Dell / BigSwitch Spine and Leaf Network Deployment Document
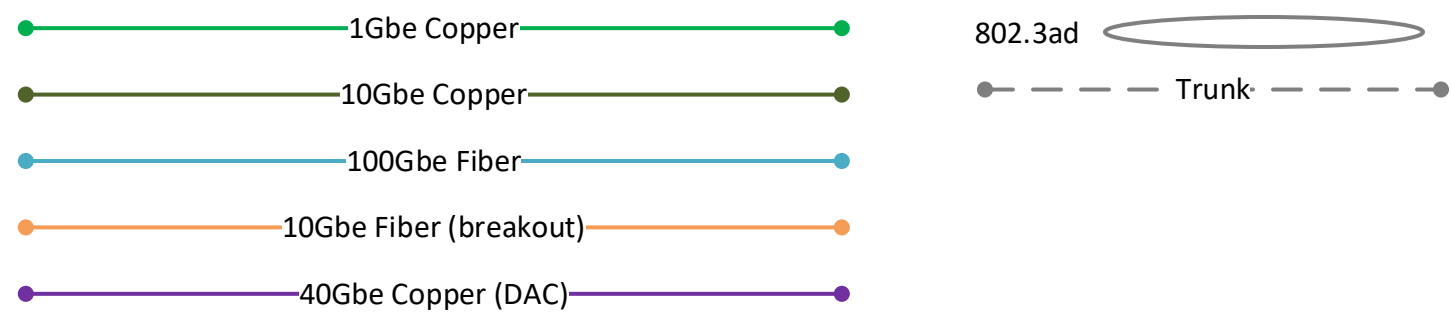
Design Goals | Physical Layer 1 | Logical Layer 2 and 3

Design Goals

Spine and Leaf Switch Fabric (BigSwitch)

- Dedicated VPC/tenant for production with traditional web, application and database segmentation
- Enable a equal cost multipath horizontally scalable switch fabric (3 x spine, 8 leafs, 4 leaf groups)
- 10Gbps edge ports in 20Gbps LACP bundle
- BigSwitch distributed layer 3
- BigSwitch hitless/in-service network services upgrades
- BigSwitch hitless redundancy for network services and edge ports via multi chassis link aggregation
- Northbound API to the fabric for configuration and monitoring
- Visibility via telemetry from the fabric (e.g., flow data, packet capture)
- Stateful filtering between web and application segments
- Stateless filtering between application and database segments

Next Generation Firewall (Palo Alto)

- Palo Alto Networks firewall for edge security
- 1Gbps throughput

Hardware Refresh of Load Balancers (F5)

- F5 ADCs in one-arm topology
- 1Gbps throughput

Compute Capacity

- 3 spines and 16 x leaf groups with 768 20Gbps LAG host ports (server density) approximately 15,360 virtual machines capacity

Datacenter 1

Dell / BigSwitch Network Deployment Document		
1.0	Physical Layer 1	09/17/2019	hmoats

Legend:
- 1Gbe Copper
- 10Gbe Copper
- 100Gbe Fiber
- 10Gbe Fiber (breakout)
- 40Gbe Copper (DAC)
- 802.3ad
- Trunk

ISP1

ISP2

Edge Routing and Switching

Router 1 — ASR1001
Router 2 — ASR1001

Edge Switch 1 — S3048-ON Switch
Edge Switch 2 — S3048-ON Switch

Network Services

Firewall 1 — PA-850
Firewall 2 — PA-850
Load Balancer 1 — I2600
Load Balancer 2 — I2600

Leaf Switches

Leaf Switch 1 — S4148T-ON Switch
Leaf Switch 2 — S4148T-ON Switch

Leaf Pair X 16

Spine Switches

Spine Switch 1 — Z9100-ON Switch
Spine Switch 2 — Z9100-ON Switch
Spine Switch 3 — Z9100-ON Switch

Management Switches

Management Switch 1 — S3048-ON Switch
Management Switch 2 — S3048-ON Switch

Controllers

BigSwitch Controller 1 — KVM Host
BigSwitch Controller 2 — KVM Host
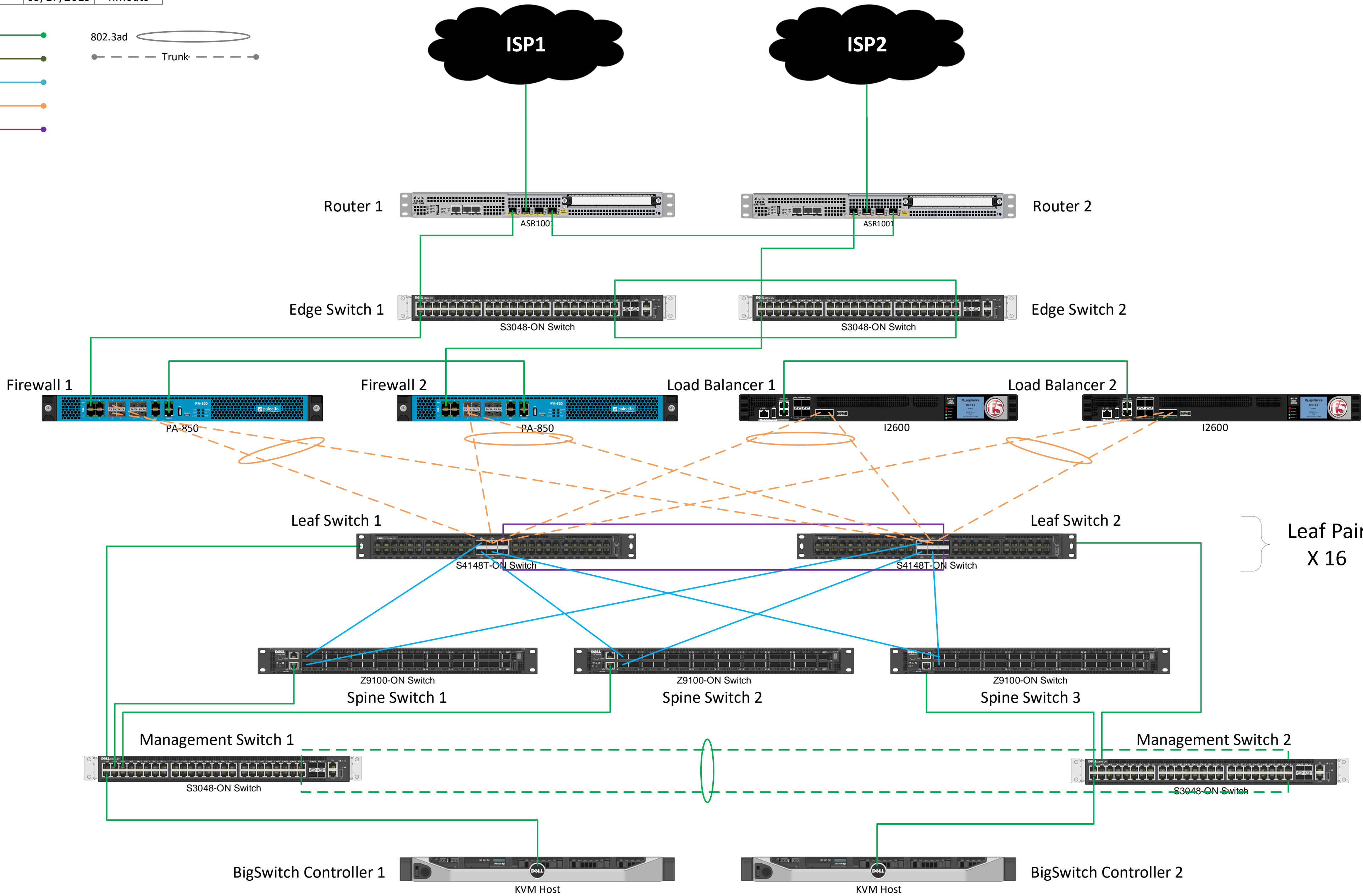
Network Parameters

VPC/Tenants

- Core
- DMZ
- Production
- System

Networks

- A.B.C.0/X (public network)
- 10.0.0.0/16 (private network)

ISP1

ISP2

A.B.C.2
VRRP A.B.C.1

border1

A.B.C.3
VRRP A.B.C.1

border2

name=outside1 ,vlan=1031, network=A.B.C.0/X

A.B.C.11
A.B.C.12

10.0.2.1
10.0.2.2

10.0.255.1
10.0.255.2

fwc-03

name=core1 ,vlan=255, network=10.0.255.0/24

10.0.255.11

core

tenant core

Load balancer

10.0.2.11
10.0.2.12

10.0.2.13

name=dmz1 ,vlan=2,network=10.0.2.0/24

system

tenant system

dmz

tenant dmz

10.0.255.11

production

10.0.255.11

name=app1, vlan=20, network=10.1.20.0/24

name=db1 ,vlan=200,network=10.1.200.0/24

tenant production