Max 256GB Memory DDR4 RAM
- PCI Express Slots for Flash Accelerator, HBA Card, ...
- PCIe v3 interface (4EA) for connecting Switch Board



Switch Board

- Intel RRC N/W Controller based
- PCIe v3 interface (4EA) for connecting Server Board
- Modular type Ethernet Interface Slot (3 EA)
 - 10G & 40G supported
 - 1G/2.5G/5G/25G/50G/100G supportable





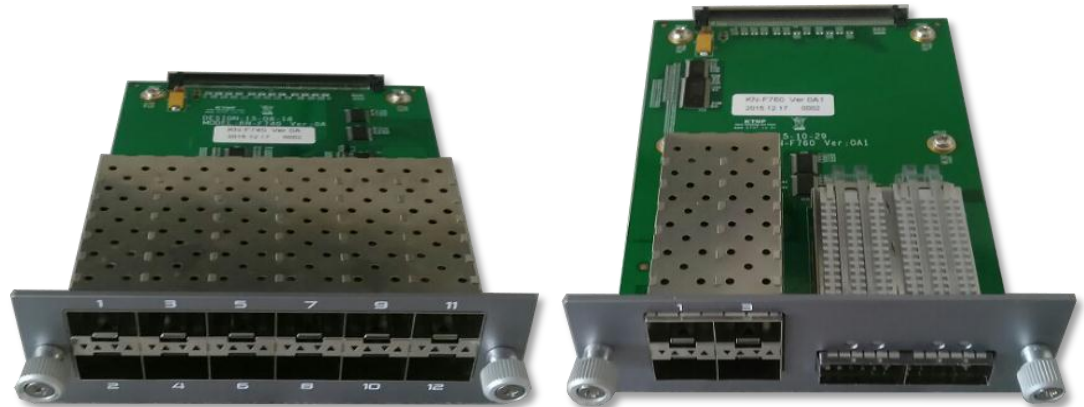
CPP(Control Plane Processor) Board for Switch

- Intel Rangeley/Avoton CPU based
- SATA-DOM for OS Boot
- 2x USB2.0, 1x External Console(RJ45 Type), 1x GbE for Management



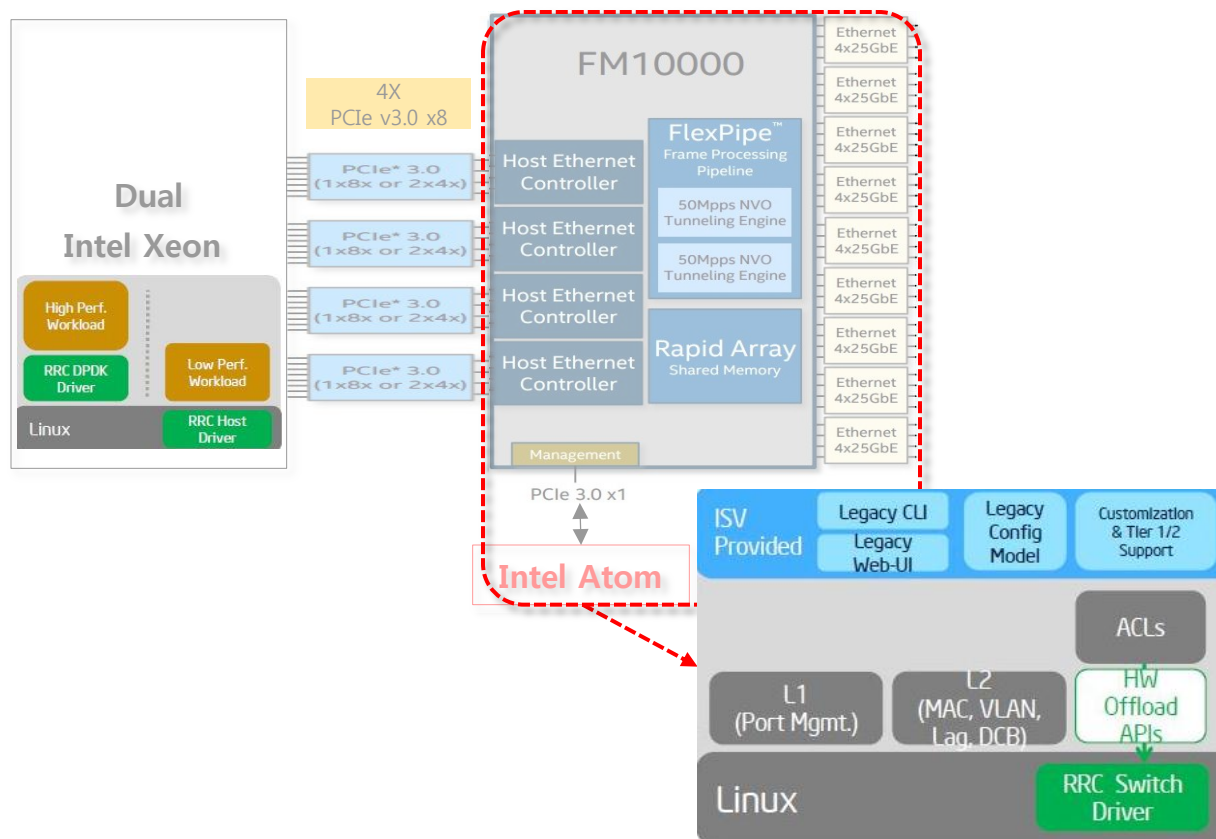
Ethernet Module

- Front Loading type Ethernet Daughter card
 - 12 port 10G Daughter card
 - 4 port 10G & 2 port 40G Daughter card





Open Architecture based Network OS – Commercial & Open Source NOS



Partnership with Commercial NOS

- IPI OcNOS / Launch in July '15
- Quick deployment with advanced Features

Open NOS Integration

- OpenSwitch and other
- Integration roadmap with SDN Platform



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SK Telecom to Integrate IP Infusion's OcNOS™ Network Operating System Into Their Converged Network Solutions for Mobile and Customers Networks

OcNOS solution allows for new, innovative services to be launched faster and more cost effectively

June 07, 2016 11:00 AM Eastern Daylight Time

SANTA CLARA, Calif.--(BUSINESS WIRE)--IP Infusion, Inc., a leading provider of intelligent network software for telecom and data communications services, today announced that SK Telecom, Korea's largest telecommunications company, will use the OcNOS network operating system as part of their open networking strategy to deliver enterprise and carrier-grade solutions, which will allow them to reduce network costs, increase flexibility, and to deploy new features and services quickly. In addition to integrating OcNOS as the network operating system for their own networks, SK Telecom will provide its networking solution combined with OcNOS to networking customers.

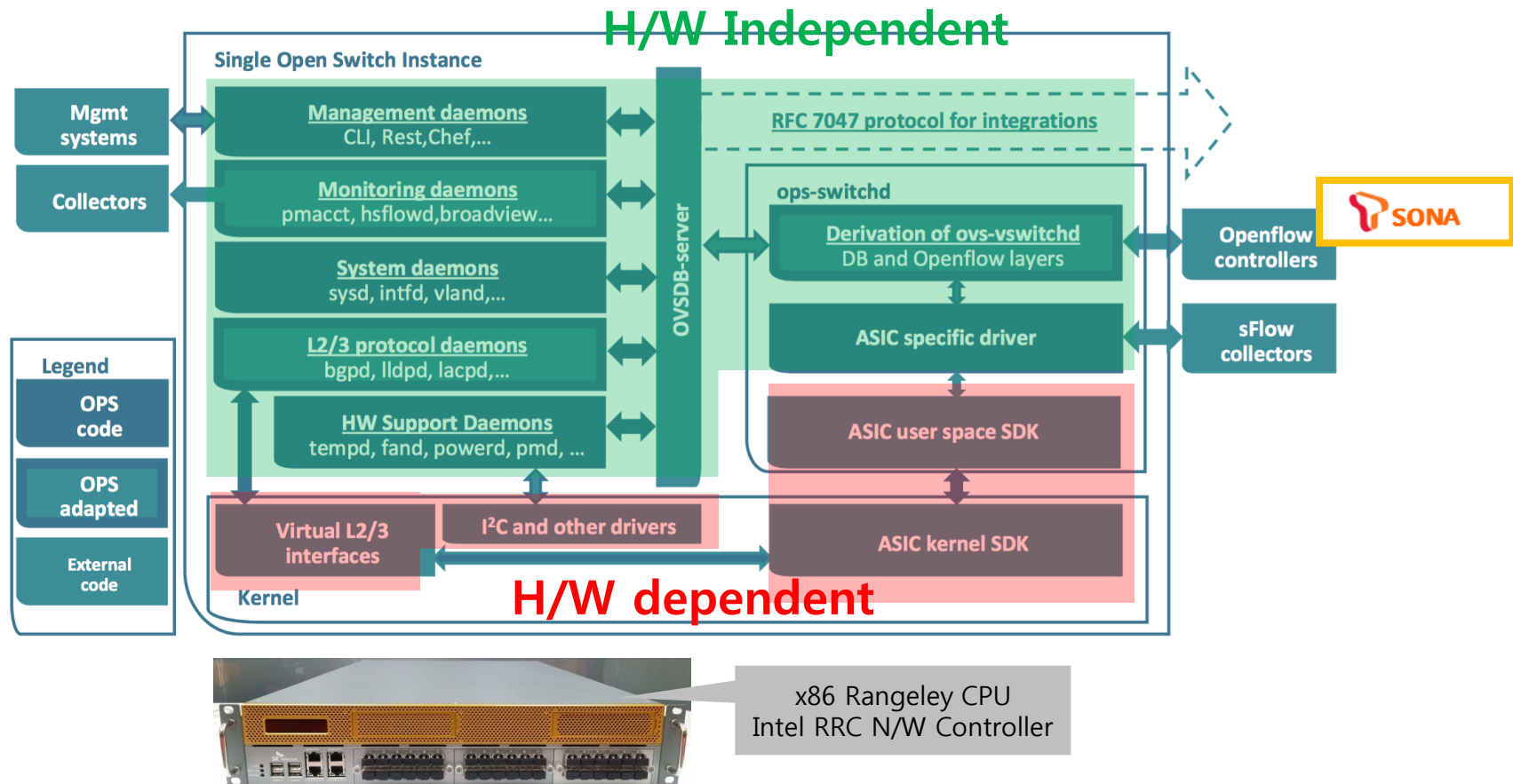
"We are proud to work with SK Telecom to deliver solutions that require less time and lower capital and operating expenditures."

SK Telecom is creating a converged network appliance (i.e. T-CAP), based on open networking architecture combining a high performance server and a data center scale switch together, as part of their strategy to build modular data center solutions for services at the edge to serve VNF and mobile computing needs. With this approach, the carrier can move service intelligence distributed and closer to the edge of the



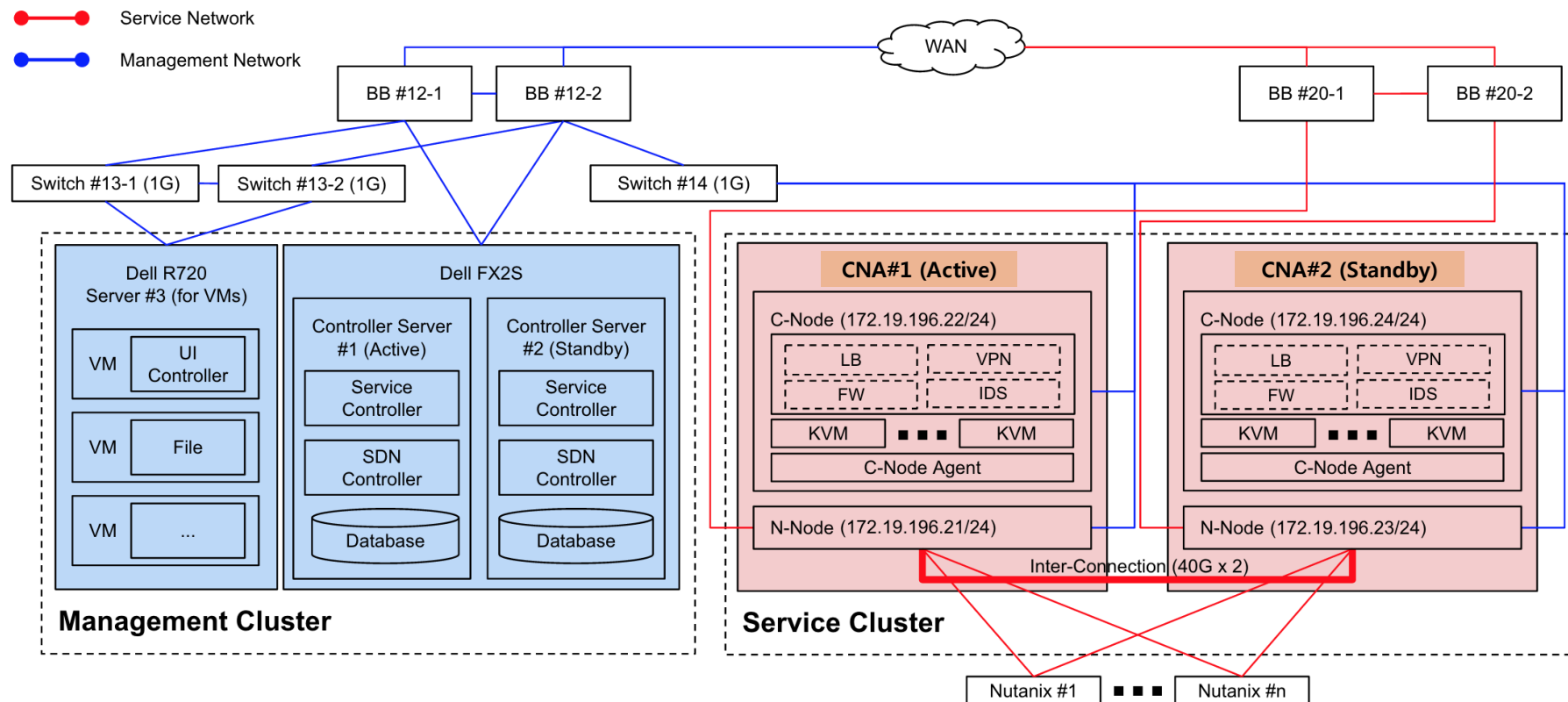
Requirement	Feature
Layer2	Virtual LANs with Port-based VLANs
	IP Subnet-based VLAN classifiers
	Broadcast/Multicast/Unknown Unicast Storm Recovery
	Jumbo Ethernet Frames
	Static MAC Filtering
	MAC based VLANs
Layer3	Ethernet ARP
	Transmission of IP Datagrams over Ethernet
	IP Broadcast
	IP Broadcast in the Presence of Subnets
	IP Subnetting
	ICMP Router Discovery Messages
	Classless Inter-Domain Routing (CIDR): an address assignment and aggregation strategy
	Classless Inter-Domain Routing (CIDR): an address assignment and aggregation strategy
	Requirements for IP Version 4 Routers
	Route Redistribution across OSPF and BGP
	VLAN Routing
	Dual IPv4 / IPv6 TCP/IP Stack
	Border Gateway Protocol, Version 4
	Capabilities Negotiation with BGP-4
	BGP Support for Four-Octet AS Number Space
	Open Shortest Path First Version 2
	OSPF Enhancement for NSSA/AS-External and Reducing CPU Loads
	Passive Interface Support for OSPFv2
	OSPF Not-So-Stubby-Area (NSSA) Option
	Passive Interface Support in OSPFv3

Requirement	Feature
QoS	DiffServ Field in IPv4/IPv6 Headers
	Architecture for Differentiated Services
	QoS Access Control Lists (ACLs) Permit/Deny for Inbound/Outbound IP traffic based on:
	a) Type of Service (TOS) or DiffServ (DS) DSCP field b) Source IP address c) Destination IP address d) IP Protocol Number
	QoS Class of Service (CoS) direct user configuration of the following:
	a) IP DSCP to Traffic Class Mapping
	b) Interface Traffic Shaping Rate
	c) Minimum and Maximum Bandwidth Per Queue d) WRR/WFQ/SP Scheduling Per Queue
VxLAN	VxLAN tunneling for IPv4
xSTP	Spanning Tree (STP)
	Multiple Spanning Tree Protocol (MSTP)
	Rapid Spanning Tree (RSTP)
	Rapid Spanning Tree (RSTP) optimization for rings
VRRP	Virtual Router Redundancy Protocol (VRRP) for IPv4
OpenFlow	Multiple Flow table Support
	Connecting to multiple controllers for HA Hybrid Mode Support (May need to understand the level of hybrid support in the Intel)
Hardware Diagnostic	Over temperature protection
	Fan control
	Power: Current and Voltage monitor
System Information	CPU and Memory usage
	LED settings
	Board Serial Number/Device Identifier, MAC Address
	Part numbers for CPU, FAN, PSU ...
	H/W controller information
Management	BIOS info
	OS Information
	SNMP
	sFlow



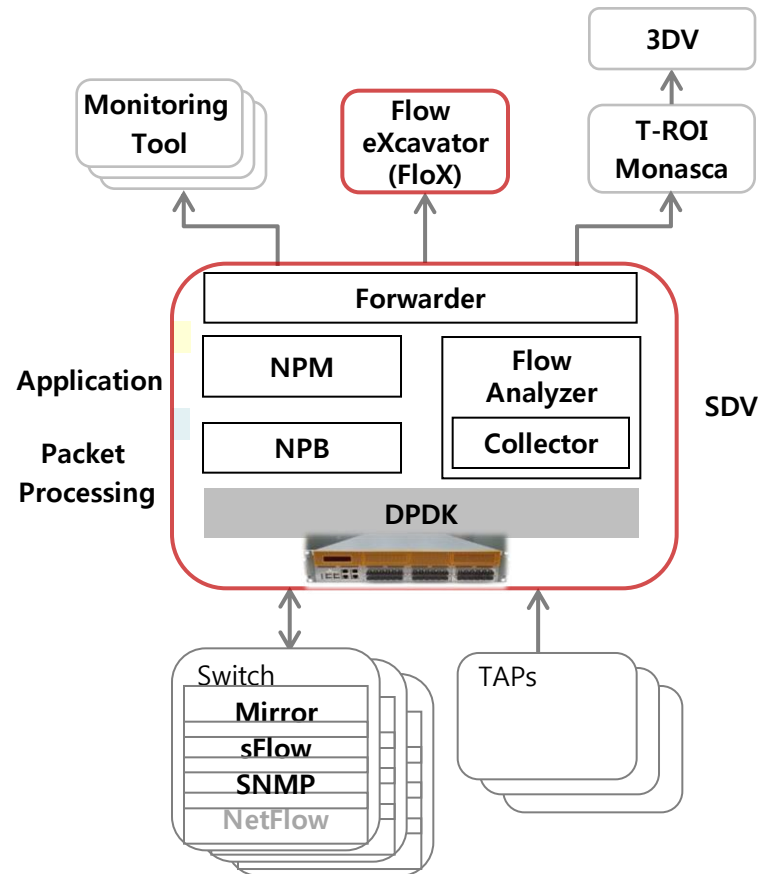


On-Demand N/W Service Platform



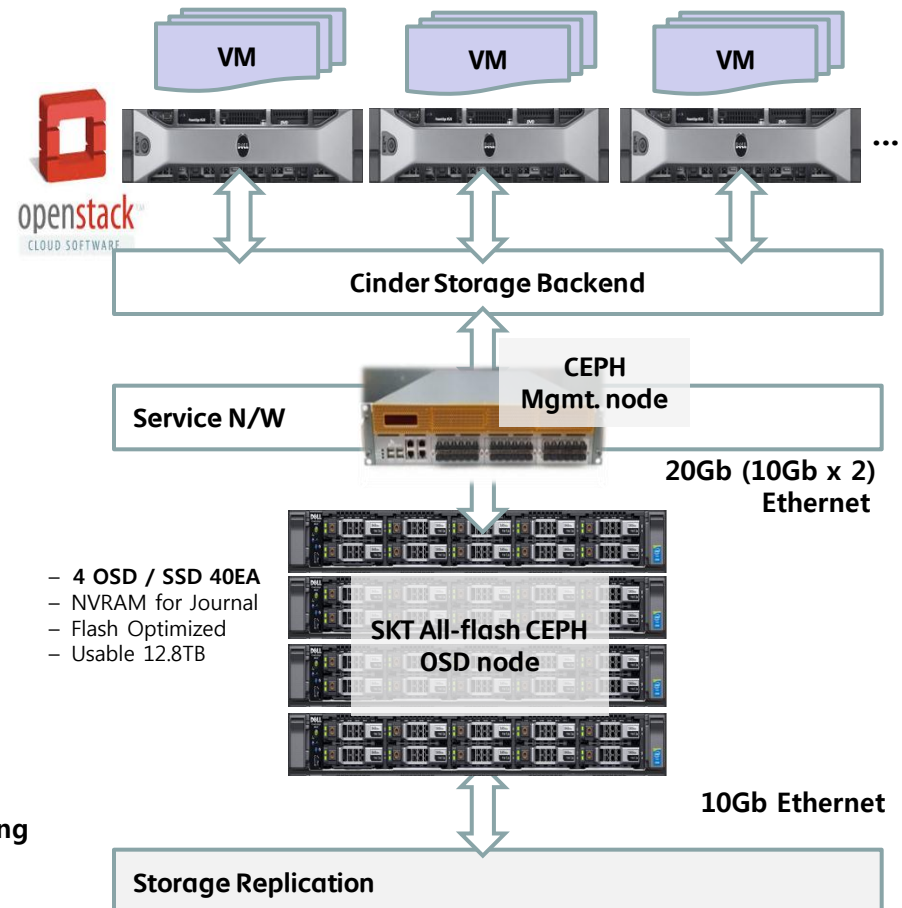


SDV System for advanced monitoring



- NPB : Packet Filtering/Distribution/Copy, VLAN stripping, Time stamping
- Collector : SNMP, sFlow, NetFlow
- Flow Analyzer : s/n/pFlowGen
- NPM : TCP Performance, Link/Flow Statistics
- Forwarder : Packet Forwarding, External I/F, API

AF-Ceph Storage Mgmt. node



- NOS option
- BMC controller support
- More core for Xeon Processor E5-2600 v3 series, 6 to 18 cores
- 100G network interface options
- NFV Applications supported
- 48V power option available
- ...

End

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