

CO1507 Introduction to Networking

Lab 8: Custom Subnetting

Task 1: Sub-Netted WAN Implementation in Packet Tracer

Construct the following topology in Packet Tracer

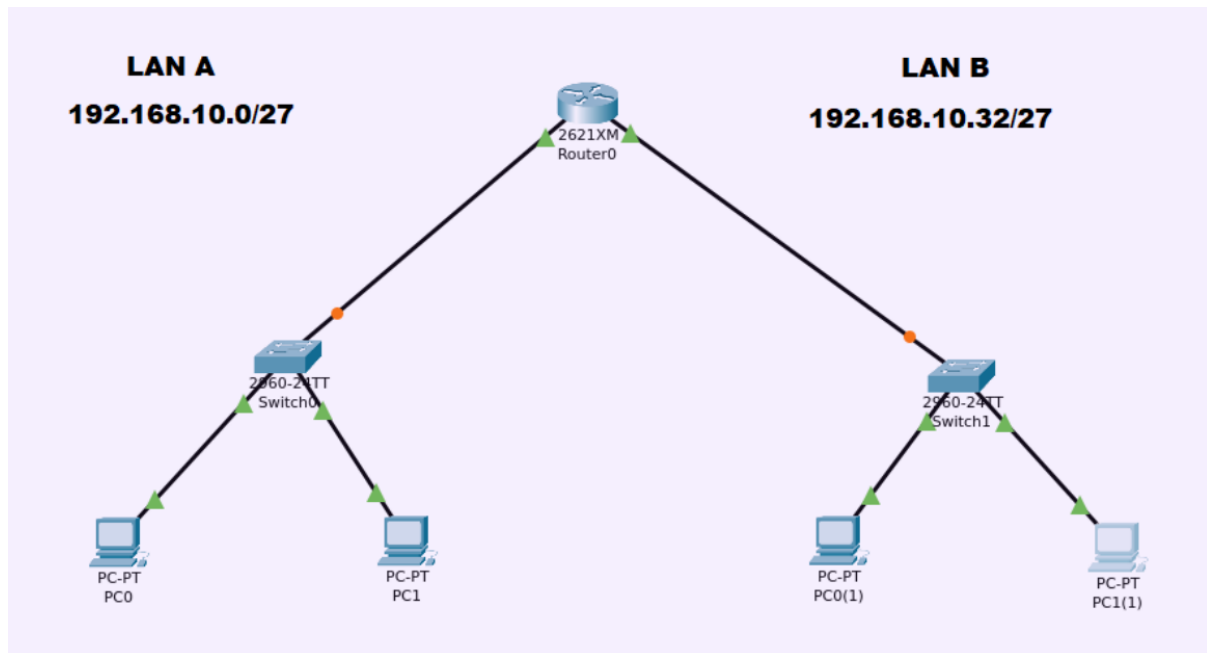


Figure 1 Sub-netted Wide-Area Network

Calculate all the addressing requirements for the network

Remember: The routers should use the FIRST valid host IP address on each subnet

LAN A:

LAN A PC 1 IP Address

LAN A PC 1 Subnet Mask

LAN A PC 1 Default Gateway

LAN A PC 2 IP Address

LAN A PC 2 Subnet Mask

LAN A PC 2 Default Gateway

Router f0/0 (LAN A side) IP Address

Router f0/0 Subnet Mask

LAN B:

Router f0/1 (LAN B side) IP Address

Router f0/1 Subnet Mask

LAN B PC 1 IP Address

LAN B PC 1 Subnet Mask

LAN B PC 1 Default Gateway

LAN B PC 2 IP Address

LAN B PC 2 Subnet Mask

LAN B PC 2 Default Gateway

Configure and test the network for full connectivity.

Task 2: Servers

Add a server to LAN A. The server should use the LAST valid host IP address on the subnet

Setup a DHCP service on the server paying special attention to:

- The appropriate start addresses for the pool
- The limited availability of addresses in the DHCP pool
- The correct subnet mask and default gateway

Change the 2 PCs in LAN A from statically assigned IP addresses, to DHCP and check to see everything is working correctly. Re-test the network connectivity

FINALLY: repeat above steps for a second server in LAN B. Again, paying attention to the issues aforementioned within the different subnet

Task 3: Inter-connecting routers

Construct the following topology in Packet Tracer:

This network features 3 subnets. HINT: The point-to-point connection between the two routers is a LAN in its own right!

The red connection is a SERIAL connection and not Ethernet - though it works with an IP address and subnet mask just the same

Your router will need to come with a serial interface (and not all do!) So please choose model "Router-PT" to avoid complications

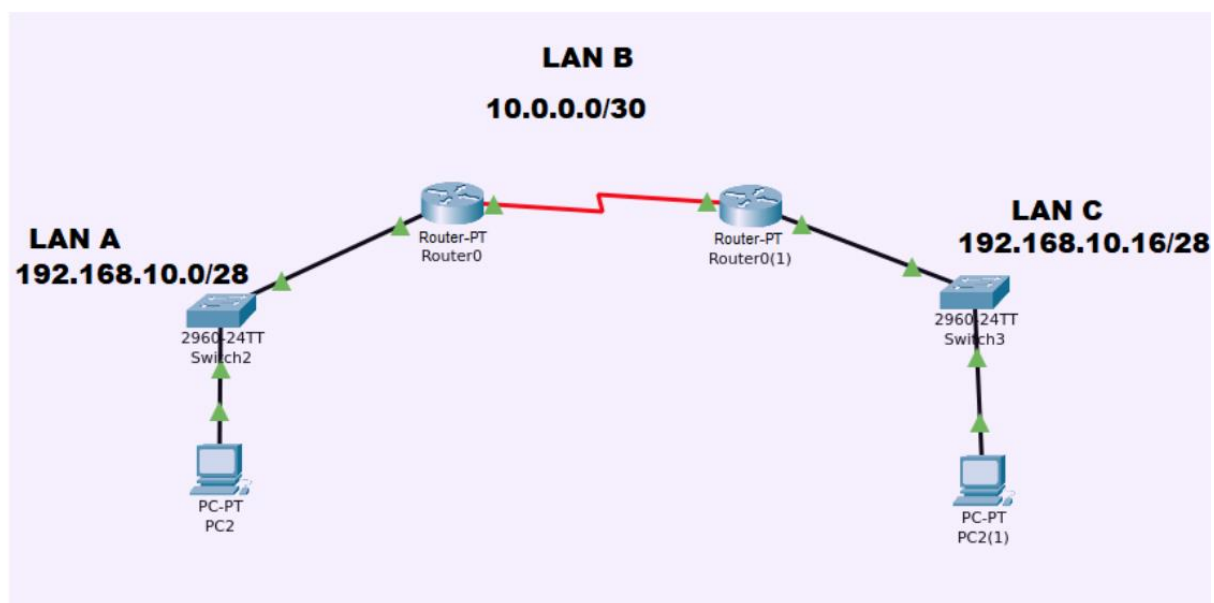


Figure 2 Sub-Netted Wide-Area Network

There are a total of 6 network host interfaces to be configured. Each subnet contains only 2 hosts.

LAN A:

LAN A PC IP Address

LAN A PC Subnet Mask

LAN A PC Default Gateway

Router f0/0 (LAN A side) IP Address

Router f0/0 Subnet Mask

LAN B:

Router s0/0 (LAN A side) IP Address

Router s0/0 Subnet Mask

Router s0/1 (LAN C side) IP Address

Router s0/1 Subnet Mask

LAN C:

LAN C PC IP Address

LAN C PC Subnet Mask

LAN C PC Default Gateway

Router f0/0 (LAN A side) IP Address

Router f0/0 Subnet Mask

IMPORTANT: it will not be possible to ping from LAN A to LAN C even when you have done everything correctly because the routers have no routing protocol enabled. **We will cover this next semester.**

Task 4: Subnet Calculations (Advanced)

Before attempting this make sure you have completed and understood last week's subnet calculations (solutions were provided in the lecture)

Scenario 1

Host IP Address 172.16.228.12

Original Subnet Mask 255.255.0.0

Custom Subnet Mask 255.255.248.0

Number Of Subnet Bits

Number Of Subnets Created

Number Of Host Bits Per Subnet

Number Of Valid Host Ips Per Subnet

Network Address Of This Subnet

First Valid Host Address On This Subnet

Last Valid Host Address On This Subnet

Broadcast Address On This Subnet

Scenario 2

Host IP Address 10.201.99.228

Original Subnet Mask 255.0.0.0

Custom Subnet Mask 255.255.128.0

Number Of Subnet Bits

Number Of Subnets Created

Number Of Host Bits Per Subnet

Number Of Valid Host Ips Per Subnet

Network Address Of This Subnet

First Valid Host Address On This Subnet

Last Valid Host Address On This Subnet

Broadcast Address On This Subnet

Task 5: Questions

Use the lecture from last week as well as the web to answer the following questions in your notes

1. Under old-fashioned classful addressing, how many hosts were supported in class A, B, and C networks respectively?
2. What are the benefits of custom subnetting (give at least 3 benefits)
3. Which of the following is an invalid subnet mask
 - a) 255.255.224.128
 - b) 255.248.0.0
 - c) 255.255.255.252
 - d) 255.255.192.0
4. Referring to the previous question, explain WHY the mask was not valid
5. What is the subnet mask corresponding to the following CIDR notations:
 - a) /27
 - b) /23
 - c) /12
 - d) /29
 - e) /18
6. What custom subnet mask would be most appropriate to use for the following needs:
 - a) 300 hosts
 - b) 200 hosts
 - c) 2 hosts
 - d) 8 hosts
 - e) 5000 hosts