

CCNA EXPLORATION v4.0 LAN SWITCHING AND WIRELESS INSTRUCTOR REFERENCE GUIDE

COMPARISON OF NEW CURRICULA WITH EXISTING CURRICULA



**Prepared by
Cisco Learning Institute**

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LAN Switching and Wireless Summary

New CCNA curriculum has been created to improve student experience, improve quality, and increase flexibility.

LAN Switching and Wireless Course Outline

Following is the outline for this new course with indications as to which topics contain new content. Please note that P-New means that the original subject matter has been enhanced and/or there is additional subject matter in the section.

Course Outline				New/ Existing Content
1.0			LAN Design	
	1.1		Switched LAN Architecture	
		1.1.1	The Hierarchical Network Model	P-New, 5.1, 5.2.1
		1.1.2	Principles of Hierarchical Network Design	P-New, 5.1.4, 5.1.5
		1.1.3	What is a Converged Network?	NEW
	1.2		Matching Switches to Specific LAN Functions	
		1.2.1	Considerations for Hierarchical Network Switches	NEW
		1.2.2	Switch Features	P-New, 5.2.2, 5.2.4, 5.2.6
		1.2.3	Switch Features in a Hierarchical Network	P-New, 5.2.2-5.2.6
		1.2.4	Switches for Small and Medium Sized Business (SMB)	P-New, 5.2.2-5.2.6
2.0			Basic Switch Concepts and Configuration	
	2.1		Introduction to Ethernet/802.3 LANs	4.1.3, 4.1.4
		2.1.1	Key Elements of Ethernet/802.3 Networks	P-New, 4.1.4, 4.1.9, 4.2.7
		2.1.2	Design Considerations for Ethernet/802.3 Networks	4.1.6, 4.2.2, 4.2.4, 4.2.5, 4.2.7, 4.3.7, 4.3.8
		2.1.3	LAN Design Considerations	4.1.6
	2.2		Forwarding Frames using a Switch	
		2.2.1	Switch Forwarding Methods	4.2.10
		2.2.2	Symmetric and Asymmetric Switching	4.2.8
		2.2.3	Memory Buffering	4.2.8, 4.2.9
		2.2.4	Layer 2 and Layer 3 Switching	4.2.3, 4.2.4, 4.2.7
	2.3		Switch Management Configuration	
		2.3.1	Navigating Command-Line Interface Modes	P-New, 6.1.6
		2.3.2	Using the Help Facility	P-New, 6.1.5
		2.3.3	Accessing the Command History	NEW
		2.3.4	The Switch Boot Sequence	P-New, 6.1.4
		2.3.5	Prepare to Configure the Switch	6.1.4
		2.3.6	Basic Switch Configuration	P-New, 6.2.2, 6.2.3
		2.3.7	Verifying Switch Configuration	6.2.1
		2.3.8	Basic Switch Management	P-New, 6.2.2
	2.4		Configuring Switch Security	
		2.4.1	Configure Password Options	P-New, 6.2.2, 6.2.7, 6.2.8



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Course Outline				New/ Existing Content
		2.4.2	Login Banners	NEW
		2.4.3	Configure Telnet and SSH	P-New, 6.2.2
		2.4.4	Common Security Attacks	NEW
		2.4.5	Security Tools	NEW
		2.4.6	Configuring Port Security	6.2.4, 6.2.5
		2.4.7	Securing Unused Ports	6.2.5
3.0			VLANs	
	3.1		Introducing VLANs	
		3.1.1	Introducing VLANs	P-New, 8.1.1-8.1.4
		3.1.2	Types of VLANs	P-New, 8.1.5
		3.1.3	Switch Port Membership Modes	P-New, 8.1.3
		3.1.4	Controlling Broadcast Domains with VLANs	P-New, 8.1.2
	3.2		VLAN Trunking	
		3.2.1	VLAN Trunks	P-New, 9.1.1, 9.1.4
		3.2.2	Trunking Operation	9.1.3
		3.2.3	Trunking Modes	P-New, 9.1.3-9.1.5
	3.3		Configure VLANs and Trunks	
		3.3.1	Configuring VLANs and Trunks Overview	9.1.4, 9.1.5
		3.3.2	Configure a VLAN	8.2.3
		3.3.3	Managing VLANs	8.2.4-8.2.6
		3.3.4	Configure a Trunk	9.1.5
	3.4		Troubleshooting VLANs and Trunks	
		3.4.1	Common Problems with Trunks	NEW
		3.4.2	A Common Problem with VLAN Configurations	NEW
4.0			VTP	
	4.1		VTP Concepts	
		4.1.1	What is VTP?	9.2.1-9.2.3
	4.2		VTP Operation	
		4.2.1	Default VTP Configuration	P-New, 9.2.5
		4.2.2	VTP Domains	9.2.3, 9.2.4
		4.2.3	VTP Advertising	9.2.3, 9.2.4
		4.2.4	VTP Modes	P-New, 9.2.3
		4.2.5	VTP Pruning	NEW
	4.3		Configure VTP	
		4.3.1	Configuring VTP	P-New, 9.2.5
		4.3.2	Troubleshooting VTP Configurations	P-New, 9.2.5
		4.3.3	Managing VLANs on a VTP Server	P-New, 9.2.3
5.0			STP	
	5.1		Redundant Layer 2 Topologies	
		5.1.1	Redundancy	P-New, 7.1.1-7.1.3
		5.1.2	Issues with Redundancy	7.1.4, 7.1.5
		5.1.3	Real-world Redundancy Issues	NEW

Course Outline			New/ Existing Content
	5.2	Introduction to STP	
	5.2.1	The Spanning Tree Algorithm	P-New, 7.2.1, 7.2.2, 7.2.4
	5.2.2	STP BPDU	7.2.2, 7.2.4
	5.2.3	Bridge ID	NEW
	5.2.4	Port Roles	P-New, 7.2.5
	5.2.5	STP Port States and BPDU Timers	P-New, 7.2.5
	5.3	STP Convergence	
	5.3.1	STP Convergence	7.2.6
	5.3.2	Step 1. Electing A Root Bridge	P-New, 7.2.4
	5.3.3	Step 2. Elect Root Ports	P-New, 7.2.3
	5.3.4	Step 3. Electing Designated Ports and Non-Designated Ports	P-New, 7.2.3, 7.2.4
	5.3.5	STP Topology Change	NEW
	5.4	PVST+, RSTP and Rapid PVST+	
	5.4.1	Cisco and STP Variants	NEW
	5.4.2	PVST+	NEW
	5.4.3	RSTP	P-New, 7.2.7
	5.4.4	Edge Ports	P-New, 7.2.7
	5.4.5	Link Types	P-New, 7.2.7
	5.4.6	RSTP Port States and Port Roles	P-New, 7.2.7
	5.4.7	Configuring rapid PVST+	NEW
	5.4.8	Design STP for Trouble Avoidance	NEW
	5.4.9	Troubleshoot STP Operation	NEW
6.0		Inter-VLAN Routing	
	6.1	Inter-VLAN Routing	
	6.1.1	Introducing Inter-VLAN Routing	P-New, 9.3.2, 9.3.3
	6.1.2	Interfaces and Subinterfaces	P-New, 9.3.4, 9.3.5
	6.2	Configuring Inter-VLAN Routing	
	6.2.1	Configure Inter-VLAN Routing	9.2.6
	6.2.2	Configuring Router-on-a-Stick Inter-VLAN Routing	P-New, 9.3.5, 9.3.6
	6.3	Troubleshooting Inter-VLAN Routing	
	6.3.1	Switch Configuration Issues	NEW
	6.3.2	Router Configuration Issues	NEW
	6.3.3	IP Addressing Issues	NEW
7.0		Basic Wireless Concepts and Configuration	
	7.1	The Wireless LAN	
	7.1.1	Why Use Wireless?	NEW
	7.1.2	Wireless LAN Standards	NEW
	7.1.3	Wireless Infrastructure Components	NEW
	7.1.4	Wireless Operation	NEW
	7.1.5	Planning the Wireless LAN	NEW

Course Outline			New/ Existing Content
	7.2	Wireless LAN Security	
	7.2.1	Threats to Wireless Security	NEW
	7.2.2	Wireless Security Protocols	NEW
	7.2.3	Securing a Wireless LAN	NEW
	7.3	Configure Wireless LAN Access	
	7.3.1	Configuring the Wireless Access Point	NEW
	7.3.2	Configuring a Wireless NIC	NEW
	7.4	Troubleshooting Simple WLAN Problems	
	7.4.1	Solve Access Point Radio and Firmware Issues	NEW
	7.4.2	Incorrect Channel Settings	NEW
	7.4.3	Solve Access Point Radio and Firmware Issues	NEW
	7.4.4	Solve Access Point Radio and Firmware Issues	NEW
	7.4.5	Problems with Authentication and Encryption	NEW

LAN Switching and Wireless Summary of Skills and Equipment Changes

There are new skills as well as new equipment being introduced in the CCNA Exploration curriculum.

NEW SKILLS REQUIRED

Following is a list of the new skills that shall be required for the LAN Switching and Wireless course:

- Advanced examination of frames for troubleshooting purposes.
- Advanced switch and router configuration and troubleshooting for VLANs.
- Advanced switch configuration and troubleshooting for STP.
- Advanced switch configuration and troubleshooting for VTP.
- Advanced switch configuration and troubleshooting for switch security.
- Advanced switch configuration and troubleshooting for trunking switches.
- Basic and advanced use of Packet Tracer 4.1 or greater for switch configuration and frame examination.
- Basic configuration of a wireless access point.
- Basic configuration of a wireless router.
- Basic configuration of a wireless NIC.
- Basic wireless LAN troubleshooting.
- Basic wireless router security configuration and troubleshooting.

EQUIPMENT REQUIRED

Academies adopting all CCNA Exploration courses – The minimum required equipment bundle for assured compatibility with all labs:



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In order to be able to implement the different topologies that are used in the lab exercises of the CCNA curricula, Academies teaching the four courses of either CCNA Exploration and/or CCNA Discovery require as a minimum the following equipment:

- 3 Cisco 1841 Integrated Services Routers (ISR) with Base IP IOS 12.4
- 3 2960 switches
- 2 Linksys wireless routers (Linksys WRT150N is preferred, but other models like the WRT54G, WRT300N, and WRT350N are alternatives) or SOHO equivalent

Note: The routers and switches in this equipment bundle can be substituted by other models of Cisco routers and switches with equal or higher specifications. Older equipment may be used as a substitute in some cases, but compatibility with labs is not guaranteed.

Additional Lab Equipment Required:

In addition to the networking equipment specified above, the lab topologies of CCNA Exploration may require the use of some or all of the following equipment and accessories:

- 1 PC acting as an Application Server
- A minimum of 2 desktop/laptop PCs acting as clients
- NIC Cards for the PC server and PC clients
- 2 Wireless LAN Adapters for the client PCs
- Ethernet cables and Serial Cables
- Cable-making and testing equipment

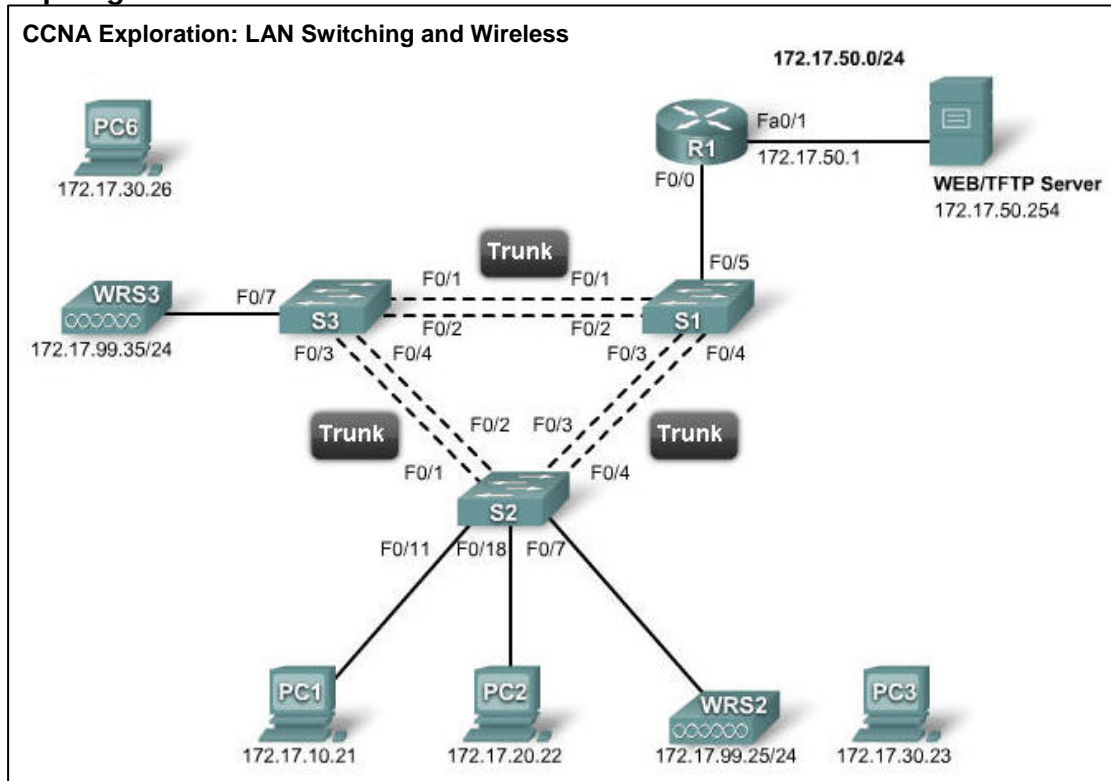
IOS Option:

In order to keep equipment investment to a minimum, the Product Development team designed all lab exercises for CCNA Exploration using the BASE IP IOS 12.4. For those Academies that wish to drill deeper into some of the routing functionalities, Cisco recommends an upgrade of the BASE IP IOS to the Advanced Services IOS. In addition to the software itself, this upgrade requires additional DRAM and Flash memories for the 1841 Routers.

Mounting Rack Accessories:

The 1841 is a desktop router. Academies that prefer to install lab equipment in standard 19" racks can use the optional Rack Kit for the 1841.

Topologies:



Summary of Changes

The CCNA Exploration: LAN Switching and Wireless curriculum has some pedagogical changes that have been applied to make the learning process more effective. The changes include the following:

- Integrated use of Packet Tracer 4.1 or greater for network visualization, skill building and simulation.
- More challenging lab activities including skill building and troubleshooting practice.
- Removal of content related to OSPF, EIGRP, and VLSM. These subjects are now covered in the semester two curriculum.
- Addition of Wireless LAN study, with configuration and troubleshooting of wireless routers and access points.