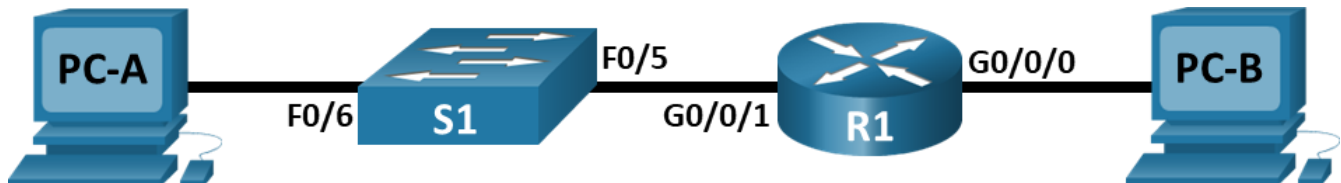# GDT2JM DATAKOMMUNIKATION1 NÄTVERKSLABORATION V1

Topology

Assessment Objectives

Part 1: Develop an IP Addressing Scheme

Part 2: Initialize and Reload Devices

Part 3: Configure Device IP address and Security Settings

Part 4: Test and Verify IPv4 and IPv6 End-to-End Connectivity

Part 5: Use the IOS CLI to Gather Device Information

Scenario

In this Skills Assessment (SA) you will configure the devices in a small network. You must configure a router, switch and PCs to support both IPv4 and IPv6 connectivity. You will configure security, including SSH, on the router. In addition, you will test and document the network using common CLI commands.

Required Resources

- 1 Router (Cisco 2911)
- 1 Switch (Cisco 2960)
- 2 PCs (Windows with a terminal emulation program, such as Tera Term)
- Console cables to configure the Cisco IOS devices via the console ports
- Ethernet cables as shown in the topology

Övrig examinationsinformation

- Maximal tid = 4 timmar
- Tillåtna hjälpmedel = Kommando-guiden

Instructions Part 1: Develop an IP Addressing Scheme

a. You will use the IPv4 network found in the table below. You will subnet it to provide IP addresses to two subnets that will support the required number of hosts. <mark>No subnet calculators may be used</mark>. All work must be shown using the IP Addressing worksheet below.

Network	Number of Hosts in Subnet A	Number of Hosts in Subnet B
140.12.0.128/25	**54**	**30**

IP Addressing Worksheet

Specification	Subnet A	Subnet B
Number of bits in the subnet	*26*	*27*
IP mask (binary)	*11111111.11111111.11111111.11000000*	*11111111.11111111.11111111.11100000*
New IP mask (decimal)	*255.255.255.192*	*255.255.255.224*
Maximum number of usable subnets (including the 0th subnet)	*4*	*8*
Number of usable hosts per subnet	*62*	*30*
IP Subnet	*140.12.0.128*	140.12.0.192
First IP Host address	140.12.0.129	140.12.0.193
Last IP Host address	140.12.0.190	140.12.0.222

b. Record your subnet assignment in the table below.

1) Assign the first IPv4 address of each subnet to a router interface

   (i) subnet A is hosted on R1 G0/0/1

   (ii) subnet B is hosted on R1 G0/0/0

2) Assign the last IPv4 address of each subnet to the PC NIC

3) Assign the second IPv4 address of subnet A to S1

　　　　　　　　www.netacad.com

4) List the maximum number of useable hosts per subnet

Description	Subnet A	Subnet B
First IP address	140.12.0.129	140.12.0.193
Last IP address	140.12.0.190	140.12.0.222
Maximum number of hosts	62	30

c. Record the IP address information for each device:

Device	IP address	Subnet Mask	Gateway
PC-A	140.12.0.190	255.255.255.192	140.12.0.129
R1-G0/0/0	140.12.0.193	255.255.255.224	N/A
R1-G0/0/1	140.12.0.129	255.255.255.192	N/A
S1	140.12.0.130	140.12.0.129	255.255.255.192
PC-B	140.12.0.222	255.255.255.224	140.12.0.193

d. Use the IPv6 address abcd:1111:2222::/48 and create <u>two subnets</u> for use in this network. Record the IPv6 addresses in the table.

Assigned to Interface	IPv6 Subnet Address	Prefix Length
R1-G0/1	abcd:1111:2222::	64
R1-G0/0	abcd:1111:2222::	64

e. Record the IPv6 address information for each device.

Note: Use <mark>FE80::1</mark> as the <u>link-local</u> address on <u>both router</u> interfaces.

Device	IPv6 address	Prefix Length	Gateway
R1-G0/0/0	abcd:1111:2222:b::1	64	N/A
R1-G0/0/1	abcd:1111:2222:a::1	64	N/A
S1	abcd:1111:2222:a::2	64	abcd:1111:2222:a::1

Part 2: Initialize and Reload Devices

- Erase the startup configurations and VLANs from the router and switch and reload the devices.
- After the switch is reloaded, change the SDM template to one that supports IPv6 as necessary, and reload the switch again.

Part 3: Configure Device IP Address and Security Settings

Step 1: Configure R1.

Configuration tasks for R1 include the following:

Task	Specification

Disable DNS lookup	no ip domain lookup
Router name	R1
Domain name	ccna-lab.com
Encrypted privileged EXEC password	ciscoenpass

Task	Specification
Console access password	ciscoconpass
Set the minimum length for passwords	10 characters
Create an administrative user in the local database	Username: **admin** Password: **admin1pass**
Set login on vty lines to use local database	line vty 0 15
Set vty lines to accept SSH connections only	transport input ssh
Encrypt the clear text passwords	service password-encryption
Configure an MOTD Banner	banner motd "Unauthorized Access is Prohibited!"
Enable IPv6 Routing	ipv6 unicast-routing
Configure Interface G0/0/0	Set the description Set the Layer 3 IPv4 address Set the IPv6 Link Local Address as **FE80::1** Set the Layer 3 IPv6 address Activate Interface
Configure Interface G0/0/1	Set the description Set the Layer 3 IPv4 address Set the IPv6 Link Local Address as **FE80::1** Set the Layer 3 IPv6 address Activate Interface
Generate an RSA crypto key	1024 bits modulus

Step 2: Configure S1.

Configuration tasks for S1 include the following:

Task	Specification
Disable DNS lookup	no ip domain lookup
Switch name	S1

Domain name	ccna-lab.com
Encrypted privileged EXEC password	ciscoenpass
Console access password	ciscoconpass
Shutdown all unused interfaces	F0/1-4, F0/7-24, G0/1-2
Create an administrative user in the local database	Username: **admin** Password: **admin1pass**
Set login on vty lines to use local database	line vty 0 15
Set vty lines to accept SSH connections only	transport input ssh

Task	Specification
Encrypt the clear text passwords	service password-encryption
Configure an MOTD Banner	banner motd "Unauthorized Access is Prohibited!"
Generate an RSA crypto key	1024 bits modulus
Configure Management Interface (SVI) on VLAN1	Set the description Set the Layer 3 IPv4 address Set the IPv6 Link Local Address as **FE80::2** Set the Layer 3 IPv6 address

Step 3: Configure host computers.

After configuring each host computer, record the host network settings with the **ipconfig /all** command.

PC-A Network Configuration	
Description	
Physical Address	0030.F24C.C805
IPv4 Address	*140.12.0.190*
Subnet Mask	*255.255.255.192*
IPv4 Default Gateway	*140.12.0.129*
IPv6 Address	*abcd:1111:2222:a::a*
IPv6 Default Gateway	*FE80::1*

PC-B Network Configuration	
Description	
Physical Address	0002.16AB.9589

IP Address	*140.12.0.222*
Subnet Mask	*255.255.255.224*
Default Gateway	*140.12.0.193*
IPv6 Address	*abcd:1111:2222:b::b*
IPv6 Default Gateway	*FE80::1*

Part 4: Test and Verify End-to-End Connectivity

Use the ping command to test IPv4 and IPv6 connectivity between all network devices.

Note: If pings to host computers fail, temporarily disable the computer firewall and retest.

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

From	To	Protocol	IP Address	Ping Results
PC-A	R1 G0/0/0	IPv4	140.12.0.193	*success*
		IPv6	*abcd:1111:2222:b::1*	*success*
	R1 G0/0/1	IPv4	140.12.0.129	*success*
		IPv6	*abcd:1111:2222:a::1*	*success*
	S1 VLAN 1	IPv4	140.12.0.130	*success*
		IPv6	*abcd:1111:2222:a::2*	*success*
	PC-B	IPv4	140.12.0.222	*success*
		IPv6	*abcd:1111:2222:b::b*	*success*
PC-B	R1 G0/0/0	IPv4	140.12.0.193	*success*
		IPv6	*abcd:1111:2222:b::1*	*success*
	R1 G0/0/1	IPv4	140.12.0.129	*success*
		IPv6	*abcd:1111:2222:a::1*	*success*
		IPv4	140.12.0.130	*success*

	S1 VLAN1	IPv6	*abcd:1111:2222:a::2*	*success*	

In addition to the ping command, what other command is useful in displaying network delay and breaks in the path to the destination?

Part 5: Use the IOS CLI to Gather Device Information

Step 1: Issue the appropriate command to discover the following information: show version

Description	
Router Model	CISCO2911/K9
IOS Image File	flash0:c2900-universalk9-mz.SPA.151-1.M4.bin
Total RAM	491520K
Total Flash Memory	249856K
Configuration Register	0x2102
CLI Command Used	*Show version*

Step 2: Enter the appropriate CLI command needed to display the following on R1:

Command Description	Command
Display a summary of important information about the IPv4 interfaces on R1.	*Show ip interface brief*
Display the IPv4 routing table.	*Show ip route*
Display the Layer 2 to Layer 3 mapping of addresses on R1.	*Show arp*
Display detailed IPv4 information about interface G0/0/0 on R1.	*Show interface g0/0*
Display the IPv6 routing table.	*Show ipv6 route*
Display a summary of IPv6 interface addresses and status.	*Show ipv6 interface brief*
Display information about the devices connected to R1. Information should include Device ID, Local Interface, Hold time, Capability, Platform, and Port ID.	*Show cdp neighbor*
Save the current configuration so it will be used the next time the router is started.	*Copy running-config startup-config*