

CO1507 Introduction to Networking

Lab 3 - Wide Area Networks and IP Addressing

Task 1 - Quiz

Tutor led - no instructions necessary - good luck!

Task 2 - Building a Wide Area Network

Construct the following topology in Packet Tracer, and follow the addressing scheme in the table below

When you have built the network and configured all ports correctly, test for full connectivity (all interfaces should be able to be pinged)

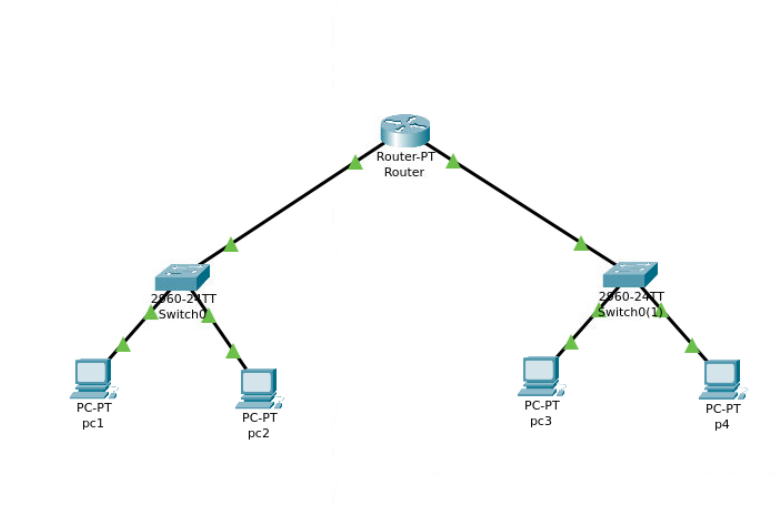


Figure 1: Logical topology of a small wide area network

Interface	IP Address	Subnet Mask	Default Gateway
Router left side	192.168.10.1	255.255.255.0	n/a
PC1	192.168.10.2	255.255.255.0	192.168.10.1
PC2	192.168.10.3	255.255.255.0	192.168.10.1
Router right side	172.16.0.1	255.255.0.0	n/a
PC3	172.16.0.2	255.255.0.0	172.16.0.1
PC4	172.16.0.3	255.255.0.0	172.16.0.1

Task 3 - Network Addressing

Construct the same topology as above. This time you are going to work out the appropriate addressing requirements. You are given 2 network addresses:

Left side subnet **192.168.10.0** **255.255.255.0**

Right side subnet **192.168.20.0** **255.255.255.0**

You should be able to identify all IP addresses, subnet masks, and default gateways based upon your knowledge of network addressing after this week's lecture. If not ask your tutor for help

Draw a table like below in your notes, and fill in all the addresses

Interface	IP Address	Subnet Mask	Default Gateway
Router left side			
PC1			
PC2			
Router right side			
PC3			
PC4			

Configure and fully test the network correcting any mistakes as you go along. Ask your tutor if you get stuck and cannot achieve full communications

Task 4 - Webserver

Add a web server to the topology by connecting it to the switch on the left-hand side of the WAN. Give it a suitable IP address for the subnet. You should be able to do this based upon the previous task and this week's lecture.

The web server can be found under "end devices" and is simply called "Server" (It can be setup as many different kinds of server)

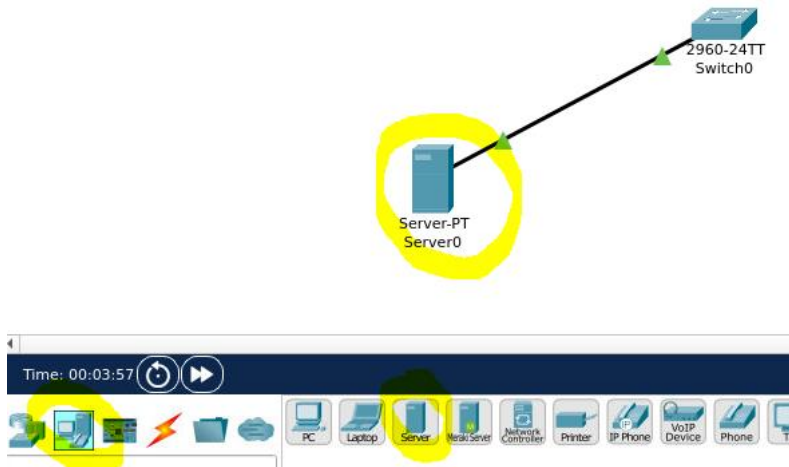


Figure 2: A server connected to a switch showing where the device is found under "End devices"

Test that the web server is working by clicking on one of the PCs in the network, under the desktop tab click "Web Browser"

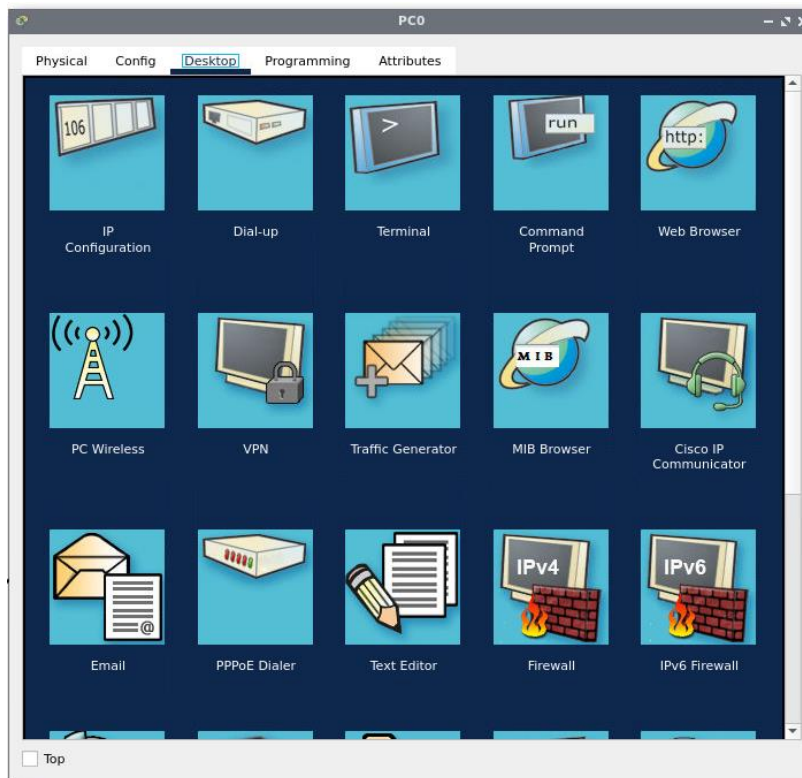


Figure 3: The desktop tab for a PC being configured in packet tracer

Within the web browser type the IP address of the server in the URL bar, and press GO

You should see something like this:

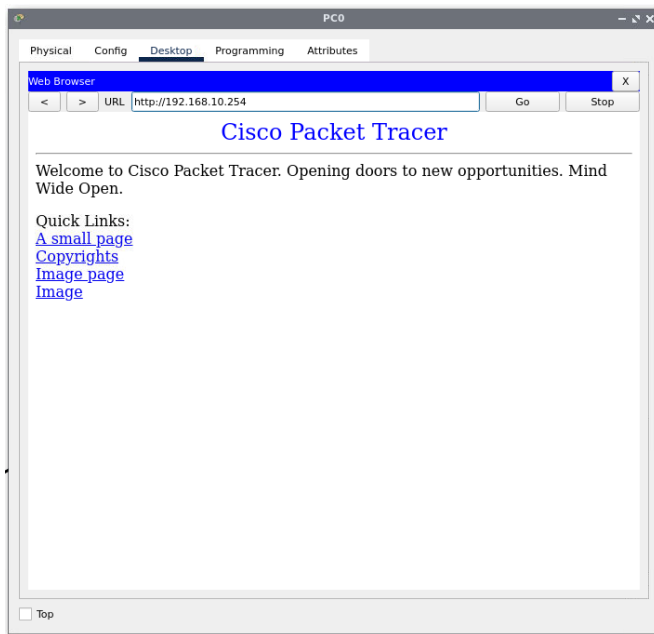


Figure 4: Packet tracer PC web browser showing content

If you see "Request timed out" instead then this means either the sever or the PC is configured incorrectly - so, troubleshoot where necessary.

You can Edit the server's output by clicking on the server, choosing the services tab, selecting HTTP on the left hand side, and editing one of the pages (index.html is what we just looked at)

Add your name and the IP address of the server to the index page.

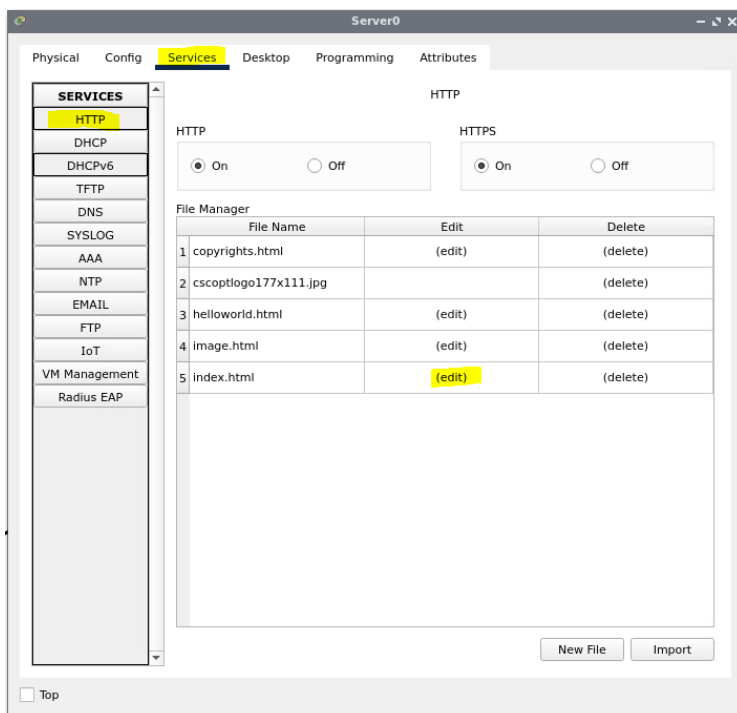


Figure 5: Packet tracer server services tab showing HTTP

Add your name, the module code, and the IP address of the server to the index page.

Task 5 - Troubleshooting

Download the following file and open it in packet tracer. There are 5 mistakes in the configuration of the network. Log the mistakes, and correct them

Download from Blackboard.

Draw the following table in your notes and fill in the errors and remedies for each

	Mistake	Remedy
1:		
2:		
3:		
4:		
5:		

Make the necessary corrections and fully test the connectivity of the network

Task 6 - Troubleshooting

1. How many bits are in an IP address? (IPv4)
2. Convert the following IP addresses to binary:
 1. 192.168.10.33
 2. 172.16.32.12
 3. 10.0.255.66
 4. 193.61.240.146
3. What is the purpose of a subnet mask?
4. What is a default gateways purpose and to which device in the network does it represent?
5. What is the minimum addressing requirements in a LOCAL area network
6. What is the minimum addressing requirements in a WIDE area network
7. If a host on a WIDE area network has a wrongly configured or omitted default gateway, what will be the effect?
8. How many hosts can be addressed if the network address is IP: 192.168.10.0 mask: 255.255.255.0?
9. How many hosts can be addressed if the network address is IP: 172.16.0.0 mask: 255.255.0.0?
10. What is the DEFAULT subnet mask for the IP address 192.168.1.1?
11. What is the DEFAULT subnet mask for the IP address 172.16.0.1?
12. How do we know what the DEFAULT subnet mask is?
13. Do we need to use the default subnet mask, and why / why not?
14. Use the table below to record your answers to the following: Calculate the network address and the host id for each given IP and subnet mask pairing
15. Use the table below to record your answers to the following: Using the same addresses from part 4 calculate having calculated the network address, calculate the FIRST and LAST possible IP address as well as the BROADCAST address

Table for your answers to questions 14 and 15

IP	Subnet Mask	Network Address	First IP Address	Last Host IP Address	Broadcast Address
192.168.10.33	255.255.255.0				
172.16.32.12	255.255.0.0				
10.0.255.66	255.0.0.0				
192.168.33.16	255.255.0.0				
172.32.255.12	255.255.255.0				

Your tutor will go through the answers at the end of the session

Task 7 - Troubleshooting

Use the web to research the following questions.

1. What is a private IP address?
2. Where can private IP addresses be used?
3. What are the number ranges for private IP addresses?
4. Give an example of a private address from each range
5. Why are private IP addresses useful?