

**CCNA PROJECT**

**TOPIC**

ESTABLISH NETWORK DESIGN FOR NETWORKZ SYSTEMS IN TRIVANDRUM AND COCHIN.

**ABSTRACT**

* Establish a network for Networkz Systems in Trivandrum and Cochin.
* There are two offices in and also have a branch in Cochin.
* There are two servers each in the main two offices in Trivandrum and also have a server at backup network.
* There is communication between every pc’s in the branch at Cochin.
* There are 5 predefined networks blocked from further movement from the office networks and a backup pc.

**CHAPTER 1**

**AIM**

* To establish a network for the business firm.
* To connect the head offices networks with the distant located branches
* Allow communication between the local networks in the same locations.
* Restrict the movement of packets from predefined networks.

**CHAPTER 2**

PROCEDURES

* Start the newly assigned project.
* Prepare the initial layout.
* Place the components properly.
* Establish the connections.
* Perform routing operations properly.
* Perform network securities.
* Test the operation of network.

**CHAPTER 3**

**NETWORK REQUIREMENTS**

* Identify the parts and components which are used to build up the required network.
* The local networks at main offices and branches should be clearly defined.
* The servers and local pc’s should be given with their ip addresses.
* Up the router interfaces and security at every end must be ensured.
* Proper routing protocols must be applied to each and every network.
* Communication between the local pc’s under the same location must be established.
* Access of predefined networks should be restricted.

**CHAPTER 4**

**THEORY**

* **Routing protocols** determine the best path to each network, which is then added to the routing table.
* The **Dynamic routing** protocol is one of such and here routers exchange routing information whenever there is a topology change.
* This exchange allows routers to automatically learn about new networks and also to find alternate paths if there is a link failure to a current network.
* In comparison with static routing, dynamic routing protocols require less administrative efforts.
* The static routing can be implemented with small networks where values are determined by administrator. But dynamic routing is a way better choice when the network becomes large and having more components.
* Even though the dynamic routing is the better choice, the dynamic routing alone or the combination of both are used where there is a moderate level of complexity.
* The main purposes of dynamic routing protocols are the follows:
* Discovering the remote networks.
* Maintaining up-to-date routing information.
* Determining the best path to destination networks.
* Having the ability to find a new best path if the current path is no longer available etc.
* The operations of dynamic routing protocol may vary depending on the type of routing protocol. There specific operations of different kinds of dynamic routing protocols like RIP, IGRP, EIGRP, and OSPF.
* Where RIP is a universal protocol with Administrative Distance (AD) value 120 and with a hop count of 15.
* IGRP is a CISCO proprietary protocol with AD value 100 and with default hop count of 100. And OSPF is an open standard protocol with AD value 110 and with unlimited hop counts.
* ***EIGRP*** (Enhanced Interior Gateway Protocol) is an advanced version of IGRP protocol. It is a hybrid protocol and has features like link state and DVP.
* It maintains three tables:
* Neighbor ship table: which keep’s the information of another router which is its neighbor.
* Topology table: it keeps the information of all possible routers from one network to another.
* Routing table: this keeps the information of best path from one network to another.
* The EIGRP has AD value 90 and distance is calculated by composite metric. Its hop count is 100. But can be extended up to 255.
* The CISCO ***ACL or Access Control Lists*** are used mainly for network security.
* The conditions (permit and deny) for controlling traffic’s through router are called ACL. Cisco ACLs are available for several types of routed protocols including IP, IPX, AppleTalk, XNS, DEC net, and others. However, we will be discussing ACLs pertaining to TCP/IP protocol only.
* The ACL are classified to Standard ACL and Extended ACL.
* Standard ACL is applied to an interface inbound or outbound. Here source ip is given for Standard ACL. Entire tcp/ip protocol stack is blocked when deny condition is applied and it varies from 1-99.
* ***Extended ACL*** is configured under the source router. And it varies form 100-199.
* Here the source and destination ip is given for extended ACL.
* Each or any protocols could be blocked when deny condition is applied.

*EIGRP Configuration:*

On router A;

RouterA(config)#router eigrp <as value>

RouterA(config-router)# network <adjacent networks>

RouterA(config-router)#exit

On router B;

RouterB(config)#router eigrp <as value>

RouterB(config-router)# network <adjacent networks>

RouterA(config-router)#exit

*To verify:*

Router#show ip route

0r

Route#show running configuration

*To remove routing:*

clear ip eigrp neighbors [ip-address | interface-type interface-number]

*ACL Configuration*:

Router(config)#access-list 100 deny icmp <network address> <wildcard mask> <network address> <wildcard mask>

Router(config)#access-list 100 permit icmp any any

Router(config)#int fa 0/0

Router(config-if)#ip access-group 100 in

Router(config-if)#exit

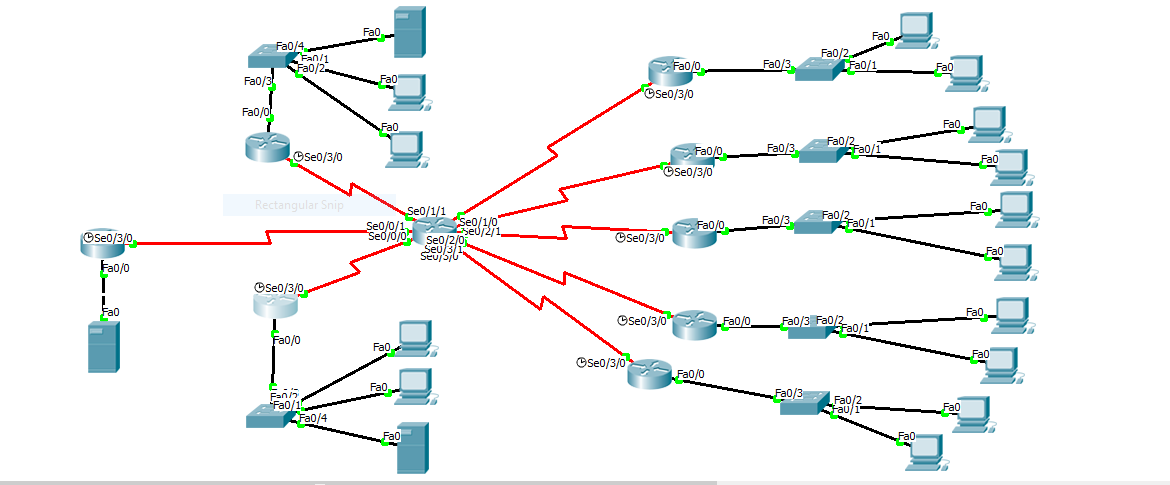
Router(config)#int se 0/2/0

Router(config-if)#ip access-group 100 in

Router(config-if)#exit

**CHAPTER 5**

**TOPOLOGY**

****

**CHAPTER 6**

**CONFIGURATION**

***Cochin:***

**[i] Router 1**

router1#show run

Building configuration...

Current configuration : 903 bytes

!

version 12.4

no service timestamps log datetimemsec

no service timestamps debug datetimemsec

no service password-encryption

!

hostname router1

!

!

!

enable secret 5 $1$mERr$JzfpN3ofmoFKhqwHnph3o1

!

!

!

!

!

!

!

!

!

!

!

!

spanning-tree mode pvst

!

!

!

!

interface FastEthernet0/0

ip address 192.168.1.1 255.255.255.0

ip access-group 100 in

duplex auto

speed auto

!

interface FastEthernet0/1

noip address

duplex auto

speed auto

shutdown

!

interface Serial0/3/0

ip address 50.0.0.2 255.0.0.0

ip access-group 100 out

clock rate 72000

!

interface Serial0/3/1

noip address

shutdown

!

interface Vlan1

noip address

shutdown

!

routereigrp 100

network 192.168.1.0

network 50.0.0.0

auto-summary

!

ip classless

!

!

access-list 100 deny icmp 192.168.1.0 0.0.0.255 180.160.0.0 0.0.255.255

access-list 100 permit icmp any any

!

!

!

!

!

line con 0

!

line aux 0

!

linevty 0 4

login

!

!

!

end

**ii. Host IP address**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Serial no | Host | IP address | Subnet mask | Default gateway |
| 1 | PC-PT | 192.168.1.2 | 255.255.255.0 | 192.168.1.1 |
| 2 | PC-PT | 192.168.1.3 | 255.255.255.0 | 192.168.1.1 |

**iii. Password**

|  |  |  |
| --- | --- | --- |
| Sl no | Type | Password |
| 1 | Secret | broadcomm |

**iv. Routing protocols used**

EIGRP (Dynamic Routing) Protocol is used in the network.

**v. Network Security**

ACL (access control list)

**vi. Blocked IP**

1. 180.160.1.0

**vii. Networks**

(a) 192.168.1.0

(b) 50.0.0.0

**viii. Interface**

(a) interface serial 0/3/0

(b) interfacefastethernet 0/0

**ix. clock rate**

The clock rate is 72000

**[ii] Router 2**

router2#show run

Building configuration...

Current configuration : 744 bytes

!

version 12.4

no service timestamps log datetimemsec

no service timestamps debug datetimemsec

no service password-encryption

!

hostname router2

!

!

!

enable secret 5 $1$mERr$JzfpN3ofmoFKhqwHnph3o1

!

!

!

!

!

!

!

!

!

!

!

!

spanning-tree mode pvst

!

!

!

!

interface FastEthernet0/0

ip address 182.168.1.1 255.255.0.0

duplex auto

speed auto

!

interface FastEthernet0/1

noip address

duplex auto

speed auto

shutdown

!

interface Serial0/3/0

ip address 40.0.0.2 255.0.0.0

clock rate 72000

!

interface Serial0/3/1

noip address

shutdown

!

interface Vlan1

noip address

shutdown

!

routereigrp 100

network 182.168.0.0

network 40.0.0.0

auto-summary

!

ip classless

!

!

!

!

!

!

!

line con 0

!

line aux 0

!

linevty 0 4

login

!

!

!

end

**ii. Host IP address**

|  |  |  |  |
| --- | --- | --- | --- |
| Serial no | Host (IP address) | Subnet mask | Default gateway |
| 1 | PC-PT(182.168.1.2) | 255.255.0.0 | 182.168.1.1 |
| 2 | PC-PT(182.168.1.3) | 255.255.0.0 | 182.168.1.1 |

**iii. Password**

|  |  |  |
| --- | --- | --- |
| Sl no | Type | Password |
| 1 | Secret | broadcomm |

**iv. Routing protocols used**

EIGRP (Dynamic Routing) Protocol is used in the network.

**v. Network Security**

ACL (access control list)

**vi Blocked IP**

1. 180.160.1.0

**vii. Networks**

(a) 182.168.1.0

(b) 40.0.0.0

**viii. Interface**

(a) interface serial 0/3/0

(b) interfacefastethernet 0/0

**ix. Clock rate**

The clock rate is 72000

**[iii] Router3**

router3#show run

Building configuration...

Current configuration : 903 bytes

!

version 12.4

no service timestamps log datetimemsec

no service timestamps debug datetimemsec

no service password-encryption

!

hostname router3

!

!

!

enable secret 5 $1$mERr$JzfpN3ofmoFKhqwHnph3o1

!

!

!

!

!

!

!

!

!

!

!

!

spanning-tree mode pvst

!

!

!

!

interface FastEthernet0/0

ip address 172.168.1.1 255.255.0.0

ip access-group 120 in

duplex auto

speed auto

!

interface FastEthernet0/1

noip address

duplex auto

speed auto

shutdown

!

interface Serial0/3/0

ip address 30.0.0.2 255.0.0.0

ip access-group 120 out

clock rate 72000

!

interface Serial0/3/1

noip address

shutdown

!

interface Vlan1

noip address

shutdown

!

routereigrp 100

network 172.168.0.0

network 30.0.0.0

auto-summary

!

ip classless

!

!

access-list 120 deny icmp 172.168.0.0 0.0.255.255 100.0.0.0 0.255.255.255

access-list 120 permit icmp any any

!

!

!

!

!

line con 0

!

line aux 0

!

linevty 0 4

login

!

!

!

end

**ii. Host IP address**

|  |  |  |  |
| --- | --- | --- | --- |
| Serial no | Host (IP address) | Subnet mask | Default gateway |
| 1 | PC-PT(172.168.1.2) | 255.255.0.0 | 172.168.1.1 |
| 2 | PC-PT(172.168.1.3) | 255.255.0.0 | 172.168.1.1 |

**iii. Password**

|  |  |  |
| --- | --- | --- |
| Sl no | Type | Password |
| 1 | Secret | broadcomm |

**iv. Routing protocols used**

EIGRP (Dynamic Routing) Protocol is used in the network.

**v. Network Security**

ACL (access control list)

**vi. Blocked IP**

1. 100.0.0.0

**vii. Networks**

(a) 172.168.1.0

(b) 30.0.0.0

**viii. Interface**

(a) interface serial 0/3/0

(b) interfacefastethernet 0/0

**ix. Clock rate**

The clock rate is 72000

**[iv] Router 4**

router4#show run

Building configuration...

Current configuration : 916 bytes

!

version 12.4

no service timestamps log datetimemsec

no service timestamps debug datetimemsec

no service password-encryption

!

hostname router4

!

!

!

enable secret 5 $1$mERr$JzfpN3ofmoFKhqwHnph3o1

!

!

!

!

!

!

!

!

!

!

!

!

spanning-tree mode pvst

!

!

!

!

interface FastEthernet0/0

ip address 162.168.1.1 255.255.0.0

ip access-group 130 in

duplex auto

speed auto

!

interface FastEthernet0/1

noip address

duplex auto

speed auto

shutdown

!

interface Serial0/3/0

ip address 20.0.0.2 255.0.0.0

ip access-group 130 out

clock rate 72000

!

interface Serial0/3/1

noip address

shutdown

!

interface Vlan1

noip address

shutdown

!

routereigrp 100

network 162.168.0.0

network 20.0.0.0

auto-summary

!

ip classless

!

!

access-list 130 deny icmp 162.168.0.0 0.0.255.255 170.160.0.0 0.0.255.255

access-list 130 permit icmp any any

!

nocdp run

!

!

!

!

!

line con 0

!

line aux 0

!

linevty 0 4

login

!

!

!

end

**ii. Host IP address**

|  |  |  |  |
| --- | --- | --- | --- |
| Serial no | Host (IP address) | Subnet mask | Default gateway |
| 1 | PC-PT(162.168.1.2) | 255.255.0.0 | 162.168.1.1 |
| 2 | PC-PT(162.168.1.3) | 255.255.0.0 | 162.168.1.1 |

**iii. Password**

|  |  |  |
| --- | --- | --- |
| Sl no | Type | Password |
| 1 | Secret | broadcomm |

**iv. Routing protocols used**

EIGRP (Dynamic Routing) Protocol is used in the network.

**v. Network Security**

ACL (access control list)

**vi. Blocked IP**

1. 170.160.1.0

**vii. Networks**

(a) 162.168.1.0

(b) 20.0.0.0

**viii. Interface**

(a) interface serial 0/3/0

(b) interfacefastethernet 0/0

**ix. Clock rate**

The clock rate is 72000

**[v] Router 5**

router5#show run

Building configuration...

Current configuration : 757 bytes

!

version 12.4

no service timestamps log datetimemsec

no service timestamps debug datetimemsec

no service password-encryption

!

hostname router5

!

!

!

enable secret 5 $1$mERr$JzfpN3ofmoFKhqwHnph3o1

!

!

!

!

!

!

!

!

!

!

!

!

spanning-tree mode pvst

!

!

!

!

interface FastEthernet0/0

ip address 152.168.1.1 255.255.0.0

duplex auto

speed auto

!

interface FastEthernet0/1

noip address

duplex auto

speed auto

shutdown

!

interface Serial0/3/0

ip address 10.0.0.2 255.0.0.0

clock rate 72000

!

interface Serial0/3/1

noip address

shutdown

!

interface Vlan1

noip address

shutdown

!

routereigrp 100

network 152.168.0.0

network 10.0.0.0

auto-summary

!

ip classless

!

!

!

nocdp run

!

!

!

!

!

line con 0

!

line aux 0

!

linevty 0 4

login

!

!

!

end

**ii. Host IP address**

|  |  |  |  |
| --- | --- | --- | --- |
| Serial no | Host (IP address) | Subnet mask | Default gateway |
| 1 | PC-PT(152.168.1.2) | 255.255.0.0 | 152.168.1.1 |
| 2 | PC-PT(152.168.1.3) | 255.255.0.0 | 152.168.1.1 |

**iii. Password**

|  |  |  |
| --- | --- | --- |
| Sl no | Type | Password |
| 1 | Secret | broadcomm |

**iv. Routing protocols used**

EIGRP (Dynamic Routing) Protocol is used in the network.

**v. Network Security**

ACL (access control list)

**vi. Blocked IP**

1. 170.160.1.0

**vii. Networks**

(a) 152.168.1.0

(b) 10.0.0.0

**viii. Interface**

(a) interface serial 0/3/0

(b) interfacefastethernet 0/0

**ix. Clock rate**

The clock rate is 72000

***Trivandrum:***

**[vi] Router 6**

router6#show run

Building configuration...

Current configuration : 1169 bytes

!

version 12.4

no service timestamps log datetimemsec

no service timestamps debug datetimemsec

no service password-encryption

!

hostname router6

!

!

!

enable secret 5 $1$mERr$JzfpN3ofmoFKhqwHnph3o1

!

!

!

!

!

!

!

!

!

!

!

!

spanning-tree mode pvst

!

!

!

!

interface FastEthernet0/0

noip address

duplex auto

speed auto

shutdown

!

interface FastEthernet0/1

noip address

duplex auto

speed auto

shutdown

!

interface Serial0/0/0

ip address 70.0.0.1 255.0.0.0

!

interface Serial0/0/1

ip address 80.0.0.1 255.0.0.0

!

interface Serial0/1/0

ip address 10.0.0.1 255.0.0.0

!

interface Serial0/1/1

ip address 60.0.0.1 255.0.0.0

!

interface Serial0/2/0

ip address 30.0.0.1 255.0.0.0

!

interface Serial0/2/1

ip address 20.0.0.1 255.0.0.0

!

interface Serial0/3/0

ip address 50.0.0.1 255.0.0.0

!

interface Serial0/3/1

ip address 40.0.0.1 255.0.0.0

!

interface Vlan1

noip address

shutdown

!

routereigrp 100

network 50.0.0.0

network 40.0.0.0

network 30.0.0.0

network 20.0.0.0

network 10.0.0.0

network 60.0.0.0

network 70.0.0.0

network 80.0.0.0

auto-summary

!

ip classless

!

!

!

nocdp run

!

!

!

!

!

line con 0

!

line aux 0

!

linevty 0 4

login

!

!

!

end

**ii. Password**

|  |  |  |
| --- | --- | --- |
| Sl no | Type | Password |
| 1 | Secret | broadcomm |

**iii. Routing protocols used**

EIGRP (Dynamic Routing) Protocol is used in the network.

**vi. Networks**

(a) 10.0.0.0

(b) 20.0.0.0

(c) 30.0.0.0

(d) 40.0.0.0

(e) 50.0.0.0

(f) 70.0.0.0

(g) 80.0.0.0

**vi. Interface**

Interface serial0/0/0

InterfaceSerial0/0/1

InterfaceSerial0/1/0

InterfaceSerial0/1/1

InterfaceSerial0/2/0

InterfaceSerial0/2/1

Interface Serial0/3/0

Interface Serial0/3/1

**ix. Clock rate**

The clock rate is 72000

**[vii] Router 7**

router7#show run

Building configuration...

Current configuration : 867 bytes

!

version 12.4

no service timestamps log datetimemsec

no service timestamps debug datetimemsec

no service password-encryption

!

hostname router7

!

!

!

enable secret 5 $1$mERr$JzfpN3ofmoFKhqwHnph3o1

!

!

!

!

!

!

!

!

!

!

!

!

spanning-tree mode pvst

!

!

!

!

interface FastEthernet0/0

ip address 180.160.1.1 255.255.0.0

ip access-group 110 in

duplex auto

speed auto

!

interface FastEthernet0/1

noip address

duplex auto

speed auto

shutdown

!

interface Serial0/3/0

ip address 70.0.0.2 255.0.0.0

ip access-group 110 out

clock rate 72000

!

interface Vlan1

noip address

shutdown

!

routereigrp 100

network 180.160.0.0

network 70.0.0.0

auto-summary

!

ip classless

!

!

access-list 110 deny icmp 180.160.0.0 0.0.255.255 182.168.0.0 0.0.255.255

access-list 110 permit icmp any any

!

nocdp run

!

!

!

!

!

line con 0

!

line aux 0

!

linevty 0 4

login

!

!

!

end

**ii.Host IP address**

|  |  |  |  |
| --- | --- | --- | --- |
| Serial no | Host (IP address) | Subnet mask | Default gateway |
| 1 | PC-PT(180.160.1.2) | 255.255.0.0 | 180.160.1.1 |
| 2 | PC-PT(180.160.1.3) | 255.255.0.0 | 180.160.1.1 |
| 3 | Server-PT(180.160.1.4) | 255.255.0.0 | 180.160.1.1 |

**iii. Password**

|  |  |  |
| --- | --- | --- |
| Sl no | Type | Password |
| 1 | Secret | broadcomm |

**iv. Routing protocols used**

EIGRP (Dynamic Routing) Protocol is used in the network.

**v. Network Security**

ACL (access control list)

**vi. Blocked IP**

1. 192.168.1.0
2. 182.168.1.0

**vii. Networks**

(a) 180.160.1.0

(b) 70.0.0.0

**viii. Interface**

(a) interface serial 0/3/0

(b) interfacefastethernet 0/0

**ix. Clock rate**

The clock rate is 72000

**[viii] Router 8**

router8#show run

Building configuration...

Current configuration : 867 bytes

!

version 12.4

no service timestamps log datetimemsec

no service timestamps debug datetimemsec

no service password-encryption

!

hostname router8

!

!

!

enable secret 5 $1$mERr$JzfpN3ofmoFKhqwHnph3o1

!

!

!

!

!

!

!

!

!

!

!

!

spanning-tree mode pvst

!

!

!

!

interface FastEthernet0/0

ip address 170.160.1.1 255.255.0.0

ip access-group 140 in

duplex auto

speed auto

!

interface FastEthernet0/1

noip address

duplex auto

speed auto

shutdown

!

interface Serial0/3/0

ip address 60.0.0.2 255.0.0.0

ip access-group 140 out

clock rate 72000

!

interface Vlan1

noip address

shutdown

!

routereigrp 100

network 170.160.0.0

network 60.0.0.0

auto-summary

!

ip classless

!

!

access-list 140 deny icmp 170.160.0.0 0.0.255.255 152.168.0.0 0.0.255.255

access-list 140 permit icmp any any

!

nocdp run

!

!

!

!

!

line con 0

!

line aux 0

!

linevty 0 4

login

!

!

!

end

**ii. Host IP address**

|  |  |  |  |
| --- | --- | --- | --- |
| Serial no | Host (IP address) | Subnet mask | Default gateway |
| 1 | PC-PT(170.160.1.2) | 255.255.0.0 | 170.160.1.1 |
| 2 | PC-PT(170.160.1.3) | 255.255.0.0 | 170.160.1.1 |
| 3 | Server-PT(170.160.1.4) | 255.255.0.0 | 170.160.1.1 |

**iii. Password**

|  |  |  |
| --- | --- | --- |
| Sl no | Type | Password |
| 1 | Secret | broadcomm |

**iv. Routing protocols used**

EIGRP (Dynamic Routing) Protocol is used in the network.

**v. Network Security**

ACL (access control list)

**vi Blocked IP**

1. 162.168.1.0
2. 152.168.1.0

**vii. Networks**

(a) 170.160.1.0

(b) 60.0.0.0

**viii. Interface**

(a) interface serial 0/3/0

(b) interfacefastethernet 0/0

**ix. Clock rate**

The clock rate is 72000

**[ix] Router 9**

router9#show run

Building configuration...

Current configuration : 702 bytes

!

version 12.4

no service timestamps log datetimemsec

no service timestamps debug datetimemsec

no service password-encryption

!

hostname router9

!

!

!

enable secret 5 $1$mERr$JzfpN3ofmoFKhqwHnph3o1

!

!

!

!

!

!

!

!

!

!

!

!

spanning-tree mode pvst

!

!

!

!

interface FastEthernet0/0

ip address 100.0.0.1 255.0.0.0

duplex auto

speed auto

!

interface FastEthernet0/1

noip address

duplex auto

speed auto

shutdown

!

interface Serial0/3/0

ip address 80.0.0.2 255.0.0.0

clock rate 72000

!

interface Vlan1

noip address

shutdown

!

routereigrp 100

network 100.0.0.0

network 80.0.0.0

auto-summary

!

ip classless

!

!

!

nocdp run

!

!

!

!

!

line con 0

!

line aux 0

!

linevty 0 4

login

!

!

!

end

**ii. Host IP address**

|  |  |  |  |
| --- | --- | --- | --- |
| Serial no | Host (IP address) | Subnet mask | Default gateway |
| 1 | Server-PT(100.0.0.2) | 255.0.0.0 | 100.0.0.1 |

**iii. Password**

|  |  |  |
| --- | --- | --- |
| Sl no | Type | Password |
| 1 | Secret | broadcomm |

**iv. Routing protocols used**

EIGRP (Dynamic Routing) Protocol is used in the network.

**v. Network Security**

ACL (access control list)

**vi. Blocked IP**

1. 172.168.1.0

**viii. Interface**

(a) interface serial 0/3/0

(b) interfacefastethernet 0/0

**RESULTS**

The network proposal for the Networkz Systems is successfully obtained. The communication between the head offices and branch offices are established and securities at required ends are ensured. Aim of this project is fulfilled.