

CN LAB EXAM

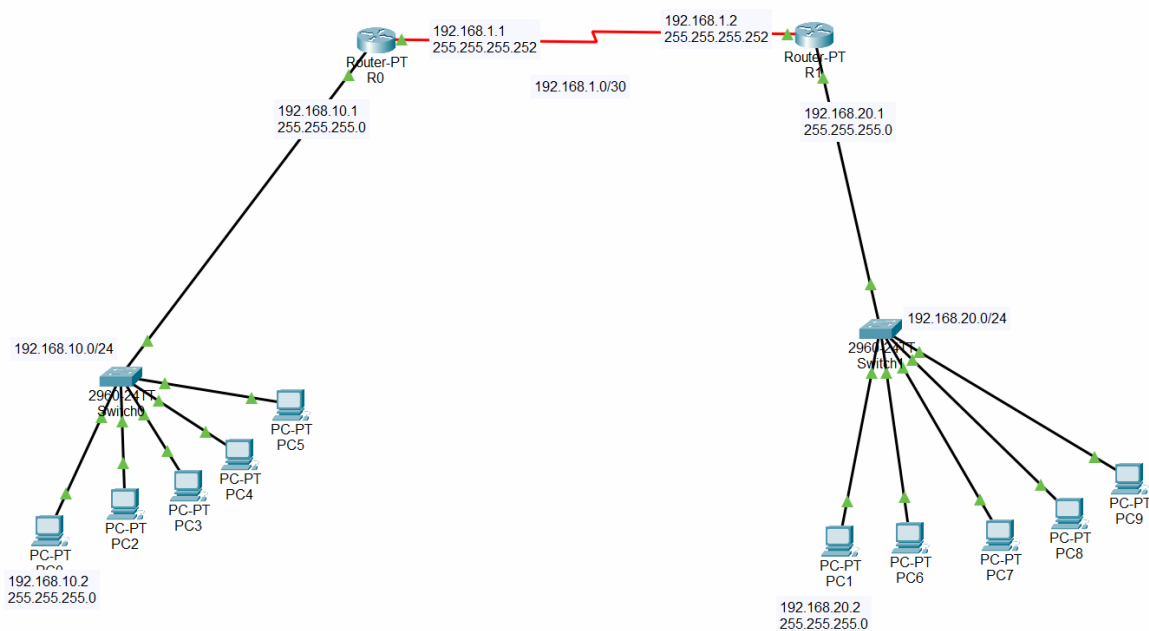
Objective

- To configure static and default routing on routers to enable communication between different network segments.
- Using cisco packet tracer, to create a network with multiple routers and PCs, and configure routing to ensure proper data transfer.

Steps taken to set up the network

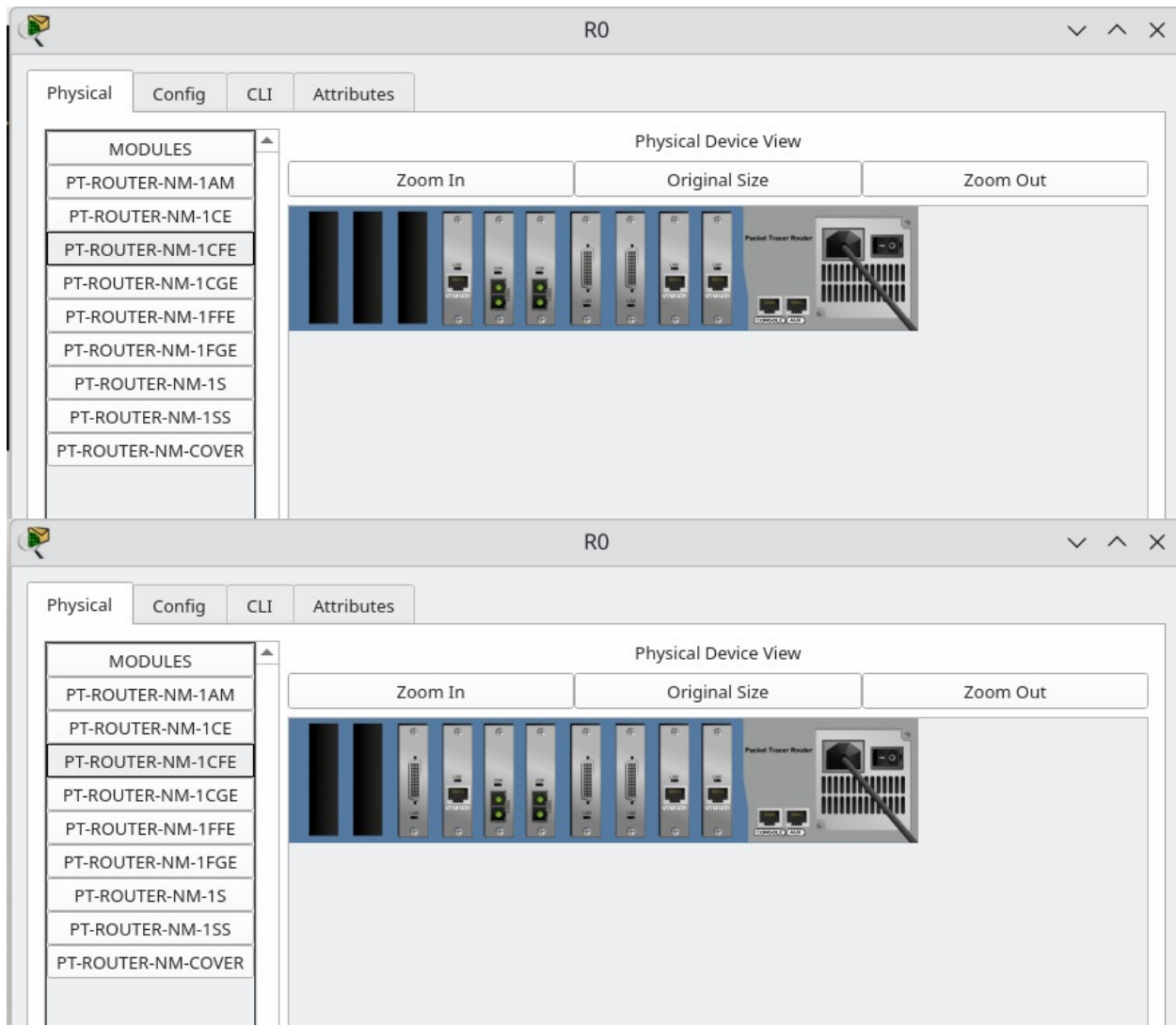
Step 1:

Select and drag required network devices (2 Router-PTs, 2 2960-24TT Switches) and end devices (10 PC-PTs).



Step 2:

Open Routers and add PT-ROUTER-NM-1CFE and PT-ROUTER-NM-1S Modules.



Step 3:

Connect the cables (Straight through cables for different devices) and Serial DCE (between routers).

Step 4:

Open the routers CLI and type in the following commands (R0)

```
Router>enable
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int fa 0/0
Router(config-if)#ip address 192.168.20.1 255.255.255.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

Router(config-if)#exit
Router(config)#int se2/0
Router(config-if)#ip address 192.168.1.2 255.255.255.252
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface Serial2/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0, changed state to up

Router(config-if)#exit
Router(config)#
```

Similarly do it for R1.

Step 5:

Configure IP addresses for PC1 and PC2

PC0

Physical Config Desktop Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.10.2

Subnet Mask 255.255.255.0

Default Gateway 192.168.10.1

DNS Server 0.0.0.0

IPv6 Configuration

PC1

Physical Config Desktop Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

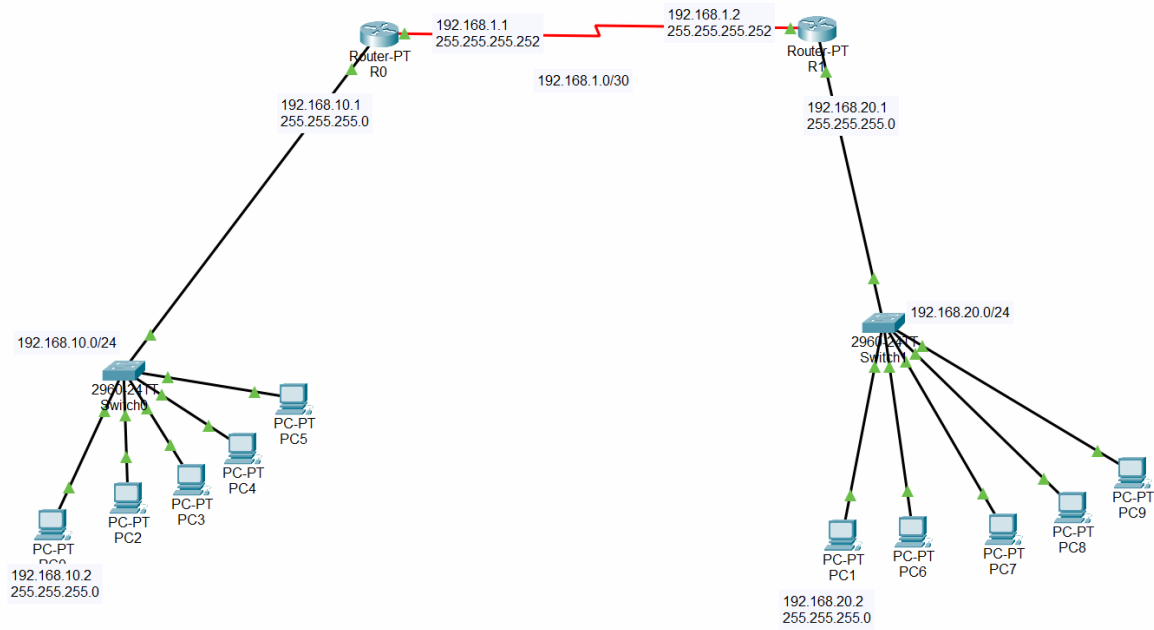
IPv4 Address 192.168.20.2

Subnet Mask 255.255.255.0

Default Gateway 192.168.20.1

DNS Server 0.0.0.0

IPv6 Configuration



Step 6:

Configure Static Routing and Default Routing for Routers.

```

Router(config-if)#do show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
        i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
        * - candidate default, U - per-user static route, o - ODR
        P - periodic downloaded static route

Gateway of last resort is not set

    192.168.1.0/30 is subnetted, 1 subnets
C       192.168.1.0 is directly connected, Serial2/0
C       192.168.10.0/24 is directly connected, FastEthernet0/0

Router(config-if)#ip route 192.168.20.0 255.255.255.0 192.168.1.2
Router(config)#do show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
        i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
        * - candidate default, U - per-user static route, o - ODR
        P - periodic downloaded static route

Gateway of last resort is not set

    192.168.1.0/30 is subnetted, 1 subnets
C       192.168.1.0 is directly connected, Serial2/0
C       192.168.10.0/24 is directly connected, FastEthernet0/0
S       192.168.20.0/24 [1/0] via 192.168.1.2

Router(config)#ip route 0.0.0.0 0.0.0.0 192.168.1.1
%Invalid next hop address (it's this router)
Router(config)#ip route 0.0.0.0 0.0.0.0 192.168.1.2
Router(config)#do show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
        i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
        * - candidate default, U - per-user static route, o - ODR
        P - periodic downloaded static route

Gateway of last resort is 192.168.1.2 to network 0.0.0.0

    192.168.1.0/30 is subnetted, 1 subnets
C       192.168.1.0 is directly connected, Serial2/0
C       192.168.10.0/24 is directly connected, FastEthernet0/0
S       192.168.20.0/24 [1/0] via 192.168.1.2
S*    0.0.0.0/0 [1/0] via 192.168.1.2

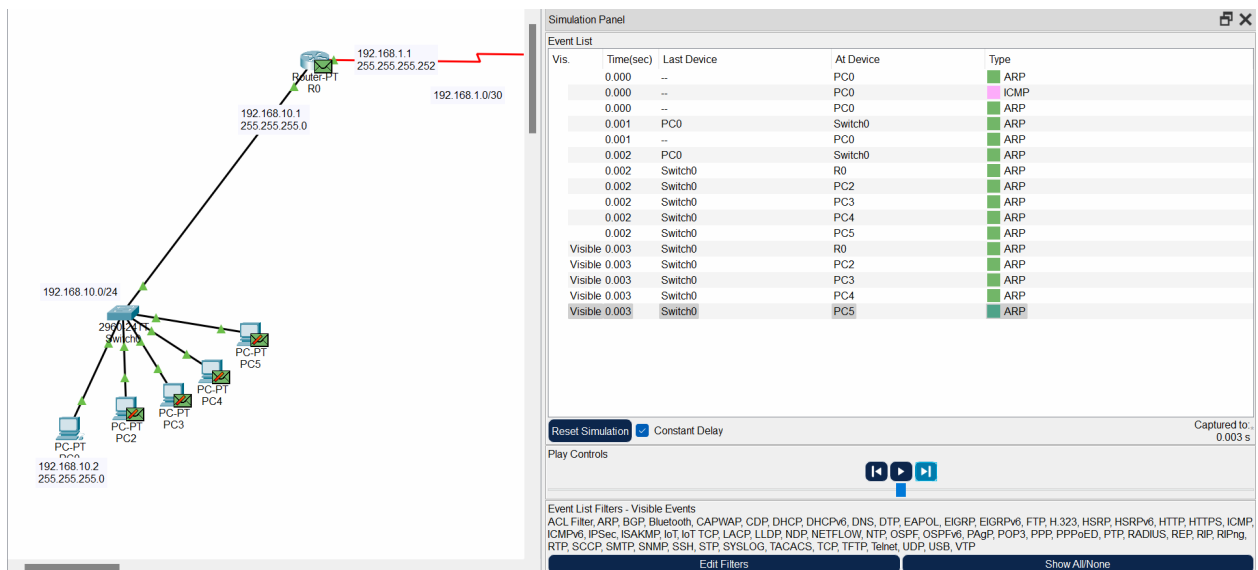
```

This is for R0, Implement the similar for R1 (default and static pointing to R0).

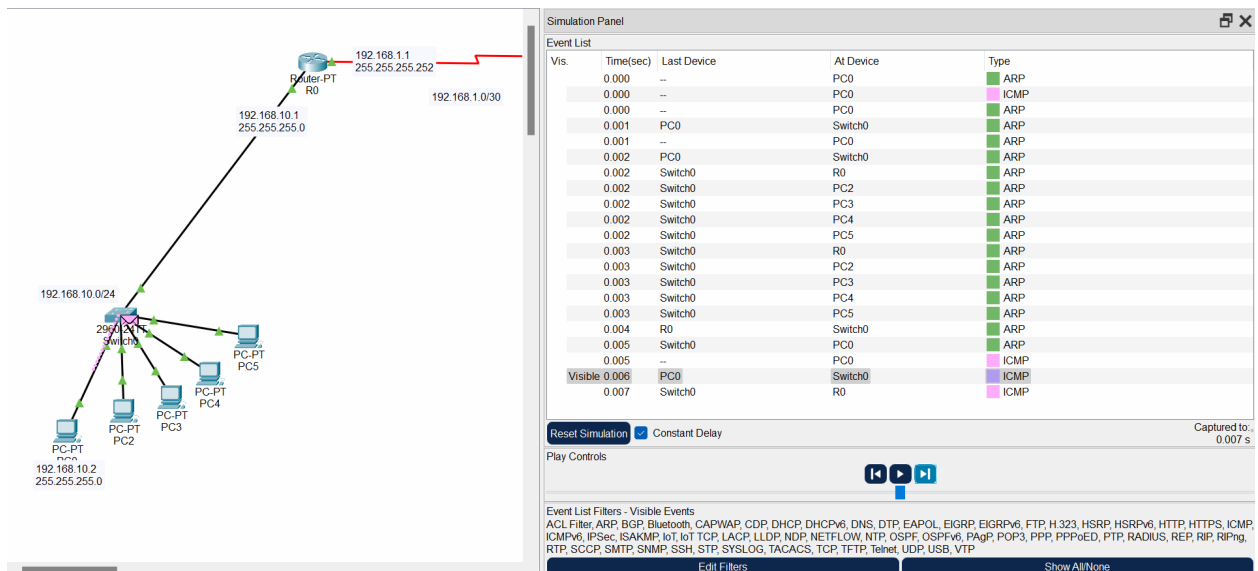
Simulation:

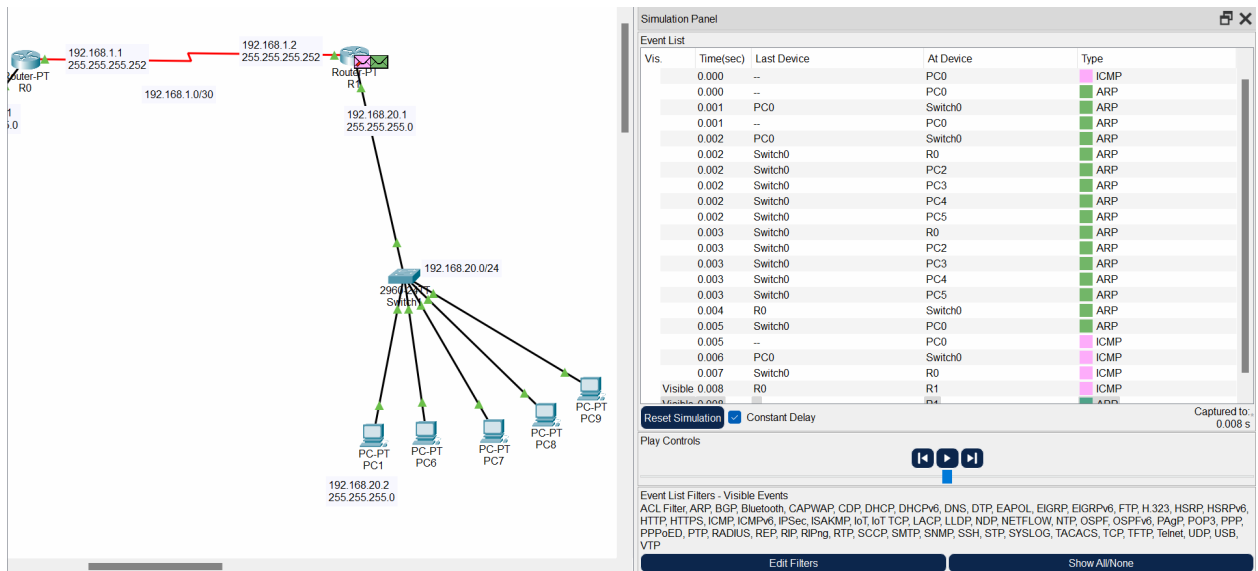
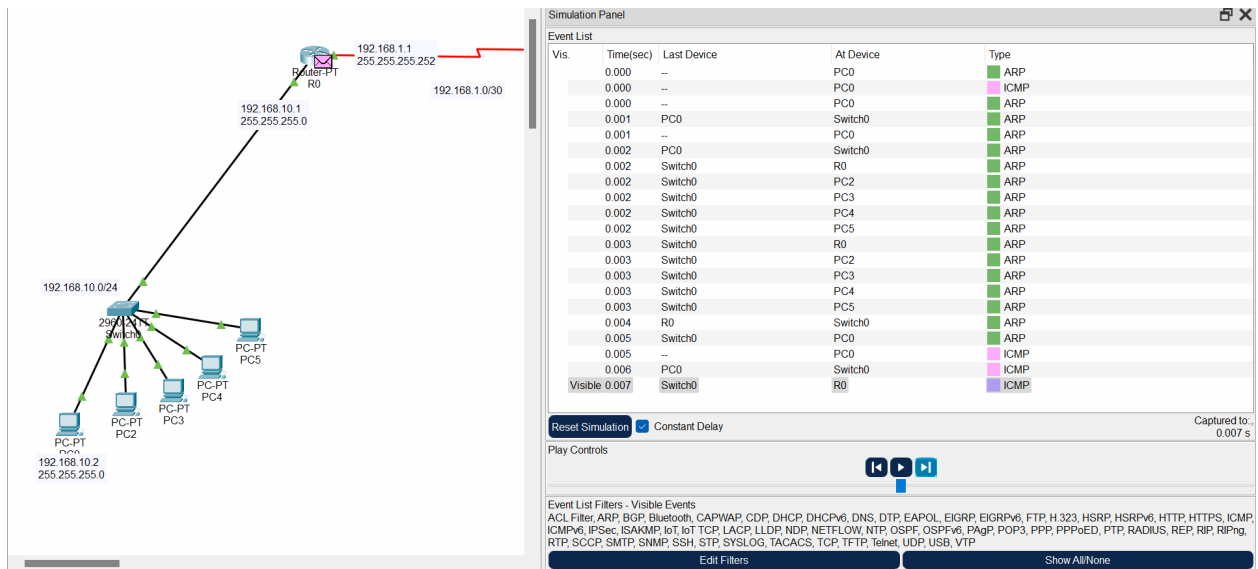
Pinging PC1 from PC0

ARP Requests:

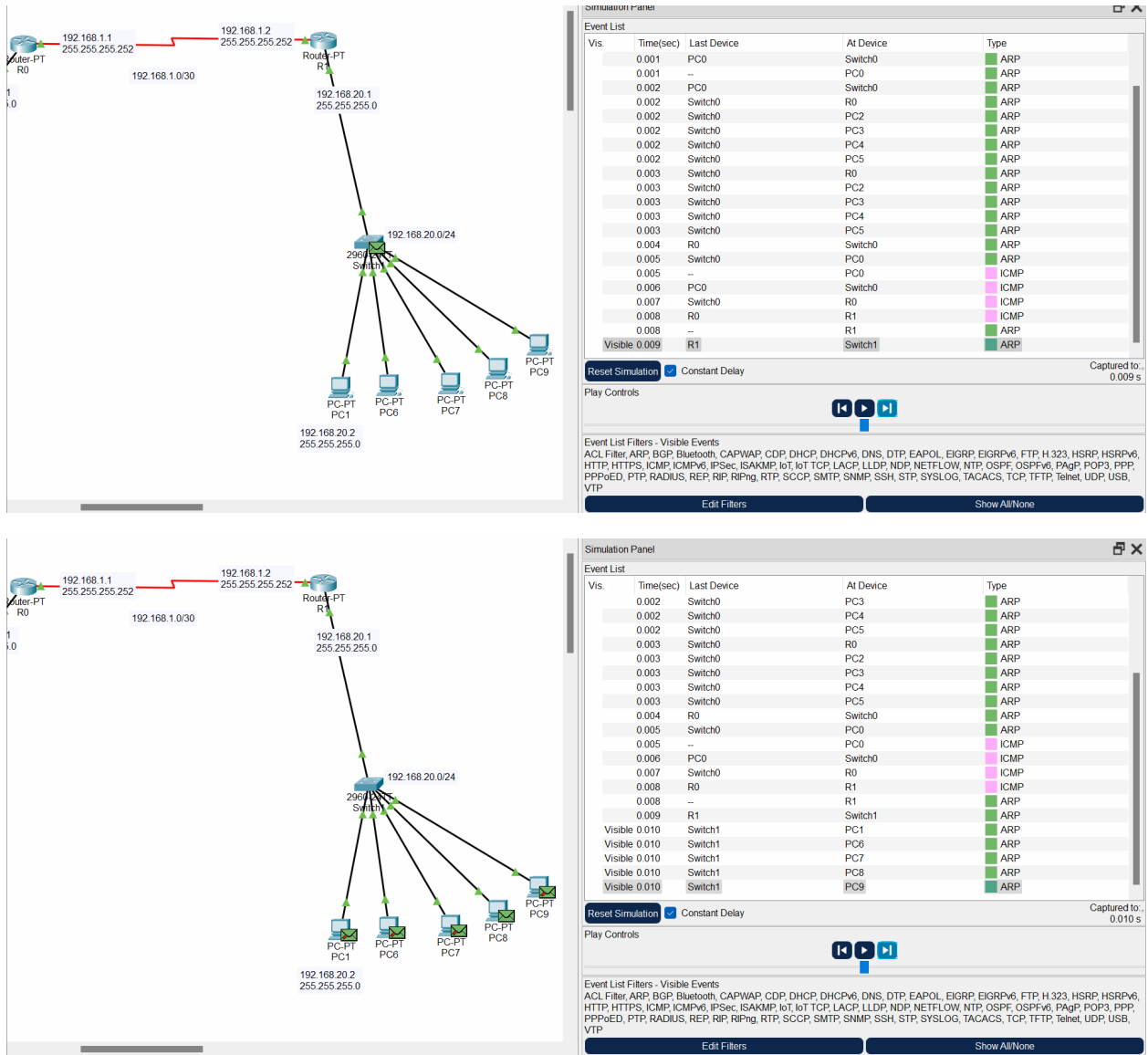


ICMP ECHO REQUEST:

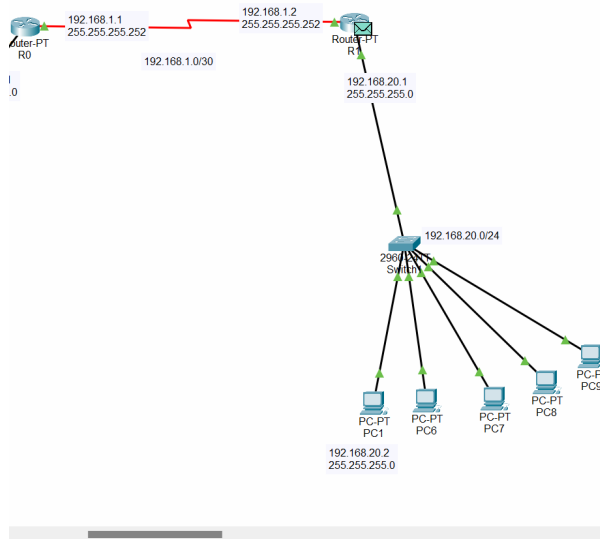




ARP Requests:



ICMP Request:



Simulation Panel				
Event List				
Vis	Time(sec)	Last Device	At Device	Type
	4.989	Switch1	PC7	STP
	4.989	Switch1	PC9	STP
	4.993	--	Switch0	STP
	4.994	Switch0	R0	STP
	4.994	Switch0	PC0	STP
	4.994	Switch0	PC2	STP
	4.994	Switch0	PC3	STP
	4.994	Switch0	PC4	STP
	4.994	Switch0	PC5	STP
	5.915	--	Switch0	DTP
	5.916	Switch0	PC0	DTP
	5.917	--	Switch1	DTP
	5.918	Switch1	R1	DTP
	5.922	--	Switch1	DTP
	5.923	Switch1	PC1	DTP
	5.925	--	Switch0	DTP
	5.926	Switch0	R0	DTP
	6.004	--	PC0	ICMP
	6.005	PC0	Switch0	ICMP
	6.006	Switch0	R0	ICMP
Visible	6.007	R0	R1	ICMP
Reset Simulation <input checked="" type="checkbox"/> Constant Delay				
Captured to: 6.007 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		

192.168.1.1
255.255.255.252

192.168.1.2
255.255.255.252

192.168.1.0/30

192.168.20.1
255.255.255.0

192.168.20.0/24

192.168.20.2
255.255.255.0

192.168.20.5
255.255.255.0

Simulation Panel

Event List

Vis	Time(sec)	Last Device	At Device	Type
	4.989	Switch1	PC9	STP
	4.993	--	Switch0	STP
	4.994	Switch0	R0	STP
	4.994	Switch0	PC0	STP
	4.994	Switch0	PC2	STP
	4.994	Switch0	PC3	STP
	4.994	Switch0	PC4	STP
	4.994	Switch0	PC5	STP
	5.915	--	Switch0	DTP
	5.916	Switch0	PC0	DTP
	5.917	--	Switch1	DTP
	5.918	Switch1	R1	DTP
	5.922	--	Switch1	DTP
	5.923	Switch1	PC1	DTP
	5.925	--	Switch0	DTP
	5.926	Switch0	R0	DTP
	6.004	--	PC0	ICMP
	6.005	PC0	Switch0	ICMP
	6.006	Switch0	R0	ICMP
	6.007	R0	R1	ICMP
Visible	6.008	R1	Switch1	ICMP

Reset Simulation ☒ Constant Delay

Captured to: 6.008 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, 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

192.168.1.1
255.255.255.252

192.168.1.2
255.255.255.252

192.168.1.0/30

192.168.20.1
255.255.255.0

192.168.20.0/24

192.168.20.2
255.255.255.0

192.168.20.5
255.255.255.0

Simulation Panel

Event List

Vis	Time(sec)	Last Device	At Device	Type
	4.993	Switch0	Switch0	STP
	4.994	Switch0	R0	STP
	4.994	Switch0	PC0	STP
	4.994	Switch0	PC2	STP
	4.994	Switch0	PC3	STP
	4.994	Switch0	PC4	STP
	4.994	Switch0	PC5	STP
	5.915	--	Switch0	DTP
	5.916	Switch0	PC0	DTP
	5.917	--	Switch1	DTP
	5.918	Switch1	R1	DTP
	5.922	--	Switch1	DTP
	5.923	Switch1	PC1	DTP
	5.925	--	Switch0	DTP
	5.926	Switch0	R0	DTP
	6.004	--	PC0	ICMP
	6.005	PC0	Switch0	ICMP
	6.006	Switch0	R0	ICMP
	6.007	R0	R1	ICMP
	6.008	R1	Switch1	ICMP
Visible	6.009	Switch1	PC8	ICMP

Reset Simulation ☒ Constant Delay

Captured to: 6.009 s

Play Controls

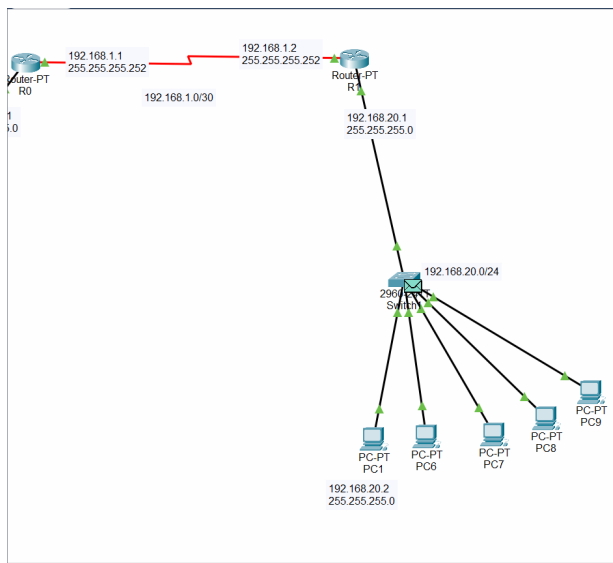
If last event, capture then forward (Alt + C).

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

ICMP ECHO REPLY:



Simulation Panel

Event List

Vis	Time(sec)	Last Device	At Device	Type
	4.994	Switch0	R0	STP
	4.994	Switch0	PC0	STP
	4.994	Switch0	PC2	STP
	4.994	Switch0	PC3	STP
	4.994	Switch0	PC4	STP
	4.994	Switch0	PC5	STP
	5.915	--	Switch0	DTP
	5.916	Switch0	PC0	DTP
	5.917	--	Switch1	DTP
	5.918	Switch1	R1	DTP
	5.922	--	Switch1	DTP
	5.923	Switch1	PC1	DTP
	5.925	--	Switch0	DTP
	5.926	Switch0	R0	DTP
	6.004	--	PC0	ICMP
	6.005	PC0	Switch0	ICMP
	6.006	Switch0	R0	ICMP
	6.007	R0	R1	ICMP
	6.008	R1	Switch1	ICMP
	6.009	Switch1	PC8	ICMP
Visible	6.010	PC8	Switch1	ICMP

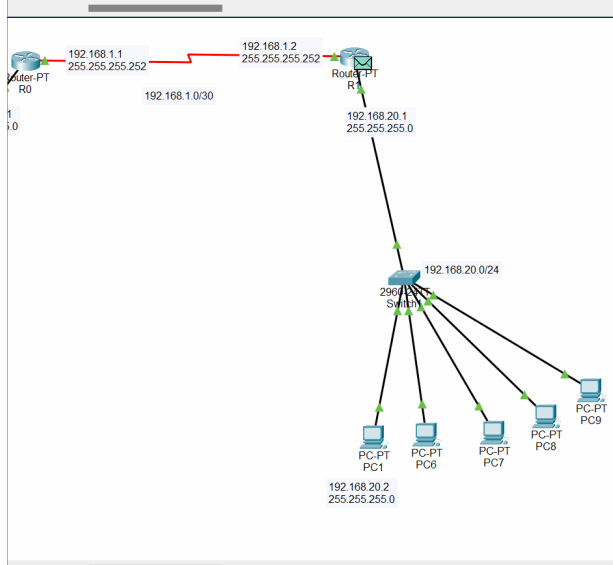
Reset Simulation ☒ Constant Delay

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



Simulation Panel

Event List

Vis	Time(sec)	Last Device	At Device	Type
	4.994	Switch0	PC0	STP
	4.994	Switch0	PC2	STP
	4.994	Switch0	PC3	STP
	4.994	Switch0	PC4	STP
	4.994	Switch0	PC5	STP
	5.915	--	Switch0	DTP
	5.916	Switch0	PC0	DTP
	5.917	--	Switch1	DTP
	5.918	Switch1	R1	DTP
	5.922	--	Switch1	DTP
	5.923	Switch1	PC1	DTP
	5.925	--	Switch0	DTP
	5.926	Switch0	R0	DTP
	6.004	--	PC0	ICMP
	6.005	PC0	Switch0	ICMP
	6.006	Switch0	R0	ICMP
	6.007	R0	R1	ICMP
	6.008	R1	Switch1	ICMP
	6.009	Switch1	PC8	ICMP
Visible	6.011	Switch1	R1	ICMP

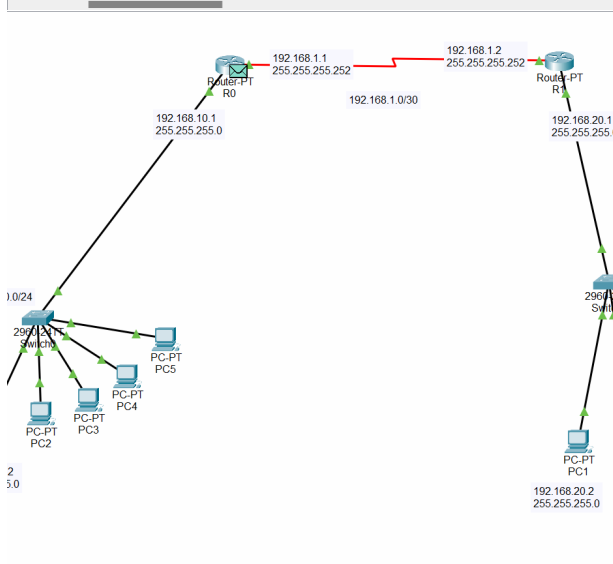
Reset Simulation ☒ Constant Delay

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



Simulation Panel

Event List

Vis	Time(sec)	Last Device	At Device	Type
	4.994	Switch0	PC2	STP
	4.994	Switch0	PC3	STP
	4.994	Switch0	PC4	STP
	4.994	Switch0	PC5	STP
	5.915	--	Switch0	DTP
	5.916	Switch0	PC0	DTP
	5.917	--	Switch1	DTP
	5.918	Switch1	R1	DTP
	5.922	--	Switch1	DTP
	5.923	Switch1	PC1	DTP
	5.925	--	Switch0	DTP
	5.926	Switch0	R0	DTP
	6.004	--	PC0	ICMP
	6.005	PC0	Switch0	ICMP
	6.006	Switch0	R0	ICMP
	6.007	R0	R1	ICMP
	6.008	R1	Switch1	ICMP
	6.009	Switch1	PC8	ICMP
	6.010	PC8	Switch1	ICMP
Visible	6.012	R1	R0	ICMP

Reset Simulation ☒ Constant Delay

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

Network diagram showing a topology with a central 2950 Switch connected to a Router-PT R0 and several PC-PT devices (PC2, PC3, PC4, PC5). IP addresses are assigned to various interfaces.

Router-PT R0: 192.168.1.1 (255.255.255.252), 192.168.1.2 (255.255.255.252), 192.168.1.0/30

2950 Switch: 192.168.10.0/24

PC-PT PC2: 192.168.10.2 (255.255.255.0)

PC-PT PC3: 192.168.10.1 (255.255.255.0)

PC-PT PC4: 192.168.10.3 (255.255.255.0)

PC-PT PC5: 192.168.10.4 (255.255.255.0)

Simulation Panel

Event List

Vis	Time(sec)	Last Device	At Device	Type
	4.994	Switch0	PC3	STP
	4.994	Switch0	PC4	STP
	4.994	Switch0	PC5	STP
	5.915	--	Switch0	DTP
	5.916	Switch0	PC0	DTP
	5.917	--	Switch1	DTP
	5.918	Switch1	R1	DTP
	5.922	--	Switch1	DTP
	5.923	Switch1	PC1	DTP
	5.925	--	Switch0	DTP
	5.926	Switch0	R0	DTP
	6.004	--	PC0	ICMP
	6.005	PC0	Switch0	ICMP
	6.006	Switch0	R0	ICMP
	6.007	R0	R1	ICMP
	6.008	R1	Switch1	ICMP
	6.009	Switch1	PC8	ICMP
	6.010	PC8	Switch1	ICMP
	6.011	Switch1	R1	ICMP
	6.012	R1	R0	ICMP
Visible	6.013	R0	Switch0	ICMP

Reset Simulation ☒ Constant Delay Captured to: 6.013 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

Network diagram showing a topology with a central 2950 Switch connected to a Router-PT R0 and several PC-PT devices (PC2, PC3, PC4, PC5). IP addresses are assigned to various interfaces.

Router-PT R0: 192.168.1.1 (255.255.255.252), 192.168.1.2 (255.255.255.252), 192.168.1.0/30

2950 Switch: 192.168.10.0/24

PC-PT PC2: 192.168.10.2 (255.255.255.0)

PC-PT PC3: 192.168.10.1 (255.255.255.0)

PC-PT PC4: 192.168.10.3 (255.255.255.0)

PC-PT PC5: 192.168.10.4 (255.255.255.0)

Simulation Panel

Event List

Vis	Time(sec)	Last Device	At Device	Type
	4.994	Switch0	PC4	STP
	4.994	Switch0	PC5	STP
	5.915	--	Switch0	DTP
	5.916	Switch0	PC0	DTP
	5.917	--	Switch1	DTP
	5.918	Switch1	R1	DTP
	5.922	--	Switch1	DTP
	5.923	Switch1	PC1	DTP
	5.925	--	Switch0	DTP
	5.926	Switch0	R0	DTP
	6.004	--	PC0	ICMP
	6.005	PC0	Switch0	ICMP
	6.006	Switch0	R0	ICMP
	6.007	R0	R1	ICMP
	6.008	R1	Switch1	ICMP
	6.009	Switch1	PC8	ICMP
	6.010	PC8	Switch1	ICMP
	6.011	Switch1	R1	ICMP
	6.012	R1	R0	ICMP
	6.013	R0	Switch0	ICMP
Visible	6.014	Switch0	PC0	ICMP

Reset Simulation ☒ Constant Delay Captured to: 6.014 s

Play Controls

If last event, capture then forward (Alt + C)

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