Embrace the Future of Data Center Networking

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“To remain static is to lose ground.”

David Packard
Legacy data center networks are at a breaking point
What’s driving change in higher education data center networks

- Big Data
- Security
- Cloud
HP Software Defined Data Center

Software Defined Servers
- Project Moonshot

Software Defined Storage
- HP StoreVirtual VSA

Software Defined Networking
- HP SDN
FlexFabric – the future of data center networking

Simple
Up to 75% simpler

Scalable
Up to 2X fabric scaling

Automated
HP Virtual Application Networks

Months to minutes
HP delivers SDN to achieve agility

Ability to apply business logic to network behavior in dynamic fashion

SDN Architecture

- Application Layer
- Control Layer
- Infrastructure Layer

Deliver open programmable interfaces to automate orchestration of network services

Separate control and data plane; abstract control plane of many devices to one

Open standard-based programmatic access to infrastructure
HP delivers SDN to achieve agility

Ability to apply business logic to network behavior in dynamic fashion

SDN Architecture

Application Layer

Control Layer

Infrastructure Layer

Control & Data Plane Programmable Interface (e.g., OpenFlow)

Programmable Open APIs

SDN Controller

Network Device

Cloud Orchestration

Business Applications

(e.g., OpenStack, CloudStack)

SDN Applications

Network Device

Network Device

Network Device
HP SDN solutions delivering network agility

Ability to apply business logic to network behavior in dynamic fashion

Virtual Cloud Networks, Sentinel Security & Open APIs

Virtual Application Networks SDN Controller

HP 2920  HP 3500  HP 3800  HP 5400  HP 8200
Debunking some SDN myths

- Only offering proprietary programming interfaces to network devices & management
- The end of hardware innovation
- Only deliver network a function in software on a VM or only creating an overlay network
HP Software Defined Networking in the data center

HP will be the only vendor pursuing an **SDN strategy** which comprehends the entire path from user-to-datacenter and the entire technology stack from infrastructure-to-management.
HP commitment to software-defined networks

Software-defined Network Leadership

Open Network Foundation
OpenFlow Leadership
NFV Leadership
OpenStack Leadership
We’re investing in architectures to meet your needs today and into the future

SDN is a transformation in networking

HP Networking is leading this transformation

We deliver the data center solutions required for big data, security, cloud

“Believe you can change the world”
Make it matter.
Typical University Networks

If your drive to work was this complex, wouldn’t you take a different path
University Networks with SDN

Getting out of the way

All users can be treated together

Dynamically treat traffic even if it is unknown

Traffic will route direct unless it needs treatment or is unknown

Stop worrying about who owns the device and focus on what its doing
SDN Applied

Conditional routing - Http traffic to a well known site

IDS    Anti Virus    Proxy

Rule 1: Route http direct to proxy
SDN Applied

Conditional routing – Unknown traffic to a new research resource

Rule 1: Route unknown to IDS
Rule 2: Route unknown to IDS
Rule 3: Res. A Is Safe - Route direct
University Networks with SDN

Benefits – Reduce costs, enable innovation and support collaboration

**Reduce Costs**
- Removing hard-wired configurations
- Down-sizing security infrastructure

**Enable Innovation**
- Removing restrictive configurations

**Support Collaboration**
- Allowing more device types
- Supporting user preferred collaboration channels
Thank you
HP leads in software-defined networking

*Winner of prestigious Ethernet Innovation Award for Sentinel Security application*

**2H 2012**
- 25 OpenFlow switches
- Over 15 M installed ports

**1H 2013**
- 40 OpenFlow switches
- Over 20 M installed ports
HP FlexFabric solutions can double your fabric capacity and improve Virtual Machine mobility performance and increasing reliability.

- FlexFabric 11900 provides 34% higher GbE port density at 31% lower cost per port\(^1\)
- Can connect up to 92 C-Class Servers to one 11900 switch
- FlexFabric 5900 delivers nearly 60% improvement in virtual machine mobility performance\(^2\)

\(^1\) FlexFabric 11900 compared with Nexus 7009 with M2 Modules
\(^2\) Network Test report, August 2011
FlexFabric 12900 Switch enables large-scale clouds

- Up to 2x switching capacity¹
- Up to 3x 40 GbE density²

Up to 24,000 servers
100K+ workloads
Physical and virtual routers for clouds

Virtual Services Router delivers Network Function Virtualization technology

Up to 7X higher routing performance\(^1\)

Up to 4900X faster failure recovery\(^2\)

HSR 6800 Router

Private Cloud

Public Cloud

VSR

HSR 6800 Router

Private Cloud

\(^1\)NetworkTest report reference

\(^2\) HSR 6808 vs. Cisco ASR 1000 Series
New innovations for data center networks

**Simple**
- **FlexFabric Virtual Switch 5900v with EVB/VEPA**
  - FlexFabric 5900 Series Switch with EVB/VEPA

**Scalable**
- **Virtual Services Router**
  - HP FlexFabric 11900 Switch
  - HP FlexFabric 12900 Switch
  - HSR 6800 Router

**Automated**
- **OpenFlow 1.3**
- **IMC SDN Manager**

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1Coming soon
FlexFabric Virtual Switch 5900v with EVB/VEPA

Delivers standards-based automated VM network policy management

- **Unifies** physical & virtual data center fabric
- **Advances** networking beyond basic hypervisor vSwitch
- **Simplifies** operations with separation of switch & server functions

| Single policy & management for physical & virtual | Zero dedicated management appliances |

\(^1\text{Compared with Cisco Nexus 1010 Virtual Services Appliance}\)
FlexFabric 11900 switch series
Delivers leading 40 GbE End-of-Row scaling for server-to-server traffic flows

- Industry’s first **TRILL/SPB** for scalability
- Industry’s first **OpenFlow 1.3-enabled** for SDN
- **Cost-effective** scale-out for Hadoop environments

50% lower latency\(^1\)  Up to 31\% lower cost per 40 GbE port\(^2\)  Up to 34\% higher 40 GbE density\(^3\)

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\(^1\) FlexFabric 11908 compared with Nexus 7010 with F2 modules.  
\(^2\) FlexFabric 11908 compared with Nexus 7010 with M2 modules.  
\(^3\) FlexFabric 11908 compared with Nexus 7009 with M2 modules. All data HP internal comparative analysis based on Cisco public website.
FlexFabric 12900 switch series

Sets new benchmark for core data center fabric scaling

• Ideal for large-scale cloud deployments
• First core OpenFlow-enabled switch for SDN
• Industry’s first TRILL/SPB for scalability

Up to 2X switching capacity\(^1\)  Up to 3X 40 GbE density\(^2\)  400% lower power per port\(^2\)

HP internal comparative analysis based on Cisco public website.  \(^1\)FlexFabric 12916 compared with Nexus 7018 with F2 modules.  \(^2\)FlexFabric 12910 compared with Nexus 7010 with M2 modules.
HSR 6800 router series – breakthrough performance

- Comprehensive **routing**, **firewall** and **VPN**
- High-density WAN router – **32 10 GbE ports**
- Carrier-class reliability with IRF – **687 µs recovery**

Up to **4900X** faster failure recovery

Up to **7X** higher routing performance

Up to **5X** higher firewall scaling

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2 HSR 6808 vs. Cisco ASR 1000 Series. HP internal comparative analysis based on Cisco public website.
Virtual Services Router

Industry’s first Network Function Virtualization (NFV) technology

- Deployment **flexibility** across branch, data center and cloud
- **Agile services** delivery for faster time to revenue
- **Virtualized router** for multi-tenant, hosted public clouds
  - 10X faster time to revenue\(^1\)
  - Up to 87% operating cost reduction\(^1\)
  - 50% less power & rack space\(^1\)

\(^1\)Compared to physical routers
IMC Virtual Application Networks SDN Manager

Delivers the industry’s first comprehensive SDN management tool

• One application for managing SDN & traditional networks

• Configuration, monitoring & policy mgmt for all SDN layers

• 10X acceleration of SDN deployments

• 3X faster troubleshooting

• At least 50% less management complexity

1 HP Internal Research