



# Volume 3: Lab Preparation Workbook

for the Cisco® CCIE™ Routing & Switching Lab Exam

This product is part of the IPexpert Blended Learning Program™



**ipexpert**

powered by **PROCTOR**  
LABS.



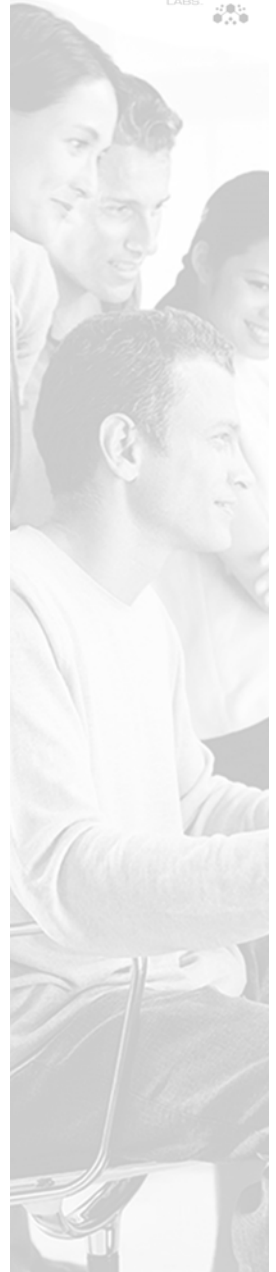
## Volume 3 - Lab 1

- Complete Mock Lab Exam

### Prerequisites

- None

**Estimated Time to Complete: 8 hours**



## Volume 3 - Lab 1 Configuration Tasks

### NOTE

As a general rule of thumb, we recommend that you read the ENTIRE lab prior to beginning.

## 1.0 Switching

### 1.1 (5 points)

Configure the switches as follows:

```
VTP domain apples
VTP password oranges
```

Cat1 should be the VTP server. The other switches should be VTP clients. On Cat1 and Cat2, 'show vtp status' should show the loopback1 interface as the local updater ID, and as the preferred interface.

Configure VLAN assignment as shown in the chart below.

Hostname/ Port	Switch Connection	VLAN
BB1 Eth0/0	Cat1 0/11	100
BB2 Eth0/0	Cat2 0/12	200
R1 F0/0	Cat1 F0/1	
R1 F0/1	Cat2 F0/1	12
R2 F1/0	Cat1 F0/2	12
R4 F0/0	Cat1 F0/4	200
R6 F0/0	Cat2 F0/6	67
R7 F0/0	Cat2 F0/7	67
R7 F0/1	Cat4 F0/7	100
R8 F0/0	Cat2 F0/8	

Fast Ethernet ports 19 and 20 and the Gi0/1 and Gi0/2 ports should be shut down on all 4 switches.

Each pair of ports connecting two switches should be seen as a single logical link. Encapsulation for trunks between switches should be statically configured, not dynamically negotiated, and should use dot1q tags. Use a native VLAN of 123. Do not use PAgP or LACP. For ports 21/22 use group 21, for ports 23/24, use group 23.

### 1.2 (3 points)

Switch 1 should be the spanning tree root for vlans 12, 67, 100. Switch 2 should be root for VLAN 200. Do not configure the switches for 802.1s.

Ports that are connected to routers and that are used in the logical topology should be configured such that a TCN will not be generated if the port goes up or down. This should be configured per port, not globally.

### 1.3 (2 points)

Configure Switch1's connection to R1's Fa0/0 without using a SVI.

### 1.4 (3 points)

Configure Switch2 for a system MTU of 1508, and for the template that will allocate the TCAM resources to support the highest number of indirect unicast routes.

Configure Switch2 for DHCP snooping for VLAN 67.

## 2.0 Frame Relay / PPP

### 2.1 (3 points)

Configure the frame relay connections between R2, R6, and R5 as follows:

On R2 and R6, do not use any subinterfaces interfaces. On R5, use a multipoint subinterface for the network connecting to R2 and R6. For the subnet between R2, R5, and R6, address mappings to DLCIs should be statically configured.

## 2.2 (4 points)

For the connection between R4 and R5, use a PPP over frame configuration with RFC 1973 Encapsulation. The connection should use CHAP authentication. For authentication, both devices should use a username of T3ST123 and a password of PPPoverFr@m3. Both sides should challenge and respond.

## 2.3 (3 points)

Configure the serial link connecting R2 and R5 for PPP encapsulation, using plaintext authentication. R2 should receive its IP address from R5. Configure for a maximum of 3 bad authentication retries. Configure link control and IP control to predict peer responses.

# 3.0 Routing

## 3.1 (3 points)

Configure the connections from R6 to R7 and R9 for EIGRP AS 679. Add the loopback1 interfaces on R6, R7, and R9 to EIGRP. Add R2's loopback1 interface to EIGRP AS 2.

## 3.2 (3 points)

Configure the link between R6 and R7 to use authentication for routing updates. Use key 1 and cisco as the password.

## 3.3 (3 points)

Configure R7's connection to BB1 for EIGRP AS 679. R7 should receive routes from the backbone of the format 201.y.x.x, where y is a number from 1 to 10. Configure R7 to only allow routes with an even second octet. Do not configure an ACL for the filtering.

## 3.4 (2 points)

Based on the configuration of R9, R6 should learn that it should not send QUERY packets to R9, and that R9 will only route packets for networks it has explicitly advertised.

3.5 (3 points)

Configure RIP for the connection between R1 and Switch1, the PPP link between R2 and R5, and the link from R5 to R4. Add the loopback1 interface on switch1 and R4 to RIP.

3.6 (3 points)

Configure R4 to receive routes via RIP from BB2. R4 should receive routes from BB2 of the format 172.20.x.y. Only allow routes with a third octet from 33 to 46, using an access list. Your access list should use the fewest number of lines that will not allow any extra networks.

3.7 (4 points)

Configure OSPF for the network between R2, R5, and R6 in area 256. Configure OSPF for the network between R1, R2, and Switch 2 in area 12. Area 12 should use the option discussed in RFC 1587. Add the loopback1 interfaces on R1 and Switch2 to area 12. Add the loopback1 interfaces of R5 and R6 to area 0.

3.8 (2 points)

Configure MD5 authentication for the OSPF interfaces in area 256.

3.9 (4 points)

Redistribute as needed on R1, R2, R5, and R6, so that all routers can reach all networks that have not been explicitly filtered in other steps.

3.10 (4 points)

R9 should load balance traffic destined to the rest of the network. Traffic to the networks learned from BB1 should prefer the path via Ser0/2/1 over Ser0/2/0. Traffic to the networks learned from BB2 should prefer the path via Ser0/2/0. Traffic to other networks should be balanced across the two links per packet.

## 4.0 BGP

### 4.1 (4 points)

Configure R2, R5, and R6 in AS 256. Configure R4 in AS 4. Configure R9 in AS 9. Do not configure a full mesh between the three routers in AS 256.

R9 should peer to R6, R4 should peer to R5. For R6's peering to R9, R6 should appear to be in AS 66. For R9's peering to R6, R9 should appear to be in AS 99.

Add the following 4 loopbacks on R4.

Loopback40 – 204.40.4.4/32  
Loopback41 – 204.41.4.4/32  
Loopback42 – 204.42.4.4/32  
Loopback43 – 204.43.4.4/32

On R4, add these 4 loopbacks to BGP, and advertise them to R5.

### 4.2 (4 points)

Configure R5 such that the following requirements are met regarding these loopback networks.

R2 and R6 should not see the loopbacks with an odd second octet. R2 and R6 should still be able to ping all 4 loopbacks.

R9 should not see any of the /32 loopback network routes, but should be able to ping all 4 loopbacks. Do not configure anything on R6 to achieve this task. Do not add any static routes to achieve this task.

## 5.0 Multicast

### 5.1 (4 points)

Configure sparse mode for the interfaces connecting R2, R5, and R6, and the loopback1 interfaces on those devices. R2's loopback1 should be the RP.

Configure R2's loopback1 interface to join the group 225.0.0.2.

Configure R5's loopback1 interface to join the group 225.0.0.5.

Configure R6's loopback1 interface to join the group 225.0.0.6.

R2, R5, and R6 should receive a response when they ping the multicast groups 225.0.0.2, 225.0.0.5, and 225.0.0.6.

## 6.0 IOS features / services

### 6.1 (3 points)

Configure NTP on R1, R2, R4, R5, R6, R7, and R9. You may only configure the NTP master command on one device. In the output of show ntp status, each device's stratum should be the same as the router number. (R1 should have a stratum of 1, R4 should have a stratum of 4, R7 should have a stratum of 7, etc.)

### 6.2 (3 points)

Configure R4 to hand out addresses for VLAN 67 with a fourth octet from 20 to 40. Do not add any subinterfaces on R4. R4 should hand out a default router address of x.x.x.6, and should hand out a DNS server address of x.x.x.53. Test by configuring R8's Fa0/0 interface to receive an address via DHCP, and verifying that the address received is in the range of addresses that R4 is handing out. Verify that DHCP still works if R5's serial 0/1/0 subinterface connecting to R2 fails.

### 6.3 (3 points)

Add a loopback222 on R2 with the address 222.222.222.222 and a 32 bit mask. Do not add this loopback network to any routing protocol. R2 should have 100% success for a ping is sourced from this new loopback with a destination of the loopback1 interfaces of the routers and switches in the topology.

## 7.0 IPv6

### 7.1 (5 points)

Add a loopback on R5, R6, and R2 of the format 2001::x, where x is the router number. Add these networks to an IPv6 RIP process, and configure the frame relay connection between R5, R6, and R2 for RIP. Verify that each of these three routers can ping all three IPv6 loopbacks. Do not configure the PPP link between R2 and R5 for IPv6.

## 8.0 QoS / Traffic information

### 8.1 (3 points)

Configure an outbound policy on R1's Fa0/0 interface for traffic classification. Telnet traffic should be marked with precedence level 5, HTTP traffic should be marked with precedence level 4. Do not assign any bandwidth allocations, reservations, or restrictions for these two traffic classes. All other traffic entering this interface should be handled using WRED with explicit congestion notification.

### 8.2 (3 points)

Configure R2's FastEthernet and Frame-relay interfaces to gather statistics for traffic, to monitor what protocols are seen, using common protocol names.

### 8.3 (3 points)

Configure R2's FastEthernet interface to drop ICMP type 0 and type 8 packets with a size from 250 to 300 bytes.

### 8.4 (3 points)

On R6's FastEthernet interface connecting to VLAN 67, configure a custom Queue with the following parameters:

Configure telnet for queue 3, double the default byte count, and increase the queue length to 10 times the default value.

Configure SMTP traffic for queue 5, with the default queue length and byte count.

Configure other packets to use queue 4, with a queue length 20 times the default value, and a byte count of 10 times the default value.

## 9.0 Security

### 9.1 (3 points)

R9 should be configured to accept telnet connections on port 3005. Telnet connections to port 23 should not be allowed. Configure a local user named cisco with a password of cisco, and privilege level 15. Telnet access should require user login, but console access should not require user login.

## 9.2 (2 points)

When the user cisco telnets to R9, the user should be able to show the routing table (show ip route), and show interface status (show interface). The user should not be able to make configuration changes.

## 9.3 (3 points)

Switch1 should only allow telnet and SSH connections from R5's loopback1 interface. Do not configure an extended ACL for this task.

### **Technical Verification and Support**

To verify your router configurations please ensure that you have downloaded the latest configurations from your [www.IPexpert.com](http://www.IPexpert.com) account.

Support is also available in the following ways:

- Mailing List: <http://www.OnlineStudyList.com>
- Online Forum: <http://www.CertificationTalk.com>
- Email: [support@ipexpert.com](mailto:support@ipexpert.com)

This page left intentionally blank.