Dell Networking Reference Architectures:
Enabling high density campus environments

Dell Networking
April 2013
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Dell Networking Reference Architectures

Objectives and Goals

• Demonstrate how businesses can scale their workforce and productivity
  – Improve productivity, backed by in-house solution setup methodology and testing
  – Scale and interoperate across the network and with existing infrastructures.
  – RA’s are designed to be interoperable and modular with existing solutions and architectures.

• Help with evaluation and network upgrade planning
  – With a series of tools demonstrating a tested and proven LAN architecture, provides high quality network capabilities for Campus-size deployments
  – Reduces deployment time, effort required and learning curve, while helping assess requirements and resources accurately before implementation

• Provide a technical blueprint
  – Detail deployment scenarios, assumptions, equipment needs (parts list and accessories), required to implement the architecture
  – Guidance and best practices on installation, configuration and operation of components and management
  – Help expedite evaluations and implementation for faster on-ramp
Dell Networking Reference Architectures
Enabling complete and scalable solutions end-to-end

**SOHO**
- 2800
- 10s End-users
- End-user networking

**WORKGROUP**
- PowerEdge
- PowerVault
- Workgroup networking
- 10s-100s End-users

**BRANCH**
- 5500
- 1000s End-users

**CAMPUS**
- 3000
- 1000s+ End-users

**SMALL**
- Blade Server Fabric
- S4810
- S60, S55
- 10s Server/VMs

**MEDIUM**
- S4810 or Z9000 w/VLT
- MXL 10/40G
- 10s-100s Server/VMs

**LARGE**
- S4810 Leaf
- Z9000 Spine
- MXL 10/40G
- 1000s+ Server/VMs

**EXTRA LARGE**
- S4810 Leaf
- Z9000 Distributed Core
- MXL 10/40G
- 1000s+ Server/VMs
Delivering benefits for growing networks

Why is this important?
Continued user growth, and application performance limit business effectiveness
IT is being asked to do more with less, deploy band-aid solutions over proper planning
Management complexity increases risk of mis-configuration and network downtime
Businesses want to add functionality without compromising strategic technology initiatives

What are the benefits of reference architectures?
Increase success of implementation and network readiness for business efficiency
Deliver a proven blueprint using solutions and configurations available today
Simplify complex infrastructure with end-to-end, centralized management solutions
Scale architectures with modular blueprints to advance application and user functionality

Why Dell?
• High-performance, standards-based platforms allow choice without compromise
• Efficient platforms use less space, power, and cooling
• Common practices and cross-vendor support make heterogeneous network management easy
• Interoperable platforms enable incremental augmentation while protecting network investments
Agile and Scalable Campus Networks
Dell Campus Reference Architecture

Sizing: Large Campus
- 1000 to 3000 ports

Great for
- Dense end-user base
- Environments with multiple IP peripherals including security cameras, printers, while supporting Unified Communications and collaboration (UC&C) and other user applications

Deployment type
- Medium to large campus including corporate offices/HQ, school districts, institutions, hospitals
- Multi-building, multi-floor
- MDF, IDF closets

Focus of this RA

Guidelines in this RA may be applied to these

BRANCH
- 100s-1000s End-Users

WORKGROUP
- 10s-100s End-Users

Sizing
- 100 to 1000 ports

Great for
- Mid-sized end-user base
- Office environments with IP peripherals
- Emerging unified communications delivery

Deployment type
- SMB, distributed offices
- Multi-floor, IDF closets

Sizing
- 10 to 100 ports

Great for
- Dedicated to teams, groups
- Email, data sharing

Network Scale
Campus RA Solution Overview
Proven components available today

Access, Aggregation, Core

2800  3500  5500  6200  7000  8100  C150/C300

L3 Access / Edge
Core / Aggregation (10/40GbE)

Scalable GbE Access
Agile, high density stacking
GbE to 10GbE (module)
PoE+ capable

Streamlined 10GbE core and aggregation
Powerful, maximum performance
10/40GbE High Availability

Reduce risk and deploy with proven platforms deployed in thousands of networks today
Campus RA Technical Guide Overview

• The Technical Guide is the main guidance for deployment, with campus RA design, best practices, configuration and commands

• Best Practices include
  – Features explanation and Switch configuration setup
    › VLAN, Link-Aggregation, QoS, STP/Spanning Tree and Stacking; VRRP and other key features
  – Procedures and configuration for all switches
    › VLAN: Create VLANs for physical location
    › MST: for certain VLANs
    › VRRP: on the MST root bridge switch
    › QoS: for iSCSI networks etc.
    › Stacking: Uplink configuration
    › Wireless connectivity
    › Other configurations
Key section details

- **Detail and topology examples supporting large campus environments**
- **Configuration detail for switches in the RA**
- **Command-line detail examples for each switch**
  Available for download

**Configuration file for stack configuration**

```
slot 1/0 7 ! PowerConnect 7040
slot 1/1 11 ! SFP+ Card
slot 1/2 9 ! CX4 Card
...
slot 6/0 3 ! PowerConnect 7024P
slot 6/1 9 ! CX4 Card
slot 6/2 11 ! SFP+ Card
stack
member 1 7 ! PCT7048
member 2 3 ! PCT7048
member 3 3 ! PCT7048
member 4 3 ! PCT7048
member 5 3 ! PCT7048
member 6 3 ! PCT7048
exit
```

```
ip vrrp
interface vlan 200
vrrp 20
vrrp 20 mode
vrrp 20 description master
vrrp 20 ip 20.20.20.1
exit
interface vlan 201
vrrp 21
vrrp 21 mode
vrrp 21 description master
vrrp 21 ip 21.21.21.1
exit
interface vlan 300
vrrp 30
vrrp 30 mode
vrrp 30 description backup
vrrp 30 ip 30.30.30.1
exit
```
Dell Networking RA Resources
Tools for our customers and communities

Presentation & Brochures
Reference Architecture
White papers & guides
Configuration examples and tools
Reference Architecture community & blog

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Campus Networking Solutions
Reference Architecture 1.0 (Large Campus)

A Dell Reference Architecture

ip wrsp
interface vlan 200
wrsp 50
wrsp 20 mode
wrsp 20 description master
wrsp 20 ap 20.20.20.1
exit
interface vlan 201
wrsp 31
wrsp 21 mode
wrsp 21 description master
wrsp 21 ap 21.21.21.1
exit
interface vlan 300
wrsp 30
wrsp 30 mode
wrsp 30 description back
wrsp 30 ap 30.30.30.1
exit

Future:

Download here

Dell Networking Wiki
Solutions Made Easy

Tutorials & Training
Multimedia, Videos
Case Studies
Dell Services to help deploy RAs

Comprehensive portfolio for all aspects of planning

**Approach**
- Workshop: Understand potential
- Assessment: Make informed decisions
- Design: Lay path for success
- Implementation: Capture value
- Manage/support: Ongoing success

**Services portfolio**
- Consulting services
- Deployment services
- Managed services
- Support services

**Customer Value**
- Manage tech and business changes
- Focused high impact engagements
- Flexible purchase models
- Reduced deployment time and cost
- Comprehensive Hardware support
- Reduced and predictable OpEx
- Single point of case ownership
- Global service availability
- Industry best practices
Summary: Networking Reference Architectures
The right choice for your network

Smart Choices
Improvements and efficiencies are designed in from the start, with an interoperable networking framework for efficient IT

Innovative Frameworks
Increase performance and reliability, while delivering high availability, flexibility and modular building blocks for the future

Increased Agility
With designs, tools, services and support to simplify campus network designs, reduce risk and realize productivity faster