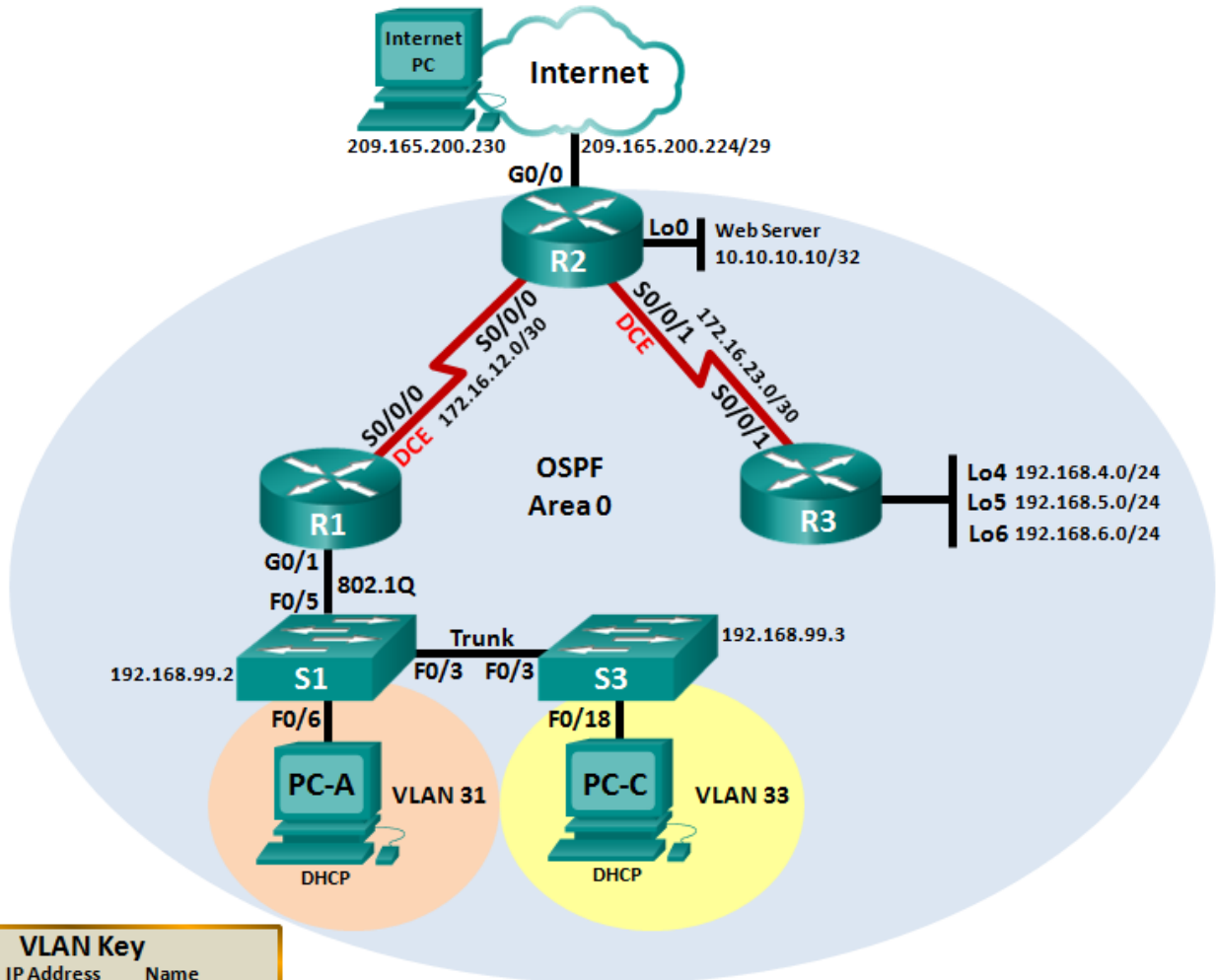


CCNA: Routing and Switching Essentials

Skills Assessment – Student Training Exam

Topology



VLAN Key		
VLAN	IP Address	Name
31	192.168.31.0/24	Accounting
33	192.168.33.0/24	Engineering
99	192.168.99.0/24	Management

Assessment Objectives

- Part 1: Initialize Devices (8 points, 5 minutes)
- Part 2: Configure Device Basic Settings (28 points, 30 minutes)
- Part 3: Configure Switch Security, VLANs, and Inter-VLAN Routing (14 points, 15 minutes)
- Part 4: Configure OSPFv2 Dynamic Routing Protocol (24 points, 25 minutes)
- Part 5: Implement DHCP and NAT (13 points, 25 minutes)
- Part 6: Configure and Verify Access Control Lists (ACLs) (13 points, 25 minutes)

Scenario

In this Skills Assessment (SA) you will configure a small network. You will configure routers, switches, and PCs to support IPv4 connectivity, switch security, and inter VLAN routing. You will then configure the devices with OSPFv2, DHCP, and dynamic and static NAT. Access control lists (ACLs) will be applied for added security. You will test and document the network using common CLI commands throughout the assessment.

Required Resources

- 3 Routers (Cisco 1941 with Cisco IOS Release 15.2(4)M3 universal image or comparable)
- 2 Switches (Cisco 2960 with Cisco IOS Release 15.0(2) lanbasek9 image or comparable)
- 3 PCs (Windows 7, Vista, or XP with terminal emulation program, such as Tera Term)
- Console cable to configure the Cisco IOS devices via the console ports
- Ethernet and Serial cables as shown in the topology

Part 1: Initialize Devices

Total points: 8

Time: 5 minutes

Step 1: Initialize and reload the routers and switches.

Erase the startup configurations reload the devices.

Before proceeding, have your instructor verify device initializations.

Task	IOS Command	Points
Erase the startup-config file on all routers.		1½ points (½ point per router)
Reload all routers.		1 ½ points (½ point per router)
Erase the startup-config file on all switches and remove the old VLAN database.		2 points (1 point per switch)
Reload both switches.		2 points (1 point per switch)
Verify VLAN database is absent from flash on both switches.		1 point (½ point per switch)

Instructor Sign-off Part 1: _____

Points: _____ of 8

Part 2: Configure Device Basic Settings

Total points: 28

Time: 30 minutes

Step 1: Configure the Internet PC.

Configuration tasks for the Internet PC include the following (Refer to Topology for IP address information):

Configuration Item or Task	Specification	Points
IP Address		(1/2 point)
Subnet Mask		(1/2 point)
Default Gateway	209.165.200.225	

Note: It may be necessary to disable the PC firewall for pings to be successful later in this lab.

Step 2: Configure R1.

Configuration tasks for R1 include the following:

Configuration Item or Task	Specification	Points
Disable DNS lookup		(1/2 point)
Router name	R1	(1/2 point)
Encrypted privileged exec password	class	(1/2 point)
Console access password	cisco	(1/2 point)
Telnet access password	cisco	(1/2 point)
Encrypt the clear text passwords		(1/2 point)
MOTD banner	Unauthorized Access is Prohibited!	(1/2 point)
Interface S0/0/0	Set the description Set the Layer 3 IPv4 address. Use the first available address in the subnet. Set the clocking rate to 128000 Activate Interface	(1/2 point)
Default route	Configure a default route out S0/0/0.	(1/2 point)

Note: Do not configure G0/1 at this time.

Step 3: Configure R2.

Configuration tasks for R2 include the following:

Configuration Item or Task	Specification	Points
Disable DNS lookup		(1/2 point)
Router name	R2	(1/2 point)
Encrypted privileged exec password	class	(1/2 point)
Console access password	cisco	(1/2 point)
Telnet access password	cisco	(1/2 point)
Encrypt the clear text passwords		(1/2 point)
Enable HTTP server		(1/2 point)
MOTD banner	Unauthorized Access is Prohibited!	(1/2 point)
Interface S0/0/0	Set the description Set the Layer 3 IPv4 address. Use the next available address in the subnet. Activate Interface	(1 point)
Interface S0/0/1	Set the description Set the Layer 3 IPv4 address. Use the first available address in the subnet. Set clocking rate to 128000 Activate Interface	(1 point)
Interface G0/0 (Simulated Internet)	Set the Description Set the Layer 3 IPv4 address. Use the first available address in the subnet. Activate Interface	(1 point)
Interface Loopback 0 (Simulated Web Server)	Set the description. Set the Layer 3 IPv4 address.	(1/2 point)
Default route	Configure a default route out G0/0.	(1/2 point)

Step 4: Configure R3.

Configuration tasks for R3 include the following:

Configuration Item or Task	Specification	Points
Disable DNS lookup		(1/2 point)
Router name	R3	(1/2 point)
Encrypted privileged exec password	class	(1/2 point)
Console access password	cisco	(1/2 point)
Telnet access password	cisco	(1/2 point)
Encrypt the clear text passwords		(1/2 point)
MOTD banner	Unauthorized Access is Prohibited!	(1/2 point)
Interface S0/0/1	Set the description Set the Layer 3 IPv4 address. Use the next available address in the subnet. Activate Interface	(1/2 point)
Interface Loopback 4	Set the Layer 3 IPv4 address. Use the first available address in the subnet.	(1/2 point)
Interface Loopback 5	Set the Layer 3 IPv4 address. Use the first available address in the subnet.	(1/2 point)
Interface Loopback 6	Set the Layer 3 IPv4 address. Use the first available address in the subnet.	(1/2 point)
Default route	Configure a default route out S0/0/1.	(1/2 point)

Step 5: Configure S1.

Configuration tasks for S1 include the following:

Configuration Item or Task	Specification	Points
Disable DNS lookup		(1/2 point)
Switch name	S1	(1/2 point)
Encrypted privileged exec password	class	(1/2 point)
Console access password	cisco	(1/2 point)
Telnet access password	cisco	(1/2 point)
Encrypt the clear text passwords		(1/2 point)
MOTD banner	Unauthorized Access is Prohibited!	(1/2 point)

Step 6: Configure S3

Configuration tasks for S3 include the following:

Configuration Item or Task	Specification	Points
Disable DNS lookup		(1/2 point)
Switch name	S3	(1/2 point)
Encrypted privileged exec password	class	(1/2 point)
Console access password	cisco	(1/2 point)
Telnet access password	cisco	(1/2 point)
Encrypt the clear text passwords		(1/2 point)
MOTD banner	Unauthorized Access is Prohibited!	(1/2 point)

Step 7: Verify network connectivity.

Use the **ping** command to test connectivity between network devices.

Use the following table to methodically verify connectivity with each network device. Take corrective action to establish connectivity if a test fails:

From	To	IP Address	Ping Results	Points
R1	R2, S0/0/0			(1/2 point)
R2	R3, S0/0/1			(1/2 point)
Internet PC	Default Gateway			(1/2 point)

Note: It may be necessary to disable the PC firewall for pings to be successful.

Instructor Sign-off Part 2: _____

Points: _____ of **28**

Part 3: Configure Switch Security, VLANs, and Inter VLAN Routing

Total points: 14

Time: 15 minutes

Step 1: Configure S1.

Configuration tasks for S1 include the following:

Configuration Item or Task	Specification	Points
Create the VLAN database	Use Topology VLAN Key table to create and name each of the listed VLANs.	(1 point)
Assign the management IP address.	Assign the Layer 3 IPv4 address to the Management VLAN. Use the IP address assigned to S1 in the Topology diagram.	(1/2 point)
Assign the default-gateway	Assign the first IP address in the subnet as the default-gateway.	(1/2 point)
Force trunking on Interface F0/3	Use VLAN 1 as the native VLAN.	(1/2 point)
Force trunking on Interface F0/5	Use VLAN 1 as the native VLAN.	(1/2 point)
Configure all other ports as access ports	Use the interface range command.	(1/2 point)
Assign F0/6 to VLAN 31		(1/2 point)
Shutdown all unused ports.		(1/2 point)

Step 2: Configure S3.

Configuration tasks for S3 include the following:

Configuration Item or Task	Specification	Points
Create the VLAN database	Use Topology VLAN Key Table to create each of the listed VLANs. Name each VLAN.	(1 point)
Assign the management IP address.	Assign the Layer 3 IPv4 address to the Management VLAN. Use the IP address assigned to S3 in the Topology diagram.	(1/2 point)
Assign the default-gateway	Assign the first IP address in the subnet as the default-gateway	(1/2 point)
Force trunking on Interface F0/3	Use VLAN 1 as the native VLAN.	(1/2 point)
Configure all other ports as access ports	Use the interface range command.	(1/2 point)
Assign F0/18 to VLAN 33		(1/2 point)
Shutdown all unused ports.		(1/2 point)

Step 3: Configure R1.

Configuration tasks for R1 include the following:

Configuration Item or Task	Specification	Points
Configure 802.1Q subinterface .31 on G0/1	Description Accounting LAN Assign VLAN 31. Assign the first available address to this interface.	(1 point)
Configure 802.1Q subinterface .33 on G0/1	Description Engineering LAN Assign VLAN 33. Assign the first available address to this interface.	(1 point)
Configure 802.1Q subinterface .99 on G0/1	Description Management LAN Assign VLAN 99. Assign the first available address to this interface.	(1 point)
Activate Interface G0/1		(1/2 point)

Step 4: Verify network connectivity.

Use the **ping** command to test connectivity between the switches and R1.

Use the following table to methodically verify connectivity with each network device. Take corrective action to establish connectivity if a test fails:

From	To	IP Address	Ping Results	Points
S1	R1, VLAN 99 address			(1/2 point)
S3	R1, VLAN 99 address			(1/2 point)
S1	R1, VLAN 31 address			(1/2 point)
S3	R1, VLAN 33 address			(1/2 point)

Instructor Sign-off Part 2: _____

Points: _____ of 14

Part 4: Configure OSPFv2 Dynamic Routing Protocol

Total points: 24

Time: 25 minutes

Step 1: Configure OSPFv2 on R1.

Configuration tasks for R1 include the following:

Configuration Item or Task	Specification	Points
OSPF Process ID	1	(1/2 point)
Router ID	1.1.1.1	(1/2 point)
Advertise directly connected Networks	Use classless network addresses Assign all directly connected networks to Area 0	(1 point)
Set all LAN interfaces as passive		(1 point)
Change the default cost reference bandwidth to support Gigabit interface calculations	1000	(1 point)
Set the serial interface bandwidth	128 Kb/s	(1 point)
Adjust the metric cost of S0/0/0	Cost: 7500	(1 point)

Step 2: Configure OSPFv2 on R2.

Configuration tasks for R2 include the following:

Configuration Item or Task	Specification	Points
OSPF Process ID	1	(1 point)
Router ID	2.2.2.2	(1 point)
Advertise directly connected Networks	Use classless network addresses Note: Omit the G0/0 network.	(1 point)
Set the LAN (Loopback) interface as passive		(1 point)
Change the default cost reference bandwidth to allow for Gigabit interfaces	1000	(1 point)
Set the bandwidth on all serial interfaces	128 Kb/s	(1 point)
Adjust the metric cost of S0/0/0	Cost: 7500	(1 point)

Step 3: Configure OSPFv2 on R3.

Configuration tasks for R3 include the following:

Configuration Item or Task	Specification	Points
OSPF Process ID	1	(1/2 point)
Router ID	3.3.3.3	(1/2 point)
Advertise directly connected Networks	Use classless network addresses Assign interfaces to Area 0 Use a single summary address for the LAN (loopback) interfaces.	(1 point)
Set all LAN (Loopback) interfaces as passive		(1 point)
Change the default cost reference bandwidth to support Gigabit interface calculations	1000	(1 point)
Set the serial interface bandwidth	128 Kb/s	(1 point)

Step 4: Verify OSPF information.

Verify that OSPF is functioning as expected. Enter the appropriate CLI command to discover the following information:

Question	Response	Points
What command will display all connected OSPFv2 routers?		(1 point)
What command displays a summary list of OSPF interfaces that includes a column for the cost of each interface?		(1 point)
What command displays the OSPF Process ID, Router ID, Address summarizations, Routing Networks, and passive interfaces configured on a router?		(1 point)
What command displays only OSPF routes?		(1 point)
What command displays detail information about the OSPF interfaces, including the authentication method?		(1 point)
What command displays the OSPF section of the running-configuration?		(1 point)

Instructor Sign-off Part 3: _____

Points: _____ of 24

Part 5: Implement DHCP and NAT for IPv4

Total points: 13

Time: 25 minutes

Step 1: Configure R1 as the DHCP server for VLANs 31 and 33.

Configuration tasks for R1 include the following:

Configuration Item or Task	Specification	Points
Reserve the first 20 IP addresses in VLAN 31 for static configurations		(1 point)
Reserve the first 20 IP addresses in VLAN 33 for static configurations		(1 point)
Create a DHCP pool for VLAN 31	Name: ACCT DNS-Server: 10.10.10.11 Domain-Name: ccna-sba.com Set the default gateway.	(1 point)
Create a DHCP pool for VLAN 33	Name: ENGNR DNS-Server: 10.10.10.11 Domain-Name: ccna-sba.com Set the default gateway.	(1 point)

Step 2: Configure Static and Dynamic NAT on R2.

Configuration tasks for R2 include the following:

Configuration Item or Task	Specification	Points
Create a local database with 1 user account	Username: webuser Password: cisco12345 Privilege level: 15	(1 point)
Enable HTTP server service		(1/2 point)
Configure the HTTP server to use the local database for authentication		(1/2 point)
Create a static NAT to the Web Server	Inside Global Address: 209.165.200.229	(1 point)
Assign the inside and outside interface for the static NAT		(1 point)
Configure the dynamic NAT inside private ACL	Access List: 1 Allow the Accounting and Engineering networks on R1 to be translated. Allow a summary of the LANs (loopback) networks on R3 to be translated.	(1 point)
Define the pool of usable public IP addresses	Pool Name: INTERNET Pool of addresses include: 209.165.200.225 – 209.165.200.228	(1 point)
Define the dynamic NAT translation		(1 point)

Step 3: Verify DHCP and Static NAT.

Use the following tasks to verify that DHCP and Static NAT settings are functioning correctly. It may be necessary to disable the PC firewall for pings to be successful:

Test	Results	Points
Verify that PC-A acquired IP information from the DHCP server		(1/2 point)
Verify that PC-C acquired IP information from the DHCP server		(1/2 point)
Verify that PC-A can ping PC-C. Note: It may be necessary to disable the PC firewall		(1/2 point)
Use a Web browser on the Internet PC to access the Web server (209.165.200.229). Login with Username: webuser , Password: cisco12345		(1/2 point)

Note: Verification of dynamic NAT will be performed in Part 6.

Instructor Sign-off Part 2: _____

Points: _____ of **13**

Part 6: Configure and Verify Access Control Lists (ACLs)

Total points: 13

Time: 25 minutes

Step 1: Restrict access to VTY lines on R2.

Configuration Item or Task	Specification	Points
Configure a named access list to only allow R1 to telnet to R2.	ACL Name: ADMIN-MGT	(2 points)
Apply the named ACL to the VTY lines		(1 point)
Verify ACL is working as expected,		(1 point)

Step 2: Secure the network from Internet traffic.

Configuration Item or Task	Specification	Points
Configure an Extended ACL to: <ul style="list-style-type: none"> Allow Internet hosts WWW access to the simulated web server on R2 by accessing the static NAT address (209.165.200.229) that you configured in Part 3. Prevent traffic from the Internet from pinging internal networks, while continuing to allow LAN interfaces to ping the Internet PC. 	ACL No.: 101	(2 points)
Apply ACL to the appropriate interface(s)		(1 point)
Verify ACL is working as expected	From the Internet PC: <ul style="list-style-type: none"> Ping PC-A (Pings should be unreachable.) Ping PC-C (Pings should be unreachable.) From R1, Ping the Internet PC (Pings should be successful.)	(1 point)

Note: It may be necessary to disable the PC firewall for pings to be successful.

Step 3: Enter the appropriate CLI command needed to display the following:

Command Description	Student Input (command)	Points
Display the matches an access-list has received since the last reset.		(1 point)
Reset access-list counters.		(1 point)
What command is used to display what ACL is applied to an interface and the direction that it is applied		(1 point)
What command displays the NAT translations?	Note: The translations for PC-A and PC-C were added to the table when the Internet PC attempted to ping these PCs in Step 2. Pinging the Internet PC from PC-A or PC-C will not add the translations to the table because of the way the Internet is being simulated on the network.	(1 point)
What command is used to clear dynamic NAT translations?		(1 point)

Instructor Sign-off Part 4: _____

Points: _____ of **13**

Part 7: Cleanup

NOTE: DO NOT PROCEED WITH CLEANUP UNTIL YOUR INSTRUCTOR HAS GRADED YOUR SKILLS EXAM AND HAS INFORMED YOU THAT YOU MAY BEGIN CLEANUP.

Before turning off power to the routers, remove the NVRAM configuration files (if saved) from all devices.

Disconnect and neatly put away all cables that were used in the Final.

Router Interface Summary Table

Router Interface Summary				
Router Model	Ethernet Interface #1	Ethernet Interface #2	Serial Interface #1	Serial Interface #2
1800	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
1900	Gigabit Ethernet 0/0 (G0/0)	Gigabit Ethernet 0/1 (G0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
2801	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/1/0 (S0/1/0)	Serial 0/1/1 (S0/0/1)
2811	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
2900	Gigabit Ethernet 0/0 (G0/0)	Gigabit Ethernet 0/1 (G0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)

Note: To find out how the router is configured, look at the interfaces to identify the type of router and how many interfaces the router has. There is no way to effectively list all the combinations of configurations for each router class. This table includes identifiers for the possible combinations of Ethernet and Serial interfaces in the device. The table does not include any other type of interface, even though a specific router may contain one. An example of this might be an ISDN BRI interface. The string in parenthesis is the legal abbreviation that can be used in Cisco IOS commands to represent the interface.