



1.3 Design a bus topology with switches and routers

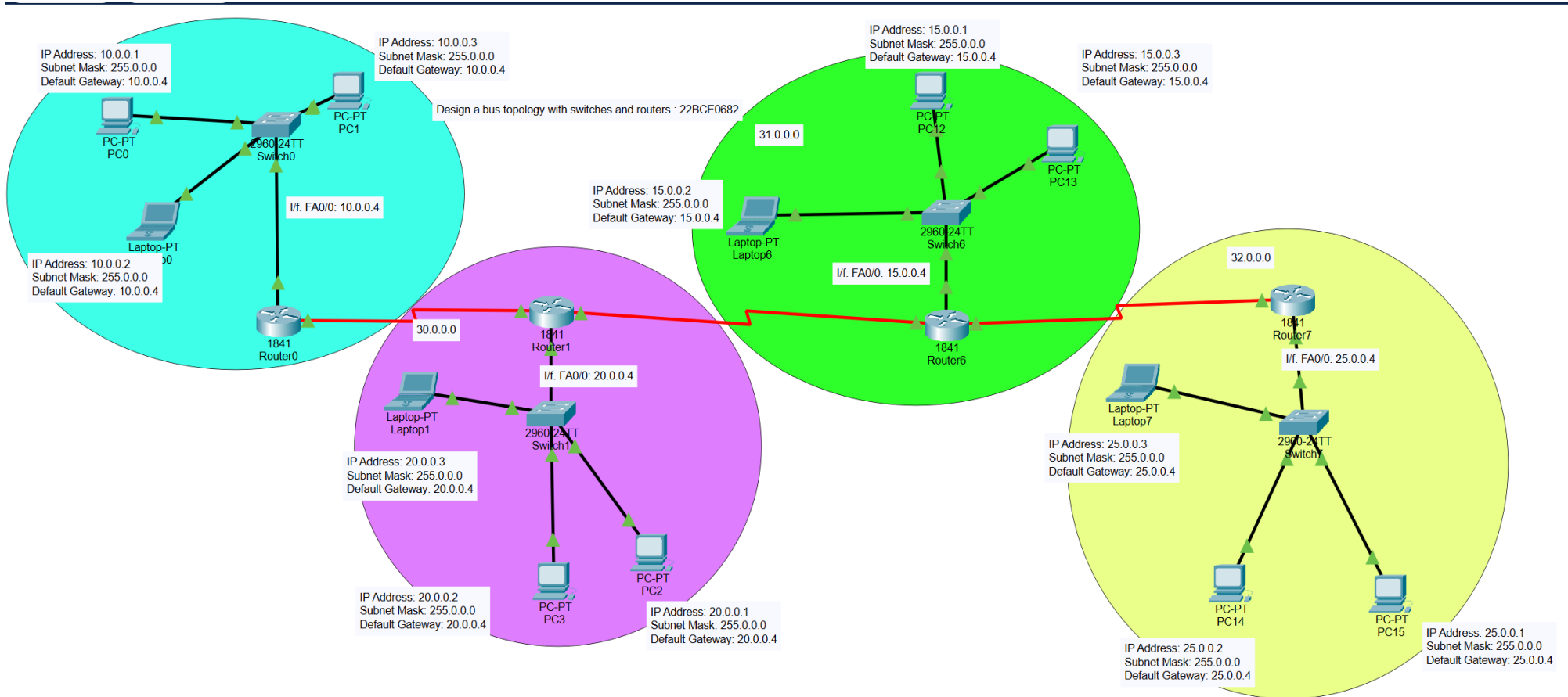
Design and configure a fully connected Bus Network in CISCO Packet Tracer and ensure all devices can communicate with each other.

Requirements:

1. Detailed Network Design(Screenshot from CISCO)
2. Basic setup
 1. What devices are added to the workspace in CISCO Packet Tracer?
 2. What are the steps to connect each device to every other device using appropriate cables?
3. MAC and IP address configuration
 1. How do you assign an IP address to each device in the Bus Network? Mention both the IP and MAC addresses of each device from your network.
 2. Mention the configuration made on routers with different interfaces.
 3. What subnet mask should be used for the given IP address?
4. Verification
 1. How can you verify the connectivity between devices using the command?
 2. What steps would you take if a device does not respond to a ping request?
5. Status of packet transmission (screenshot of workspace along with status panel)

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1. Detailed Network Design(Screenshot from CISCO)



2. Basic setup

a. What devices are added to the workspace in CISCO Packet Tracer?

- The devices used are:
 - 4 Switches
 - 4 Routers
 - 8 PCs
 - 4 Laptops

b. What are the steps to connect each device to every other device using appropriate cables?

- Connect each Router to a Switch using a Copper Straight-through cable.
- Connect each Switch to 2 PCs and 1 Laptop using Copper Straight-through cables.
- Connect the Routers to each other using Serial cables to establish communication between them.

3. MAC and IP address configuration

a. How do you assign an IP address to each device in the Bus Network?

Mention both the IP and MAC addresses of each device from your network.

- PCs and Laptops:
 - Click on a PC or Laptop.
 - Go to the "Desktop" tab.
 - Open the "IP Configuration" tool.
 - Assign an IP address and subnet mask.
 - PC0: IP Address: 10.0.0.1, MAC Address: 00E0.F9EC.2E60
 - PC1: IP Address: 10.0.0.3, MAC Address: 0002.1785.C041
 - PC2: IP Address: 20.0.0.1, MAC Address: 0090.0C2C.379B
 - PC3: IP Address: 20.0.0.2, MAC Address: 00D0.9775.BBA7
 - PC12: IP Address: 15.0.0.1, MAC Address: 00D0.FF21.6D1B
 - PC13: IP Address: 15.0.0.3, MAC Address: 000C.8570.9B25
 - PC14: IP Address: 25.0.0.2, MAC Address: 0040.0B1E.9D1D
 - PC15: IP Address: 25.0.0.1, MAC Address: 0030.F2B8.652A
 - Laptop0: IP Address: 10.0.0.2, MAC Address: 0001.9613.6D2E
 - Laptop1: IP Address: 20.0.0.3, MAC Address: 00D0.5828.81EC
 - Laptop6: IP Address: 15.0.0.2, MAC Address: 00E0.B073.ED09
 - Laptop7: IP Address: 25.0.0.3, MAC Address: 0002.4AD2.B70D

- Routers:
 - Router0:
 - I/f. FA0/0: IP Address: 10.0.0.4, MAC Address: 00D0.D375.B702
 - I/f. Se0/0/0: IP Address: 30.0.0.1
 - RIP: 10.0.0.0, 30.0.0.0
 - Router1:
 - I/f. FA0/0: IP Address: 20.0.0.4, MAC Address: 0001.63D7.5D85
 - I/f. Se0/0/0: IP Address: 30.0.0.2
 - I/f. Se0/0/1: IP Address: 31.0.0.1
 - RIP: 20.0.0.0, 30.0.0.0, 31.0.0.0
 - Router6:
 - I/f. FA0/0: IP Address: 15.0.0.4, MAC Address: 0005.5E29.E9AA
 - I/f. Se0/0/0: IP Address: 32.0.0.1
 - I/f. Se0/0/1: IP Address: 31.0.0.2
 - RIP: 15.0.0.0, 31.0.0.0, 32.0.0.0
 - Router7:
 - I/f. FA0/0: IP Address: 25.0.0.4, MAC Address: 0009.7C97.DAE8
 - I/f. Se0/0/0: IP Address: 32.0.0.2
 - RIP: 25.0.0.0, 32.0.0.0

b. Mention the configuration made on routers with different interfaces.

- Added HWIC-2T Module
- Set Respective FA0/0 and FA0/1 (We do not assign any values to FA0/1 in this problem)
- Set Respective Se0/0/0 and Se0/0/1
- Set all the RIP Routing.

c. What subnet mask should be used for the given IP address?

Devices		Subnet - Mask
PC	PC0	255.0.0.0
	PC1	
	PC2	
	PC3	
	PC12	
	PC13	
	PC14	
	PC15	

Devices		Subnet - Mask
Laptop	Laptop0	255.0.0.0
	Laptop1	
	Laptop6	
	Laptop7	

4. Verification

a. How can you verify the connectivity between devices using the command?

- Open the Command Prompt on a PC or Laptop.
- Use the ping command to test connectivity. For example:

Unset

```
ping ip-address-of-the-target
```

- Some Examples:
 - Pinging 10.0.0.2 to 15.0.0.2

```
C:\>ping 15.0.0.2

Pinging 15.0.0.2 with 32 bytes of data:

Request timed out.
Reply from 15.0.0.2: bytes=32 time=25ms TTL=125
Reply from 15.0.0.2: bytes=32 time=2ms TTL=125
Reply from 15.0.0.2: bytes=32 time=34ms TTL=125

Ping statistics for 15.0.0.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 34ms, Average = 20ms
```

- Pinging 15.0.0.3 to 20.0.0.3

```
C:\>ping 20.0.0.3

Pinging 20.0.0.3 with 32 bytes of data:

Request timed out.
Reply from 20.0.0.3: bytes=32 time=22ms TTL=126
Reply from 20.0.0.3: bytes=32 time=2ms TTL=126
Reply from 20.0.0.3: bytes=32 time=16ms TTL=126

Ping statistics for 20.0.0.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 22ms, Average = 13ms
```

- Pinging 20.0.0.1 to 10.0.0.1

```
C:\>ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time<1ms TTL=128
Reply from 10.0.0.1: bytes=32 time<1ms TTL=128
Reply from 10.0.0.1: bytes=32 time<1ms TTL=128
Reply from 10.0.0.1: bytes=32 time<1ms TTL=128

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

- Pinging 20.0.0.3 to 25.0.0.3

```
C:\>ping 25.0.0.3

Pinging 25.0.0.3 with 32 bytes of data:

Request timed out.
Reply from 25.0.0.3: bytes=32 time=3ms TTL=124
Reply from 25.0.0.3: bytes=32 time=5ms TTL=124
Reply from 25.0.0.3: bytes=32 time=3ms TTL=124

Ping statistics for 25.0.0.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 5ms, Average = 3ms
```

b. What steps would you take if a device does not respond to a ping request?

- Check cabling and ensure correct IP addressing.
- Verify that the routers are properly configured and that routing between networks is enabled.
- Ensure that all interfaces are up and running.

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5. Status of packet transmission (screenshot of workspace along with status panel)

Cisco Packet Tracer - E:\bus, ring, hybrid.pkt

File Edit Options View Tools Extensions Window Help

Logical Physical x: 1549, y: 928

Design a bus topology with switches and routers: 22BCE0682

Simulation Panel

Event List

Vis.	Time(sec)	Last Device
	0.000	--
	0.001	PC0
	0.002	Switch0
	0.003	Router0
	0.004	Router1
	0.005	Switch1
	0.006	PC3
	0.007	Switch1
	0.008	Router1
	0.009	Router0
	0.010	Switch0
Visible	0.533	--

Reset Simulation ☒ Constant Delay Captured to: 0.533 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, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIP, RIPv2, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Time: 00:08:01.852 PLAY CONTROLS

Scenario 0

New Delete

Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	PC3	IC...		0.000	N	0	(e...	(delete)

(Select a Device to Drag and Drop to the Workspace)

Siddhant Bhagat

22BCE0682

1. Sending Message from PC0 to PC3

Cisco Packet Tracer - E:\bus, ring, hybrid.pkt

File Edit Options View Tools Extensions Window Help

Logical Physical x: 1549, y: 928

Root 09:49:30

Simulation Panel

Event List

Vis.	Time(sec)	Last Device
	0.000	--
	0.001	PC0
	0.002	Switch0
	0.003	Router0
	0.004	Router1
	0.005	Switch1
	0.006	PC3
	0.007	Switch1
	0.008	Router1
	0.009	Router0
	0.010	Switch0
Visible	0.533	--

Reset Simulation ☒ Constant Delay Captured to: 0.533 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, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIP, RIPv2, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Time: 00:08:01.852 PLAY CONTROLS

Scenario 0

New Delete

Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC0	PC3	IC...		0.000	N	0	(e...)	(delete)

(Select a Device to Drag and Drop to the Workspace)

2. Sending Message from PC3 to PC12

Cisco Packet Tracer - E:\bus, ring, hybrid.pkt

File Edit Options View Tools Extensions Window Help

Logical Physical x: 1537, y: 655

Root 10:16:30

Simulation Panel

Event List

Vis.	Time(sec)	Last Device
	0.007	Switch17
	0.007	Switch17
	0.007	Switch17
	0.007	Switch6
	0.008	Switch20
	0.008	Switch20
	0.008	Switch18
	0.008	Switch18
	0.009	Router6
	0.009	Switch19
	0.009	Switch19
	0.009	Router1
	0.010	Switch23
	0.010	Switch23
	0.010	Switch1
Visible	0.011	Switch24
Visible	0.011	Switch24

Reset Simulation Constant Delay Captured to: 0.011 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, NDP, NETFLOW, NTP, OSPF, OSPFv6, PaGP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Event List Realtime Simulation

Time: 00:08:06.220 PLAY CONTROLS

Scenario 0

New Delete Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC3	PC12	IC...		0.000	N	0	(e...)	(delete)

(Select a Device to Drag and Drop to the Workspace)

3. Sending Message from PC12 to PC14

Cisco Packet Tracer - E:\bus, ring, hybrid.pkt

File Edit Options View Tools Extensions Window Help

Logical Physical x: 1313, y: 599

Root 10:33:30

Simulation Panel

Event List

Vis.	Time(sec)	Last Device
	0.001	PC12
	0.002	Switch6
	0.003	Router6
	0.004	Router7
	0.005	Switch7
	0.006	PC14
	0.007	Switch7
	0.008	Router7
	0.009	Router6
	0.010	Switch6
	0.575	--
	0.576	Switch2
	0.576	Switch2
	0.576	Switch2
Visible	0.668	--
Visible	0.668	--
Visible	0.668	--

Reset Simulation ☒ Constant Delay Captured to: 0.668 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, NDP, NETFLOW, NTP, OSPF, OSPFv6, PaGP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

Event List Realtime Simulation

Time: 00:08:11.947 PLAY CONTROLS

Scenario 0

New Delete Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC12	PC14	IC...		0.000	N	0	(e...)	(delete)

(Select a Device to Drag and Drop to the Workspace)

Siddhant Bhagat

22BCE0682

4. Sending Message from PC15 to PC00

Cisco Packet Tracer - E:\bus, ring, hybrid.pkt

File Edit Options View Tools Extensions Window Help

Logical Physical x: 1365, y: 551

Root 10:48:00

Simulation Panel

Event List

Vis.	Time(sec)	Last Device
	0.222	--
	0.223	Switch2
	0.223	Switch2
	0.223	Switch2
	0.223	Switch2
	0.365	--
	0.366	Switch4
	0.366	Switch4
	0.366	Switch4
	0.366	Switch4
	0.425	--
Visible	0.426	Switch0
Visible	0.426	Switch0
Visible	0.426	Switch0
Visible	0.426	Switch0

Reset Simulation ☒ Constant Delay Captured to: 0.426 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, NDP, NETFLOW, NTP, OSPF, OSPFv6, PaGP, POP3, PPP, PPPoE, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP

Edit Filters Show All/None

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		PC15	PC0	IC...		0.671	N	0	(e...)	(delete)
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(Select a Device to Drag and Drop to the Workspace)