Name: Shubham Chemate

Subject: Computer Networks and Security Lab

Roll Number: 31118 (K-1 Batch)

Assignment No: 02 – Wired wireless LAN setup

(1)

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Computer Networks & Security Lab
Assignment No: 02

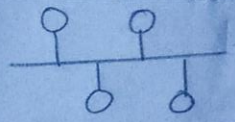
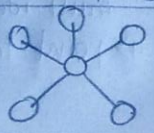
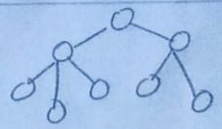
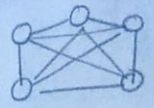
Roll. No. 31118
Name: Shubham Chemate
Date: 31-Aug-21

Title: Wired-Wireless LAN setup

Problem statement:
Setup a WAN which contains wired as well as wireless LAN by using a packet tracer tool. Demonstrate transfer of a packet from LAN-1 (wired LAN) to LAN-2 (wireless LAN).

Requirements: Cisco Packet Tracer, Wireshark Packet Analyzer Tool

Description:
Comparison of network topology.

	Bus topology	star topology	Ring topology	Tree topology	Mesh topology
Structure					
Architecture	All nodes are connected to a single cable.	All nodes are connected to central connect point	Devices create circular path.	Connected like a branches in tree	All nodes are connected to each other
No. of wires (n = no. of devices)	= (n+1)	= n	= (n+1)	= (n+1)	= $\frac{n(n+1)}{2}$
no. of ports per device	= 1 port/device	= 1 per device	= 2 per device	= between 1 & (n+1)	= (n-1) per device
Delay	slow response time.	Good response time.	moderate	slow response time	very good response time.
complexity	Less	Average	Average	averge to high.	High
security	Less	Depends on central device.	Average	Average	Very High
Reliability	Less	Less	~~Less~~ Average	Average	Highest
Cost	Less	~~Normal~~/Moderate	Moderate	High.	Very High
Advantages	1) ideal for small network. 2) Simplest 3) Less cables & inexpensive.	1) Centralization 2) Easy to add another node. 3) doesn't affect by failure of one ~~computer~~	1) Unidirectional data flow. (less collisions) 2) No need of network server to control network	1) High scalability 2) doesn't affect by damage of one node. (leaf) 3) easy maintainance &	1) data has multiple path. 2) keeps data transfer rate at optimal level.

	Bus topology	Star topology	Ring topology	Tree topology	Mesh topology
			connectivity. 3) high speed. data transfer. 4) Additional workstation can be added w/o affecting performance.	fault identification 4) point-to-point.	
Disadvantages	1) difficult to identify ~~ex~~fault (hard troubleshooting) 2) Not good for large networks 3) Terminators required at end of backbone 4) Additional devices slow down network 5) Network functionality depends on main cable.	1) May have higher implementation cost. 2) central device determines functionality. 3) failure of central device cause network failure.	1) Slower. 2) On failure of single device entire network may get impacted. 3) expensive hardware	1) large cabling is required. 2) On failure of root device entire network got affected. 3) Difficult to build Architecture.	1) Large amount of cabling. 2) Complex. 3) High cost, installation difficulty.

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Ad-hoc vs infrastructure:

Wireless network can be work one of two nodes
i) infrastructure
ii) Ad-hoc

Parameter	Infrastructure mode	Ad-hoc Mode.
definition/ concept	communication occurs b/w wireless node & access point, not directly b/w wireless nodes.	each node communicate directly with other node.
physical infrastructure	Needed	Not needed
Complexity	Simple designing (centralization)	Complex designing (decentralized)
Range	Depends on number of access points	Restricted to range of individual device.
Speed	Usually faster	Usually slower.
Applications.	i) IEEE 802.11 ii) HIPERLAN 2.	~~Blooto~~ Bluetooth.
Channel Access.	TDMA-based protocols	contention MAC protocols.

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Steps (performed in Cisco Packet Tracer Tool)

Wireless LAN setup:

1) Choose wireless device to establish network.
2) Choose end-devices (wireless).
3) Assign IP address to end-devices & ping each other to check connection.

Wired-LAN setup:

1) Choose network device → switch (generic)
2) Choose end-devices (wired)
3) connect switch to end using automatic cable.
4) ~~Attr ping~~ Assign IP-addresses to end-devices & ping each other to check connection.

1) Connect switch to access-point using automatic wire.
2) In simulation mode, apply ICMP filter & add simple PDU to end devices (wired to wireless)
3) Click auto-capture & play and observe how packet get transferred ~~for~~ in wired-wireless LAN setup

Demonstration of captured packets in Wireshark Packet Analyzer Tool:

1) Note down IP address of your smartphone device
2) ~~In~~ Make sure your smartphone & PC are connected to same network.
3) Ping your smartphone from your PC & observe captured packets in wireshark packet Analyzer Tool

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Troubleshooting:

Common mistakes that I have observed while performing this assignment:

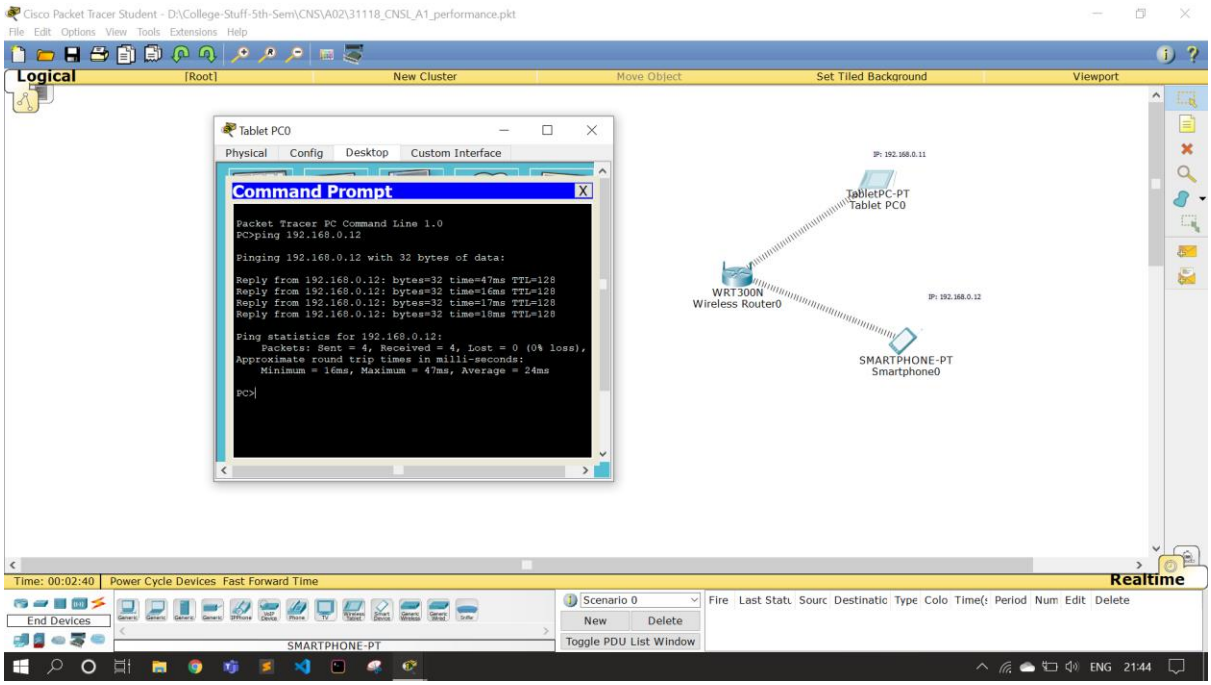
1) Always check IP-addresses & assign them properly.
2) Ping proper device.
3) In simulation mode, before starting simulation apply filter - ICMP.
4) Assign simple PDU before starting simulation.

Conclusion:

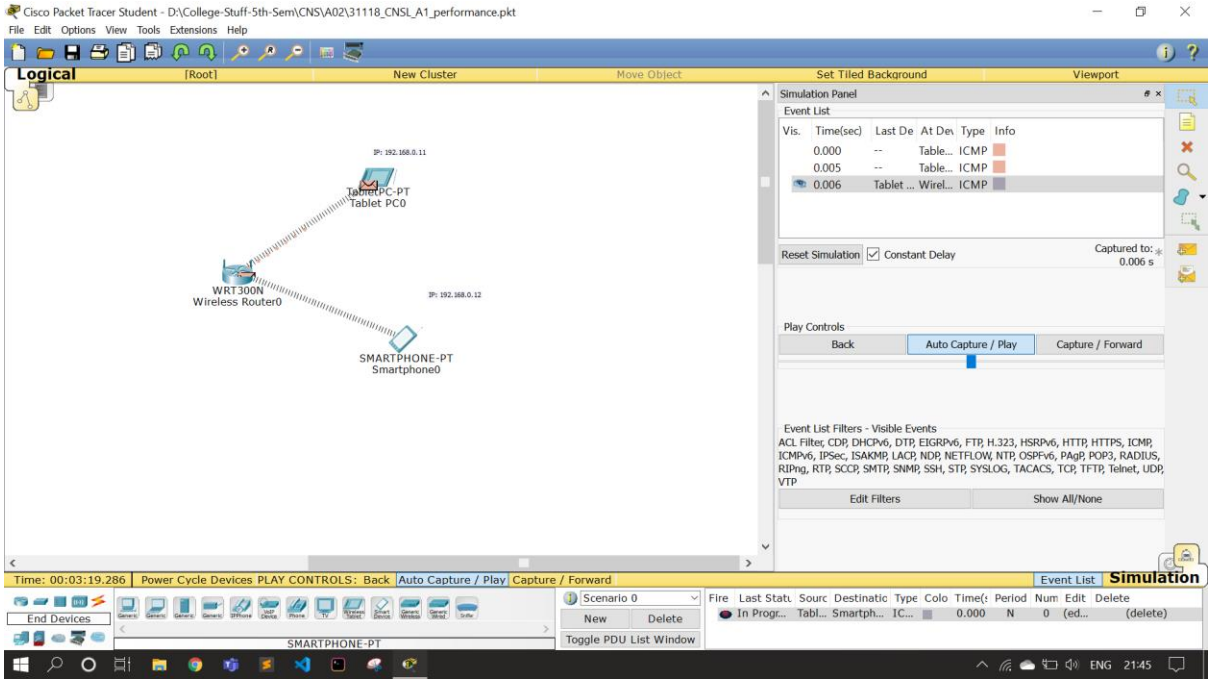
We have successfully implemented wired-wireless LAN setup & also captured packets ~~as~~ under guidance of our lab teacher.

Screenshots of performance:

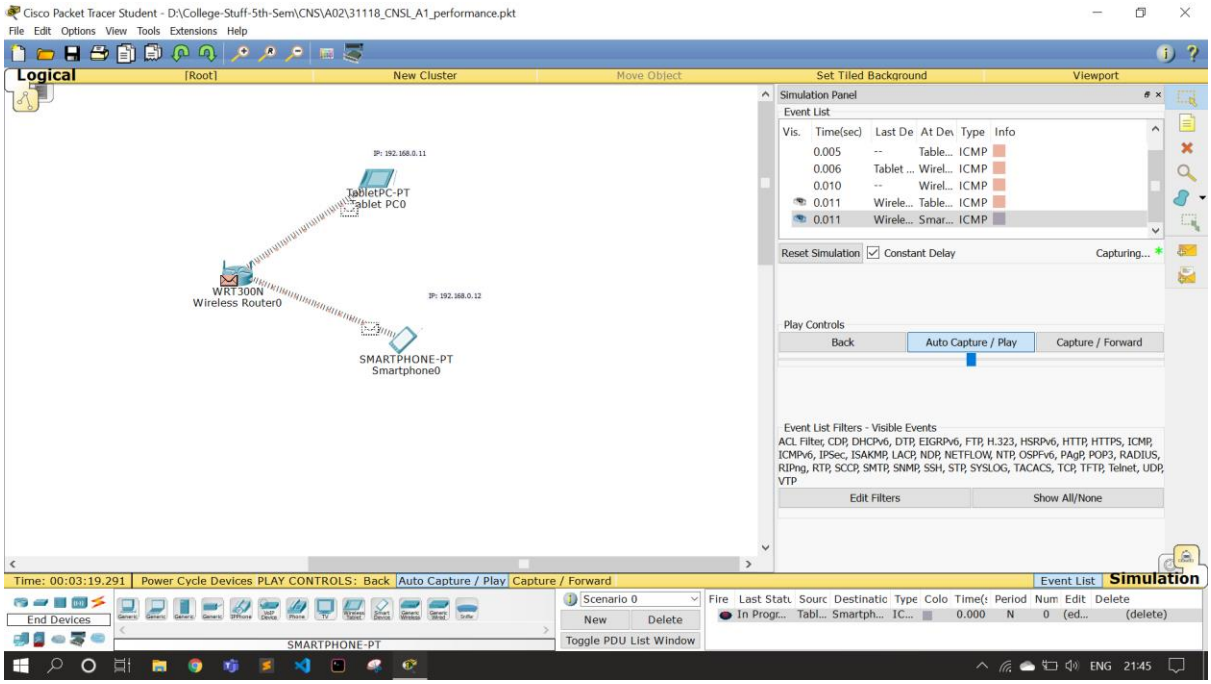
Wireless Lan Setup:



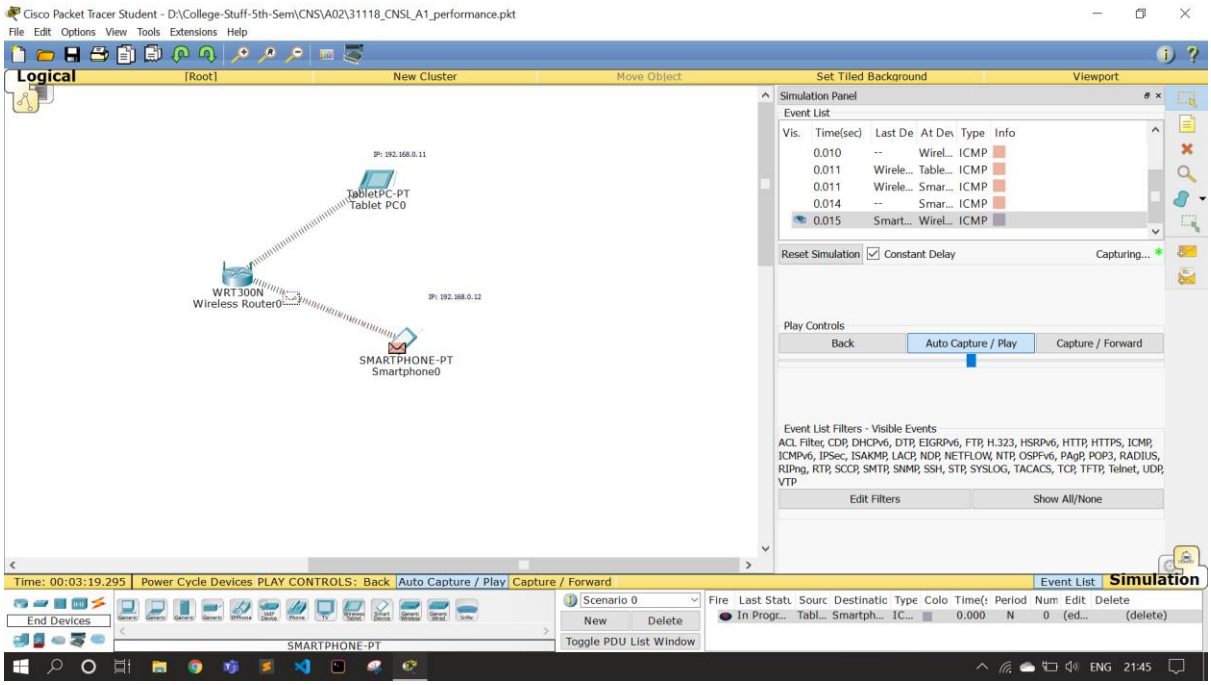
Screenshot-1: Pinging in wireless LAN



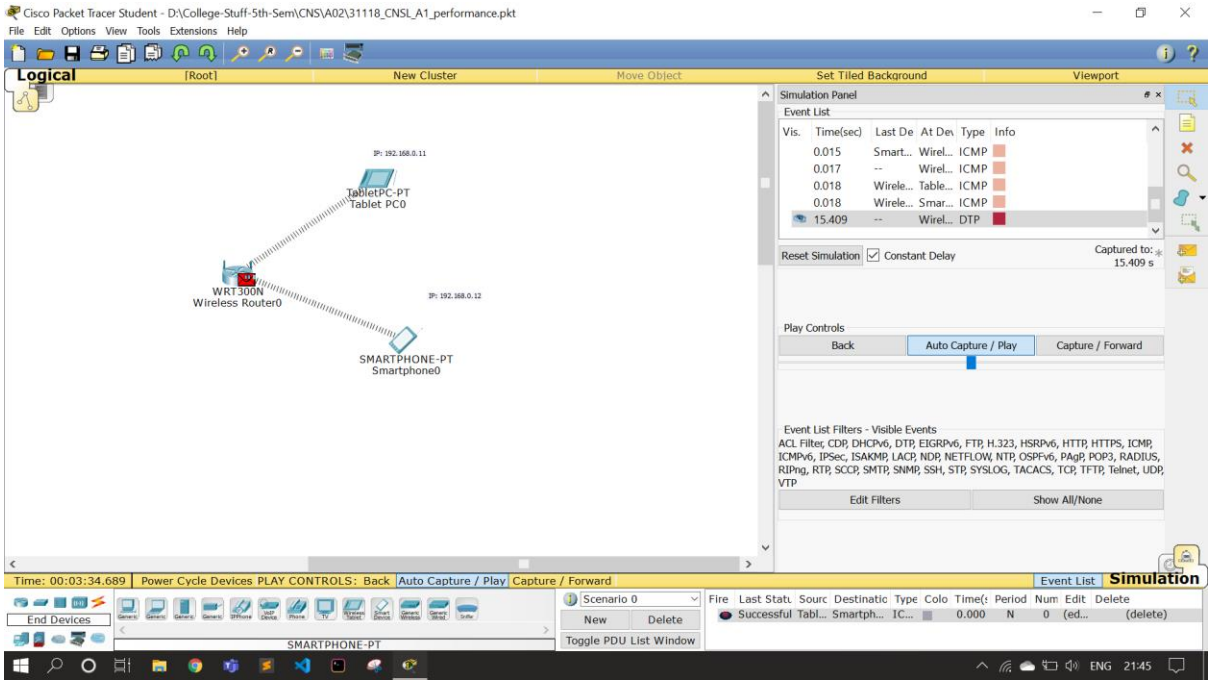
Screenshot-2: Packet transfer in wireless LAN



Screenshot-3: Packet transfer in WLAN

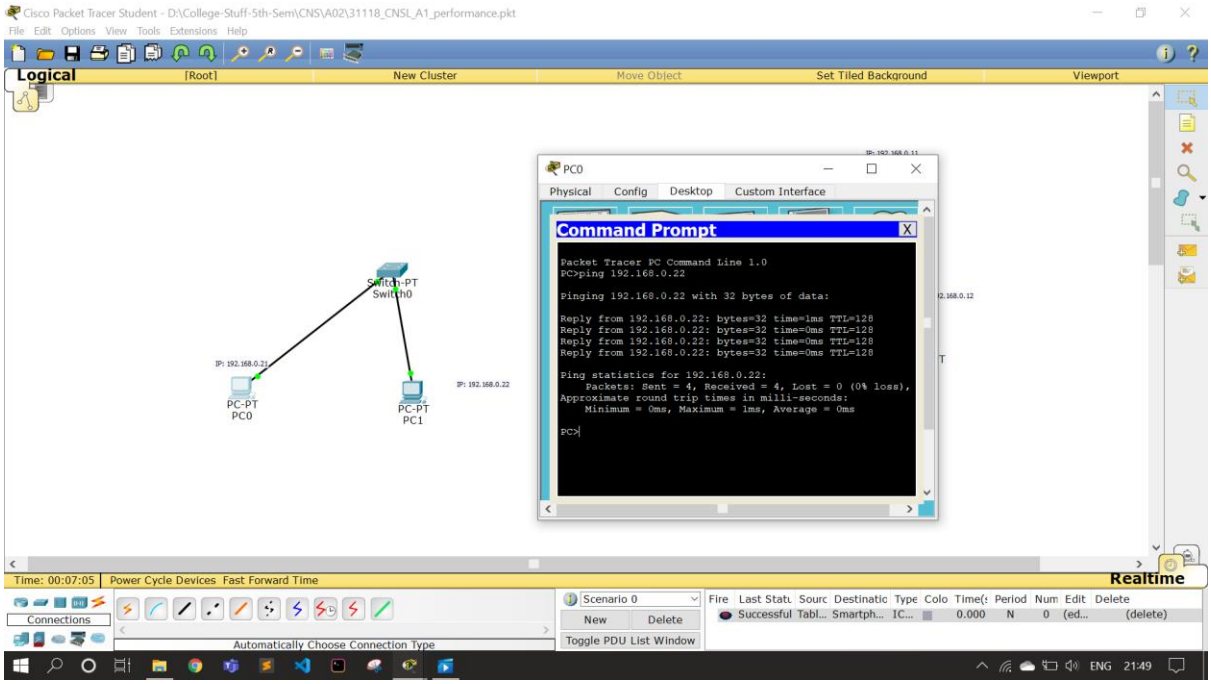


Screenshot-4: Packet transfer in wireless LAN



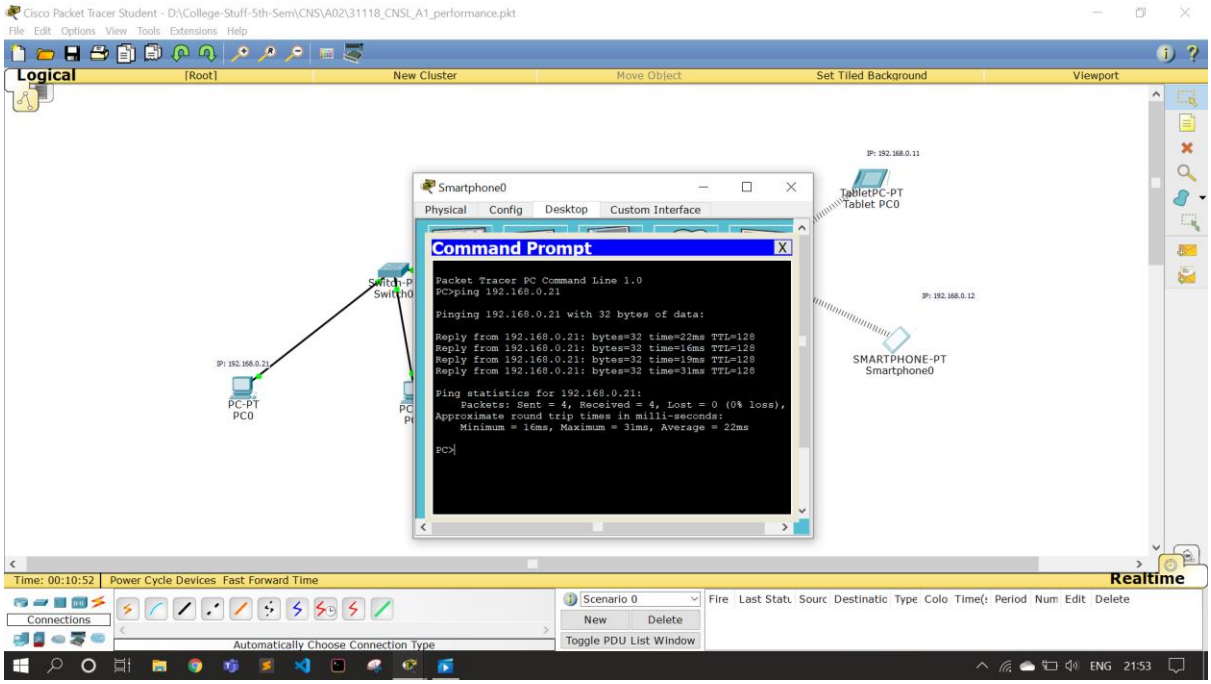
Screenshot-5: Packet transfer in wireless LAN

Wired LAN Setup:



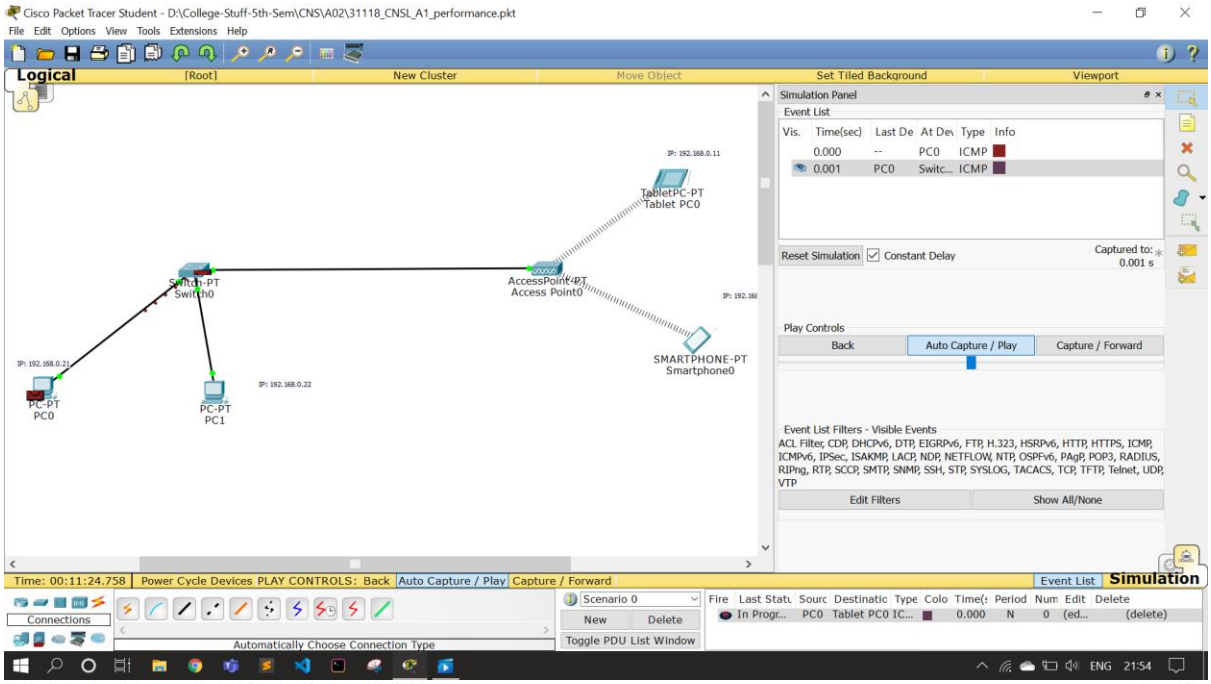
Screenshot-6: Pinging in wired LAN

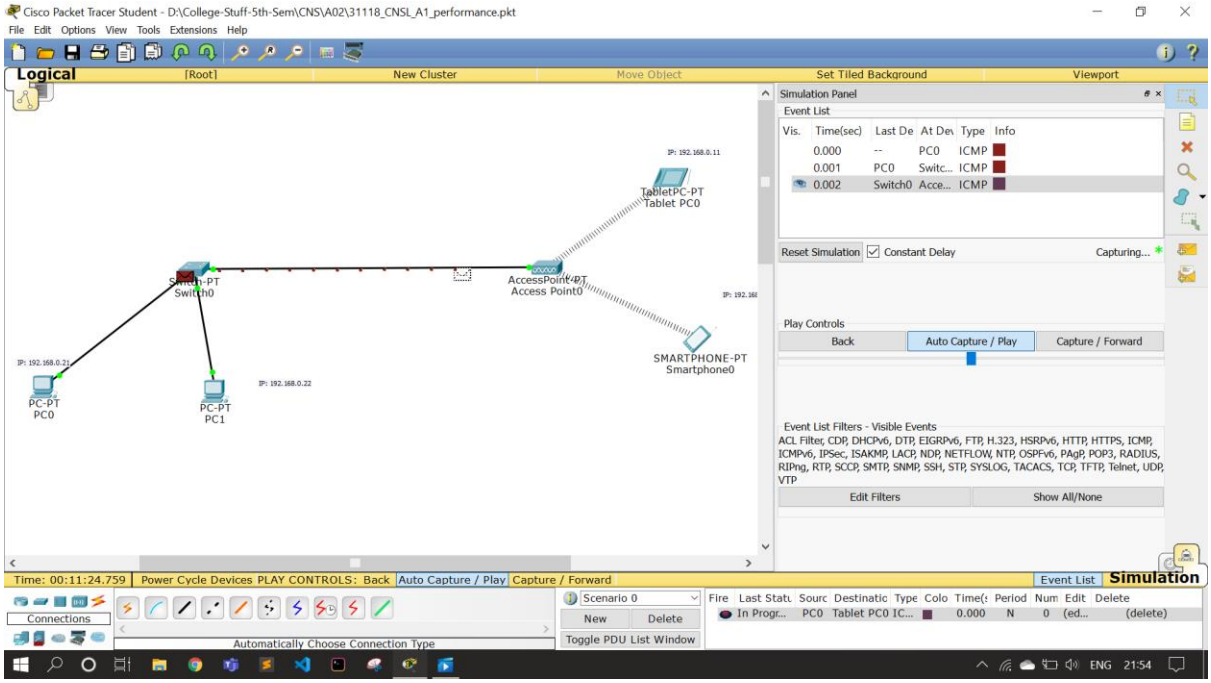
Wired to Wireless:

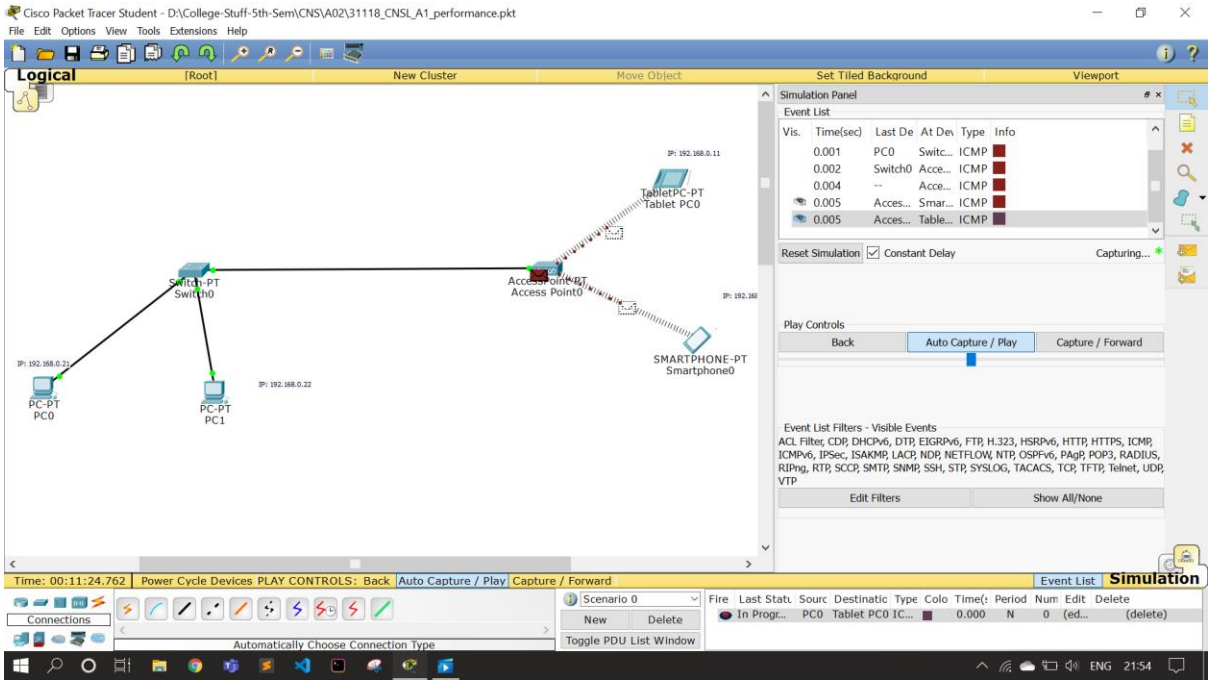


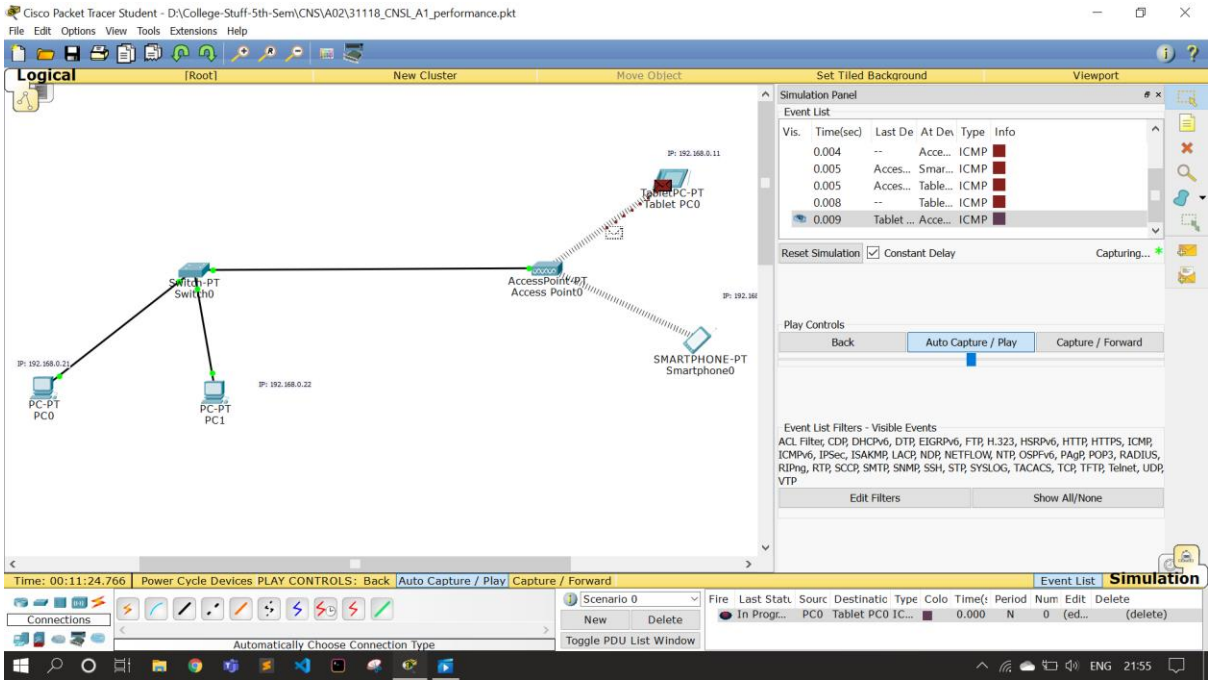
Screenshot-7: Pinging in wired-wireless LAN

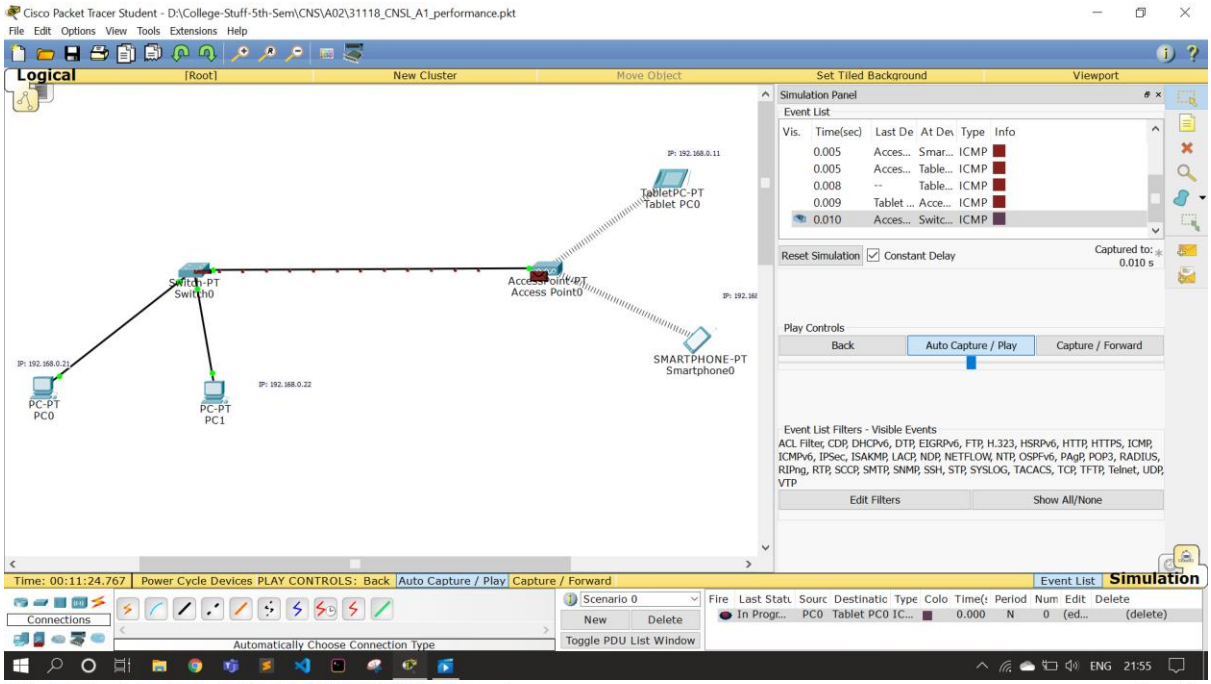
Packet Transfer in wired wireless LAN:

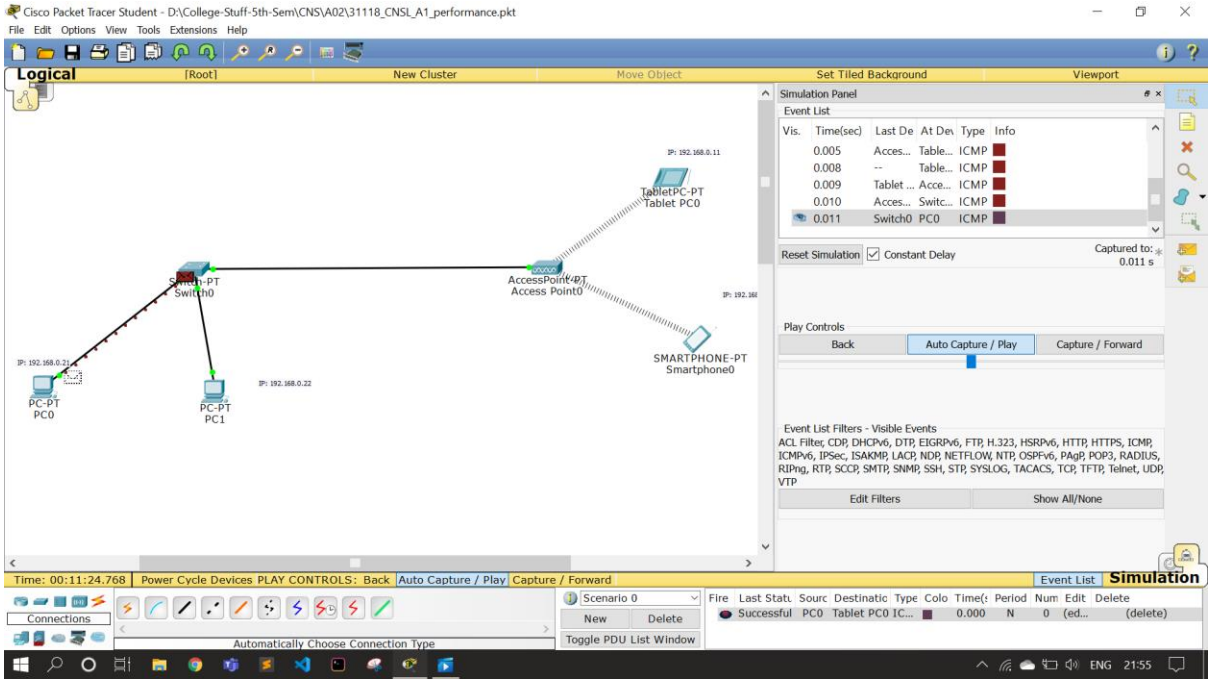

Cisco Packet Tracer Student - D:\College-Stuff-5th-Sem\CNS\A02\31118_CNSL_A1_performance.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
TabletPC-PT Tablet PC0
Switch-PT Switch0
AccessPoint-PT Access Point0
SMARTPHONE-PT Smartphone0
PC-PT PC0
PC-PT PC1
Simulation Panel
Event List
Vis. Time(sec) Last De At De Type Info
0.000 -- PC0 ICMP
0.001 PC0 Switc... ICMP
Reset Simulation
Constant Delay
Captured to: 0.001 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, CDP, DHCPv6, DTP, EIGRPv6, FTP, H.323, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPFv6, PAgP, POP3, RADIUS, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
Time: 00:11:24.758
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulation
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Statu Sourc Destinatic Type Colo Time(: Period Num Edit Delete
In Progr... PC0 Tablet PC0 IC... 0.000 N 0 (ed... (delete)
ENG 21:54

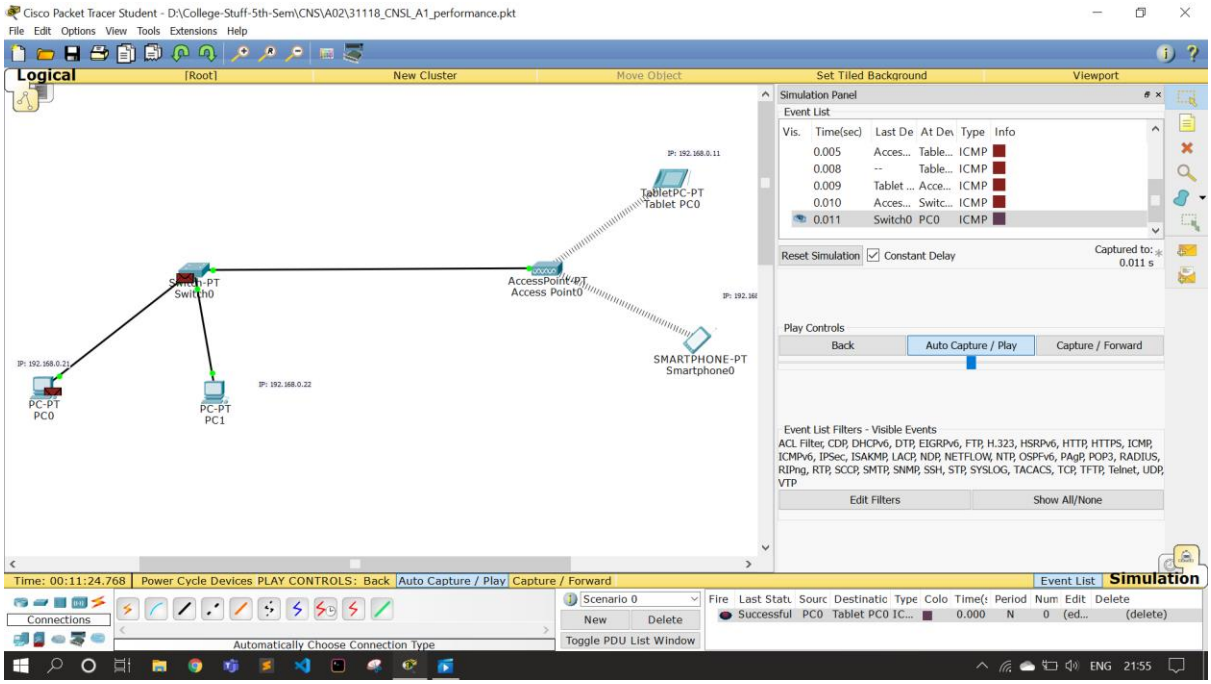

Cisco Packet Tracer Student - D:\College-Stuff-5th-Sem\CNS\A02\31118_CNSL_A1_performance.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
TabletPC-PT Tablet PC0
Switch-PT Switch0
AccessPoint-PT Access Point0
SMARTPHONE-PT Smartphone0
PC-PT PC0
PC-PT PC1
Simulation Panel
Event List
Vis. Time(sec) Last De At De Type Info
0.000 -- PC0 ICMP
0.001 PC0 Switc... ICMP
0.002 Switch0 Acce... ICMP
Reset Simulation
Constant Delay
Capturing...
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, CDP, DHCPv6, DTP, EIGRPv6, FTP, H.323, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPFv6, PAgP, POP3, RADIUS, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
Time: 00:11:24.759
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulation
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Statu Sourc Destinatic Type Colo Time(: Period Num Edit Delete
In Progr... PC0 Tablet PC0 IC... 0.000 N 0 (ed... (delete)
ENG 21:54

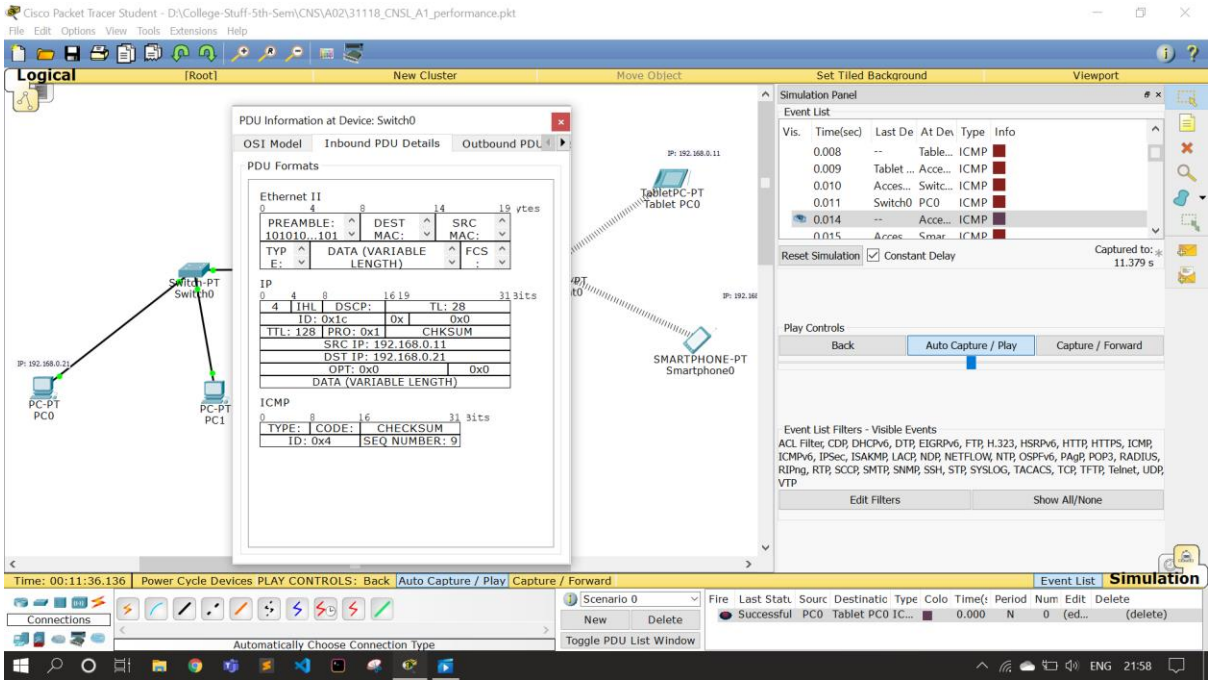

Cisco Packet Tracer Student - D:\College-Stuff-5th-Sem\CNS\A02\31118_CNSL_A1_performance.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Simulation Panel
Event List
Vis. Time(sec) Last De At De Type Info
0.001 PC0 Switc... ICMP
0.002 Switch0 Acce... ICMP
0.004 -- Acce... ICMP
0.005 Acces... Smar... ICMP
0.005 Acces... Table... ICMP
Reset Simulation
Constant Delay
Capturing...
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, CDP, DHCPv6, DTP, EIGRPv6, FTP, H.323, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPFv6, PAgP, POP3, RADIUS, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
IP: 192.168.0.11
TabletPC-PT
Tablet PC0
Switch-PT
Switch0
AccessPoint-PT
Access Point0
SMARTPHONE-PT
Smartphone0
IP: 192.168.0.21
PC-PT
PC0
IP: 192.168.0.22
PC-PT
PC1
Time: 00:11:24.762
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulation
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Statu Sourc Destinatic Type Colo Time(: Period Num Edit Delete
In Progr... PC0 Tablet PC0 IC... 0.000 N 0 (ed... (delete)
ENG 21:54


Cisco Packet Tracer Student - D:\College-Stuff-5th-Sem\CNS\A02\31118_CNSL_A1_performance.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Simulation Panel
Event List
Vis. Time(sec) Last De At De Type Info
0.004 -- Acce... ICMP
0.005 Acces... Smar... ICMP
0.005 Acces... Table... ICMP
0.008 -- Table... ICMP
0.009 Tablet ... Acce... ICMP
Reset Simulation
Constant Delay
Capturing...
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, CDP, DHCPv6, DTP, EIGRPv6, FTP, H.323, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPFv6, PAgP, POP3, RADIUS, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
IP: 192.168.0.11
TabletPC-PT
Tablet PC0
Switch-PT
Switch0
AccessPoint-PT
Access Point0
SMARTPHONE-PT
Smartphone0
IP: 192.168.0.21
PC-PT
PC0
IP: 192.168.0.22
PC-PT
PC1
Time: 00:11:24.766
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulation
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Statu Sourc Destinatic Type Colo Time(: Period Num Edit Delete
In Progr... PC0 Tablet PC0 IC... 0.000 N 0 (ed... (delete)
ENG 21:55

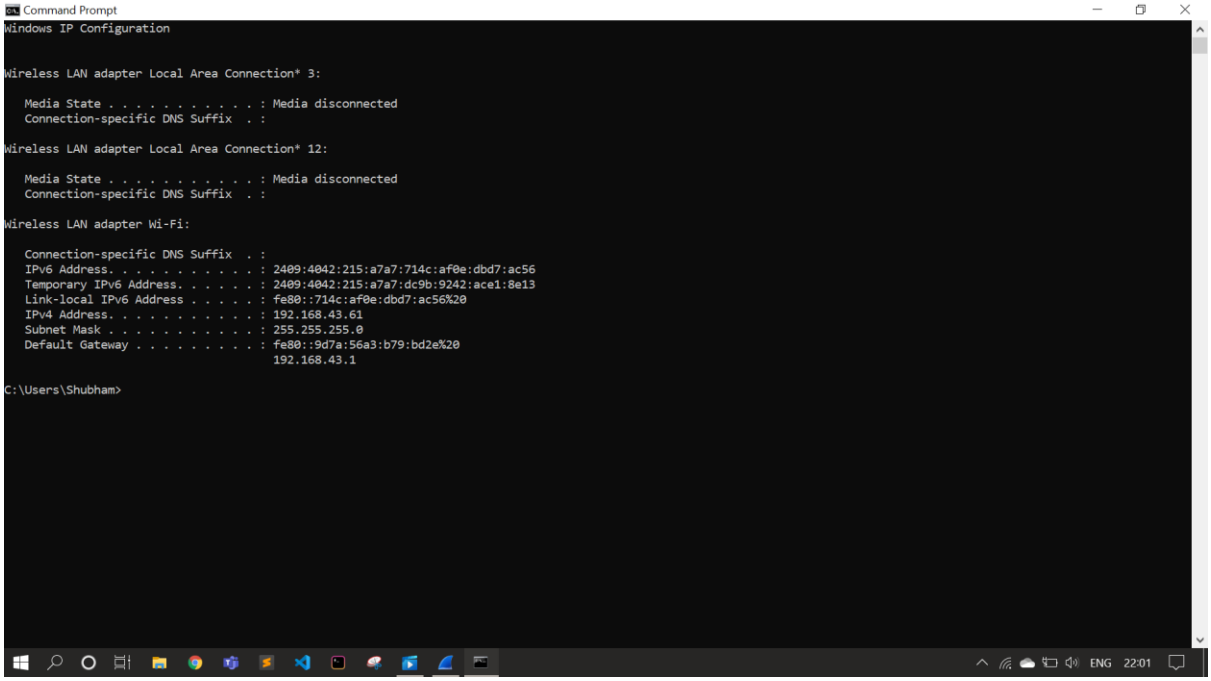

Cisco Packet Tracer Student - D:\College-Stuff-5th-Sem\CNS\A02\31118_CNSL_A1_performance.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
TabletPC-PT
Tablet PC0
Switch-PT
Switch0
AccessPoint-PT
Access Point0
SMARTPHONE-PT
Smartphone0
PC-PT
PC0
PC-PT
PC1
Simulation Panel
Event List
Vis. Time(sec) Last De At De Type Info
0.005 Acces... Smar... ICMP
0.005 Acces... Table... ICMP
0.008 -- Table... ICMP
0.009 Tablet ... Acce... ICMP
0.010 Acces... Switc... ICMP
Reset Simulation
Constant Delay
Captured to: 0.010 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, CDP, DHCPv6, DTP, EIGRPv6, FTP, H.323, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPFv6, PAgP, POP3, RADIUS, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
Time: 00:11:24.767
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulation
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Statu Sourc Destinatic Type Colo Time(s Period Num Edit Delete
In Progr... PC0 Tablet PC0 IC... 0.000 N 0 (ed... (delete)
ENG 21:55


Cisco Packet Tracer Student - D:\College-Stuff-5th-Sem\CNS\A02\31118_CNSL_A1_performance.pkt
File Edit Options View Tools Extensions Help
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
TabletPC-PT
Tablet PC0
Switch-PT
Switch0
AccessPoint-PT
Access Point0
SMARTPHONE-PT
Smartphone0
PC-PT
PC0
PC-PT
PC1
Simulation Panel
Event List
Vis. Time(sec) Last De At De Type Info
0.005 Acces... Table... ICMP
0.008 -- Table... ICMP
0.009 Tablet ... Acce... ICMP
0.010 Acces... Switc... ICMP
0.011 Switch0 PC0 ICMP
Reset Simulation
Constant Delay
Captured to: 0.011 s
Play Controls
Back
Auto Capture / Play
Capture / Forward
Event List Filters - Visible Events
ACL Filter, CDP, DHCPv6, DTP, EIGRPv6, FTP, H.323, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, LACP, NDP, NETFLOW, NTP, OSPFv6, PAgP, POP3, RADIUS, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, VTP
Edit Filters
Show All/None
Time: 00:11:24.768
Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward
Event List
Simulation
Connections
Automatically Choose Connection Type
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Statu Sourc Destinatic Type Colo Time(s Period Num Edit Delete
Successful PC0 Tablet PC0 IC... 0.000 N 0 (ed... (delete)
ENG 21:55

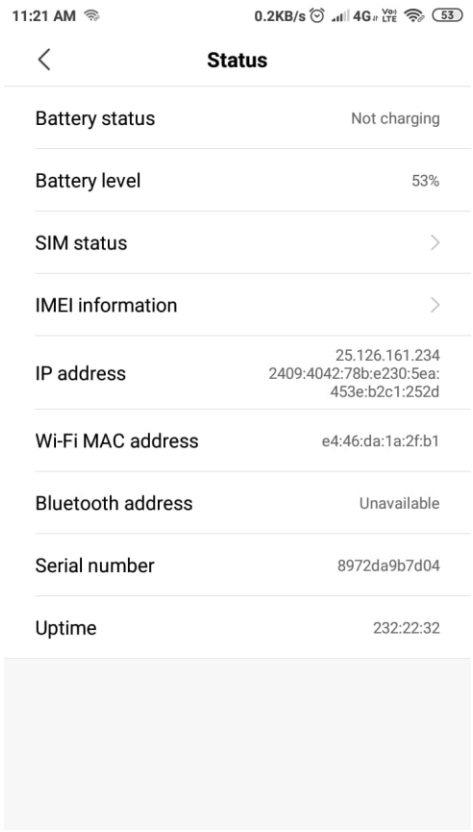




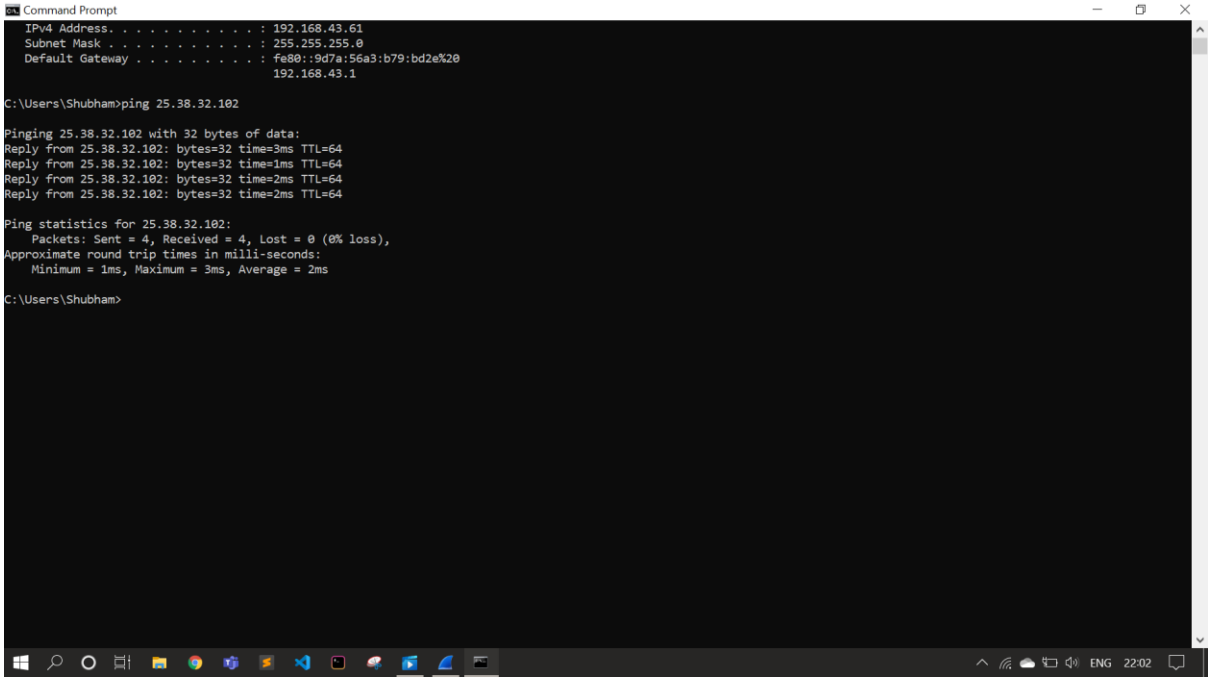
Wireshark Demonstration:



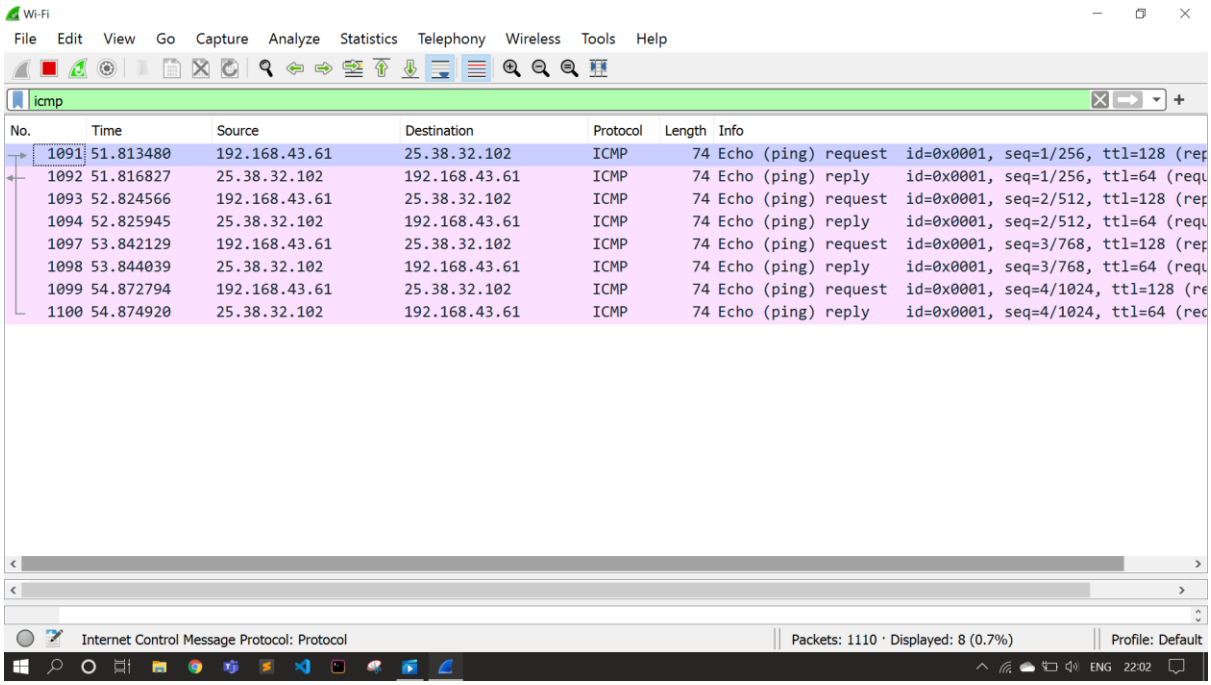
Screenshot: Laptop IP



Screenshot: Mobile IP



Screenshot: pinging my mobile device



Screenshot: captured ICMP packets in Wireshark