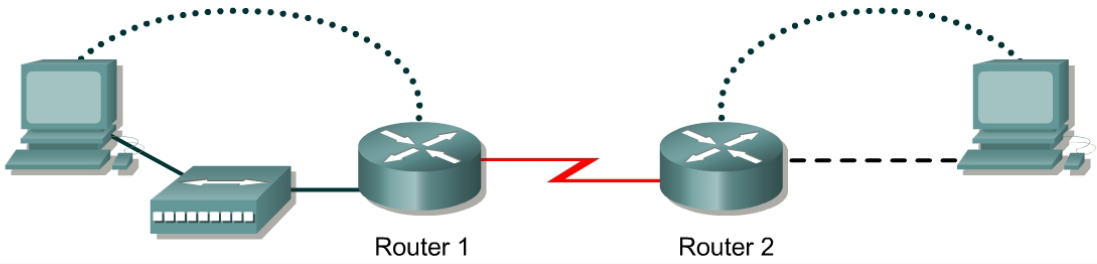
# Lab 6.1.6 Configuring Static Routes – Instructor Version 2500




| Router ID | Router Name | Enable secret password | Enable/VTY/ and Console passwords | Routing protocol | RIP network statements |
|---|---|---|---|---|---|
| Router 1 | GAD | class | cisco | none | none |
| Router 2 | BHM | class | cisco | none | none |

| Router ID | IP host name | Fast Ethernet 0 address | Interface type Serial 0 | Serial 0 address | Interface type Serial 1 | Serial 1 address | Subnet mask all addresses |
|---|---|---|---|---|---|---|---|
| Router 1 | GAD | 192.168.14.1 | DCE | 192.168.15.1 | NA | No address | 255.255.255.0 |
| Router 2 | BHM | 192.168.16.1 | DTE | 192.168.15.2 | NA | No address | 255.255.255.0 |

| | |
|---|---|
| Straight-through cable | |
| Serial cable | |
| Console (Rollover) | |
| Crossover cable | |

## Objective

- Configure static routes between routers to allow data transfer between routers without the use of dynamic routing protocols.

## Background/Preparation

Setup a network similar to the one in the diagram. Any router that meets the interface requirements may be used. Possible routers include 800, 1600, 1700, 2500, 2600 routers, or a combination. Refer to the chart at the end of the lab to correctly identify the interface identifiers to be used based on the equipment in the lab. The configuration output used in this lab is produced from 1721 series routers. Any other router used may produce slightly different output. The following steps are intended to be executed on each router unless specifically instructed otherwise.

Start a HyperTerminal session as performed in the Establishing a HyperTerminal session lab.

**Note:** Go to the erase and reload instructions at the end of this lab. Perform those steps on all routers in this lab assignment before continuing.

## Step 1 Configure both routers

a. Enter the global configuration mode and configure the hostname as shown in the chart. Then configure the console, virtual terminal, and enable passwords. If there are any difficulties, refer to the Configuring router passwords lab. Configure interfaces and IP host tables. If there are any difficulties, refer to the Configuring Host Tables lab. Do not configure a routing protocol.

## Step 2 Configure the workstations

Configure the workstations with the proper IP address, subnet mask, and default gateway.

a. The configuration for the host connected to the GAD Router is:

IP Address 192.168.14.2

IP subnet mask 255.255.255.0

Default gateway 192.168.14.1

b. The configuration for the host connected to the BHM Router is:

IP Address 192.168.16.2

IP subnet mask 255.255.255.0

Default gateway 192.168.16.1

c. Check connectivity between the workstations using **ping**. From the workstation attached to the GAD router, ping the workstation attached to the BHM router.

```
C:\>ping 192.168.16.2
Pinging 192.168.16.2 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.168.16.2:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

d. Was the **ping** successful? No

e. Why did the **ping** fail? The hosts cannot ping to a network that there is no record of in the routing table.

## Step 3 Check interface status

a. Check the interfaces on both routers with the command **show ip interface brief**.

b. Are all the necessary interfaces up? Yes

## Step 4 Check the routing table entries

a. Using the command **show ip route**, view the IP routing table for GAD.

```
GAD>show ip route

output eliminated


Gateway of last resort is not set

C    192.168.14.0/24 is directly connected, FastEthernet0
```

```
C    192.168.15.0/24 is directly connected, Serial0
```

b. Use the command **show ip route**, view the IP routing table for BHM.

```
BHM>show ip route
```

Output eliminated.

```
Gateway of last resort is not set

C    192.168.15.0/24 is directly connected, Serial0
C    192.168.16.0/24 is directly connected, FastEthernet0
```

c. Are all of the routes needed in the routing tables? No

d. "Based on the output from the show ip route command on the GAD and BHM routers, can a host on network 192.168.16.0 connect to a host on network 192.168.14.0?" No

If a route is not in the routers to which the host is connected, the host cannot reach the destination host.

## Step 5 Adding static routes

a. How can this situation be changed so that the hosts can **ping** each other?

Add static routes to each router or run a routing protocol.

b. In global configuration mode, add a static route on Router1 to network 192.168.16.0 and on Router2 to network 192.168.14.0.

```
GAD(config)#ip route 192.168.16.0 255.255.255.0 192.168.15.2
```

```
BHM(config)#ip route 192.168.14.0 255.255.255.0 192.168.15.1
```

c. Why is a static route needed on both routers? Static routes are needed to show the routers that there are networks beyond what they are connected.

## Step 6 Verify the new routes

a. Use the command **show ip route**, view the IP routing table for GAD.

```
GAD>show ip route

output eliminated

Gateway of last resort is not set

C    192.168.14.0/24 is directly connected, FastEthernet0
C    192.168.15.0/24 is directly connected, Serial0
S    192.168.16.0/24 [1/0] via 192.168.15.2
```

b. Using the command **show ip route**, view the IP routing table for BHM.

```
BHM>show ip route
```

Output eliminated.

```
Gateway of last resort is not set

S    192.168.14.0/24 [1/0] via 192.168.15.1
```

```
C    192.168.15.0/24 is directly connected, Serial0
C    192.168.16.0/24 is directly connected, FastEthernet0
```

c. Are all of the routes needed in the routing tables? Yes

d. Can a host on subnet 192.168.16.0 see a host on network 192.168.14.0? Yes

### Step 7 ping host to host again

a. Check connectivity between the workstations using **ping**. From the workstation attached to the GAD router, ping the workstation attached to the BHM router.

```
C:\>ping 192.168.16.2
Pinging 192.168.16.2 with 32 bytes of data:
Reply from 192.168.16.2: bytes=32 time=20ms TTL=254
Reply from 192.168.16.2: bytes=32 time=20ms TTL=254
Reply from 192.168.16.2: bytes=32 time=20ms TTL=254
Reply from 192.168.16.2: bytes=32 time=20ms TTL=254
Ping statistics for 192.168.16.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 20ms, Maximum = 20ms, Average = 20ms
```

b. If the **ping** was not successful, check routing table to make sure static routes are entered correctly.

Upon completion of the previous steps, logoff by typing **exit**. Turn the router off.

## Erasing and reloading the router

Enter into the privileged EXEC mode by typing **enable**.

If prompted for a password, enter **class**. If “class” does not work, ask the instructor for assistance.

```
Router>enable
```

At the privileged EXEC mode, enter the command **erase startup-config**.

```
Router#erase startup-config
```

The responding line prompt will be:

```
Erasing the nvram filesystem will remove all files! Continue?
[confirm]
```

Press **Enter** to confirm.

The response should be:

```
Erase of nvram: complete
```

Now at the privileged EXEC mode, enter the command **reload**.

```
Router#reload
```

The responding line prompt will be:

```
System configuration has been modified. Save? [yes/no]:
```

Type **n** and then press **Enter**.

The responding line prompt will be:

```
Proceed with reload? [confirm]
```

Press **Enter** to confirm.

In the first line of the response will be:

```
Reload requested by console.
```

After the router has reloaded the line prompt will be:

```
Would you like to enter the initial configuration dialog? [yes/no]:
```

Type **n** and then press **Enter**.

The responding line prompt will be:

```
Press RETURN to get started!
```

Press **Enter**.

The router is ready for the assigned lab to be performed.

| Router Interface Summary | | | | | |
|---|---|---|---|---|---|
| Router Model | Ethernet Interface #1 | Ethernet Interface #2 | Serial Interface #1 | Serial Interface #2 | Interface #5 |
| 800 (806) | Ethernet 0 (E0) | Ethernet 1 (E1) | | | |
| 1600 | Ethernet 0 (E0) | Ethernet 1 (E1) | Serial 0 (S0) | Serial 1 (S1) | |
| 1700 | FastEthernet 0 (FA0) | FastEthernet 1 (FA1) | Serial 0 (S0) | Serial 1 (S1) | |
| 2500 | Ethernet 0 (E0) | Ethernet 1 (E1) | Serial 0 (S0) | Serial 1 (S1) | |
| 2600 | FastEthernet 0/0 (FA0/0) | FastEthernet 0/1 (FA0/1) | Serial 0/0 (S0/0) | Serial 0/1 (S0/1) | |
| In order to find out exactly how the router is configured, look at the interfaces. This will identify the type of router as well as how many interfaces the router has. There is no way to effectively list all of the combinations of configurations for each router class. What is provided are the identifiers for the possible combinations of interfaces in the device. This interface chart 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 IOS command to represent the interface. | | | | | |
| | | | | | |

```
GAD#show running-config
Current configuration:
version 11.1
service slave-log
service udp-small-servers
service tcp-small-servers
hostname GAD
enable secret 5 $1$Ww8B$/8tZiqrR8JiciB/QFBCxY.
ip subnet-zero
interface Ethernet0
 ip address 192.168.14.1 255.255.255.0
interface Serial0
 ip address 192.168.15.1 255.255.255.0
 clockrate 56000
interface Serial1
 no ip address
 shutdown
ip host BHM 192.168.16.1 192.168.15.2
no ip classless
ip route 192.168.16.0 255.255.255.0 192.168.15.2
ip http server
line con 0
 exec-timeout 0 0
 password cisco
 login
 transport input none
line aux 0
 password cisco
 login
line vty 0 4
 password cisco
 login
end
GAD#
```

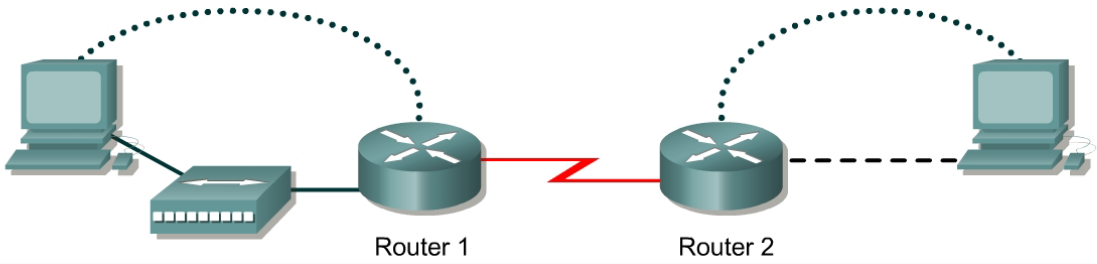
 

```
BHM#show running-config
Current configuration:
version 11.1
service slave-log
service udp-small-servers
service tcp-small-servers
hostname BHM
enable secret 5 $1$G/Xt$Zc3OC27TODxCKZylBAJ2i/
interface Ethernet0
 ip address 192.168.16.1 255.255.255.0
interface Serial0
 ip address 192.168.15.2 255.255.255.0
interface Serial1
 no ip address
 shutdown
ip host GAD 192.168.14.1 192.168.15.1
ip host BHM 192.168.16.1 192.168.15.2
no ip classless
ip route 192.168.14.0 255.255.255.0 192.168.15.1
line con 0
 password cisco
 login
line aux 0
line vty 0 4
 password cisco
 login
end
```

```
BHM#show ip interface brief
Interface          IP-Address  OK?   Method Status                  Protocol
Ethernet0          192.168.16.1       YES    manual up                    up
Serial0            92.168.15.2 YES    manual up                    up
Serial1            unassigned  YES    unset  administratively down  down
```

# Lab 6.1.6 Configuring Static Routes – Instructor Version 2600




| Router ID | Router Name | Enable secret password | Enable/VTY/ and Console passwords | Routing protocol | RIP network statements |
|---|---|---|---|---|---|
| Router 1 | GAD | class | cisco | none | none |
| Router 2 | BHM | class | cisco | none | none |

| Router ID | IP host name | Fast Ethernet 0 address | Interface type Serial 0 | Serial 0 address | Interface type Serial 1 | Serial 1 address | Subnet mask all addresses |
|---|---|---|---|---|---|---|---|
| Router 1 | GAD | 192.168.14.1 | DCE | 192.168.15.1 | NA | No address | 255.255.255.0 |
| Router 2 | BHM | 192.168.16.1 | DTE | 192.168.15.2 | NA | No address | 255.255.255.0 |

| | |
|---|---|
| Straight-through cable | |
| Serial cable | |
| Console (Rollover) | |
| Crossover cable | |

## Objective

- Configure static routes between routers to allow data transfer between routers without the use of dynamic routing protocols.

## Background/Preparation

Setup a network similar to the one in the diagram. Any router that meets the interface requirements may be used. Possible routers include 800, 1600, 1700, 2500, 2600 routers, or a combination. Refer to the chart at the end of the lab to correctly identify the interface identifiers to be used based on the equipment in the lab. The configuration output used in this lab is produced from 1721 series routers. Any other router used may produce slightly different output. The following steps are intended to be executed on each router unless specifically instructed otherwise.

Start a HyperTerminal session as performed in the Establishing a HyperTerminal session lab.

**Note:** Go to the erase and reload instructions at the end of this lab. Perform those steps on all routers in this lab assignment before continuing.

## Step 1 Configure both routers

a. Enter the global configuration mode and configure the hostname as shown in the chart. Then configure the console, virtual terminal, and enable passwords. If there are any difficulties, refer to the Configuring router passwords lab. Configure interfaces and IP host tables. If there are any difficulties, refer to the Configuring Host Tables lab. Do not configure a routing protocol.

## Step 2 Configure the workstations

Configure the workstations with the proper IP address, subnet mask, and default gateway.

a. The configuration for the host connected to the GAD Router is:

IP Address 192.168.14.2

IP subnet mask 255.255.255.0

Default gateway 192.168.14.1

b. The configuration for the host connected to the BHM Router is:

IP Address 192.168.16.2

IP subnet mask 255.255.255.0

Default gateway 192.168.16.1

c. Check connectivity between the workstations using **ping**. From the workstation attached to the GAD router, ping the workstation attached to the BHM router.

```
C:\>ping 192.168.16.2
Pinging 192.168.16.2 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.168.16.2:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

d. Was the **ping** successful? No

e. Why did the **ping** fail?

The hosts cannot ping to a network that there is no record of in the routing table.

## Step 3 Check interface status

a. Check the interfaces on both routers with the command **show ip interface brief**.

b. Are all the necessary interfaces up? Yes

## Step 4 Check the routing table entries

a. Using the command **show ip route**, view the IP routing table for GAD.

```
GAD>show ip route

output eliminated
```

```
Gateway of last resort is not set

C    192.168.14.0/24 is directly connected, FastEthernet0
C    192.168.15.0/24 is directly connected, Serial0
```

b. Use the command **show ip route**, view the IP routing table for BHM.

```
BHM>show ip route
```

Output eliminated.

```
Gateway of last resort is not set

C    192.168.15.0/24 is directly connected, Serial0
C    192.168.16.0/24 is directly connected, FastEthernet0
```

c. Are all of the routes needed in the routing tables? No

d. "Based on the output from the show ip route command on the GAD and BHM routers, can a host on network 192.168.16.0 connect to a host on network 192.168.14.0?" No

If a route is not in the routers to which the host is connected, the host cannot reach the destination host.

## Step 5 Adding static routes

a. How can this situation be changed so that the hosts can **ping** each other?

Add static routes to each router or run a routing protocol.

b. In global configuration mode, add a static route on Router1 to network 192.168.16.0 and on Router2 to network 192.168.14.0.

```
GAD(config)#ip route 192.168.16.0 255.255.255.0 192.168.15.2
```

```
BHM(config)#ip route 192.168.14.0 255.255.255.0 192.168.15.1
```

c. Why is a static route needed on both routers? Static routes are needed to show the routers that there are networks beyond what they are connected.

## Step 6 Verify the new routes

a. Use the command **show ip route**, view the IP routing table for GAD.

```
GAD>show ip route

output eliminated

Gateway of last resort is not set

C    192.168.14.0/24 is directly connected, FastEthernet0
C    192.168.15.0/24 is directly connected, Serial0
S    192.168.16.0/24 [1/0] via 192.168.15.2
```

b. Using the command **show ip route**, view the IP routing table for BHM.

```
BHM>show ip route
```

Output eliminated.

```
Gateway of last resort is not set

S    192.168.14.0/24 [1/0] via 192.168.15.1
C    192.168.15.0/24 is directly connected, Serial0
C    192.168.16.0/24 is directly connected, FastEthernet0
```

c. Are all of the routes needed in the routing tables? Yes

d. Can a host on subnet 192.168.16.0 see a host on network 192.168.14.0? Yes

### Step 7 ping host to host again

a. Check connectivity between the workstations using **ping**. From the workstation attached to the GAD router, ping the workstation attached to the BHM router.

```
C:\>ping 192.168.16.2
Pinging 192.168.16.2 with 32 bytes of data:
Reply from 192.168.16.2: bytes=32 time=20ms TTL=254
Reply from 192.168.16.2: bytes=32 time=20ms TTL=254
Reply from 192.168.16.2: bytes=32 time=20ms TTL=254
Reply from 192.168.16.2: bytes=32 time=20ms TTL=254
Ping statistics for 192.168.16.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 20ms, Maximum = 20ms, Average = 20ms
```

b. If the **ping** was not successful, check routing table to make sure static routes are entered correctly.

Upon completion of the previous steps, logoff by typing **exit**. Turn the router off.

## Erasing and reloading the router

Enter into the privileged EXEC mode by typing **enable**.

If prompted for a password, enter **class**. If “class” does not work, ask the instructor for assistance.

```
Router>enable
```

At the privileged EXEC mode, enter the command **erase startup-config**.

```
Router#erase startup-config
```

The responding line prompt will be:

```
Erasing the nvram filesystem will remove all files! Continue?
[confirm]
```

Press **Enter** to confirm.

The response should be:

```
Erase of nvram: complete
```

Now at the privileged EXEC mode, enter the command **reload**.

```
Router#reload
```

The responding line prompt will be:

```
System configuration has been modified. Save? [yes/no]:
```

Type **n** and then press **Enter**.

The responding line prompt will be:

```
Proceed with reload? [confirm]
```

Press **Enter** to confirm.

In the first line of the response will be:

```
Reload requested by console.
```

After the router has reloaded the line prompt will be:

```
Would you like to enter the initial configuration dialog? [yes/no]:
```

Type **n** and then press **Enter**.

The responding line prompt will be:

```
Press RETURN to get started!
```

Press **Enter**.

The router is ready for the assigned lab to be performed.

| Router Interface Summary | | | | | |
|---|---|---|---|---|---|
| Router Model | Ethernet Interface #1 | Ethernet Interface #2 | Serial Interface #1 | Serial Interface #2 | Interface #5 |
| 800 (806) | Ethernet 0 (E0) | Ethernet 1 (E1) | | | |
| 1600 | Ethernet 0 (E0) | Ethernet 1 (E1) | Serial 0 (S0) | Serial 1 (S1) | |
| 1700 | FastEthernet 0 (FA0) | FastEthernet 1 (FA1) | Serial 0 (S0) | Serial 1 (S1) | |
| 2500 | Ethernet 0 (E0) | Ethernet 1 (E1) | Serial 0 (S0) | Serial 1 (S1) | |
| 2600 | FastEthernet 0/0 (FA0/0) | FastEthernet 0/1 (FA0/1) | Serial 0/0 (S0/0) | Serial 0/1 (S0/1) | |
| In order to find out exactly how the router is configured, look at the interfaces. This will identify the type of router as well as how many interfaces the router has. There is no way to effectively list all of the combinations of configurations for each router class. What is provided are the identifiers for the possible combinations of interfaces in the device. This interface chart 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 IOS command to represent the interface. | | | | | |
| | | | | | |

```
BHM#show running-config
Building configuration...

Current configuration : 723 bytes
!
version 12.2
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname BHM
!
logging queue-limit 100
enable secret 5 $1$a4d8$3NE4IuumvLA2a.YDnKo6j1
!
ip subnet-zero
!
ip host GAD 192.168.14.1 192.168.15.1
!
ip audit notify log
ip audit po max-events 100
!
call rsvp-sync
!
interface FastEthernet0/0
 ip address 192.168.16.1 255.255.255.0
 duplex auto
 speed auto
!
interface Serial0/0
 ip address 192.168.15.2 255.255.255.0
 no fair-queue
!
interface Serial0/1
 no ip address
 shutdown
!
ip classless
!
 ip route 192.168.14.0 255.255.255.0 192.168.15.1
dial-peer cor custom
!
line con 0
 password cisco
 login
line aux 0
line vty 0 4
 password cisco
 login
!
end
```

```
GAD#show running-config
Building configuration...

Current configuration : 723 bytes
!
version 12.2
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname GAD
!
logging queue-limit 100
enable secret 5 $1$a4d8$3NE4IuumvLA2a.YDnKo6j1
!
ip subnet-zero
!
ip host BHM 192.168.16.1 192.168.15.2
!
ip audit notify log
ip audit po max-events 100
!
call rsvp-sync
!
interface FastEthernet0/0
 ip address 192.168.14.1 255.255.255.0
 duplex auto
 speed auto
!
interface Serial0/0
 ip address 192.168.15.1 255.255.255.0
 no fair-queue
!
interface Serial1
 no ip address
 shutdown
!
ip classless
!
ip route 192.168.16.0 255.255.255.0 192.168.15.2

dial-peer cor custom
!
line con 0
 password cisco
 login
line aux 0
line vty 0 4
 password cisco
 login
!
end


BHM#show ip interface brief
Interface          IP-Address  OK?   Method Status                Protocol
FastEthernet0/0          192.168.16.1      YES   manual up          up
Serial0/0          192.168.15.2      YES   manual up              up
Serial0/1          unassigned  YES   unset  administratively down  down
```