Smart Internet Networking: Hardware & Software

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Atto Research

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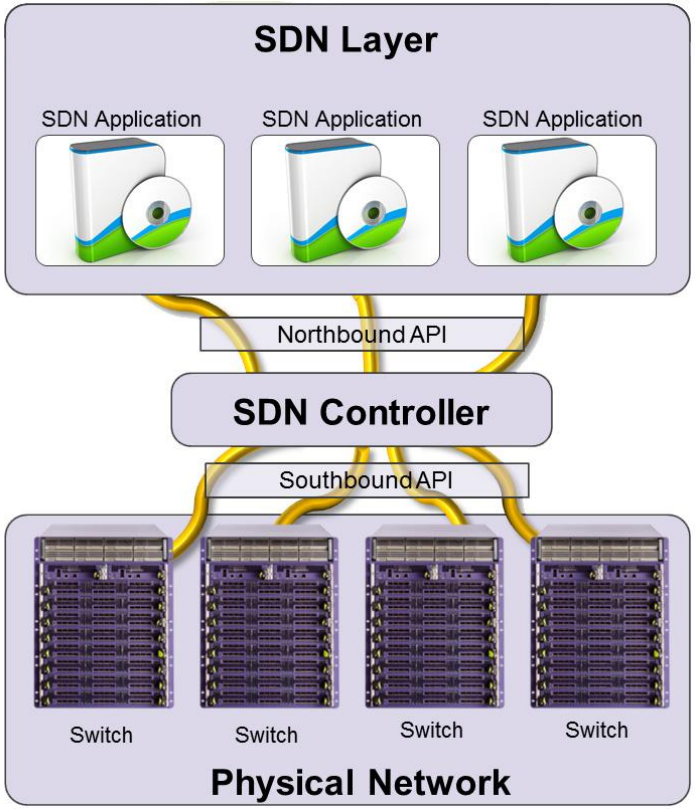
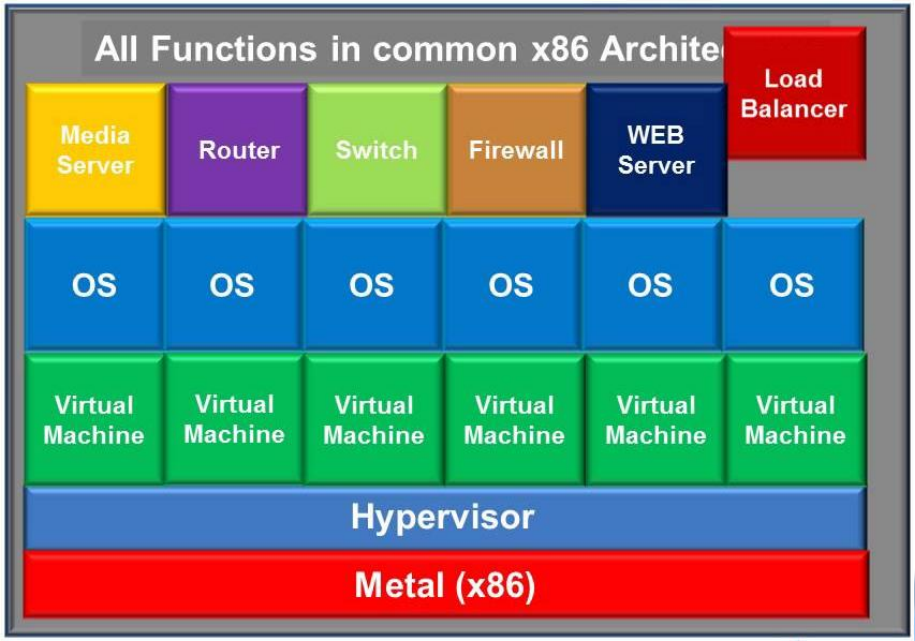
SDN / NFV

SDN and NFV





SDN(Software Defined Network)

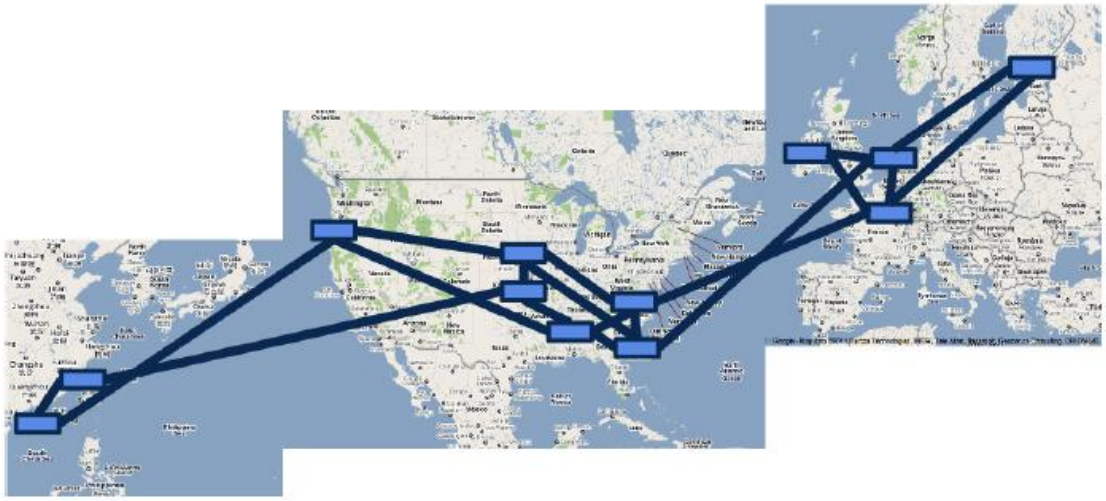
- Control / Data Plane 분리
- 중앙집중 관제
- Software 컨트롤

NFV(Network Function Virtualization)

- General Purpose 하드웨어
- 소프트웨어 네트워크 서비스
- 가상화

SDN Use case: Pseudo Circuit Switching

- **IDC 간 Traffic Engineering (예: Google B4)**
  - 데이터센터 간 연결: 16 곳, 46 링크
  - WAN 회선은 비쌈
  - 사용률 30% -> SDN으로 99% 향상



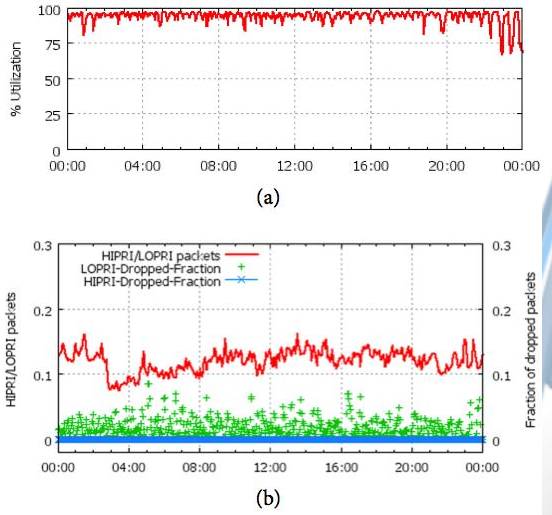
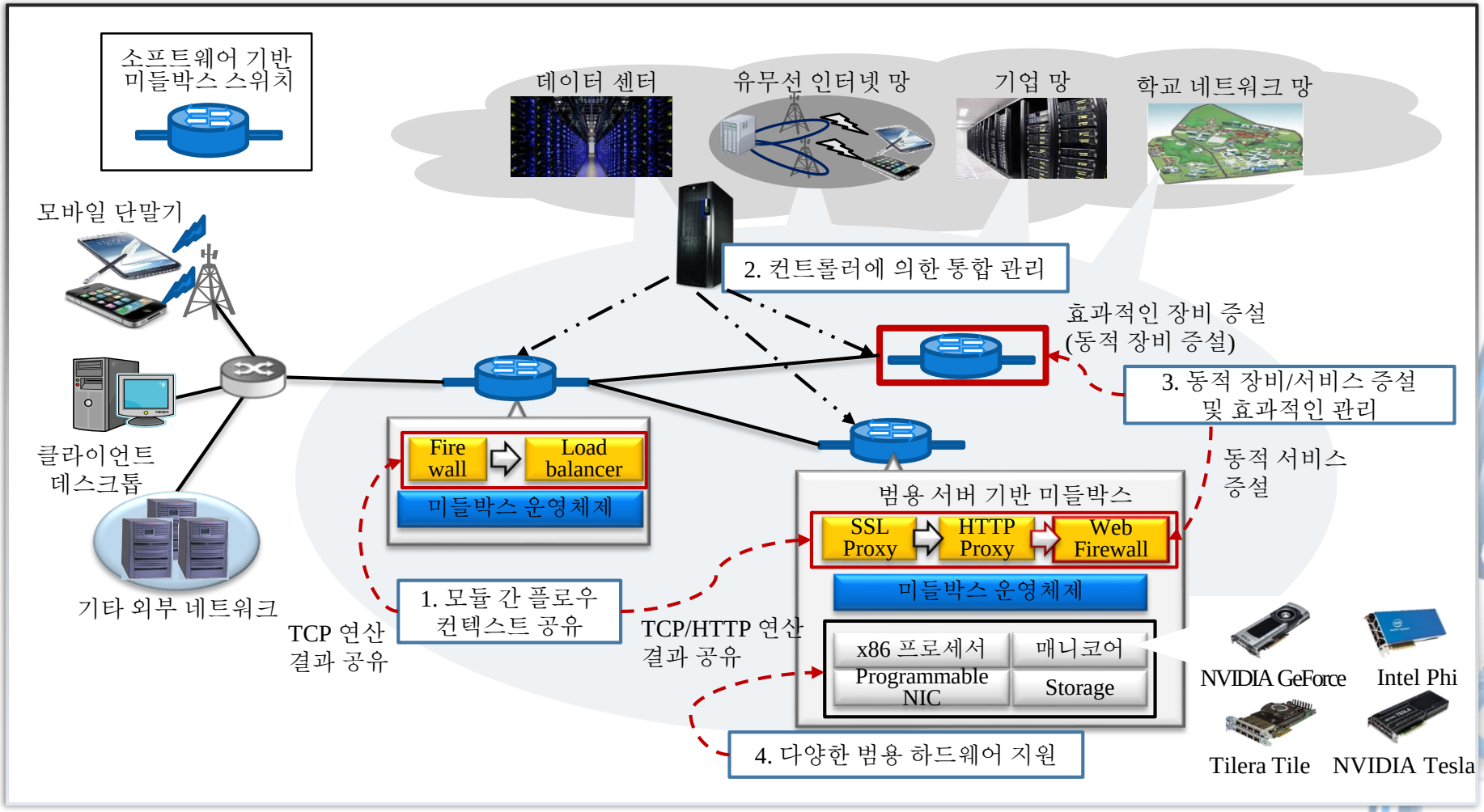


Figure 14: Utilization and drops for a site-to-site edge.

[SigComm13]

NFV Use case: 범용 하드웨어 기반 미들박스

범용 서버 기반에서 고성능의 미들박스 서비스를 제공할 수 있는 스위칭 시스템 설계 및 구현 (Middlebox + Switch)



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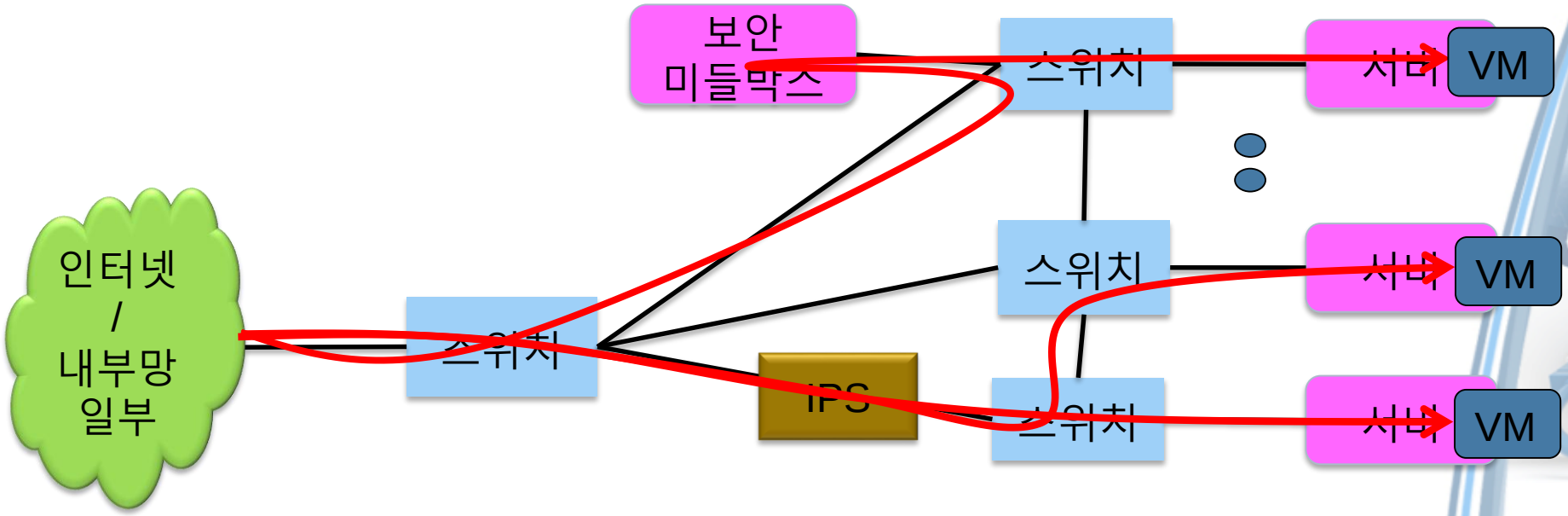
SDN/NFV Use case: Service Steering

◆ Cloud Watcher : SDN/NFV 기반 클라우드 보안 기술

- 문제 : 클라우드 환경에서는 네트워크 edge 단에서의 보안 만으로는 불충분
- SDN : Security-aware routing application 적용
- +NFV : 동적으로 보안 미들박스를 추가 가동



Keywords

- Openness (HW/SW interface)
- Programmability
- Centralized management

Hardware

Openness

Exodus from the black box: WhiteBox

cumulus networks

PICOS FREE TRIAL

WINDGate™

centec networks

▲ Software

Quanta

ADVANTECH

centec networks

▲ Hardware

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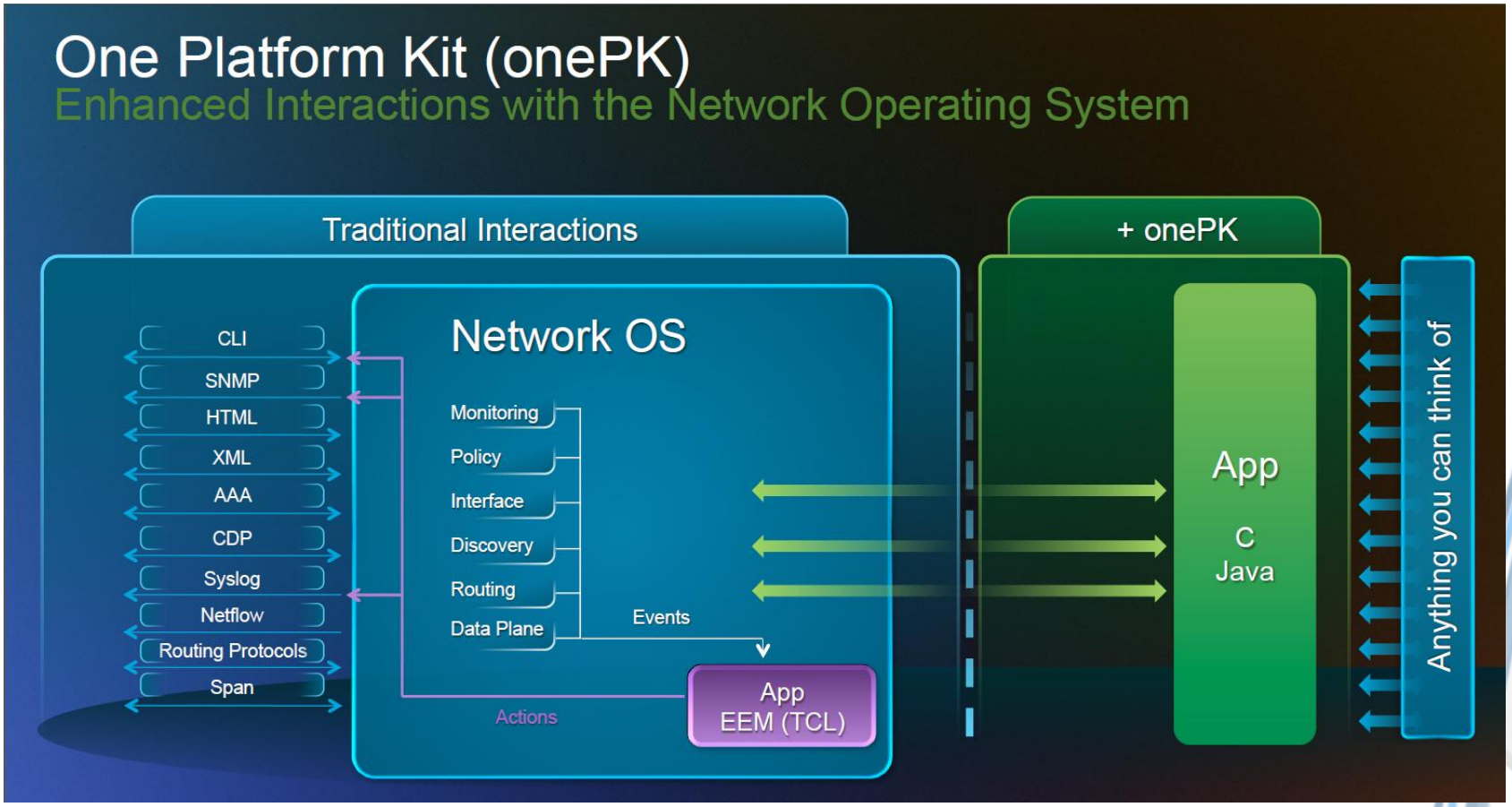
Programmability (1/2)

Special application on the box

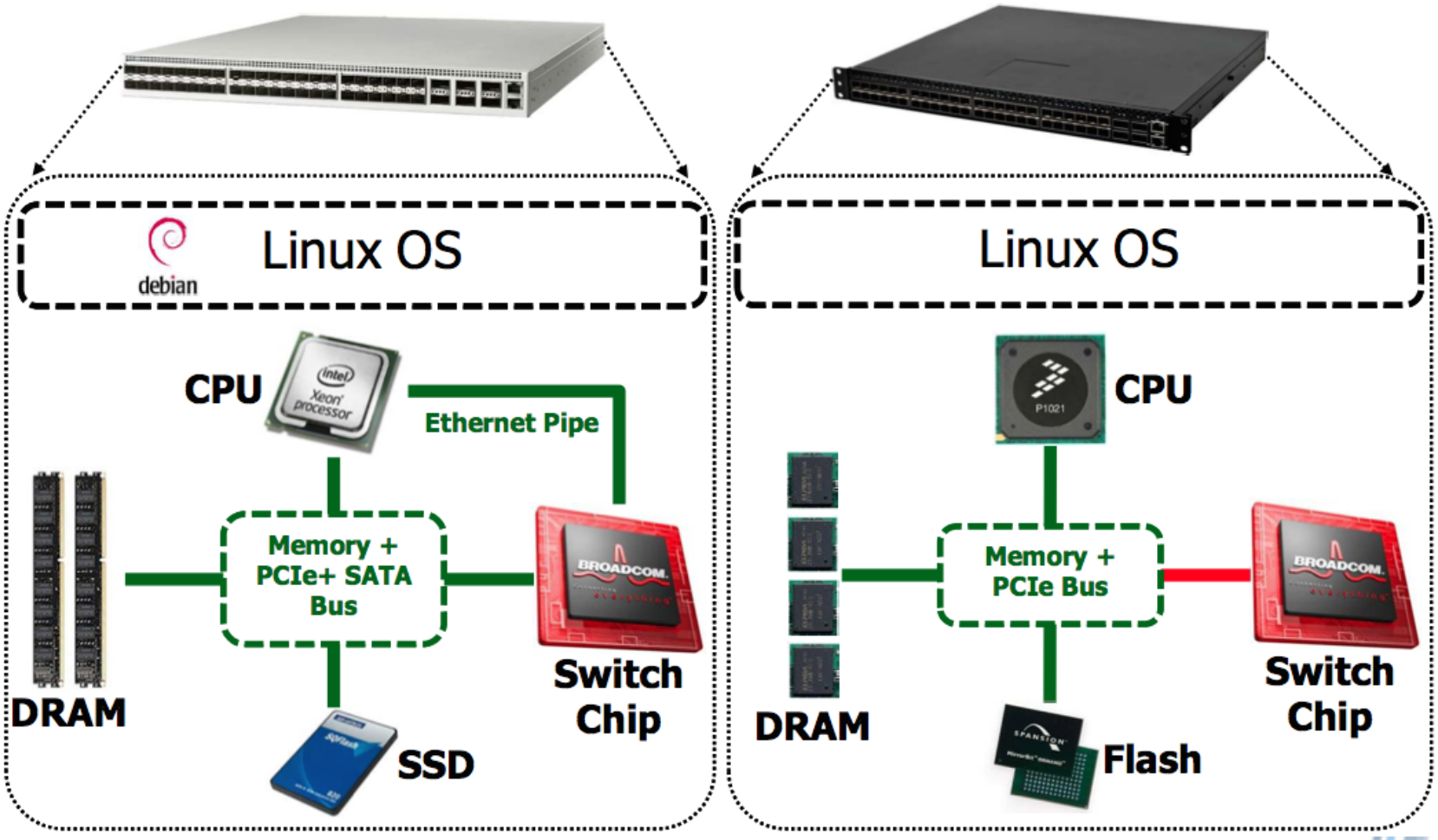


- Source from http://www.cisco.com/c/en/us/products/ios-nx-os-software/onepk.html

* EEM: Embedded Event Manager

Programmability (2/2)

Special box for custom application - concept

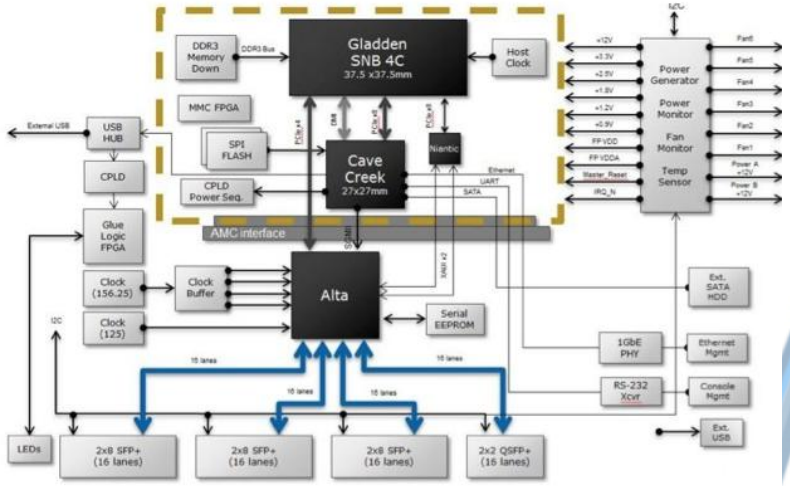


▲ Comparison with traditional switch(from Advantech)

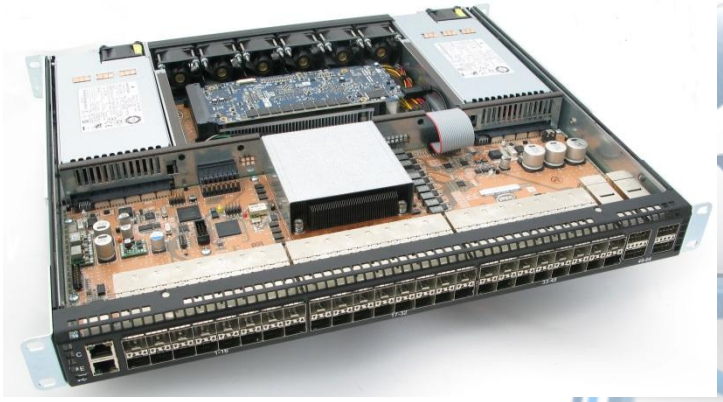
Programmability (2/2)

Special box for custom application - example

- Seacliff Trail H/W 사양
  - **Intel Gladden processor with Cave Creek chipset**
  - **Intel Alta (Ethernet Switch Family)**
  - **RAM: 4GB DDR3**
  - **HDD: 8GB NAND Flash**
  - **48 x SFP+ (480G), 4 x QSFP (160G)**



▲ H/W Block diagram



▲ Chassis Top View

Software

Openness (1/3)

Open Source

openstack
CLOUD SOFTWARE

Quagga

OpenFlow

strongSwan

libvirt

HAPROXY
Powering Your Uptime

WINDGate™

OPEN
DAYLIGHT

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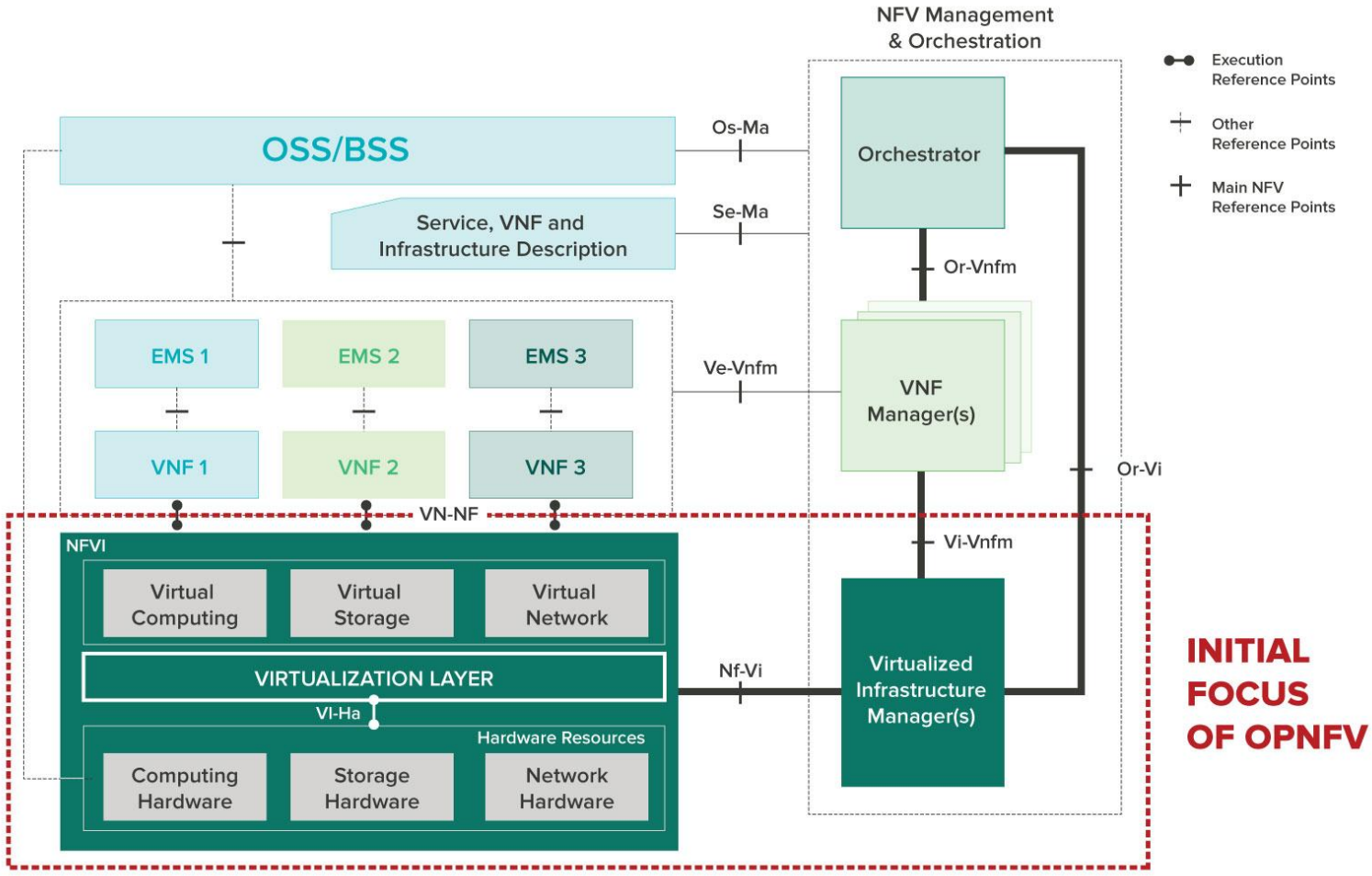
Openness (2/3)

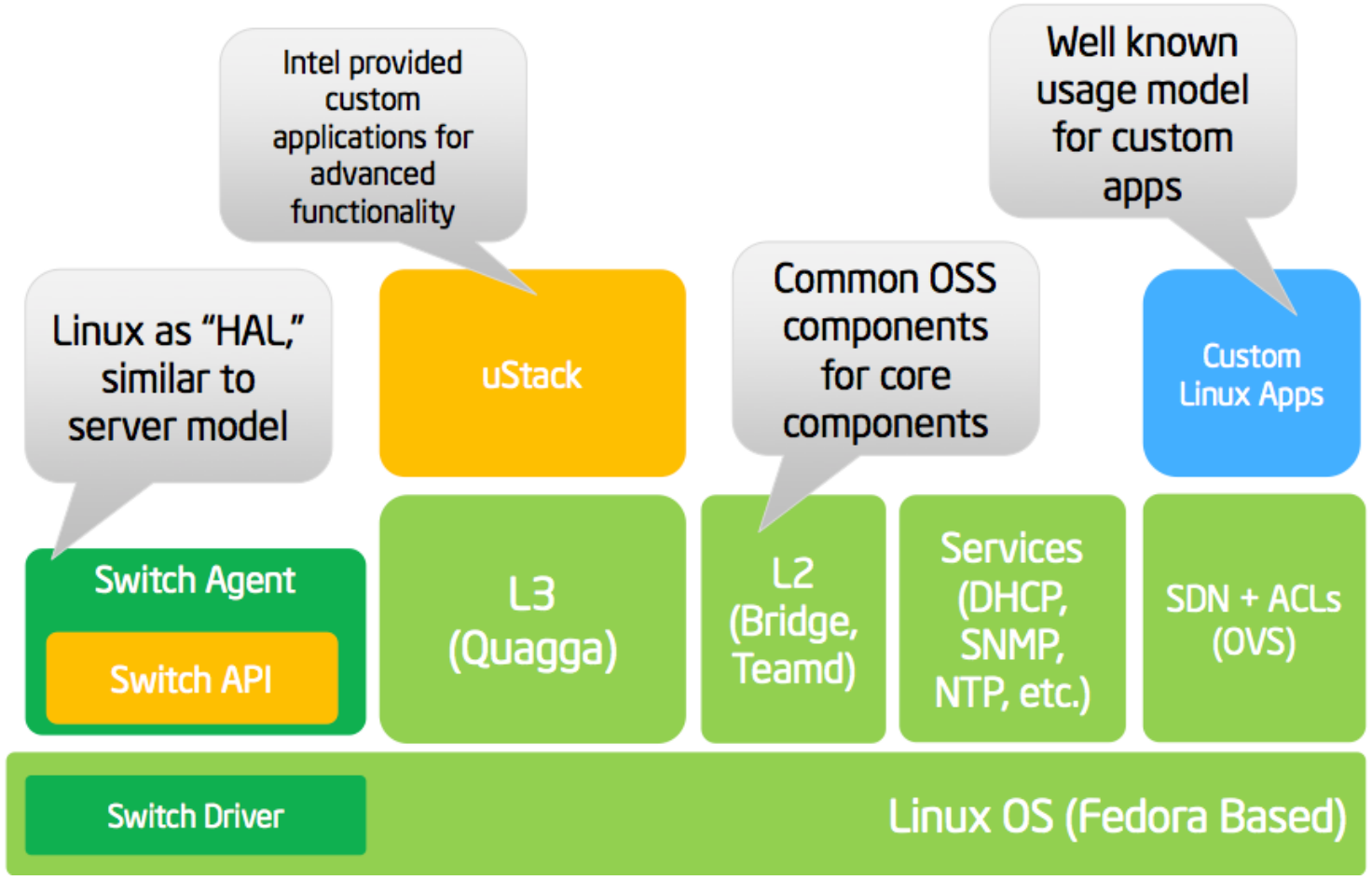
Open Platform OPNFV



▲ Architectural overview from opnfv.org

Openness (3/3)

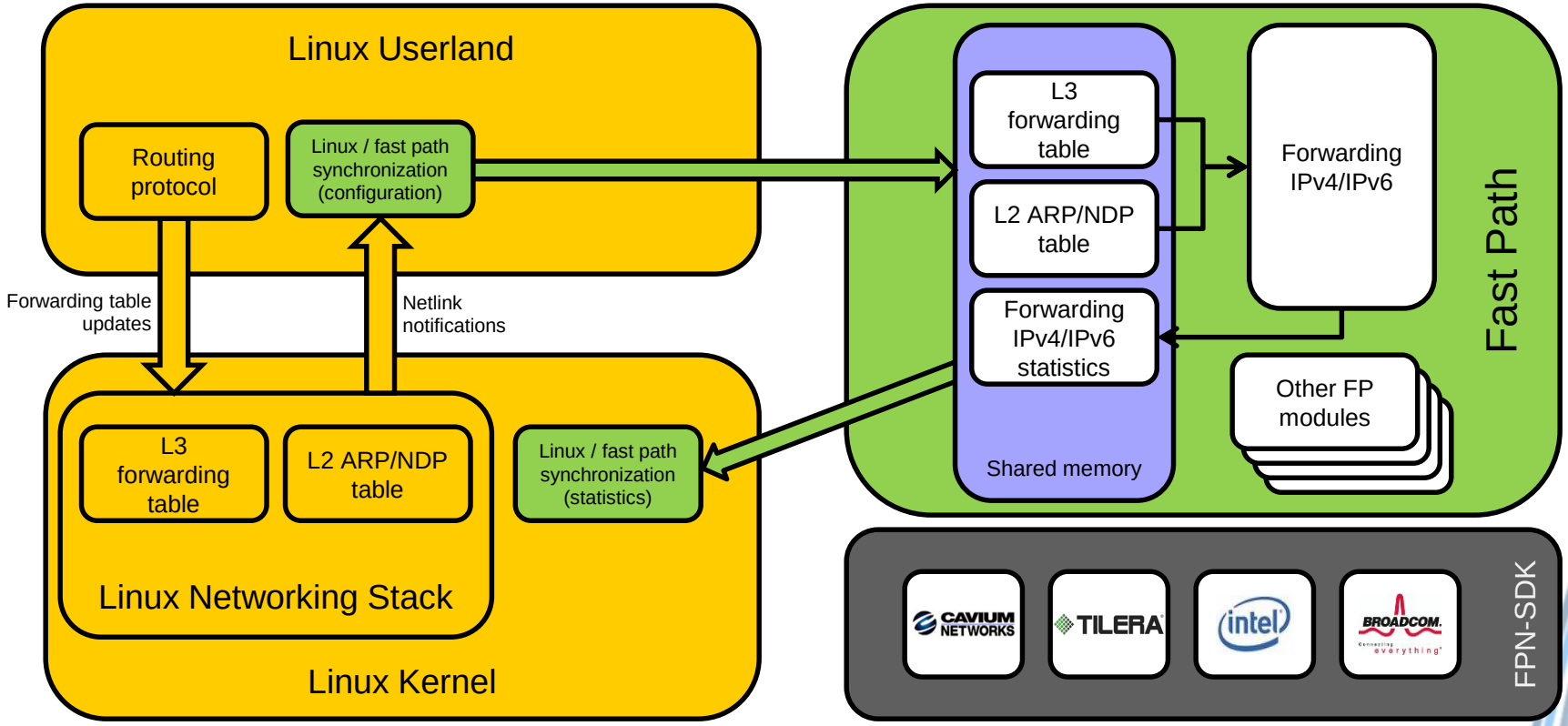
Backward compatibility #1



▲ Intel ONS architecture

Openness (3/3)

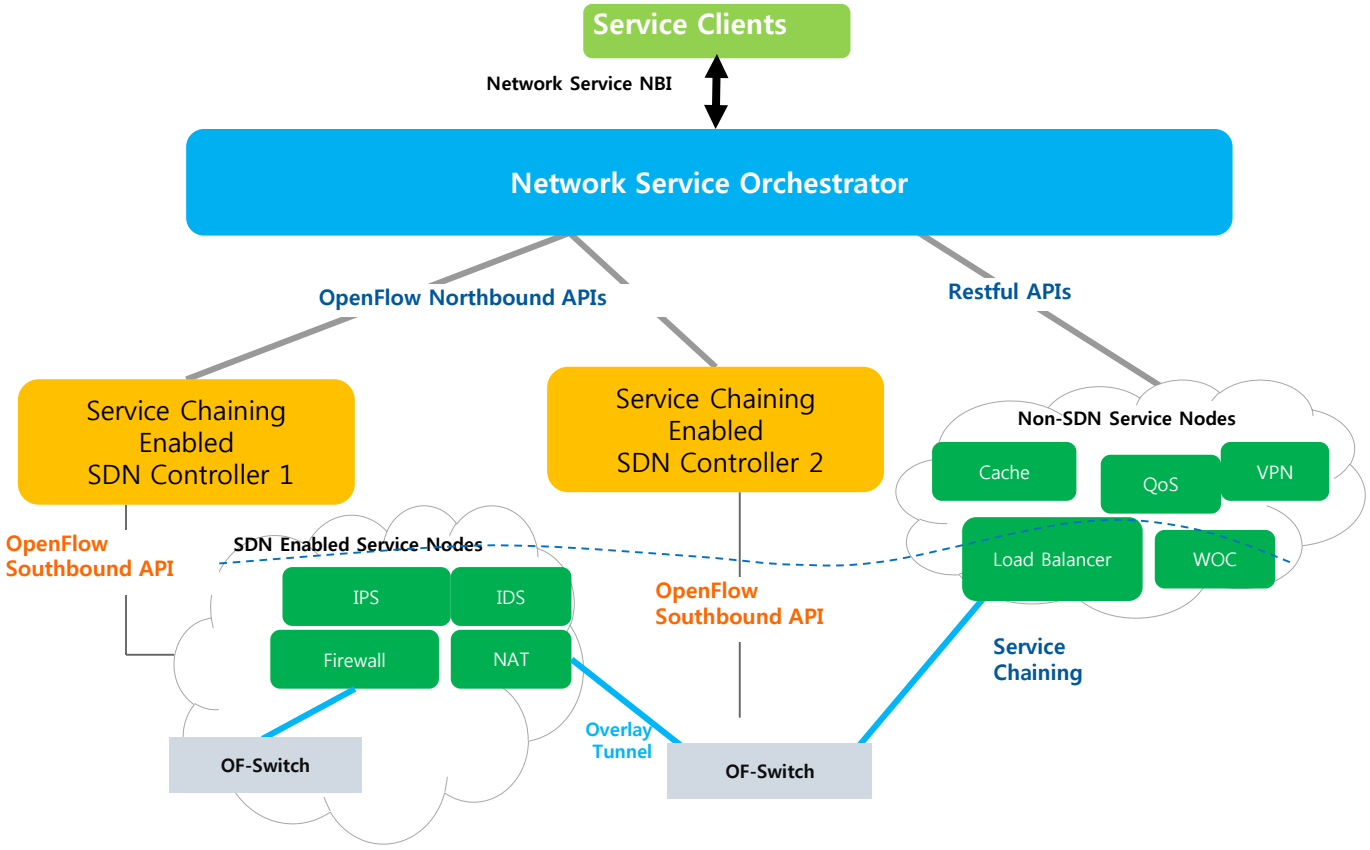
Backward compatibility #2



▲ 6windgate architecture

Centralized management (1/2)

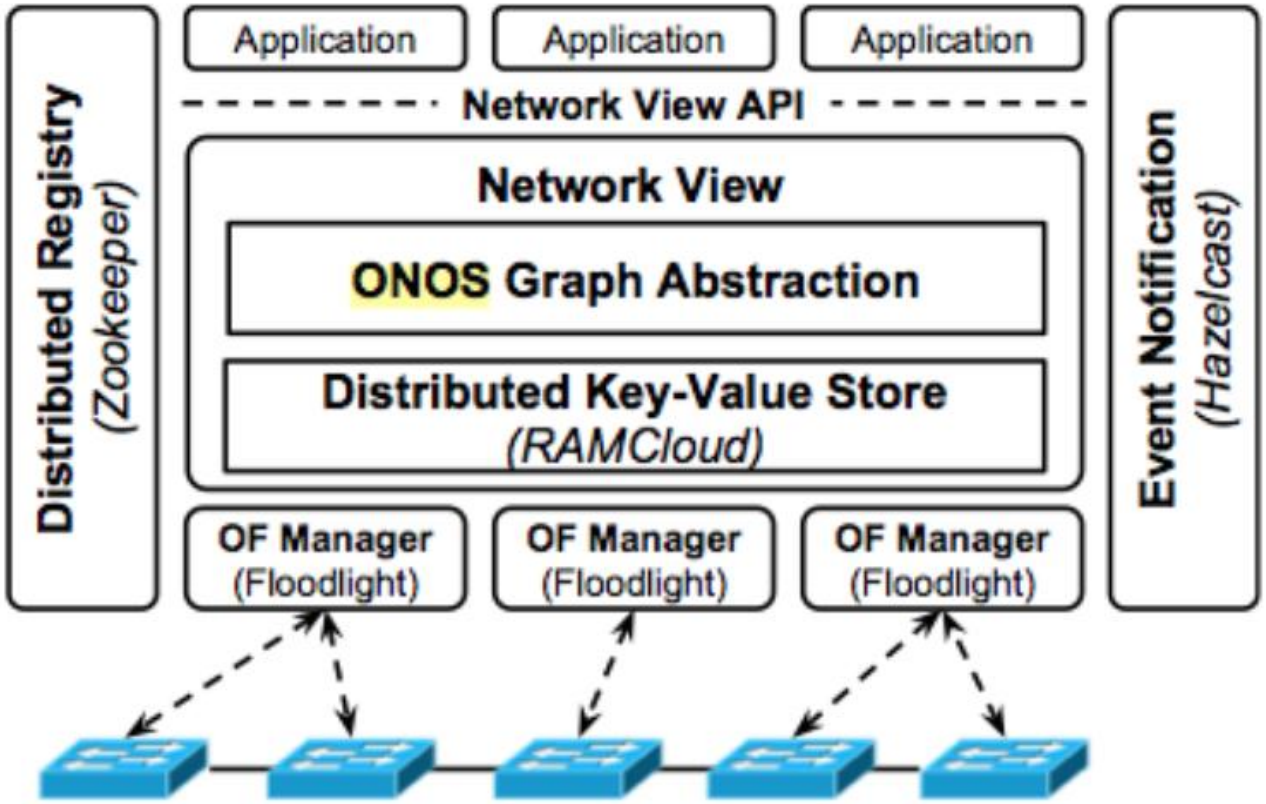
Service Controller



▲ Service Control and Requirement from ONF

Centralized management (2/2)

Distributed Controller



▲ ONOS from ON.Lab

Conclusion

- Openness (HW/SW Interface)
- Programmability
- Centralized management