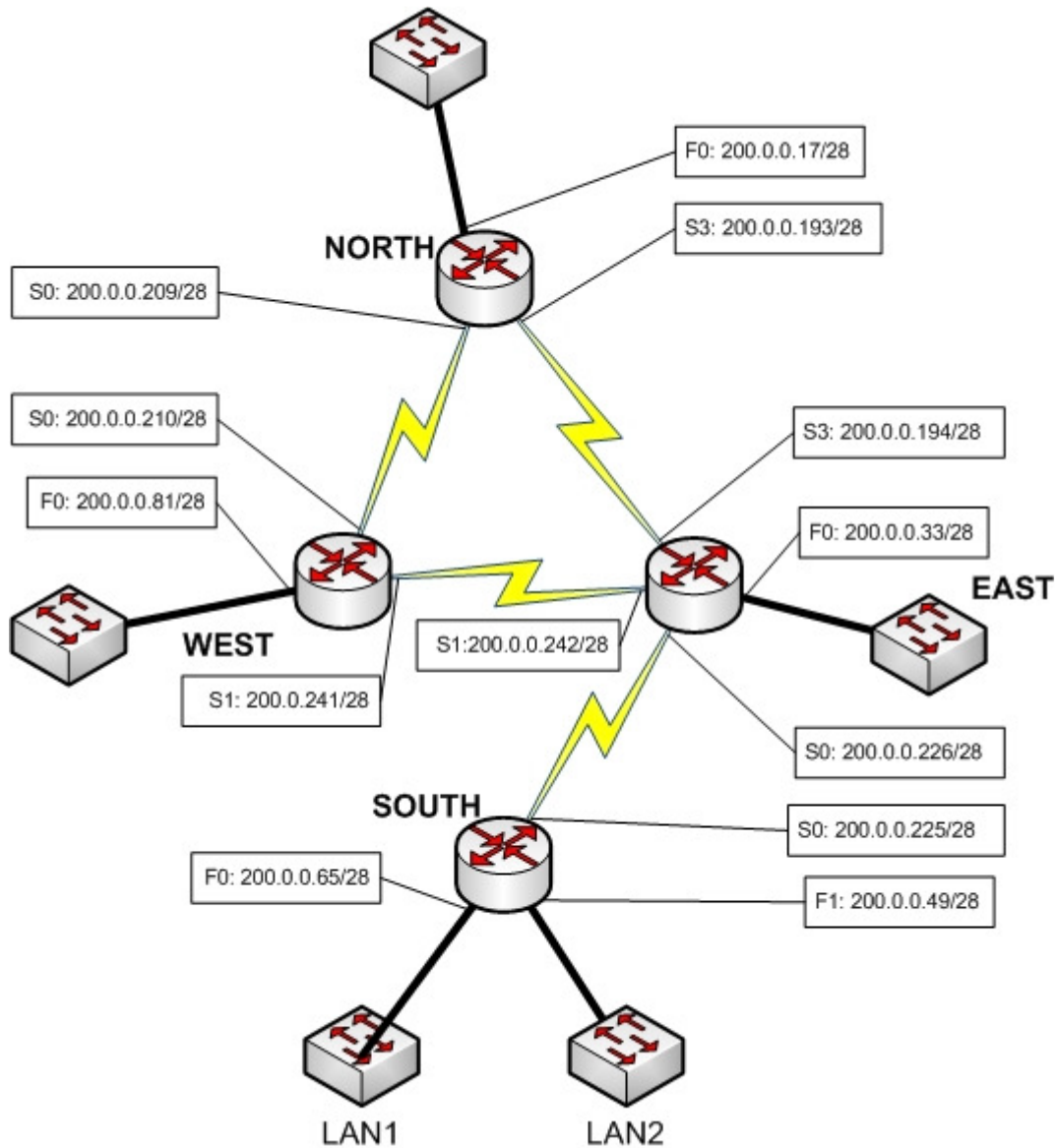


The interface labels and IP scheme depicted here indicate how I set up my network in lab, and student cabling and IP assignments are probably different from this.

The commands listed in the **Router Configuration** section are provided as syntax examples to show where and how commands are placed on the routers to accomplish the listed tasks. These examples are not intended to be a complete answer key. Full configurations for each router are listed as the last items in this key.



## IP Addressing

This network has been assigned 200.0.0.0/24. The South LAN1 supports 13 users. We have five LANs and four serial connections.

We need at least nine subnets to accommodate all LANs and serial connections. Each subnet must offer at least 13 users to meet the maximum host count on South LAN1.

The existing /24 subnet mask in binary:

11111111.11111111.11111111.00000000 (255.255.255.0)

If we borrow four bits, we get this:

\*

11111111.11111111.11111111.**1111**0000 (255.255.255.240)

\*

*\* last network bit is in the fourth octet and has a decimal value of 16.*

Since we've borrowed four bits, we've created 14 useable subnets, since  $(2^4 \text{ ones}) - 2 = 14$  subnets. Likewise, each subnet will offer 14 useable addresses since we have four zeros remaining in the subnet mask.  $(2^4 \text{ zeros}) - 2 = 14$  hosts per subnet.

The last network bit of the subnet mask is in the fourth octet and has a decimal value of 16. Therefore, our IP ranges will increment in multiples of 16:

<del>0) 200.0.0.0</del>	<del>200.0.0.15</del>	<del>unusable</del>
1) 200.0.0.16	200.0.0.31	
2) 200.0.0.32	200.0.0.47	
3) 200.0.0.48	200.0.0.63	
4) 200.0.0.64	200.0.0.79	
5) 200.0.0.80	200.0.0.95	
6) 200.0.0.96	200.0.0.111	
7) 200.0.0.112	200.0.0.127	
8) 200.0.0.128	200.0.0.143	
9) 200.0.0.144	200.0.0.159	
10) 200.0.0.160	200.0.0.175	
11) 200.0.0.176	200.0.0.191	
12) 200.0.0.192	200.0.0.207	
13) 200.0.0.208	200.0.0.223	
14) 200.0.0.224	200.0.0.239	
<del>200.0.0.240</del>	<del>200.0.0.255</del>	<del>unusable</del>

## **Router Configuration**

Ensure the following parameters are set on each router:

Router Clock

```
Router#clock set 15:45:34 24 August 2007
```

Host name

```
Router (config) #hostname West
```

Enable secret password (use "cisco")

```
Router (config) #enable secret cisco
```

Appropriate banner message

```
Router (config) #banner motd # Stay out or die #
```

IP Host Tables. Use Router names and one IP per entry.

```
Router (config) #ip host North 200.0.0.17
```

```
Router (config) #ip host West 200.0.0.81
```

```
Router (config) #ip host East 200.0.0.33
```

```
Router (config) #ip host South 200.0.0.65
```

Interface IP addresses

```
Router (config) #interface s0/1
```

```
Router (config-if) #ip address 200.0.0.17 255.255.255.240
```

Interface Descriptions

```
Router (config-if) #description connection to East s0/1
```

Serial Interface clock rates (use 56000)

```
Router (config-if) #clock rate 56000
```

\*Require telnet and console connections to prompt for a username and password. (use *class* for the user name and *cisco* for the password)

```
Router (config) #username class password cisco
```

```
Router (config) #line console 0
```

```
Router (config-line) #login local
```

```
Router (config) #line vty 0 4
```

```
Router (config-line) #login local
```

\*Configure telnet and console connections to time-out after 40 minutes of inactivity.

```
Router (config) #line console 0
```

```
Router (config-line) #exec-timeout 40
```

```
Router (config-line) #line vty 0 4
```

```
Router (config-line) #exec-timeout 40
```

Use RIP as the dynamic routing protocol on West, East, and North. South will use a static default route to connect to East. East will use a static route to connect to South.

```
East (config) #ip route 200.0.0.64 255.255.255.240 Serial10/0
```

## Semester 2 Refresher Lab

```
East(config)#ip route 200.0.0.48 255.255.255.240 Serial10/0
East(config)#router rip
East(config-router)#network 200.0.0.0
```

```
South(config)#ip route 0.0.0.0 0.0.0.0 Serial10/0
```

\*East will use the command *redistribute static* to ensure West and North know about its static route to South. If doing this lab on Packet Tracer, West and North will need static routes for South's LANs, because Packet Tracer does not support the *redistribute* command.

```
East(config)#router rip
East(config-router)#redistribute static 1
```

OR

```
West(config)#ip route 200.0.0.64 255.255.255.240 Serial10/1
West(config)#ip route 200.0.0.48 255.255.255.240 Serial10/1
```

```
North(config)#ip route 200.0.0.64 255.255.255.240 Serial10/3
North(config)#ip route 200.0.0.48 255.255.255.240 Serial10/3
```

Prevent RIP Updates from going out onto all LANs and in the serial link between East and South.

```
East(config)#router rip
East(config-router)#passive-interface FastEthernet0/0
East(config-router)#passive-interface Serial10/0
```

## Semester 2 Refresher Lab

```
!North Router Configuration for the CIT205 review lab
!8.21.07
!
! go from user mode to privileged exec mode
Enable
! set the clock; one of the few things configured outside of global config!
clock set 15:45:34 24 August 2007
! go to global configuration mode
configure terminal
!set a banner to be displayed at login. Any characters between the '#' symbols
!will be displayed
banner motd #North Router. Stay out or die.#
!make an entry in the local username/password data base for
!telnet and console to use for session authentication
username class password cisco
!Set up a host table to make connecting easier once the network is functional.
ip host North 200.0.0.17
ip host West 200.0.0.81
ip host East 200.0.0.33
ip host South 200.0.0.65
!prevent the router from broadcasting for a DNS server when you enter a typo
no ip domain-lookup
!set the host name
hostname North
!set the encrypted secret password to control privileged access
enable secret cisco
!move to fast Ethernet interface mode
interface FastEthernet0/0
!set the interface description
description To North LAN
!set the IP address and subnet mask
ip address 200.0.0.17 255.255.255.240
!don't forget to turn on the interface!
no shut
!move to serial interface mode
interface Serial0/0
description To West S0/0
ip address 200.0.0.209 255.255.255.240
!set the clock rate whether it's DTE or DCE, just to be safe.
clock rate 56000
no shut
interface Serial0/3
description To East S0/3
ip address 200.0.0.193 255.255.255.240
clock rate 56000
```

## Semester 2 Refresher Lab

```
no shut
!move to rip configuration mode
router rip
!prevent rip broadcasts from cluttering up you LAN traffic
passive-interface FastEthernet0/0
!advertise all directly connected networks
network 200.0.0.0
! The following two ip routes aren't needed if this lab is done
!on real equipment because East can redistribute its static routes.
!These are entered at global configuration mode. When pasting
!a configuration file into a router, the router will automatically
!return to global config to enter the commands.
ip route 200.0.0.64 255.255.255.240 Serial0/3
ip route 200.0.0.48 255.255.255.240 Serial0/3
!Move to console line configuration mode
line con 0
!tell the router to use the local username/password data base
!to authenticate all incoming console sessions.
login local
!Set the console session to shut down after 40 minutes of inactivity
exec-timeout 40
!set the console session to group your typed commands together
!when a logging message posts and splits your typing. This is
!just a handy feature to make the CLI more user friendly for
!bad typists (like me.)
logging synchronous
!Move to telnet configuration mode. The "0 4" configures all 5 lines.
line vty 0 4
login local
exec-timeout 40
logging synchronous
!return to privileged exec mode
end
!save the running config to NVRAM. "write memory" is an old command
!that does the same thing as "copy run start" without prompting for a
!file name confirmation, so it works better when pasting config files.
Write memory
```

## Semester 2 Refresher Lab

```
!West Router Configuration for the CIT205 review lab
!8.21.07
enable
clock set 15:45:34 24 August 2007
configure terminal
banner motd #West Router. Stay out or die.#
username class password cisco
ip host North 200.0.0.17
ip host West 200.0.0.81
ip host East 200.0.0.33
ip host South 200.0.0.65
no ip domain-lookup
hostname West
enable secret cisco
interface FastEthernet0/0
description To West LAN
ip address 200.0.0.81 255.255.255.240
no shut
interface Serial0/0
description To North S0/0
ip address 200.0.0.210 255.255.255.240
clock rate 56000
no shut
interface Serial0/1
description To East S0/1
ip address 200.0.0.241 255.255.255.240
clock rate 56000
no shut
router rip
passive-interface FastEthernet0/0
network 200.0.0.0
!The following two ip routes aren't needed if this lab is done
!on real equipment because East can redistribute its static routes.
ip route 200.0.0.64 255.255.255.240 Serial0/1
ip route 200.0.0.48 255.255.255.240 Serial0/1
line con 0
login local
exec-timeout 40
logging synchronous
line vty 0 4
login local
exec-timeout 40
logging synchronous
end
wr mem
```

## Semester 2 Refresher Lab

```
!East Router Configuration for the CIT205 review lab
```

```
!8.21.07
```

```
enable
clock set 15:45:34 24 August 2007
configure terminal
banner motd #East Router. Stay out or die.#
username class password cisco
ip host North 200.0.0.17
ip host West 200.0.0.81
ip host East 200.0.0.33
ip host South 200.0.0.65
no ip domain-lookup
hostname East
enable secret cisco
interface FastEthernet0/0
description To East LAN
ip address 200.0.0.33 255.255.255.240
no shut
interface Serial0/0
description To South S0/0
ip address 200.0.0.226 255.255.255.240
clock rate 56000
no shut
interface Serial0/1
description To West S0/1
ip address 200.0.0.242 255.255.255.240
clock rate 56000
no shut
interface Serial0/3
description To North S0/3
ip address 200.0.0.194 255.255.255.240
clock rate 56000
no shut
router rip
passive-interface FastEthernet0/0
passive-interface Serial0/0
network 200.0.0.0
!if doing this lab on real equipment, enter the next line
!to send static routes to North and West. It "injects" the
!static routes into the RIP updates so other routers can
!learn about them. The "1" tells East to advertise them in
!RIP as if they had a hop count of 1
redistribute static 1
ip route 200.0.0.64 255.255.255.240 Serial0/0
ip route 200.0.0.48 255.255.255.240 Serial0/0
line con 0
```

## Semester 2 Refresher Lab

```
login local
exec-timeout 40
logging synchronous
line vty 0 4
login local
exec-timeout 40
logging synchronous
end
wr mem
```

\* \* \* \* \*

```
!South Router Configuration for the CIT205 review lab
!8.21.07
enable
clock set 15:45:34 24 August 2007
configure terminal
banner motd #South Router. Stay out or die.#
username class password cisco
ip host North 200.0.0.17
ip host West 200.0.0.81
ip host East 200.0.0.33
ip host South 200.0.0.65
no ip domain-lookup
hostname South
enable secret cisco
interface FastEthernet0/0
description To South LAN 1
ip address 200.0.0.65 255.255.255.240
no shut
interface FastEthernet0/1
description To South LAN 2
ip address 200.0.0.49 255.255.255.240
duplex auto
speed auto
no shut
interface Serial0/0
description To East S0/0
ip address 200.0.0.225 255.255.255.240
clock rate 56000
no shut
! this static route tells the router to send data out the Serial 0/0
!interface if it's not bound for a network on any other
!directly connected interface
```

## Semester 2 Refresher Lab

```
ip route 0.0.0.0 0.0.0.0 Serial0/0
line con 0
login local
exec-timeout 40
logging synchronous
line vty 0 4
login local
exec-timeout 40
logging synchronous
end
wr mem
```