

The network 192.168.0.0/20 has 4094 hosts.
Your subnets need 2972 hosts.

NAME	HOSTS NEEDED	HOSTS AVAILABLE	UNUSED HOSTS	NETWORK ADDRESS	SLASH	MASK	USABLE RANGE	BROADCAST
CSE	1501	2046	545	192.168.0.0	/21	255.255.248.0	192.168.0.1 - 192.168.7.254	192.168.7.255
EEE	701	1022	321	192.168.8.0	/22	255.255.252.0	192.168.8.1 - 192.168.11.254	192.168.11.255
MNS	501	510	9	192.168.12.0	/23	255.255.254.0	192.168.12.1 - 192.168.13.254	192.168.13.255
Admin	251	254	3	192.168.14.0	/24	255.255.255.0	192.168.14.1 - 192.168.14.254	192.168.14.255
S6_Servers	6	6	0	192.168.15.0	/29	255.255.255.248	192.168.15.1 - 192.168.15.6	192.168.15.7
S4_Routers	4	6	2	192.168.15.8	/29	255.255.255.248	192.168.15.9 - 192.168.15.14	192.168.15.15
WAN_Hop_Admin	2	2	0	192.168.15.16	/30	255.255.255.252	192.168.15.17 - 192.168.15.18	192.168.15.19
WAN_CSE_Bckp	2	2	0	192.168.15.20	/30	255.255.255.252	192.168.15.21 - 192.168.15.22	192.168.15.23
WAN_Bckp_Server	2	2	0	192.168.15.24	/30	255.255.255.252	192.168.15.25 - 192.168.15.26	192.168.15.27
WAN_Server_Admin	2	2	0	192.168.15.28	/30	255.255.255.252	192.168.15.29 - 192.168.15.30	192.168.15.31

Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
CSE Router	fa0/0	192.168.15.9	255.255.255.248	n/a
	fa0/1	192.168.0.1	255.255.248.0	n/a
	s0/0/0	192.168.15.22	255.255.255.252	n/a
PC1_CSE	fa0	DHCP Assigned	DHCP Assigned	DHCP Assigned
PC2_CSE	fa0	DHCP Assigned	DHCP Assigned	DHCP Assigned
PC_Super_CSE	fa0	192.168.7.254	255.255.248.0	192.168.0.1
EEE Router	fa0/0	192.168.15.10	255.255.255.248	n/a
	fa0/1	192.168.8.1	255.255.252.0	n/a
PC1_EEE	fa0	DHCP Assigned	DHCP Assigned	DHCP Assigned
PC2_EEE	fa0	DHCP Assigned	DHCP Assigned	DHCP Assigned
PC_Super_EEE	fa0	192.168.11.254	255.255.252.0	192.168.8.1
MNS Router	fa0/0	192.168.15.11	255.255.255.248	n/a
	fa0/1	192.168.12.1	255.255.254.0	n/a
PC1_MNS	fa0	DHCP Assigned	DHCP Assigned	DHCP Assigned
PC2_MNS	fa0	DHCP Assigned	DHCP Assigned	DHCP Assigned
PC_Super_MNS	fa0	192.168.13.254	255.255.254.0	192.168.12.1
Hop Router	fa0/0	192.168.15.12	255.255.255.248	n/a
	s0/0/0	192.168.15.18	255.255.255.252	n/a
Admin Router	fa0/0	192.168.15.2	255.255.255.248	n/a
	fa0/1	192.168.14.1	255.255.255.0	n/a
	s0/0/0	192.168.15.17	255.255.255.252	n/a
	s0/0/1	192.168.15.30	255.255.255.252	n/a
Admin1	fa0	DHCP Assigned	DHCP Assigned	DHCP Assigned
Admin2	fa0	DHCP Assigned	DHCP Assigned	DHCP Assigned
Admin_Super	fa0	192.168.14.254	255.255.255.0	192.168.14.1
Server Router	fa0/1	192.168.15.1	255.255.255.248	n/a
	s0/0/0	192.168.15.25	255.255.255.252	n/a
	s0/0/1	192.168.15.29	255.255.255.252	n/a
DHCP Server	fa0	192.168.15.6	255.255.255.248	192.168.15.1
Mail Server	fa0	192.168.15.5	255.255.255.248	192.168.15.1
DNS Server	fa0	192.168.15.4	255.255.255.248	192.168.15.1
Web Server	fa0	192.168.15.3	255.255.255.248	192.168.15.1
Backup Router	s0/0/0	192.168.15.26	255.255.255.252	n/a
	s0/0/1	192.168.15.21	255.255.255.252	n/a

Packet Tracer Commands

```
#####  
##### CSE Router #####  
#####
```

```
en  
conf t  
hostname CSE
```

```
int fa0/1  
ip address 192.168.0.1 255.255.248.0  
no shut  
exit  
int fa0/0  
ip address 192.168.15.9 255.255.255.248  
no shut  
exit  
int s0/0/0  
ip address 192.168.15.22 255.255.255.252  
no shut  
exit
```

```
router rip  
version 2  
no auto-summary  
network 192.168.0.0  
network 192.168.15.8  
network 192.168.15.20  
passive-interface fa0/1  
end
```

```
conf t  
ip route 192.168.15.0 255.255.255.248 192.168.15.21 150  
end
```

```
conf t  
int fa0/1  
ip helper-address 192.168.15.6  
end
```

```
copy run start
```

```
#####  
##### EEE Router #####  
#####
```

```
en  
conf t  
hostname EEE
```

```
int fa0/1
ip address 192.168.8.1 255.255.252.0
no shut
exit
int fa0/0
ip address 192.168.15.10 255.255.255.248
no shut
exit
```

```
router rip
version 2
no auto-summary
network 192.168.8.0
network 192.168.15.8
passive-interface fa0/1
end
```

```
conf t
int fa0/1
ip helper-address 192.168.15.6
end
```

```
copy run start
```

```
#####
##### MNS Router #####
#####
```

```
en
conf t
hostname MNS
```

```
int fa0/1
ip address 192.168.12.1 255.255.254.0
no shut
exit
int fa0/0
ip address 192.168.15.11 255.255.255.248
no shut
exit
```

```
router rip
version 2
no auto-summary
network 192.168.12.0
network 192.168.15.8
passive-interface fa0/1
end
```

```
conf t
int fa0/1
```

```
ip helper-address 192.168.15.6
end
```

```
copy run start
```

```
#####
##### Hop Router #####
#####
```

```
en
conf t
hostname HopR
```

```
int fa0/0
ip address 192.168.15.12 255.255.255.248
no shut
exit
int s0/0/0
ip address 192.168.15.18 255.255.255.252
no shut
exit
```

```
router rip
version 2
no auto-summary
network 192.168.15.8
network 192.168.15.16
end
```

```
copy run start
```

```
#####
##### Admin Router #####
#####
```

```
en
conf t
hostname Admin
```

```
int s0/0/0
ip address 192.168.15.17 255.255.255.252
clock rate 64000
no shut
exit
int s0/0/1
ip address 192.168.15.30 255.255.255.252
no shut
exit
int fa0/0
ip address 192.168.15.2 255.255.255.248
no shut
```

```
exit
int fa0/1
ip address 192.168.14.1 255.255.255.0
no shut
exit
```

```
router rip
version 2
no auto-summary
network 192.168.14.0
network 192.168.15.0
network 192.168.15.16
network 192.168.15.28
passive-interface fa0/0
passive-interface fa0/1
end
```

```
conf t
int fa0/1
ip helper-address 192.168.15.6
end
```

```
copy run start
```

```
#####
##### Server Router #####
#####
```

```
en
conf t
hostname Server
```

```
int s0/0/0
ip address 192.168.15.25 255.255.255.252
clock rate 64000
no shut
exit
int s0/0/1
ip address 192.168.15.29 255.255.255.252
clock rate 64000
no shut
exit
int fa0/1
ip address 192.168.15.1 255.255.255.248
no shut
exit
```

```
ip route 0.0.0.0 0.0.0.0 192.168.15.30
ip route 0.0.0.0 0.0.0.0 192.168.15.26 5
exit
```

```
copy run start
```

```
#####  
##### Backup Router #####  
#####
```

```
en  
conf t  
hostname Backup
```

```
int s0/0/0  
ip address 192.168.15.26 255.255.255.252  
no shut  
exit  
int s0/0/1  
ip address 192.168.15.21 255.255.255.252  
clock rate 64000  
no shut  
exit
```

```
ip route 192.168.15.0 255.255.255.248 192.168.15.25  
ip route 192.168.0.0 255.255.248.0 192.168.15.22  
end
```

```
copy run start
```

```
#####  
          Miscellaneous Codes  
          to display configured settings  
#####
```

```
show ip int brief  
show ip route  
show run
```

Assumptions for this Network Simulation

- Since the default Administrative Distance (AD) for RIP is 120, using an AD of 150 for static routes on the CSE Router ensures that RIP-learned routes via the Hop Router are preferred.
- Since the DHCP server is located in the Server Building, all department routers (CSE, EEE, MNS, Admin) must have ip helper-address configured on their LAN interfaces to forward DHCP requests.
- Clock rates for WAN links using Serial DCE/DTE are manually configured to 64000.
- After a link failure, the network will require a brief convergence period (up to 30 seconds or 1 minute for RIP) before the backup route via the Backup Router becomes active.