

VLANs, Trunks, VTP, DTP

Essentials: VLAN Protocols; Trunking with Switches & Routers

Agenda

- In the News:
 - What's the best way to learn?
<https://arstechnica.com/science/2019/09/college-students-think-they-learn-less-with-an-effective-teaching-method/>
 - Extra bandwidth is very common:
<https://tech.slashdot.org/story/19/08/20/1450204/the-truth-about-faster-internet-its-not-worth-it>
- Review of Exercise 1: highly interesting; ... class average is probably 66%
- Review of Lab 1: What's the hidden agenda? (last item in the lab)
- Course overview, including structure of a large hierarchical network
- New material: VLANs, VTP, DTP, Inter-VLAN routing

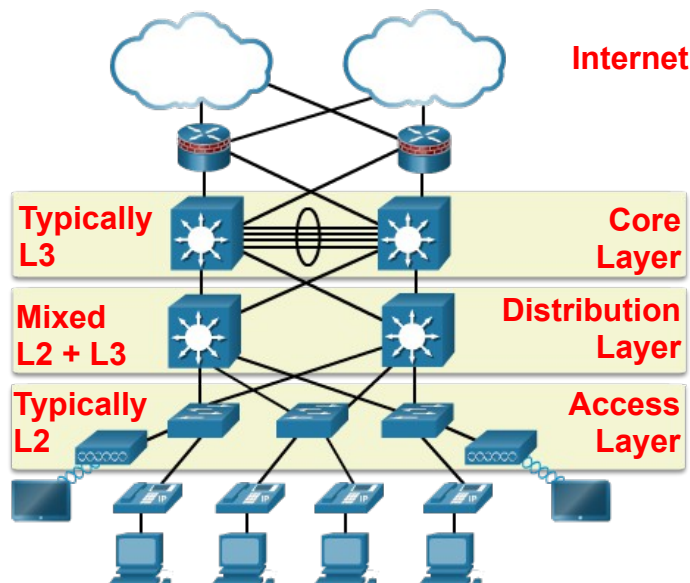
Assignments and Lab work

- Due today: Lab 1 post-lab quiz (BrightSpace); Ch 1 of "Scaling Networks v6"
- **Readings:** Ch 2 by next Mon
- **Chapter Quiz:** NetAcad online Chapter 1 "exam"; due by **Fri @ 11:59pm**
- **Lab work:** Cisco Labs 2.1 & 2.2 (pdf on BrightSpace in Assignments/Labs ...)
- Lab 2 **post-lab:** due before **10am next Mon** (Sep 16)
- Lab 3 **pre-lab:** due before your lab period next week

Course Overview

Cisco's overview for their course "CCNA – Scaling Networks" is:

The focus of this course is on the architecture, components, and operations of routers and switches in a larger and more complex network. You will learn how to configure routers and switches for advanced functionality.



Adapted from Figure 1.5 (sect 1.1.1.2)
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(Course Overview cont'd)

You will do the following:

- Describe the operations and benefits of link aggregation and Cisco VLAN Trunk Protocol (VTP).
- Describe the operations and benefits of the Spanning Tree Protocol (STP).
- Configure and troubleshoot STP operations.
- Configure and troubleshoot VTP, STP, DTP, and RSTP.
- Configure and troubleshoot inter-VLAN routing.
- Configure and troubleshoot EtherChannel and HSRP.
- Configure and troubleshoot basic operations of routers in a complex routed network for IPv4 and IPv6.
- Configure and troubleshoot advanced operations of routers and implement OSPF and EIGRP routing protocols for IPv4 and IPv6.

By the end of this course, you will be able to configure and troubleshoot routers and switches and resolve common issues with OSPF, EIGRP, STP, and VTP in both IPv4 and IPv6 networks.

Ch 1 Review

Major items covered in this chapter:

- § 1.1.1: The Need to Scale the Network
 - Def'n of a **campus network**: an interconnected group of LANs that are spread over a small geographic area; up to networks with 1000's users
 - 3-layer heirarchical design: Core, Distribution, Access; def'n of each layer (also option for starting with "collapsed core" for smaller networks)
- § 1.1.2: Expanding a Network using Design for Scalability:
 1. Suitable choice of equipment (expandable, modular)
 2. Heirarchical network design
 3. IP addressing plan, including both IPv4 and IPv6
 4. Segmented networks to limit broadcasts, *failure domains*; filter traffic
 5. Redundant links (need STP at L2)
 6. LAG (PAgP, LACP)
 7. Dynamic protocols, at both L2 and L3
 8. Wireless, mobility options (**not** covered in this course)
- § 1.2: Network Hardware & Characteristics (examples from Cisco only!)
 - Switches: cost, port density, forwarding rate, PoE, "multi-layer" switches
 - Routers: branch, network edge, **service provider**,
 - **In-band** and **Out-of-band** management of network devices
 - basic CLI commands for routers & switches (Any you **don't** already know?)

Ch 2 Review

Major items covered in this chapter:

- § 2.1: DTP, VTP, Extended VLANs
 - VTP: components, modes, advertisements, versions, **caveats**, config
 - NB:** VTP [& ISL] is Cisco proprietary; Multiple VLAN Registration Protocol (**MVRP**) is cross-vendor, defined by 802.1ak in a 2007 amendment to 802.1Q https://en.wikipedia.org/wiki/Multiple_Registration_Protocol
 - extended VLANs: range numbers (ONLY Cisco puts these limits!)
 - DTP: modes, behaviour, negotiations, config & troubleshooting
- § 2.2: Multi-VLAN issues: configuration, IP addressing, dynamic L2 protocols
- § 2.3: L3 Switching: SVIs, configuration, troubleshooting
- **Beware:** we start to see the first instance where *describing* a protocol or feature in the config is **not** necessarily the same as **activating** it!!!

VTP Charts

Ver.	Features
1	<ul style="list-style-type: none"> - Cisco default - Supports only 1-1005
2	<ul style="list-style-type: none"> - Backwards compatible with Ver 1 - Supports T.R, opaque TLVs, consistency checks
3	<ul style="list-style-type: none"> - Supports extended VLANs + other features (MSTP) - NOT compatible with Ver 1, but <u>is</u> with Ver 2

Mode	Features
Client	<ul style="list-style-type: none"> - Receive & relay VTP info only - Must match domain, password
Server	<ul style="list-style-type: none"> - Generate, receive, relay VTP info - Multiple servers allowed, all equal - Must match domain, password
Trans-parent	<ul style="list-style-type: none"> - Relay VTP info, but ignore it - ONLY method of handling extended VLAN #'s - ONLY method for Private VLANs

Messages: Summary Advertisement, Advertisement Request, Subset Advertisement

DTP Chart

	Dynamic Auto	Dynamic Desirable	Trunk	Access
Dynamic Auto	Access	Trunk	Trunk	Access
Dynamic Desirable	Trunk	Trunk	Trunk	Access
Trunk	Trunk	Trunk	Trunk	Problem! Limited Connectivity
Access	Access	Access	Problem! Limited Connectivity	Access