Experiment No.: 9

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Semester: 6th
Subject Name: Computer Networks Lab

UID: 20BEC1073
Section/Group: 1-A
Date of Performance: 24/03/2023
Subject Code: 20ECP-374

1. **Aim/Overview of the practical:** Implementing IP Addressing Scheme using subnetting.

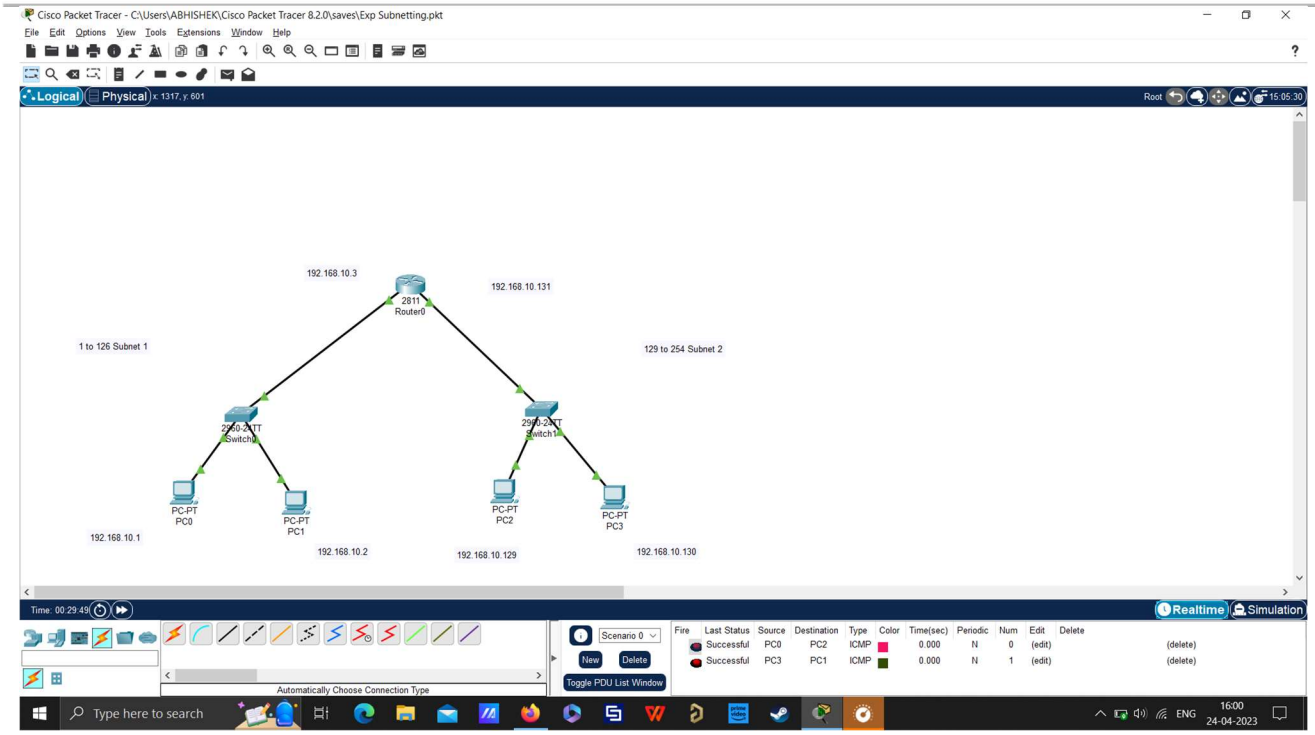
2. **Apparatus/Tool Used:** Cisco Packet Tracer

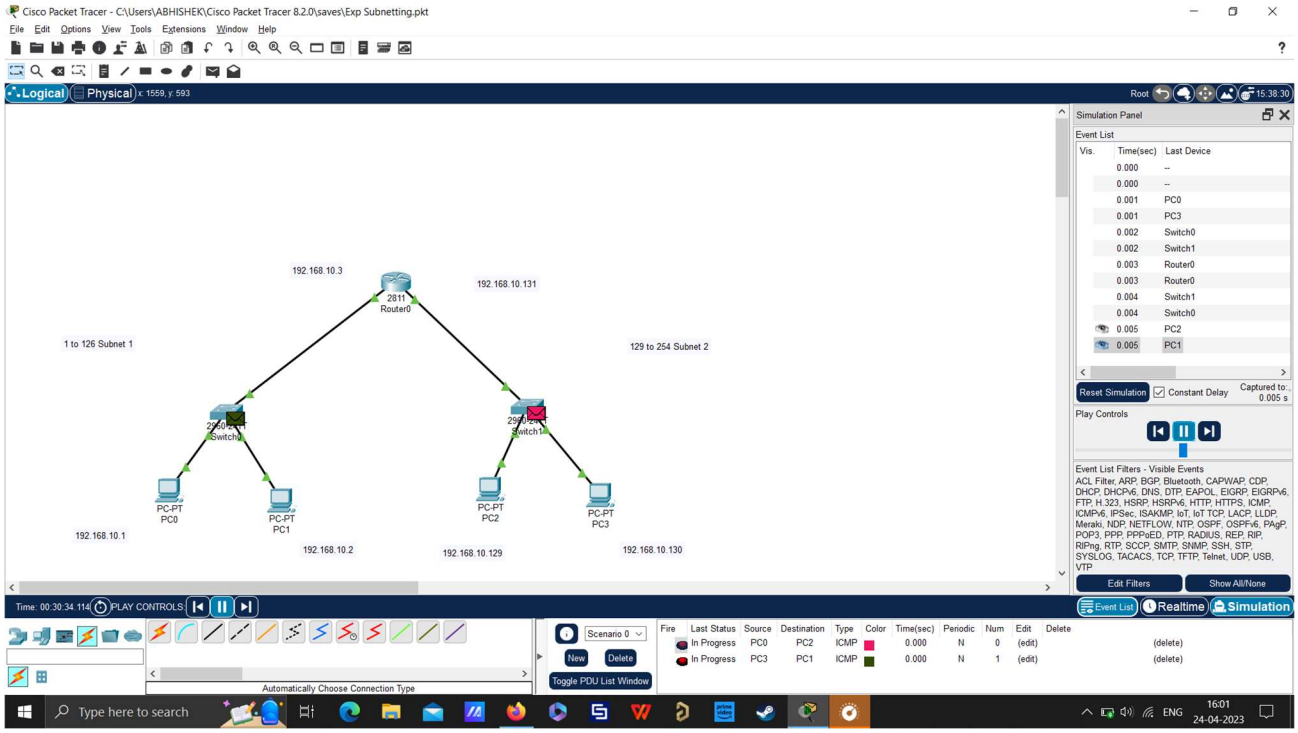
3. **Theory:** Subnetting is a technique employed to divide a larger network into smaller subnetworks or subnets. Its purpose is to optimize the use of IP addresses and enhance network performance and security. The process involves taking bits from the host portion of an IP address and utilizing them to create a new network address for the subnet. The subnet mask is then used to differentiate between the network and host sections of the IP address.

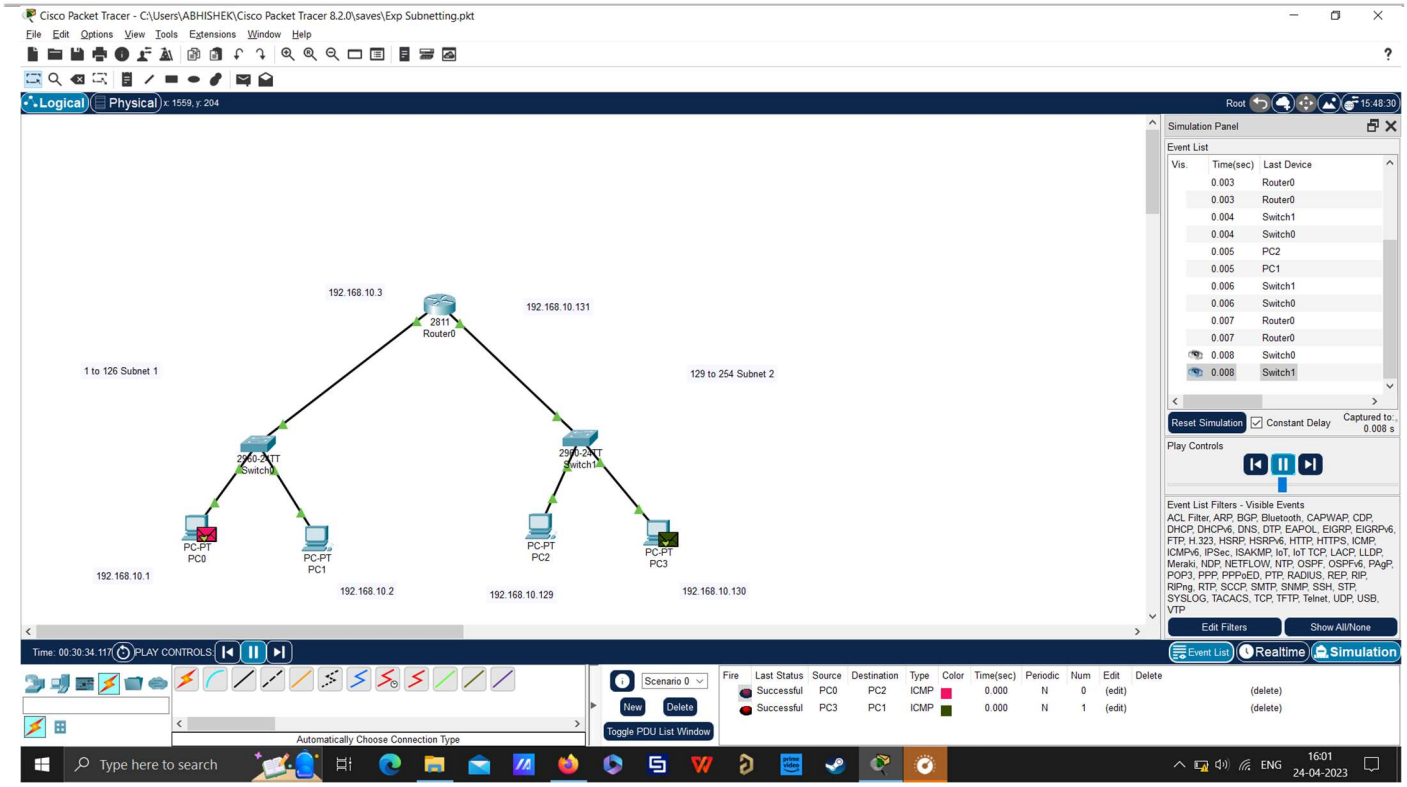
Both IPv4 and IPv6 networks can benefit from subnetting, although the approach differs due to the contrasting address spaces. In the case of IPv6, which has a significantly larger address space, the subnet ID is positioned in the middle of the address. The prefix length, equivalent to the subnet mask in IPv4, is specified using slash notation.

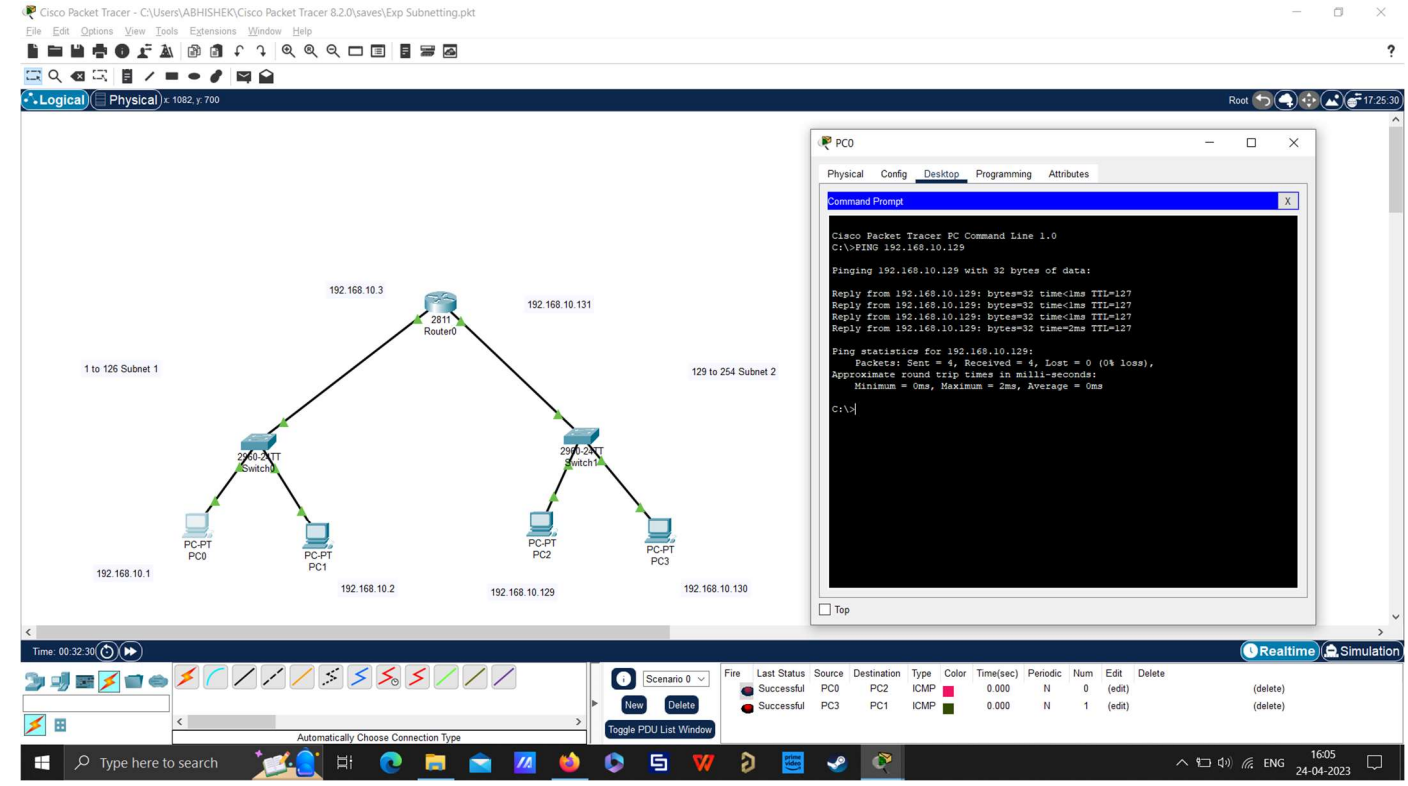
By subnetting, administrators can efficiently manage IP address allocation, reduce network congestion, and enhance security by isolating different parts of the network. It allows for better control over network traffic and facilitates the implementation of network policies. Additionally, subnetting enables organizations to logically organize their network infrastructure, making it easier to troubleshoot and manage. Overall, subnetting is a valuable technique in modern networking that aids in optimizing resource utilization and improving network performance and security.

4. **Screenshots:**


Cisco Packet Tracer - C:\Users\ABHISHEK\Cisco Packet Tracer 8.2.0\saves\Exp Subnetting.pkt
File Edit Options View Tools Extensions Window Help
Logical Physical x: 1317, y: 601
Root 15:05:30
192.168.10.3
2811 Router0
192.168.10.131
1 to 126 Subnet 1
129 to 254 Subnet 2
2960-24TT Switch0
2960-24TT Switch1
PC-PT PC0
PC-PT PC1
PC-PT PC2
PC-PT PC3
192.168.10.1
192.168.10.2
192.168.10.129
192.168.10.130
Time: 00:29:49
Realtime Simulation
Scenario 0
New Delete
Toggle PDU List Window
Automatically Choose Connection Type
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
Successful PC0 PC2 ICMP 0.000 N 0 (edit) (delete)
Successful PC3 PC1 ICMP 0.000 N 1 (edit) (delete)
Type here to search
ENG 16:00 24-04-2023


Cisco Packet Tracer - C:\Users\ABHISHEK\Cisco Packet Tracer 8.2.0\saves\Exp Subnetting.pkt
File Edit Options View Tools Extensions Window Help
Logical Physical x: 1559, y: 593
Root 15:38:30
Simulation Panel
Event List
Vis. Time(sec) Last Device
0.000 --
0.000 --
0.001 PC0
0.001 PC3
0.002 Switch0
0.002 Switch1
0.003 Router0
0.003 Router0
0.004 Switch1
0.004 Switch0
0.005 PC2
0.005 PC1
Reset Simulation Constant Delay Captured to: 0.005 s
Play Controls
Event List Filters - Visible Events
ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, IoT, IoT TCP, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoED, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP
Edit Filters Show All/None
192.168.10.3
2811 Router0
192.168.10.131
1 to 126 Subnet 1
129 to 254 Subnet 2
PC-PT PC0
PC-PT PC1
PC-PT PC2
PC-PT PC3
192.168.10.1
192.168.10.2
192.168.10.129
192.168.10.130
Time: 00:30:34.114 PLAY CONTROLS
Event List Realtime Simulation
Scenario 0
New Delete
Toggle PDU List Window
Automatically Choose Connection Type
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
In Progress PC0 PC2 ICMP 0.000 N 0 (edit) (delete)
In Progress PC3 PC1 ICMP 0.000 N 1 (edit) (delete)
Type here to search
ENG 16:01 24-04-2023


Cisco Packet Tracer - C:\Users\ABHISHEK\Cisco Packet Tracer 8.2.0\saves\Exp Subnetting.pkt
File Edit Options View Tools Extensions Window Help
Logical Physical x: 1559, y: 204
Root 15:48:30
192.168.10.3
2811 Router0
192.168.10.131
1 to 126 Subnet 1
129 to 254 Subnet 2
2960-24TT Switch0
2960-24TT Switch1
PC-PT PC0
PC-PT PC1
PC-PT PC2
PC-PT PC3
192.168.10.1
192.168.10.2
192.168.10.129
192.168.10.130
Simulation Panel
Event List
Vis. Time(sec) Last Device
0.003 Router0
0.003 Router0
0.004 Switch1
0.004 Switch0
0.005 PC2
0.005 PC1
0.006 Switch1
0.006 Switch0
0.007 Router0
0.007 Router0
0.008 Switch0
0.008 Switch1
Reset Simulation
Constant Delay
Captured to: 0.008 s
Play Controls
Event List Filters - Visible Events
ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, IoT, IoT TCP, LACP, LLDP, Meraki, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoED, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP
Edit Filters
Show All/None
Time: 00:30:34.117 PLAY CONTROLS
Event List Realtime Simulation
Scenario 0
New Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
Successful PC0 PC2 ICMP 0.000 N 0 (edit) (delete)
Successful PC3 PC1 ICMP 0.000 N 1 (edit) (delete)
Automatically Choose Connection Type
Type here to search
ENG 16:01 24-04-2023


Cisco Packet Tracer - C:\Users\ABHISHEK\Cisco Packet Tracer 8.2.0\saves\Exp Subnetting.pkt
File Edit Options View Tools Extensions Window Help
Logical Physical x: 1082, y: 700
Root 17:25:30
PC0
Physical Config Desktop Programming Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>PING 192.168.10.129
Pinging 192.168.10.129 with 32 bytes of data:
Reply from 192.168.10.129: bytes=32 time<1ms TTL=127
Reply from 192.168.10.129: bytes=32 time<1ms TTL=127
Reply from 192.168.10.129: bytes=32 time<1ms TTL=127
Reply from 192.168.10.129: bytes=32 time=2ms TTL=127
Ping statistics for 192.168.10.129:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 2ms, Average = 0ms
C:\>
Top
192.168.10.3
2811 Router0
192.168.10.131
1 to 126 Subnet 1
129 to 254 Subnet 2
2960-24TT Switch0
2960-24TT Switch1
PC-PT PC0
PC-PT PC1
PC-PT PC2
PC-PT PC3
192.168.10.1
192.168.10.2
192.168.10.129
192.168.10.130
Time: 00:32:30
Realtime Simulation
Scenario 0
New Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
Successful PC0 PC2 ICMP 0.000 N 0 (edit) (delete)
Successful PC3 PC1 ICMP 0.000 N 1 (edit) (delete)
Automatically Choose Connection Type
Type here to search
ENG 16:05 24-04-2023

5. Steps for experiment/practical:

1. Assign IP addresses, default mask, default gateway and other network requirements to the required devices for performing subnetting.
2. Subnet an address space based on the host requirements.
3. Assign host addresses to devices.
4. Configure devices with IP addressing.
5. Verify the addressing configuration.
6. Send PDU in the network to observe proper error free functioning of the network.
7. Ping the IP address of the other devices (PC's or computer) to verify the network utility.

6. Result and Summary:

- Subnetting can be a useful tool for improving network performance and security, but it should be implemented carefully and with consideration for the potential disadvantages.
- Proper planning and implementation can help to ensure that subnetting is a beneficial addition to a network.
- The advantages of subnetting include efficient use of IP addresses, improved network performance, improved security, and simplified network management

7. Additional Creative Inputs (If Any):

NA

8. Learning outcomes (What I have learnt):

- Learnt about what is subnetting.
- Learnt about how is subnetting helpful in creating networks.
- Learnt the application areas of subnetting.
- Learnt about advantages and disadvantages of subnetting.

Evaluation Grid (To be filled by Faculty):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.	Worksheet completion including writing learning objectives/Outcomes. (To submit at the end of the day)		
2.	Viva		
3.	Student Engagement in Simulation/Demonstration/Performance and Controls/Pre-Lab Questions.		
	Signature of Faculty (with Date):	**Total Marks Obtained:**	