Technology Exploration Forum

Scale Out Ethernet Networks & SDN

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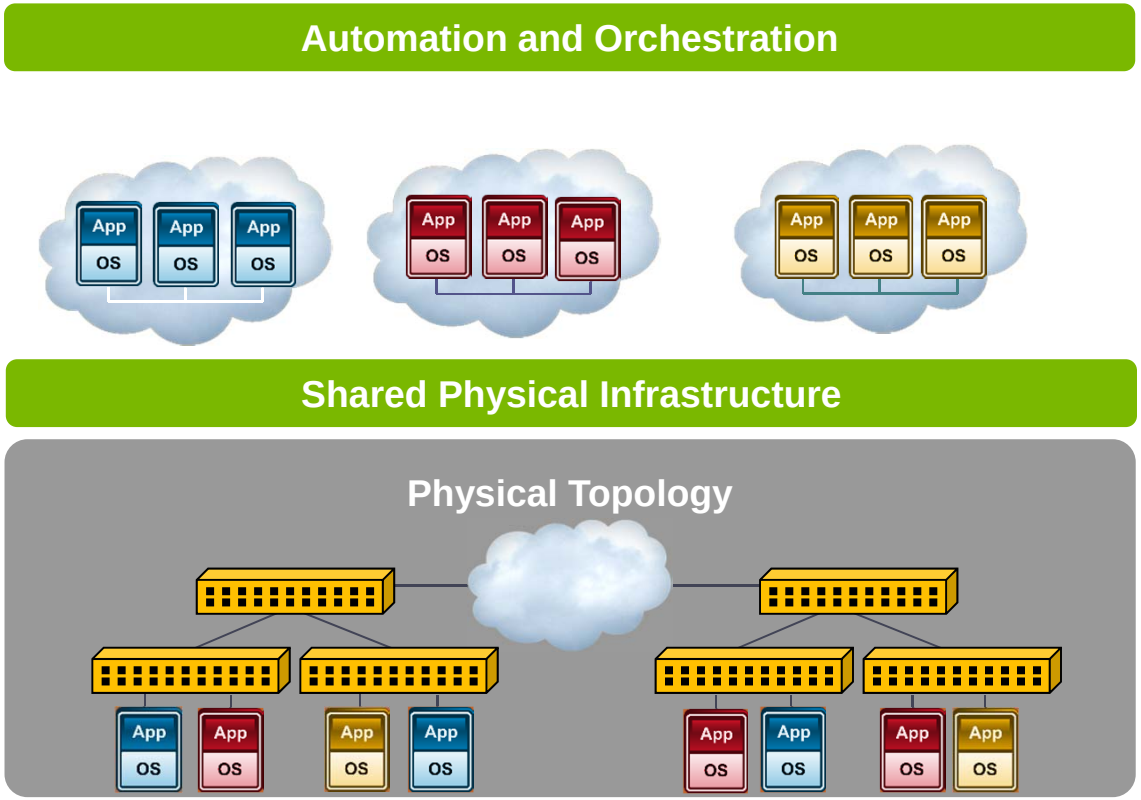
Multi-Tenant Data Center

Tenant

- ✓ Agility of their virtual domain

Provider

- ✓ Infrastructure Efficiency



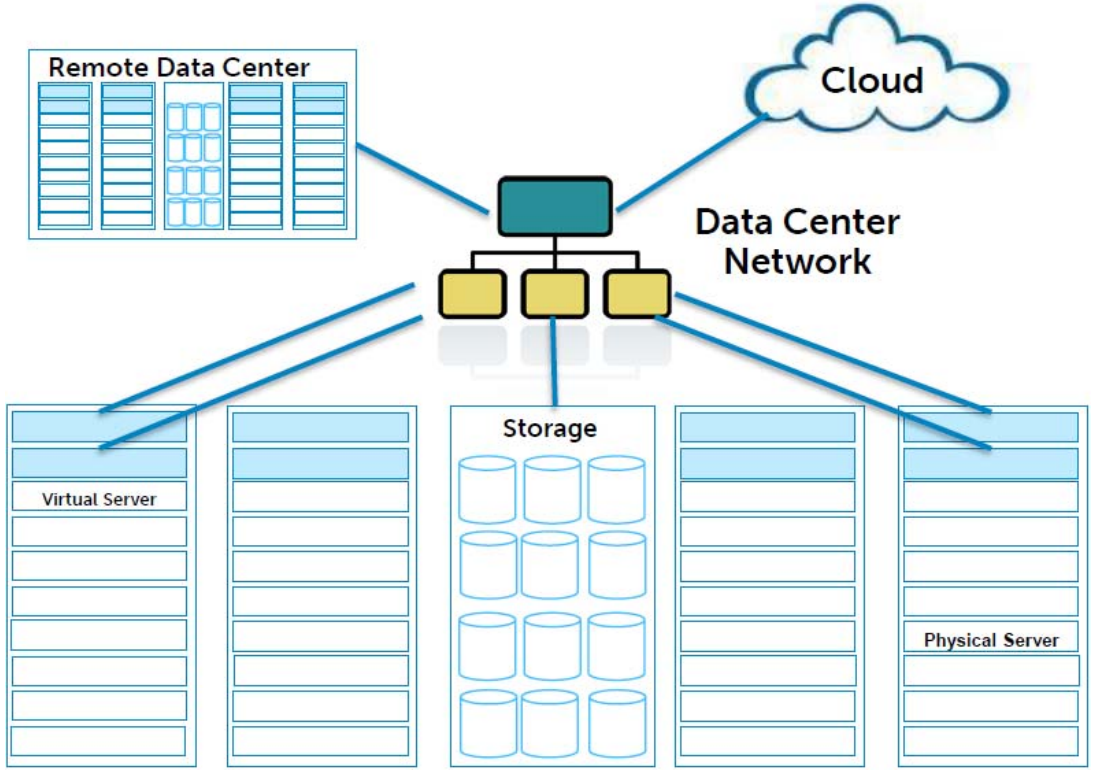
Agility & Efficiency

Workload

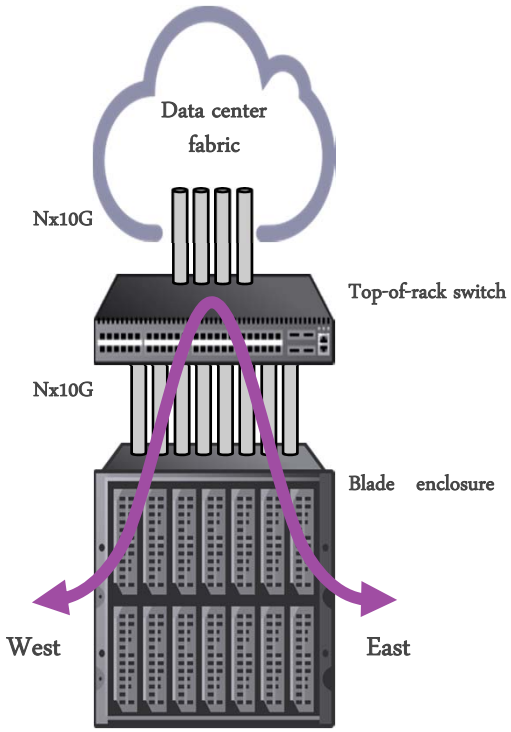
- ✓ Ability to bring it up anywhere
- ✓ Bandwidth and latency requirements with other workloads and storage

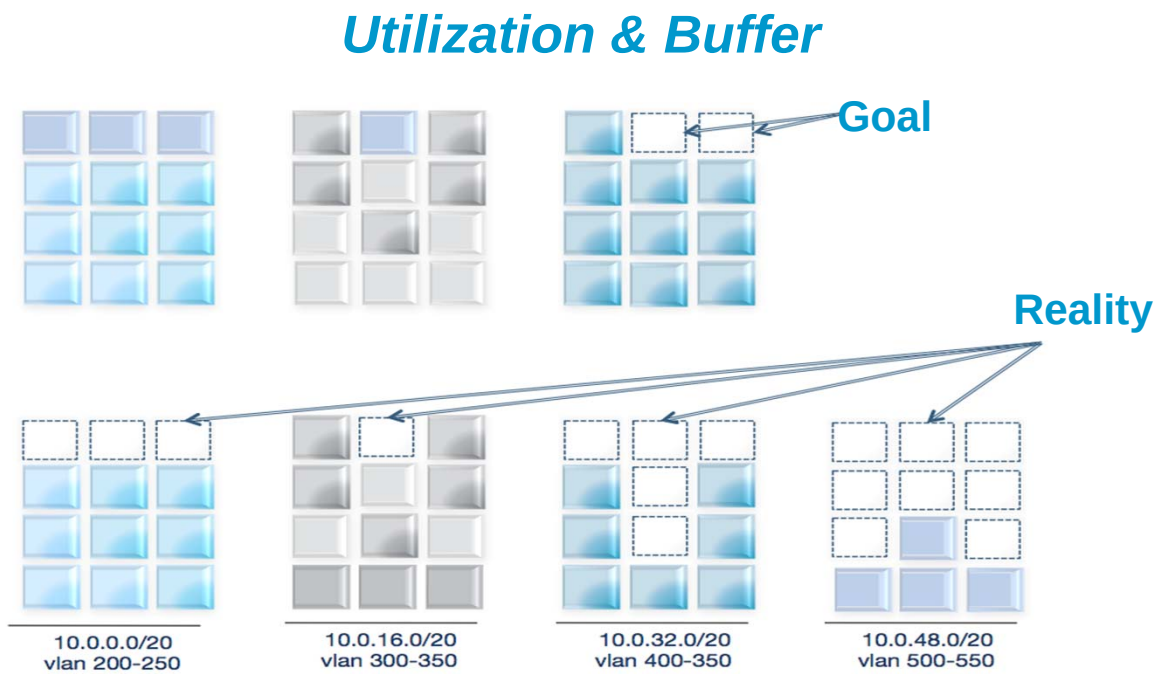
Network

- ✓ Best utilization of network paths
- ✓ Tenant traffic isolation



Reality of Today's Datacenters



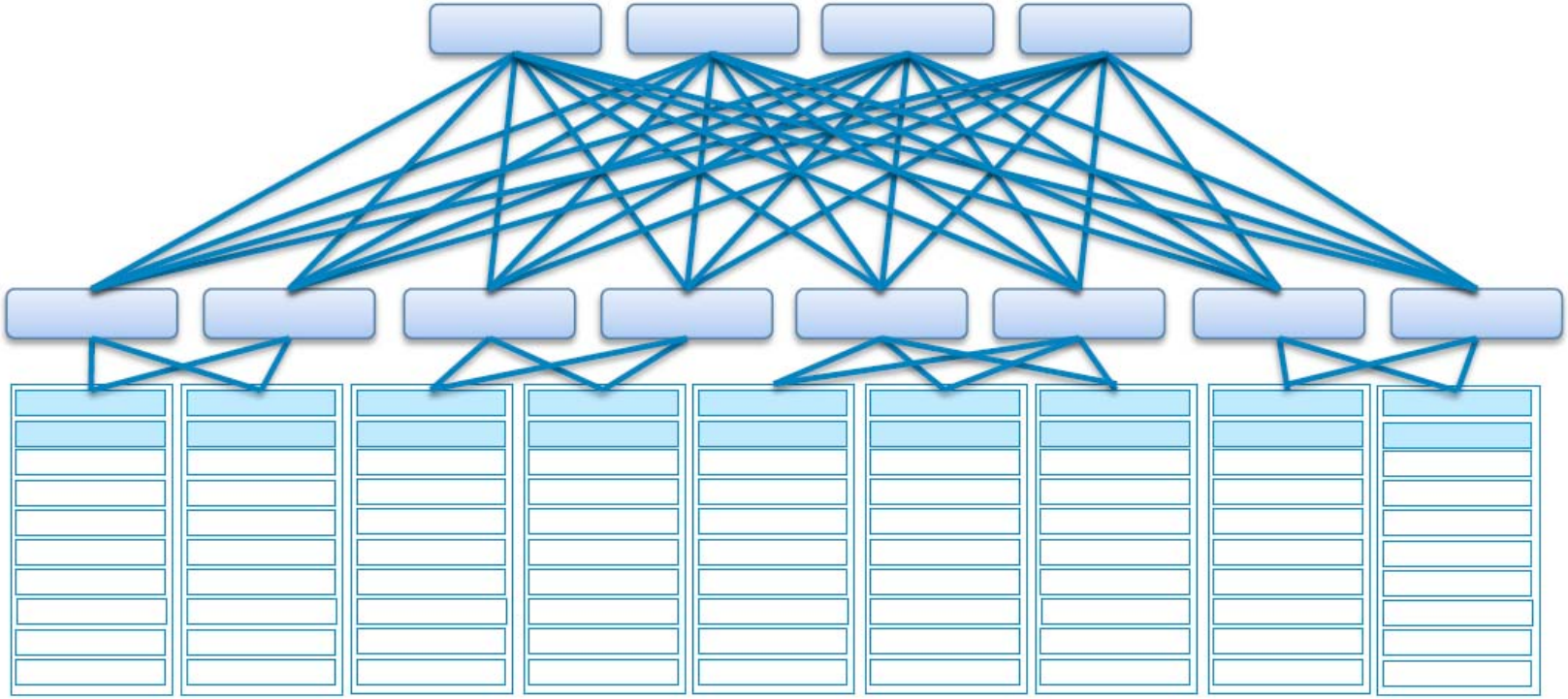


Oversubscription creates constraints for mobility

Subnet and VLAN boundaries leave stranded compute capacity

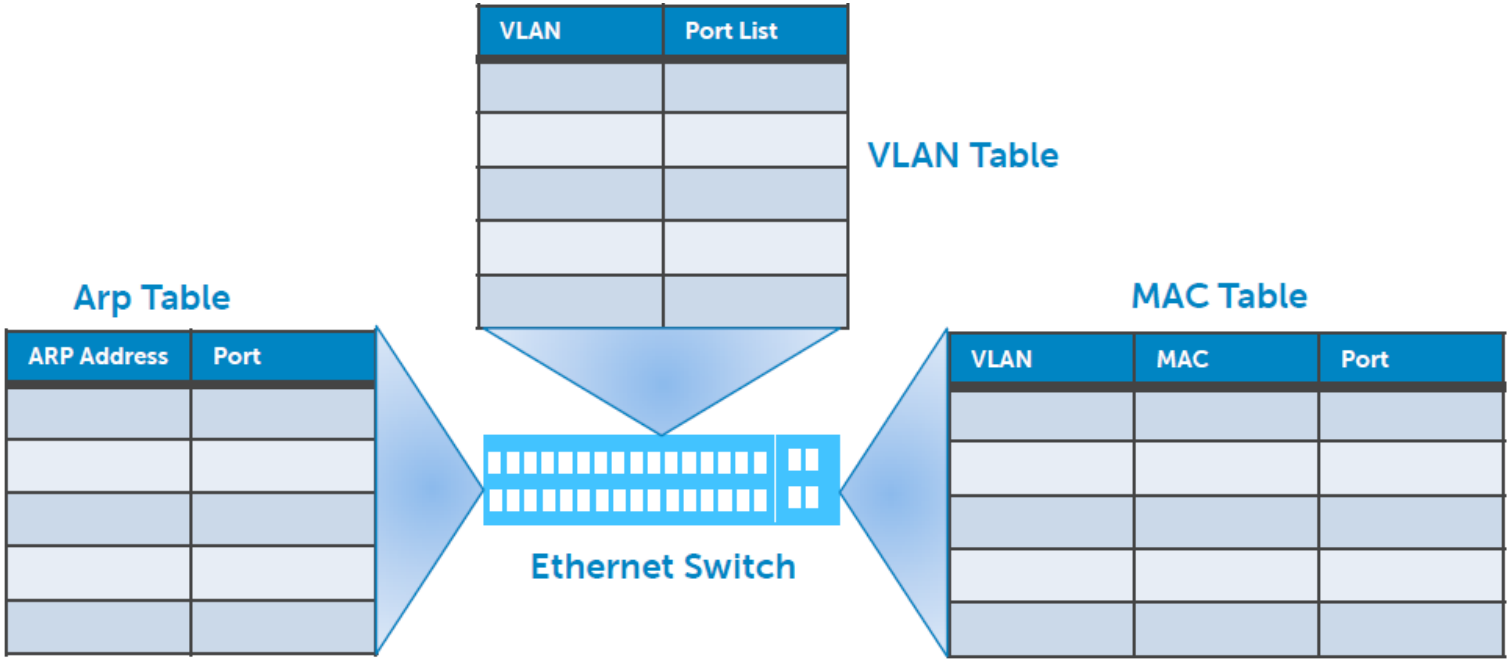
Clos Topology based Physical Network

- ✓ Leaf & spine design
- ✓ Non-blocking
- ✓ Predictable latency
- ✓ Resiliency – equal cost paths
- ✓ Load-balancing of Network paths
- ✓ Scale-out



Switch forwarding table constraint

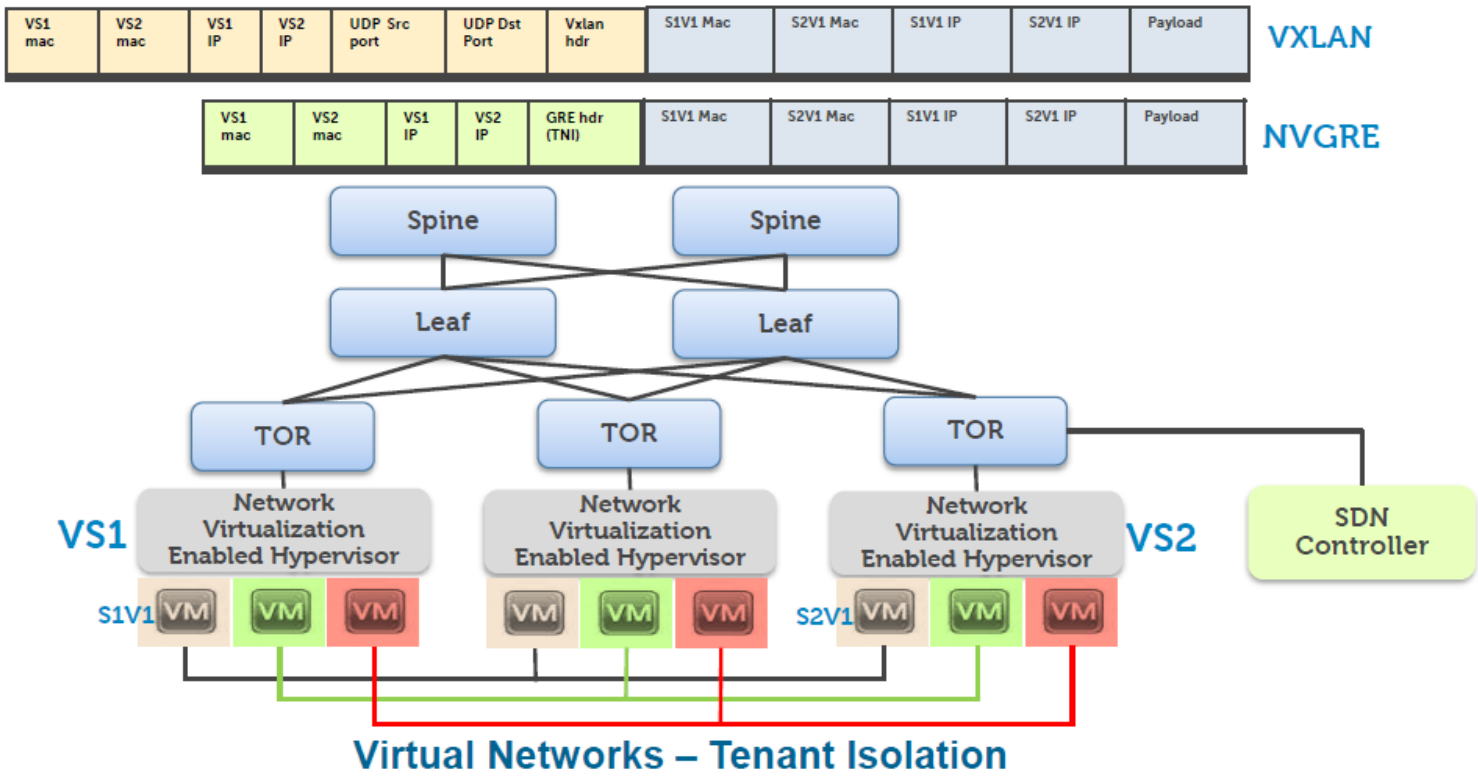
* Lack of boundaries will result in large number of forwarding entries
* Forwarding table is kept internal to achieve high packet throughput



Network Virtualization Overlay

- ✓ Distributed forwarding table at network edges
- ✓ Encapsulation of packet – VXLAN/NVGRE

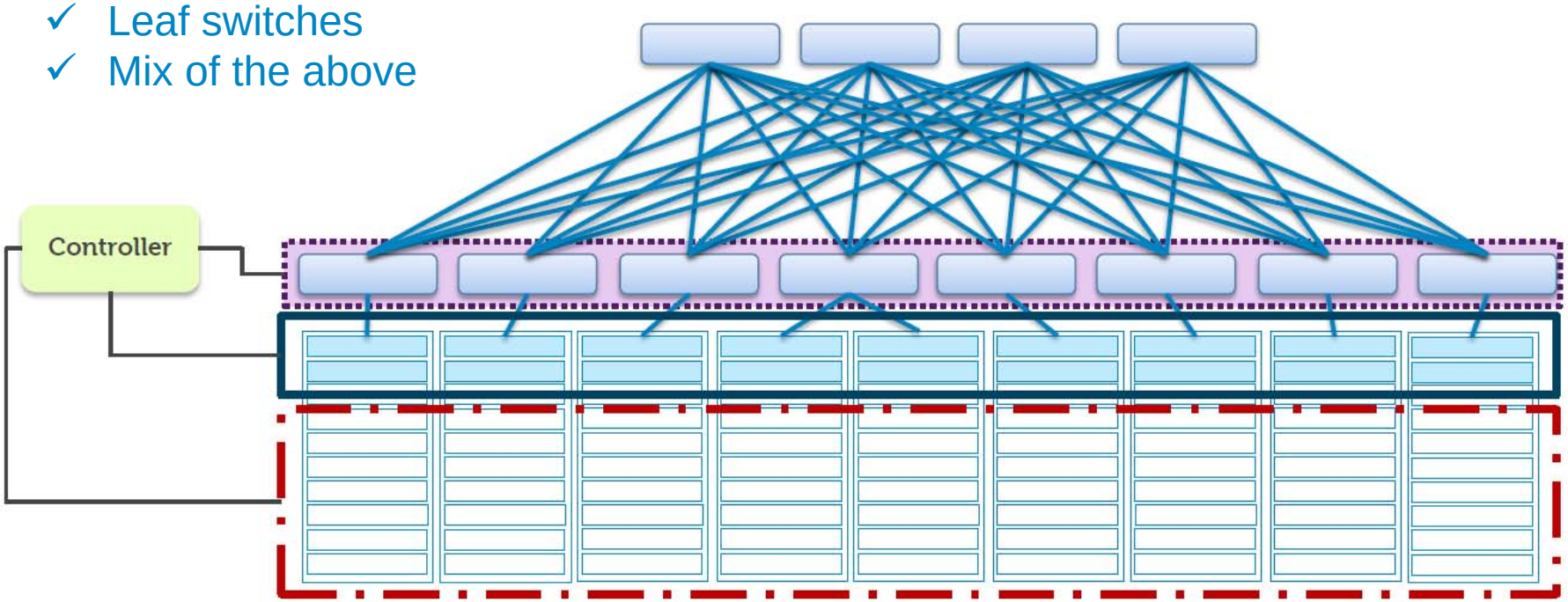
- ✓ Scalability of L2, L3 and VLANs
- ✓ Requires centralized controller



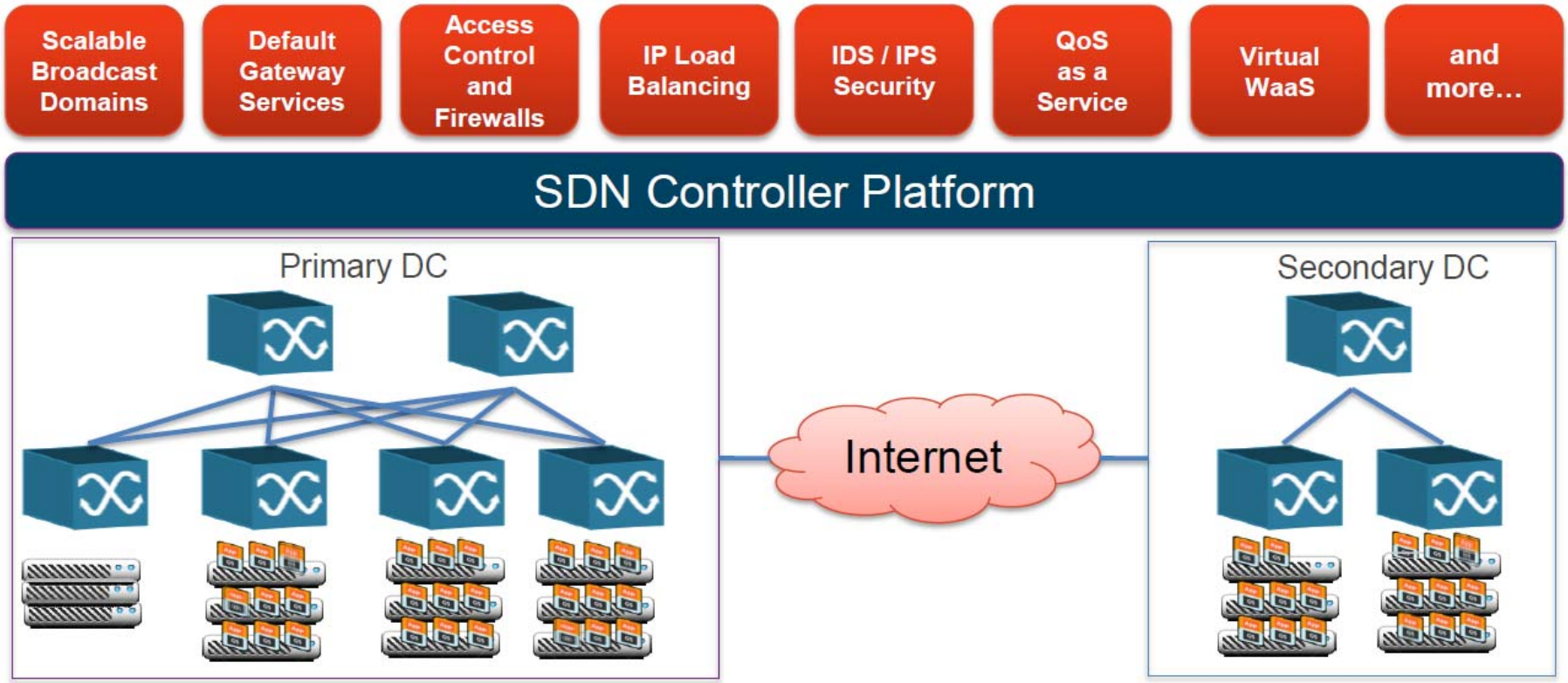
NVO Implementation

Options

- ✓ Virtualized Servers
- ✓ TOR Switches
- ✓ Leaf switches
- ✓ Mix of the above



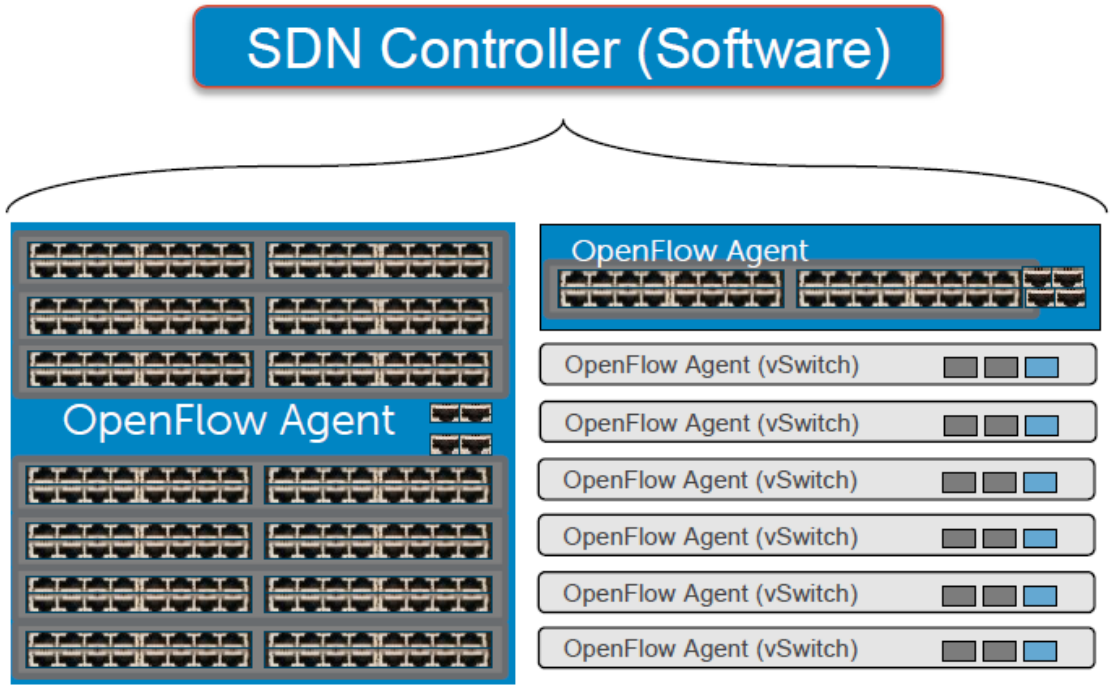
Software Defined Network



SDN for scale out networks

SDN Controller

- ✓ Computes forwarding table at network level
- ✓ Effective use of switch forwarding table using aggregation, overlay etc.
- ✓ Load balance the traffic among the Clos network paths



Summary

Key take away

- ✓ Infrastructure scale-out can be realized using Clos network.
- ✓ Forwarding table scale-out can be realized using NVO.
- ✓ SDN is well-suited for these network level technologies.

Areas of further study

- ✓ Optimization of packet traversal paths over Clos network using workload and virtual service appliance placement algorithms.
- ✓ Tools to debug overlay networks.

Thank you

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