A Project Report

On

“Secure Network Using Routing Protocol”

Submitted to

Department of Computer Studies

In the Partial Fulfilment for the award of the degree of

M.Sc. (Computer Science in Cyber Security)
Part II SEM-IV

By

RAHUL KAPLANATH PRASAD

(8464)

Under The Guidance of

MR. SAGAR TONDALE

DOMAIN COMPUTERS

CHHATRAPATI SHAHU INSTITUTE OF BUSINESS EDUCATION AND RESEARCH (CSIBER), KOLHAPUR.

[2022-2023]

A PROJECT MODULE REPORT ON

Secure Network Using Routing Protocol

DEVELOPED THROUGH

"CISCO PACKET TRACER"

IN THE PARTIAL FULFILLMENT OF

MASTER OF COMPUTER SCIENCE IN CYBER SECURITY

MSC – II Semester – IV

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[2022-2023]

Chhatrapati Shahu Institute of Business Education & Research, Kolhapur.

DEPARTMENT OF COMPUTER STUDIES

CERTIFICATE

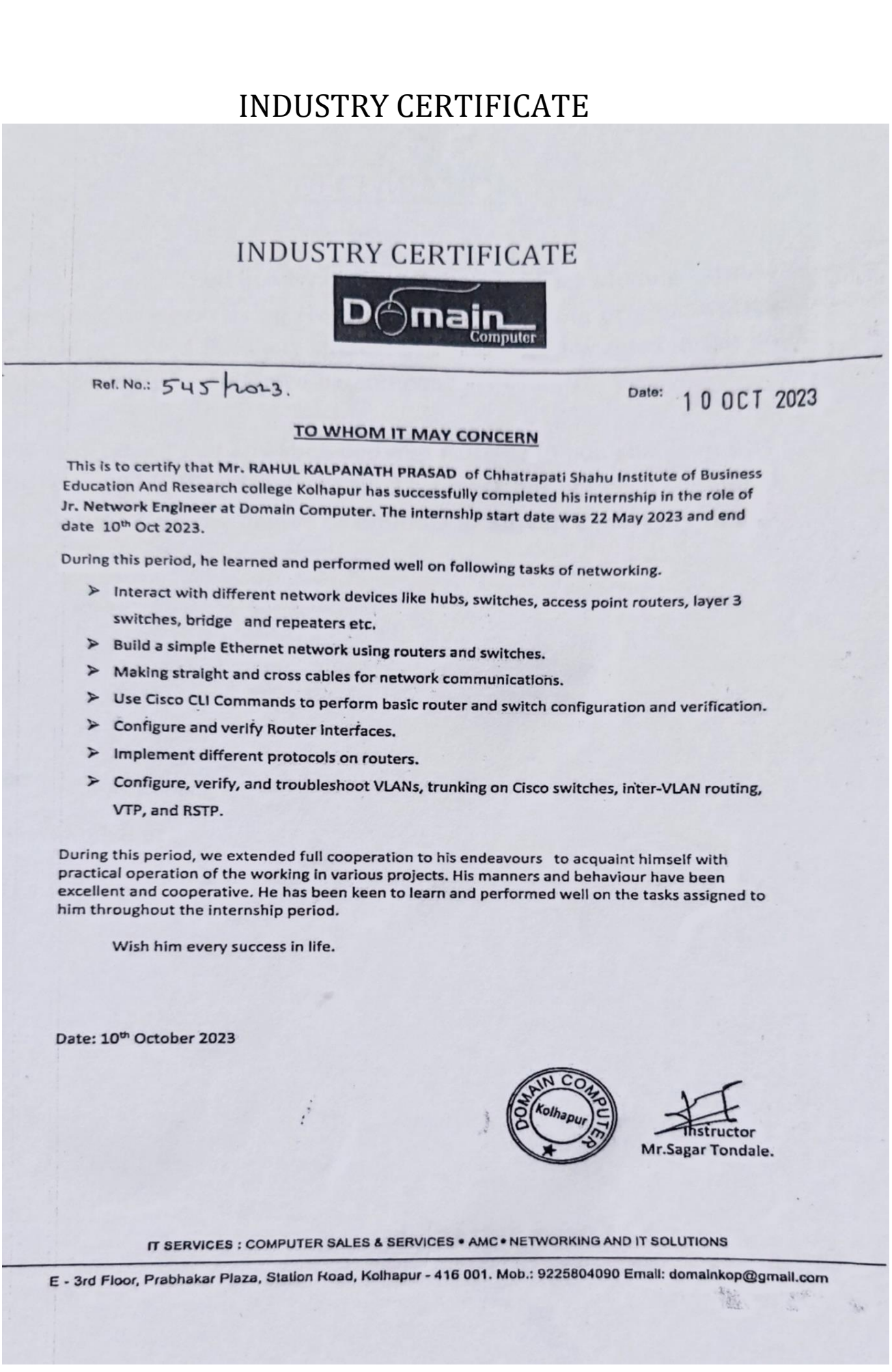
This is to certify that Mr. Rahul Kalpanath Prasad satisfactorily completed the project module work entitled "Secure Network Using Routing Protocol" in CISCO Packet Tracer for the partial fulfillment of Master of Computer Science part II Semester IV for academic Year 2017-2018.

Date :

Place: Kolhapur

DR. S.D. BHOITE
Head of Department

INDUSTRY CERTIFICATE



INDUSTRY CERTIFICATE

Domain Computer

Ref. No.: 545/2023.

Date: 10 OCT 2023

TO WHOM IT MAY CONCERN

This is to certify that **Mr. RAHUL KALPANATH PRASAD** of Chhatrapati Shahu Institute of Business Education And Research college Kolhapur has successfully completed his internship in the role of **Jr. Network Engineer** at Domain Computer. The internship start date was 22 May 2023 and end date 10th Oct 2023.

During this period, he learned and performed well on following tasks of networking.

- Interact with different network devices like hubs, switches, access point routers, layer 3 switches, bridge and repeaters etc.
- Build a simple Ethernet network using routers and switches.
- Making straight and cross cables for network communications.
- Use Cisco CLI Commands to perform basic router and switch configuration and verification.
- Configure and verify Router interfaces.
- Implement different protocols on routers.
- Configure, verify, and troubleshoot VLANs, trunking on Cisco switches, inter-VLAN routing, VTP, and RSTP.

During this period, we extended full cooperation to his endeavours to acquaint himself with practical operation of the working in various projects. His manners and behaviour have been excellent and cooperative. He has been keen to learn and performed well on the tasks assigned to him throughout the internship period.

Wish him every success in life.

Date: 10th October 2023

DOMAIN COMPUTER Kolhapur

Instructor
Mr.Sagar Tondale.

IT SERVICES : COMPUTER SALES & SERVICES • AMC • NETWORKING AND IT SOLUTIONS

E - 3rd Floor, Prabhakar Plaza, Station Road, Kolhapur - 416 001. Mob.: 9225804090 Email: domainkop@gmail.com

DECLARATION

We the undersigned hereby declare that the project Module entitled "**Secure Network Using Routing Protocol** " is our original work and not being copied from any source. The contents presented in this work are based on data collected by company.

We understand that any such copying is liable to punishable in way the Institute Authorities deem fit. This work has not been submitted for the award of any degree or diploma to Shivaji University or any other University.

Date:

Place: Kolhapur

Mr. RAHUL KALPANATH PRASAD
M.Sc. Cyber Security

ACKNOWLEDGEMENT

We like to share our sincere gratitude to all those who help us in completion of this implant training. During the work we faced many challenges due to our lack of knowledge and experience, but these people help us to get over from all the difficulties and in final compilation of our idea. I am indeed grateful to Head of Department of Computer Studies. Mr. S. D. Bhoite for being an effective source of inspiration.

We would like to thank Mr. Sagar Tondale as well as Ms. Shibani Kambale(Technical Trainer) for his governance and guidance, because of which our whole team was able to learn the minute aspects of a Computer Studies.

We would also like to show our gratitude to our department faculties Mr. S. S. Jamsandekar of our Computer Studies department for their continuous help and monitoring during the work. I am thankful to supporting staff of our department as well as Domain Computer, for their help and support towards my training.

In the last we would like to thank the management of CSIBER COLLECE, Kolhapur for providing us such an opportunity to learn from these experiences.

We are also thankful to our whole class and most of all to our parents who have inspired us to face all the challenges and win all the hurdles in life.
Thank you all.

ABSTRACT

Industrial training offers the students with important practical knowledge and skills and encourage the min becoming a successful and best professional. The main objective of the industrial training is to provide the best and relevant theoretical knowledge, practical knowledge and soft skills to gain in a particular time period. Industrial training is an important phase of a student life.

A well planned properly executed and evaluated industrial training helps a lot in developing a professional attitude. It develops an awareness of industrial approach to problem solving, based on a broad understanding of process and mode of operation of organization.

The aim and motivation of this industrial training is to receive discipline, skills, teamwork, and technical knowledge through a proper training environment, which will help me as a student in the field of computer science.

In this training we have learn lot of about computer studies, like scope of computer science, importance of computer networking.

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CHAPTER 1

INTRODUCTION OF ORGANIZATION

History

Domain Computer Education was founded in January 2008 in Kolhapur District & in July 2013 Established center in Sangli District.

Domain Computer Education is one of the well-known leading Institutes in Kolhapur & Sangli District for the Industry Oriented Global IT Certification Training & Placement Services.

Founders Of the Domain Computer Education Kolhapur Head Office:

- Mr. Sagar Tondale
- Mr. Sachin Shrishrimal

Company aim is to prepare Qualified Technical Manpower required for the reputed MNC's

To achieve its goal the Domain Computer Education conducts Technology workshops, Technology update sessions, Trainings for industry certification, Technology advisory meet, Professionals meet for emerging technology discussions, etc. Domain Computer Education prime. Collaboration mechanism is providing comprehensive trainings on industry certifications from Cisco, Microsoft, RedHat and others. These trainings are conducted by industry working professionals who have extensive hands-on experience and the practical knowledge in designing and deploying solutions, according to real life situations.

Today we people are working as certified training and exam partner for Red hat India Pvt. Ltd, Our Organization is affiliated with "Shivaji University" for Computer Hardware Course. Also our organization is affiliated with MSSDS [Maharashtra State Skill Development Society] for SKILL India IT courses.

- **Corporate Training :**

  Domain computer education is a team of corporate trainers. With the advance training of computer technology, we are also able to provide corporate training for corporate levels candidate and companies.

- **Mission :**

  Our mission is to train our student to an expertise level, with the latest technologies in the Global IT Market. Which is required by MNC's. Providing in-depth knowledge with hands-on practical on modern equipment's with Global IT Certification.

- **Values:**

  1) Integrity and Trust
  2) Commitment to Excellence
  3) Valuing Diversity
  4) Career Oriented
  5) Genuine Relationships

- **Quality Policy:**

  We at Domain Computer Education are committed to continually achieve higher quality standards in providing- Training, project Management and offering Staffing &IT Solutions ensuring quality service every time

- **Services given by organization**

1. Network Projects Wired & Wireless
2. Cisco Router Configuration & Solutions
3. Remote Support
4. IT Services
5. AWS&AMAZON Cloud Solutions

- **Staff Team**

There are no leashes at Domain Computer. Domain Computer work on flat, decentralized teams, each with decision-making authority, and our people have the freedom to approach, own, and solve problems creatively. Domain Computer have intentionally chosen this Domain Computer is a team of young, enthusiastic and creative Engineers working consistently towards quality delivery. At Domain Computer believes in long term relations.

Domain Computer has approximately 5 employee team which includes following staff members.

1. Mr. Sagar Tondale (Founder & Director)
2. Mr. Sachin Shrishrimal (Founder & Director)
3. Mr. Nilesh Patil (Senior Technical Trainer)
4. Miss. Vaishnavi Patil (Senior Technical Trainer)
5. Miss. Shibani Kambale (Senior Technical Trainer)

CHAPTER 2

STRUCTURE OF INDUSTRY AND GENERAL LAYOUT

IT Infrastructure Services	Providing Network Projects services for Banking sectors
Providing Datacenters Service Solutions	Providing Remote Technical Support
Cloud Services Solutions of AMAZON AWS & MICROSOFT AZURE	Providing Virtual Industry Corporate training

- **Organizational Structure of Industry :**

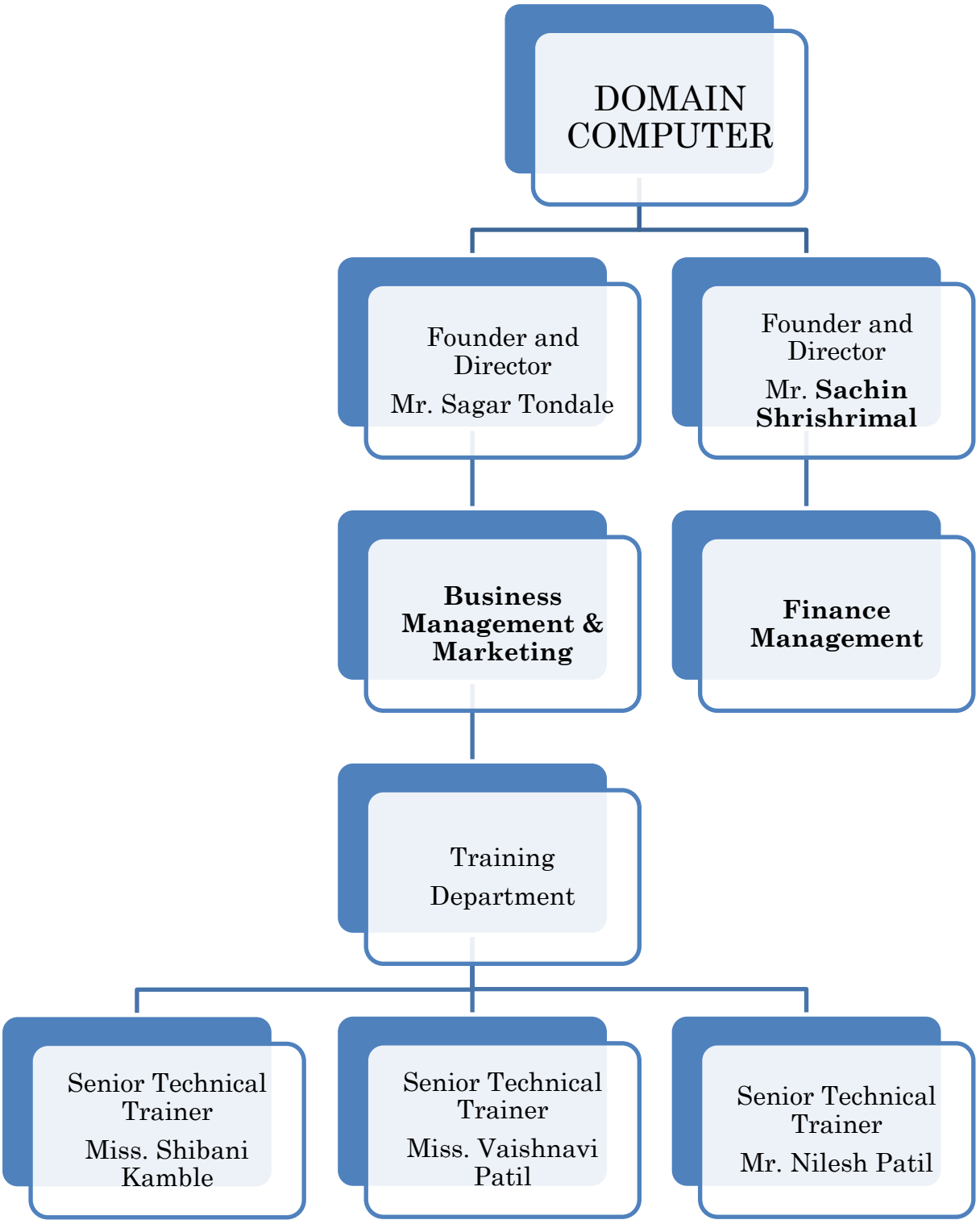
- **Facilities :**

Lab Facility	Battery Backup
Library Facilities	Special Coaching for Soft Skill & Interview Techniques

- **Infrastructure :**

Internet Facility	Well Equipped Labs
Special CISCO Equipped Lab	Special Lecture Rooms
Router RACK	Structured Cabling

STRUCTURE OF INDUSTRY


DOMAIN COMPUTER
Founder and Director
Mr. Sagar Tondale
Founder and Director
Mr. Sachin Shrishrimal
Business Management & Marketing
Finance Management
Training Department
Senior Technical Trainer
Miss. Shibani Kamble
Senior Technical Trainer
Miss. Vaishnavi Patil
Senior Technical Trainer
Mr. Nilesh Patil

CHAPTER 3

TYPES OF MAJOR EQUIPMENT'S AND MACHINES USED IN ORGANIZATION

▪ Major equipment's used

1. Computer System :

Manufacturer	HP, Fujitsu, Lenovo
Operating System	Windows 10
Memory(Ram)	4.00 GB
Hard Disk	500 GB
Total Computer Systems	30

2. Network Components :

Device Name	• Cisco Router Series 1750,1841,1941,2841 • Cisco Switches Series Catalyst 2950,2960,500	• Dlink Wireless Access Point • Cisco Wireless Firewall Router
Cables	• Coaxial Cable-5 • Twisted Pair-100 • Fiber Optic-10	• Cable Tester-2 • Crimping Tools-4 • Punch down Tool-2 • RJ 45 Connectors-100

▪ About routine maintenance

1. Daily infrastructure maintenance for about 1 Hr.
2. Weekly system maintenance.
3. Daily work progress backup.

CHAPTER 4

DEVELOPMENT PROCESS ALONG WITH PRODUCTION PLANNING AND METHODS

- **Steps to Prepare the Various Network Cables**

STEP 1: Identifying Various Network Devices, Cables, Connectors
STEP 2: Preparing Twisted Pair Cable Straight through& Cross Cables using 568A&B standards.
STEP 3: Configuring Wireless Access point to access the wireless internet.
STEP 4: Creating Private LAN using Straight cable.

- **Application deployment process for Network services**

STEP 1: Installing & Configuring Server Client Model
STEP 2: Accessing the Wireless Access Point configuring SSID & setting security password.
STEP 3: Accessing the Cisco Router configuring it for telnet access and securing it assigning secret passwords.
STEP 4: Accessing the Cisco VLAN Switches and creating VLANS.
STEP 5: Creating EC2 Linux, Windows instances& Storage Bucket on AWS cloud service.
STEP 6: Creating VM's & Storage Container on Microsoft AZURE cloud service.

- **Testing process**

Step 1: Log inning on client computer using Domain user verifying authentication
Step 2: Connecting WIFI devices to test the connectivity of Wireless Access point.
Step 3: Running Routing Protocols RIP, EIGRP &OSPF to test the routing between different networks
Step 4: After creating VLAN's assigning it to various interfaces and testing it with connected host PC's

Step 5: Execute test cases by giving variety of inputs.

CHAPTER 5

TESTING OF FINISHED PRODUCTS ALONG WITH QUALITY ASSURANCE PROCEDURES

- **Testing of products**

1. Requirement Analysis –

The first step towards testing is analyzing the user requirements and converting those requirements into formal requirements like functional and non-functional requirements.

2. Planning the test –

Planning the test is the main step in testing cycle. Planning of the testing is done far before the testing actually takes place. The test plan must be followed strictly to get the error free network communication and connectivity to the cloud services.

3. Developing test scenarios -

The next step after planning is deploying the test scenarios on which the test case execution will take place. Test scenarios can be different modules or any specific function to be tested as per industry real scenarios.

4. Developing the test case -

A test case is a specification of the inputs, execution conditions, testing procedure, and expected results that define a single test to be executed to achieve a particular software testing objective.
Developing test cases becomes a vital role when testing the Network Services as all the functions are verified and validated as per the Industry requirements.

5. **Setting up the test environment-**

A testing environment is a setup of Network and Cloud Services for the testing teams to execute test cases. Setting up a right test environment ensures Network &cloud services testing success. Any flaws in this process may lead to extra cost and time to the client.

6. **Execution of the test-**

Test execution is the process of Configuring and deploying network & cloud services and comparing the expected and actual real scenarios of IT industries

7. **Test closure-**

Test Closure is a document that gives a summary of all the tests conducted during the Cloud Service life cycle, it also gives a detailed analysis of the errors resolved and errors found .

- **Testing carried out**

1. Functional testing -

Organizations need to enhance the effectiveness and efficiency of functional testing by focusing on accelerated and optimized testing. Functional testing in Domain Computer included System testing, Integration testing, Component Testing, End to End Testing and User Accessibility & Availability.

Domain Computer Education believe in early involvement of testing teams in the Networking and Cloud Computing requirements validation, risk-based testing, and Security oriented test case design

2. Test Automation -

Domain Computer Education partners with its customers, understands their needs and processes, and recommends appropriate automation strategies and executes them to enhance testing quality, reduce implementation effort and schedule and ensure return on investments.

3. Compatibility testing -

Compatibility & Interoperability Testing is aimed at verifying whether the application under test interacts, and functions as expected with the required software and hardware combinations. Thus, this test plays an important role in case any Private network & Cloud services are required to run on different platforms with multiple software and hardware components.

CHAPTER 6

MAJOR SOFTWARE PRODUCTS USED

- **Major software products used**

In these 120 days of training, we used various software's that helped us in test case making and executing the test cases too. Major software's used during this course were Outlook, Remote Desktop, Microsoft word, Abode reader and Command Prompt Google Chrome web browser.
And also, we are introduced with new software's like Cisco Packet Trace Simulation software,
Cloud Computing Platforms AMAZON AWS Console& Microsoft AZURE Portal that made us aware about the latest industry demandable technologies for the MNC's.

Most of these software's which helped us in efficient implementation of it for training course.

First of all, in the first month of training, we learnt about the Network Components & Devices, use of those devices in networking purpose. This was totally new to us hence we needed to know about the Networking and then implement it for deploying Wireless And wired network. For this we used the Network LAB access where we actually prepared our own cables and made the connectivity and testing the connectivity between multiple computers. By suing Command line utility called PING Command

After that in second month, we were introduced to Wireless access point product to configure the WIFI Internet, which made possible to access to Wi-Fi internet connection.
We learned how to create SSID & Set security password.

After we deployed the server client model to provide the centralized network access by using windows server 2016 configuring it as Domain Controller and adding windows 10 computers as a client to the server.

CHAPTER 7

PARTICULARS OF PRACTICAL EXPERIENCES IN ORGANIZATION

- **Practical experiences in organization**

We completed our industrial training at Laurel Technologies. Our training was of 6 weeks. During our 6 weeks training we were assigned with different tasks such as testing, development and management. We all worked on a live project named "Better Emailing". There are three different versions of Better Emailing are:

1. Better Emailing mobile version
2. Better Emailing desktop version and
3. Better Emailing Microsoft Outlook version.

Everyone was assigned a specific module from Better Emailing for testing purpose. I was assigned the Message actions module that included options like tiny tasks, Done, Add task, schedule, needs scheduling and spam. Each one of the above options had different functionality and each functionality was to be tested on its true and false sides so that there were no defects in the application and its output must be as expected by the user.

For the above module, I first wrote test cases on each and every field in every option. After that I tested the test cases, uploaded screenshots and then submitted the status to the developer. Then developer resolved our queries and made changes with the help of test cases. After developers work was done then I retested the test cases with the new updates and uploaded new status as per the output.

▪ Particulars Of Practical Experiences

In the industrial training, we also attended the Contest organized by the Domain Computer that is helped us to develop versatile skills like Presentation, Video presentation Resume Building k which will, help us for our future life and our professional career also.

❖ Soft Skills :

Communication, Presentation, etc.

In our training, we develop our communication and presentation skills, which are most helpful for us. With the help of this skills we can able to represent our ideas in front of our team and able to communicate properly with our head and team and its help the also for project discussion such as collecting requirements and expectation of users for their project

❖ Life Skills :

Time management, Safety, Innovation, Entrepreneurship, Teambuilding, etc.

In the time of training we develop our skills like time management, team building.

With the help of this skills we are developing our project task in the given time, audit's also

helps us for working in team, in this period we are able to complete our work in given time

and understand the opinions of our team members. Also we are able to keep our data safe

from the hackers. It's really a great achievement for us to working in the group,

understanding the ideas of each other and completing the work in the defined amount of time

and keep our data safe and secure from the stakeholders and hackers.

❖ Hands-On:

In the training we are not just studies the theoretical concepts, also learnt form it
Practically by our own way, it helps us for developing our ideas and our mentality about
Networking and Cloud Computing Services in this days we are able to remove the errors occurs in the Network and the problems occurred in the time of deployment. Our practical knowledge is increased in those days.
That helps us to increase our ideas in the quality and implementation areas, also we
are able are able to use the tools and familiar with them which are used in industries for network & Cloud computing utilization in IT Infrastructure services..

Our other some developed skills are –

- To Configuring Network devices like Cisco Router and switches.
- How to test a Network and Resolve the errors from the network communication?
- Problem solving and Implementation of devices.
- Utilization of AMAZON AWS & MICROSOFT AZURE cloud services in IT Industries
- In this training we also experienced the study of industry, its history and its IT infrastructure Deploying methods using various platforms, its turnover and how teamwork is carried out. In short, we experienced the completely industrial environment.

CHAPTER 8

DESCRIPTION ABOUT PROJECT

- **Title : Secure network using routing protocol.**

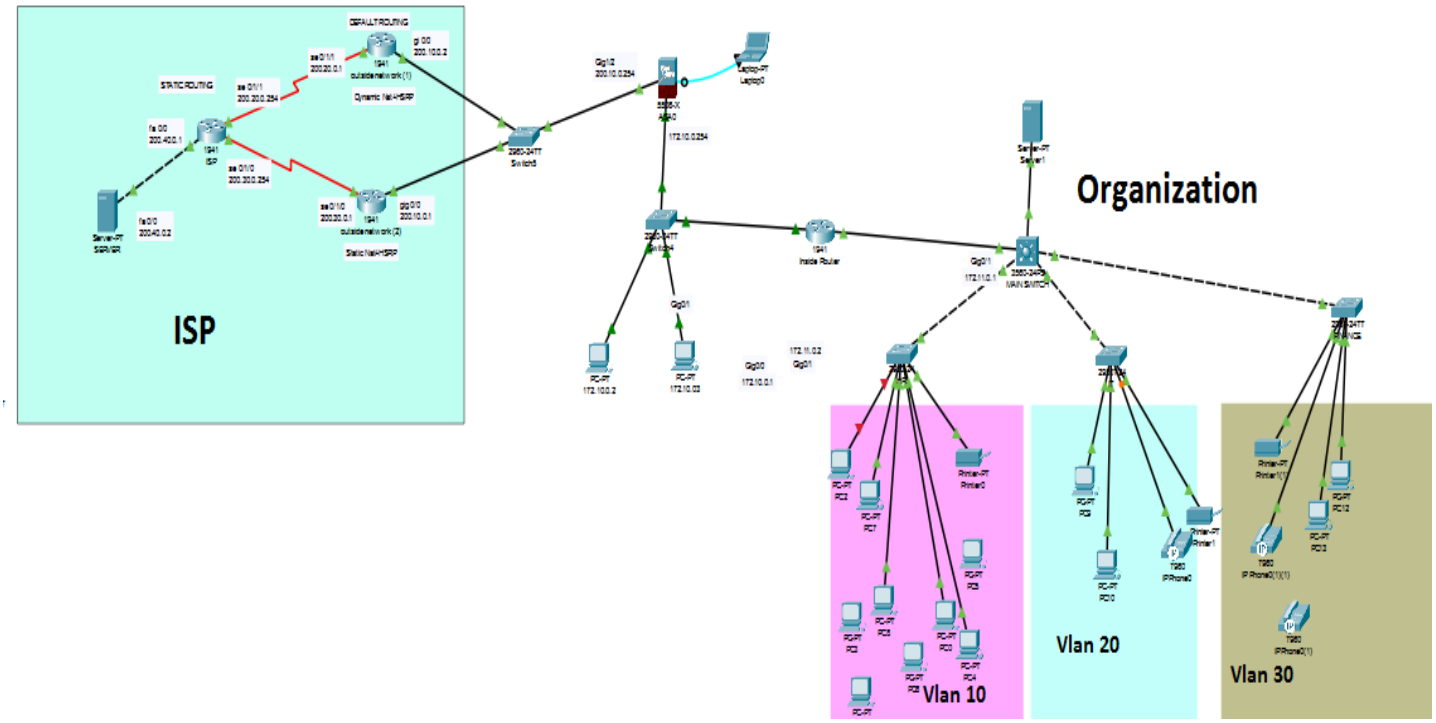
Configuring network between ISP and Organization by using different routing Protocol with different device on Cisco Packet Tracer.

- **About Project :**

The project that we deployed in the period of our industrial training is
We created two networks in our project.

The aim of this project is to configure secure network routing protocol to make a communication between ISP and Organization network and to allow share resources between users.

- **Network Design in Cisco Packet Tracer :**



- **Features:**

1. Automatic IP .
2. IP converts private into Public (static and Dynamic method).
3. Auto standby mode.
4. Multiples vlans.
5. Firewall security.

- **Configuration Layer 3 switch :**

```
sw1(config)#interface range FastEthernet0/1-4
sw1(config-if)#switchport mode trunk
sw1(config-if)#ex
sw1(config)#interface GigabitEthernet0/1
sw1(config-if)#no switchport
sw1(config-if)#ip add 172.11.0.1 255.255.0.0
sw1(config-if)#no shut
sw1(config-if)#ex
sw1(config)#router rip
sw1(config-router)#network  192.168.10.0
sw1(config-router)#network  192.168.20.0
sw1(config-router)#network  192.168.30.0
sw1(config-router)#network  172.10.0.0
sw1(config-router)#network  172.11.0.0
sw1(config-router)#ex
```

IP address configuration for L3
Gig0/1 -172.11.0.1 S0/0/0- 192.168.1.113/30 Fa0/3- 192.168.30.0 trank vlan 30 Fa0/1- 192.168.10.0 trank vlan 10 Fa0/2- 192.168.20.0 trank vlan 20 Fa0/4- 192.168.1.0 trank vlan 1 Dhcp Serve 192.168.1.2

Switch-port Security Commands

VLAN_10_HR(config)#int range fa 0/1-24
VLAN_10_HR(config-if-range)#switchport mode access
VLAN_10_HR(config-if-range)#%SPANTREE-2-RECV_PVID_ERR: Received 802.1Q BPDU on non trunk FastEthernet0/4 VLAN1.

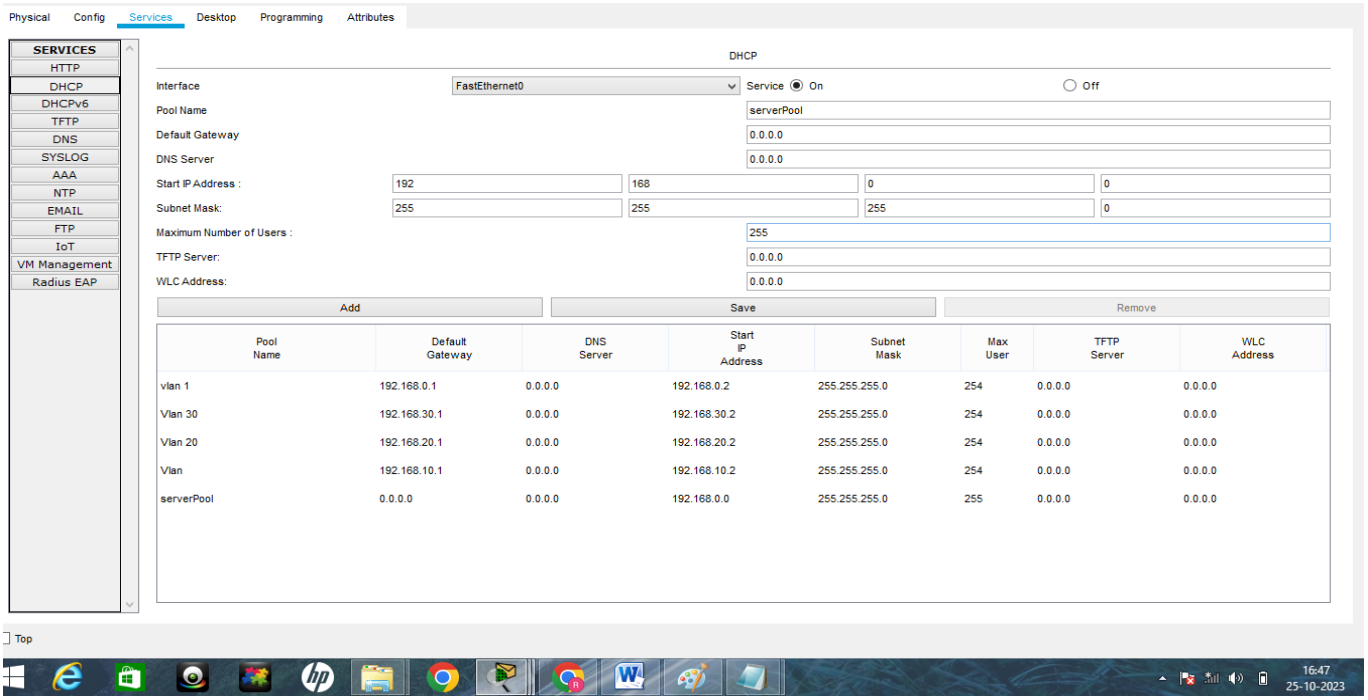
%SPANTREE-2-BLOCK_PVID_LOCAL: Blocking FastEthernet0/4 on VLAN0001. Inconsistent port type.

VLAN_10_HR(config-if-range)#switchport port-security
VLAN_10_HR(config-if-range)#switchport port-security ?
 aging   Port-security aging commands
 mac-address Secure mac address
 maximum   Max secure addresses
 violation   Security violation mode
 <cr>
LAN_10_HR(config-if-range)#switchport port-security max 2
VLAN_10_HR(config-if-range)#switchport port-security mac-address sticky?
sticky
VLAN_10_HR(config-if-range)#switchport port-security mac-address sticky
VLAN_10_HR(config-if-range)#switchport port-security violation shutdown
VLAN_10_HR(config-if-range)#ex
VLAN_10_HR(config)#ex
VLAN_10_HR#
%SYS-5-CONFIG_I: Configured from console by console

VLAN_10_HR#copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
VLAN_10_HR#sh port-security

NOTE:
configure same command on switch 2 and 3

DHCP server to VLans IP



Inside Router (1941)

Router(config)#interface GigabitEthernet0/1
Router(config-if)#ip address 172.11.0.2 255.255.0.0
Router(config-if)#ip address 172.11.0.2 255.255.0.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

---

Router(config)#interface GigabitEthernet0/0
Router(config-if)#ip address 172.10.0.1 255.255.0.0
Router(config-if)#ip address 172.10.0.1 255.255.0.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

Router(config)#router rip
Router(config-router)network 172.11.0.0
Router(config-router)network 172.10.0.0

Router outside (1)

```
outside_router(config)#interface GigabitEthernet0/0
outside_router(config-if)#ip add 200.10.0.2 255.255.255.0
outside_router(config-if)#no shut
outside_router(config)#ex

outside_router(config)#interface Serial0/1/0
outside_router(config-if)#ip add 200.20.0.1 255.255.255.0
outside_router(config-if)#no shut
outside_router(config)#ex

---------------------------------------------- HSRP-----------------------------------
outside_router(config-if)#standby 10 ip 200.10.0.254
Router(config-if)#standby 10 pri
Router(config-if)#standby 10 priority 95
Router(config-if)#
%HSRP-6-STATECHANGE: GigabitEthernet0/0 Grp 10 state Speak -> Standby
---------------------------------- ROUTING INFORMATIONPROTCOL  ----------------------------------------

outside_router(config)#router rip
outside_router(config-router)#network 200.10.0.0
outside_router(config-router)#network 200.20.0.0

-------------------------- NATWORK ADDRESS TRANSLATION STATIC DYNAMIC -----------------

outside_router(config)#access-list 11 permit 200.10.0.0
outside_router(config)#access-list 11 permit 200.10.0.0 0.0.0.255
outside_router(config)#ip nat pool rp 10.20.10.1 10.20.10.5 netmask 255.0.0.0
outside_router(config)#ip nat inside source list 10 pool rp
outside_router(config)#int gig0/0
outside_router(config-if)#ip nat inside
outside_router(config-if)#ex
outside_router(config)#int se0/1/1
outside_router(config-if)#ip nat outside
outside_router(config-if)#ex
outside_router(config)#ex
outside_router#
%SYS-5-CONFIG_I: Configured from console by console
```

Router outside (2)

outside_router(config)#interface GigabitEthernet0/1
outside_router(config-if)#ip add 200.10.0.3 255.255.255.0
outside_router(config-if)#no shut
outside_router(config)#ex

outside_router(config)#interface Serial0/1/0
outside_router(config-if)#ip address 200.30.0.3 255.255.255.0
outside_router(config-if)# no shut
---------- ROUTING INFORMATIONPROTCOL ----------
outside_router(config)#router rip
outside_router(config-router)#network 200.10.0.0
outside_router(config-router)#network 200.30.0.0

---------- HSRP ----------
outside_router(config-if)#standby 10 ip 200.10.0.254
outside_router(config-if)#stan
outside_router(config-if)#standby 10 pri
outside_router(config-if)#standby 10 priority 90
outside_router(config-if)#

----------NATWORK ADDRESS TRANSLATION STATIC ----------

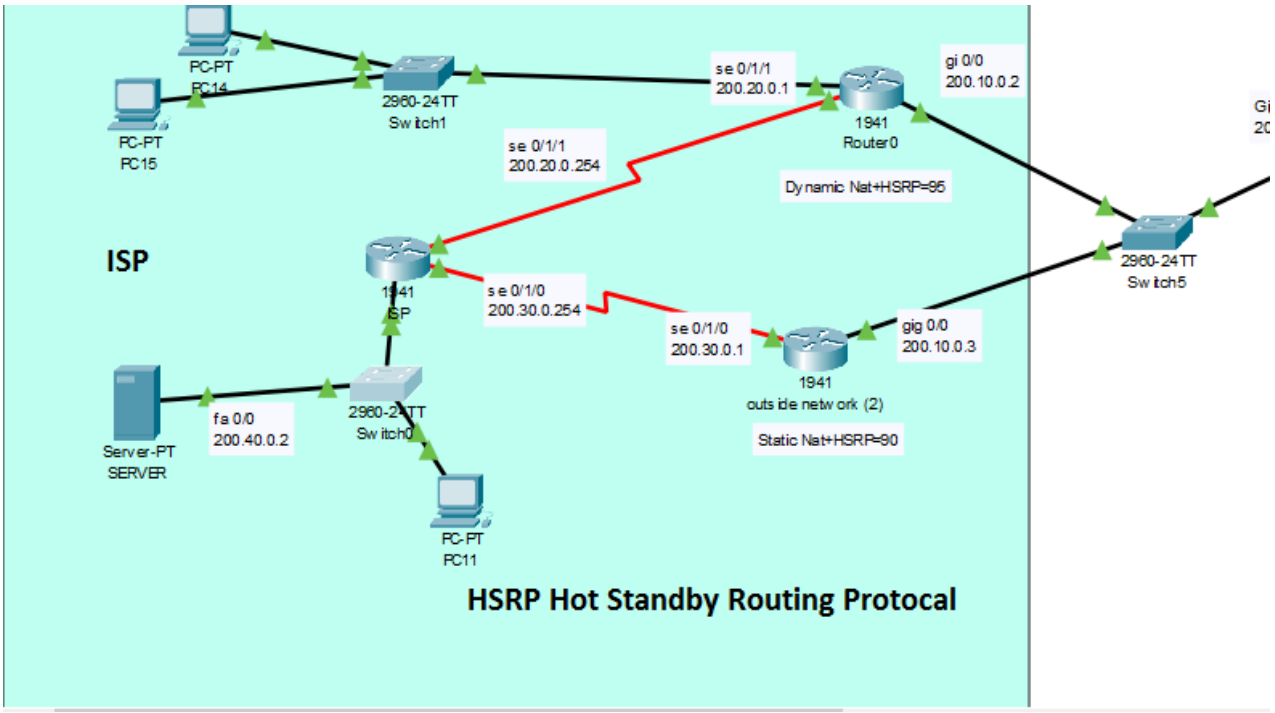
outside_router(config)#access-list 10 permit 200.10.0.0
outside_router(config)#ip nat inside source static 200.10.0.254 10.10.10.1
outside_router(config)#int gig 0/0
outside_router(config-if)#ip nat inside
outside_router(config-if)#ex
outside_router(config)#int se0/1/0
outside_router(config-if)#ip nat outside
outside_router(config-if)#ex
outside_router(config)#
outside_router(config)#
Router(config)#

ISP ROUTER

outside_router2(config)#interface Serial0/1/0
outside_router2(config-if)#ip address 200.30.0.1 255.255.255.0
outside_router2(config-if)#ip address 200.30.0.1 255.255.255.0

outside_router2(config-if)# no shut

Router(config)#interface Serial0/1/0
Router(config-if)#ip address 200.20.0.254 255.255.255.0
Router(config-if)#ip address 200.20.0.254 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
Router(config)#int fa0/0
Router(config-if)#ip address 192.169.1.1 254 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#ex
Router(config)#router rip
Router(config-router)#network 200.20.0.0
Router(config-router)#network 200.30.0.0
Router(config-router)#network 192.169.1.0



Firewall

ciscoasa(config)#interface GigabitEthernet1/1
ciscoasa(config-if)#ip add 172.10.0.254 255.255.0.0
ciscoasa(config-if)#nameif inside
ciscoasa(config-if)#security-level 100
ciscoasa(config-if)#no shut
ciscoasa(config-if)#ex

ciscoasa(config)#interface GigabitEthernet1/2
ciscoasa(config-if)#ip address 200.10.0.1 255.255.255.0
ciscoasa(config-if)#nameif outside
ciscoasa(config-if)#seccurity-level 0
ciscoasa(config-if)#no shutdown

ciscoasa(config)# route outside 0.0.0.0 0.0.0.0 20.20.20.1
ciscoasa(config)#route inside 172.11.0.0 255.255.0.0 172.10.0.1
ciscoasa(config)#route inside 0.0.0.0 0.0.0.0 200.20.0.2

ciscoasa(config)#access-list OUTSIDE-IN extended permit icmp any any echo-reply
ciscoasa(config)# access-list OUTSIDE-IN extended permit ip any any
ciscoasa(config)# access-group OUTSIDE-IN in interface outside

ciscoasa(config)#policy-map global_policy

ciscoasa(config-pmap)#class-map inspection_default

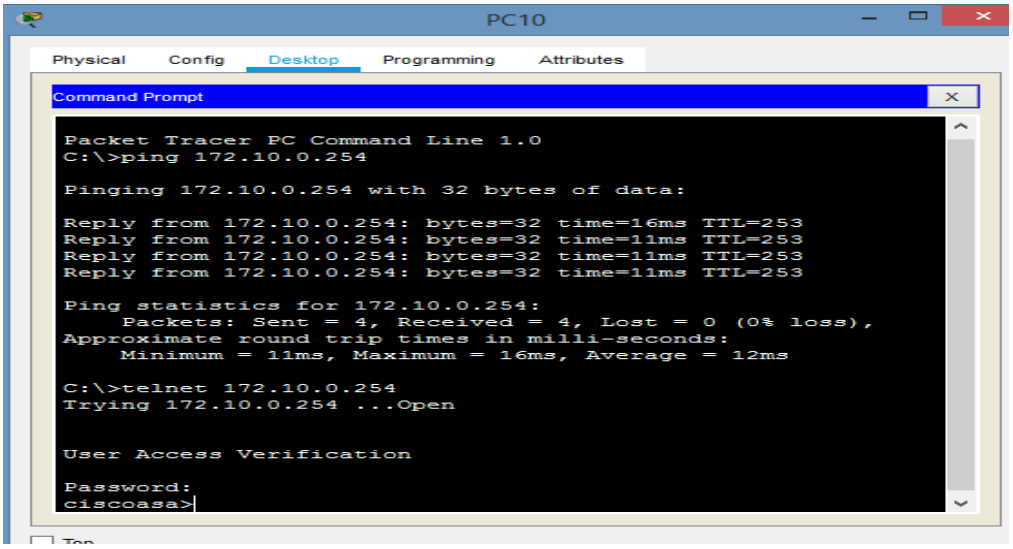
ciscoasa(config-cmap)#match default-inspection-traffic
ciscoasa(config-cmap)#ex
ciscoasa(config)#policy-map global_policy
ciscoasa(config-pmap)#class?

ciscoasa(config-pmap)#class inspection_default
ciscoasa(config-pmap-c)#inspect icmp
ciscoasa(config-pmap-c)#ex

TELNET

ciscoasa(config)#telnet 192.168.20.0 255.255.255.0 inside
ciscoasa(config)#
ciscoasa(config)#pas?

configure mode commands/options:
passwd
ciscoasa(config)#passwd 123
ciscoasa(config)#
ciscoasa#


PC10
Physical
Config
Desktop
Programming
Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\>ping 172.10.0.254
Pinging 172.10.0.254 with 32 bytes of data:
Reply from 172.10.0.254: bytes=32 time=16ms TTL=253
Reply from 172.10.0.254: bytes=32 time=11ms TTL=253
Reply from 172.10.0.254: bytes=32 time=11ms TTL=253
Reply from 172.10.0.254: bytes=32 time=11ms TTL=253
Ping statistics for 172.10.0.254:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 11ms, Maximum = 16ms, Average = 12ms
C:\>telnet 172.10.0.254
Trying 172.10.0.254 ...Open
User Access Verification
Password:
ciscoasa>

Also Test the connectivity between two PC‘s

- **Output :**

Output in the above image shows ping reply from ip assigned to network.

CHAPTER 9

INFORMATION ABOUT THE EIGRP PROTOCOL

❖ Enhanced Interior Gateway Routing Protocol

1. Enhanced Interior Gateway Routing Protocol is an advanced distance vector routing protocol based on the principles of Interior Gateway Routing Protocol (IGRP). It has a unique characteristic that improves operational ability and fast converging rate.

2. Enhanced Interior Gateway Routing Protocol or EIGRP automates the routing decisions and configurations in computer networking. Cisco designed the protocol, and it is available only on Cisco routers.

3. It can determine the shortest path distance vector and works on the Interior Gateway Routing Protocol principle, a classless routing protocol. It calculates the shortest optimal network route using bandwidth, load, and delays metrics.

4. It is a technologically more advanced distance vector-based routing protocol. To exchange information using EIGRP, first and foremost, the routers need to become neighbors to EIGRP, then EIGRP uses the multicast address to share the information.

5. Enhanced Interior Gateway Routing Protocol's underlying logic is based on the concept of an autonomous system. In a system where each router should become neighbors to EIGRP and each system tagged as neighbors under Enhanced Interior, Gateway Routing

❖ BENEFITS OF EIGRP :

- Enhanced Interior Gateway Routing Protocol converges at fast rapid times for the changes in the network topology.
- It uses links more effectively through (ECMP) Equal-Cost Multi-Path and unequal-cost load sharing.
- It performs a much easier transition with a multi-address family.
- It supports both IPV4 and IPV6 networks.
- It provides encryption for security, and users can utilize it with iBGP for WAN routing.
- It reduces network traffic by making use of 'need-based' updates.
- Enhanced Interior Gateway Routing Protocol (EIGRP) is an advanced distance-vector routing protocol used on a computer network to help automate routing decisions and configuration.

❖ Pros and Cons of EIGRP :

➢ Pros :

- EIGRP with protocol-dependent modules can route several different layer protocols.
- The designers intended to create EIGRP configuration to be easy to configure.
- With EIGRP Autonomous number and network command, EIGRP can be enabled.
- It will converge in 200 milliseconds.
- It is the protocol that performs unequal cost load balancing.
- If the destination has more than one link, it will identify the variance between the links.
- One of the more advanced features of EIGRP is Manual route summarization. It improves stability and reduces the routing table size.

➢ *Cons :*

- EIGRP routing protocol can be accessible with the CISCO network devices.
- It is a distance vector routing protocol that relies on neighbors' routes.
- It does not support future applications as it is not extensible.

❖ Conclusion :

EIGRP is the most advanced routing protocol that relies on distance vectors and state route links effectively identify the optimal route path. It will have more impact in real-time as it uses the required resources, and the only disadvantage is that it is not extensible.

CHAPTER 10

SPECIAL EXPERIENCE ENCOUNTERED DURING TRAINING

- **Challenging experiences encountered.**

Implementing & Deploying network & configuration of routing and switching services is itself a challenging experience although it allows us to find errors but also to resolve is it satisfies the requirements or not so it must be carried out professional to provide the proof of quality of services. As we do not have much of practicals in our course so we learned the proper format for creating and accessing the Network & services as well as the techniques to execute them therefor it take us about a week to learn all the things.

Also, we were given task for implementing routers for routing using cisco packet tracer which unfortunately did not get completed but was a very challenging task. As the it was carried on using the guidance of our Trainer, we needed to learn about it.

In this 4 month of training we faced 2 special challenging tasks like testing a live Network service and learning deployment in IT Infrastructure which helped us in improving our practical skills as well as enhancing our Technical knowledge.