

# **“Design a pre-sales proposal for network setup in a university”**

**A COURSE PROJECT REPORT**

**By**

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**FACULTY OF ENGINEERING AND TECHNOLOGY**

**SRM INSTITUTE OF SCIENCE AND TECHNOLOGY**

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# **SRM INSTITUTE OF SCIENCE AND TECHNOLOGY**

## **BONAFIDE CERTIFICATE**

Certified that this mini project report "**A pre-sales design proposal for network setup in a university**" is the bonafide work of **Rakshita Raj (RA2011030010030)**, **Harshitha G (RA2011030010020)** and **Devshree Moghe(RA2011030010049)** who carried out the project work under my supervision.

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## **ABSTRACT**

A pre-sales design proposal for network setup in a university

The university has the following 7 departments.

1. IT
2. Finance
3. HR
4. Management
5. Faculty
6. Students
7. R&D

The university has an ADSL internet connection which would be used by the departments except for the R&D department which should not have access to the same. All the departments should be able to communicate with each other. Each department contains 50-100 users.

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## **TABLE OF CONTENTS**

<b>CHAPTERS</b>	<b>CONTENTS</b>
<b>1.</b>	<b>ABSTRACT</b>
<b>2.</b>	<b>INTRODUCTION</b>
<b>3.</b>	<b>LITERATURE SURVEY</b>
<b>4.</b>	<b>REQUIREMENT ANALYSIS</b>
<b>5.</b>	<b>ARCHITECTURE &amp; DESIGN</b>
<b>6.</b>	<b>IMPLEMENTATION</b>
<b>7.</b>	<b>EXPERIMENT RESULTS &amp; ANALYSIS</b> 7.1. RESULTS 7.2. RESULT ANALYSIS
<b>8.</b>	<b>CONCLUSION &amp; FUTURE ENHANCEMENT</b>
<b>9.</b>	<b>REFERENCES</b>

# **1. INTRODUCTION**

## **1.1 Scenario Description**

A network has to be designed for a university which has 50-100 users in each department. It is a pre-sales network setup in which various computers of different departments are set up so that they can interact and communicate with each other by interchanging data. To design a networking scenario for a college which connect various departments to each other's, it puts forward communication among different departments.

The students and faculties in the organization will be able to use the server without any restriction since they are directly routed to the same network via the campus server. The departments can also intercommunicate with one another without any restriction.

The main objective of the proposed network is to update the existing network and also enhance its capabilities and increase the flexibility of the network which will eventually provide good security.

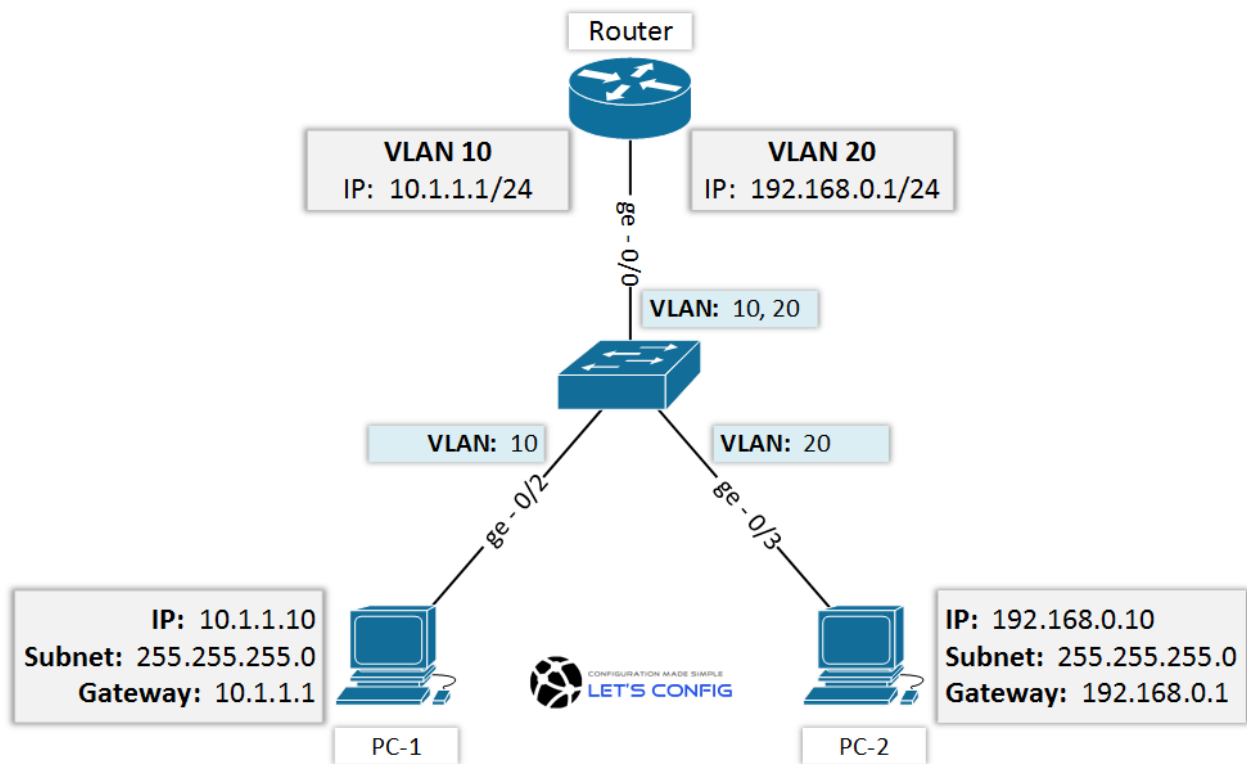
### **3.REQUIREMENTS**

#### **1.2 Requirement Analysis**

1. The active network components which are required ( Routers , Switches ).
2. Given the number of switches , routers which are required for the design.
3. The IP Design schema for the department.
4. Explained about other details required to be configured on the Switch and how to create different departments with VLAN.
5. Explanation of how to restrict internet connection for R&D Department and allow access for the other departments with Access control lists on the Router.
6. Identifying the feature on the router which is required for sharing the Internet for the users.
7. Identifying the TCP/IP adapter parameters ( IP address, Subnet mask, Default Gateway, DNS Server IP address) for the users.

## 2. ARCHITECTURE AND DESIGN

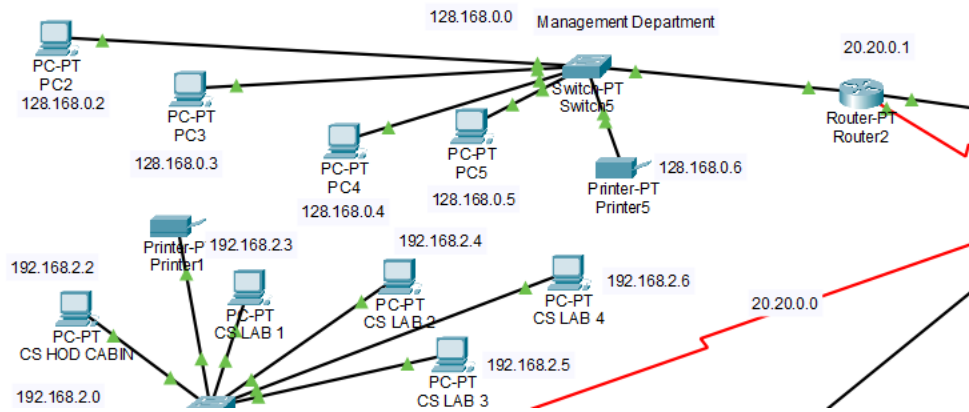
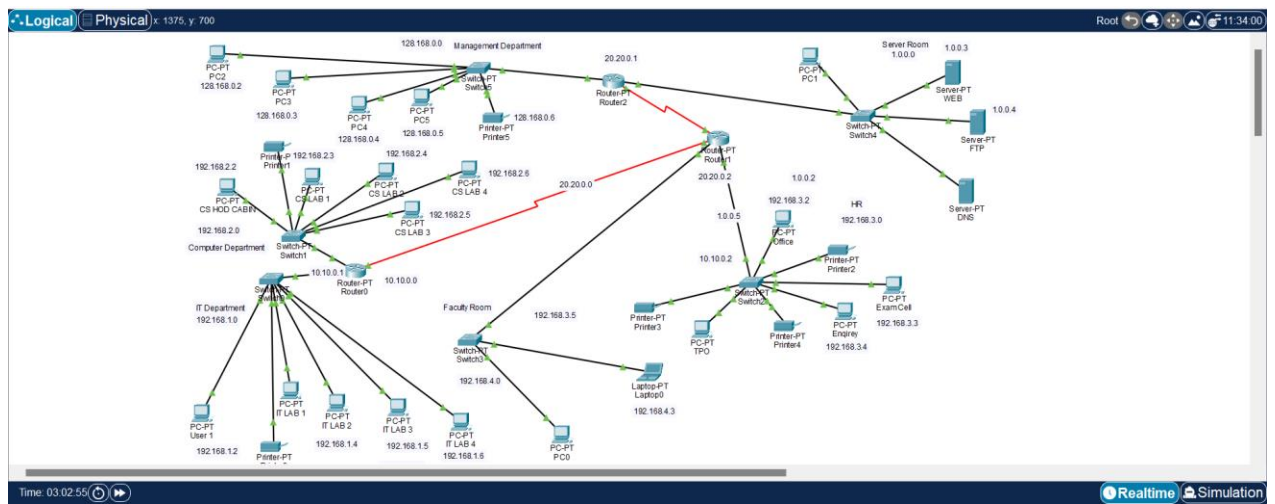
### 2.1 Network Architecture



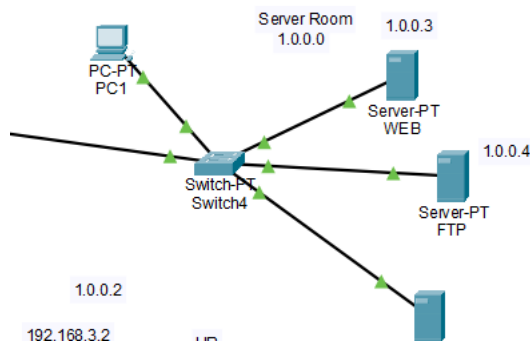
Usual vlan setup for connection between users or pc's

The network architecture is as follows:

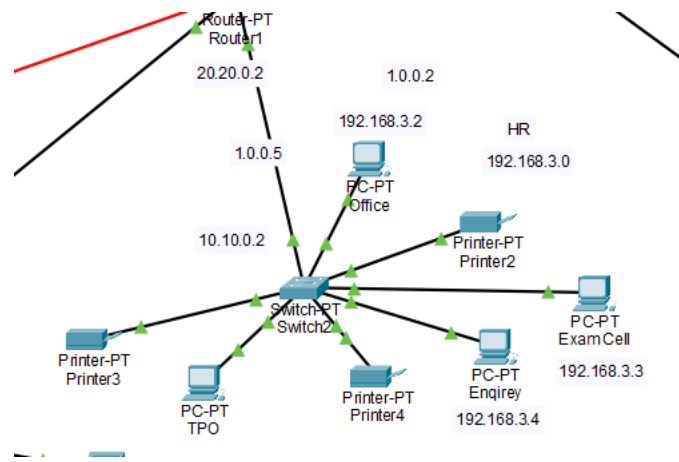




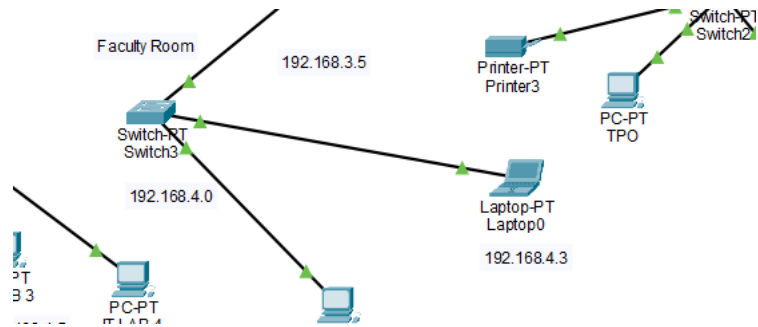
Management Department



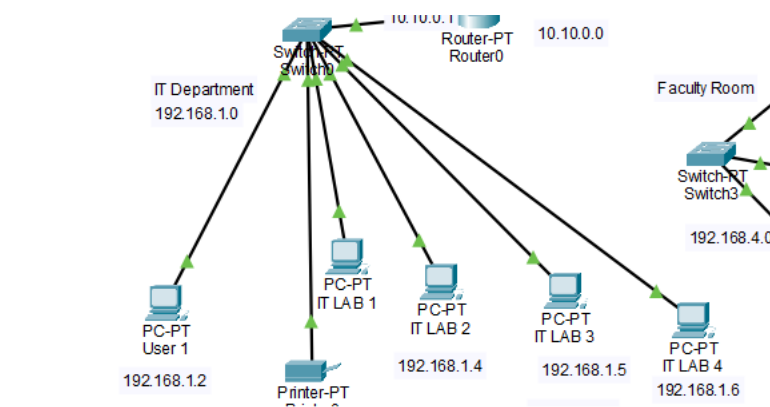
Server Room



HR Department



Faculty Room



IT Department

The architecture consists of server room which has a switch connected to a router.

Every department has one switch connected to two routers except the management department through serial connection.

These networks are interconnected with each other with varying degrees  
ADSL or DSL connection is used to establish a communication between the different departments and with the department and the server.

### 3. IMPLEMENTATION

#### 3.1 Address Table

The address table is as follows:

Device	Interface	Address
Server	Fa0	1.0.0.0
Management Department	Fa0/0	172.16.0.1
	Fa1/0	192.16.0.1
	Se2/0	10.0.0.1
Finance Department	Fa0/0	192.16.0.2 to 192.16.0.7
It Department	Se2/0	10.0.0.2
	Fa0/0	192.168.10.1
Faculty	Fa0/0	192.168.4.0
HR Department	Fa0/0	192.168.3.0

## 4. RESULTS AND DISCUSSION

### 4.1 Connection Check

The network connections were checked by ping requests:



```
Physical Config Desktop Programming Attributes
Command Prompt

Cisco Packet Tracer PC Command Line 1.0
C:\>ping 128.168.0.3

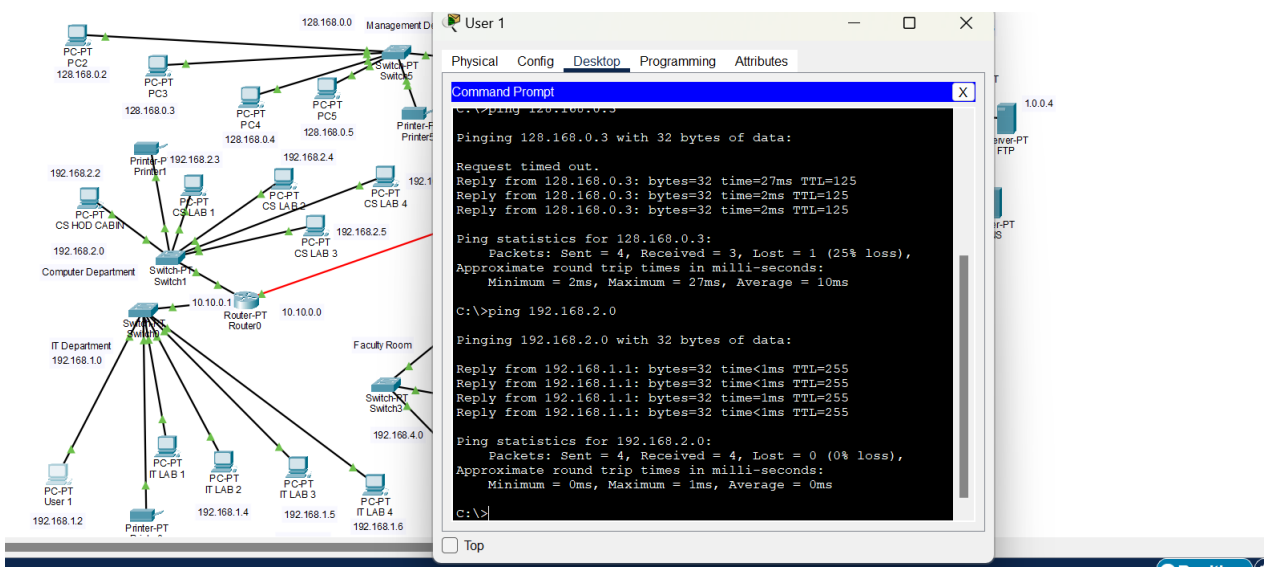
Pinging 128.168.0.3 with 32 bytes of data:

Request timed out.
Reply from 128.168.0.3: bytes=32 time=28ms TTL=125
Reply from 128.168.0.3: bytes=32 time=3ms TTL=125
Reply from 128.168.0.3: bytes=32 time=32ms TTL=125

Ping statistics for 128.168.0.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 32ms, Average = 21ms

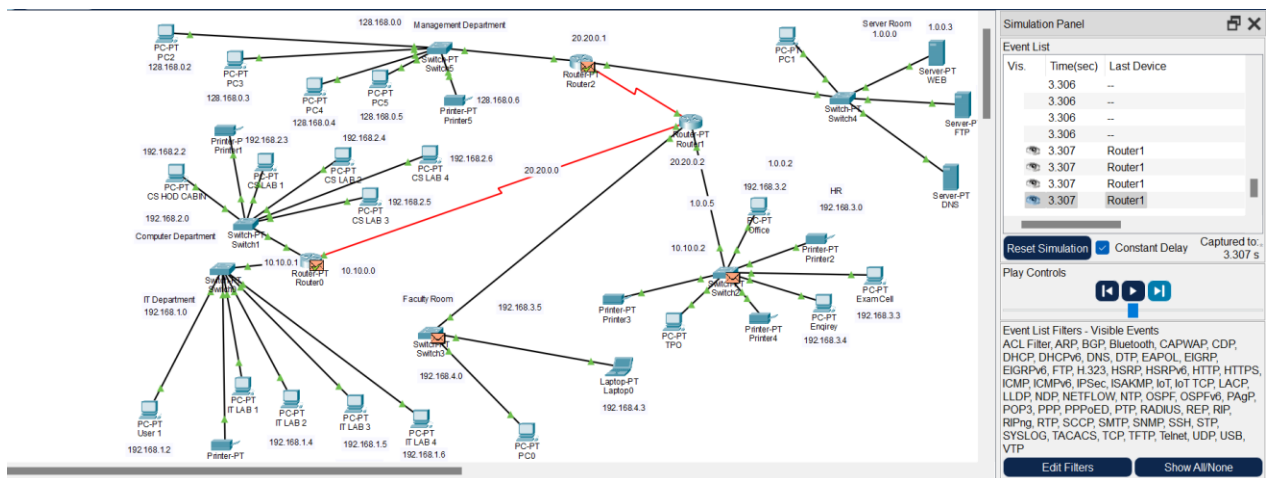
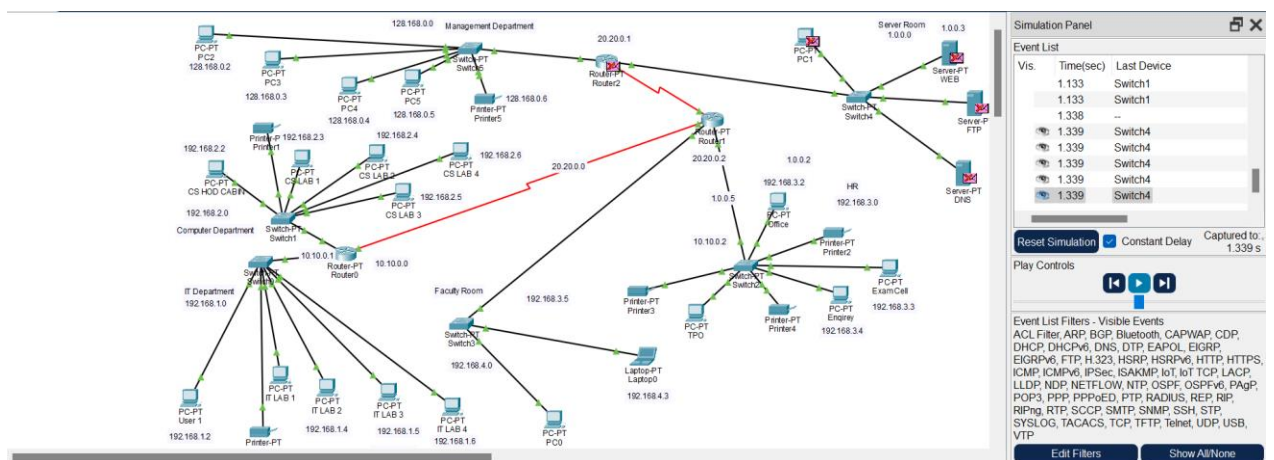
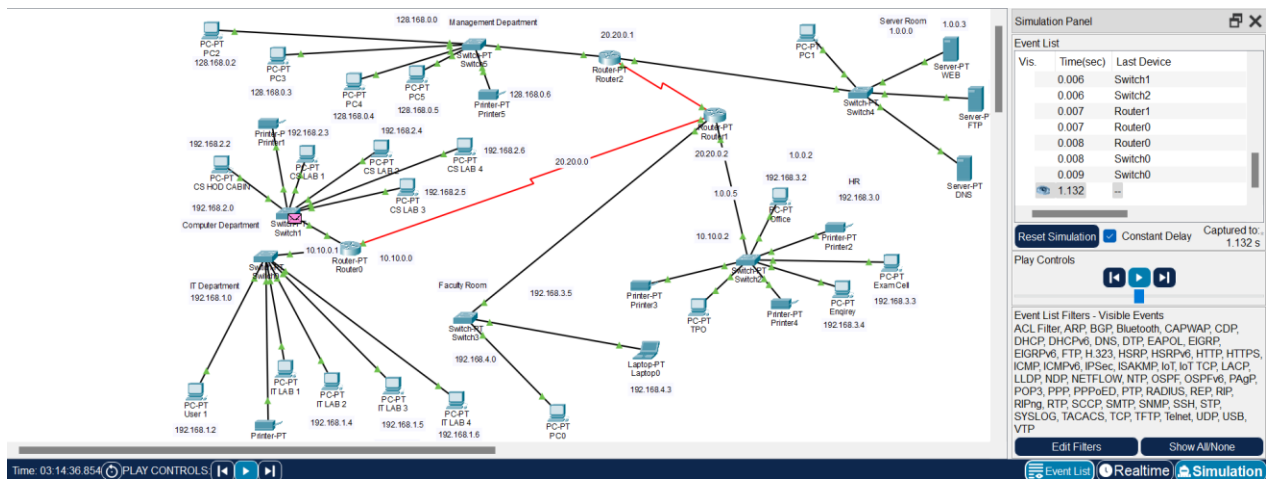
C:\>
```

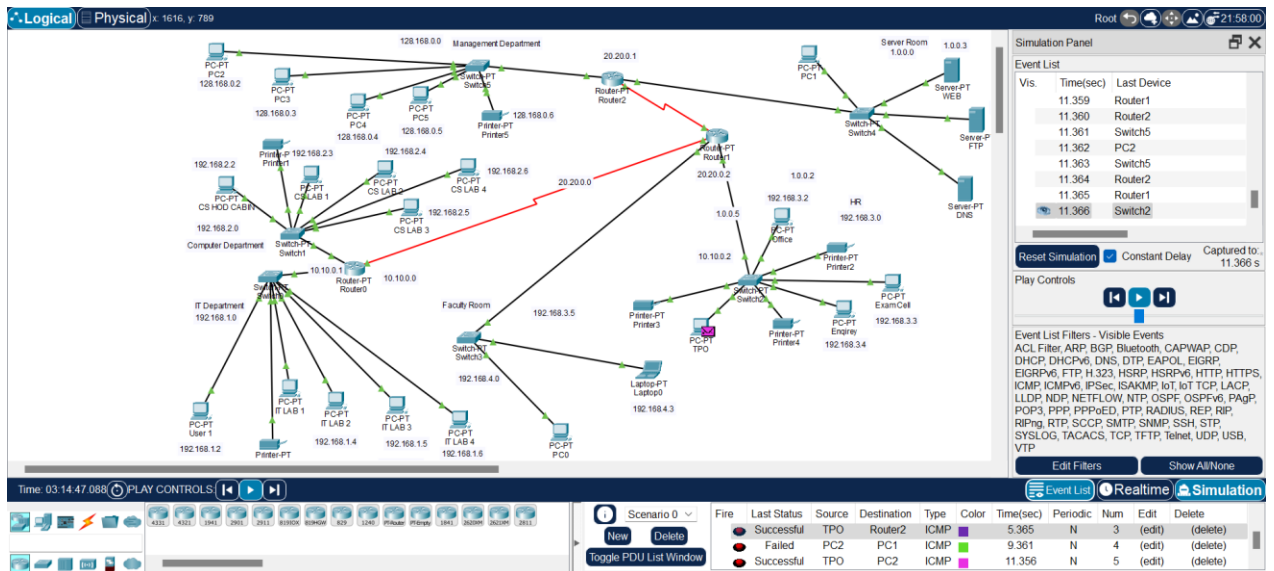
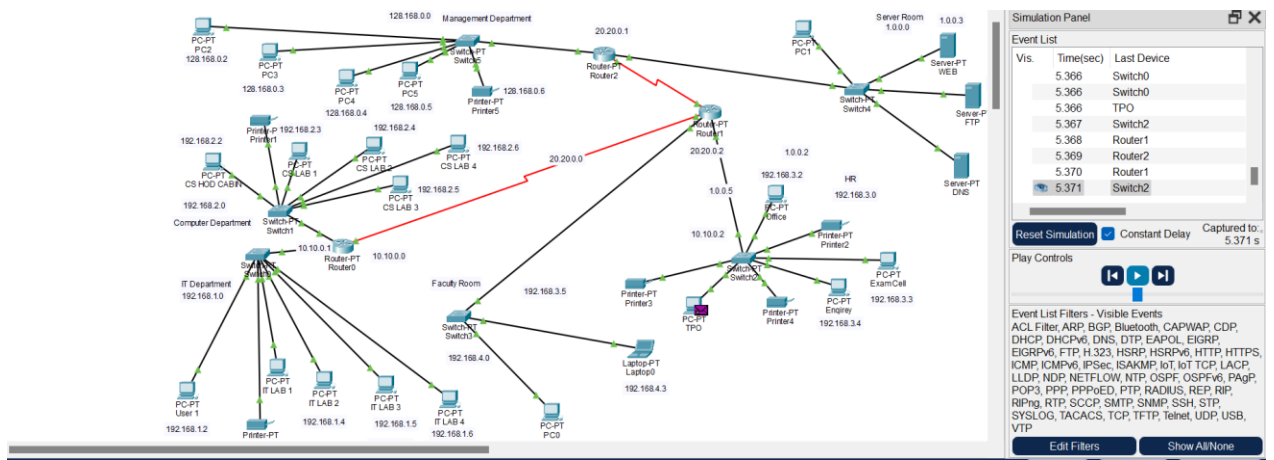
### Communication between user of it department and management department



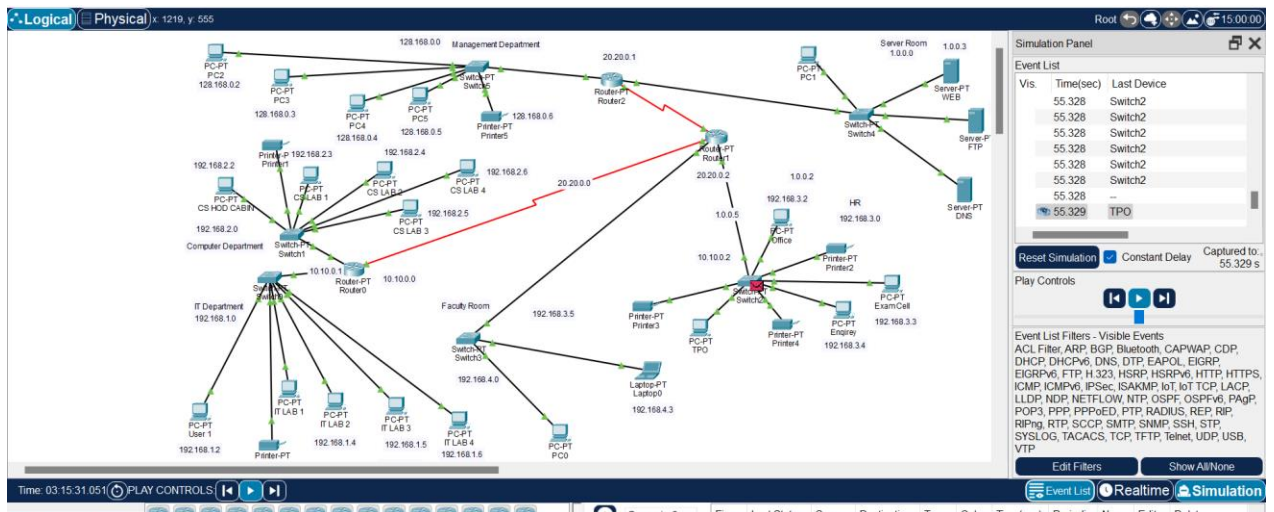
### Communication between it and computer department



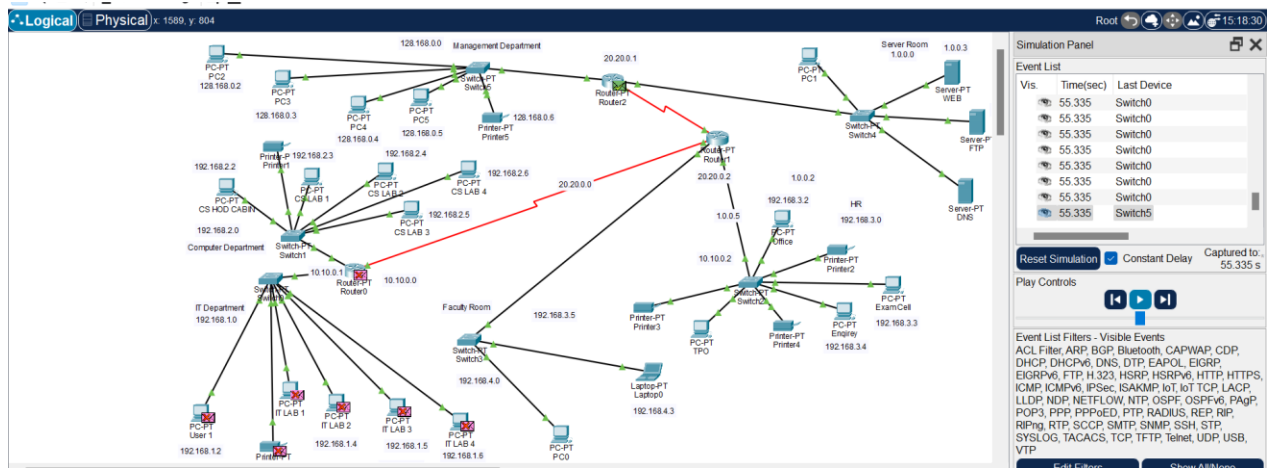


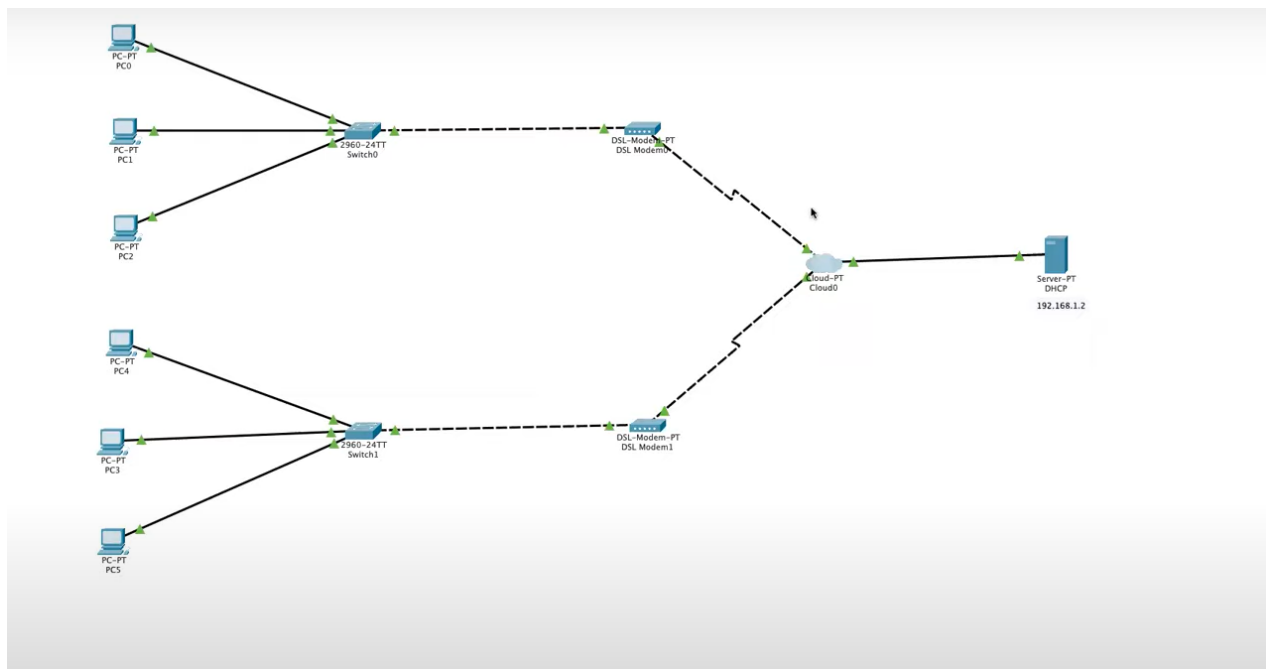


Tracing from hr department to management department









**DSL is configured**

### ADSL/DSL connection:

DSL is a cost-effective method to connect to the internet with high speed bandwidth, as compared to cellular data. It's much faster than a dial-up connection with a high bitrate. DSL speeds vary from 256 Kbps to 100 Mbps. Internet providers have various packages depending on the connection speed you need.

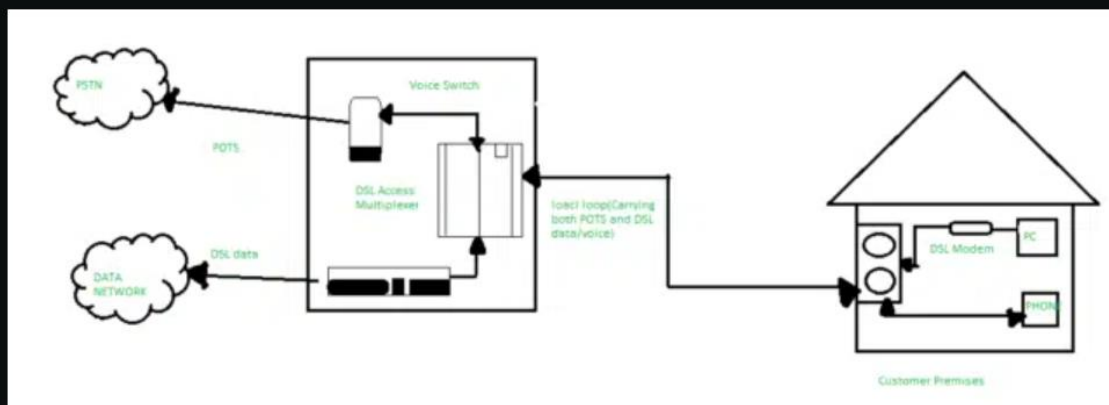


Image source

# DSL vs cable

## Structure

Cable internet is a type of **broadband internet connection** that uses coaxial cables to connect you to the internet. It uses the same infrastructure as cable television, quite analogous to a DSL service using telephone lines. Cable internet is popular among residential users and one of the cheaper options.

## Availability

Cable internet is almost as easily available as DSL. It's widely accessible because of the reach of cable television especially in urban and suburban areas. You can easily find packages bundled with your cable TV monthly subscription.

There might be availability issues in rural areas. DSL comes to the rescue there because telephone lines have reached where cable still has not.

## Reliability

Speed reliability can be a concern with cable internet. Cable internet uses a shared network and the coaxial cables are susceptible to network congestion. This can lead to slowed speeds and performance can dip during peak times.

## Speed

It's among the fastest internet types out there. Download speeds can go up to 1 Gbps and upload up to 50 Mbps.

Many people opt for a DSL connection because it's widely available. Fibre optic is mostly available in urban areas and tech hubs. Cable internet is also available but not preferred to DSL because DSL is more dependable. It's hard to give the broadband crown to DSL or cable, because while DSL can be easier on the pocket, cable can be faster.

Depending on what's offered where you live, fast reliable internet is easily achievable these days. Between DSL, cable internet, fixed wireless internet, and fibre optic, you have the option to find the perfect internet connection for your home or business. Just do your homework before taking the plunge.

DSL brings a connection into your home through telephone lines and allows the household to use the Internet and make telephone calls at the same time. It works because the DSL system separates the telephone signals into three bands of frequencies. The lowest band allows for telephone calls, while the other two bands take care of uploading and downloading online activity.

Cable companies provide a cable modem for their Internet customers. DSL companies provide a similar piece of hardware called a DSL *transceiver*.

Since DSL uses telephone wires, it makes sense that the biggest providers are telephone companies. AT&T is the largest telecommunications company in the world and is also the largest provider of DSL service. Verizon and Century Link are also major providers of DSL.

[ADSL](#) is a popular, older type of broadband, with the term standing for Asymmetric Digital Subscriber Line. It is a broadband connection that works through the copper wires of existing phone lines and is mainly used for home broadband and within small businesses.

1. Runs through the BT phone line network
2. High-quality, reliable broadband connection
3. Permits faster data transmission through a single connection
4. Allows internet access at the same time as making phone calls
5. Minimal installation costs and maintenance

ADSL broadband is an extremely cost effective way to access the

internet and is the most useful for startups and small businesses who have low reliance on the technology. Perhaps only one call needs to be made at a time and the business owner is often online at off-peak times.

For such businesses, ADSL is a fantastic entry level broadband that allows for easy budgeting; it won't have a huge impact on finances and forecasts. With speeds of up to 24Mbps download and 8Mbps upload, it can be more than enough for your needs. When this is the case, it's a wise business decision to not pay for more than you need and to reinvest the savings into your success.

Should your business still be using a dial-up modem, it is recommend to switch to broadband to benefit from fast internet access that's always on, to help improve productivity. To access ADSL once it's installed, you need an ethernet cable and router, which also enables a WiFi connection.

### How does ADSL broadband work?

To set-up an ADSL broadband connection, an existing phone system is connected to the BT line through copper wires. During installation, a DSL (Digital Subscriber Line) filter, or splitter, isolates frequency bands allowing a single line to be used for both telephone calls and ADSL broadband.

Due to how ADSL is accessed, performance is affected by distance from the PBX, or Private Branch Exchange. The closer premises are to the exchange, then the better the performance received as the connection benefits from a stronger signal. This is known as an asymmetric flow of data.

In the immediate vicinity of the exchange, users will get a high speeds (up to 24Mbps) and those towards the edge of the signal range will get lower rates of speed (down to 1Mbps). Estimated speeds can be checked before installing the connection.

ADSL is also not exclusive; it is known as a contended service where usage is shared between other businesses and home users in your area. It's performance will slow down at peak times of usage.

## 5. CONCLUSION AND FUTURE ENHANCEMENT

Thus the pre sales network setup for a university/campus was successfully implemented. Through this proposed setup we get a visual perspective on how to create connections for various departments of a university.

The outcome of the proposed system will be a fail-safe backbone network infrastructure which meets the requirements for readily available access to information and security of the private network, and also ensures optimized productivity when telecommunication services are accessed. The installed equipment allowed to organize high-speed wired and wireless Internet access throughout the whole complex of hospital buildings as well as providing transfer of all types of data throughout the single optimized network.

In most scenarios, you'd likely want DSL only if your other alternative were old-fashioned, low-cost dial-up service, which surprisingly is still available in many areas. Compared to dial-up, DSL offers you advantages:

1. You're able to use the Internet and make phone calls simultaneously.
2. It's faster than dial-up.
3. You have a choice of price plans, based on the speed you want or are willing to get.

That seems like a good start, but there are some disadvantages nonetheless:

1. Sending data won't work as well or as fast as receiving data.
2. The further you are from the telephone company's central location, the slower your service might be (we're not talking hundreds of miles either—more like just under four miles).
3. Sorry. You just might be too far away to even be offered DSL.
4. [The increasing reliance on fiber optics](#), highlighted through the big investments communications service providers are dedicating to strengthen their infrastructure, has been the main driver away from DSL services. The properties of optical transmission in terms of speed, low interference and attenuation have been appealing to individuals and companies. The deployment of a fiber network that reaches all premises constitutes a last-mile connectivity to the global fiber optic network. The difference in user experience perceived by subscribers is the main reason to switch from aging DSL connections.

## 5. 5G Wireless Networks

5G is the talk of the town! Everyone from standardization bodies to governments, network operators, businesses, and individuals are talking about the properties of the new technology. 5G is not only a new standard that should provide higher data rates and lower latencies. [It is rather a complete ecosystem](#) that is meant to transform how services are conceived and provided. The adoption of true versatile mobile connectivity that started with 3G should be amplified further with 5G. Subscribers are relying more on their mobile devices to perform most of their daily tasks, and DSL is simply not adequate for that. In addition to enabling mobile broadband connectivity, new 5G fixed wireless access solutions are being developed to provide high speed fixed broadband connectivity.

## 6. Cable Internet Connectivity

Cable internet is yet another alternative to DSL. Instead of relying on copper-based telephone lines, cable solutions use the television cable infrastructure to provide internet connectivity. As TV transmission only consumes a small part of the bandwidth, service providers are able to deliver high speed internet over the link.

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