
# 2013 ONS Tutorial 2: SDN Market Opportunities

SDN for the Enterprise

Don Clark, NEC Corp of America, don.clark@necam.com
Michael Steineke, Edgenet, msteineke@edgenet.com

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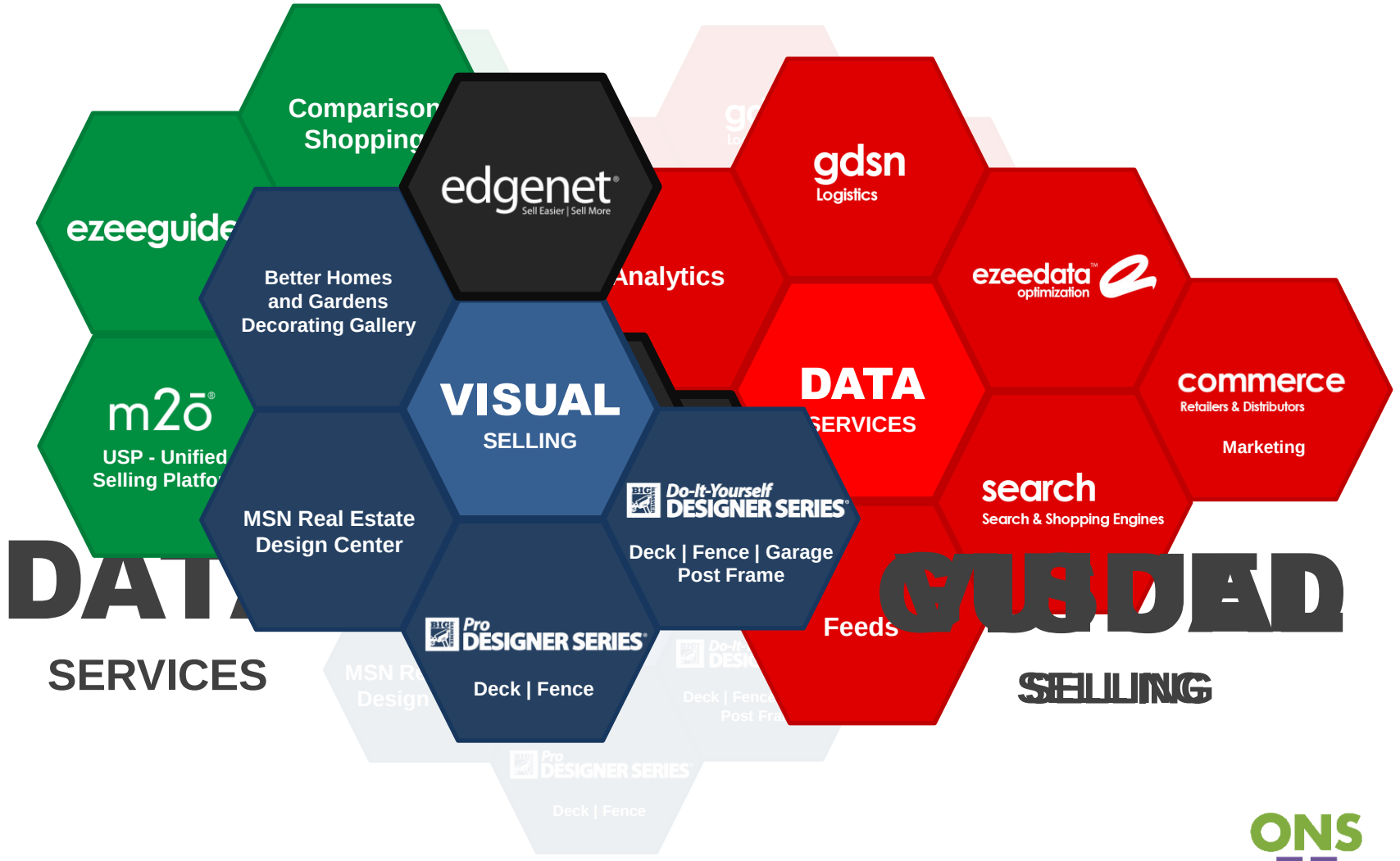
OPEN NETWORKING FOUNDATION

# Who is Edgenet?

- Provides application and services to help companies sell easier and sell more
- Privately-held company with office in Nashville, Atlanta and Milwaukee
- Our customers are top retailers, distributors, web sites and suppliers in the retail industry.
- Manages and distributes product information for over 4,000 companies, 8,000 brands and 6,000,000+ products

# Edgenet's Selling Tools



# Existing Environment

- Microsoft Windows Server® 2012 with Hyper-V
  - Hyper-V SMB
  - Hyper-V Replica
  - < 10 VMs per host
- Servers interconnected via Gigabit Ethernet
- Storage interconnected via Fiber Channel
- Multiple VLANs

# Challenges with legacy environment

- VM mobility
  - IP address management
  - Access control
- Real time network visibility
  - No visibility into tenant network usage
- Traffic separation/isolation
- Bandwidth optimization
- Network service level guarantees across tenants

# Requirements

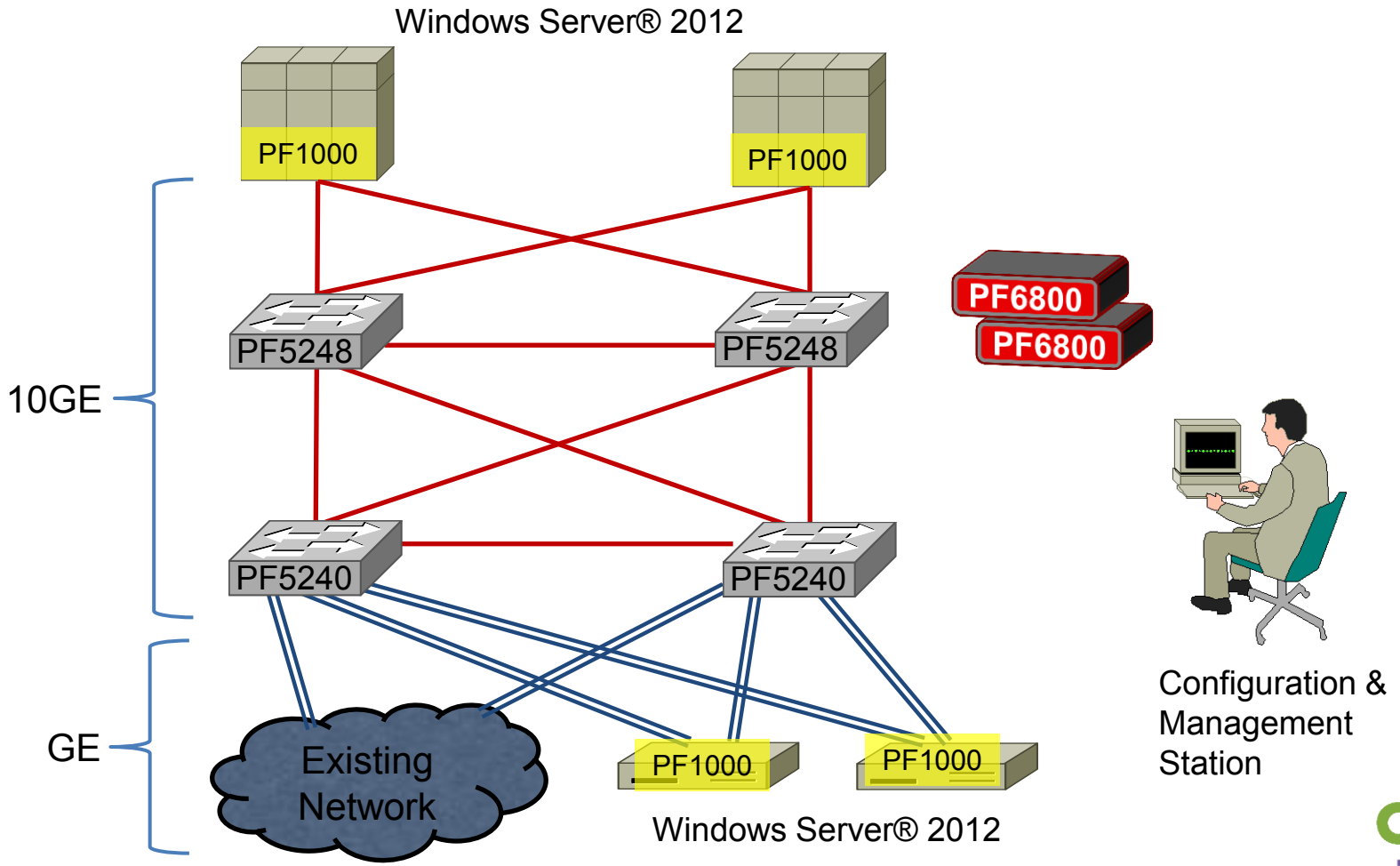
- Integration with Windows Server® 2012 with Hyper-V extensible switch
- Live migration
- Traffic prioritization
- Policy enforcement
- Ease of operations and maintenance
- Manageability and visibility
- Resiliency and high availability
- 10 Gig upgrade

# Why OpenFlow-based SDN?

- Live VM migration without network reconfiguration
- Integrated virtual and physical network management
- Greater flexibility/faster deployment of network services
- Open Standard – more infrastructure options

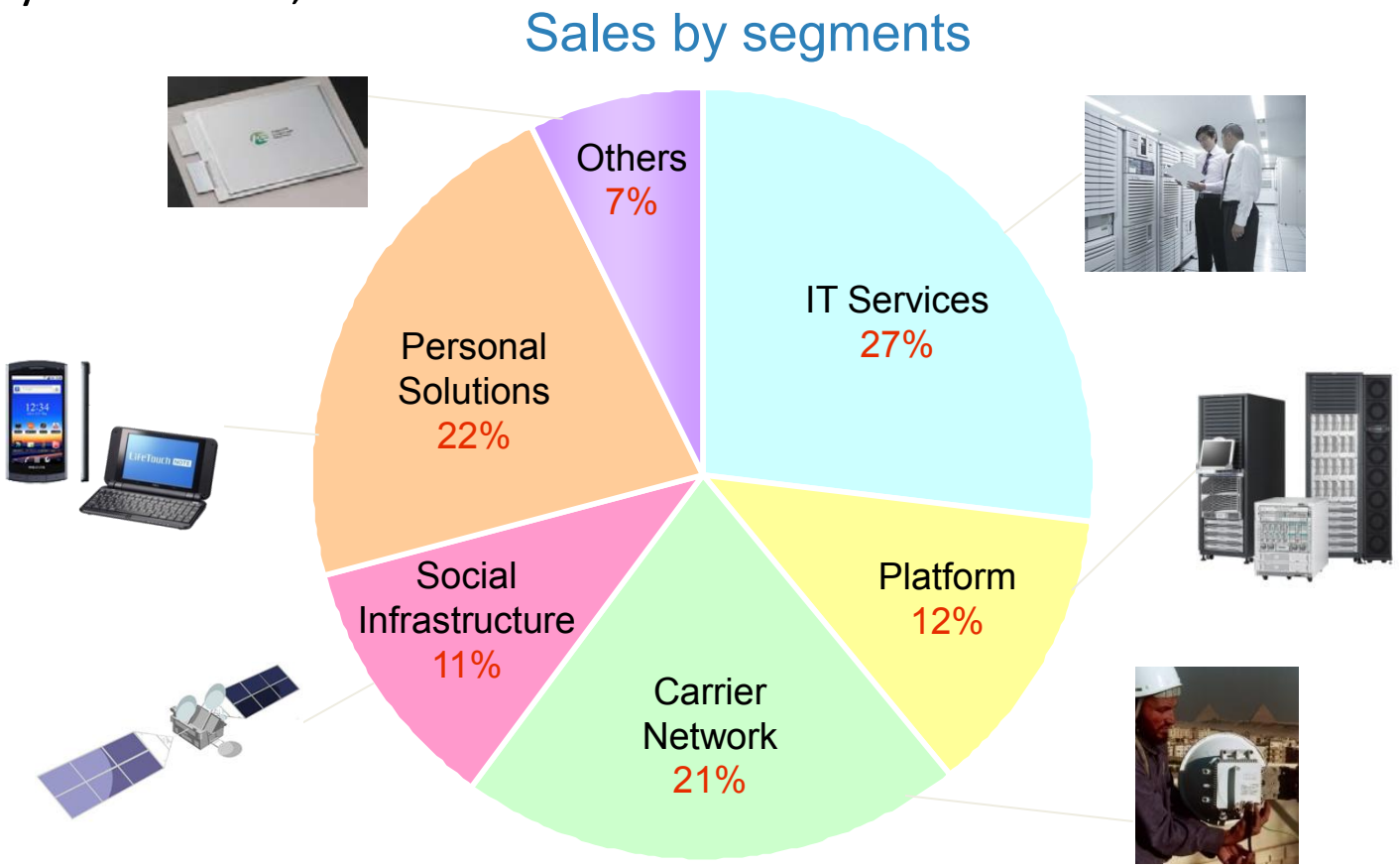
# Solution: Software Defined Network

- NEC's ProgrammableFlow networking suite



# NEC Corporation at a Glance

- Established: 1899
- Sales: $37 Billion
- Employees: 109,000 worldwide



# NEC ProgrammableFlow Networking Suite

**Network Control Layer (Controller)**

PF6800, OpenFlow Controller

- Unified Network Control
- High Availability

PF5248

- 8 ports x 10GbE
- 2 10/100/1000 ports
- OpenFlow + Legacy

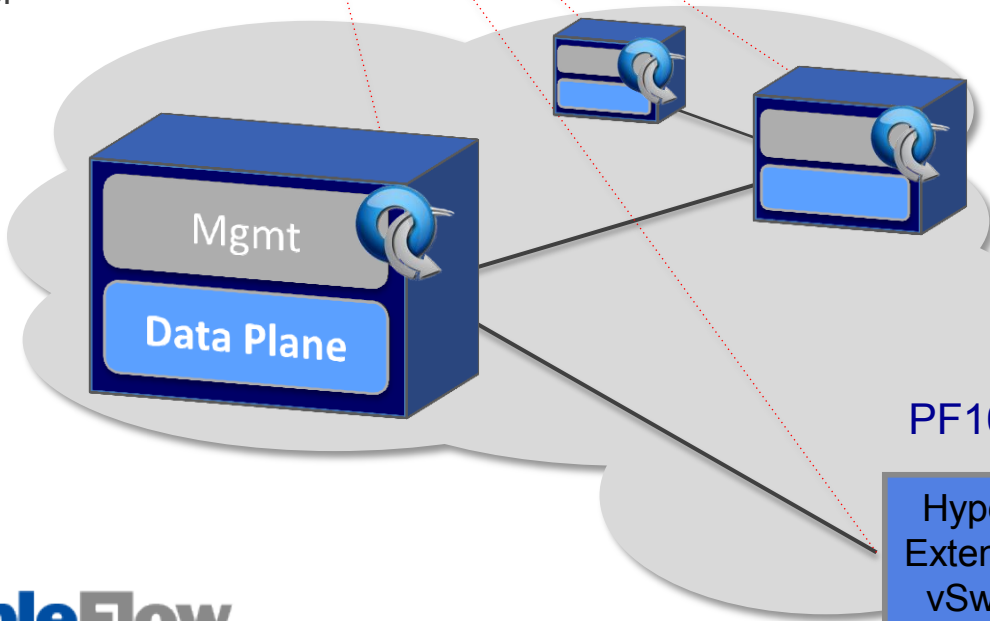
PF5820

- 48 ports x 10GbE
- 4 x 40GbE (QSFP/+)
- OpenFlow Networks

PF5240

- 48 ports x 1GbE(UTP)
- 4 x 10GbE (SFP/+) ports
- OpenFlow + Legacy

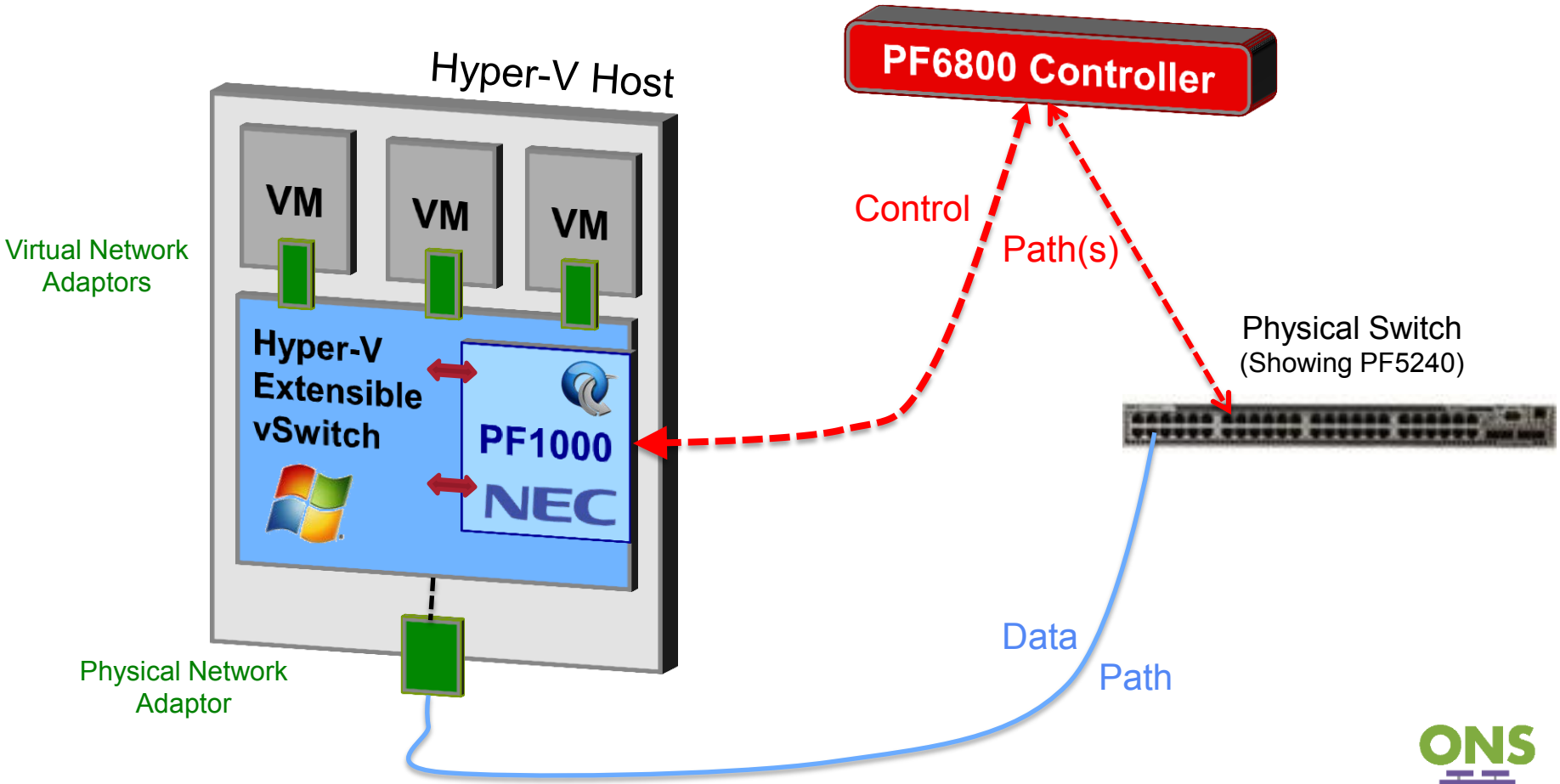
OpenFlow




ProgrammableFlow

ONS

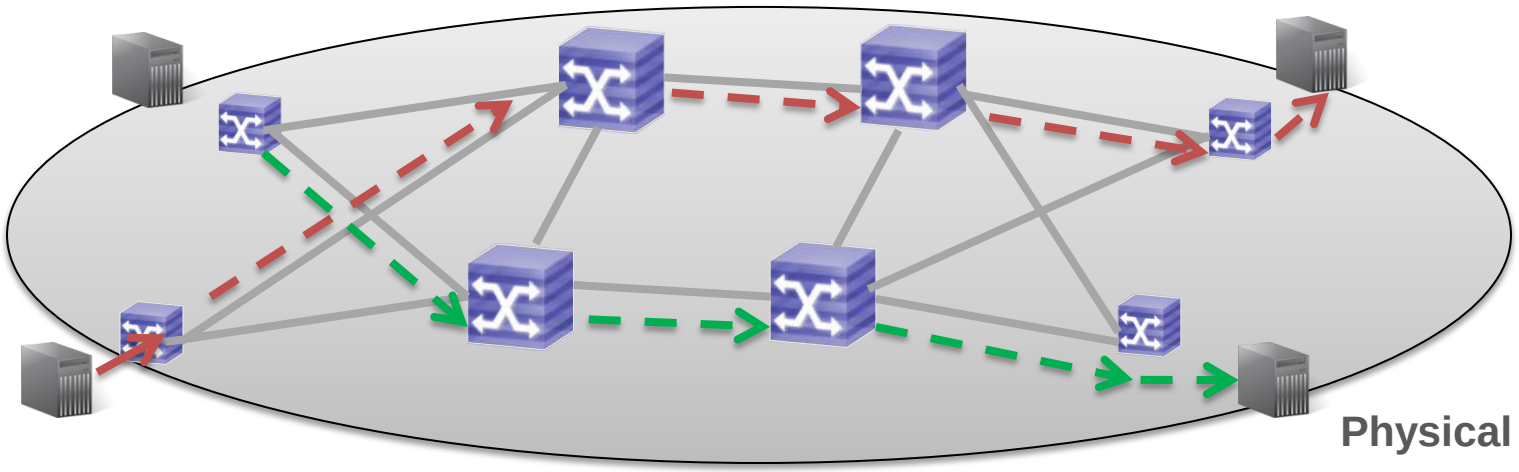
# PF1000: OpenFlow Extension To Hyper-V vSwitch



# Multipath Supporting East-West Fabric Traffic

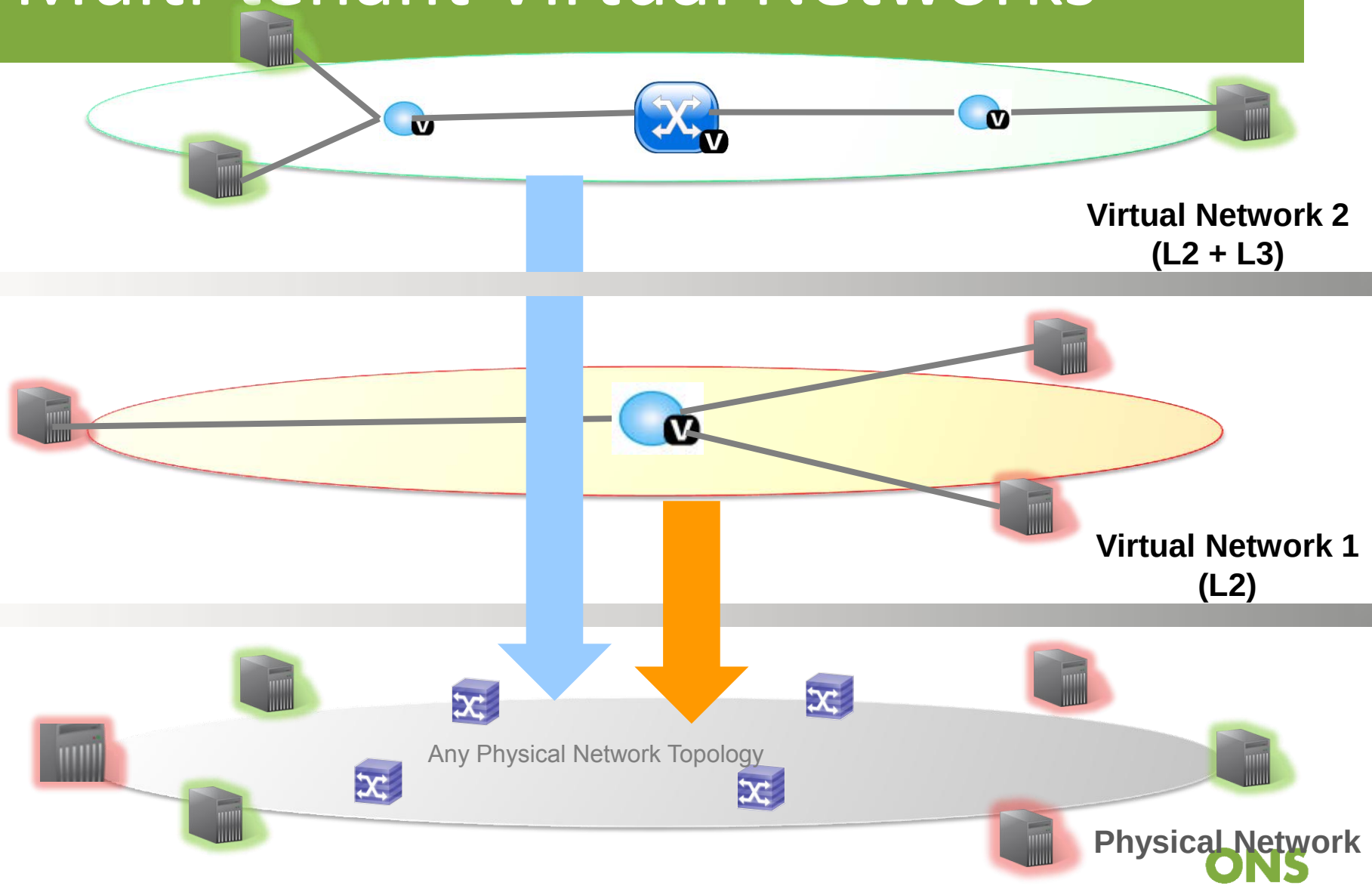
- Multipath without HW vendor lock-in
- Support any interconnect topology
- No complex distributed protocols

- Automatically discovers multiple paths (8-way ECMP)
- Automatically avoids loops
- Automatically balances flows across paths
- No route flapping



Physical Network

# Multi-tenant Virtual Networks



# Integration

- Extending network virtualization to the server environment
- VM mobility and migration
- IP address migration
- Single point of control and policy definition
- Automated configuration
- End to end reliability
- Fully redundant connection to existing network

# Business Benefits

- CAPEX Savings
  - Scale out network design
  - No vendor lock in
- OPEX Savings
  - Save hours of engineering
    - On pre-provisioning for each VM
    - Maintenance of Vlans & TOR switches
    - Reduce possibility of human error
    - Agility and rapid service delivery
  - Create network policies to suit your own operational needs

# SDN Impact: Prioritization & Policy Enforcement

- Secure multi-tenancy
  - Separation of traffic
- QoS based on class of traffic
- End to End Reliability

# SDN Impact: Management

- Single management control
- Visualization
  - Physical network
  - Logical network
- Traffic metering and statistics
  - Identify choke points
  - Tenant bandwidth consumption

# Thank You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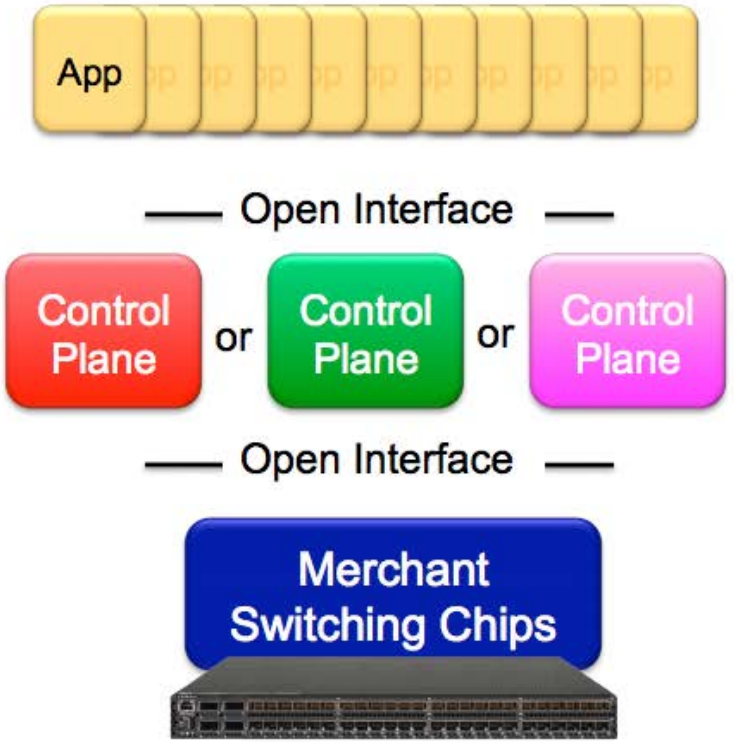
# Software Defined Networking


Vertically integrated
Closed, proprietary
Slow innovation

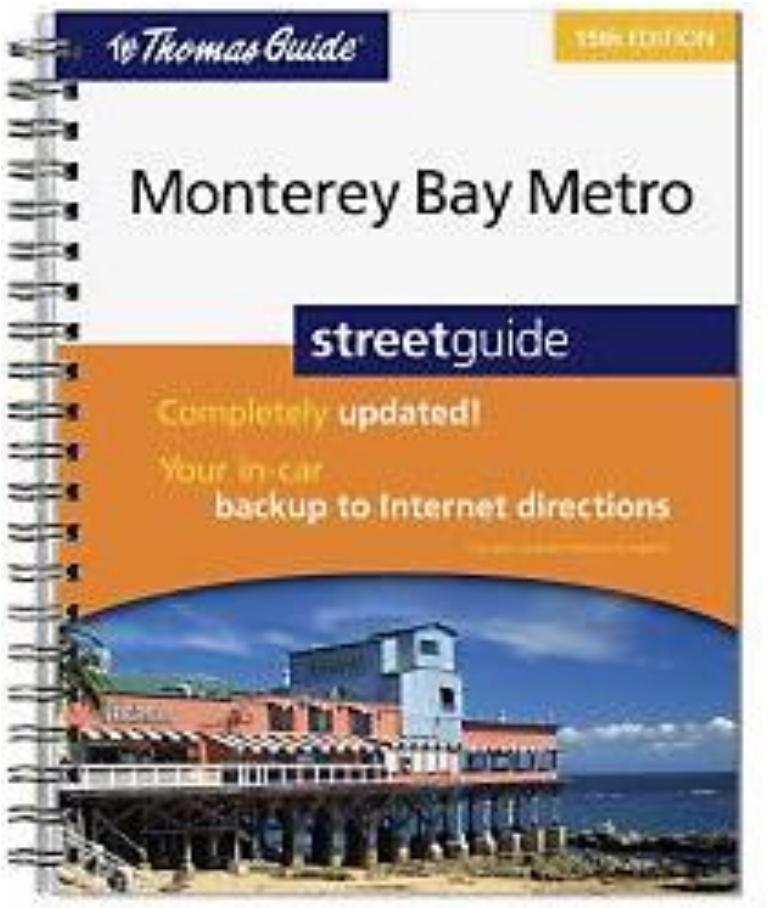
Horizontal
Open interfaces
Rapid innovation

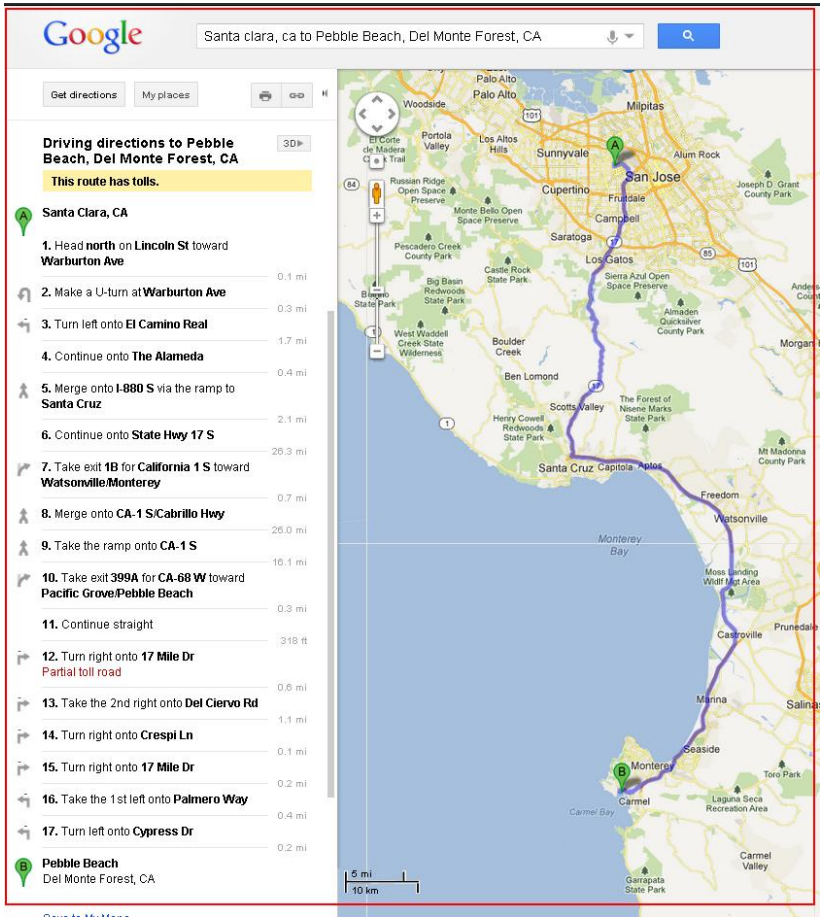
# SDN a Response to Networking's Limitations

- Scaling needs outstripping networking's ability to keep apace
  - Painfully felt in the data center (e.g. VM mobility, VLAN mgmt., etc.)
- Traffic patterns (E-W) no longer fit networking's N-S orientation
  - Expl: Data center E-W traffic needs collide with spanning tree's needs
- Controls (on policy implementations, traffic flow, etc.) too coarse
- Limited innovation, limited ability for users to inject innovation
- Limited competition

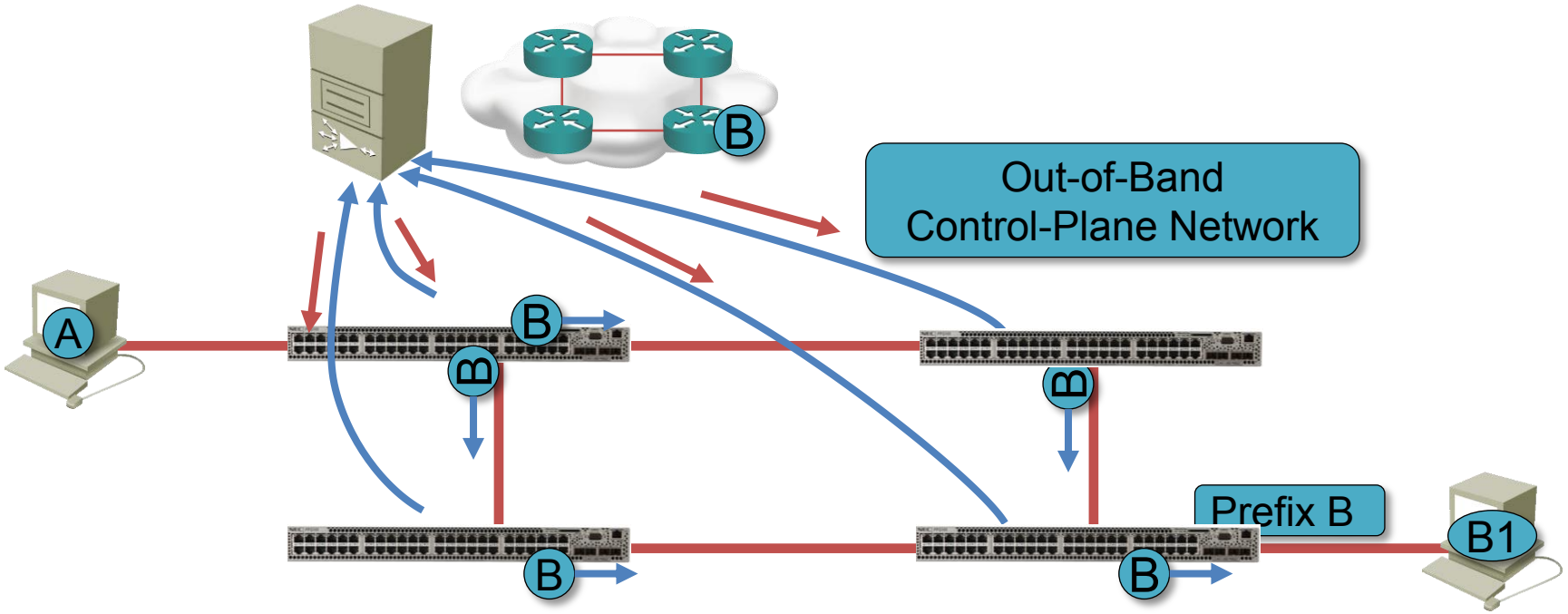
*Networking increasingly limiting business needs*

# SDN: Google Maps for Networking



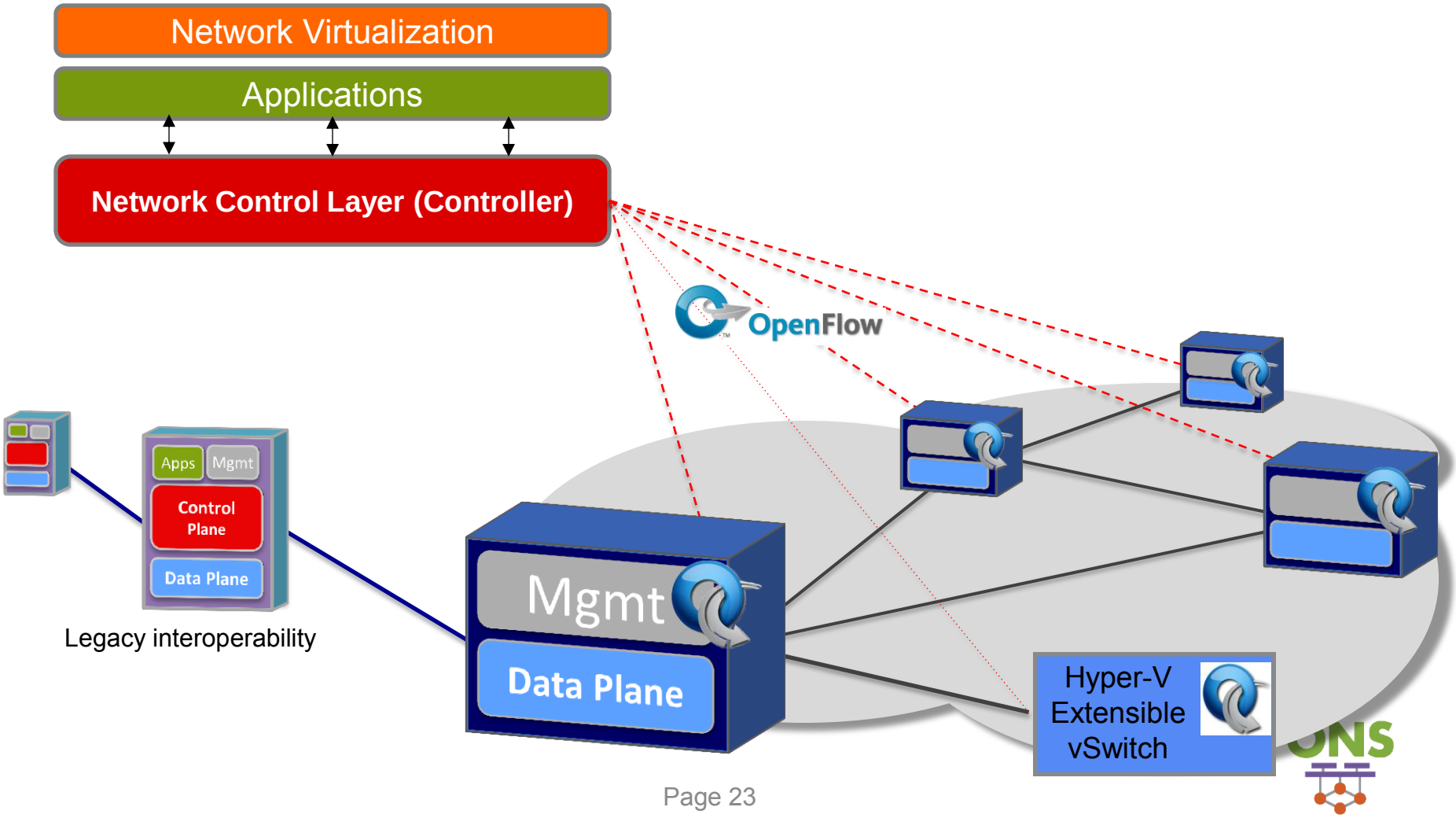
# OpenFlow = Control / Data Plane Separation




- Basic principles:
  - Control / Management plane in a dedicated *controller*
  - Networking devices perform forwarding and maintenance functions
  - IP / SSL connectivity between controller and OpenFlow switch
  - OpenFlow = Forwarding table managed by controller

# Solution: Software Defined Networking (cont.)

- Centralized, automated, software-driven approach to networking



# NEC - Leading SDN Innovation

*"Cloud in a Vault is a proven solution that has already been successfully deployed across several organizations within the financial, healthcare and legal verticals. Its capabilities are highly flexible and attractive to any enterprise that values security, scalability, reliability and control."*

Jack Pressman
Managing Director of Cyber Innovation Labs, LLC

CDGI

*"It' s been six months since ProgrammableFlow was installed, and we' re very satisfied with the functionality and quality of the product.*

Shinji Fujibayashi
Nippon Express

NIPPON EXPRESS

*The NEC SDN solution is completely compatible with Hyper-V Network Virtualization and allows for easy configuration of virtual appliances such as load balancers, intrusion detection systems, and network monitoring solutions.*

**Jeffrey Snover**
Windows Server

Windows Server

*This global scale ICT infrastructure is flexibly controlled and takes only a few minutes to remotely complete connections between data centers that conventionally took several days.*

NTT Communications

*"The NEC PF5820 met all of our evaluation objectives and the initial deployment with ProgrammableFlow has gone well – completely as expected."*

Matt Davy
Co-director of the Internet2 NDDI program and Chief Architect for Indiana University

INTERNET2

*This collaboration reflects the reality that the data center network is vital to business, driving new ways for users to control the functionality of networks to meet application requirements, for cloud, Big Data/analytics and high performance computing, more simply, flexibly and intelligently.*

Vikram Mehta
VP System Networking

IBM

## Awards

Best of Microsoft TechEd North America 2012 – Finalist – Microsoft Partner Product Awards Produced By: Windows IT Pro | SQL Server Pro | Dev Pro | SharePoint Pro

best of INTEROP Awards 2012 – Grand Prize Winner – Grand Prize – PRESENTED BY: InformationWeek reports

best of INTEROP Awards 2012 – Winner – Management, Monitoring & Testing – PRESENTED BY: InformationWeek reports

Networking Innovation Award – NEC Software-defined Networks

BEST OF INTEROP 2011 – Infrastructure – PRESENTED BY: InformationWeek analytics

BEST OF SHOW AWARD INTEROP TOKYO | 7-10 JUNE, 2011 – Grand Prix

BEST OF SHOW AWARD INTEROP TOKYO | 7-10 JUNE, 2011 – Special Prize