



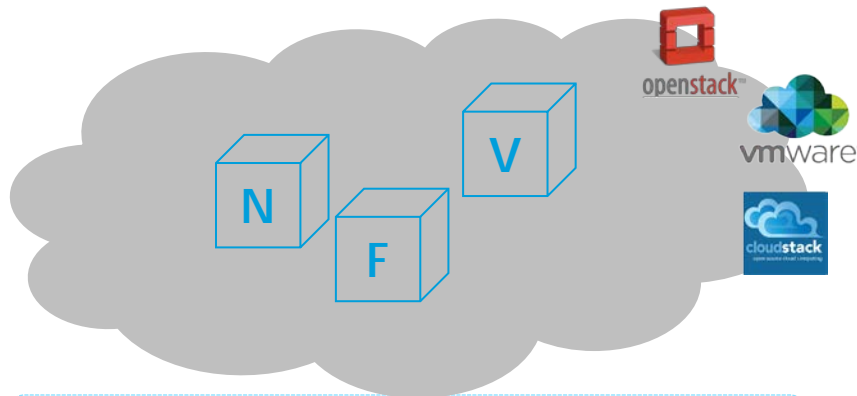
# Open SDN Fabrics for NFV

PRASHANT GANDHI

[gandhi@bigswitch.com](mailto:gandhi@bigswitch.com)

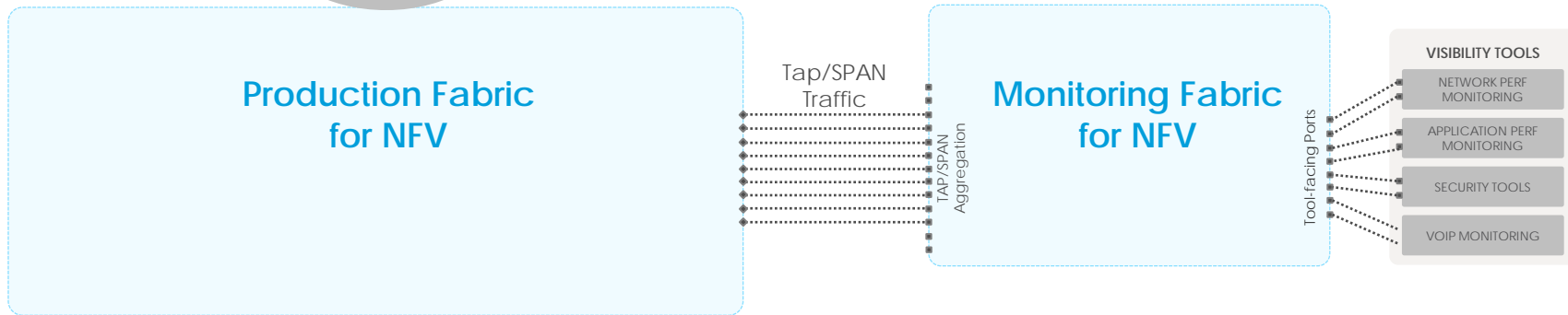
IEEE CQR (MAY 2015)

# NETWORK FABRICS FOR NFV

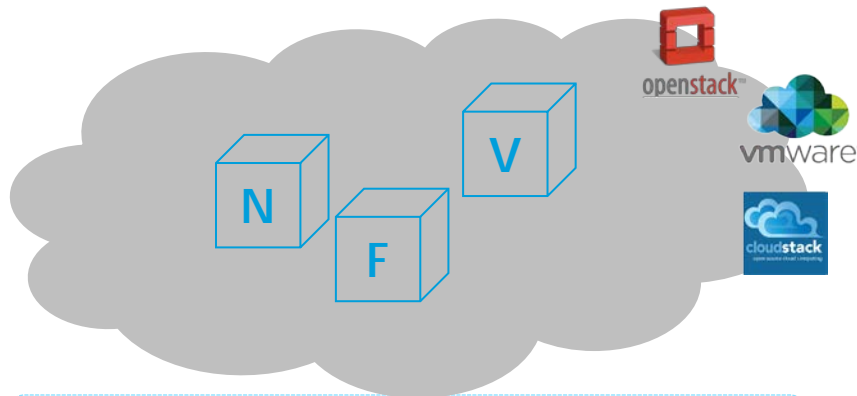


## Why NFV:

- Faster time-to-service
- Elastic scale
- Open/commodity HW



# FABRIC REQUIREMENTS FOR NFV



## Why NFV:

- Faster time-to-service
- Elastic scale
- Open/commodity HW

### Production Fabric for NFV

- Fast change velocity
- Scale-out w/ service chaining
- Open/commodity HW

Tap/SPAN Traffic

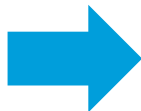
### Monitoring Fabric for NFV

- Scale-out
- Simple
- Open/Economical

#### VISIBILITY TOOLS

- NETWORK PERF MONITORING
- APPLICATION PERF MONITORING
- SECURITY TOOLS
- VOIP MONITORING

Tool-facing Ports



Open SDN Fabrics

# OPEN NETWORKING MOMENTUM ACCELERATING

## HW/SW Disaggregation

### ODMs:

- Accton
- Quanta
- Delta



Wedge

JUNIPER  
NETWORKS



6-Pack



2013

1Q14

2Q14

3Q14

4Q14

1Q15



ONIE: Open  
Network Install  
Environment

FBOSS

ONL: Open  
Network Linux  
(Switch Platform  
OS)

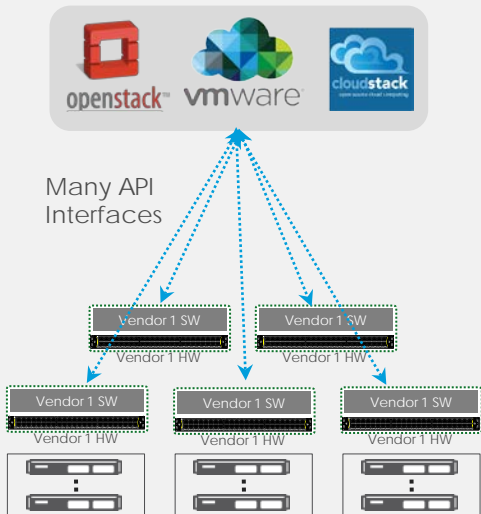
OpenNSL:  
Broadcom ASIC APIs



Open HW, Value in SW  
HW/SW vendor choice  
Single throat to choke (for HW & SW)

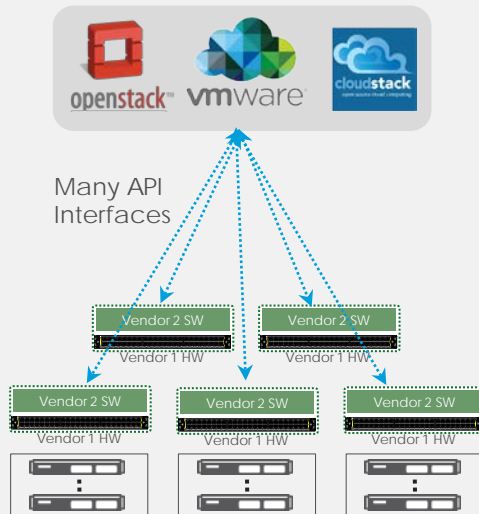
# SDN: OPTIMIZING FOR SIMPLICITY & AUTOMATION

## Closed Network Switch



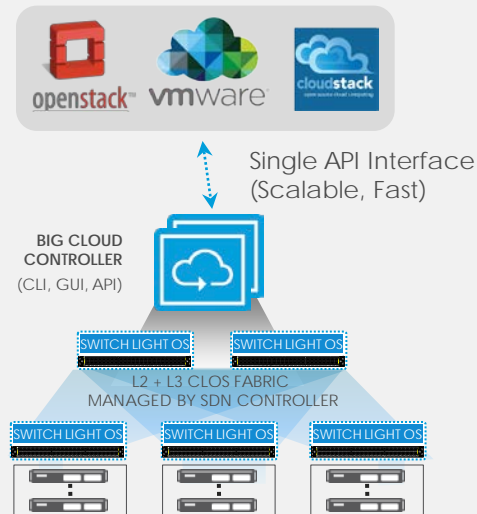
- Box-by-box, NetOps complexity
- Now w/ DevOps Programmability
- Expensive, Vendor lock-in

## Open Network Switch



- Box-by-box, Linux-style mgmt
- DevOps Programmability
- Lower CapEx, Vendor choice

## Open SDN Fabric

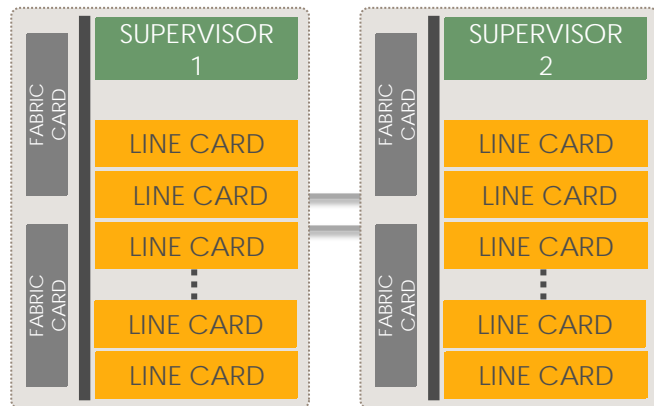


- Single point of management
- NetOps + DevOps
- Lower Capex & OpEx, Vendor Choice

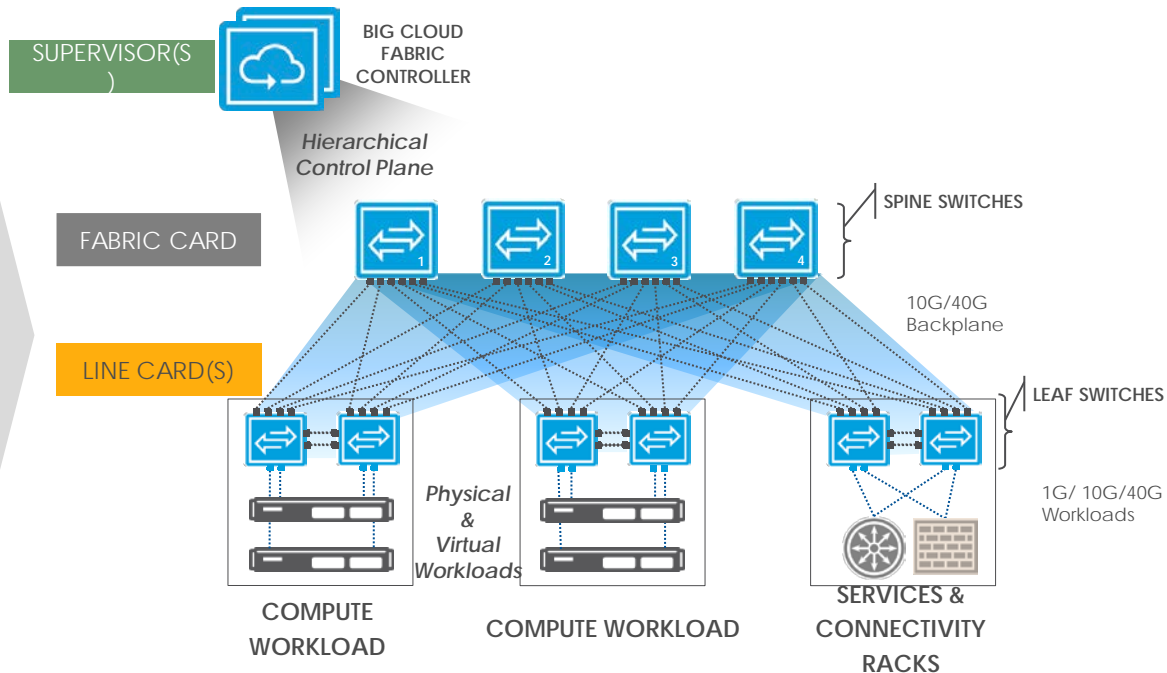
# SDN FABRIC IS “ONE BIG SWITCH”

## Disaggregation of the “NetFrame”

Traditional Chassis Pair

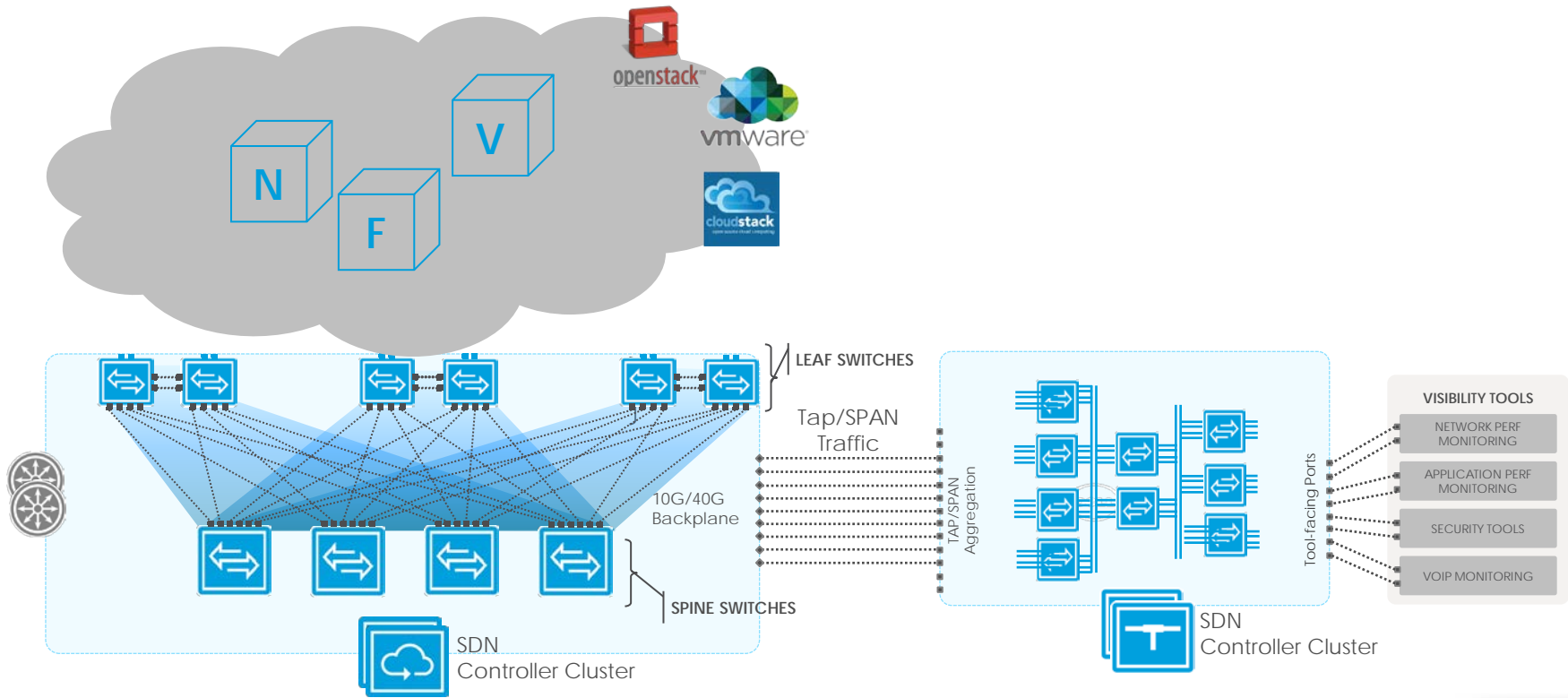


- Aggregation of many smaller switches
- Single point of management



- Disaggregated Chassis Pair – One “Big Switch”
- Extend all the benefits of chassis to SDN Clos fabric

# SDN FABRIC OPTIONS FOR NFV

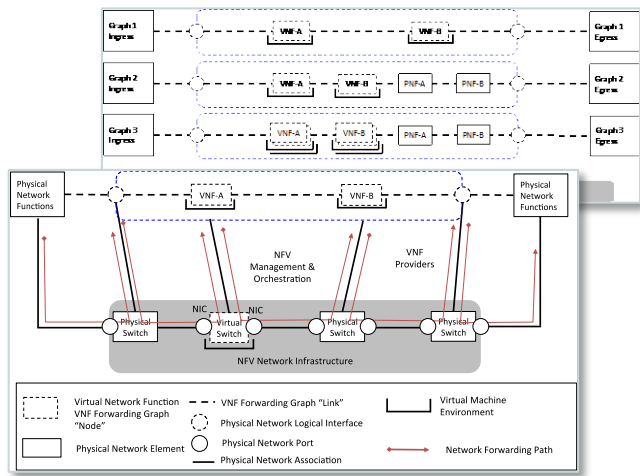


SDN Fabric for NFV cloud

SDN Fabric for NFV Monitoring

# OPTIMIZING FOR SCALE

Only design to address all advanced requirements



Unified design for physical and virtual networks

East-west Traffic Scaling

Any IP address in any rack  
(fabric-wide VNF mobility)

Programmatic Service Chaining

Traditional L2 Fabric

Traditional L3 Fabric

SDN-based L2/L3 Fabric

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Yes

Whitepaper available on request

# OPPORTUNITY: SDN CONTROLLER ANALYTICS/MONITORING

Fault Detection

Configuration  
Changes

Fabric  
Topology

VM-level  
Visibility

VNF-level  
Visibility

Resource  
Utilization

Fabric-wide  
SPAN

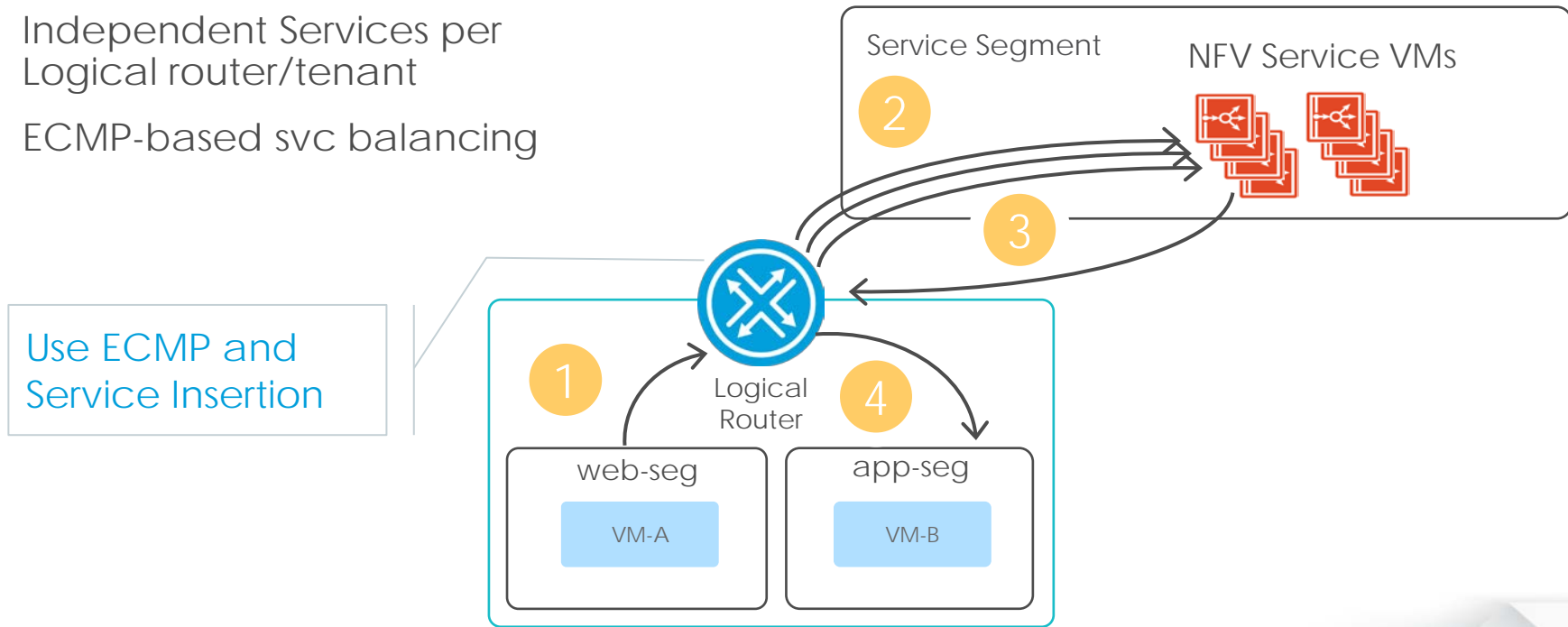
Fabric-wide  
Trouble-shooting  
(leaf/spine/leaf)

Congestion  
Dashboard  
(Heat Map)

# Thank You

# NFV: SERVICE CHAINING

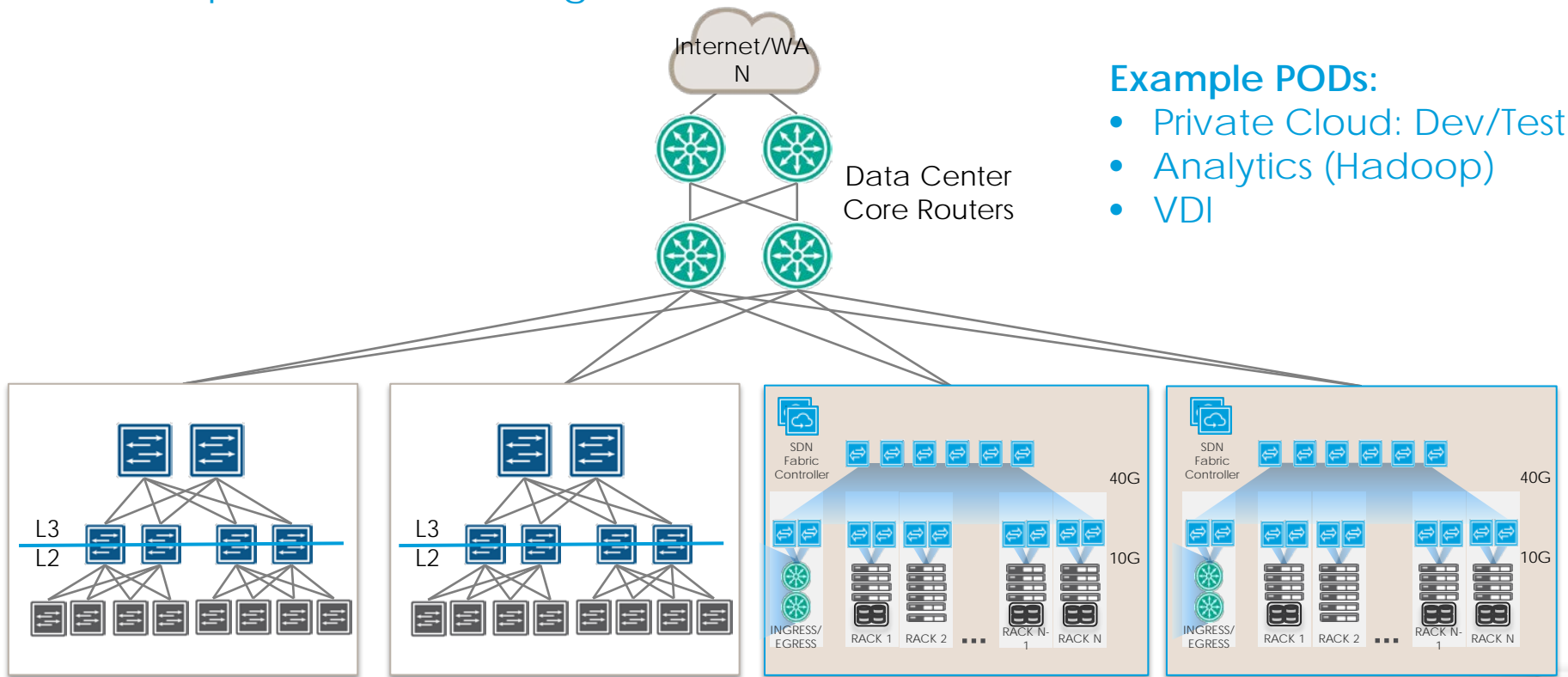
- Implemented via Next-Hop Forwarding
- Independent Services per Logical router/tenant
- ECMP-based svc balancing



Green Tenant

# POD-LEVEL DEPLOYMENT

Inter-operate with Existing PODs in Data Center



## Example PODs:

- Private Cloud: Dev/Test
- Analytics (Hadoop)
- VDI

# USE CASE: MOBILE / LTE NETWORK MONITORING

Enabling Advanced Monitoring for Mobile Core networks

