<u>WIRELESS NETWORK PROPOSAL</u>

A Course Project Report

By

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Under the guidance of

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of

18CSC302J - COMPUTER NETWORKS

In

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BONAFIDE CERTIFICATE

Certified that this project report "Wireless Network Proposal" is the bonafide work of **Uday Goel (RA2011003010544), Andreas Breitkopf (RA2011003010548), Anushka Priya (RA2011003010555) and Dhruvil Patel (RA2011003010559)** who carried out the project work under my supervision.

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1. ABSTRACT

The network design is a major part of the infrastructure of any institution. Communication is a major factor that plays a vital role in ensuring that all the levels of staff are able to carry it out effectively in order to achieve. A good network design will be more robust and allow for better performance overall by working quickly and efficiently and providing the best platform.

The main aim of this project is to design a network setup which meets the requirements of a university allowing effective exchange of information between the various departments.

A LAN includes all the user devices, servers, switches, routers, cables, and wireless access points in one location. It includes all devices in the same broadcast domain. A broadcast domain includes the set of all LAN-connected devices, so that when any of the devices sends a broadcast frame, all the other devices get a copy of the frame. So, from one perspective, a LAN and a broadcast domain as being basically the same thing. Without VLANs, a switch considers all its interfaces to be in the same broadcast domain. That is, forgone switch, when a broadcast frame entered one switch port, the switch forwarded that broadcast frame out all other ports.

With that logic, to create two different LAN broadcast domains, needs two different Ethernet LAN switches.

With support for VLANs, a single switch can accomplish the same goals of the design to create two broadcast domains—with a single switch. With VLANs, a switch can configure some interfaces into one broadcast domain and some into another, creating multiple broadcast domains. These individual broadcast domains created by the switch are called virtual LANs (VLAN).

Designing campus LANs to use more VLANs, each with a smaller number of devices, often helps improve the LAN in many ways. For example, a broadcast sent by one host in a VLAN will be received and processed by all the other hosts in the VLAN—but not by hosts in a different VLAN. Limiting the number of hosts that receive a single broadcast frame reduces the number of hosts that waste effort processing unneeded broadcasts. It also reduces security risks, because fewer hosts see frames sent by any one host.

The following list summarizes the most common reasons for choosing to create smaller broadcast domains (VLANs):

• To reduce CPU overhead on each device by reducing the number of devices that receive each broadcast frame.

• To reduce security risks by reducing the number of hosts that receive copies of frames that the switches flood (broadcasts, multicasts, and unknown unicasts)

• To improve security for hosts that send sensitive data by keeping those hosts on a separate VLAN

• To create more flexible designs that group users by department, or by groups that work together, instead of by physical location

• To solve problems more quickly, because the failure domain for many problems is the same set of devices as those in the same broadcast domain

2. Introduction

The task is to create a wireless network proposal has to be prepared for setting up a wireless VLAN based infrastructure at a campus. The campus has 3 departments, management, research and finance.

Each department has approximately 30 users. ADSL internet connection is available in the campus, which needs to be shared by the all the users in the different departments. Wireless access to the network should be available using access points installed at strategic locations.

Users should also be able to access the network through computers using LAN connectivity. Files servers should be setup on the network for users in the departments to share and transfer files. Guest users should be able to connect to the internet through the wireless access points, without any authentication. Users in each department should have a common password, which should be used for gaining access to the network through the wireless access points. The guest users should not have access to the file server installed on the network. Dynamic IP addressing system should be available from a single DHCP server to allocate IP address to all departments users and guests. Users should be able to connect to the appropriate departments, highlighted through appropriate names on the access point. Appropriate equipment for internet sharing should be made available.

Key points to mention from above:
→ VLAN
→ 30 user's subnet each
→ Wireless
→ Access point
→ Files(ftp)
→ DHCP
→ Website

3. REQUIREMENT & ANALYSIS

3.3.1 Hardware Requirements
Processor : 2.4 GHz Clock Speed
RAM : 1 GB
Hard Disk : 500 MB (Minimum free space)

3.3.2 Software Requirements
Operating System : Windows 7
Platform : Java
Back End : MySql
Special Tools : Opencv, Xuggle

Server : Apache Tomcat

Serial:	Modules:
1	Hosts
2	Routers
3	Switch
4	Server
5	Cables
6	ADSL Modem
7	Cloud

Cisco Packet Tracer (V8.0.0)-

Cisco Packet Tracer as the name suggests, is a tool built by Cisco. This tool provides a network simulation to practice simple and complex networks. The main purpose of Cisco Packet Tracer is to help students learn the principles of networking with hands-on experience as well as develop Cisco technology specific skills. Since the protocols are

implemented in software only method, this tool cannot replace the hardware Routers or Switches. Interestingly, this tool does not only include Cisco products but also many more networking devices.
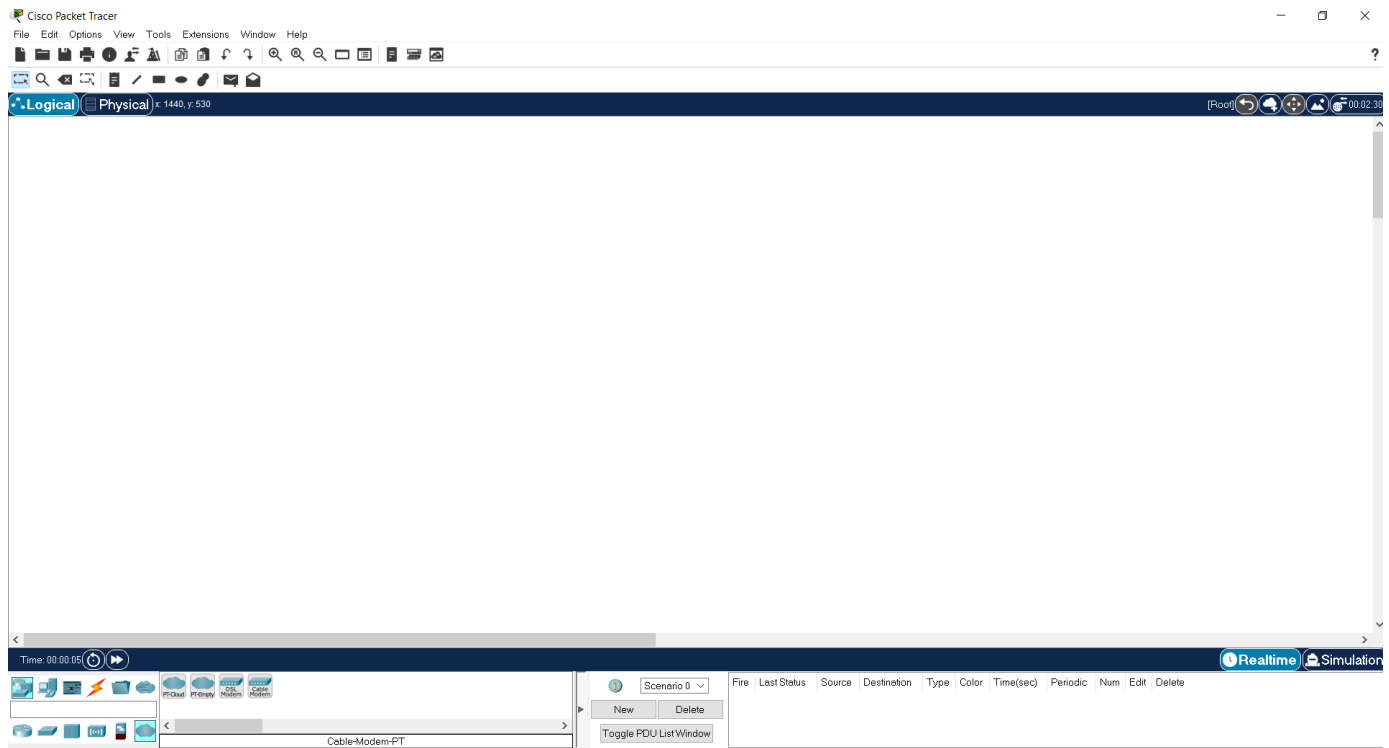
MODULES DESCRIPTION:

Routers:

A router is a networking device that forwards data packets between computer networks. Routers perform the traffic directing functions on the Internet.

Data sent through the internet, such as a web page or email, is in the form of data packets. A packet is typically forwarded from one router to another router through the networks that constitute an internetwork (e.g. the Internet) until it reaches its destination node.

Switches:

A network switch (also called switching hub, bridging hub, and, by the IEEE, 1 MAC

bridge) is networking hardware that connects devices on a computer network by using packet switching to receive and forward data to the destination device.A network switch is a multiport nework bridge that uses MAC addresses

to forward data at the data link layer (layer 2) of the OSI model often see them used in home networks or wherever a few more ports are needed, such as at your desk, in a lab, or in a conference room.

DSL Modem

This converts digital signals into analogue signals that are suitable for sending over a telephone line. It is usually built into the Internet/broadband router and not normally purchased as a separate component.

DSL/Broadband Filter

Used to filter out DSL signals from telephone signals so that you can access the internet and use the telephone simultaneously.

Requirement analysis of routers and switches

For this network we'll be needing

→ Router (1) - Cisco RV016 16-port 10/100 VPN Router - Multi WAN

→ Layer 2 switch (7) - Cisco SG350-10 Managed Switch

→ Multi-layer switch (1) - Cisco Nexus 3164Q - switch - 64 ports

Router configuration guidelines

Access CLI prompt of router

Cisco IOS supports various command modes, among those following are the main command modes.

→ User EXEC Mode

→ Privileged EXEC Mode

→ Global Configuration Mode

→ Interface Configuration Mode

→ Sub Interface Configuration Mode

→ Setup Mode

→ ROM Monitor Mode

Following table lists essential commands to navigate between different IOS modes.

Mode	Prompt	Command to enter	Command to exit
User EXEC	Router >	Default mode after booting.Login with password, if configured.	Use exit command
Privileg ed EXEC	Router #	Use enable command from userexec mode	Use exit command

| Global Configuration	Router(config)#	Use configure terminal command from privileged execmode	Use exit command
Interface Configuration	Router(config-if)#	Use interface type *number*command from global configuration mode	Use exit command to return in global configuration mode
Sub-Interface Configuration	Router(config-subif)	Use interface type *sub interfacenumber* command from global configuration mode or interfaceconfigure mode	Use exit to return previous mode. Use end command toreturn in privileged exec mode.
Setup	Parameter[Parameter ervalue]:	Router will automatically insertin this mode if running configuration is not present	Press CTRL+C to abort. Type yes to save configuration, or no to exitwithout saving when askedin the end of setup.
ROMMON	ROMMON >	Enter reload command from privileged exec mode. Press CTRL + C key combination during the first 60 seconds of booting process	Use exit command.
vlan	vlan>	To access VLAN database configuration mode, enter the vlan database privileged EXEC command. Then enter the vlan command with a new VLAN ID to create a VLAN, orenter an existing VLAN ID to modify the VLAN.	Use exit command

→ IOS commands are not case sensitive; you can enter them in uppercase, lowercase, or mixed case.

→ Password is case sensitive. Make sure you type it in correct case.

→ In any mode, you can obtain a list of commands available on that mode by entering a question mark (?).

→ Standard order of accessing mode is

→ User Exec mode => Privileged Exec mode => Global Configuration mode => Interface Configuration mode => Sub Interface Configuration mode

→ Router will enter in setup mode only if it fails to load a valid running configuration.

→ Router will enter in ROMMON mode only if it fails to load a valid IOS image file

4. ARCHITECTURE & DESIGN
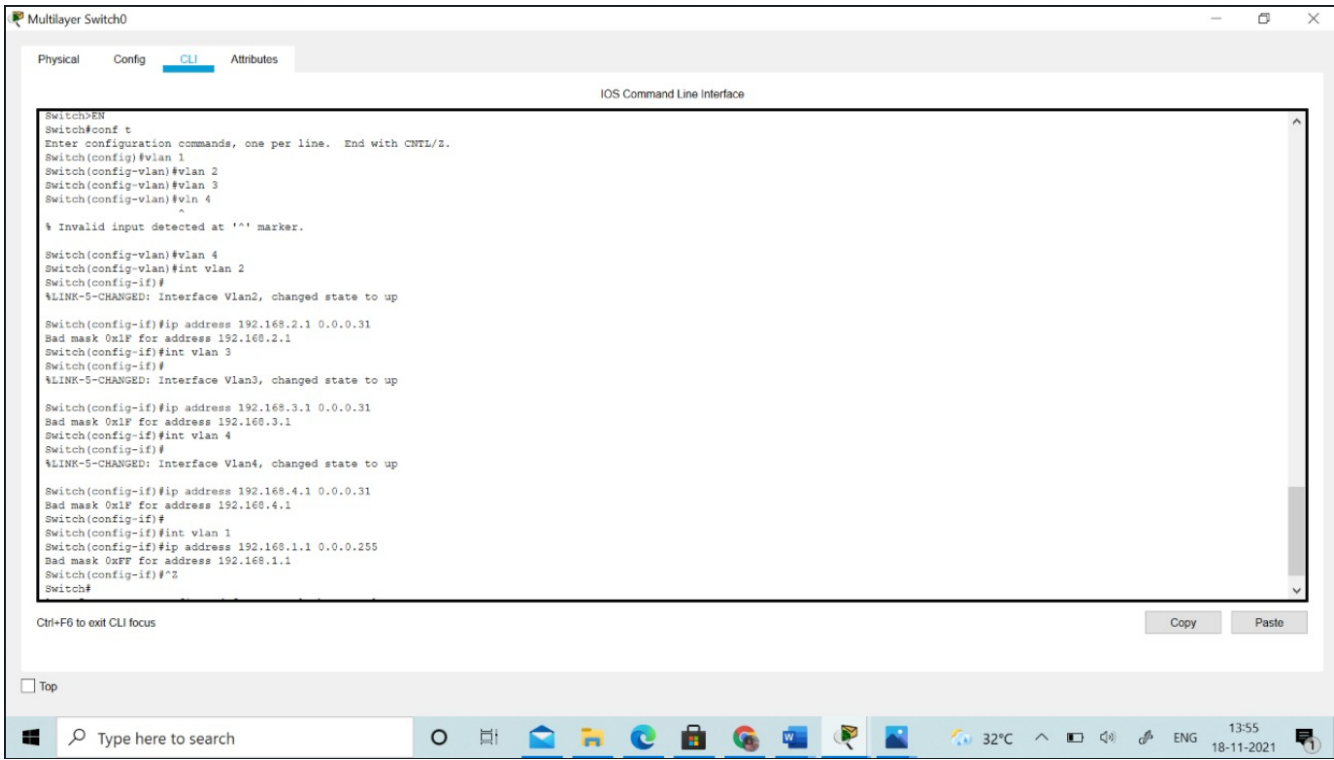
4.1 Network topology diagram
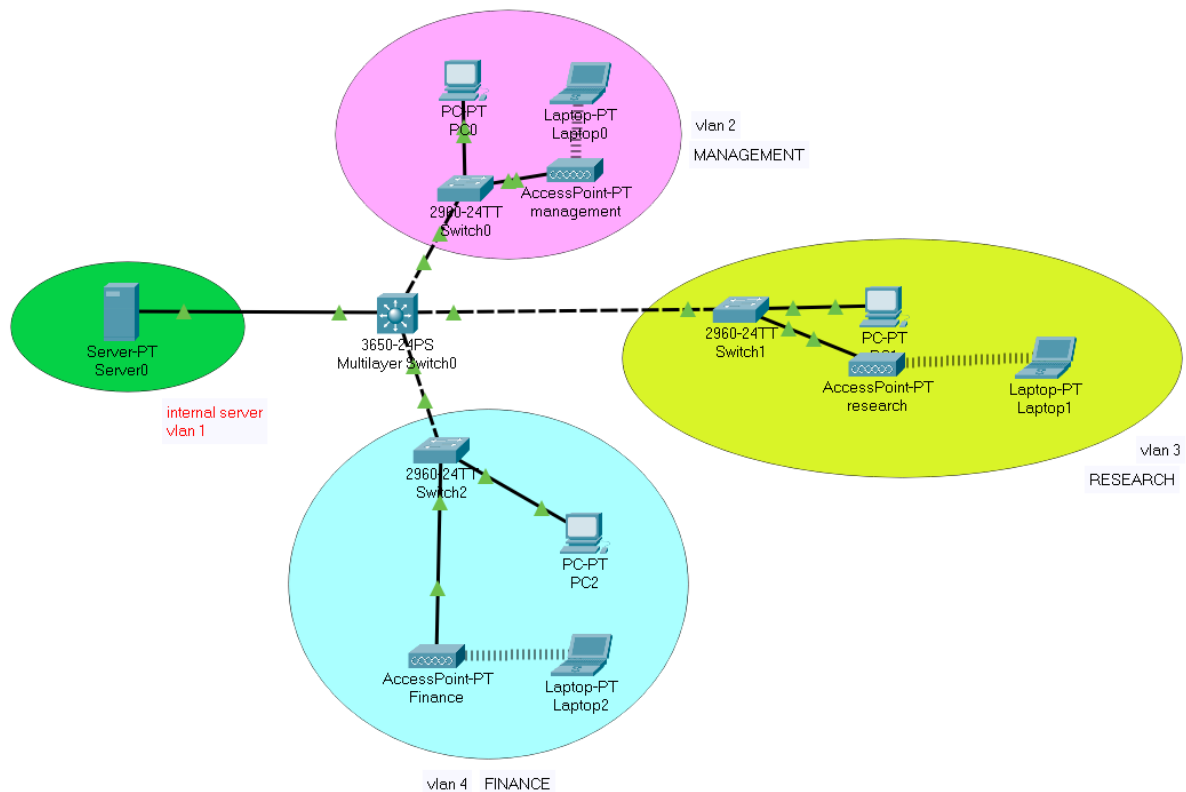
4.2 VLAN Addressing

VLAN	IP	Subnet
Vlan1	192.168.1.1/24	255.255.255.0
Vlan2	192.168.2.1/27	255.255.255.0
Vlan3	192.168.3.1/27	255.255.255.0
Vlan4	192.168.4.1/27	255.255.255.0

VLAN	Device	IP	Subnet	Gateway
Vlan1	PC0	192.168.2.2	255.255.255.0	192.168.2.1
	LAPTOP 0	192.168.2.3	255.255.255.0	192.168.2.1
Vlan2	PC1	192.168.3.2	255.255.255.0	192.168.3.1
	LAPTOP 1	192.168.3.3	255.255.255.0	192.168.3.1
Vlan3	PC2	192.168.4.3	255.255.255.0	192.168.4.1
	LAPTOP 2	192.168.4.2	255.255.255.0	192.168.4.1
Vlan4	SERVER-PT	192.168.1.2	255.255.255.0	192.168.1.1

5. IMPLEMENTATION

Multilayer Switch0 — IOS Command Line Interface

```
Switch>EN
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 1
Switch(config-vlan)#vlan 2
Switch(config-vlan)#vlan 3
Switch(config-vlan)#vln 4
                       ^
% Invalid input detected at '^' marker.

Switch(config-vlan)#vlan 4
Switch(config-vlan)#int vlan 2
Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan2, changed state to up

Switch(config-if)#ip address 192.168.2.1 0.0.0.31
Bad mask 0x1F for address 192.168.2.1
Switch(config-if)#int vlan 3
Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan3, changed state to up

Switch(config-if)#ip address 192.168.3.1 0.0.0.31
Bad mask 0x1F for address 192.168.3.1
Switch(config-if)#int vlan 4
Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan4, changed state to up

Switch(config-if)#ip address 192.168.4.1 0.0.0.31
Bad mask 0x1F for address 192.168.4.1
Switch(config-if)#
Switch(config-if)#int vlan 1
Switch(config-if)#ip address 192.168.1.1 0.0.0.255
Bad mask 0xFF for address 192.168.1.1
Switch(config-if)#^Z
Switch#
```
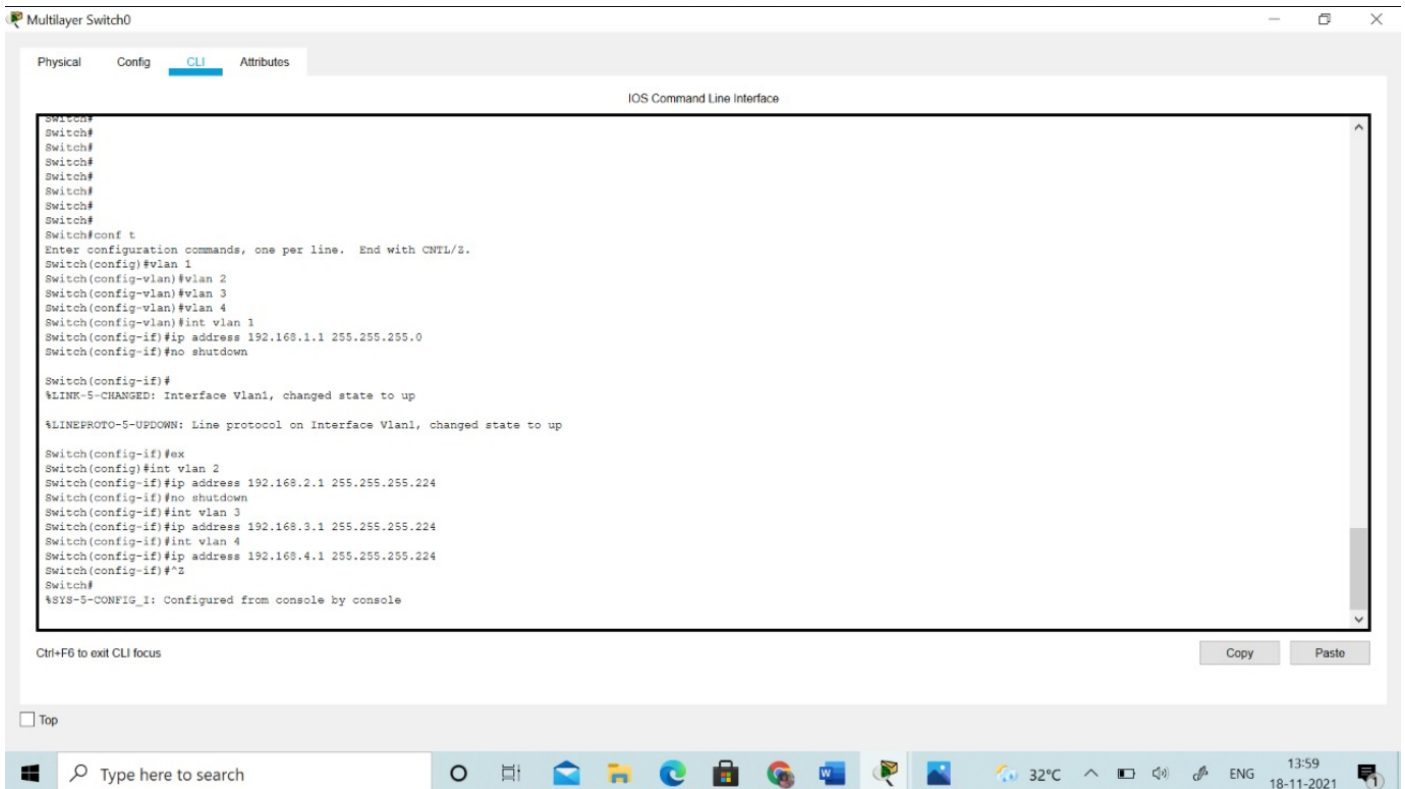

Multilayer Switch0 — IOS Command Line Interface

```
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 1
Switch(config-vlan)#vlan 2
Switch(config-vlan)#vlan 3
Switch(config-vlan)#vlan 4
Switch(config-vlan)#int vlan 1
Switch(config-if)#ip address 192.168.1.1 255.255.255.0
Switch(config-if)#no shutdown

Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up

Switch(config-if)#ex
Switch(config)#int vlan 2
Switch(config-if)#ip address 192.168.2.1 255.255.255.224
Switch(config-if)#no shutdown
Switch(config-if)#int vlan 3
Switch(config-if)#ip address 192.168.3.1 255.255.255.224
Switch(config-if)#int vlan 4
Switch(config-if)#ip address 192.168.4.1 255.255.255.224
Switch(config-if)#^Z
Switch#
%SYS-5-CONFIG_I: Configured from console by console
```

Switch0

Physical | Config | CLI | Attributes

IOS Command Line Interface

```
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 2
Switch(config-vlan)#vlan 3
Switch(config-vlan)#vlan 4
Switch(config-vlan)#int Fa0/2
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 2
Switch(config-if)#^Z
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#wr
Building configuration...
[OK]
Switch#
```

Ctrl+F6 to exit CLI focus

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Multilayer Switch0

Physical | Config | CLI | Attributes

IOS Command Line Interface

```
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#int Gig1/0/2
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk

Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/2, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan3, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan4, changed state to up

Switch(config-if)#int Gig1/0/3
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk

Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/3, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/3, changed state to up

Switch(config-if)#ex
Switch(config)#int Gig1/0/4
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk

Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/4, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/4, changed state to up
```

Ctrl+F6 to exit CLI focus

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Switch1

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%SPANTREE-2-RECV_PVID_ERR: Received 802.1Q BPDU on non trunk FastEthernet0/1 VLAN1.

%SPANTREE-2-BLOCK_PVID_LOCAL: Blocking FastEthernet0/1 on VLAN0001. Inconsistent port type.


%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up


Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 2
Switch(config-vlan)#vlan 3]
                         ^
% Invalid input detected at '^' marker.

Switch(config-vlan)#vlan 3
Switch(config-vlan)#vlan 4
Switch(config-vlan)#int Fa0/2
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 3
Switch(config-if)#^Z
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#wr
Building configuration...
[OK]
Switch#
```

Ctrl+F6 to exit CLI focus   Copy   Paste

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Switch2

Physical   Config   CLI   Attributes

IOS Command Line Interface

```
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%SPANTREE-2-RECV_PVID_ERR: Received 802.1Q BPDU on non trunk FastEthernet0/1 VLAN1.

%SPANTREE-2-BLOCK_PVID_LOCAL: Blocking FastEthernet0/1 on VLAN0001. Inconsistent port type.


%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up


Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 2
Switch(config-vlan)#vlan 3
Switch(config-vlan)#vlan 4
Switch(config-vlan)#int Fa0/2
Switch(config-if)#switchport mode access
Switch(config-if)#switcport access vlan 4
                      ^
% Invalid input detected at '^' marker.

Switch(config-if)#switchport access vlan 4
Switch(config-if)#^Z
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#wr
Building configuration...
[OK]
Switch#
```

Ctrl+F6 to exit CLI focus   Copy   Paste

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Cisco Packet Tracer

File Edit Options View Tools Exten

Logical | Physical x: 218, y: 54

Time: 00:27:30

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32°C ENG 14:07 18-11-2021

Physical Config Services Desktop Programming Attributes

SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP

Server-PT
Server0

DHCP

| Interface | FastEthernet0 | Service ● On | ○ Off |

Pool Name — vlan 4
Default Gateway — 192.168.4.1
DNS Server — 192.168.1.2
Start IP Address : 192 168 4 2
Subnet Mask: 255 255 255 224
Maximum Number of Users : 30
TFTP Server: 0.0.0.0
WLC Address: 0.0.0.0

| Add | Save | Remove |

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
vlan 4	192.168....	192.168....	192.168....	255.255....	30	0.0.0.0	0.0.0.0
vlan 3	192.168....	192.168....	192.168....	255.255....	30	0.0.0.0	0.0.0.0
vlan 2	192.168....	192.168....	192.168....	255.255....	30	0.0.0.0	0.0.0.0
serverPool	192.168....	192.168....	192.168....	255.255....	30	0.0.0.0	0.0.0.0

☐ Top

Realtime Simulation

ource Destination Type Color Time(sec) Periodi

Multilayer Switch0

Physical Config CLI Attributes

IOS Command Line Interface

```
Switch(config-if)#switchport mode trunk

Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/3, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/3, changed state to up

Switch(config-if)#ex
Switch(config)#int Gig1/0/4
Switch(config-if)#switchport trunk encapsulation dot1q
Switch(config-if)#switchport mode trunk

Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/4, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/4, changed state to up

Switch(config-if)#^Z
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#int vlan 1
Switch(config-if)#ip helper-address 192.168.1.2
Switch(config-if)#int vlan 2
Switch(config-if)#ip helper-address 192.168.1.2
Switch(config-if)#int vlan 3
Switch(config-if)#ip helper-address 192.168.1.2
Switch(config-if)#int vlan 4
Switch(config-if)#ip helper-address 192.168.1.2
Switch(config-if)#^Z
Switch#
%SYS-5-CONFIG_I: Configured from console by console
```

Ctrl+F6 to exit CLI focus

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Screenshot 1 — IOS Command Line Interface (CLI)

```
Switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/4, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet1/0/4, changed state to up

Switch(config-if)#^Z
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#int vlan 1
Switch(config-if)#ip helper-address 192.168.1.2
Switch(config-if)#int vlan 2
Switch(config-if)#ip helper-address 192.168.1.2
Switch(config-if)#int vlan 3
Switch(config-if)#ip helper-address 192.168.1.2
Switch(config-if)#int vlan 4
Switch(config-if)#ip helper-address 192.168.1.2
Switch(config-if)#^Z
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#ip routing
Switch(config)#^Z
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#wr
Building configuration...
Compressed configuration from 7383 bytes to 3601 bytes[OK]
[OK]
Switch#
```

Screenshot 2 — IP Configuration (Desktop)

Interface: FastEthernet0

IP Configuration
- ● DHCP   ○ Static   DHCP request successful.
- IPv4 Address: 192.168.2.2
- Subnet Mask: 255.255.255.224
- Default Gateway: 192.168.2.1
- DNS Server: 192.168.1.2

IPv6 Configuration
- ○ Automatic   ● Static
- IPv6 Address: _____ / ____
- Link Local Address: FE80::260:3EFF:FE81:5D77
- Default Gateway:
- DNS Server:

802.1X
- ☐ Use 802.1X Security
- Authentication: MD5
- Username:
- Password:

6. EXPERIMENT RESULTS & ANALYSIS

RESULTS:

As the college internet is accessed in each of computer on web browser it is checked as follows
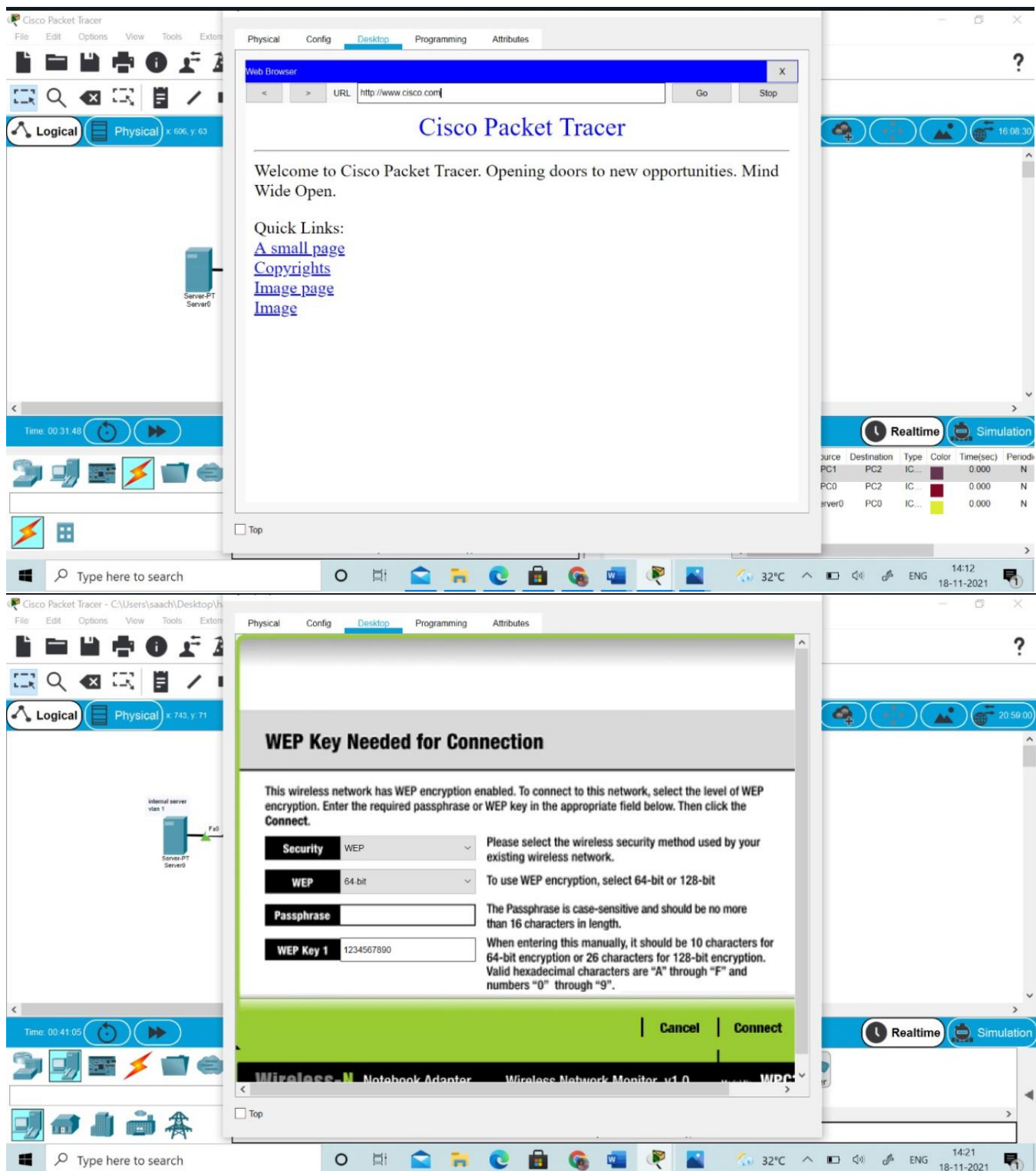
Physical | Config | Desktop | Programming | Attributes

Link Information | Connect | Profiles

Below is a list of available wireless networks. To search for more wireless networks, click the **Refresh** button. To view more information about a network, select the wireless network name. To connect to that network, click the **Connect** button below.

Wireless Network Name	CH	Signal
management	1	49%
Default	1	49%
Default	1	49%

Site Information

Wireless Mode	Infrastructure
Network Type	Mixed B/G
Radio Band	Auto
Security	WEP
MAC Address	0030.F2CB.1647

Refresh   Connect

2.4G

Adapter is

Wireless-N Notebook Adapter   Wireless Network Monitor v1.0

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Physical | Config | Desktop | Programming | Attributes

Command Prompt

```
Packet Tracer PC Command Line 1.0
C:\>

C:\>FTP 192.168.1.2
Trying to connect...192.168.1.2

%Error opening ftp://192.168.1.2/ (Timed out)
.


(Disconnecting from ftp server)



C:\>ftp 192.168.1.2
Trying to connect...192.168.1.2
Connected to 192.168.1.2
220- Welcome to PT Ftp server
Username:management
331- Username ok, need password
Password:
230- Logged in
(passive mode On)
ftp>put employees.txt
%Error opening c:employees.txt (No such file or directory)
ftp>put EMPLOYEES.txt

Writing file EMPLOYEES.txt to 192.168.1.2:
File transfer in progress...

[Transfer complete - 58 bytes]

58 bytes copied in 0.05 secs (1160 bytes/sec)
ftp>
```

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USES OF VLAN:

→ VLANs enable logical grouping of end-stations that are physically dispersed on a network.

→ When users on a VLAN move to a new physical location but continue to perform the same job function, the end-stations of those users do not need to be reconfigured. Similarly, if users change their job functions, they need not physically move: changing the VLAN membership of the end-stations to that of the new team makes the users' end- stations local to the resources of the new team.

→ VLANs reduce the need to have routers deployed on a network to contain broadcast traffic.

→ Flooding of a packet is limited to the switch ports that belong to a VLAN.

→ Confinement of broadcast domains on a network significantly reduces traffic.

→ By confining the broadcast domains, end-stations on a VLAN are prevented from listening to or receiving broadcasts not intended for them. Moreover, if a router is not connected between the VLANs, the end-stations of a VLAN cannot communicate with the end-stations of the other VLANs.

USES OF NAT:

→ Reuse of Private IP addresses

→ Enhancing security for private networks by keeping internal addressing private from the external network

→ Connecting a large number of hosts to the global Internet using a smaller number of public (external) IP address, thereby conserving IP address space.

USES OF ACL:

→ Improve network performance.

→ Provides security as administrator can configure the access list according to the needs and deny the unwanted packets from entering the network.

→ Provides control over the traffic as it can permit or deny according to the need of network.

7. Conclusion

With the growth of Information Technology in every sector and the explosion of medical IOT devices, the design of a network of any hospital has become very essential factor.

The hospitals need to have a reliable, secure and scalable network design in order to keep the patient's information, doctor's research work safe, convenient communication between various departments, etc. as well as keep it ready for any new IOT medical equipment's that may be introduced in the future.

The hierarchical model of networking best suits our needs along with providing additional features like easy maintenance, high security, simplified troubleshooting and effective performance.

FUTURE SCOPE OF PROJECT:
This project can be further used in many processes like increasing more and more algorithms and bringing in more simulation techniques

8. Reference

[1]-The University Network - A New Approach Towards Networking ZeeshanAhmed Siddique

[2]-University Network Infrastructure: a Modern Look Into the Network Backbonewith Real Time Visibility Homan Mike Hirad