

PROJECT TITLE

A COURSE PROJECT REPORT

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In partial fulfilment for the Course

of

18CSC302J - COMPUTER NETWORKS

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Department of Computational Intelligence



FACULTY OF ENGINEERING AND TECHNOLOGY

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

Kattankulathur, Chenpalattu District

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SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

(Under Section 3 of UGC Act, 1956)

BONAFIDE CERTIFICATE

Certified that this project report "**Network Design for Bank** " is the bonafide work of **Shweta Rajan Nambissan (RA1911033010120)** and **Agam Gulati (RA1911033010121)** who carried out the project work under my supervision.

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ABSTRACT

One page write up about project

Computer networks – Course Project Formatting Instructions

1. Chapter number and Chapter heading – **font size 16, upper case, bold.**
2. Space between Chapter number and Chapter heading - **double spacing.**
3. Space between heading and contents – **double spacing.**
4. Abstract heading – **font size 16.**
5. Content of abstract – **font size 14, double spacing.**
6. Sample document is given below, follow it for **font size, upper/lower case , spacing**
7. Sub-heading example as follows.

3.3 REQUIREMENT SPECIFICATION (Times New Roman 14)

3.3.1 Hardware Requirements (Times New Roman 12)

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

ACKNOWLEDGEMENT

We express our heartfelt thanks to our honorable **Vice Chancellor Dr. C. MUTHAMIZHCHELVAN**, for being the beacon in all our endeavors.

We would like to express my warmth of gratitude to our **Registrar Dr. S. Ponnusamy**, for his encouragement

We express our profound gratitude to our **Dean (College of Engineering and Technology) Dr. T. V.Gopal**, for bringing out novelty in all executions.

We would like to express my heartfelt thanks to Chairperson, School of Computing **Dr. Revathi Venkataraman**, for imparting confidence to complete my course project

We wish to express my sincere thanks to **Course Audit Professor Dr.M.LAKSHMI, Professor and Head, Data Science and Business Systems** and **Course Coordinator Dr.E. Sasikala, Associate Professor, Data Science and Business Systems** for their constant encouragement and support.

We are highly thankful to our my Course project Internal guide **Dr. M.S.Abirami, Associate Professor, Department of Computational Intelligence**, for **his/her** assistance, timely suggestion and guidance throughout the duration of this course project.

We extend my gratitude to **Student HOD – Dr. Annie Uthra, Professor & Head – Department of Computational Intelligence** and my Departmental colleagues for their Support.

Finally, we thank our parents and friends near and dear ones who directly and indirectly contributed to the successful completion of our project. Above all, I thank the almighty for showering his blessings on me to complete my Course project

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1. ABSTRACT

Course Project – Network design for bank Bank network design

Project Scope

To implement network connection for bank using CISCO Packet Tracer. The proposed plan is for multistoried banks. The model has arrangements for multiple departments like ATM, Insurance, IT, etc. Along with proper network connection, features like effective communication in-between departments, secure ATM services is also required.

Aim

- To implement network design for a Bank that has multiple departments.
- To keep the working of these departments, separate from each other.
- Effective communication in-between all departments.
- To keep the ATM related actions as secure as possible.

Modules:

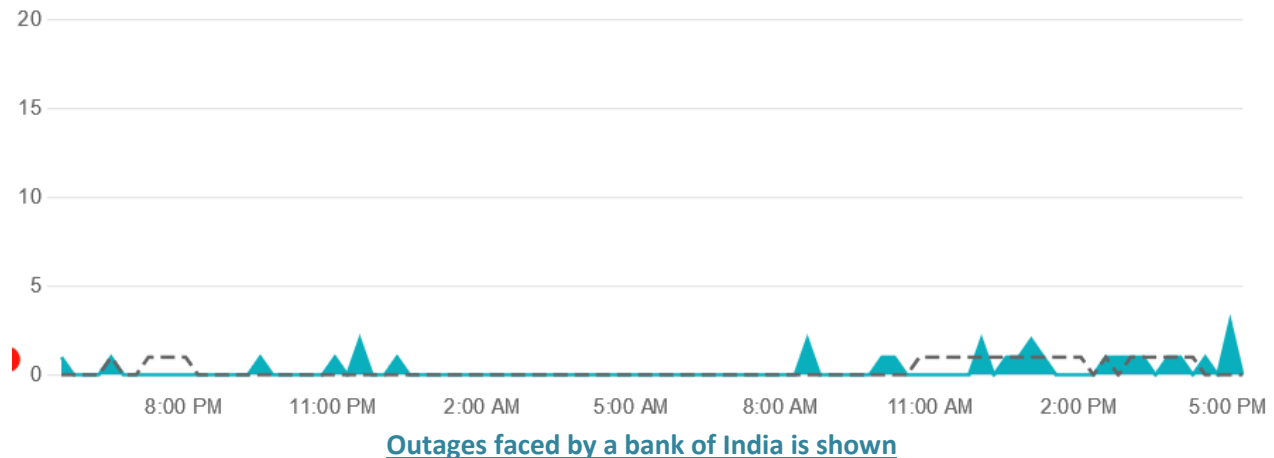
	<u>Module</u>	<u>Description</u>
RA1911033010120	Basic Network Setup	To check the scope of a project/model like this and keep a track of the competition involved. Also, to introduce new features into the model/project.
RA1911033010121	Network Design	To design a network that can function efficiently and smoothly for multiple consumer/staff.
RA1911033010121	Priority Levels	The department/network part handling consumers is expected to have maximum network usage. Thus, to set up priority levels is important in such a model/project.
RA1911033010120	Transmission Speed	Network usage is expected to be good in a bank. Thus, transmission speed along with quality is required.

RA1911033010120	Security	To meet the security requirements of a bank.
RA1911033010121	Reliability Check	To make a model such that the error rate is as low as possible.

2. INTRODUCTION

Banks in India fall prey to network outages. The analysis for the same is conducted below using some of the statistics.

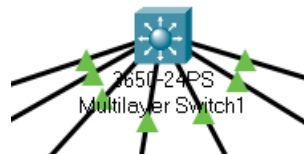
Outages faced by an “*un-named*” bank of India on one particular day is shown below.



These statistics show that banks in India face outages on regular basis. Thus, there should a solution to the same. Banks need a stable network with negligible power outages and proper security. Thus, the proposed model for our project is to implement the Network design for Bank. Our project tries to stabilize the network by sharing the load on appropriate basis. Moreover, we also provide accurate security to the system. The proposed bank design is expected to have multiple departments. These departments are as follows:

1. IT Department
2. ATM
3. Consumer Services
4. Investments
5. Loan Department
6. Insurance

All of these departments are connected to each other with a multi-layer switch.

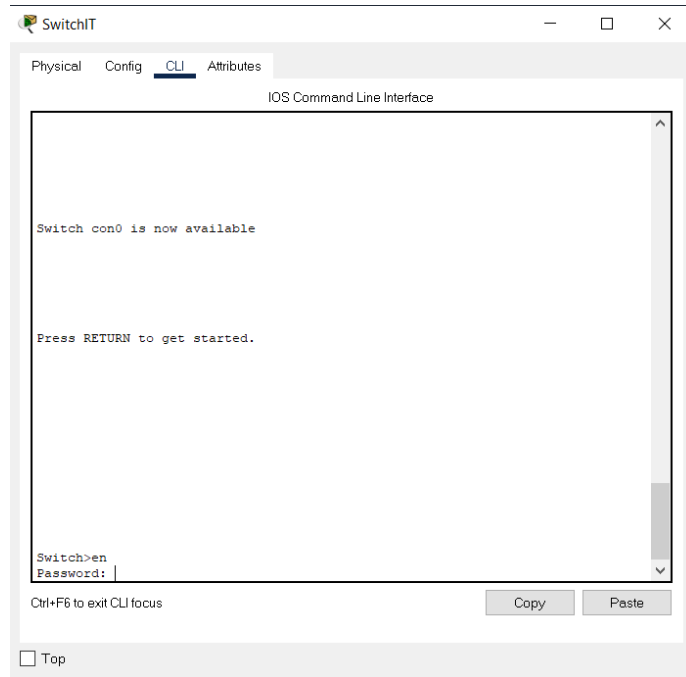


The departments include the following features:

1. IT Department

The IT department has a PC-PT and a Server. Both these devices can communicate within each other. The default gateway of IT deoartment is 192.168.10.1/24. This department can handle up to 3 PC-PT devices. Also, there is password enabled for the IT Department switch. In-order to edit/modify the department, user will have to provide with the password.

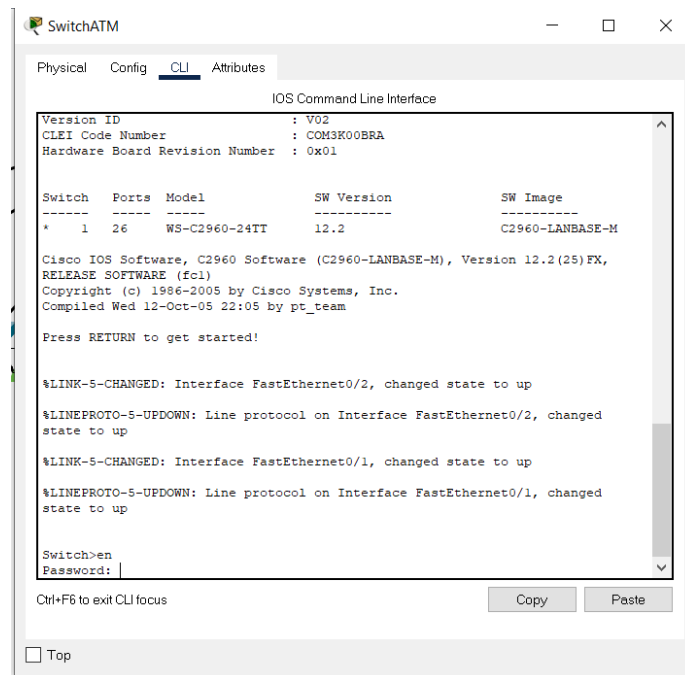
Password protected IT Switch



2. ATM

The ATM department consists a switch connected to a PC. The ATM department switch is of the model 2960-24TT. The switch is configured to the multi-layer switch as well. Default gateway for the ATM department is 192.168.20.1

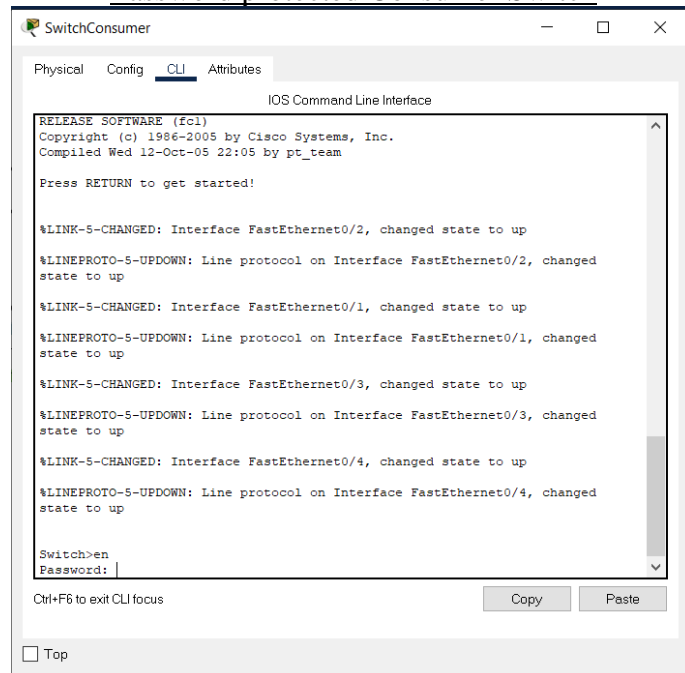
Password protected ATM Switch



3. Consumer Services

The default gateway for consumer services is 192.168.30.0. It consists of three PC of the model PC-PT. All these are configured to the multi-layer switch and can be accessed through the same as well.

Password protected Consumer Switch

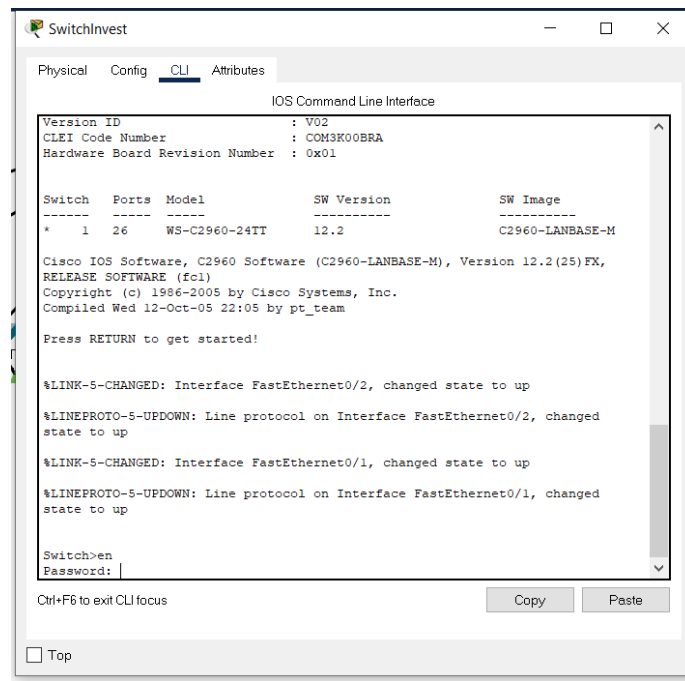


4. Investments

The investments sector consists of one PC that can be accessed through the Investments switch. The default gateway for the same is 192.168.40.0. As any other department, the

investment sector is also password protected.

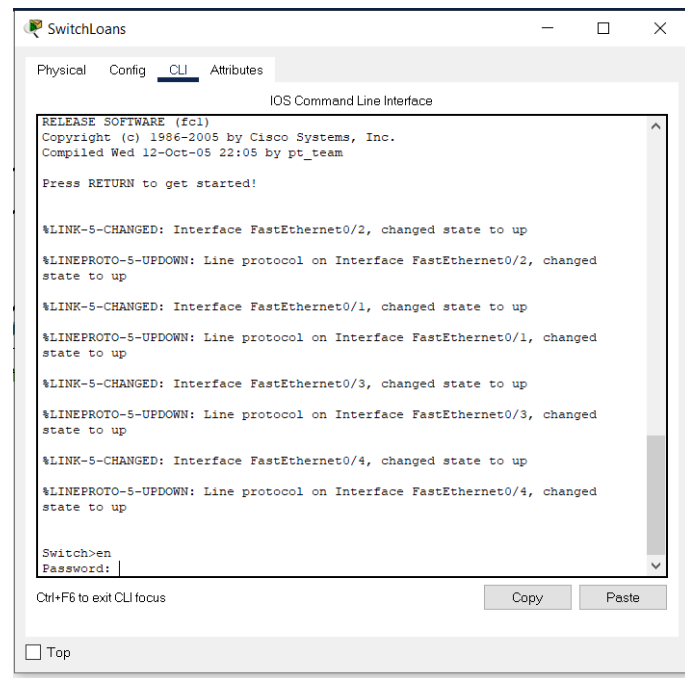
Password protected Investment Switch



5. Loan Department

The Loan Department is connected to the network through the default gateway 192.168.50.0. The department has three PC.

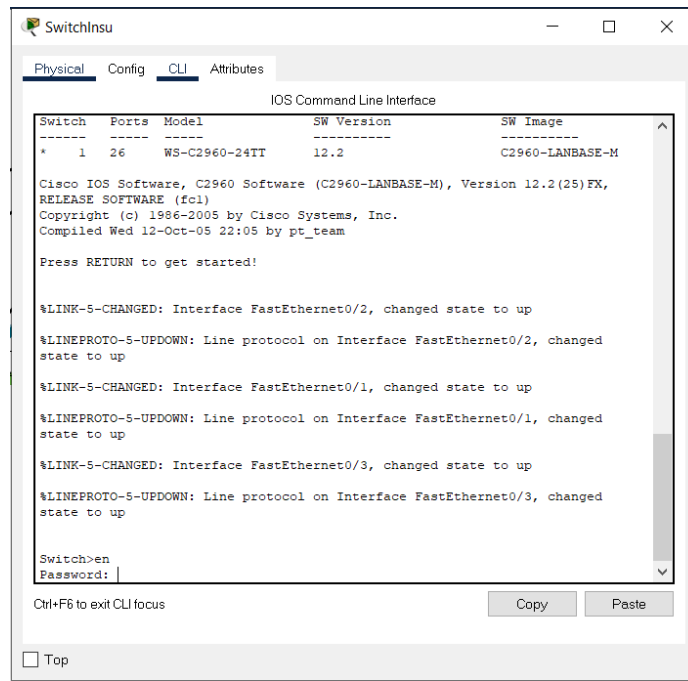
Password protected Loan Switch



6. Insurance

The default gateway of Insurance Department is 192.168.60.0. It consists of two PC's.

Password protected Insurance Switch



3. REQUIREMENT ANALYSIS

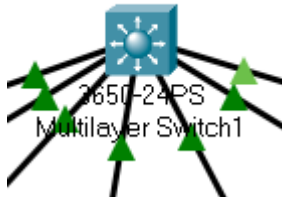
The requirement of the project are as follows:

- System Requirements
 - Device/PC of model PC-PT in Cisco Packet Tracer
 - Reliable Multi-layer switch
 - Switches of model
 - Router for guest wi-fi
 - Wireless smartphone
- Other Requirements
 - A minimum connectivity speed of 100 Mbps is required.
 - Target speed is 1 Gps per 100 users.
 - Fast Ethernet/Gigabit Ethernet switches are recommended for connectivity speeds
 - Peak traffic is expected to be between 10am – 4pm. Connectivity speed of atleast 10Mbps – 20Mbps during these hours is recommended.
 -

4. ARCHITECTURE AND DESIGN

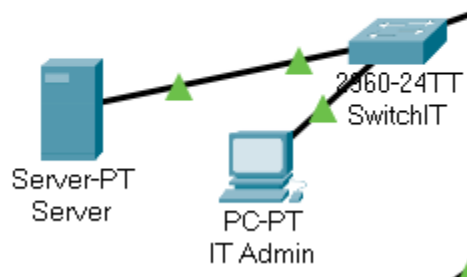
The network design is divided into six departments. Each department consists of a switch. This switch can be connected to multiple PC's/devices. All these department switches are connected to a multilayer switch. The design for the same is as following:

Multilayer Switch:



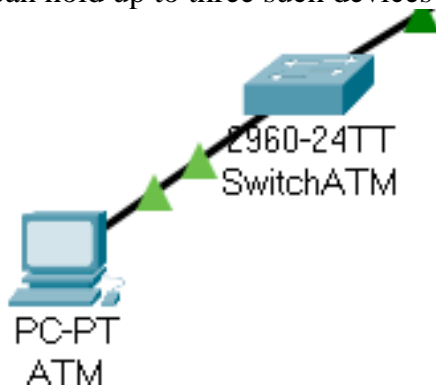
1. IT Department

The following is the design for IT Department. It consists of a switch connected to a server and a PC.



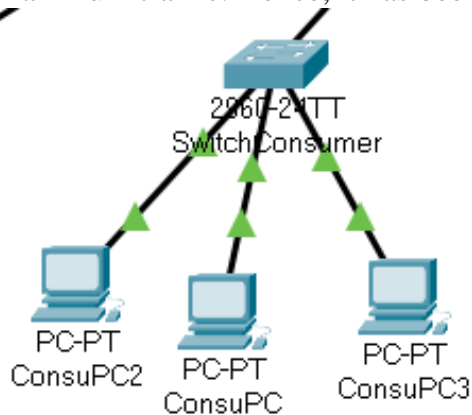
2. ATM

Design of ATM department. It consists of a switch connected to a PC. This department can hold up to three such devices securely.



3. Consumer Department

Design of Consumers Section. The consumers section is believed to be having maximum traffic. Hence, it has been already configured three devices.



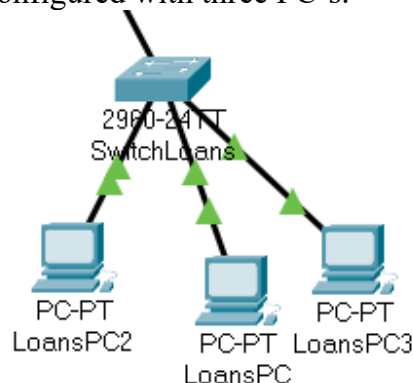
4. Investment Department

Investment Department design. Investments department has been configured with one PC connected to the switch. It can hold up to three such devices.



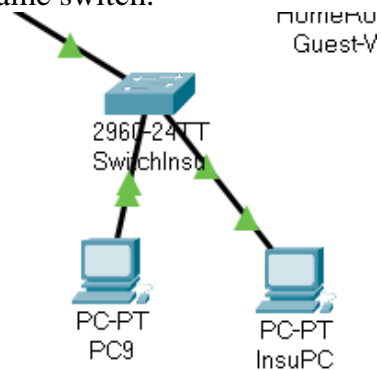
5. Loans

Loans section design. Loans section also is believed to have considerably high amount of traffic. Thus, like consumers department, the loans department also has been configured with three PC's.



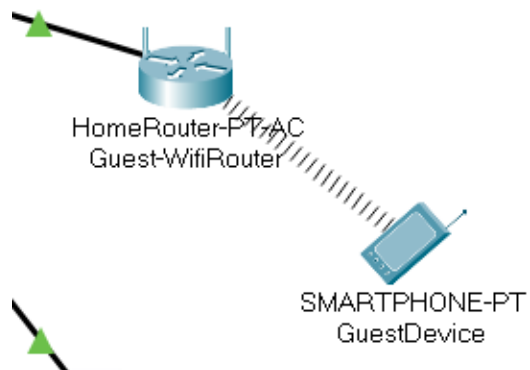
6. Insurance

Insurance department design. The insurance section has two PC's connected to the same switch.

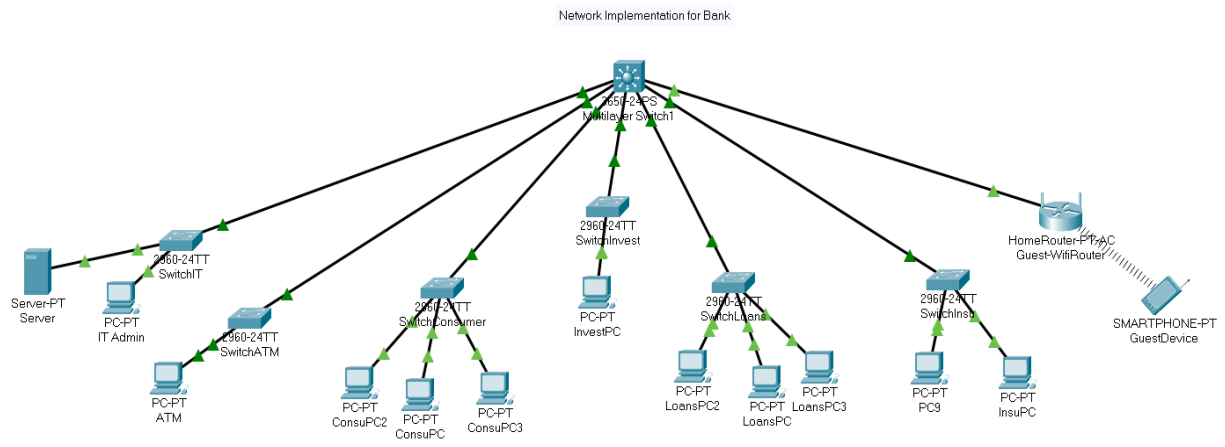


Home router/Guest Wi-Fi

The design for home router and guest Wi-Fi is as below. The guest Wi-Fi is wirelessly connected to a smartphone/guest device. A PT-AC device is used to show the home router on the cisco packet tracer.



The full design of our project is as shown below:

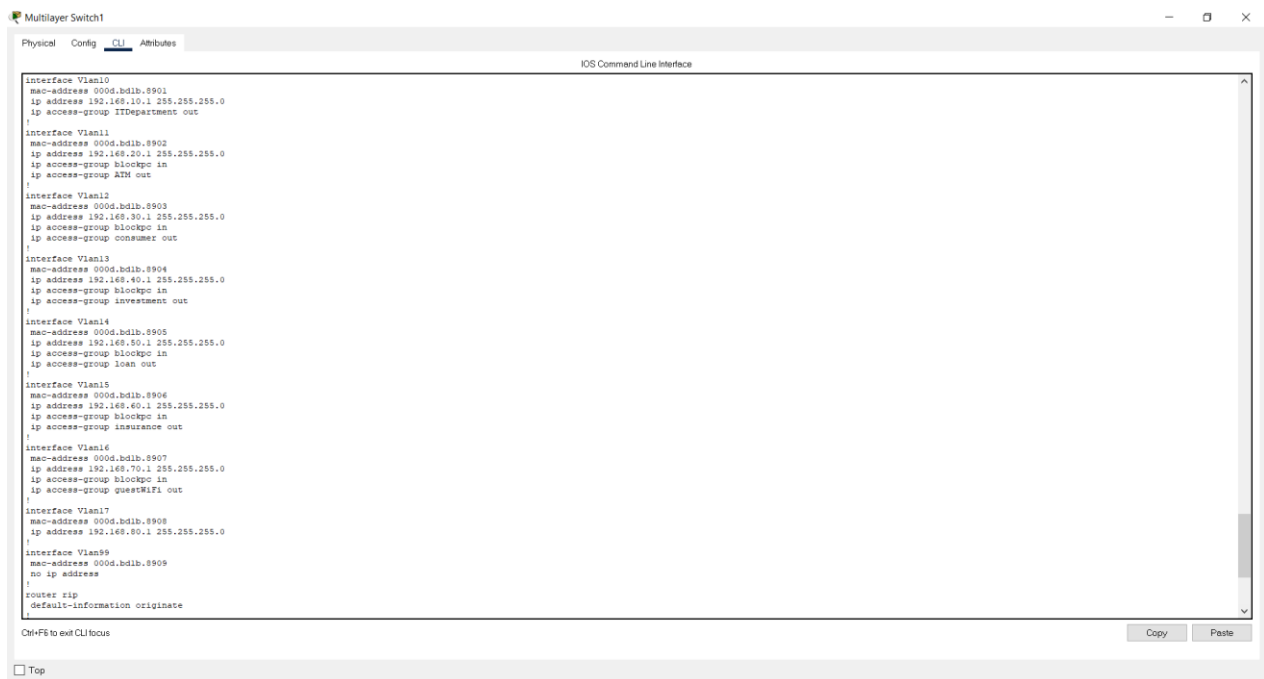


5. IMPLEMENTATION

The network design is implemented on CISCO Packet Tracer. There are multiple departments in the same. These departments have been given VLAN's. These departments have been configured using these VLAN's to the main multi-layer switch. Also, as of implementing a network design for bank, the two most important features should be:

- No compromise should be made in terms of speed even if the traffic is more
- Security of the network should be proper.

The screenshots of the command line interface of the multilayer switch shows that the departments with their respective VLAN's have been configured to the same. It is illustrated below:



```
interface Vlan10
  mac-address 000d.bdbb.8901
  ip address 192.168.10.1 255.255.255.0
  ip access-group ITDepartment out
!
interface Vlan11
  mac-address 000d.bdbb.8902
  ip address 192.168.20.1 255.255.255.0
  ip access-group blockpc in
  ip access-group ATM out
!
interface Vlan12
  mac-address 000d.bdbb.8903
  ip address 192.168.30.1 255.255.255.0
  ip access-group blockpc in
  ip access-group consumer out
!
interface Vlan13
  mac-address 000d.bdbb.8904
  ip address 192.168.40.1 255.255.255.0
  ip access-group blockpc in
  ip access-group investment out
!
interface Vlan14
  mac-address 000d.bdbb.8905
  ip address 192.168.50.1 255.255.255.0
  ip access-group blockpc in
  ip access-group loan out
!
interface Vlan15
  mac-address 000d.bdbb.8906
  ip address 192.168.60.1 255.255.255.0
  ip access-group blockpc in
  ip access-group insurance out
!
interface Vlan16
  mac-address 000d.bdbb.8907
  ip address 192.168.70.1 255.255.255.0
  ip access-group blockpc in
  ip access-group guestWifi out
!
interface Vlan17
  mac-address 000d.bdbb.8908
  ip address 192.168.80.1 255.255.255.0
!
interface Vlan99
  mac-address 000d.bdbb.8909
  no ip address
!
router ip
  default-information originate
!
```

The VLAN connection of each department is as follows:

1. IT Department

VLAN 10

The IT Department has been configured using VLAN 10. The Ethernet cable has port Gig1/0/1

2. ATM

VLAN 11

The ATM has been configured using VLAN 20. The Ethernet cable used shall be of Gig1/0/2.

3. Consumer Services

VLAN 12

The consumer department has been configured with VLAN 12. Ethernet cable Gig1/0/3.

4. Investment

VLAN 13

Investments department holds VLAN 13.

Ethernet cable Gig1/0/4

5. Loans

VLAN 14

Loans department has VLAN 14.

Ethernet cable Gig1/0/5

6. Insurance Department

VLAN 15

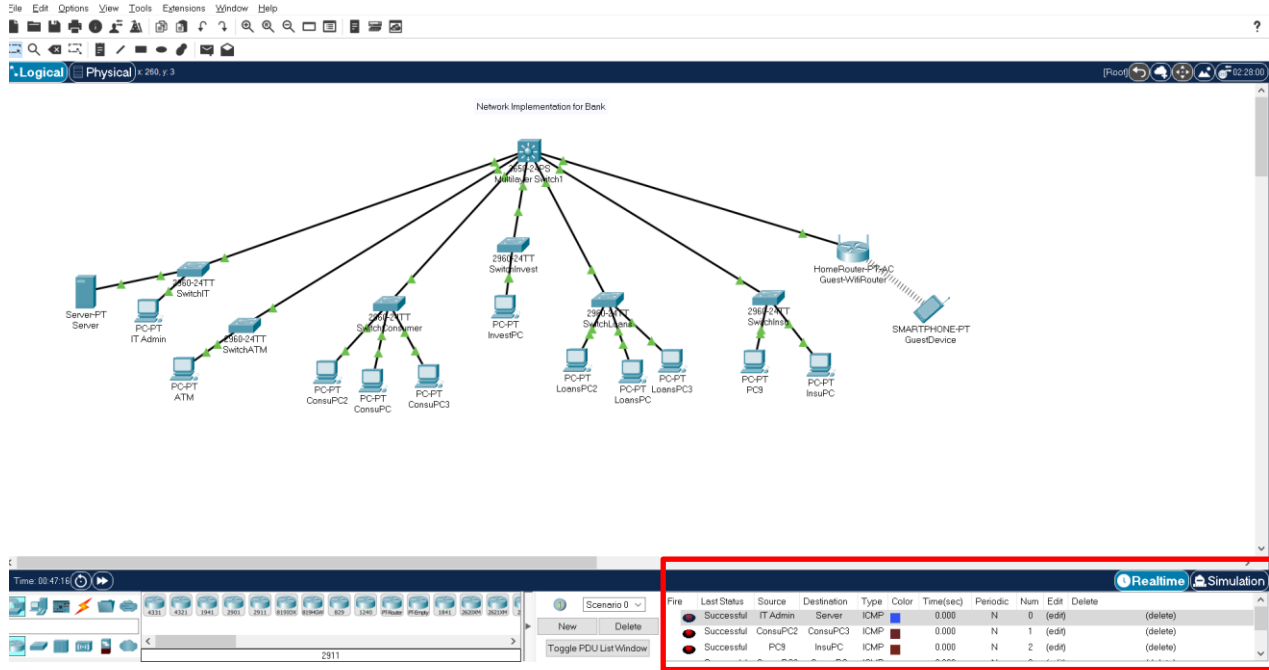
Insurance department has been configured using VLAN 15.

Ethernet cable Gig1/0/6

6. EXPERIMENT RESULTS AND ANALYSIS

6.1 RESULTS

While sending messages within the same department, we get a success message. Moreover, as mentioned earlier, since the inter department communication has not been provided, the messages sent to other department do not succeed.



6.2 RESULT ANALYSIS

After conducting the project, the following results are interpreted.

- The messages sent to a device within the department is successful
- Messages sent to a device lying in different department is not successful
- To access any switch/department, users need to enter password
- To access the main/multilayer switch, users need to go through authentication as well.

Analysis of the said results are as follows:

- **The messages sent to a device within the department is successful**

When the messages are sent from one PC/device to other PC/device lying in the same department, we get a success message. This is true for all departments present. The same is illustrated in the results below.

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	IT Admin	Server	ICMP		0.000	N	0	(edit)	(delete)
	Successful	ConsuPC2	ConsuPC3	ICMP		0.000	N	1	(edit)	(delete)
	Successful	PC9	InsuPC	ICMP		0.000	N	2	(edit)	(delete)

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	ConsuPC2	ConsuPC3	ICMP		0.000	N	1	(edit)	(delete)
	Successful	PC9	InsuPC	ICMP		0.000	N	2	(edit)	(delete)
	Successful	ConsuPC2	ConsuPC	ICMP		0.000	N	3	(edit)	(delete)

- **Messages sent to a device lying in different department is not successful**
When the messages are sent from one PC/device to other PC/device lying in different departments, we do not get a success message. Thus, the mentioned analysis shows that the inter department connection has not been established. This is true for all departments present. The same is illustrated in the results below.

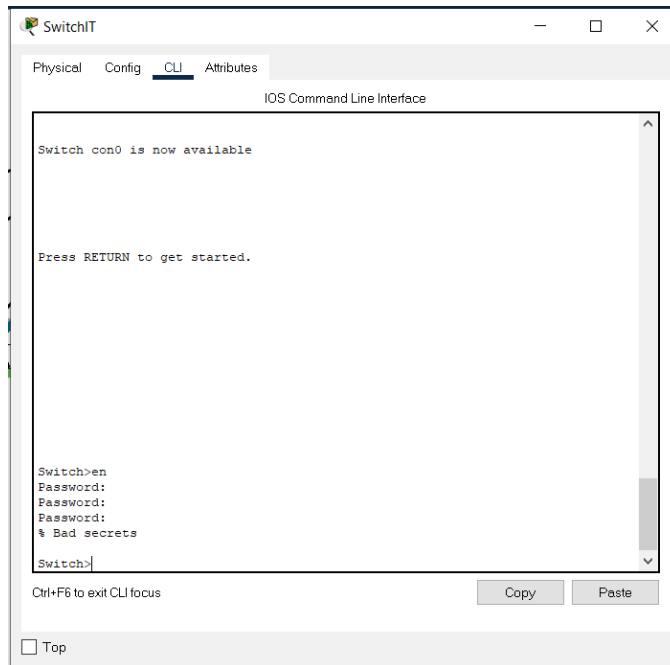
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Failed	ConsuPC2	InvestPC	ICMP		0.000	N	4	(edit)	(delete)
	Failed	LoansPC2	PC9	ICMP		0.000	N	5	(edit)	(delete)
	Failed	IT Admin	ConsuPC3	ICMP		0.000	N	6	(edit)	(delete)

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Failed	IT Admin	ConsuPC3	ICMP		0.000	N	6	(edit)	(delete)
	Failed	ConsuPC2	IT Admin	ICMP		0.000	N	7	(edit)	(delete)
	Failed	LoansPC	IT Admin	ICMP		0.000	N	8	(edit)	(delete)

- **To access any switch/department, users need to enter password**
To access any particular department, users have to enter password. This is done to ensure security in the system.

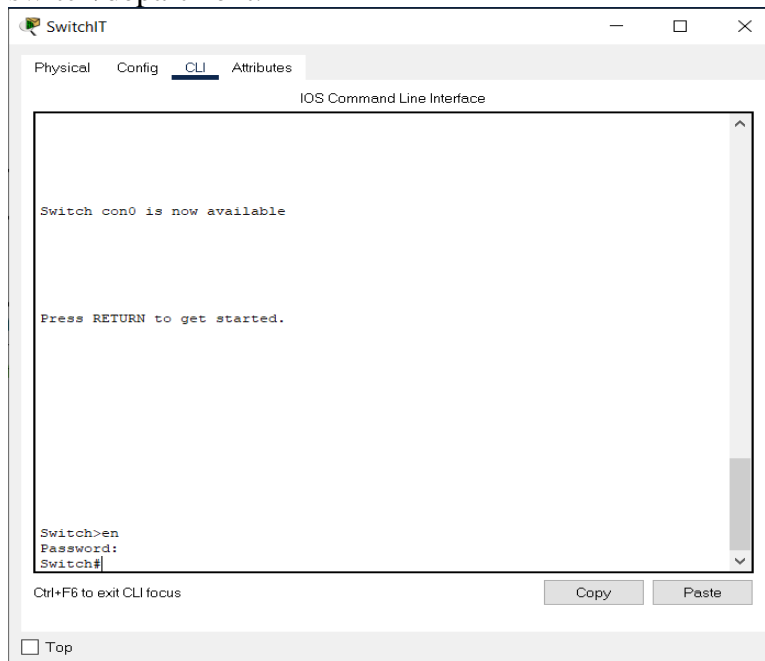
When wrong password is entered

The system will not allow a user to configure any switch/department unless the correct password is entered. Also, the limit to enter password is set to three times. If a user enters wrong password for more than three times, they will be redirected to the command line interface. The below illustrated result screenshot shows the same.



When correct password is entered

If a user enters correct password, then they can continue to configure the switch/department.

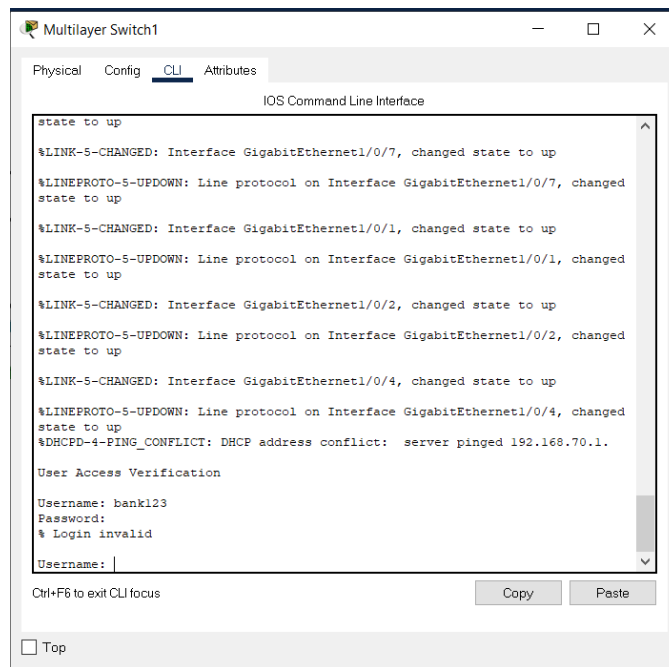


- **To access the main/multilayer switch, users need to go through authentication as well.**

If a user wants to access the multilayer switch, they have to enter Username as well as password.

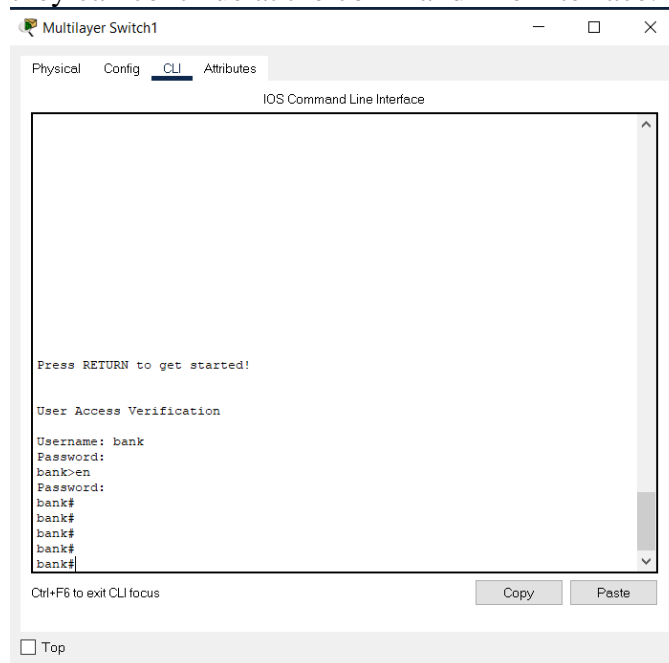
When wrong credentials are entered

If the credentials entered by a particular user are wrong, then the system will display a message saying the same. The user will have to enter correct username as well as password to configure the main switch. The same is illustrated:



When correct credentials are entered

When any particular user enters correct credentials i.e. username and password, they can continue at the command line interface.



6.3 CONCLUSION AND FUTURE WORK

Conclusion

The above mentioned report is to design a network for bank. The mentioned project can be implemented for any bank with multiple departments. The departments will be having effective communication. The system is accurately secured. Our project roles were maintaining, developing, implementing, supporting and designing communication networks within a bank.

Future work

Our work after the implementation and deployment of project will be:

- Update on regular intervals
- Re design the project whenever needed
- Keep a track on the recent modifications in the field
- Modify the project wherever necessary
- Ensure that the security of the project is maintained
- Check the system on regular basis.

7. REFERENCES

For references, the following resources were taken:

- Books
 - The following books were used for reference to build the mentioned project:
 - Data.And.Computer.Communications.8e.WilliamStallings
 - Tcp_ip-protocol-suite-4th-ed-b-forouzan-mcgraw-hill-2010-bbs
- Our knowledge/expertise in using the cisco packet tracer.
- Other references:
 - <https://prezi.com/pssdcuuyewpo/banking-network-in-cisco-packet-tracer/>
 - <https://www.slideshare.net/shakibansari2/banking-and-atm-networking-reports>

Report Should contain minimum of 25 pages and maximum of 30 pages
