Network Design proposal for 3 Star hotel

18CSS202J COMPUTER COMMUNICATION

PROJECT REPORT

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BONAFIDE CERTIFICATE

Certified that 18CSC202J minor project report titled "**Network Design proposal for 3 Star Hotel**" is the bonafide work of "**ASHWIN KUMAR K (RA2011003010586), SYED ABSAR QADRI (RA2011003010585) and RISHA S(RA2011003010589)"**who carried out the minor project work under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate

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INDEX

S. No.	Title	Page no.
1.	Project Title	1
2.	Abstract	1
3.	Objective of the project	1
4.	Introduction	2
5.	Modules of the project • Network design requirements • Design requirements analysis • Network diagram • IP address design • Hardware & Software products	3
6.	Project design Screen Shot	10
7.	Result	11
8.	Inference from the results	12
9.	Conclusion	12
10.	References	12

Project Title: Network Design proposal for 3 Star hotel

ABSTRACT:

Designing a network architecture has always been a challenging topic and an active research area. The network has to be analyzed for it to be consistent and reliable. The network design proposal is made to accommodate the requirements for a 3-star Hotel that has ADSL Internet available for the hotel. The project is focused on WLANs and associated wireless technology. Hence, further to wireless technology, the guide also delves into security issues. The network and devices provided by the management have firewall and security software installed in it. The hardware and tools used for the project are Router, Switch, Desktop, Broadband MODEM / Wireless Router, Ethernet cable, Cisco Packet Tracer to create a prototype for the proposal.

This project will result in understanding how an organization operates its network architecture, how it administers and maintains the security of the network and what are the challenges faced while architecting the network. A prototype was built which simulates the build and function of the network using virtual tools.

OBJECTIVE OF THE PROJECT:

The main objective of our project is to design a network for an Internet Cafe with secure data, safe communication and data transmission. And have an Internet access for all users ina single domain.

INTRODUCTION:

A wireless network is the sort of network that uses wireless data connections between network nodes.

Wireless networking is a way in which homes, telecommunications networks and business installations remove the cost factor of the internet previously seen due to the cables required in wired communications. The implementation of wireless connection takes place at the physical level (layer) of the OSI model network structure.

Examples of wireless networks include cell phone networks, wireless local area networks (WLANs), wireless sensor networks, and terrestrial microwave networks. Not only for general purpose but wireless communication is needed for aerospace communication between satellites, and spacecrafts.

We can send texts, audio, video through within seconds through the means of wireless communication at any place and any time provided network signals can be detected by your device. There's no wonder why most of the technology developing in our decade and upcoming decade are using more and more of wireless devices and thus a reason we rarely see wired network communication.

The most exciting development of wireless communications has been due to remote access of the wireless devices. These machines/devices are being accessed through the process of sensors and data receivers which receive their information through the wireless communication taking place between two end devices through various process.

With the great usage of remote access, it also faces problem of security. Routers and Access Points are always attempted to be remotely accessed and if it connects to the wrong person's device, then the person can do damage to your privacy and could possibly get access to financial accounts,etc

Modules of the Project:

1. Network Design Requirements

The equipment's required for this network design are:

1.	PC's	200
2.	Copper-Cross over cables	100
3.	Switches	20
4.	Routers	15
5.	Ethernet	220
6.	ADSL	10
7.	DNS/Web Server	3
8.	DHCP Server	3

2. Design Requirement Analysis

- **PC'S:**

A personal computer (PC) is a multi-purpose computer whose size, capabilities, and price make it feasible for individual use. PCs are intended to be operated directly by an end user, rather than by a computer expert or technician.

- Copper-Cross Over Cables:

A crossover cable used is a type of twisted pair copper wire cable for LANs (local areanetwork) in which the wires on the cable are crossed over so that the receive signal pins on the RJ-45 connector on one end are connected to the transmit signal pins on the RJ-45 connector on the other end.

- Switches:

The LAN network organization uses a Gigabit Ethernet switching network. It is used to segment the networks into different subnetworks called subnets or LAN segments. It is responsible for filtering and forwarding the packets between LAN segments based on MAC address. When the source wants to send the data packet tothe destination, packet first enters the switch and the switch reads its header and find the MAC address of destination to identify the device then it sends the packet out through the appropriate ports that leads to the destination devices.

- Router:

The router is used here in the network is the internet backbone that is described as exterior router. It is used to connect the pcs in the LAN network to ADSL internet. It also provides the security, as LAN's work in broadcast mode since the information is transmitted over the network and traverses the entire cable system.

- ADSL

  ADSL was specifically designed to exploit the one-way nature of most multimedia communication in which large amounts of information flow toward the user and only a small amount of interactive control information is returned. Several experiments with ADSL to real users began in 1996. In 1998, wide-scale installations began in several parts of the U.S. In 2000 and beyond, ADSL and other forms of DSL are expected to become generally available in urban areas. With ADSL (and other forms of DSL), telephone companies are competing with cable companies and their cable modem services.

- EHTERNET

  Ethernet was developed at Xerox PARC between 1973 and 1974. It was inspiredby ALOHAnet, which Robert Metcalfe had studied as part of his PhD dissertation. Theidea was first documented in a memo that Metcalfe wrote on May 22, 1973, where he named it after the luminiferous aether once postulated to exist as an "omnipresent, completely-passive medium for the propagation of electromagnetic waves.

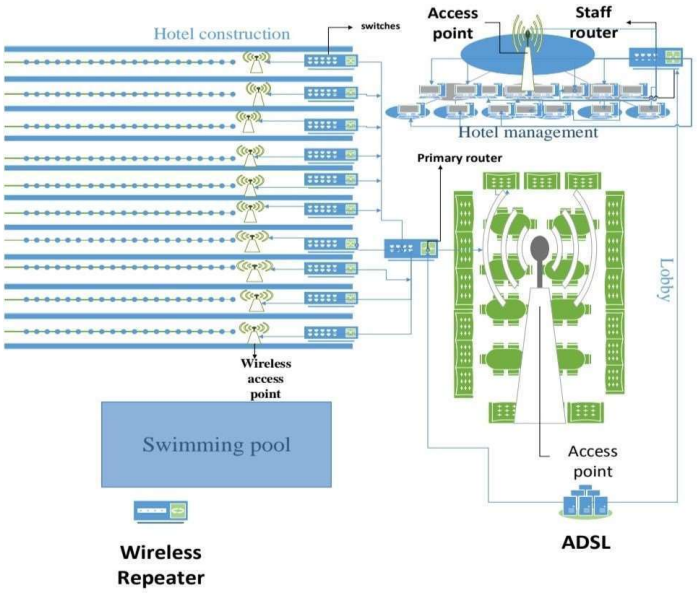
- DNS/WEB Server

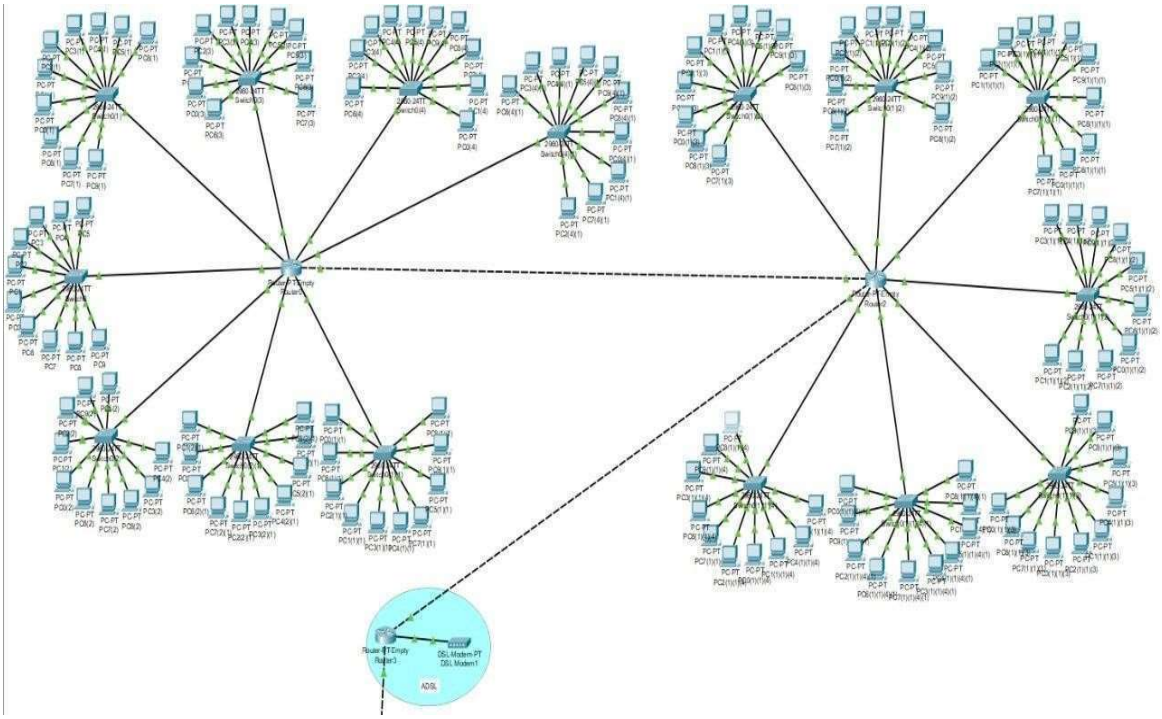
  The Domain Name System (DNS) is the phonebook of the Internet. When users type domain names such as ‘google.com’ or ‘nytimes.com’ into web browsers, DNS is responsible for finding the correct IP address for those sites. Browsers then use those addresses to communicate with origin servers or CDN edge servers to access website information. This all happens thanks to DNS servers: machines dedicated to answering DNS queries.

- DHCP Server

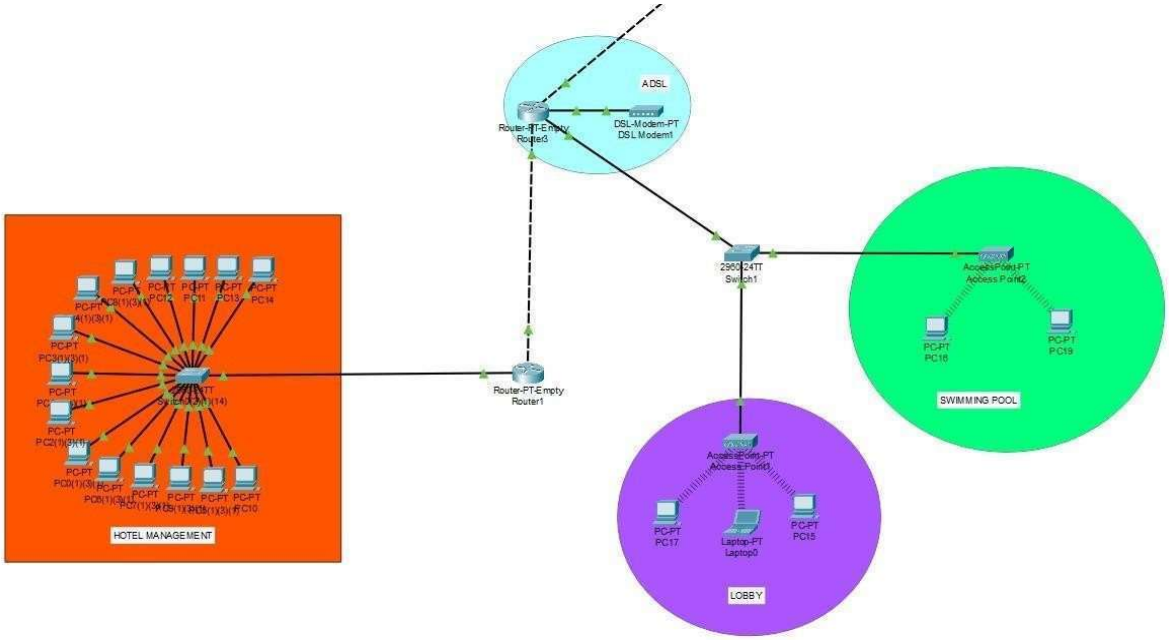
  A DHCP Server is a network server that automatically provides and assigns IP addresses, default gateways and other network parameters to client devices. It relieson the standard protocol known as Dynamic Host Configuration Protocol or DHCP to respond to broadcast queries by clients.

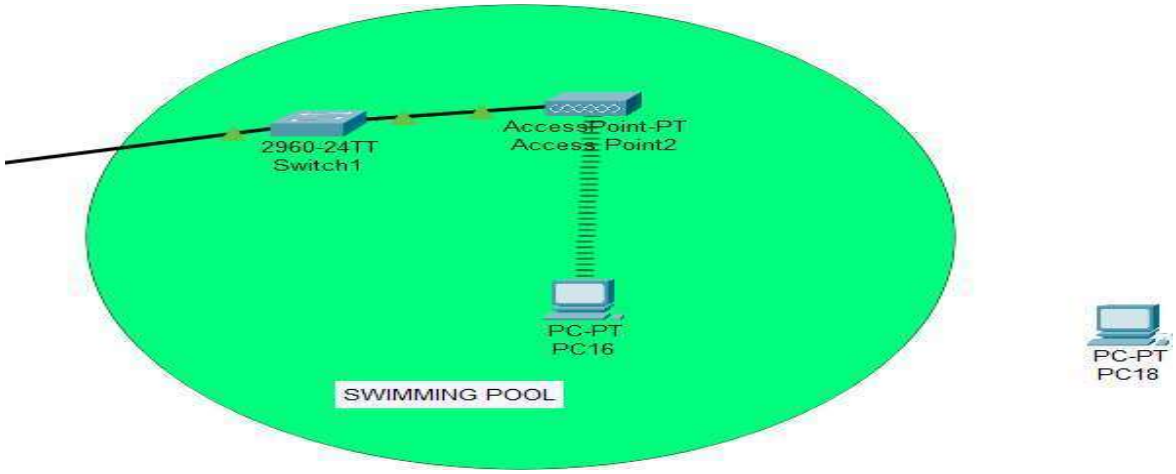
NETWORK DESIGN:

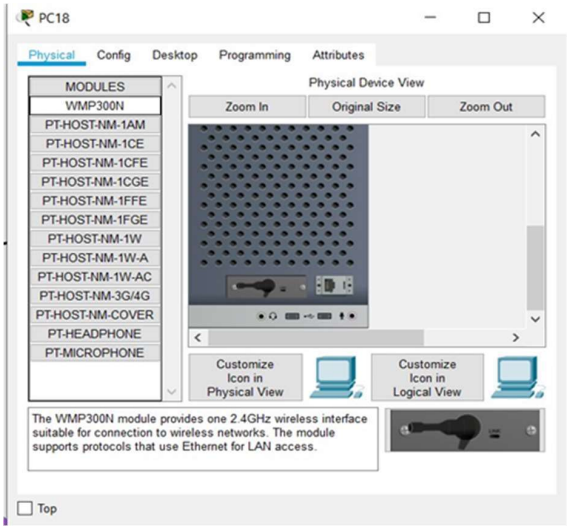


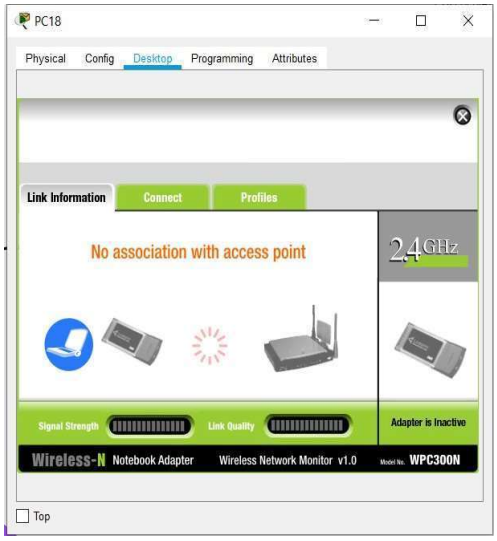


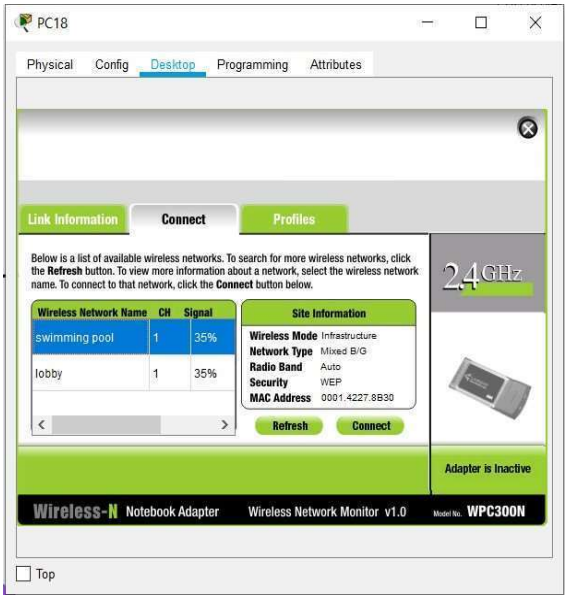
HOTEL MANAGEMENT ,LOBBY AND SWIMMING POOL

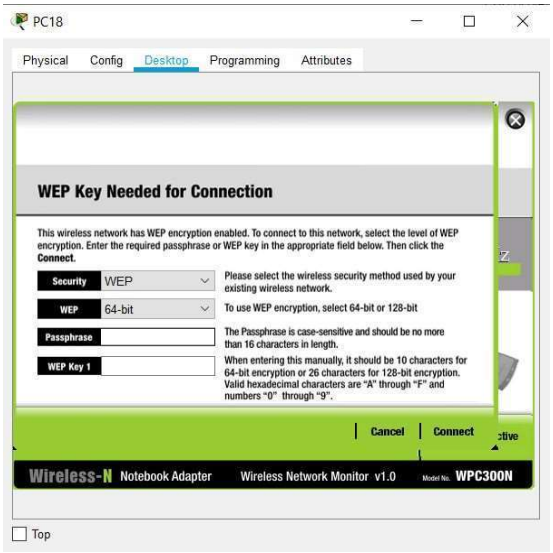


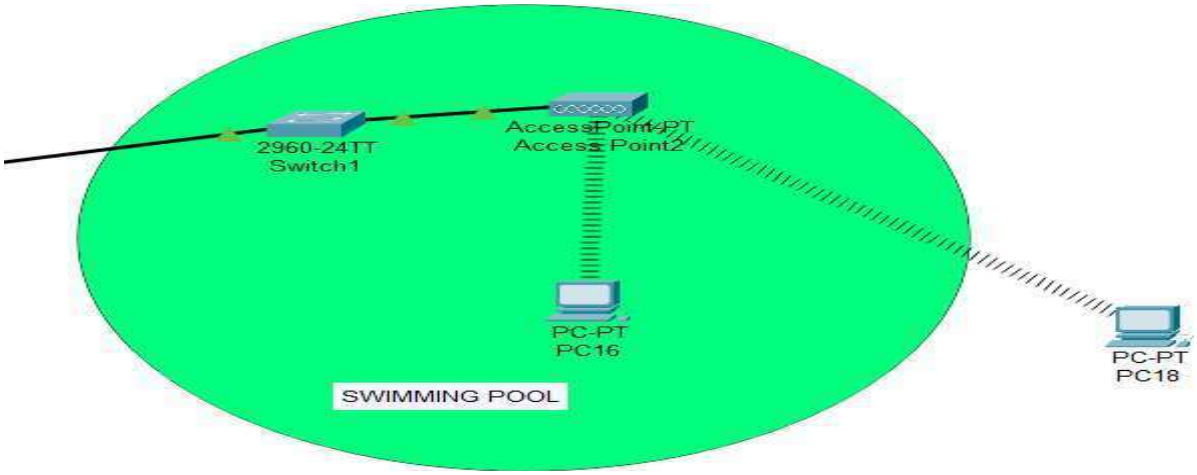



PC18
Physical
Config
Desktop
Programming
Attributes
MODULES
WMP300N
PT-HOST-NM-1AM
PT-HOST-NM-1CE
PT-HOST-NM-1CFE
PT-HOST-NM-1CGE
PT-HOST-NM-1FFE
PT-HOST-NM-1FGE
PT-HOST-NM-1W
PT-HOST-NM-1W-A
PT-HOST-NM-1W-AC
PT-HOST-NM-3G/4G
PT-HOST-NM-COVER
PT-HEADPHONE
PT-MICROPHONE
Physical Device View
Zoom In
Original Size
Zoom Out
Customize Icon in Physical View
Customize Icon in Logical View
The WMP300N module provides one 2.4GHz wireless interface suitable for connection to wireless networks. The module supports protocols that use Ethernet for LAN access.
Top


PC18
Physical
Config
Desktop
Programming
Attributes
Link Information
Connect
Profiles
No association with access point
2.4GHz
Signal Strength
Link Quality
Adapter is Inactive
Wireless-N Notebook Adapter
Wireless Network Monitor v1.0
WPC300N
Top


PC18
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.
2.4GHz
Wireless Network Name
CH
Signal
swimming pool
1
35%
lobby
1
35%
Site Information
Wireless Mode Infrastructure
Network Type Mixed B/G
Radio Band Auto
Security WEP
MAC Address 0001.4227.8B30
Refresh
Connect
Adapter is Inactive
Wireless-N Notebook Adapter
Wireless Network Monitor v1.0
WPC300N
Top


PC18
Physical
Config
Desktop
Programming
Attributes
WEP Key Needed for Connection
This wireless network has WEP encryption enabled. To connect to this network, select the level of WEP encryption. Enter the required passphrase or WEP key in the appropriate field below. Then click the Connect.
Security
WEP
Please select the wireless security method used by your existing wireless network.
WEP
64-bit
To use WEP encryption, select 64-bit or 128-bit
Passphrase
The Passphrase is case-sensitive and should be no more than 16 characters in length.
WEP Key 1
When entering this manually, it should be 10 characters for 64-bit encryption or 26 characters for 128-bit encryption. Valid hexadecimal characters are "A" through "F" and numbers "0" through "9".
Cancel
Connect
Wireless-N Notebook Adapter
Wireless Network Monitor v1.0
WPC300N
Top


2960-24TT
Switch1
Access Point-PT
Access Point2
PC-PT
PC16
PC-PT
PC18
SWIMMING POOL

IP ADDRESS DESIGN:

Port	Link	VLAN	IP Address	MAC Address
FastEthernet0/1	Up	2	--	0001.9762.9E66
FastEthernet0/2	Up	3	--	0060.70E3.48CA
FastEthernet0/3	Up	4	--	0000.0CB1.BC0D
FastEthernet0/4	Up	5	--	0010.11AE.BE5B
FastEthernet0/5	Up	6	--	0001.43D2.E777
FastEthernet0/6	Up	7	--	00E0.B06C.E115
FastEthernet0/7	Up	8	--	000A.41A9.A669
FastEthernet0/8	Up	9	--	0001.4396.2D8B
FastEthernet0/9	Up	10	--	0001.96BC.22A2
FastEthernet0/10	Up	11	--	0004.9AC4.A5C9
FastEthernet0/11	Up	1	--	0001.9668.13C2
FastEthernet0/12	Down	1	--	00D0.BC2E.7C49
FastEthernet0/13	Down	1	--	0060.5C8C.A840
FastEthernet0/14	Down	1	--	0001.96DE.792C
FastEthernet0/15	Down	1	--	00E0.F993.CCCA
FastEthernet0/16	Down	1	--	0010.1189.1087
FastEthernet0/17	Down	1	--	0030.F2A8.9C5D
FastEthernet0/18	Down	1	--	000D.BD5B.95B4
FastEthernet0/19	Down	1	--	0007.ECA3.4748
FastEthernet0/20	Down	1	--	0030.F2C6.8081
FastEthernet0/21	Down	1	--	0030.A39D.88B2
FastEthernet0/22	Down	1	--	00D0.97A8.AA72
FastEthernet0/23	Down	1	--	0001.64C6.6802
FastEthernet0/24	Down	1	--	0006.2A80.2718
GigabitEthernet0/1	Down	1	--	0004.9AC7.5A88
GigabitEthernet0/2	Down	1	--	0006.2A73.A835
Vlan1	Down	1	<not set>	0006.2A30.E5B9

Hostname: Switch

Physical Location: Intercity, Home City, Corporate Office, Main Wiring Closet

Port	Link	VLAN	IP Address	MAC Address
FastEthernet0/1	Up	2	--	00E0.B078.ECD0
FastEthernet0/2	Up	3	--	0001.C96C.C823
FastEthernet0/3	Up	4	--	000C.CF94.19C5
FastEthernet0/4	Up	5	--	0090.212C.1807
FastEthernet0/5	Up	6	--	0005.5E81.858E
FastEthernet0/6	Up	7	--	0003.E400.7C90
FastEthernet0/7	Up	8	--	000A.F395.8673
FastEthernet0/8	Up	9	--	00D0.D3B4.831D
FastEthernet0/9	Up	10	--	0090.2BE7.8AD7
FastEthernet0/10	Up	11	--	0001.C91E.A862
FastEthernet0/11	Up	12	--	000C.CF3E.14EB
FastEthernet0/12	Up	13	--	0040.0B36.0028
FastEthernet0/13	Up	14	--	00E0.F7C8.C639
FastEthernet0/14	Up	15	--	0001.6438.56A6
FastEthernet0/15	Up	16	--	0000.0CE9.4D5C
FastEthernet0/16	Up	1	--	0003.E446.AEBC
FastEthernet0/17	Up	1	--	0030.F20A.E9A3
FastEthernet0/18	Down	1	--	0001.C9EE.12A4
FastEthernet0/19	Down	1	--	00E0.A39A.3B30
FastEthernet0/20	Down	1	--	0003.E4A2.3484
FastEthernet0/21	Down	1	--	0001.6319.555A
FastEthernet0/22	Down	1	--	000C.8558.097E
FastEthernet0/23	Down	1	--	00E0.8FA5.14AB
FastEthernet0/24	Down	1	--	00E0.A37B.6858
GigabitEthernet0/1	Down	1	--	00D0.BAB1.37C2
GigabitEthernet0/2	Down	1	--	00D0.583E.BD69
Vlan1	Down	1	<not set>	0004.9A66.B367

Hostname: Switch

Physical Location: Intercity, Home City, Corporate Office, Main Wiring Closet

HARDWARE AND SOFTWARE PRODUCTS:

CISCO LINKSYS RV016 10/100 16 PORT VPN ROUTER – B2

SWITCH CISCO SF 100-24-24-PORT 10/100 SR224T

WIRELESS ACCESS POINT TYPE OF DAP 2310

AMPED WIRELESS SR300 HIGHPOWER WIRELESS 300N SMART REPEATER

The 3-star hotel support 10 computers in each floor and the hotel has a total of 15 floors. The hotel has 15 staffs in the hotel management so 15 desktop computers would be required for management department. So, 165 desktop computers would be required. All the computers should have an antivirus software to secure all the computers. The guest computers will be connected to the Primary Router whereas the staff computers will be connected to Staff Router in order to provide different network for guests and staffs. So, we require a total of 2 routers.

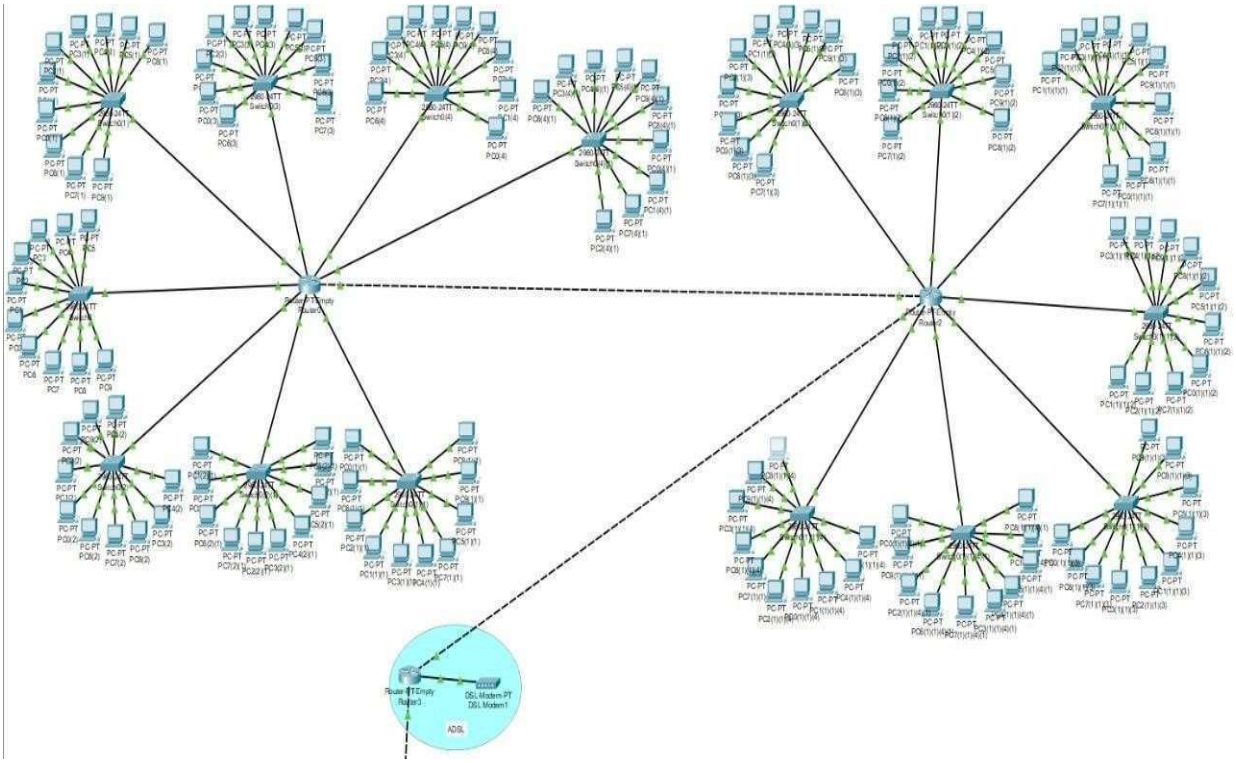
To connect those computers with internet connection will need one switch for each floor. All switches are linked to the primary router so we need 15 Switches in total for the guest computers and we require two more switches, one to connect all the staff computers to Staff Router and one to connect the Wireless Repeater to ADSL. So, 17 switches would be required.

The Lobby and Swimming Pool area will be supported with wireless internet facility. To have a better bandwidth we'll repeat the signal of the wireless access point from primary router by wireless repeater. All the wireless connection supported with WAP/WAP2PSK protection to be secure.

ADDITIONAL REQUIREMENTS:

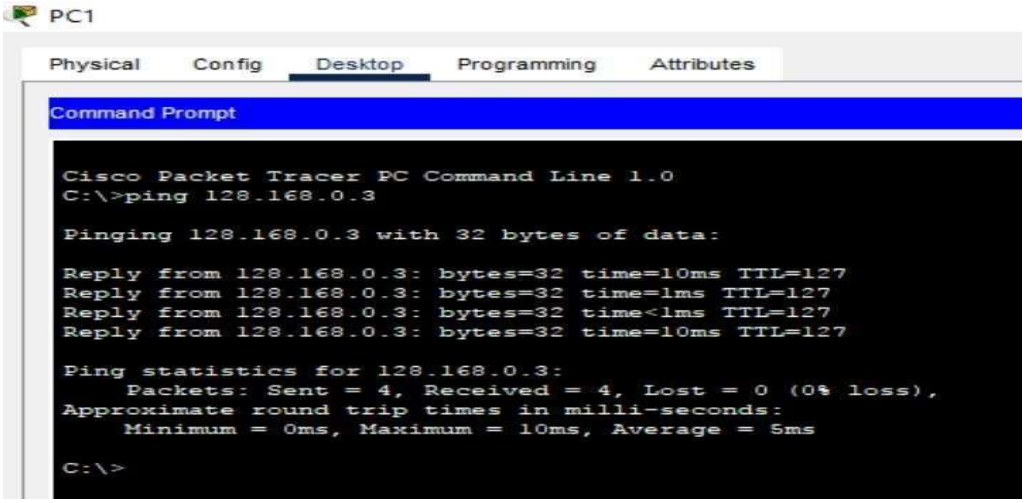
All the locations have high speed internet connection. At the Internet cafe, an additional public IP address would be required to host the application server. The IP address would be registered with a domain name, which would enable users on the outside world (internet), to access the application.

PROJECT SNAP SHOT:



CHECK CONNECTION:

Ping a pc from another pc



Pc1 in IT department is used to ping pc3 in HR department to check logical connection.We used ping command to check connectivity between the pcs

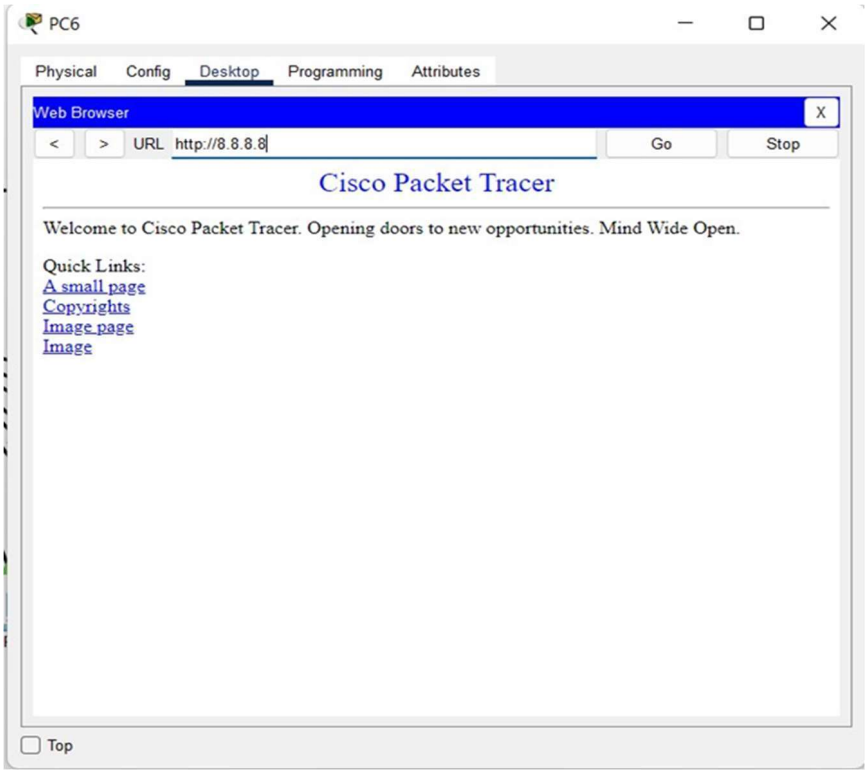
Click on Pc1-> click on desktop-> go to command prompt->

Type ping command

“ping 198.168.0.3”

The above screenshot shows the successful implementation of the connection across two different systems, where it executes perfectly.

Opening a website from PC:



RESULT:

The network design proposal for 3 - star hotel using a hybrid topology containing star and tree topology is successfully executed and implemented.

Inference from the Results:

This project has proven that a standard network system can be designed with great efficiency. The security of this network turned out to be very strong. This is because the firewall and backup devices used in this network are of good quality. And the ADSL internet access gives great support to the pc's connected on the network inside the organization

Conclusion:

Network designing is one of the vital roles in making sure that it needs the objective. Network is a connected collection of devices and end systems, such as computers and servers, which can communicate with each other. The physical components are the hardware devices that are interconnected to form a computer network. Software and firewalls play a major role in making sure that data is protected. Apart from the physicaldevices, selecting software products for installing in the network is a challenging task.

This project has proven that a standard network design with the less cost. For this project, we did not use all servers because of cost, but we used some important servers such as ADSL.It can be seen in this research that various costs were minimized in order to maximize the quality of the designed network. Although there may have been some challenges in this project due to some financial constraints, at the end our aim was achieved by designing a network for developing 3 Star hotel with minimal cost.

REFERENCE:

https://www.academia.edu/15144271/Network_Design_Project_Proposal

https://en.wikipedia.org/wiki/Network_planning_and_design

What Is Network Design? - Cisco

Networking Commands Explained with Examples (computernetworkingnotes.com)