# **NETWORK DESIGN PROPOSAL FOR A FICTIONAL UNIVERSITY**

# A PROJECT REPORT
# (Review-1)

*Submitted by*

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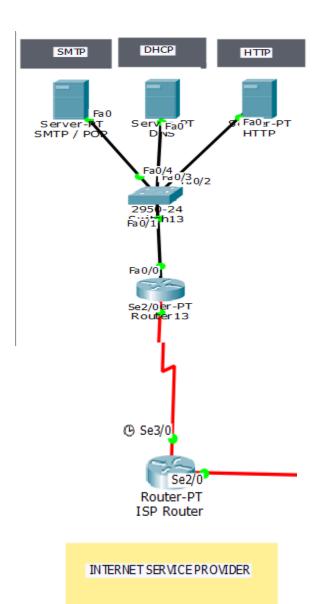**MVS Yashwanth [RA1911031010113]**

*Under the Guidance of*

**Dr. Murugaanandam S**
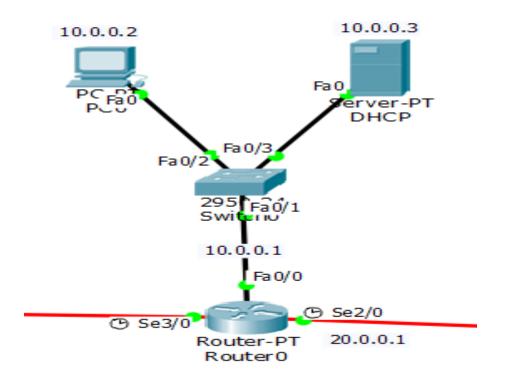
(Prof, Department of Computer Science Engineering)

## INTRODUCTION

The networks used in almost all the universities around India are extremely Inefficient (cost-bandwidth ratio is very high). So, keeping this in mind, the project is a basic design, a template, if you may, that is cost-efficient, while at the same time, supplies a decent bandwidth to the network. It can be used both for designing a small to medium-sized network, and can even be used for upgrading a network. In case it is not obvious, the design is provided free-of-charge,with life time updates, under the GNU General Public License v3 – which means that if you want to supply the project under your own company, you can, but just include this report with the design.
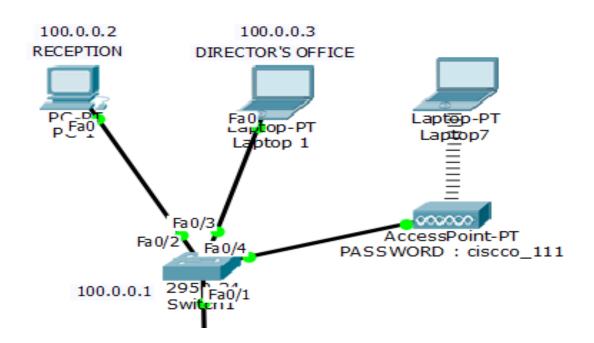
# Design Architecture

NEWTORK ADMINISTRATOR

10.0.0.2

PC-PT
PC0
Fa0

10.0.0.3

Fa0
Server-PT
DHCP

Fa0/3

Fa0/2

295...
Switch0
Fa0/1

10.0.0.1

Fa0/0

Se3/0

Se2/0

Router-PT
Router0

20.0.0.1

RECEPTION

100.0.0.2
RECEPTION

100.0.0.3
DIRECTOR'S OFFICE

Fa0
PC-PT
PC-PT
Fa0

Laptop-PT
Laptop 1

Laptop-PT
Laptop7

Fa0/3

Fa0/2
Fa0/4

AccessPoint-PT
PASSWORD : ciscco_111

100.0.0.1
2950-24
Fa0/1
Switch1

RECEPTION

100.0.0.2
RECEPTION

100.0.0.3
DIRECTOR'S OFFICE

PC-PT
PC 1

Fa0

Fa0
Laptop-PT
Laptop 1

Laptop-PT
Laptop7

Fa 0/3

Fa 0/2

Fa 0/4

AccessPoint-PT
PASSWORD : ciscco_111

100.0.0.1   2950-24   Fa0/1
Switch1

Fa0

Fa0

Fa0

Fa0

PC-PT
PC28

PC-PT
PC29

PC-PT
PC1

PC-PT
PC14

32.0.0.4

32.0.0.5

32.0.0.6

32.0.0.7

VLAN 100

VLAN 100

VLAN 200

VLAN 200

COMPUTER SCIENCE DEPT.

MECHANICAL DEPT.

ELECTRICAL DEPT

CIVIL DEPT

CHEMICAL DEPT

BOY'S HOSTEL

GIRL'S HOSTEL

AccessPoint-PT
GUEST HOUSE

Laptop-PT
PASSWORD: cisco 123

Fa0/41

Fa0/3
Fa0/2
2950-2 Fa0/2
Switch17

Fa0
PC-PT
PC30
101.0.0.3

.0.2
HEAD

Fa0
PC-PT
PC21
101.0.0.2

p-PT
op6

GUEST HOUSE

Fa0/1

2950-5 Fa0/3
S Fa0/2

Fa0

Fa0
PC-PT
PC19
12.0.0.2

Fa0
PC-PT
PC20
12.0.0.3

LIBRARY

STAFF BUILDING

STAFF BUILDING A

STAFF BUILDING B

41.0.0.2        41.0.0.3        42.0.0.2        42.0.0.3

PC-PT                PC-PT              PC-PT              PC-PT
Fe0/                Fe0/              Fe0/              Fe0/
PC13                PC17

Fe0/3              Fe0/3
Fe0/2              Fe0/2

2950-24            2950-24
Fe0/1              Fe0/1
Switch 14

Fe0/1              Eth5/0  42.0.0.1

41.0.0.1  Fe1/0

Fe0/0  er-PT
104.0.0.2  outer6

PC-PT
PC18
Fe0/2
104.0.0.3

Fe0/1  2950-24
Switch11

Fe0/2
Fe0/3

DIRECTOR'S
REEESIDEN

Fe0/1  0-24
Switch10

# CAMPUS DIAGRAM

**NETWORK REQUIREMENT ANALYSIS:**The devices used in the design can be broadly divided into four categories:

- Routers
- Switches
- Clients
- Servers
- Connecting wires

➤ <u>Clients</u> – This may include the PCs connected to the network through LAN wires. This may also include smartphones connecting to the network wirelessly,
although that particular facet of information will not be mentioned here.

➤ <u>Connecting wires</u> – This includes
DCE/DTE wires – used to connect routers to each other.
Copper Straight-Through Wires – one of the most versatile wires ever invented, and are used for connecting
- Router-to-Switch
- Switch-to-Clients
- Router-to-Clients

➤<u>Servers</u> – Basically, a server is a specialized PC, with huge bandwidth, that hosts all the files for the network, and also enable Internet functionality, by maintaining a seamless connection to the World Wide Web (WWW) through the Internet Service Provider (ISP).

•<u>Routers</u> – To be concise, a router is simply used for inter-connection of devices – for
 example, a PC to a PC.
 In our design, a router performs the
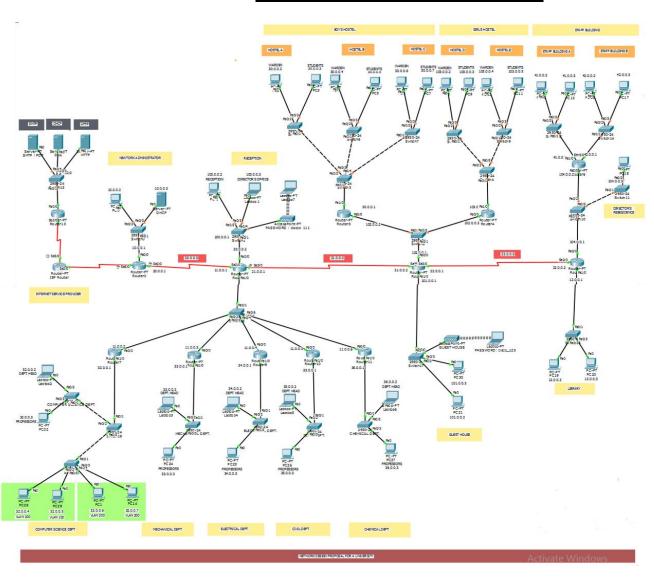 job of inter-connecting a department to another department.


•<u>Switches</u> – A switch is used for handling selective data units, termed as packets.
For example, suppose a client from the Human Resources Department
(say PC1) wants to send some confidential data to a client in the R&D Department
(say PC9) – this is accomplished through a switch, since a router would forward
the packets everywhere without rhyme or reason – hence breaking the confidentiality of the data.

# NETWORK DIAGRAM:

# NETWORK AND SYSTEM INTEGRATION METHODOLOGY

▪Network access for the hostels

•Unlimited network access for the Director's Office

•Network access only for all the departments

•Unlimited network access for the staff

•Network access for the library

•Network access for the campus

•Network access for the guest house

# IP NETWORK DESIGN GUIDELINES

**DHCP**

DHCP is a network server that dynamically assign default gateways, IP addresses and other parameters of network to client's computers. This relies on the standard protocol also known as Dynamic Host Configuration Protocol or DHCP to respond to client broadcast queries. The DHCP server automatically sends the proper network parameters for clients to interact correctly on the network. Without DHCP the network administrator must manually set up any client that enters the network, which can be tedious, particularly in large networks.

**RIP**

RIP is a standard transport layer protocol, intended to be used on a lesser scale. Networks, RIP was one of the first genuine network architectures for a distance vector, it is supported by a variety of systems. Each network which is 16 hops away or more is declared inaccessible by RIP, with a higher network length of 15 hops. A metric of 16 hops in RIP is known to be a poison route or an infinity metric. If several paths exist for a specified route, RIP can load that balancing among these paths (by default, up to 4) unless the metric (hop count) is equivalent (Gani *et al.*, 2011).

## SERVICES AND FEATURES

The various services provided by the network are detailed as follows:

1. Instant network access
2. Security
3. The Internet Service Provider provides speed at a rate of 8 MB/s
4. There is also the provision for a Network Administrator added – the person(s) who can

    a) Decrease, increase or otherwise modify the speeds of the network.

    b)Shutdown or restart the entire network (only in cases of severe eventualities).

    c)Add more sub-networks to the main networks (example – adding more users to a VLAN, in case a new department is established).

    d)Sub-netting – although not done in our network due to complexity issues, it is possible for the network administrator(s) to establish sub-netting in case of lack of IP addresses.

    e)It is also possible for the routers to get their firmware replaced, updated, etc. by the network administrator(s).

# CONCLUSION

Although it is difficult to say anything conclusive at this point of time, we can definitely say that we have much to improve upon in the future. They were not implemented in The final design. These suggestions may be taken at face value, depending upon the reader's own discretion:

1)Sub-netting
2)Sub-interfacing
3)More PCs added to each VLAN/Switch

Other suggestions may be updated as necessary

We are of the firm opinion that the template provided by this is applicable for *any* network – provided it is *not* large enough.

The network is fully featured with ISP, network administration, interconnection of various departments, VLANs for connection of Department Heads and wardens, network access for library, guesthouse, and an open Wi-Fi too.

This is the template that universities look for when building their first network. We hope you will too.

# THANK YOU