

ROUTE Lab Guide





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ROUTE

300-101 Lab Guide

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Module 1

Lab 1.1 – Initial Configuration Lab 1.2 – Router Remote Access via Telnet Lab 1.3 – AAA Login Authentication and Exec Authorization Lab 1.4 – Configuring SSH Lab 1.5 – Configuring NTP Lab 1.6 – Configuring NTP Authentication Lab 1.7 – System Message Logging Lab 1.8 – Basic Debugging Lab 1.9 – Configuring Network Device Management Lab 1.10 – NetFlow

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Lab 1.1 – Initial Configuration

To perform this lab in Boson NetSim, please download the necessary files (refer to your purchase receipt for the download link), navigate to the appropriate lab in the lab menu in NetSim, and load the lab. You can then accomplish the tasks below.

Objective

This lab corresponds to ROUTEv2 Module 1: Basic Router Security and Management, of Boson's CCNP Curriculum. Configure Pod 1 devices with host names, passwords, IP addresses, and the Routing Information Protocol version 2 (RIPv2) routing protocol. Configure the devices in Pod 1; Pod 2 has already been configured upon the initial loading of the lab.

Lab Topology

The topology diagram below represents the NetMap in the Simulator.



The commands you will need to perform the tasks in this lab, along with their syntax and descriptions, are shown in the Command Summary table below.

Command Summary

Command	Description
clock rate clock-rate	sets the clock rate for a Data Communications Equipment (DCE) interface
configure terminal	enters global configuration mode from privileged EXEC mode
copy running-config startup-config	saves the configuration file
enable	enters privileged EXEC mode
enable password password	sets the enable password
enable secret password	sets the enable secret password
end	ends and exits configuration mode
exit	exits one level in the menu structure
hostname host-name	sets the device name
interface type number	changes from global configuration mode to interface configuration mode
ip address ip-address subnet-mask	assigns an IP address to an interface
line vty 0 4	enters configuration mode for virtual terminal (Telnet) lines
login	enables password checking
network network-address	activates the specified routing protocol on the specified network
password password	specifies the password that is required for a user to log in
ping ip-address	sends an Internet Control Message Protocol (ICMP) echo request to the specified address
router rip	enables RIP routing
show controllers <i>interface-type interface-</i> <i>number</i>	displays cable orientation for serial interfaces
show interfaces [type number]	displays the interface's Data Link layer status; when the type and number parameters are included, displays detailed information about the specified interface
show ip route	displays the IP routing table
show running-config	displays the active configuration file
show startup-config	displays the backup configuration file
shutdown; no shutdown	disables an interface; enables an interface
version 2	enables RIPv2

The IP addresses and subnet masks used in this lab are shown in the table below.

Device	Interface	IP Address	Subnet Mask
P1R1	Serial 0/0	10.30.1.5	255.255.255.0
	FastEthernet 0/0	10.100.100.1	255.255.255.0
	Loopback 0	10.20.1.1	255.255.255.0
P1R2	Serial 0/0	10.30.1.6	255.255.255.0
	FastEthernet 0/0	10.40.1.1	255.255.255.0
	Loopback 0	10.10.1.1	255.255.255.0
P1R3	FastEthernet 0/0	10.40.1.2	255.255.255.0
P2R1	Serial 0/0	10.30.2.5	255.255.255.0
	FastEthernet 0/0	10.100.100.2	255.255.255.0
	Loopback 0	10.20.2.1	255.255.255.0
P2R2	Serial 0/0	10.30.2.6	255.255.255.0
	FastEthernet 0/0	10.40.2.1	255.255.255.0
	Loopback 0	10.10.2.1	255.255.255.0
P2R3	FastEthernet 0/0	10.40.2.2	255.255.255.0

IP Addresses

Lab Tasks

Task 1: Configure P1R3

- 1. Configure P1R3 with a host name of **P1R3**. Configure **cisco** as the enable, enable secret, and virtual terminal password.
- 2. Configure the appropriate IP address on the FastEthernet 0/0 interface; refer to the IP Addresses table. Enable the interface.
- 3. Enable RIPv2, and advertise the network for the FastEthernet 0/0 interface.

Task 2: Configure P1R2

- 1. Configure P1R2 with a host name of **P1R2**. Configure **cisco** as the enable, enable secret, and virtual terminal password.
- 2. Configure the appropriate IP addresses on the interfaces; refer to the IP Addresses table. Enable the interfaces.
- 3. Is the Serial 0/0 interface the DCE end or the DTE end of the link?
- 4. Enable RIPv2 on the router, and advertise the networks for all configured interfaces, including loopbacks.



Task 3: Configure P1R1

- 1. Configure P1R1 with a host name of **P1R1**. Configure **cisco** as the enable, enable secret, and virtual terminal password.
- 2. Configure the appropriate IP address on the interfaces; refer to the IP Addresses table. Enable the interfaces.
- 3. Is the Serial 0/0 interface the DCE end of the DTE end of the link?
- 4. Set the clock rate on the Serial 0/0 interface to 64000.
- 5. Enable RIPv2 on the router, and advertise the networks for all configured interfaces, including loopbacks.

Task 4: Verify the Configuration

- 1. Examine the routing tables on P1R1, P1R2, and P1R3; do routes to each subnet in the network exist?
- 2. From P1R3, attempt to ping P2R3's FastEthernet 0/0 interface (10.40.2.2). Is the ping successful?
- 3. Save the configuration to non-volatile random access memory (NVRAM) on all three routers.



Lab Solutions

Task 1: Configure P1R3

1. You should issue the following commands to configure the appropriate host name and to configure the appropriate enable, enable secret, and virtual terminal password:

```
Router(config)#hostname P1R3
P1R3(config)#enable password cisco
P1R3(config)#enable secret cisco
P1R3(config)#line vty 0 4
P1R3(config-line)#login
P1R3(config-line)#password cisco
```

2. You should issue the following commands to configure the appropriate IP address on the FastEthernet 0/0 interface and to enable the interface; refer to the IP Addresses table:

```
P1R3(config)#interface fastethernet 0/0
P1R3(config-if)#ip address 10.40.1.2 255.255.255.0
P1R3(config-if)#no shutdown
```

3. You should issue the following commands to enable RIPv2 and advertise the network for the FastEthernet 0/0 interface:

```
P1R3(config) #router rip
P1R3(config-router) #version 2
P1R3(config-router) #network 10.0.0.0
```

Task 2: Configure P1R2

1. You should issue the following commands to configure the appropriate host name and to configure the appropriate enable, enable secret, and virtual terminal password:

```
Router(config)#hostname P1R2
P1R2(config)#enable password cisco
P1R2(config)#enable secret cisco
P1R2(config)#line vty 0 4
P1R2(config-line)#login
P1R2(config-line)#password cisco
```

2. You should issue the following commands to configure the appropriate IP addresses on the interfaces and to enable the interfaces; refer to the IP Addresses table:

```
P1R2(config)#interface fastethernet 0/0
P1R2(config-if)#ip address 10.40.1.1 255.255.255.0
P1R2(config-if)#no shutdown
P1R2(config-if)#interface loopback 0
P1R2(config-if)#ip address 10.10.1.1 255.255.255.0
P1R2(config-if)#interface serial 0/0
P1R2(config-if)#ip address 10.30.1.6 255.255.255.0
P1R2(config-if)#ip shutdown
```

3. You should issue the following command to determine that the Serial 0/0 interface is the Data Terminal Equipment (DTE) end, not the DCE end. Therefore, you do not need to set a clock rate on P1R2's Serial 0/0 interface.

```
P1R2#show controllers serial 0/0
HD unit 0, idb = 0x1AE828, driver structure at 0x1B4BA0
buffer size 1524 HD unit 0,V.35 DTE cable
cpb = 0x7, eda = 0x58DC, cda = 0x58F0
RX ring with 16 entries at 0x4075800
00 bd_ptr=0x5800 pak=0x1B5E24 ds=0x4079108 status=80 pak_size=13
01 bd_ptr=0x5814 pak=0x1B85B8 ds=0x4080384 status=80 pak_size=13
<output omitted>
```

4. You should issue the following commands to enable RIPv2 and advertise the routes for all connected interfaces, including loopbacks:

```
P1R2(config)#router rip
P1R2(config-router)#version 2
P1R2(config-router)#network 10.0.0.0
```

Task 3: Configure P1R1

1. You should issue the following commands to configure the appropriate host name and to configure the appropriate enable, enable secret, and virtual terminal password:

```
Router(config)#hostname P1R1
P1R1(config)#enable password cisco
P1R1(config)#enable secret cisco
P1R1(config)#line vty 0 4
P1R1(config-line)#login
P1R1(config-line)#password cisco
```

2. You should issue the following commands to configure the appropriate IP addresses on the interfaces and to enable the interfaces; refer to the IP Addresses table:

```
P1R1(config)#interface fastethernet 0/0
P1R1(config-if)#ip address 10.100.100.1 255.255.255.0
P1R1(config-if)#no shutdown
P1R1(config-if)#interface loopback 0
P1R1(config-if)#ip address 10.20.1.1 255.255.255.0
P1R1(config-if)#interface serial 0/0
P1R1(config-if)#ip address 10.30.1.5 255.255.255.0
P1R1(config-if)#no shutdown
```



3. You should issue the following command to determine that the Serial 0/0 interface is the DCE end of the link:

```
P1R1#show controllers serial 0/0
HD unit 0, idb = 0x1AE828, driver structure at 0x1B4BA0
buffer size 1524 HD unit 0,V.35 DCE cable
cpb = 0x7, eda = 0x58DC, cda = 0x58F0
RX ring with 16 entries at 0x4075800
00 bd_ptr=0x5800 pak=0x1B5E24 ds=0x4079108 status=80 pak_size=13
01 bd_ptr=0x5814 pak=0x1B85B8 ds=0x4080384 status=80 pak_size=13
<output omitted>
```

4. You should issue the following commands to set the appropriate clock rate on the Serial 0/0 interface:

```
P1R1(config)#interface serial 0/0
P1R1(config-if)#clock rate 64000
```

5. You should issue the following commands to enable RIPv2 and advertise the networks for all configured interfaces, including loopbacks:

```
P1R1(config)#router rip
P1R1(config-router)#version 2
P1R1(config-router)#network 10.0.0.0
```

Task 4: Verify the Configuration

1. Yes, there is a route to each subnet on the network; you can determine this by issuing the following command on P1R1, P1R2, and P1R3 and examining the routing tables.

```
P1R1#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
      E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, * - candidate
default
      U - per-user static route
Gateway of last resort is not set
     10.0.0/24 is subnetted, 9 subnets
       10.10.1.0 [120/1] via 10.30.1.6, 00:09:23, Serial0/0
R
R
       10.10.2.0 [120/2] via 10.100.100.2, 00:06:27, FastEthernet0/0
С
       10.20.1.0 is directly connected, Loopback0
R
       10.20.2.0 [120/1] via 10.100.100.2, 00:09:29, FastEthernet0/0
       10.30.1.0 is directly connected, Serial0/0
С
R
       10.30.2.0 [120/1] via 10.100.100.2, 00:03:36, FastEthernet0/0
R
       10.40.1.0 [120/1] via 10.30.1.6, 00:05:20, Serial0/0
R
       10.40.2.0 [120/2] via 10.100.100.2, 00:06:28, FastEthernet0/0
С
       10.100.100.0 is directly connected, FastEthernet0/0
```

P1R2#show ip route <output omitted> Gateway of last resort is not set 10.0.0/24 is subnetted, 9 subnets С 10.10.1.0 is directly connected, Loopback0 10.10.2.0 [120/3] via 10.30.1.5, 00:04:40, Serial0/0 R 10.20.1.0 [120/1] via 10.30.1.5, 00:02:17, Serial0/0 R 10.20.2.0 [120/2] via 10.30.1.5, 00:04:24, Serial0/0 R С 10.30.1.0 is directly connected, Serial0/0 10.30.2.0 [120/2] via 10.30.1.5, 00:07:35, Serial0/0 R 10.40.1.0 is directly connected, FastEthernet0/0 С R 10.40.2.0 [120/3] via 10.30.1.5, 00:06:44, Serial0/0 10.100.100.0 [120/1] via 10.30.1.5, 00:04:43, Serial0/0 R P1R3#show ip route <output omitted> Gateway of last resort is not set 10.0.0/24 is subnetted, 9 subnets 10.10.1.0 [120/1] via 10.40.1.1, 00:01:44, FastEthernet0/0 R R 10.10.2.0 [120/4] via 10.40.1.1, 00:07:26, FastEthernet0/0 10.20.1.0 [120/2] via 10.40.1.1, 00:06:24, FastEthernet0/0 R 10.20.2.0 [120/3] via 10.40.1.1, 00:01:41, FastEthernet0/0 R 10.30.1.0 [120/1] via 10.40.1.1, 00:06:41, FastEthernet0/0 R R 10.30.2.0 [120/3] via 10.40.1.1, 00:06:26, FastEthernet0/0 10.40.1.0 is directly connected, FastEthernet0/0 С 10.40.2.0 [120/4] via 10.40.1.1, 00:08:28, FastEthernet0/0 R R 10.100.100.0 [120/2] via 10.40.1.1, 00:03:34, FastEthernet0/0

2. Yes, the ping from P1R3 to P2R3's FastEthernet 0/0 interface (10.40.2.2) is successful.

P1R3#ping 10.40.2.2

Sample Configuration Scripts

P1R1	P1R1 (continued)
P1R1#show running-config	router rip
Building configuration	version 2
Current configuration : 857 bytes	network 10.0.0.0
!	!
Version 15.b	ip classless
service timestamps debug uptime	no ip http server
service timestamps log uptime	!
no service password-encryption	line con O
!	line aux O
hostname P1R1	line vty 0 4
enable secret 5 \$1\$ynbj\$Tnn/	login
ZUNJSZs4RjVl7IszPw	password cisco
enable password cisco	!
!	no scheduler allocate
ip subnet-zero	end
!	
ip cef	
no ip domain-lookup	
!	
interface Loopback0	
ip address 10.20.1.1 255.255.255.0	
no ip directed broadcast	
!	
interface Serial0/0	
ip address 10.30.1.5 255.255.255.0	
no ip directed-broadcast	
clock rate 64000	
1	
interface Serial0/1	
no ip address	
no ip directed-broadcast	
Interiace FastEthernetU/U	
ip address 10.100.100.1 255.255.255.0	
no ip directed-broadcast	
!	

PlR2#show running-configPlR3#show running-configBuilding configurationBuilding configurationCurrent configuration: 768 bytes!!Current configuration: 592 bytes!Version 15.bservice timestamps debug uptimeservice timestamps debug uptimeservice timestamps log uptimeservice timestamps log uptimeno service password-encryptionno service password-encryption!Ihostname P1R2hostname P1R3enable secret 5 \$1\$ynbj\$Tnn/cuns2s4kjV171s2WZUMSZs4kjV171s2WZUMSZs4kjV171s2Wenable password cisco!!ip cefno ip domain-lookupinterface FastEthernet0/0!interface Serial0/0ip address 10.10.1.1 255.255.255.0ip address 10.40.1.2 255.255.255.0no ip directed-broadcast!!ip classless!ip classless!ip classless!interface FastEthernet0/0!ip classless!interface fastEthernet0/0!ip classless!inter con 0!inter con 0!inter aux 0!inter aux 0!inter aux 0	P1R2	P1R3
Building configuration Current configuration : 768 bytes ! Version 15.b service timestamps debug uptime service timestamps log uptime no service password-encryption ! hostname P1R2 enable secret 5 \$1\$ynbj\$Tnn/ ZUNJSZs4RjV171szPw enable password cisco ! ip subnet-zero ! ip cef no ip domain-lookup ! interface Loopback0 ip address 10.10.1.1 255.255.255.0 no ip directed-broadcast ! interface FastEthernet0/0 ip address 10.30.1.6 255.255.255.0 no ip directed-broadcast ! router rip version 2 no ip diress 10.40.1.0 ! router rip version 2 no ip diress 10.40.1.0 ! router rip version 2 no ip directed-broadcast ! router rip version 2 no ip directed-broadcast ! router rip version 2 no ip directed-broadcast ! router rip version 2 no ip http server ! line con 0 line aux 0 line con 0 line aux 0 line con 0 line con 0 line con 0 line aux 0 line con 0 line aux 0 line con 0 line con 0 line con 0 line con 0 line con 0 line aux 0 line con 0 lin	P1R2#show running-config	P1R3#show running-config
Current configuration : 768 bytes Version 15.b service timestamps debug uptime service timestamps log uptime no service password-encryption ! hostname P1R2 enable secret 5 \$1\$ynbj\$Tnn/ ZUNJSZs4RjV17IszPw enable password cisco ! ip subnet-zero ! interface Loopback0 in directed broadcast ! interface Serial0/0 ip address 10.40.1.1 255.255.255.0 no ip directed-broadcast ! interface FastEthernet0/0 ip address 10.40.1.2 255.255.255.0 no ip directed-broadcast ! interface FastEthernet0/0 ip address 10.40.1.1 255.255.255.0 no ip directed-broadcast ! interface FastEthernet0/0 ip address 10.40.1.2 255.255.255.0 no ip directed-broadcast ! interface FastEthernet0/0 ip address 10.40.1.2 255.255.255.0 no ip hitp server ! inter on 0 line aux 0 broadces 1 interface FastEthernet0/0 ip classless no ip http server ! line con 0 line aux 0 broadces 1 interface Serial 0 ip classless no scheduler allocate end	Building configuration	Building configuration
!!Version 15.bVersion 15.bservice timestamps debug uptimeservice timestamps debug uptimeservice timestamps log uptimeno service password-encryptionno service password-encryptionno service password-encryption!no service password-encryption!hostname P1R3enable secret 5 \$1\$ynbj\$Tnn/cuN325445jV171szPwenable password cisco!!jp subnet-zero!!ip cefno ip domain-lookup!interface Loopback0in pi directed broadcast!!interface Serial0/0no ip directed-broadcast!!ip classlessno ip directed-broadcast!!!!interface FastEthernet0/0ip address 10.40.1.2 255.255.255.0no ip directed-broadcast!!!!interface FastEthernet0/0ip classlessno ip directed-broadcast!!!<	Current configuration : 768 bytes	Current configuration : 592 bytes
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<pre>service timestamps log uptime no service password-encryption ! hostname P1R2 enable secret 5 \$1\$ynbj\$Tnn/ ZUNJSZs4RjV17IszPw enable password cisco ! ip orf no ip domain-lookup ! interface Loopback0 ip address 10.10.1.1 255.255.255.0 no ip directed broadcast ! interface Serial0/0 ip address 10.30.1.6 255.255.255.0 no ip directed-broadcast ! interface FastEthernet0/0 ip address 10.40.1.2 255.255.255.0 no ip directed-broadcast ! interface FastEthernet0/0 ip address 10.40.1.2 255.255.255.0 no ip directed-broadcast ! interface FastEthernet0/0 ip address 10.40.1.2 255.255.255.0 no ip directed-broadcast ! interface FastEthernet0/0 ip address 10.40.1.2 255.255.255.0 no ip directed-broadcast ! interface FastEthernet0/0 ip address 10.40.1.1 255.255.255.0 no ip http server ! inter ip version 2 no ip directed-broadcast ! inter ip router rip version 2 no ip http server ! ine con 0 line aux 0 </pre>	service timestamps debug uptime	service timestamps debug uptime
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Address:	25 Century Blvd., Ste. 500
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