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ROUTE
Lab Guide

300-101

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300-101 Lab Guide

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To perform the labs referenced in this book, please download and install the necessary files (refer to your purchase receipt for the download link), navigate to the appropriate lab in the lab menu in the Boson NetSim, and load the lab; all labs should work in NetSim 11 or later. To learn more about the Boson NetSim or to purchase and download the software, please visit www.boson.com/netsim.

A sample lab is included in this document to display the quality, format, and content of labs that are included in the Boson NetSim and the Boson Courseware products. However, you will not be able to work through this lab in NetSim without purchasing both Boson NetSim and the Boson CCNP Courseware Lab Pack.

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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

Labs powered by

Lab 1.1 – Initial Configuration

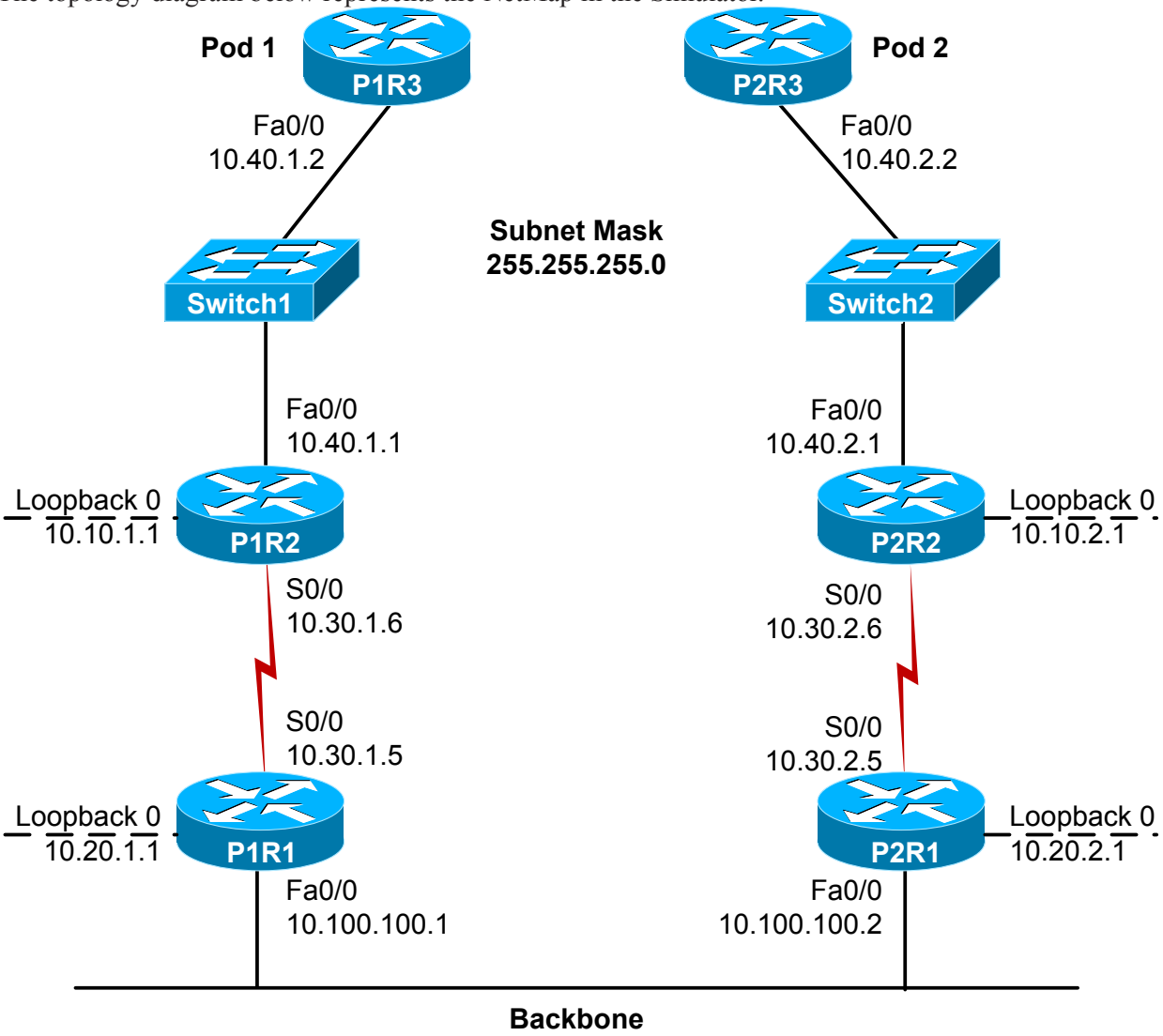
To perform this lab in Boson NetSim, please download the necessary files (refer to your purchase receipt for the download link), navigate to the appropriate lab in the lab menu in NetSim, and load the lab. You can then accomplish the tasks below.

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 *interface-type interface-number*	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.

IP Addresses

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

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)#no 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

     10.0.0.0/24 is subnetted, 9 subnets
R       10.10.1.0 [120/1] via 10.30.1.6, 00:09:23, Serial0/0
R       10.10.2.0 [120/2] via 10.100.100.2, 00:06:27, FastEthernet0/0
C       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
C       10.30.1.0 is directly connected, Serial0/0
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
C       10.100.100.0 is directly connected, FastEthernet0/0
```



```
P1R2#show ip route
<output omitted>

Gateway of last resort is not set

     10.0.0.0/24 is subnetted, 9 subnets
C       10.10.1.0 is directly connected, Loopback0
R       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
C       10.30.1.0 is directly connected, Serial0/0
R       10.30.2.0 [120/2] via 10.30.1.5, 00:07:35, Serial0/0
C       10.40.1.0 is directly connected, FastEthernet0/0
R       10.40.2.0 [120/3] via 10.30.1.5, 00:06:44, Serial0/0
R       10.100.100.0 [120/1] via 10.30.1.5, 00:04:43, Serial0/0


P1R3#show ip route
<output omitted>

Gateway of last resort is not set

     10.0.0.0/24 is subnetted, 9 subnets
R       10.10.1.0 [120/1] via 10.40.1.1, 00:01:44, FastEthernet0/0
R       10.10.2.0 [120/4] via 10.40.1.1, 00:07:26, FastEthernet0/0
R       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       10.30.2.0 [120/3] via 10.40.1.1, 00:06:26, FastEthernet0/0
C       10.40.1.0 is directly connected, FastEthernet0/0
R       10.40.2.0 [120/4] via 10.40.1.1, 00:08:28, FastEthernet0/0
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#show running-config
Building configuration...
Current configuration : 857 bytes
!
Version 15.b
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname P1R1
enable secret 5 $1$ynbj$Tnn/
ZUNJSZs4RjVl7IszPw
enable password cisco
!
ip subnet-zero
!
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
!
interface Serial0/1
 no ip address
 no ip directed-broadcast
!
interface FastEthernet0/0
 ip address 10.100.100.1 255.255.255.0
 no ip directed-broadcast
!
```

P1R1 (*continued*)

```
router rip
 version 2
 network 10.0.0.0
!
ip classless
no ip http server
!
line con 0
line aux 0
line vty 0 4
 login
 password cisco
!
no scheduler allocate
end
```


P1R2	P1R3
P1R2#show running-config 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 1ynbj$Tnn/ ZUNJSZs4RjVl7IszPw enable password cisco ! ip subnet-zero ! ip cef no ip domain-lookup ! interface Loopback0 ip address 10.10.1.1 255.255.255.0 no ip directed broadcast ! interface Serial0/0 ip address 10.30.1.6 255.255.255.0 no ip directed-broadcast ! interface FastEthernet0/0 ip address 10.40.1.1 255.255.255.0 no ip directed-broadcast ! router rip version 2 network 10.0.0.0 ! ip classless no ip http server ! line con 0 line aux 0 line vty 0 4 login password cisco ! no scheduler allocate end	P1R3#show running-config Building configuration... Current configuration : 592 bytes ! Version 15.b service timestamps debug uptime service timestamps log uptime no service password-encryption ! hostname P1R3 enable secret 5 1ynbj$Tnn/ ZUNJSZs4RjVl7IszPw enable password cisco ! ip subnet-zero ! ip cef no ip domain-lookup ! interface FastEthernet0/0 ip address 10.40.1.2 255.255.255.0 no ip directed-broadcast ! router rip version 2 network 10.0.0.0 ! ip classless no ip http server ! line con 0 line aux 0 line vty 0 4 login password cisco ! no scheduler allocate end

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