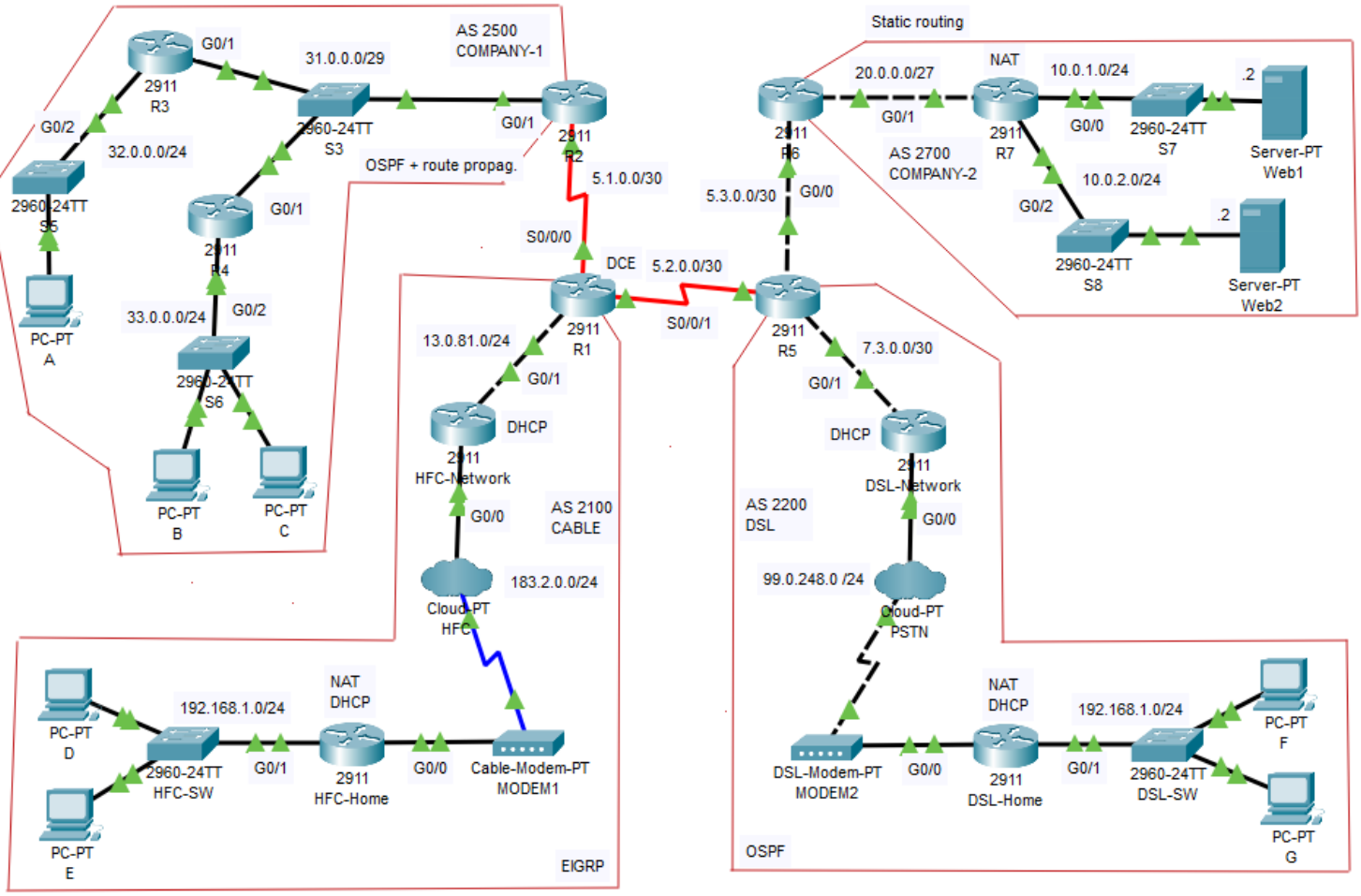
Goal. Recreate the diagram below and configure the following:

1. Hostnames on all routers
2. Set up HFC and PSTN clouds
3. IP addresses on all router interfaces, PCs and servers, except for DHCP on these devices:
   - PCs D, E, F and G (they are DHCP clients)
   - Routers HFC-Home and DSL-Home should be both DHCP client and server (client to HFC-Network/DSL-Network routers, and servers to PCs in their LANs)
4. Dynamic NAT on routers HFC-Home and DSL-Home
5. Static NAT on router R7, with both 10.0.1.0/24 and 10.0.2.0/24 being translated to 20.0.0.0
6. Routing:
   - AS 2500: OSPF + route propagation
   - AS 2700: Static routing
   - AS 2100: EIGRP + static default route on routers HFC-Home and HFC-Network
   - AS 2200: OSPF + route propagation
7. BGP
8. IGP routing protocols redistribution with BGP
9. Configure ACLs to filter the following:
   - Ban anyone not belonging in the HFC (cable) network from accessing router HFC-Network via Telnet
   - Ban computers in the 33.0.0.0/24 from browsing the web, but allow all other communication (create a simple web page on Web1 and Web2)
10. Test



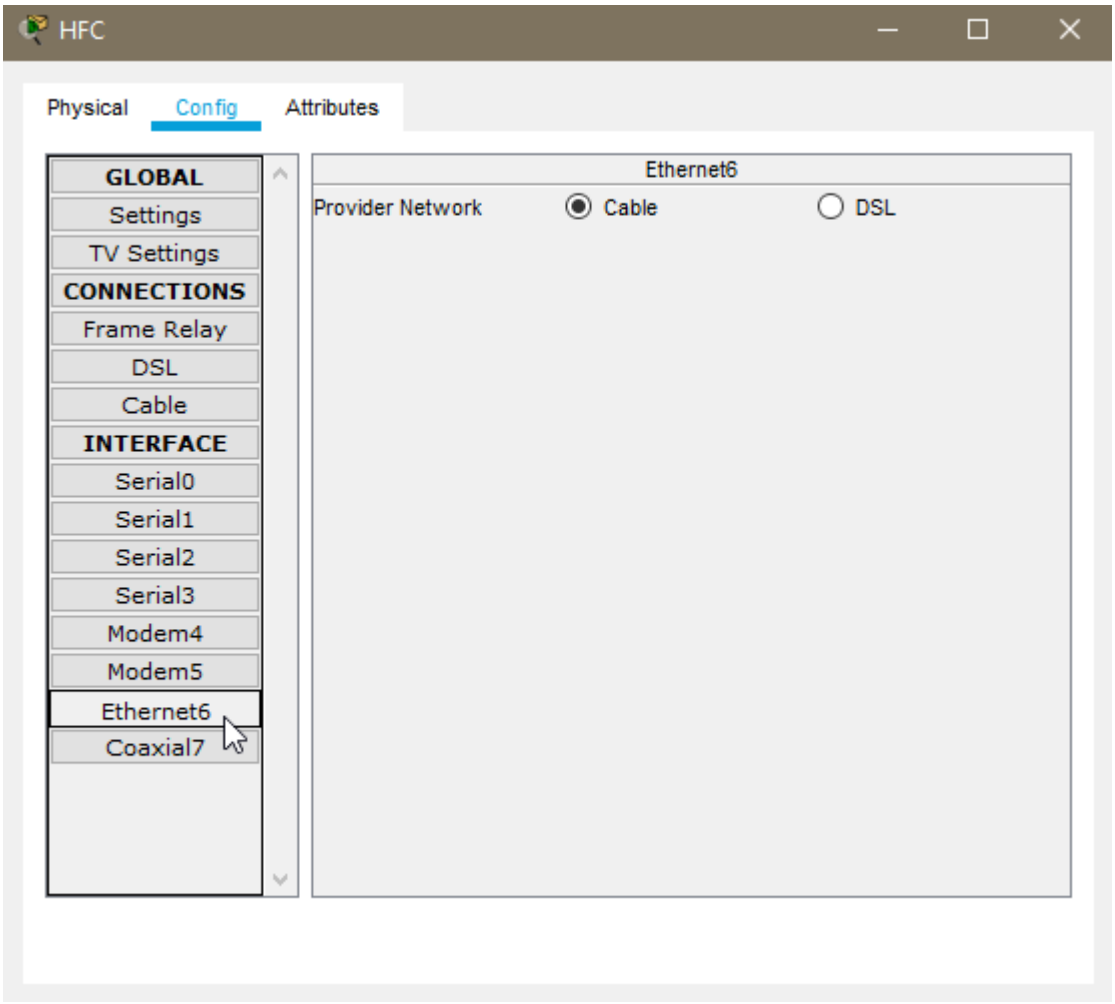
1. Hostnames

```
Router(config)#hostname R1
```

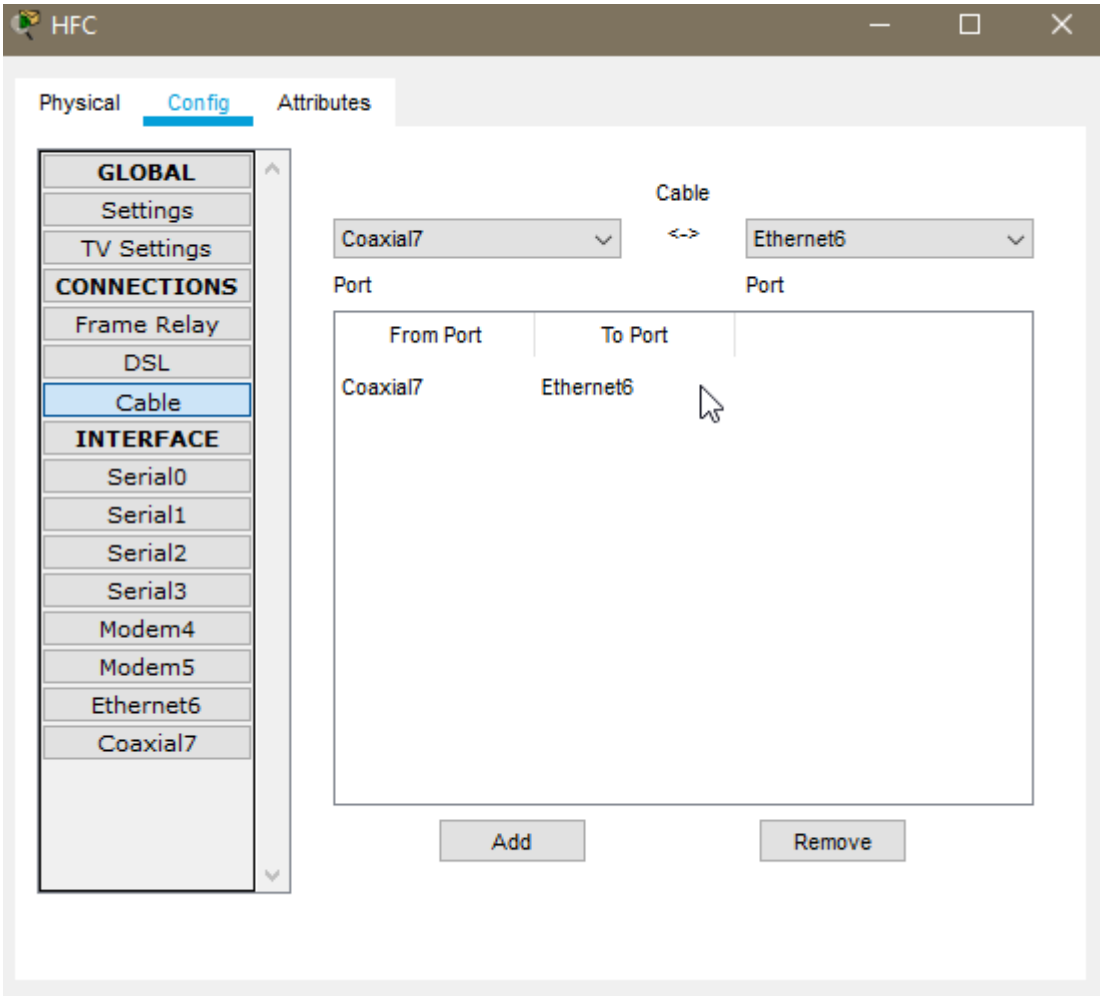
2. Set up HFC and PSTN clouds

HFC

Go to the “Config” tab, find “Ethernet6” under “INTERFACES” and select “Cable”.

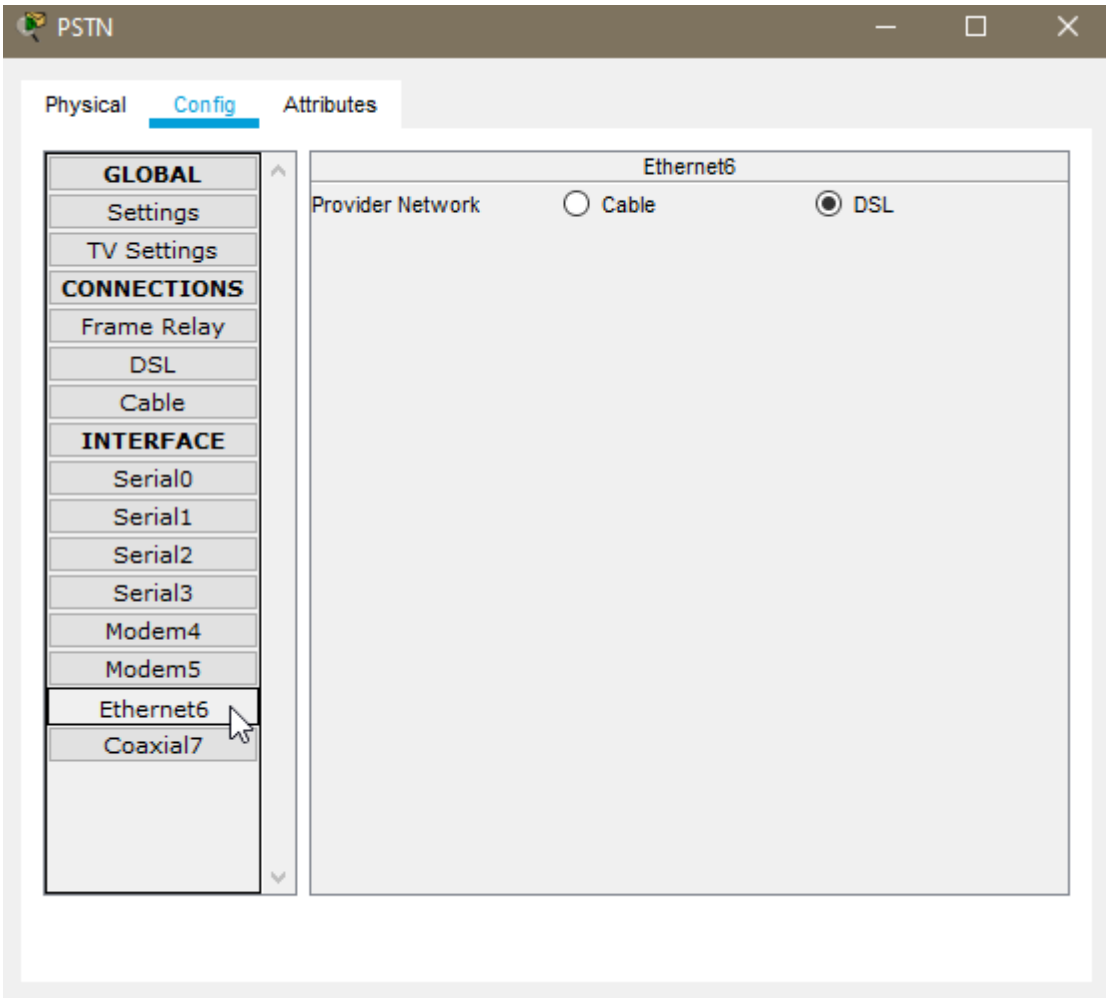


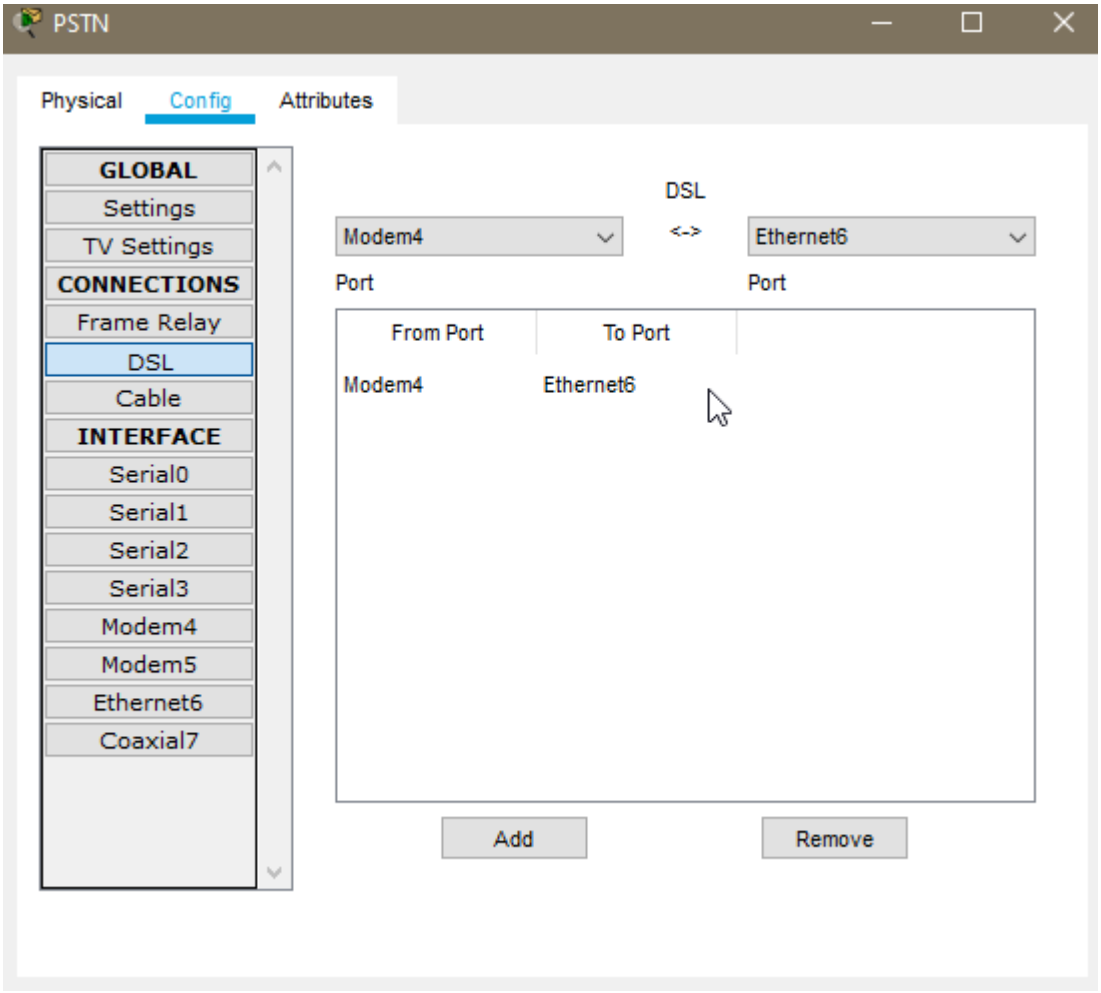
Find “Cable” under “CONNECTIONS”. Connect “Coaxial7” and “Ethernet6”, and click “Add”.



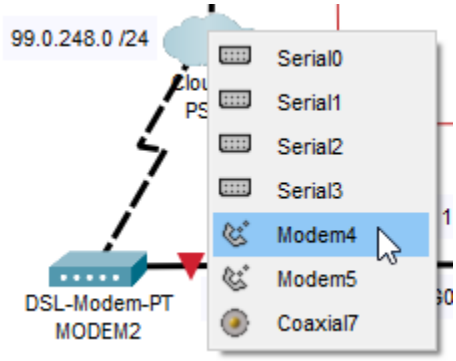
DSL

DSL cloud configuration is similar:





Here, “Modem4” is selected because that is the interface used to connect the phone cable:



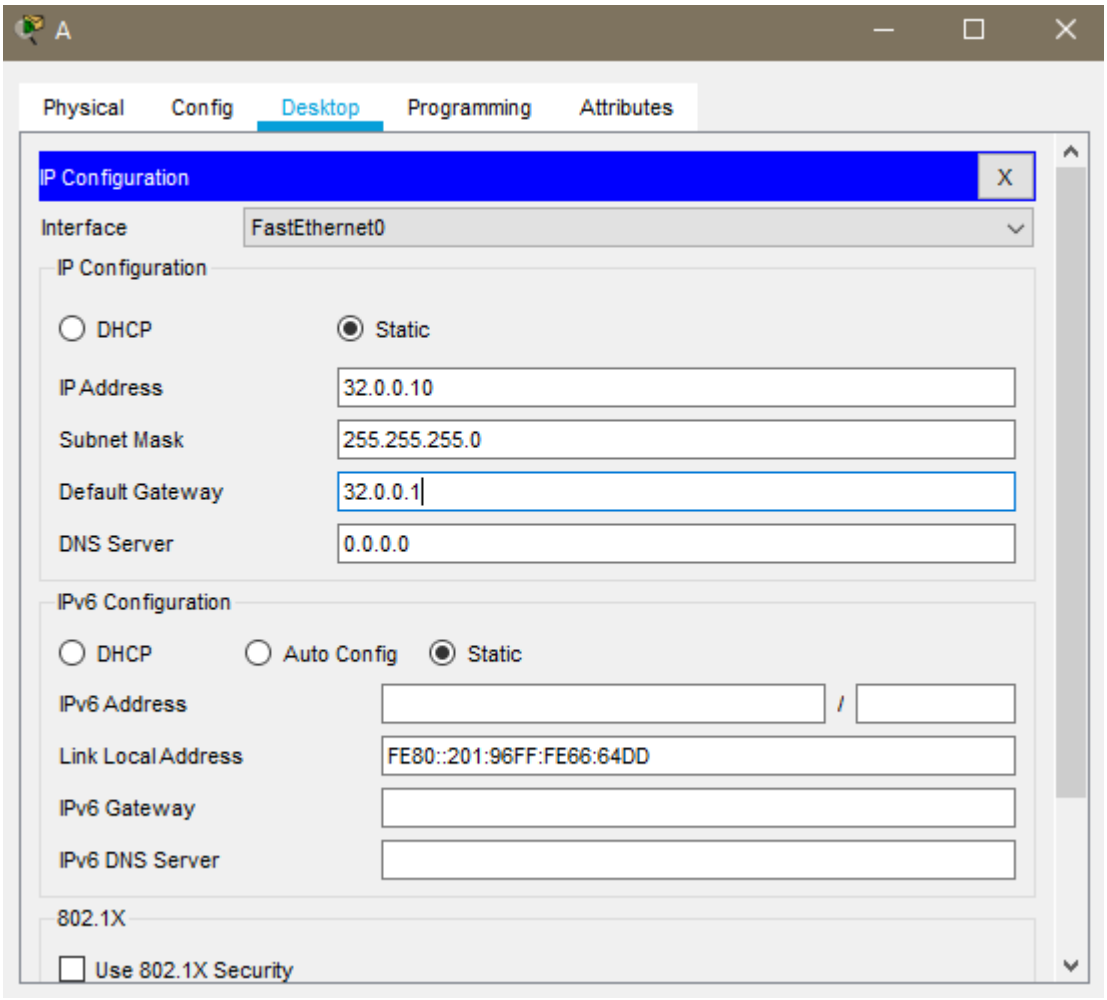
3. IP addressing

Static IP addressing on router interfaces:

```
R1(config)#interface Serial 0/0/0
R1(config-if)#clock rate 4000000
R1(config-if)#ip address 5.1.0.1 255.255.255.252
R1(config-if)#no shutdown

R1(config)#interface GigabitEthernet 0/1
R1(config-if)#ip address 13.0.81.1 255.255.255.0
R1(config-if)#no shutdown
```

All other routers with static IPs should be configured similarly.

Static IP addressing on PCs and servers (Desktop -> IP Configuration):



Router HFC-Home as a DHCP client to the service provider:

```
HFC-H(config)#interface GigabitEthernet 0/0
HFC-H(config-if)#ip address dhcp
HFC-H(config-if)#no shutdown
```

Router HFC-Home as a DHCP server to the PCs in its LAN:

```
HFC-H(config)#ip dhcp pool HFCHomePool
HFC-H(dhcp-config)#network 192.168.1.0 255.255.255.0
HFC-H(dhcp-config)#default-router 192.168.1.1
```

"DSL-Home" router configuration is the same.

4. Dynamic NAT

Router HFC-Home:

```
HFC-H(config)#ip access-list standard 1
HFC-H(config-std-nacl)#permit 192.168.1.0 0.0.0.255

HFC-H(config)#ip nat inside source list 1 interface
GigabitEthernet 0/0 overload

HFC-H(config)#interface GigabitEthernet 0/0
HFC-H(config-if)#ip nat outside

HFC-H(config)#interface GigabitEthernet 0/1
HFC-H(config-if)#ip nat inside
```

"DSL-Home" router configuration is the same.

5. Static NAT on Router R7

```
R7(config)#ip nat inside source static 10.0.1.1 20.0.0.3
R7(config)#ip nat inside source static 10.0.1.2 20.0.0.4
R7(config)#ip nat inside source static 10.0.2.1 20.0.0.5
R7(config)#ip nat inside source static 10.0.2.2 20.0.0.6

R7(config)#interface GigabitEthernet 0/0
R7(config-if)#ip nat inside

R7(config)#interface GigabitEthernet 0/2
R7(config-if)#ip nat inside

R7(config)#interface GigabitEthernet 0/1
R7(config-if)#ip nat outside
```

6. Routing

AS 2500: OSPF + route propagation

```
R2(config)#ip route 0.0.0.0 0.0.0.0 Serial 0/0/0
R2(config)#router ospf 1
R2(config-router)#network 31.0.0.0 0.0.0.7 area 0
R2(config-router)#default-information originate

R3(config)#router ospf 1
R3(config-router)#network 31.0.0.0 0.0.0.7 area 0
R3(config-router)#network 32.0.0.0 0.0.0.255 area 0

R4(config)#router ospf 1
R4(config-router)#network 31.0.0.0 0.0.0.7 area 0
R4(config-router)#network 33.0.0.0 0.0.0.255 area 0
```

AS 2700: Static routing

```
R7(config)#ip route 0.0.0.0 0.0.0.0 GigabitEthernet 0/1
```

AS 2100: EIGRP + static routes

```
HFC-H(config)#ip route 0.0.0.0 0.0.0.0 GigabitEthernet 0/0
HFC-H(config)#router eigrp 2100
HFC-H(config-router)#no auto-summary
HFC-H(config-router)#net 183.2.0.0 0.0.0.255

HFC-N(config)#ip route 0.0.0.0 0.0.0.0 GigabitEthernet 0/1
HFC-N(config)#router eigrp 2100
HFC-N(config-router)#no auto-summary
HFC-N(config-router)#network 183.2.0.0 0.0.0.255
HFC-N(config-router)#network 13.0.81.0 0.0.0.255

R1(config)#router eigrp 2100
R1(config-router)#no auto-summary
R1(config-router)#network 13.0.81.0 0.0.0.255
```

AS 2200: OSPF + route propagaion

```
DSL-N(config)#ip route 0.0.0.0 0.0.0.0 GigabitEthernet 0/1
DSL-N(config)#router ospf 1
DSL-N(config-router)#default-information originate
DSL-N(config-router)#network 7.3.0.0 0.0.0.3 area 0
DSL-N(config-router)#network 99.0.248.0 0.0.0.255 area 0

R5(config)#router ospf 1
R5(config-router)#network 7.3.0.0 0.0.0.3 area 0
```

```
DSL-H(config)#router ospf 1
DSL-H(config-router)#network 99.0.248.0 0.0.0.255 area 0
DSL-H(config-router)#network 192.168.1.0 0.0.0.255 area 0
```

7. BGP

```
R2(config)#router bgp 2500
R2(config-router)#network 5.1.0.0 mask 255.255.255.252
R2(config-router)#neighbor 5.1.0.1 remote-as 2100

R1(config)#router bgp 2100
R1(config-router)#network 5.1.0.0 mask 255.255.255.252
R1(config-router)#network 5.2.0.0 mask 255.255.255.252
R1(config-router)#neighbor 5.1.0.2 remote-as 2500
R1(config-router)#neighbor 5.2.0.2 remote-as 2200

R5(config)#router bgp 2200
R5(config-router)#network 5.2.0.0 mask 255.255.255.252
R5(config-router)#network 5.3.0.0 mask 255.255.255.252
R5(config-router)#neighbor 5.2.0.1 remote-as 2100
R5(config-router)#neighbor 5.3.0.2 remote-as 2700

R6(config)#router bgp 2700
R6(config-router)#network 5.3.0.0 mask 255.255.255.252
R6(config-router)#neighbor 5.3.0.1 remote-as 2200
```

8. Redistribution

R2 (OSPF to BGP)

```
R2(config)#router bgp 2500
R2(config-router)#redistribute ospf 1
```

R6 (static routes to BGP)

```
R6(config)#router bgp 2700
R6(config-router)#network 20.0.0.0 mask 255.255.255.224
```

R1 (EIGRP to BGP)

```
R1(config)#router bgp 2100
R1(config-router)#redistribute eigrp 2100
```

R5 (OSPF to BGP)

```
R5(config)#router bgp 2200
R5(config-router)#redistribute ospf 1
```

9. Access Lists

Ban anyone not belonging in the HFC (cable) network from accessing router HFC-Network via Telnet

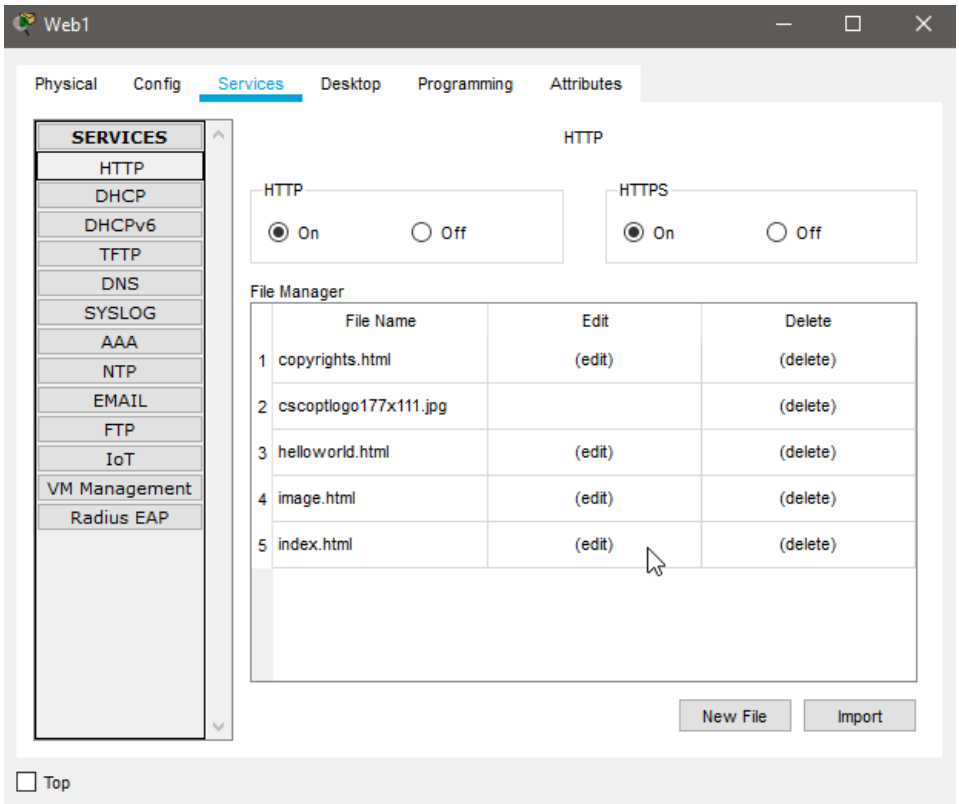
```
HFC-N(config)#ip access-list standard 1
HFC-N(config-std-nacl)#permit 13.0.81.0 0.0.0.255
HFC-N(config-std-nacl)#permit 183.2.0.0 0.0.0.255

HFC-N(config)#line vty 0 15
HFC-N(config-line)#access
HFC-N(config-line)#access-class 1 in
```

Ban computers in the 33.0.0.0/24 from browsing the web, but allow all other communication (create a simple web page on Web1 and Web2)

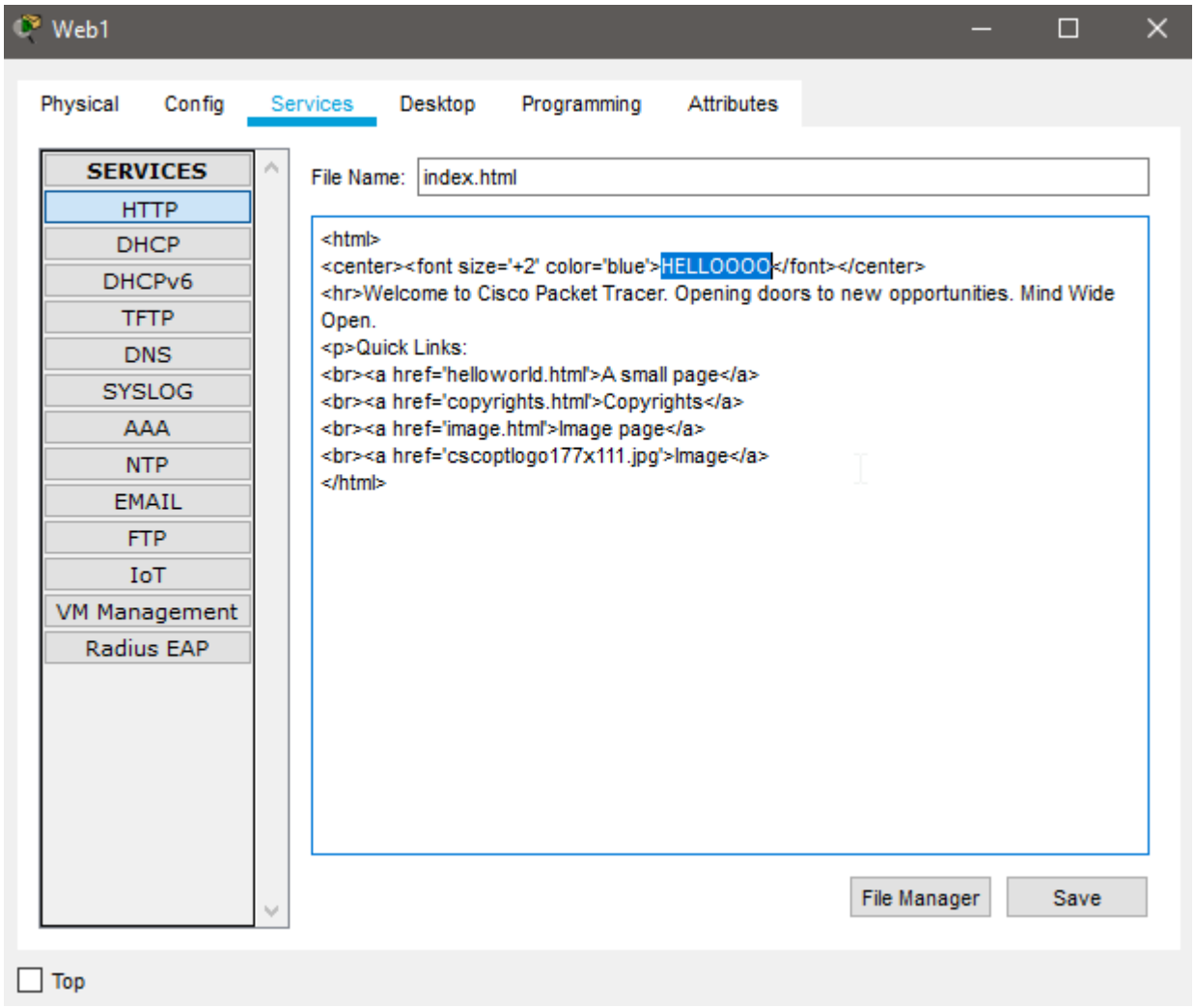
```
R4(config)#ip access-list extended 101
R4(config-ext-nacl)#deny tcp 33.0.0.0 0.0.0.255 any eq www
R4(config-ext-nacl)#permit ip any any

R4(config)#interface GigabitEthernet 0/2
R4(config-if)#ip access-group 101 in
```

To create a simple web page, do the following:

1. On Web1, open the “Services” tab, then click on “HTTP” under “SERVICES”
2. Click on the “(edit)” field next to “index.html”:



3. Instead of “Cisco Packet Tracer”, type in any random word:



4. From any PC, open the “Browser” application from the “Desktop” tab, and type in http://10.0.1.2: