

CO1507 Introduction to Networking

Lab 9 - Cisco Router Configuration With IOS

Task 1 - Configure Router in Basic WAN Scenario

Construct the following network in packet tracer:

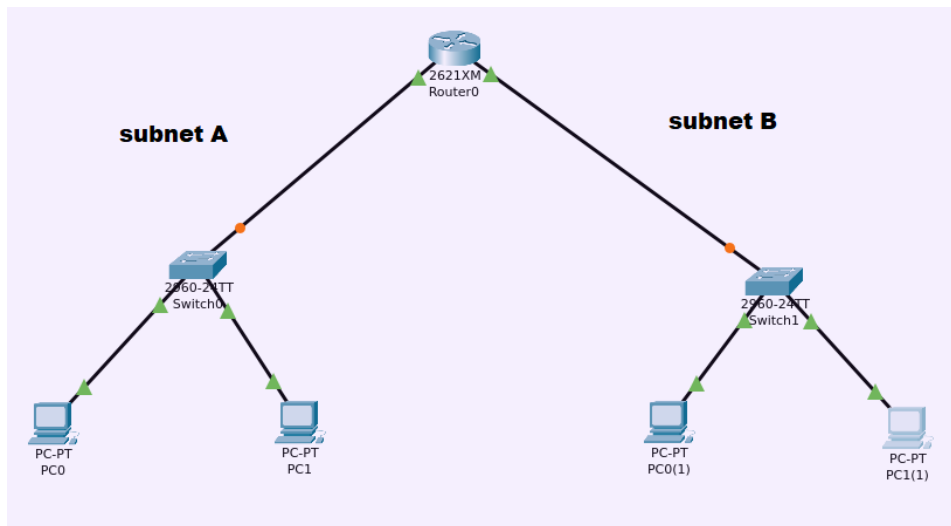


Figure 1 Small WAN with 1 router and 2 subnets

Make sure when you connect the router that the left-hand side of the diagram (subnet A) is plugged into f0/0 and the right (subnet B) f0/1 as that is what I will assume for the remainder of instructions

First configure the PC hosts using the following addresses:

Subnet A:

	IP Address	Subnet Mask	Default Gateway
PC 0	192.168.10.2	255.255.255.0	192.168.10.1
PC 1	192.168.10.3	255.255.255.0	192.168.10.1

Subnet B:

	IP Address	Subnet Mask	Default Gateway
PC 0	172.16.0.2	255.255.0.0	172.16.0.1
PC 1	172.16.0.3	255.255.0.0	172.16.0.1

Click on the router and go to the CLI tab

If you see it booting up (text scrolling up the screen) wait a minute. If it is asking you if you wish to enter initial configuration dialogue type 'n' for no followed by pressing Return. You should arrive at a prompt that says Router>

Enter the following commands to configure the f0/0 interface:

```
Router>enable
Router#configure terminal
Router(config)#interface f0/0
Router(config-if)#ip address 192.168.10.1
255.255.255.0
Router(config-if)#description link to subnet A
Router(config-if)#no shutdown
```

The router should notify you that the interface has been brought online

Repeat the steps for interface f0/1:

```
Router(config)#interface f0/1
Router(config-if)#ip address 172.16.0.1 255.255.0.0
Router(config-if)#description link to subnet B
Router(config-if)#no shutdown
```

Save the configuration:

```
Router(config-if)#exit
Router(config)#exit
Router#copy running-config startup-config
```

Ping between all PCs on the network ensuring full connectivity. Troubleshoot if there are problems

Task 2 - Further router configuration

At this point we have done enough to basically enable interfaces and set IP addresses, however there are other things we may wish to configure:

Setting the router name to Preston (or anything you like really):

```
Router(config)#hostname Preston
```

Enabling passwords: (in this case "cisco" but you can use whatever you want)

```
Router(config)#enable secret cisco
Router(config)#line console 0
Router(config-line)#password cisco
Router(config-line)#login
```

Setting a message of the day banner:

```
Router(config)#banner motd # no un-authorised access
to Preston router is permitted #
```

Disable DNS lookup: this is important as otherwise IOS will attempt to treat mistaken commands as domain names and attempt to resolve:

```
Router(config)#no ip domain-lookup
```

Task 3 - DHCP server

Add a server to Subnet A

Give the server the statically assignment IP address of 192.168.10.254 255.255.255.0

Configure a DHCP service to allocate IP addresses to the two PC hosts on the network. You will need to refer back to previous lab sheets if you do not know how to do this.

When you have setup the DHCP service, switch PC0 and PC1 over to DHCP from being statically assigned. Verify that the process has worked as intended and re-test communication across the whole network.

IMPORTANT: remember it is important to supply ALL addressing requirements in the DHCP response not merely the IP address

Task 4 - Wireless access point and laptops

Add a device AccessPoint-PT device to the topology - this can be found under "wireless devices" in the device selection tray.

Connect the access point directly to the switch in subnet A



Figure 2 AP-PT access point wired to a switch

Now add a laptop to your topology. You may wonder how we can connect this to the network. One solution would be to connect it to the switch with an ethernet cable. However, a more common solution would be to join wirelessly

Click on the laptop, and navigate to the "Physical" tab

You need to remove the ethernet NIC card and replace it with a wireless card. Follow these steps:

1. Click the power button to turn the laptop off
2. Drag the ethernet card from the laptop to the side panel on the left
3. Now drag WPC300N from the left into the vacant slot
4. Click the power button to turn the laptop back on again

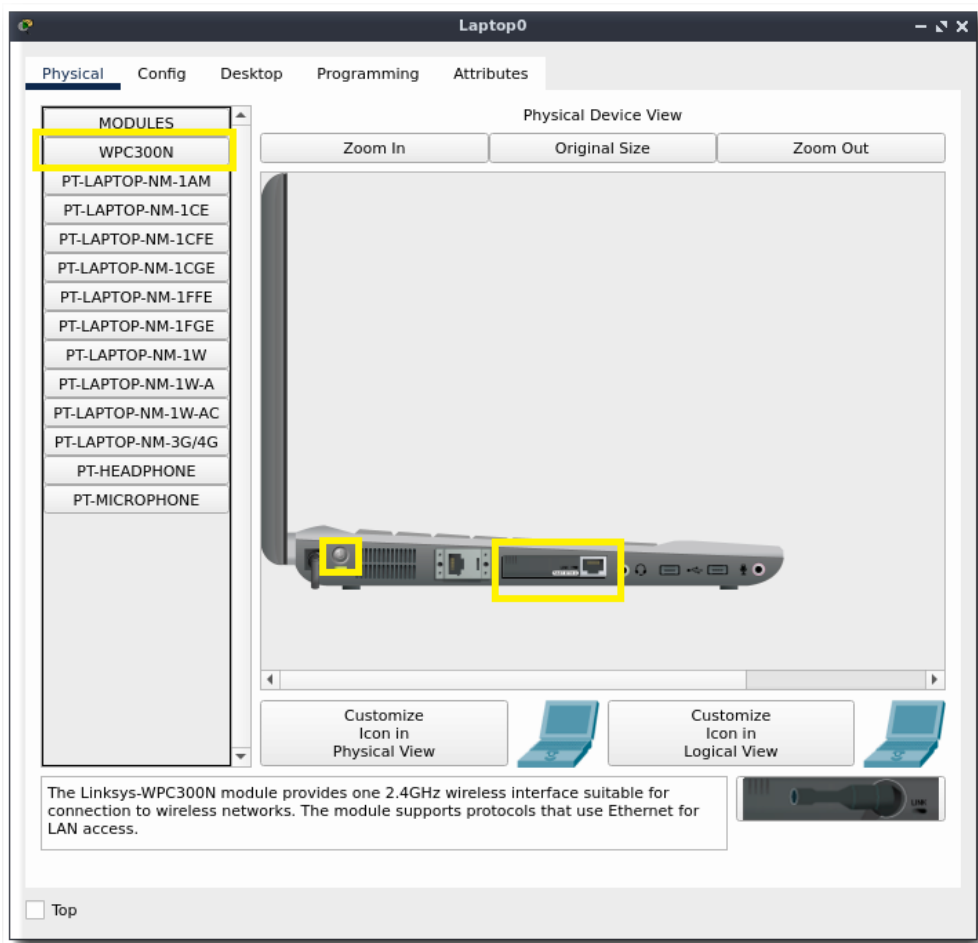


Figure 3 Laptop config physical tab showing original fastEthernet interface card

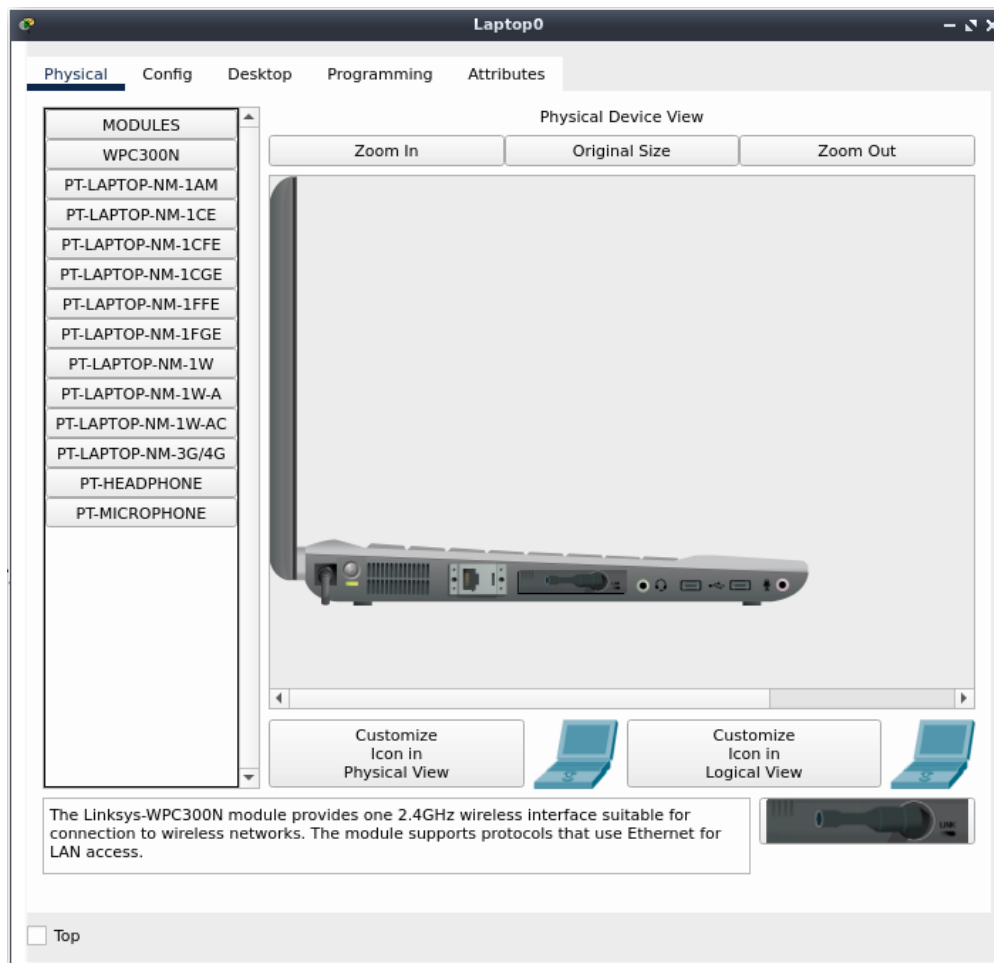


Figure 4 Laptop config physical tab showing replacement with WPC300N wireless NIC

If you have done everything correctly you should see the laptop connect to the access point.

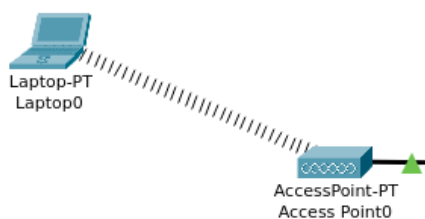


Figure 5 Laptop showing it is connected to the wireless access point

You should now be able to switch on DHCP on the laptop, and it will receive the full addressing requirements as PC0 and PC1 did.

Verify that this is the case, and that the laptop can communicate with other hosts on both subnet A and subnet B

Task 5 - Questions

Answer the following questions in your notes, refer to the lecture this week as well as researching on the web

1. What is IP address depletion and why is it a concern?
2. How is network address translation (NAT) used to address IP address depletion?
3. What is the difference between static and dynamic NAT?
4. What are the benefits and drawbacks of using NAT to address IP address depletion?
5. Can you explain the difference between NAT and PAT?
6. How does PAT achieve separation of traffic between different hosts on the private network?

How does custom subnetting help with the problem on IP address depletion?

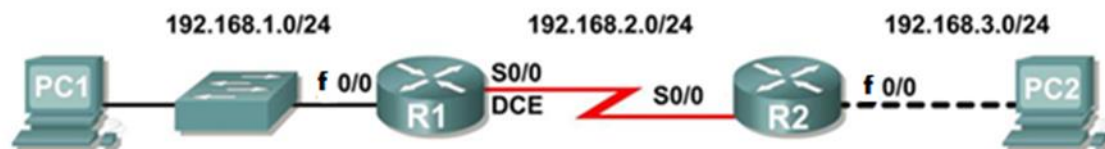
What is the long-term solution to the problem of IP address depletion?

Task 6 – Extension

Construct the following topology:

Note: use router 2621XM router WITH WIC2-T expansion card added (under physical tab in config window)

Topology Diagram



Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	f0/0	192.168.1.1	255.255.255.0	N/A
	s0/0	192.168.2.1	255.255.255.0	N/A
R2	f0/0	192.168.3.1	255.255.255.0	N/A
	s0/0	192.168.2.2	255.255.255.0	
PC 1	NIC	192.168.1.3	255.255.255.0	192.168.1.1
PC 2	NIC	192.168.3.3	255.255.255.0	192.168.3.1

Task 1. Configure the IP address, subnet mask, and default gateway settings on PC 1 and 2

Task 2. Configure the IP address, subnet mask, on Routers R1 and R2 using the cisco IOS commands as per the instructions found in the main lab sheet

Task 3. Attempt to ping from PC 1 to PC 2. Does it work? Why not?

Task 4. Research on the web what is the difference between static and dynamic routing

Task 5. Enable **RIP** on each router – this can be found under the config tab. You need to input the network address of BOTH directly connected networks i.e. the network address of the networks each of the routers interfaces is connected to. For R1 this will be 192.168.1.0 and 192.168.2.0.

Task 6. Repeat Task 3. Communication should now work. RIP is an example of dynamic routing.