Configuring IPv4 Static Routes

CIT 167

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BCTC
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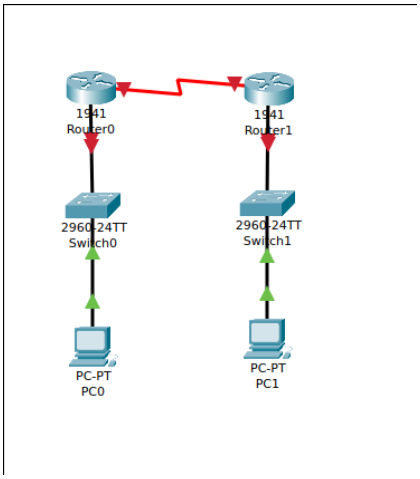
Part 1: Setting up the topology

i) Cabling the Network
I've configured the network with two routers, 2 switches, and 2 pcs as seen in Fig. 1a.

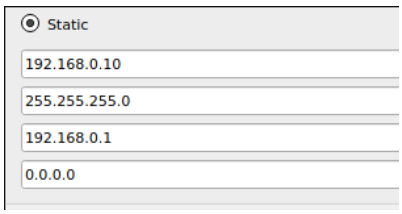


(a) Cabling the topology

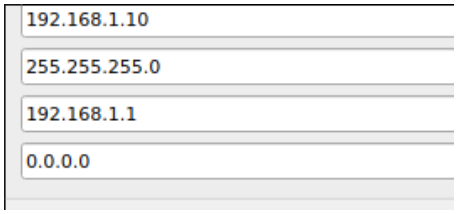
ii) Initialization
I flipped the switches and restarted the routers and switches.

Part 2: Configuring Basic Device Settings

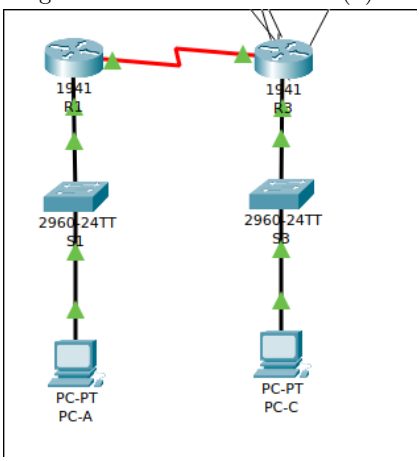
i) Configuring the PC Interfaces
I configured the PCs according to the table. As you can see in Fig. 2a and Fig. 2b on Pg. 2.
ii) Verify the LANs
Next, I ran commands on the routers to configure the device names, setup DNS lookup, added passwords, and then ran the configuration and startup styles.
iii) Configuring IP settings on the routers
Finally i configured the ip addresses on the routers and set up the static routing tables fir the addresses. See Fig. 2d and Fig. 2e on Pg. 2.



(a) PC-A IP config



(b) PC-B IPConfig



(c) The network now

```
Router>ena
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface serial 0/0/0
Router(config-if)#ip address 10.1.1.2 255.255.255.252
Router(config-if)#
Router(config-if)#clock rate 128000
Router(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
Router(config-if)#exit
Router(config)#interface
% Incomplete command.
Router(config)#interface loopback 0

Router(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up

Router(config-if)#ip address 209.165.200.225 255.255.255.224
Router(config-if)#no shut
Router(config-if)#exit interface loopback 1
                   ^
% Invalid input detected at '^' marker.

Router(config-if)#exit
Router(config)#interface loopback 1

Router(config-if)#
%LINK-5-CHANGED: Interface Loopback1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback1, changed state to up

Router(config-if)#ipaddress 198.133.219.1 255.255.255.0
                   ^
% Invalid input detected at '^' marker.

Router(config-if)#ip address 198.133.219.1 255.255.255.0
Router(config-if)#no shut
Router(config-if)#interface gigabitEthernet 0/1
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
```

(d) Router 3 config

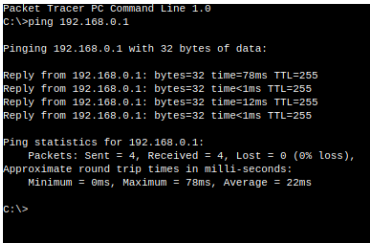
```
Router>ena
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface serial 0/0/1
Router(config-if)#ipaddress 10.1.1.1 255.255.255.252
                   ^
% Invalid input detected at '^' marker.

Router(config-if)#ip address 10.1.1.1 255.255.255.252
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

Router(config-if)#exit
Router(config)#interface gig
Router(config)#interface gigabitEthernet 0/
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up
%
Router(config-if)#interface gigabitEthernet 0/1
Router(config-if)#ip address    192.168.0.1 255.255.255.0
Router(config-if)#noshut
                   ^
% Invalid input detected at '^' marker.

Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
```

(e) router 1 config

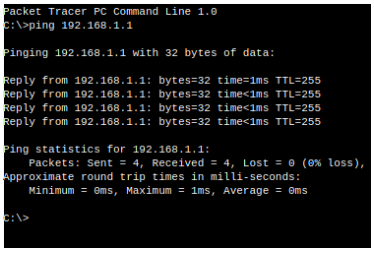
Figure 2: Configuring the network interfaces

iv) Verify Connectivity of LANs

I tested conectivity by pinging from each PC. I was able to ping from PC to router but from PC-A I was ubnable to reach PC-C or either loopback. See Fig. 3a. and Fig. 3b on Pg. 3.

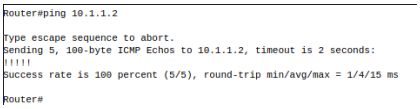


(a) Pinging the default gateway from PC-A



(b) Pinging the default gateway from PC-C

Pinging PC-C, Lo0, and Lo1 from PC-A



(c) Pinging S0/0/0 and R3 from R1

Figure 3: Verifying Connections between devices on the network

Part 3: Configure Static Routes

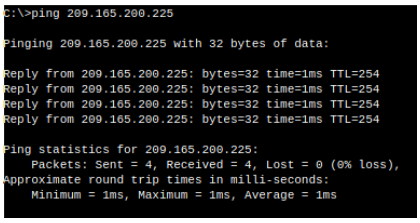
i) Configure recursive static route
I went to R1 and entered the command `ip route 192.168.1.0 255.255.255.0 10.1.1.2` in to the command line.
The new `show ip route` shows us the static routing configuration.
In the last line we see `S 192.168.1.0/24 [1/0] via 10.1.1.2 .`
ii) Configure directly connected static route
I went to R3 and entered `ip route 192.168.0.0 255.255.255.0 serial 0/0/0.`
When I run the `show ip route` command from R3 we can now see the static exit interface in the line `S 192.168.0.0/24 is directly connected, Serial0/0/0.`
iii) Configure Static Route
I went to R1 and ran `ip route 198.133.219.0 255.255.255.0 serial 0/0/1.`
iv) Remove static Routes for Loopback
I went to R1 and
ran `ip route 209.165.200.224 255.255.255.224 10.1.1.2`
and now we can see with the lines:

```
S    198.133.219.0/24 is directly connected, Serial0/0/1
     209.165.200.0/27 is subnetted, 1 subnets
S       209.165.200.224/27 [1/0] via 10.1.1.2
```

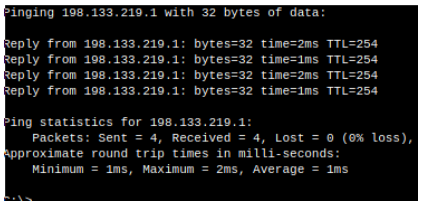
That we are correctly configured.

Part 4: Configure and verify the default route

I went to R1 and entered `ip route 0.0.0.0 0.0.0.0`.
I the went to PC-A and Pinged 209.165.200.225 see Fig. 4a
Lastly, I pinged 198.133.219.1 from PC-A. See Fig. 4b



(a) Pinging PC-C from PC- A



(b) Pinging R1 from PC-A

Figure 4: Verifying the default routes

Reflection

If we added a new network we could run `ip route 192.168.3.0 255.255.255.0 s0/0/0` `ip route 192.168.3.0 255.255.255.0 10.1.1.1` from R3
With a recursive static route perform lookups in the routing table before forwarding the packets. With a directly connected static route, the exit-interface parameter is specified, which allows the route to resolve a forwarding decision in one lookup.
A default gateway tells the device to contact the next hop of the default route if they don't have a more specific route. Without a default route, a router will drop a request for a network that is not in its routing table and send ICMP Destination unreachable.