SRM Institute of Science and Technology, Kattankulathur Campus

Faculty of Engineering and Technology

Department of Computer Science and Engineering

Small Business Network with Secure E-Commerce Server

Submitted by

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B.Tech-CSE Specialization in Cloud Computing

Third Year (Section-J2): Batch-2 Semester-5

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BONAFIDE CERTIFICATE

Certified that this project report titled **Small Business Network with Secure E-Commerce Server** is the bonafide work of **AMANDEEP KAUR [Reg No: RA1811028010066] , ASHUTOSH TEWARI [Reg No: RA1811028010067], VATSAL SAXENA [Reg No: RA1811028010068], SAI KRISHNA TEJA [Reg No: RA1811028010069]** , who carried out the project work under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

SIGNATURE	SIGNATURE
Ms.VAISHNAVI MOORTHY	Dr. B.AMUTHA
Signature of the Internal	Signature of the External Examiner

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I sincerely thank staff and students of the Computer Science and Engineering Department, SRM Institute of Science and Technology, for their help during my research. Finally, I would like to thank my parents, my family members and my friends for their unconditional love, constant support and encouragement.

Amandeep Kaur

Ashustosh Tewari

Vatsal Saxena

Sai Krishna Teja

ABSTRACT:

Description of the problem and why it is being investigated: As we have to provide a Secure E-Business Server , the users of that organization must access only the public address and not the private address of that server.They should also only access the https of that E-Commerce Server.

1. The primary methods we use here are :

- The Routing Configurations.
- DHCP Configurations.
- DNS configurations.
- Finally the HTTPS Configurations.

2. Tools used:

- Software used : Cisco Packet tracer
- Tools or components used for this project:
    1. 4- ISR 4321 Routers
    2. 7- Server-PTs (5 for DHCP Servers ,1 for DNS Server and 1 for HTTP Server)
    3. 5- 2960-24TT Switches
    4. 25- PC’s
    5. Ethernet cables of 2 types : Copper Straight-Through Cable and Serial-DTE Cable
    6. Place Note (for labeling the IP addresses)

3. Major results obtained from this project are:

Any Client from any network can access the HTTPS Server which is linked to DNS Server which is further linked to DHCP Servers of that following networks. We will see the functioning of each thing in detail below.

4. Conclusion of our results:

They can only access https of that server by not knowing the IP Address of that server , but can access its public address which is linked to many other servers by enabling Secure E-Commerce Business.

INDEX :

OBJECTIVE OF THE REPORT:

Securely access the HTTPS Page of that organisation to 100 users of the network in our project as we will see below.

INTRODUCTION:

1. For a small business organization to run successfully , the important aspect is the privacy and security of that organization.
2. To maintain these aspects in our project ,with an organization of 100 users , we divide the organization into several networks .
3. In our project we divide the organization network into 20 networks , each of the network having 5 users in it, So that the user's privacy can be maintained with their network in a limited range of networks.
4. This also enables the users to access the HTTPS Server of the organization without any traffic congestion in the network.
5. Security of the organization's data or information can be maintained by making the HTTPS Server address private , by storing it's address only in the DNS Server. We will discuss below in detail.
6. For demonstrating our project we take only 5 networks instead of 20 networks , as the working mechanism is the same in both the cases because the position of DNS and HTTP Servers are important for this network organisation.

HARDWARE REQUIREMENTS:

1. 20 switches.
2. Ethernet cables.
3. 100 PC's.
4. 20 Routers.
5. 22 Servers (20 for DHCP Servers , 1 for DNS Server , 1 for HTTP Server).

REQUIREMENT ANALYSIS:

1. Switches : Here we use 20 switches , which act as only communication points between any nodes. Also providing Port connections to respective nodes.
2. Ethernet Cables : These cables are used as a medium for communication between routers via ports , transferring packets , transferring information or data across nodes.
3. PC: Generally users of the organisation.
4. Routers : These are reasons for translation of address between different networks known as NAT . This is also the reason for providing IP Configurations to different nodes in a network and also port IP addresses by Default Gateway address.
5. DHCP Server : It is generally a BOOTSTRAP Server which stores the 4 piece information in it (we will discuss later) , but it is different from BOOTSTRAP by providing Dynamic Address also.
6. DNS Server : It maps name to address and vice versa of HTTP Server.
7. HTTP Server : It is used by users in our organisation by accessing its services by maintaining its security.

MODULES OF THE PROJECT:

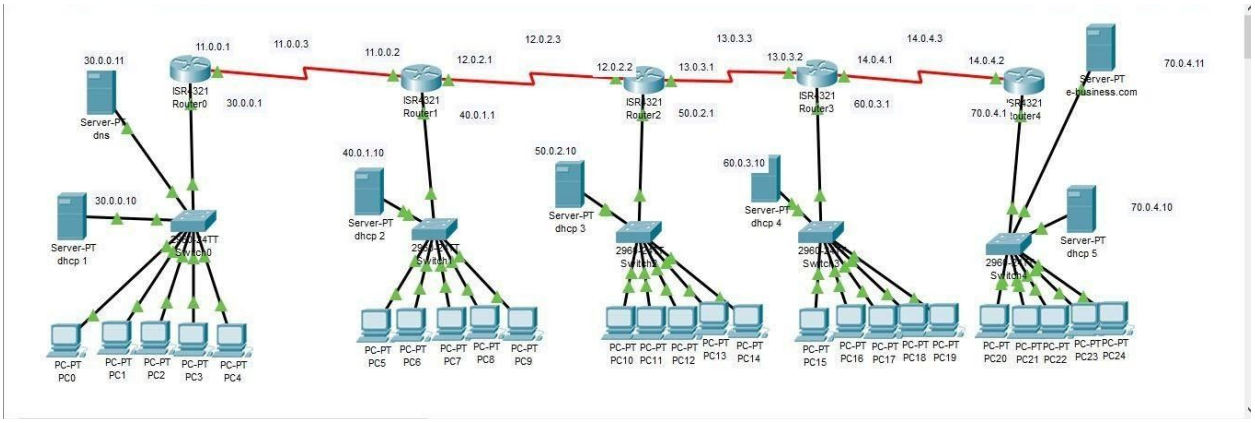
For this project to build, we mainly use certain modules like:

1. Router Configuration
2. DHCP Configuration
3. DNS Configuration
4. HTTPS Configuration

DESIGN

Each Module Description of the Project:

1. Router Configuration:



Our Network Organisation Diagram

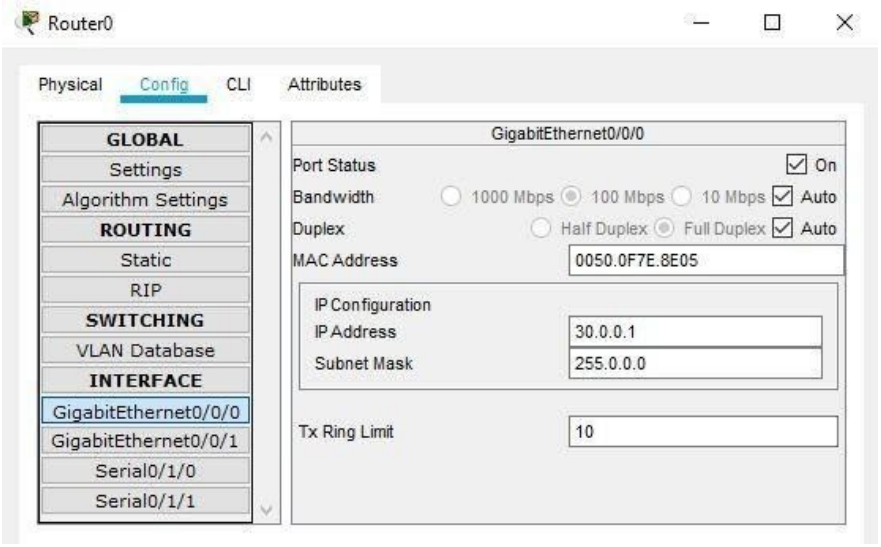
- We see here , there are 5 routers with certain configurations which we will discuss in detail.
- The routing protocol we used here is the static routing protocol , which is the best way of routing in our organisation, because our organisation is a limited network with about only 20 networks (but in diagram we used 5 networks for convenience) , so it will have 20 routers (in diagram 5 routers) and for static routing we need not follow any specific protocol like EIGRP , BGP , RIP as we assign IP address to every router with help of routing table.
- As we use static routing , we have to ensure that ports on either side of routers should be Serial Ports , because they ensure point-to-point communication between them .
- The only way to connect these serial ports is by Serial DTE or DCE Ethernet cables as shown in figure above.(red in colour).
- Before making an ethernet cable connection , we have to make sure that NIM-2T port (which is a 2 port connection) must be inserted into the router's socket and make sure the switch is ON. (see below)

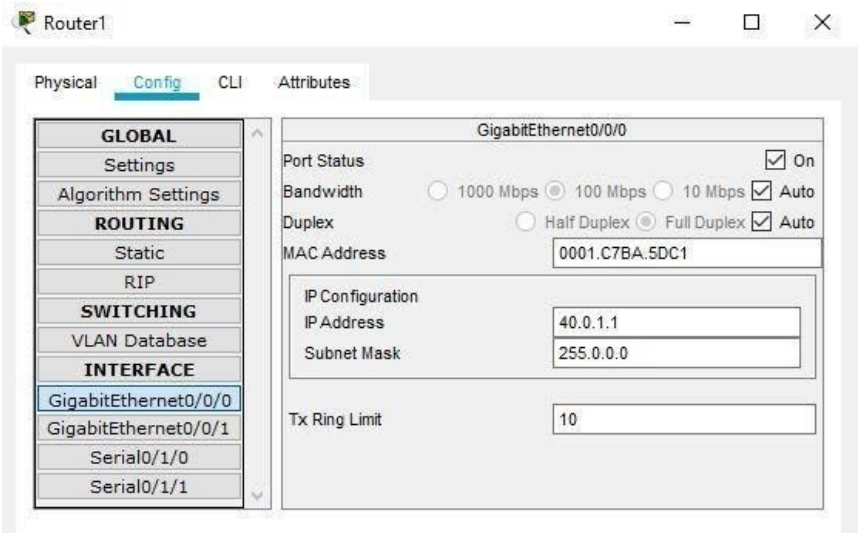
NIM-2T port (we can see 2 ports in the above diagram)

Router with free socket here and make sure NIM-2T fits into it as seen next.

Making that NIM-2T fit into that socket of the router and make the switch on. (as shown in green colour in by 1,0 in router)

- Now as the ethernet cable connection is established , we must assign router configurations to all routers.
- As we have 4 routers here in our diagram here , assign 30.0.0.1 , 40.0.1.1 , 50.0.2.1 , 60.0.3 respectively .

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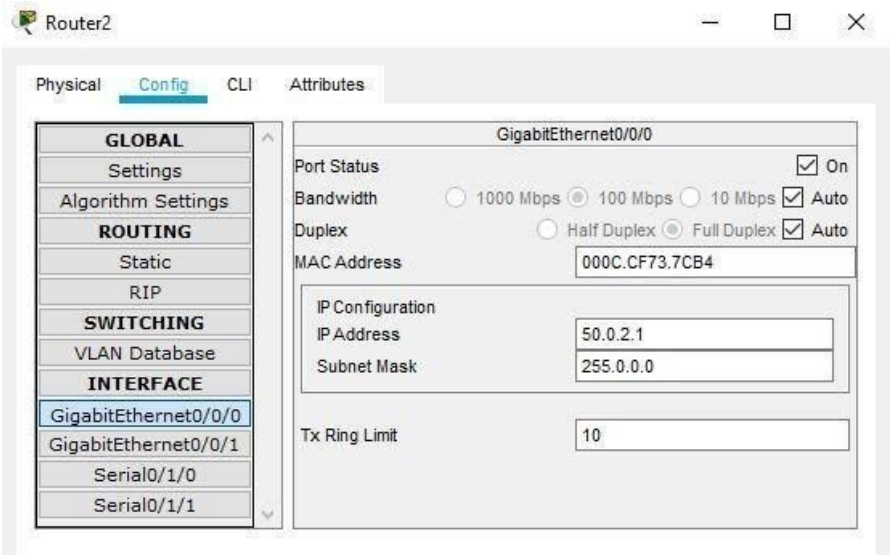
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
Serial0/1/0
Serial0/1/1
GigabitEthernet0/0/0
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
0001.C7BA.5DC1
IP Configuration
IP Address
40.0.1.1
Subnet Mask
255.0.0.0
Tx Ring Limit
10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Physical
Config
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Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
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GigabitEthernet0/0/1
Serial0/1/0
Serial0/1/1
GigabitEthernet0/0/0
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
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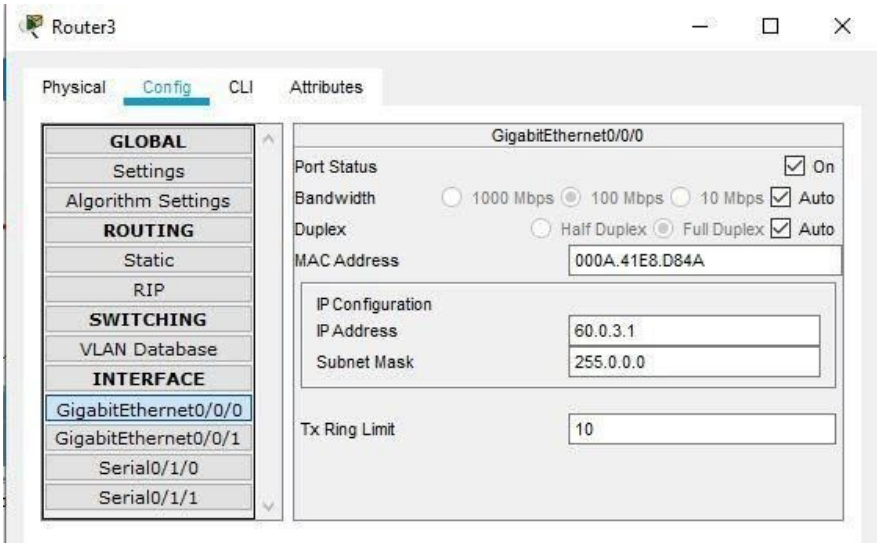
IP Configuration
IP Address
50.0.2.1
Subnet Mask
255.0.0.0
Tx Ring Limit
10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GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
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GigabitEthernet0/0/1
Serial0/1/0
Serial0/1/1
GigabitEthernet0/0/0
Port Status
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Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
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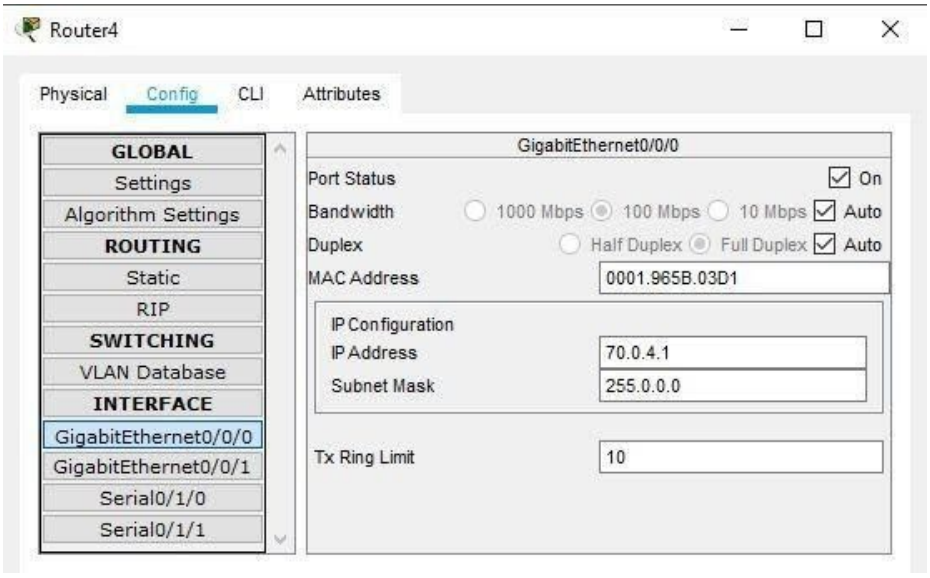
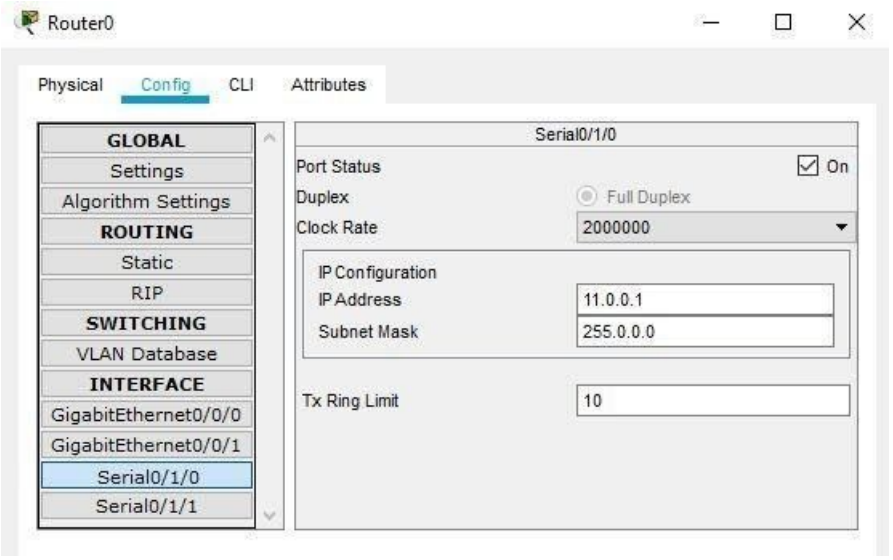
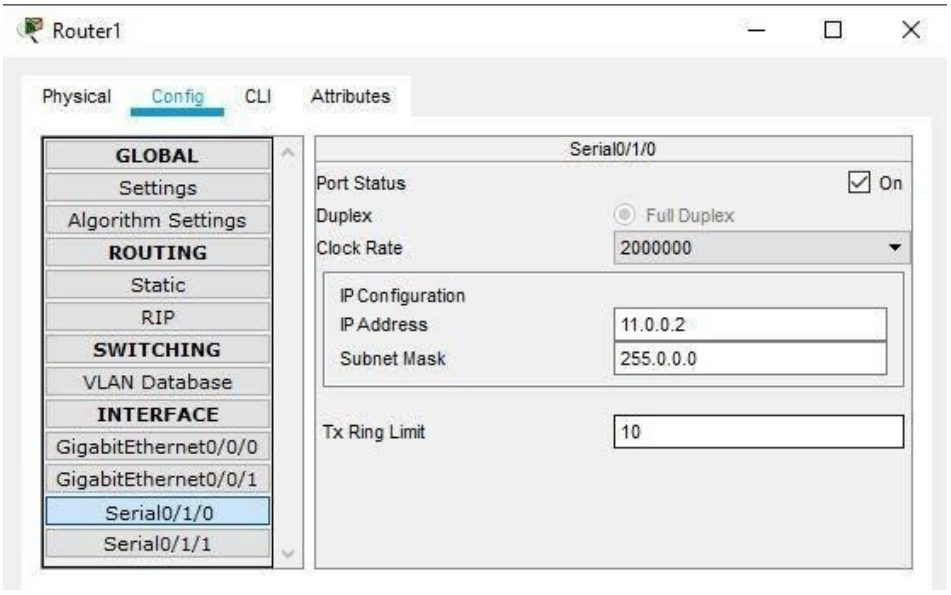
IP Configuration
IP Address
60.0.3.1
Subnet Mask
255.0.0.0
Tx Ring Limit
10



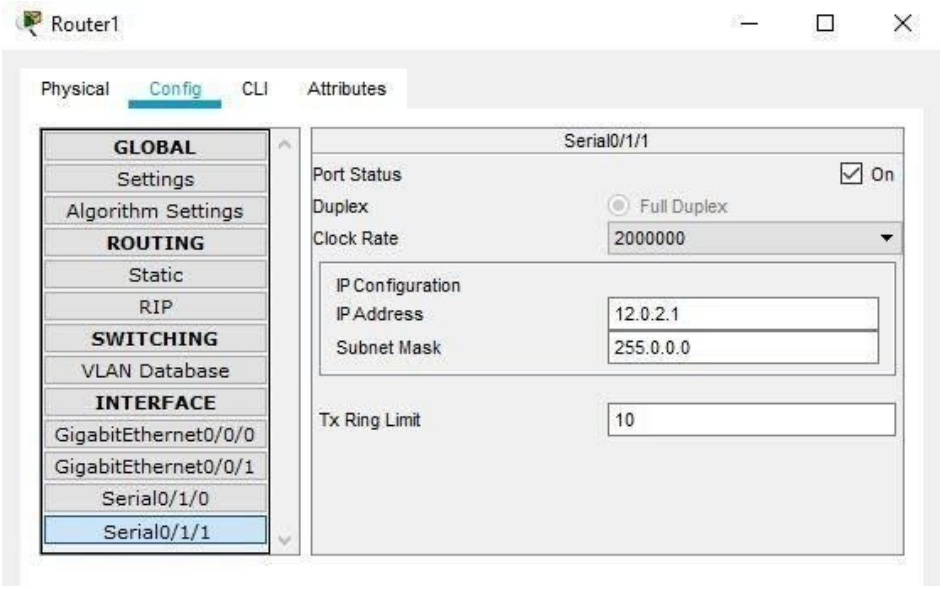
- Make sure that the 3rd part of network ID is different for each network i.e., 0.1 , 0.2 , 0.3 , 0.4 ,0.5 respectively such that we can use IP addresses of the same class (A,B, etc.) for different networks.
- As the 3rd part is different for each, they now belong to different subnets , so we need a default gateway address also for transferring information and communication.
- Here default gateway address becomes router's configuration always.
- Now establishing the serial port addresses for that routers are also important to establish a point-to-point communication between them.
- For a router connected to 1 router we have 1 serial port address and a router connected to 2 routers will have 2 serial port addresses (see below).

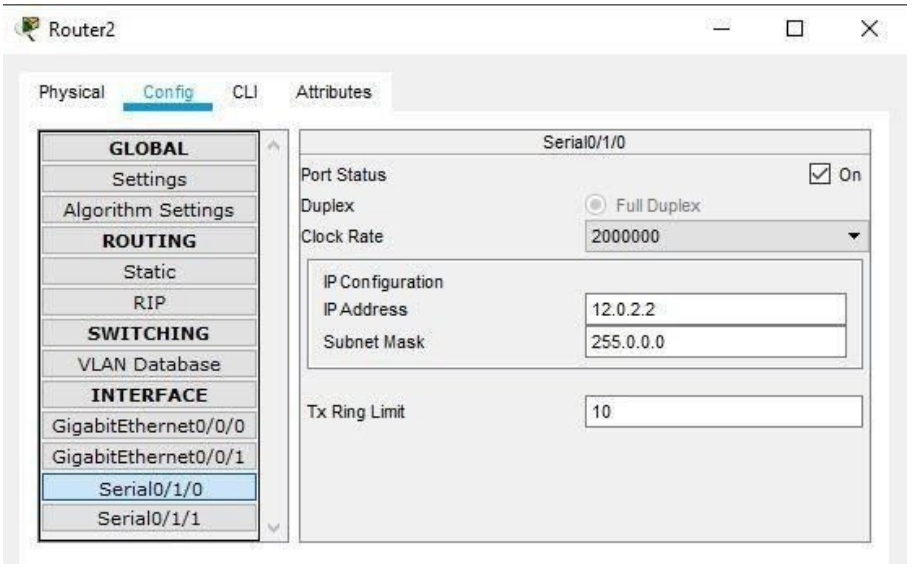


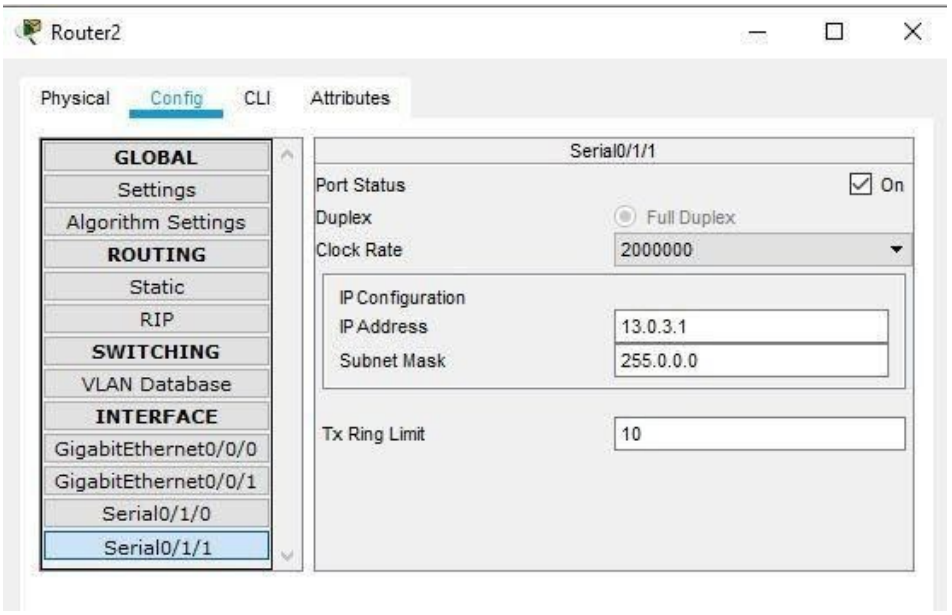
Above Router 0 will have only 1 SP as connected to 1 router .

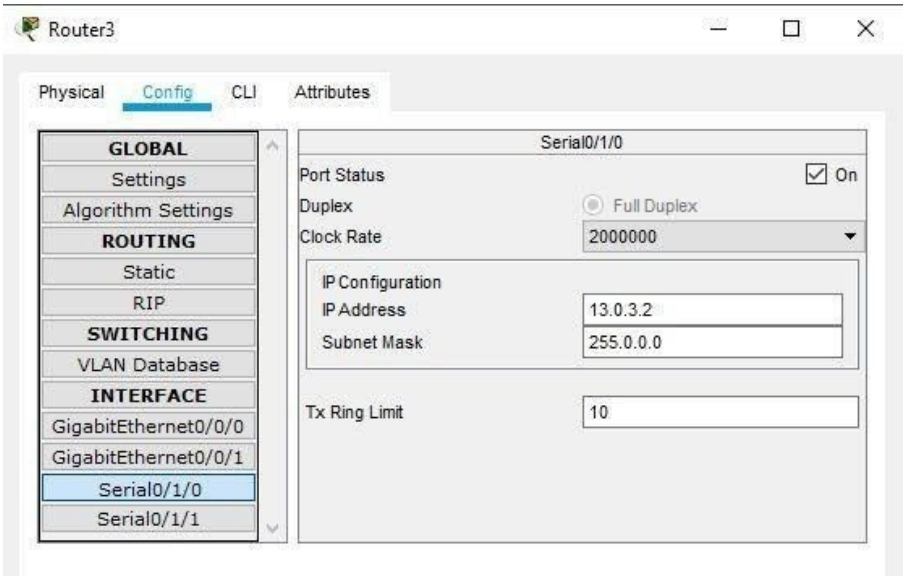


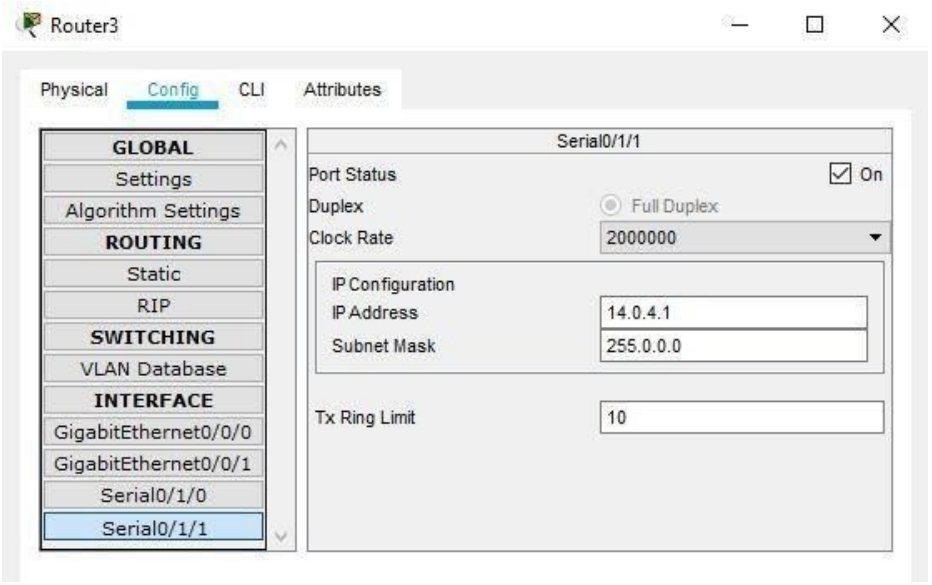
Make sure that the Serial port address of the 1st octet matches with the serial port address of router 0 to establish connection.

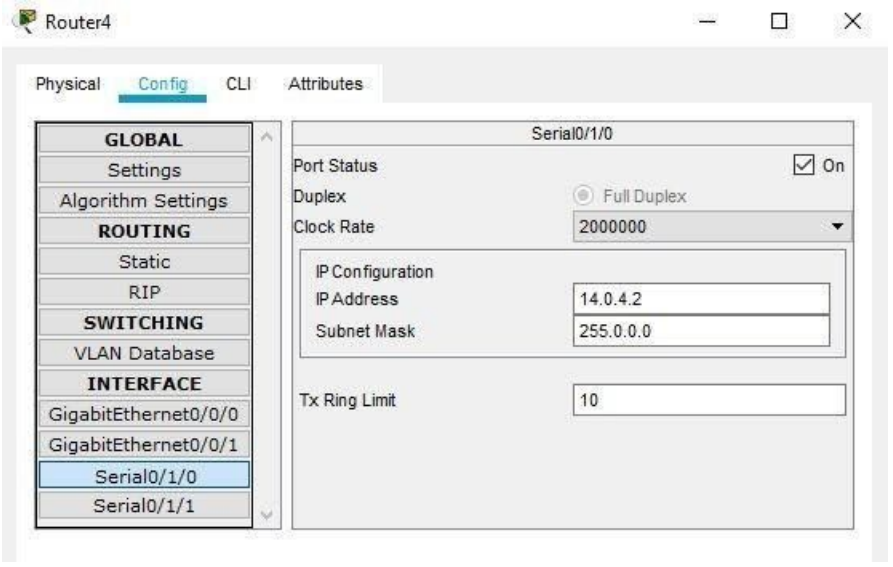

Router1
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
Serial0/1/0
Serial0/1/1
Serial0/1/1
Port Status
On
Duplex
Full Duplex
Clock Rate
2000000
IP Configuration
IP Address
12.0.2.1
Subnet Mask
255.0.0.0
Tx Ring Limit
10


Router2
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
Serial0/1/0
Serial0/1/1
Serial0/1/0
Port Status
On
Duplex
Full Duplex
Clock Rate
2000000
IP Configuration
IP Address
12.0.2.2
Subnet Mask
255.0.0.0
Tx Ring Limit
10


Router2
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
Serial0/1/0
Serial0/1/1
Serial0/1/1
Port Status
On
Duplex
Full Duplex
Clock Rate
2000000
IP Configuration
IP Address
13.0.3.1
Subnet Mask
255.0.0.0
Tx Ring Limit
10


Router3
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0/0
GigabitEthernet0/0/1
Serial0/1/0
Serial0/1/1
Serial0/1/0
Port Status
On
Duplex
Full Duplex
Clock Rate
2000000
IP Configuration
IP Address
13.0.3.2
Subnet Mask
255.0.0.0
Tx Ring Limit
10

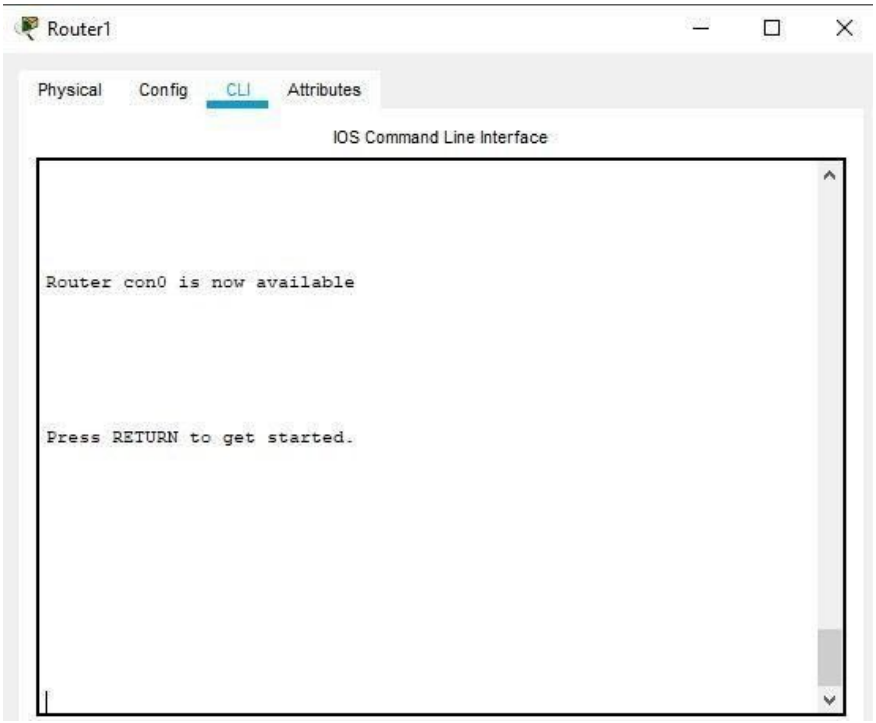




This is how we establish a serial port address for each router.

- Now we have established router configurations and SE Port configuration , now to make sure that these routers and SE Port of other routers establish communication we need to establish a terminal connection. (configuration for that red terminal)
- This terminal configuration can be established by commands like #configure enable , #configure terminal by giving like 0.0.0.0 11.0.0.3 255.0.0.0 and then # router rip and then #exit in the CLI commands respectively.

- Here 11.0.0.3 is a terminal connection and it's class must match with the serial port class address.(i.e 11.0.0.1 or 11.0.0.2) same as every router terminal.
- 12.0.2.3 , 13.0.3.3 , 14.0.4.3 for remaining respectively.

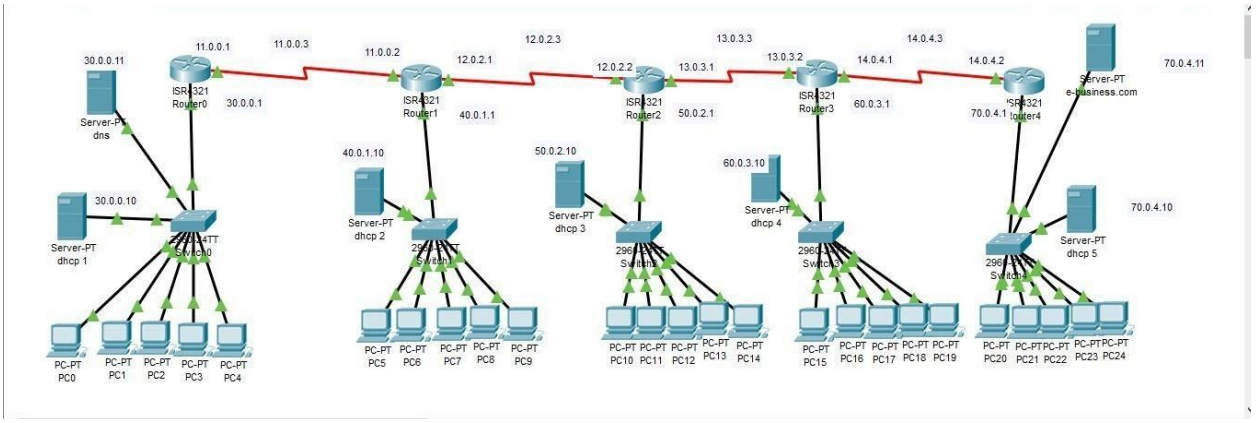


This ensures that our respective router is connected to that serial port and establishes communication. Similarly for all routers.Green symbols at the ports of the routers indicate that they are ON and communicating.

- Now connect these routers to switches , other routers. Further those switches are connected to servers , PC's of their network.

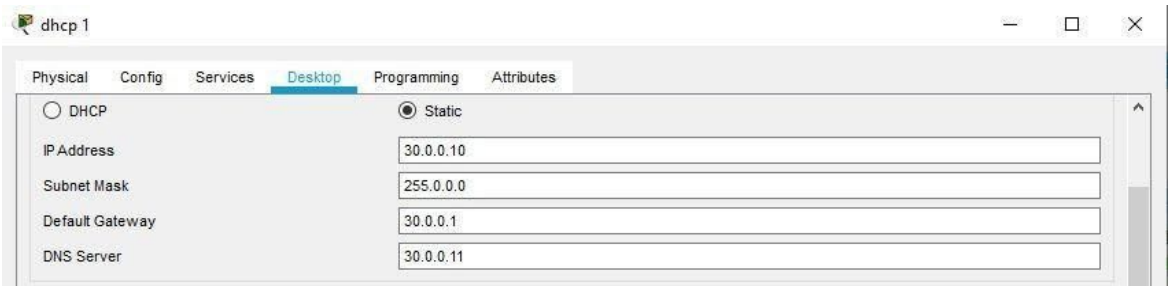
This is all about Router configurations and now we established a connection between all routers and ready for communication between them.

2. DHCP Configuration

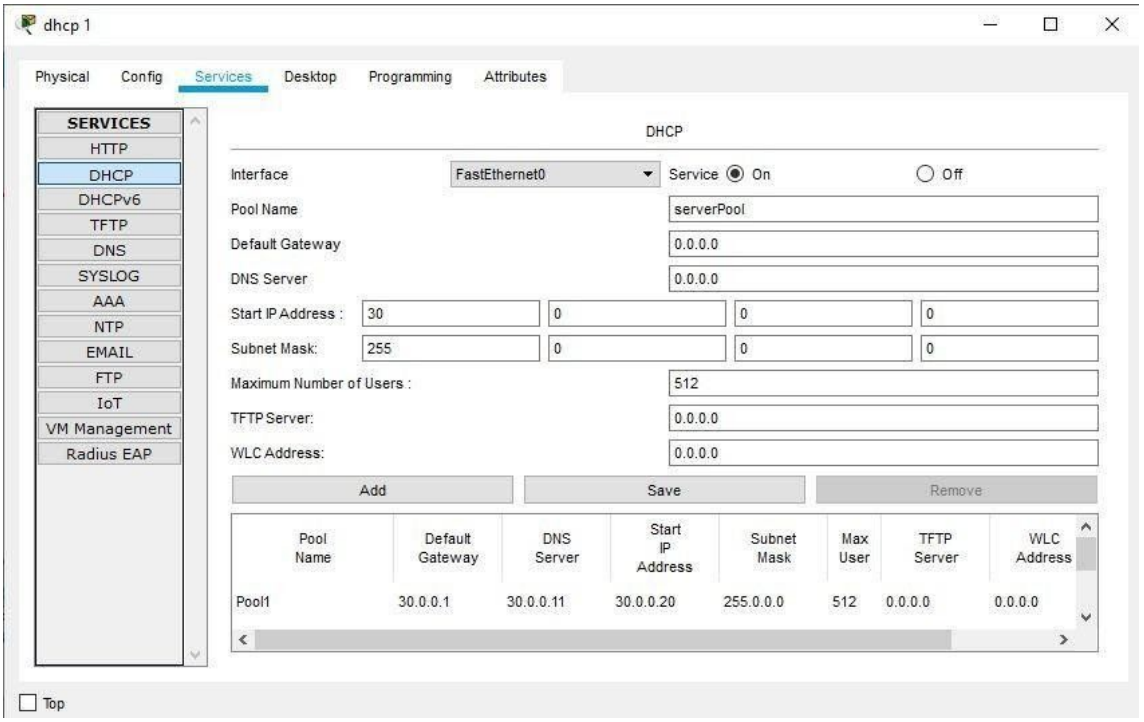


Our Network Organisation Diagram

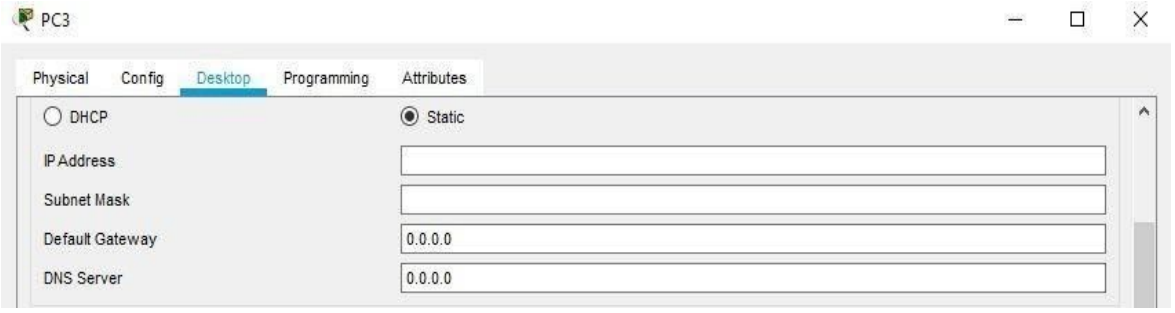
- Now we move to DHCP Configurations which plays an important role in this project.
- Basically for any network we need 4 piece information i.e.
    - Subnet mask of computer
    - IP Address of computer
    - IP address of the router
    - IP address of the name server (this the main reason , which is useful in this project).
- Reason we need DHCP configurations is that all these PC's in our project are mainly diskless computers . So, when it is loaded initially all these 4 information are stored in ROM only. So , when loaded for next time , ROM becomes empty and all these 4 information will be lost for a diskless computer.
- To store all this information we need DHCP Servers.
- Also sometimes there is a chance that a user outside of the organisation wants to access the organisation's server , for that we need to provide a dynamic address for that user each time he accesses the server . For these types of dynamic hosts we need DHCP . Now lets see the configuration.
- There are 5 DHCP Servers , one for each network.



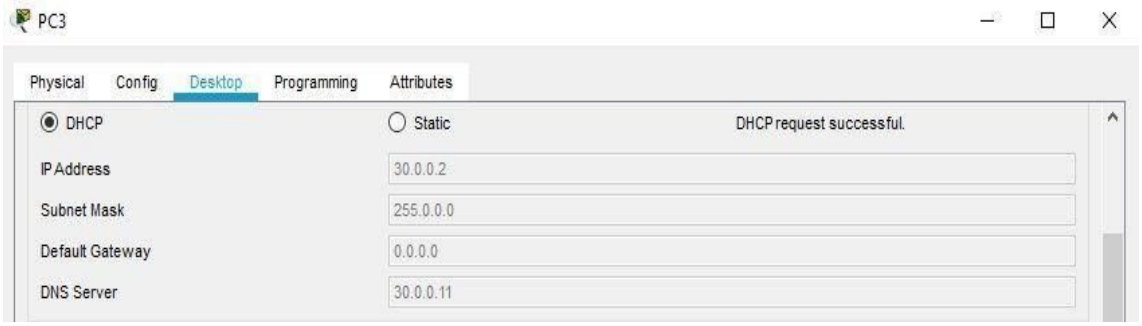
- This is the IP Configuration of DHCP Server 1 and makes sure that it must have the same class as router 1.
- Provide the default gateway address of router 1 so that this DHCP Server 1 stores all 4 piece information of all the PC's of that network.
- Here we see that , we have an IP Address for DNS Server (this is after completion of total network). But initially now DNS Server is not set , so initially it will be 0.0.0.0
- Now under the services make sure that the DHCP Services are on . (see below).



- If we observe carefully , under Pool 1 we have given the start IP address as 30.0.0.20 , so that this network 1 PC users can have any address between 1 to 20 and all these addresses are stored in DHCP Server 1 database. This is also known as Static Address Allocation.
- Under the IP Configuration of PC's , we don't set any IP Address for that computer initially under static. (see below diagram)

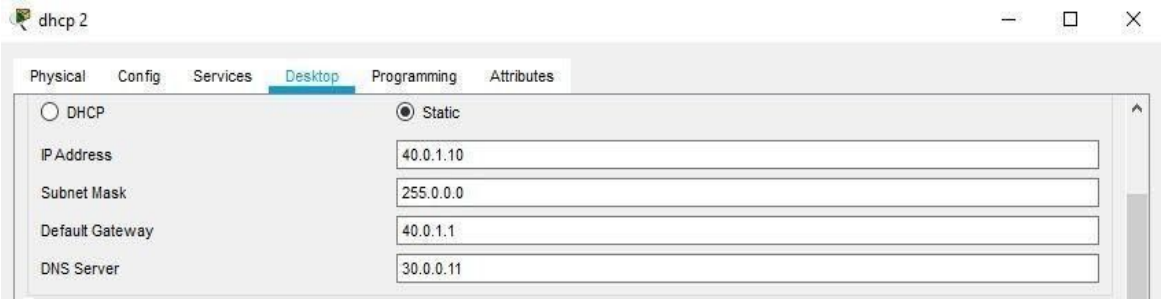


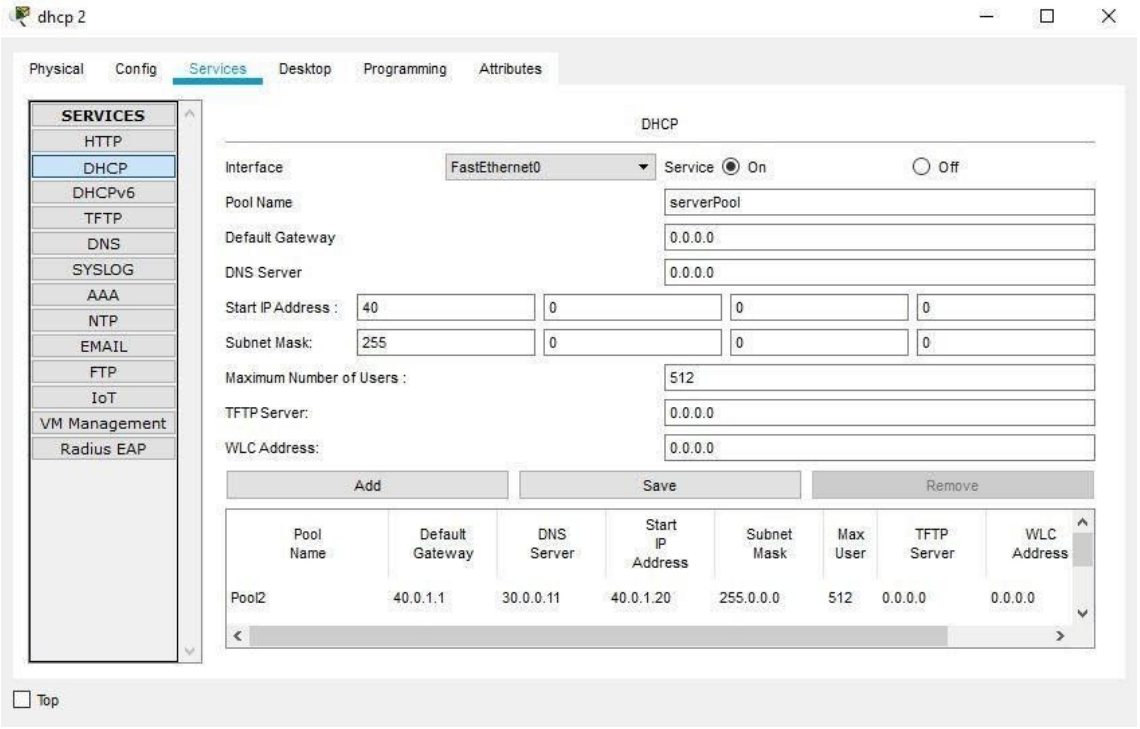
- Now upon changing from Static address to Dynamic Address we see that we get an IP Address between 1 to 20 as discussed above. (see below diagram)

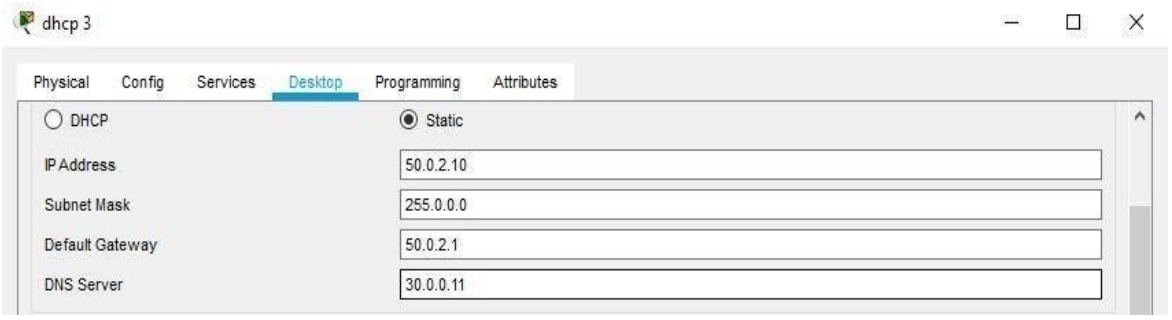


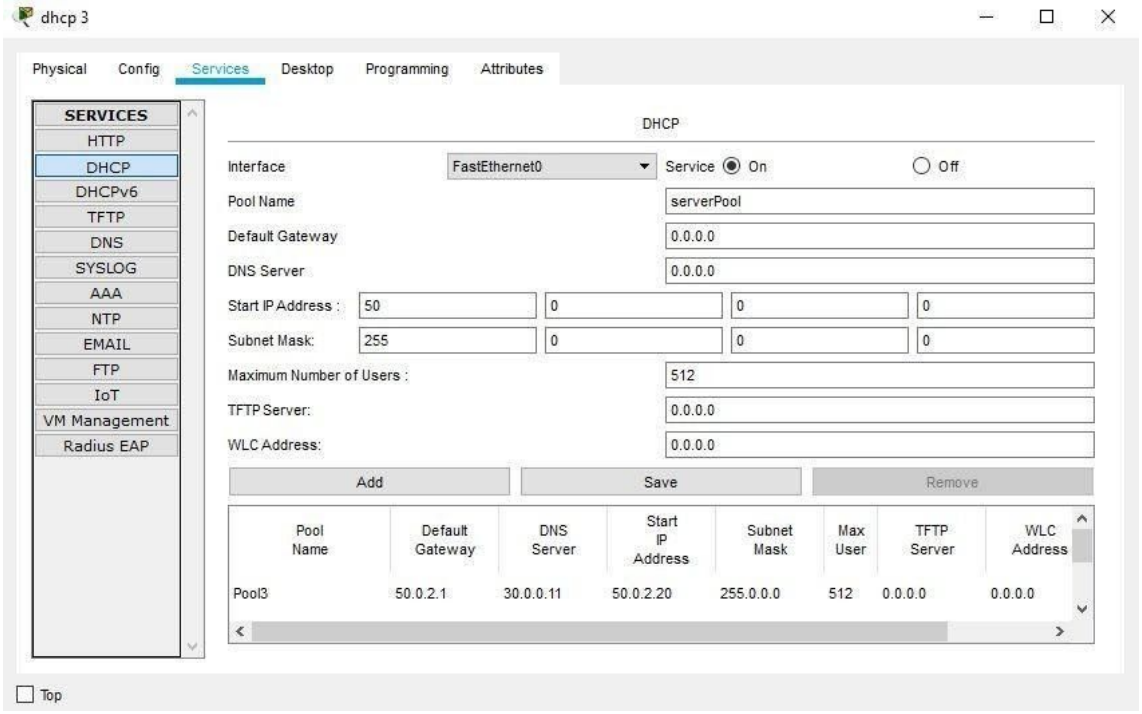
- If we see clearly , we get an IP Address between a range of 1 to 20 i.e 2 here as it is present in DHCP Server database i.e Pool1 here.
- Here the PC3 IP Address gets exactly the same class of the router 1 address , by proving that PC 3 belongs to router 1 address.
- It also shows that DHCP Request is successful. In this way DHCP Configuration is used to assign IP Address of the PC's of their network dynamically.
- It works the same for all the PC's for their respective networks.

- Whenever a PC requests another address than this , first it matches its IP Address with the physical address , as it is not present , it stores that IP Address for future use and gives a dynamic address starting from 21. This is the meaning of start IP Address . This is also known as Dynamic Address Allocation.
- Now , make the DHCP Services on the top as shown in the above figure.
- In the same way it is done for all the DHCP Servers. (see below)






dhcp 3
Physical
Config
Services
Desktop
Programming
Attributes
DHCP
Static
IP Address
50.0.2.10
Subnet Mask
255.0.0.0
Default Gateway
50.0.2.1
DNS Server
30.0.0.11


dhcp 3
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Desktop
Programming
Attributes
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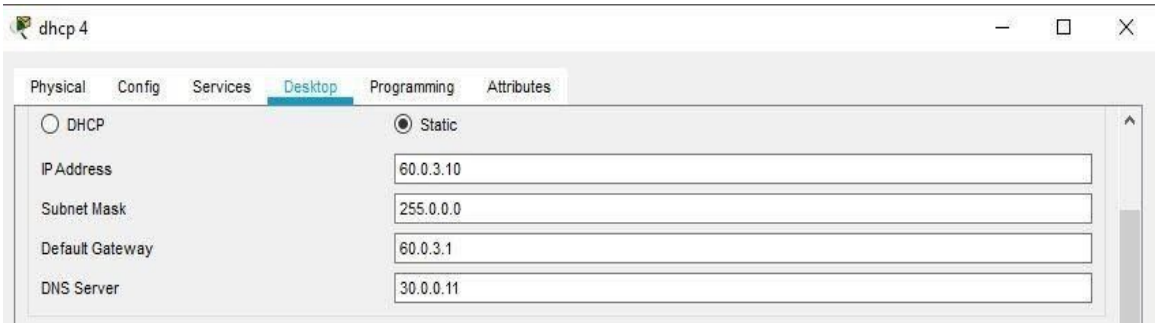
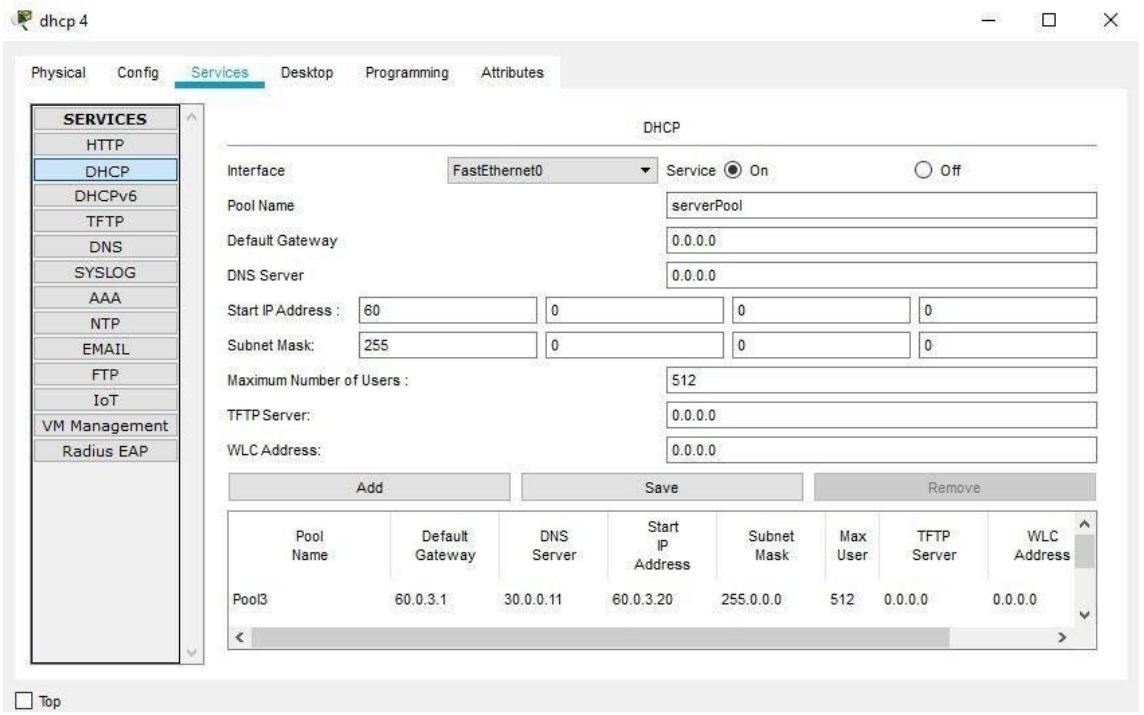
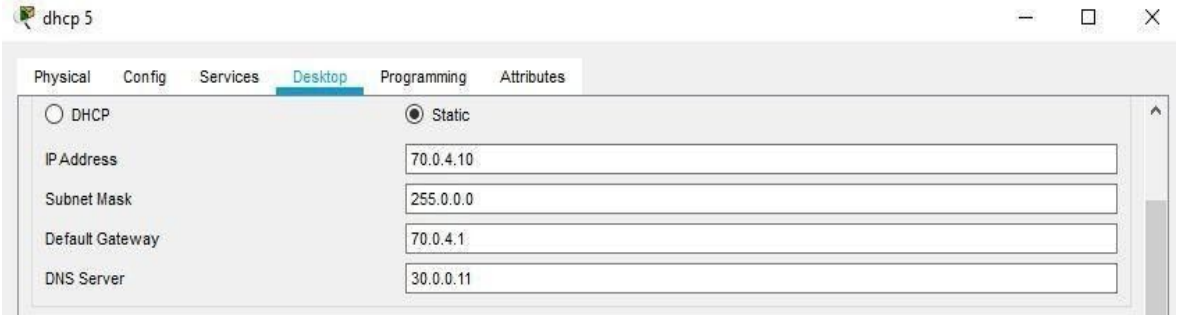
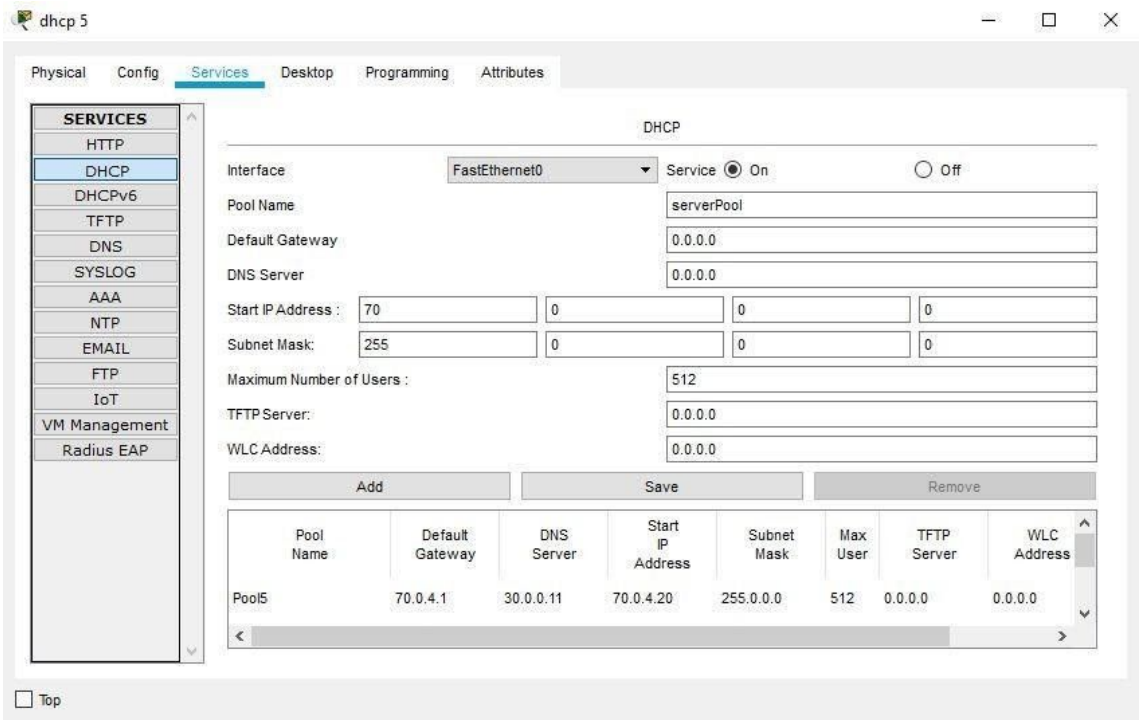
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
DHCP
Interface
FastEthernet0
Service
On
Off
Pool Name
serverPool
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
Start IP Address :
50
0
0
0
Subnet Mask:
255
0
0
0
Maximum Number of Users :
512
TFTP Server:
0.0.0.0
WLC Address:
0.0.0.0
Add
Save
Remove
Pool Name
Default Gateway
DNS Server
Start IP Address
Subnet Mask
Max User
TFTP Server
WLC Address
Pool3
50.0.2.1
30.0.0.11
50.0.2.20
255.0.0.0
512
0.0.0.0
0.0.0.0
Top


dhcp 4
Physical
Config
Services
Desktop
Programming
Attributes
DHCP
Static
IP Address
60.0.3.10
Subnet Mask
255.0.0.0
Default Gateway
60.0.3.1
DNS Server
30.0.0.11


dhcp 4
Physical
Config
Services
Desktop
Programming
Attributes
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
DHCP
Interface
FastEthernet0
Service
On
Off
Pool Name
serverPool
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
Start IP Address :
60
0
0
0
Subnet Mask:
255
0
0
0
Maximum Number of Users :
512
TFTP Server:
0.0.0.0
WLC Address:
0.0.0.0
Add
Save
Remove
Pool Name
Default Gateway
DNS Server
Start IP Address
Subnet Mask
Max User
TFTP Server
WLC Address
Pool3
60.0.3.1
30.0.0.11
60.0.3.20
255.0.0.0
512
0.0.0.0
0.0.0.0
Top

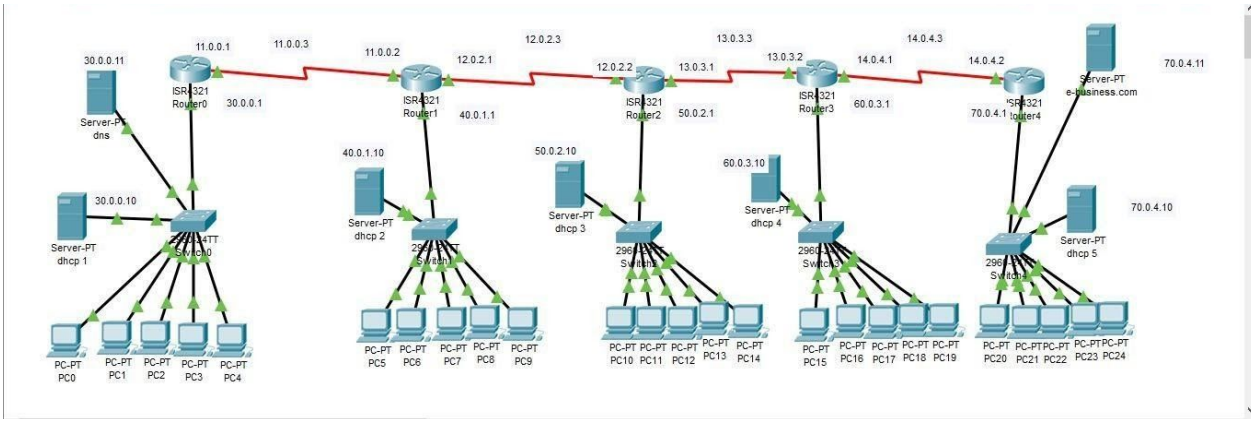

dhcp 5
Physical
Config
Services
Desktop
Programming
Attributes
DHCP
Static
IP Address
70.0.4.10
Subnet Mask
255.0.0.0
Default Gateway
70.0.4.1
DNS Server
30.0.0.11



This is how a DHCP Configuration works for a network.

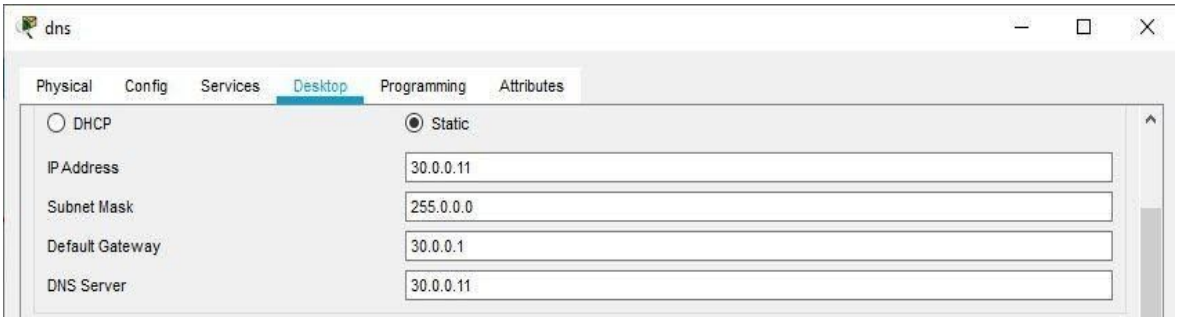
Later under DNS Configuration we will see what happens to DHCP Servers when the DNS Server is associated with an IP Address. As we assigned 0.0.0.0 under DNS Server initially , as DNS Configuration is not yet assigned.

3. DNS Configuration

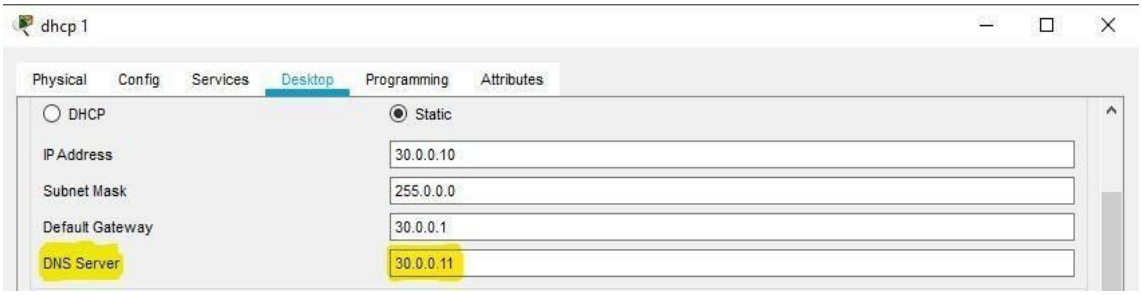


Our Network Organisation Diagram

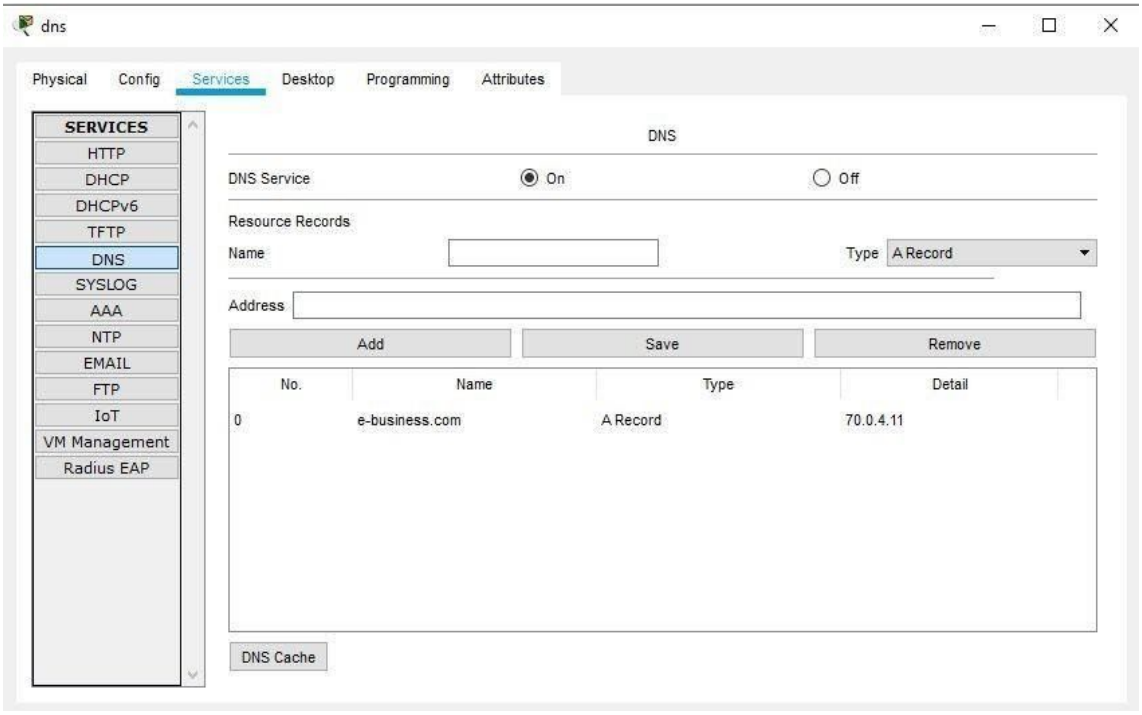
- From the above diagram , we see that there is only one DNS Server which is attached to Network 1 i.e. Router 1 Configurations.
- We need DNS Server Configurations for organisation as Users of the PC's want to access the https server i.e e-bussiness.com.
- In that case this DNS Server helps in mapping its name to this DNS Server IP address and vice versa. This is the reason we need DNS Server.
- Now let's set the DNS Server IP address and etc:



- From the above diagram , IP Address of DNS is set to 30.0.0.11 , making sure that its class matches with that of Network's IP address.
- In the last part of DHCP , we have discussed that after getting the DNS Server IP address we must assign it to the respective DHCP servers.



- We see that , DNS Server address in DHCP 1 is changed from 0.0.0.0 to 30.0.0.11. It is the same for all the DHCP Servers. So that all the DHCP Servers share a common DNS Servers address.
- By making this property enabled , DHCP Servers have the access of using e-business.com and as all DHCP Servers have the 4 piece information of all PC's , even the PC's can access the e-business.com. (still not created).
- But before making e-business.com accessible to everyone , we have to make sure that the DNS Service is ON.

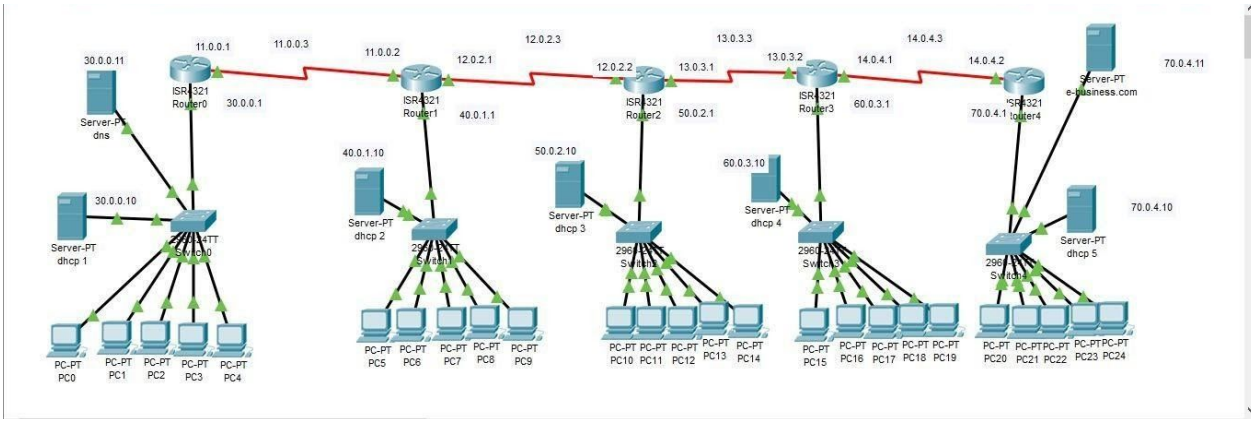


- We see under the DNS service , we have provided e-business.com under the name space , by mapping the name of the organisation to the DNS Server IP address. This is the purpose we need DNS Server.
- Under the address space , initially there will be no address (0.0.0.0) , after creating a http server , we have to provide an address in it . We will discuss it on HTTP Server later.

So, now the DNS Server configuration is available to every node in the Organisation.

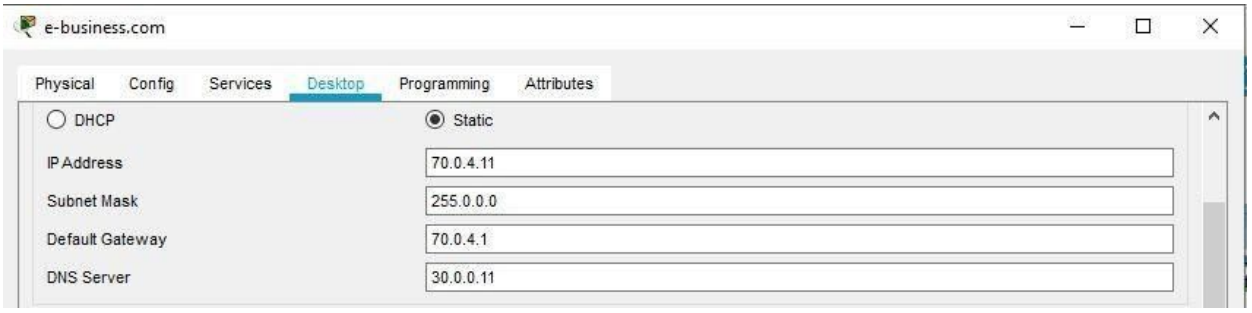
Later in the HTTP Configuration we will see how to include HTTP Server's IP address in the address space of DNS Server services.

4. HTTP Configuration

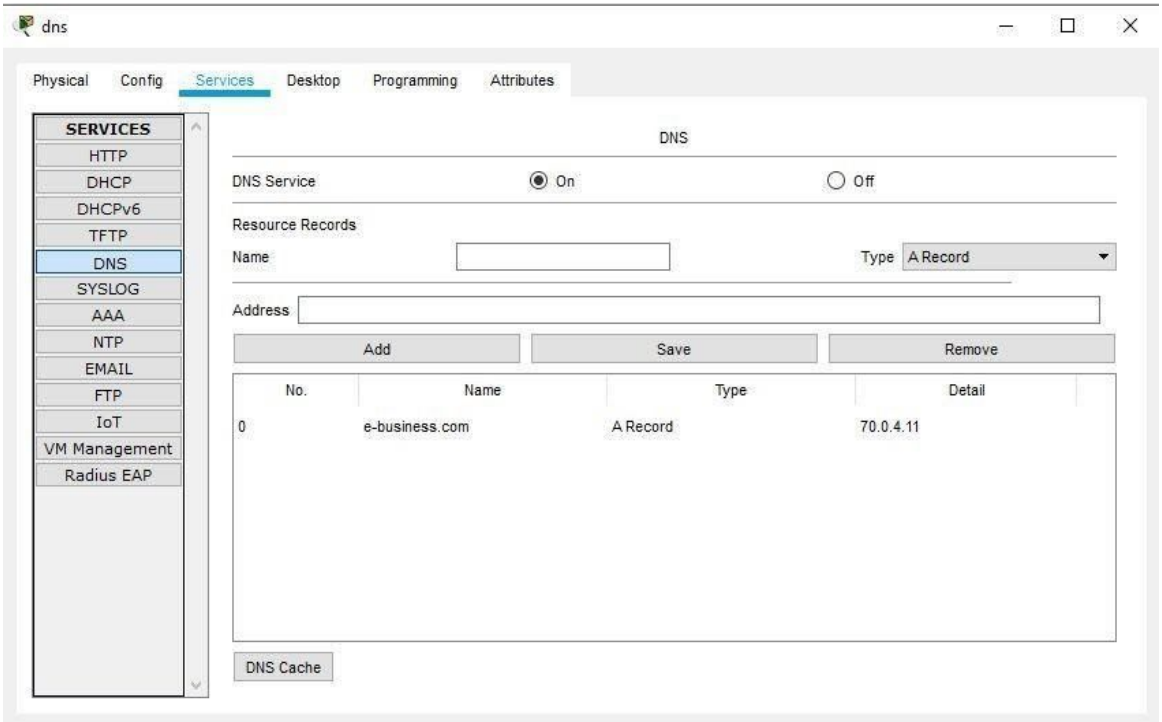


Our Network Organisation Diagram

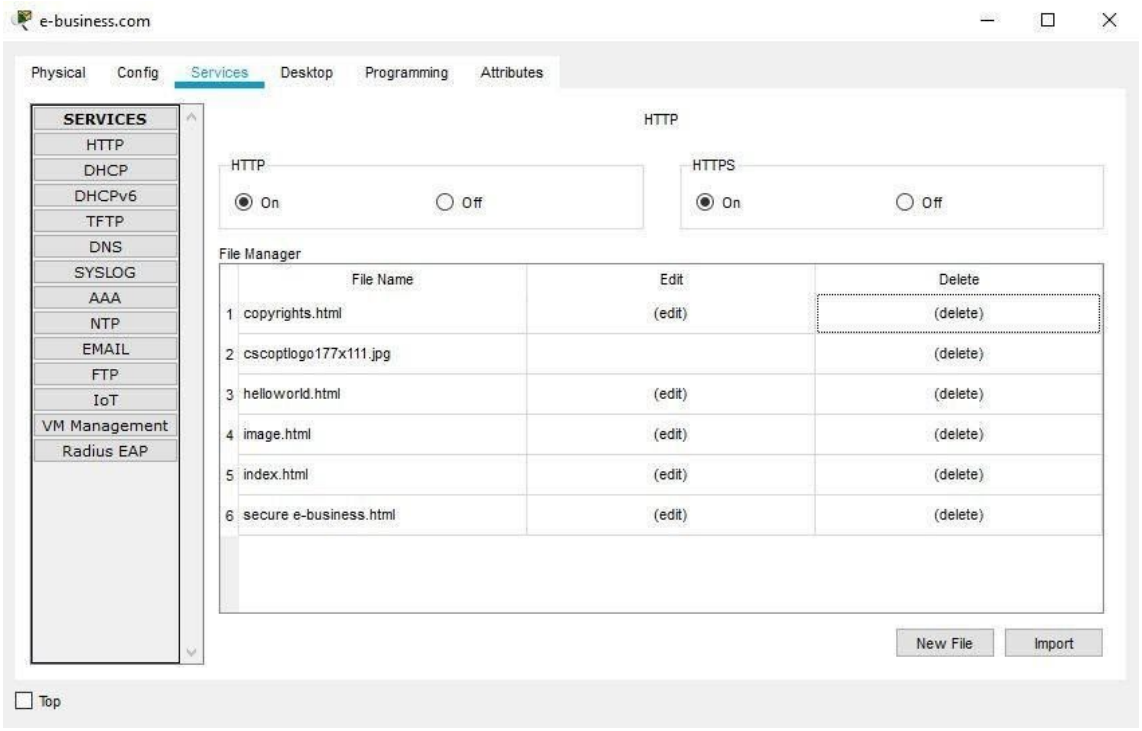
- We have seen previously how DNS Server is made available to every node in the network. But for DNS Server to be accessible to every node we must ensure that http server address must be mentioned in it.
- So we need HTTP Server to provide our e-commerce business accessible to everyone in network organisation. Let's see HTTP Server configurations:



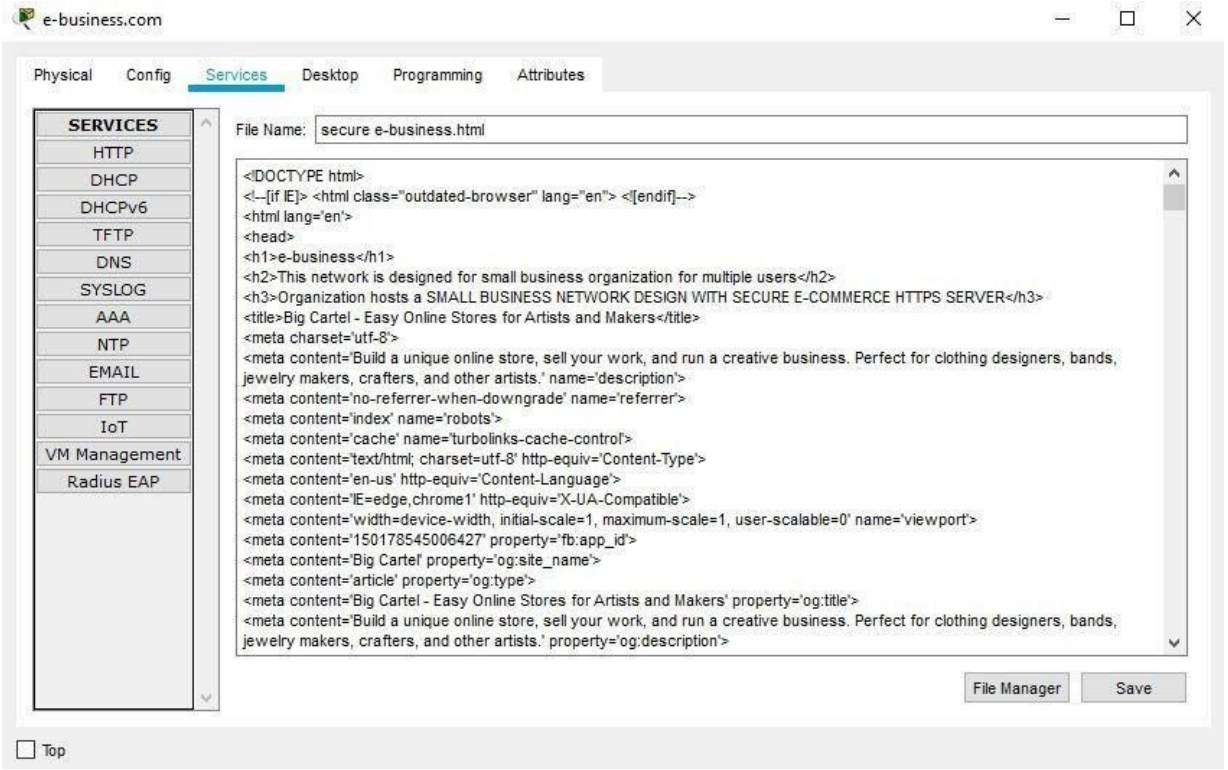
- First name the HTTP Server as e-business.com and connect this server to the last network in our organisation.
- Provide IP Address with 70.0.4.11 which matches with the class of the router 5 here.
- Now the most important thing is that , we have to provide the DNS Server IP address in HTTP Configurations , so that this HTTP Server can be accessible to DNS Server.
- In DNS Server we have kept Address as 0.0.0.0 under address space. But now we have the address of HTTP Server as 70.0.4.11 and now this should be assigned here.



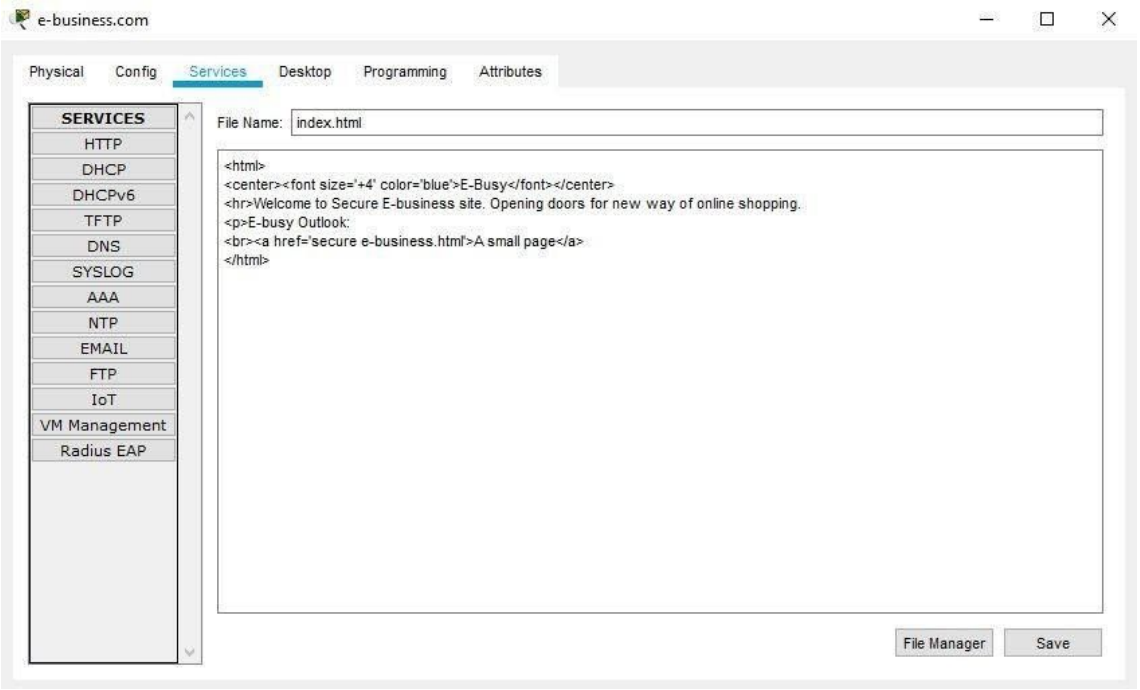
- By making this requirement , we have made sure that HTTP Server i.e e-business.com is not only accessible to DNS Server but also to every node in the network.
- Now HTTP Server is ready to be accessible by every PC in the organisation. But what they access and how they access ?
- For this under HTTP Service , we have to create a HTML Page of our e-bussiness.com which can be accessible to every PC in our organisation. Let’s see .



We have provided a HTML Page with secure e-business.html



We have provided a HTML Code for our HTML page.

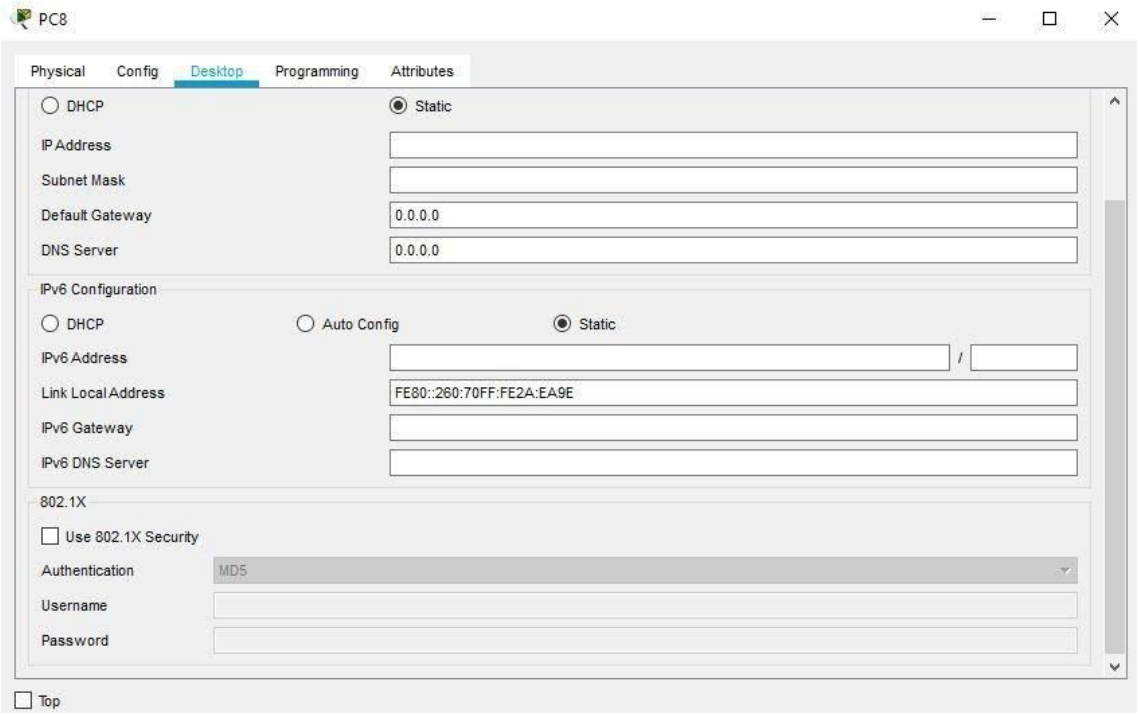


- Now including our secure e-business.html in index.html under the header reference (shown in figure as href:) , our website can be accessible to every PC in our organisation and also temporary users outside organisations.
- Make sure that HTTP Services are ON.

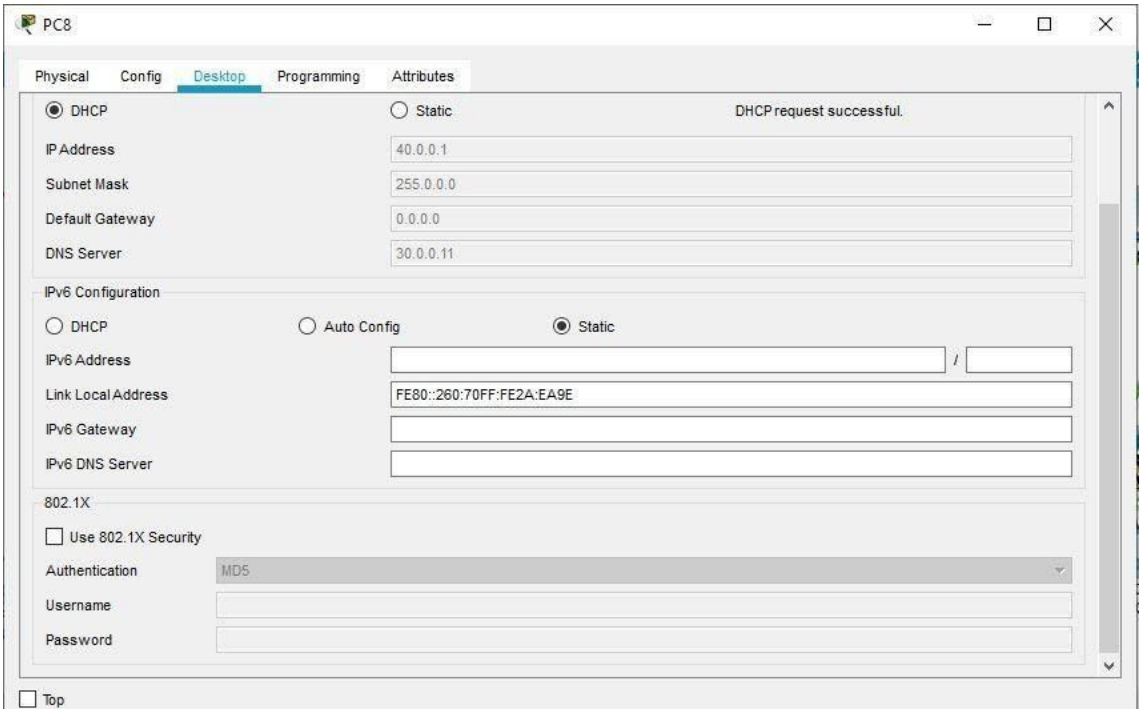
Now our organisation is ready for implementation of our Secure E- Business server.

IMPLEMENTATION :

1. Select any PC from our organisation.
2. For example let's consider PC 8 .

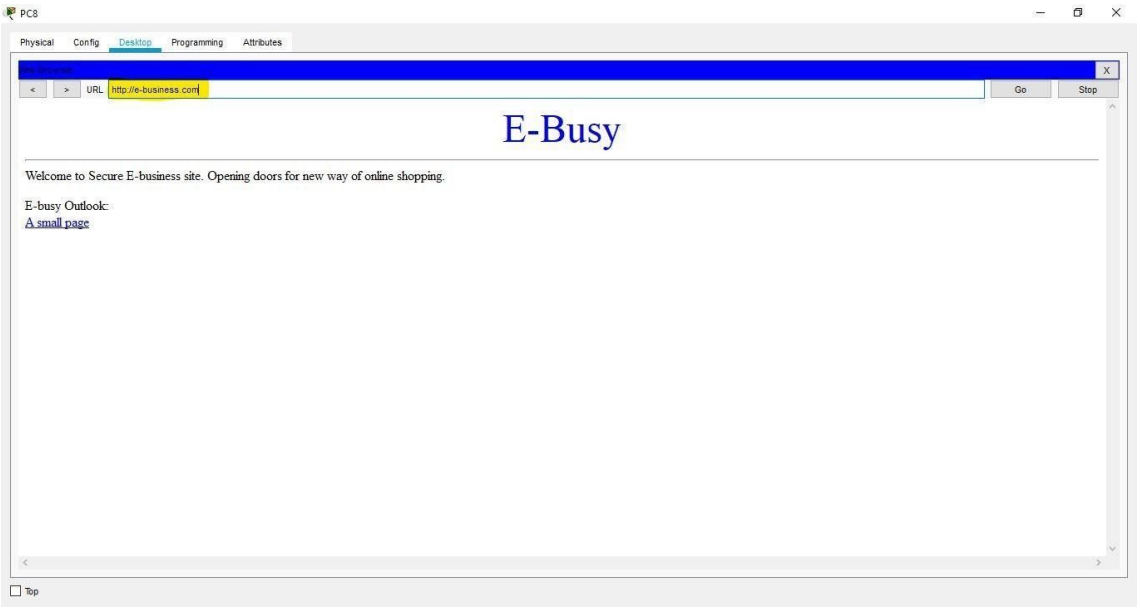


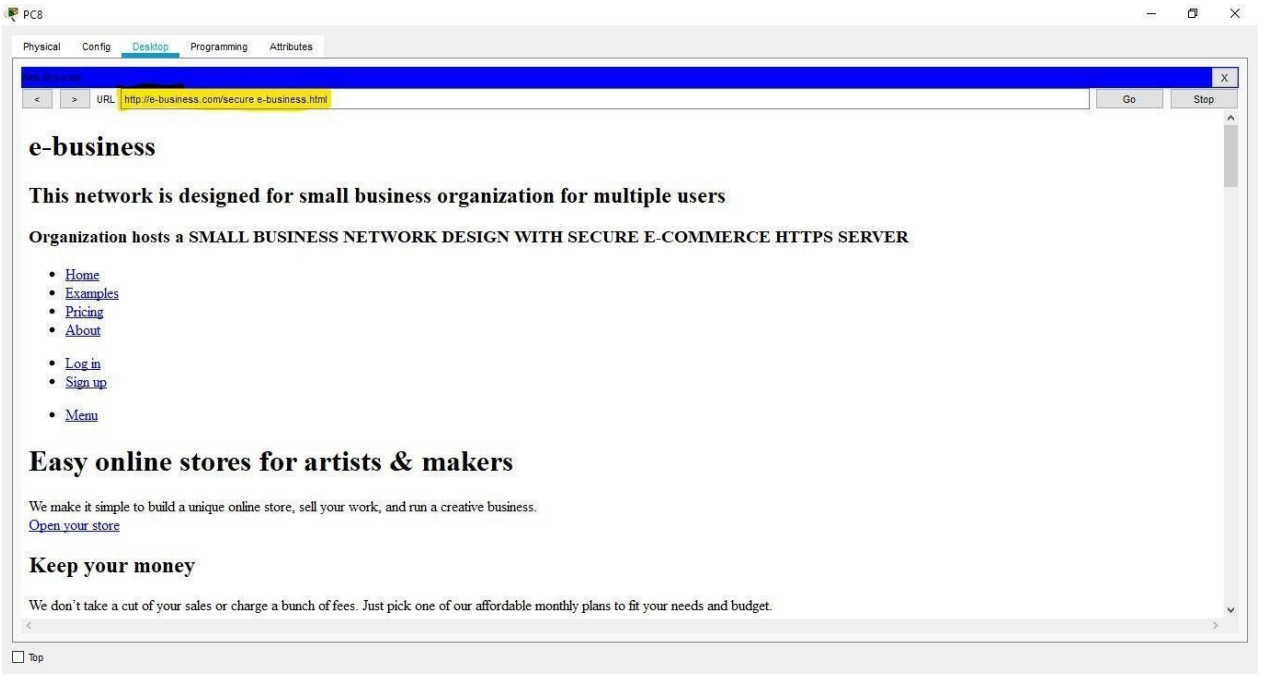
3. Initially , it will be under static configuration and change it to DHCP Configuration as all 4 piece information is stored in it and also main thing is that if we use static , after accessing the web page with our URL we get an error like HOST NAME UNRESOLVED as the PC does not have its IP address.
4. So make it to DHCP as shown below.



5. It shows DHCP requests are successful by providing IP Configuration.
6. Now under the Desktop , move to the web browser to access the web page.

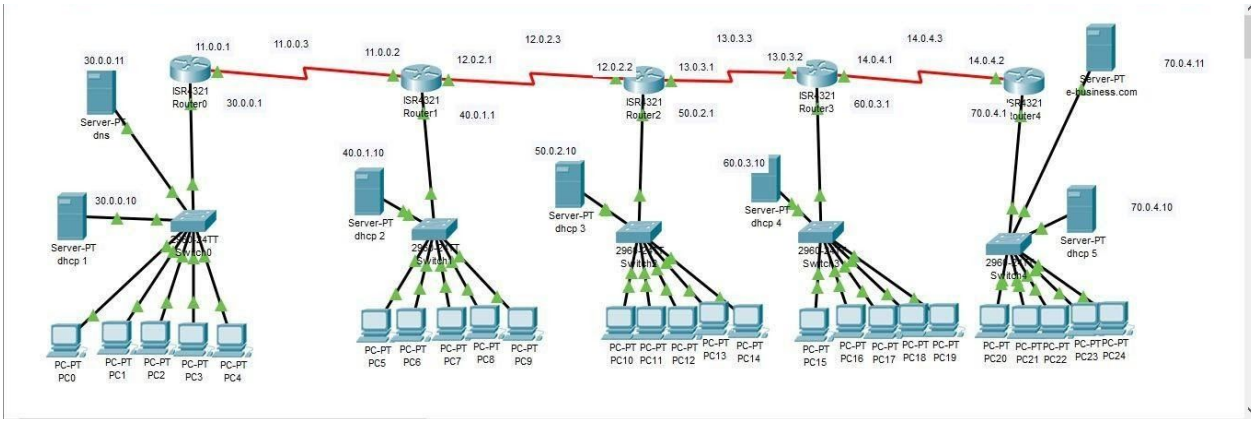
7. Provide the URL Code under this with e-business.com



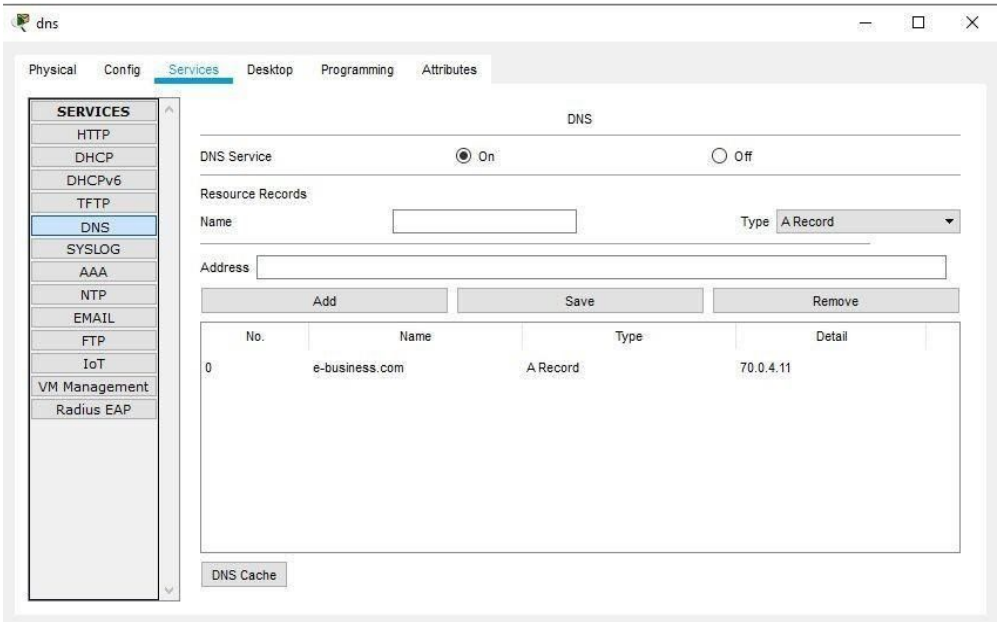


8. Finally it provides us our web page and also HTML page of our e-business.com
9. Similarly can be done for any PC's in our network or organisation.

SECURITY VERIFICATION OF ORGANIZATION



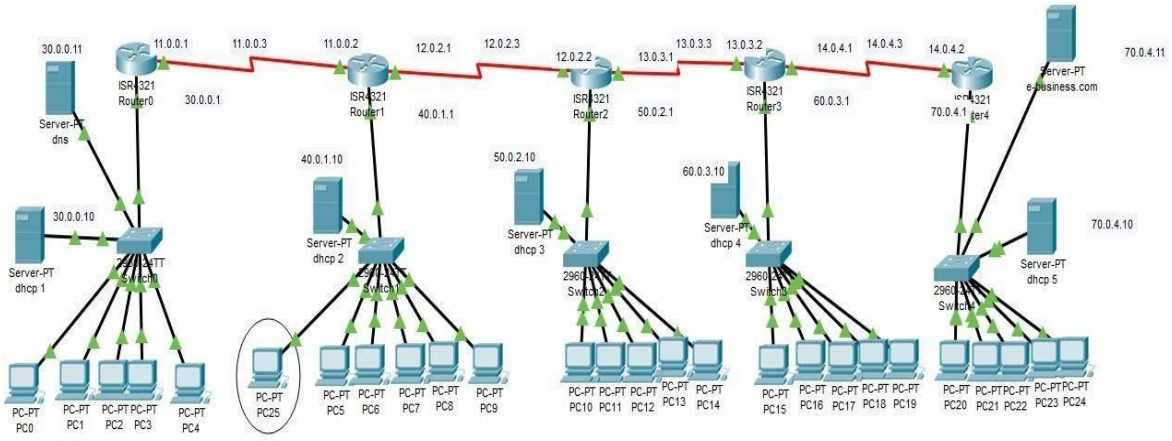
1. This is the actual network design for our organisation.
2. Security of the organisation i.e HTTP Server , IP address is maintained private by providing its IP address in DNS Server only. So, none of the PC users knows its IP address.



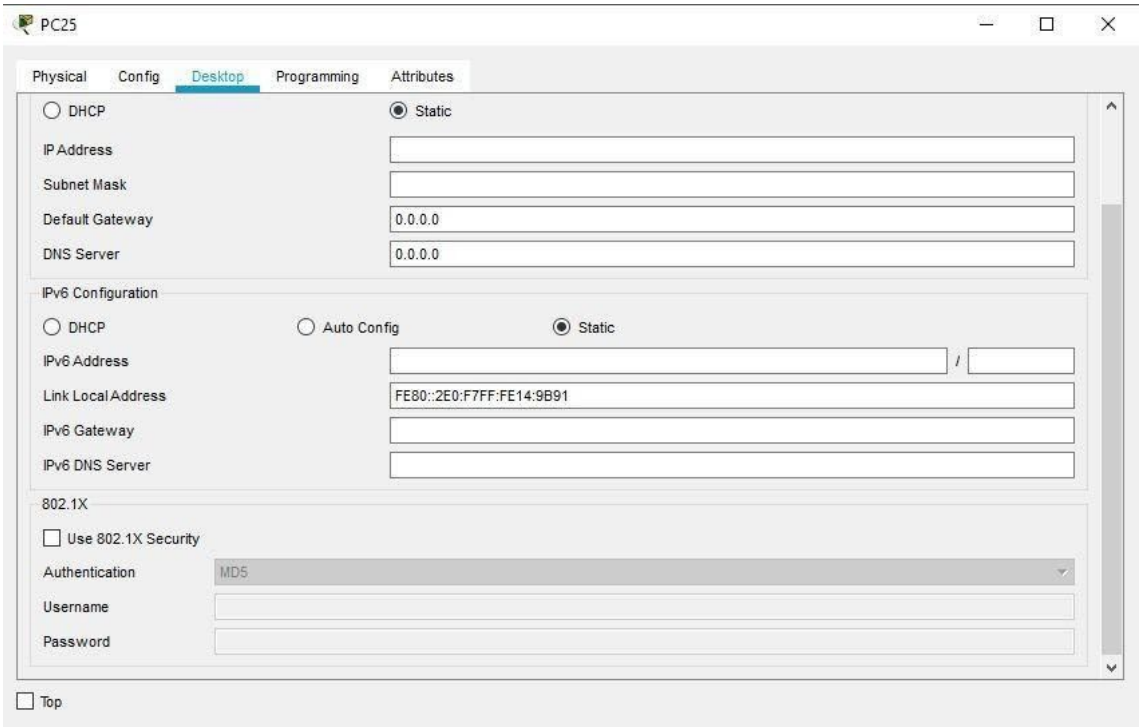
3. But it can access the services of HTTP Server , as the IP address of DNS Server is maintained in DHCP Servers of each network, through which PC users make use of DNS services which have HTTP Server address.

Q. **What happens if a new PC user wants to access the HTTP Server who does not belong to the organisation ? Is still the organisation secured as previously mentioned?**

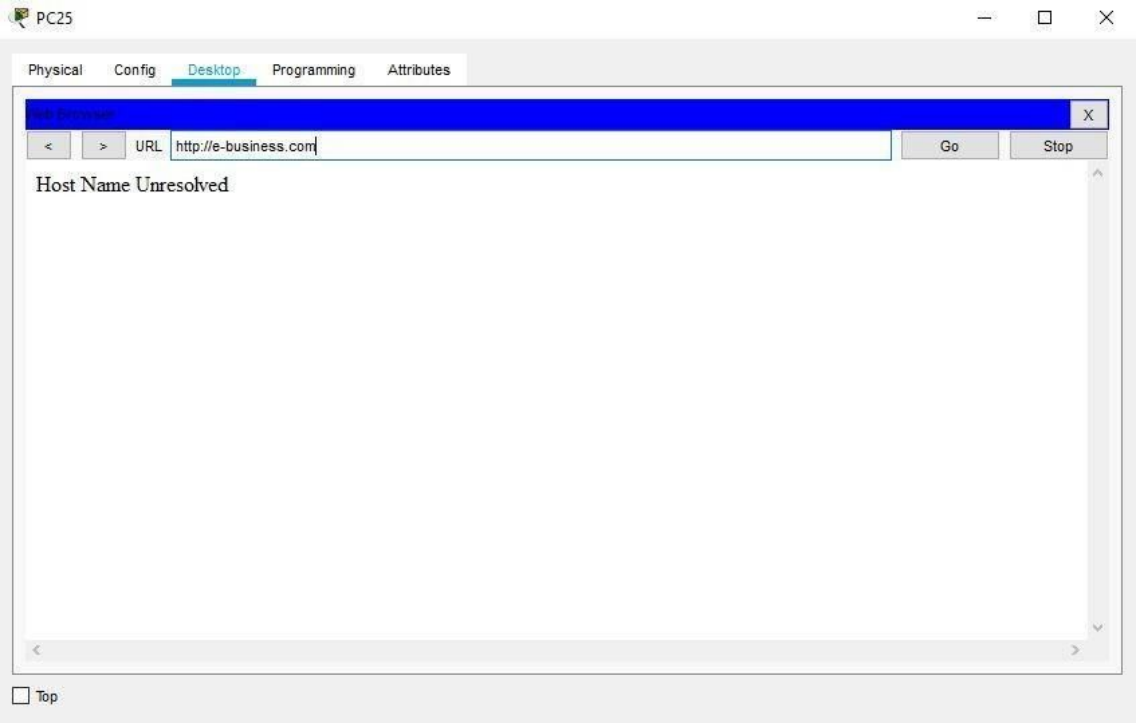
Let's see with an example:



1. If we observe, we have added a new PC user to the organisation as PC25 (represented by circling it) to the 2nd network.

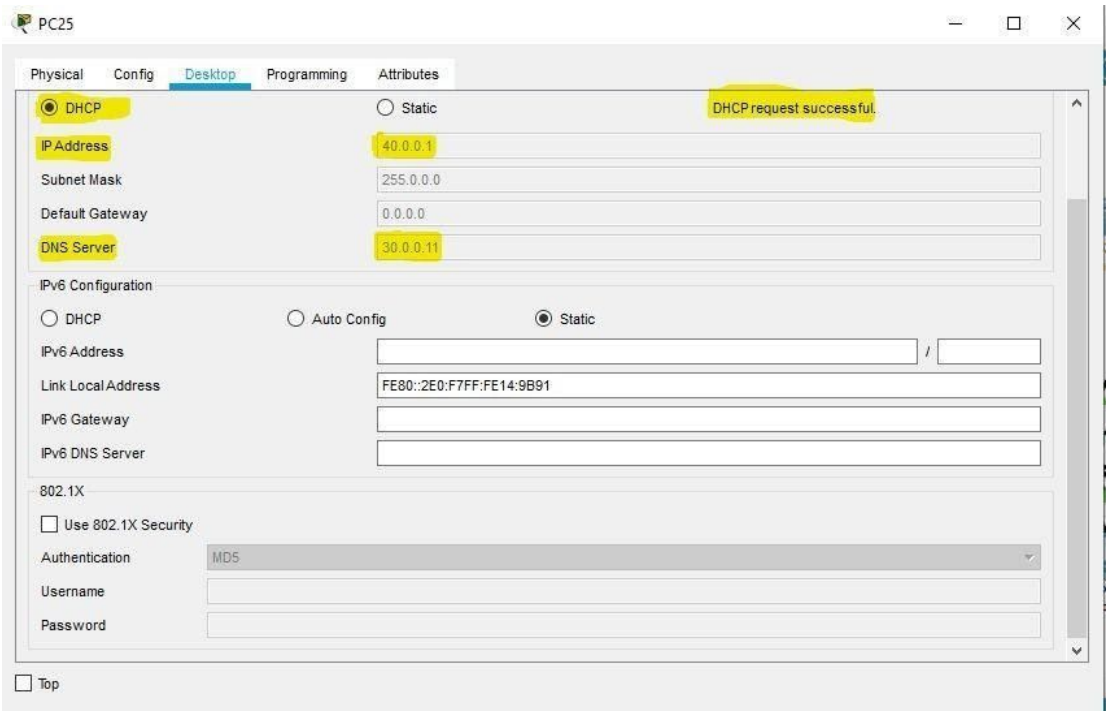


2. Initially it will not be assigned any address , as it does not have the network address and remains static and cannot use the DHCP services. Hence it does not have DNS Server IP address and cannot access the organisation's HTTP web server page. (see below fig.)

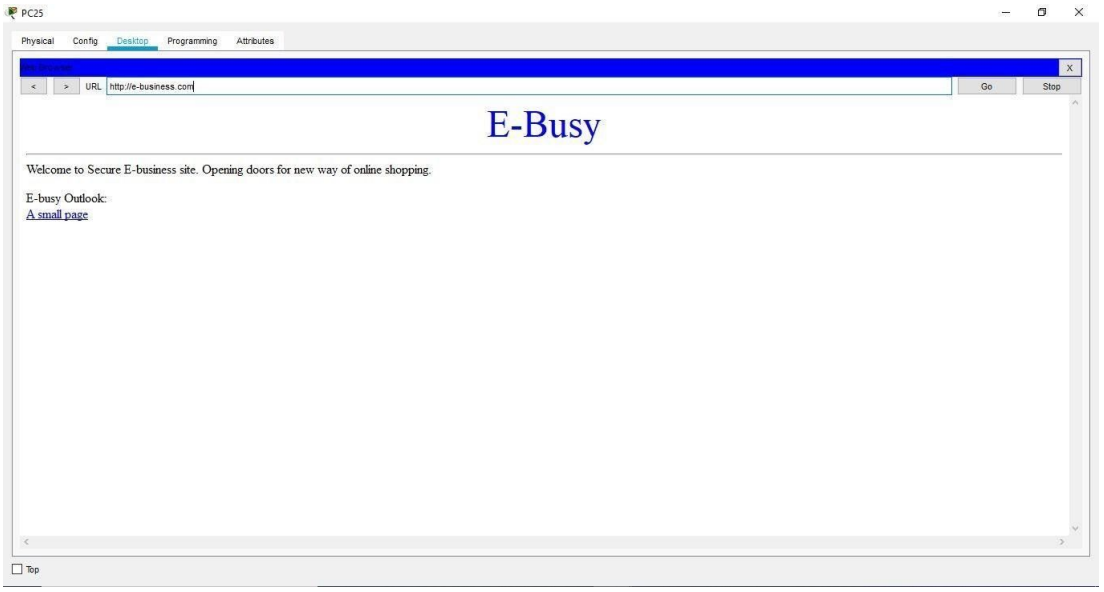


3. As mentioned above , it cannot access HTTP services and shows “HOST NAME UNRESOLVED” as PC25 cannot use DHCP services.

Now lets see what if PC uses DHCP services:

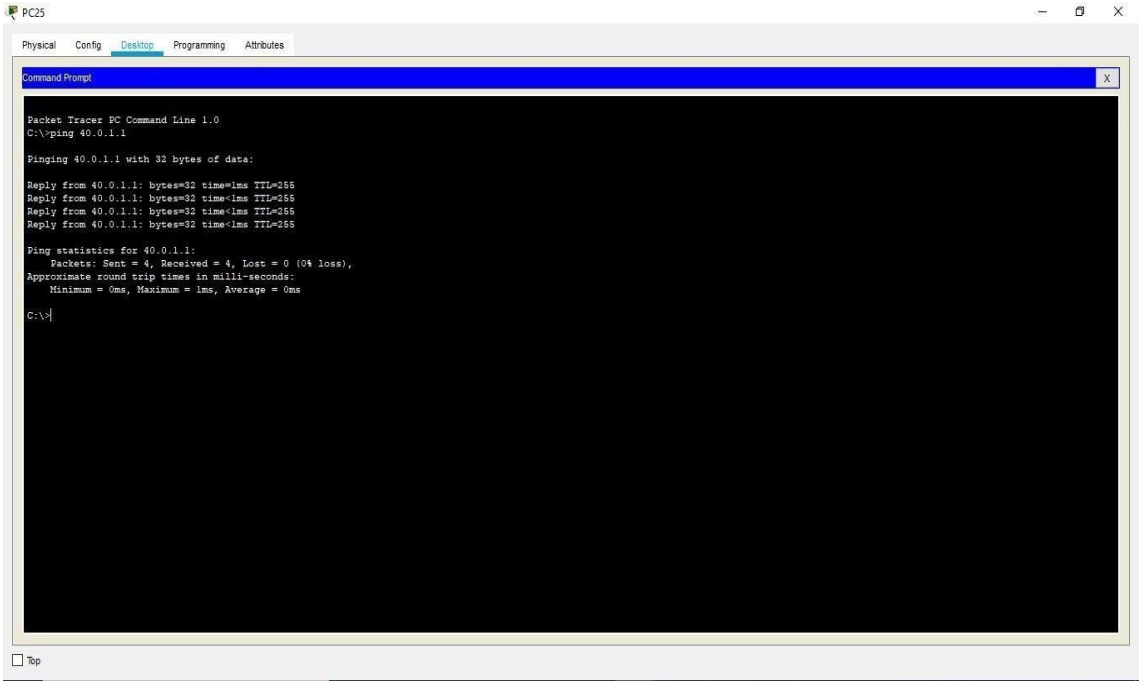


4. Here, it shows DHCP requests as successful by providing an IP address.
5. It also obtains the DNS Server IP address by making use of the DHCP services.
6. Now this PC is ready to access the HTTP Server’s web page.

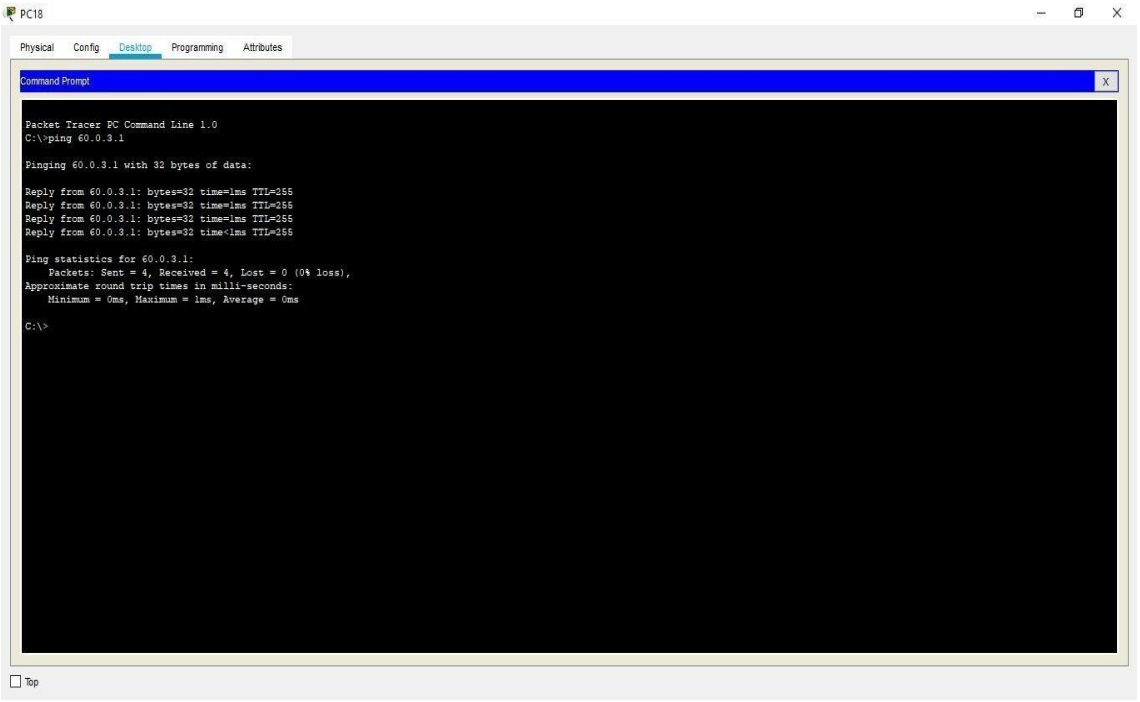


Q. Can this PC25 be part of the organisation's network?

Yes it can be part , by pinging it with its network address and let's verify this by sending a packet to another PC say(PC18) in network 4 i.e of router 3.



PC25 is pinged and got a reply from its network and is part of this network. Now let's see whether it's part of the organization by sending a packet to PC18. But before that we have to ping even PC18.



Now let's send a packet from PC25 to PC18.

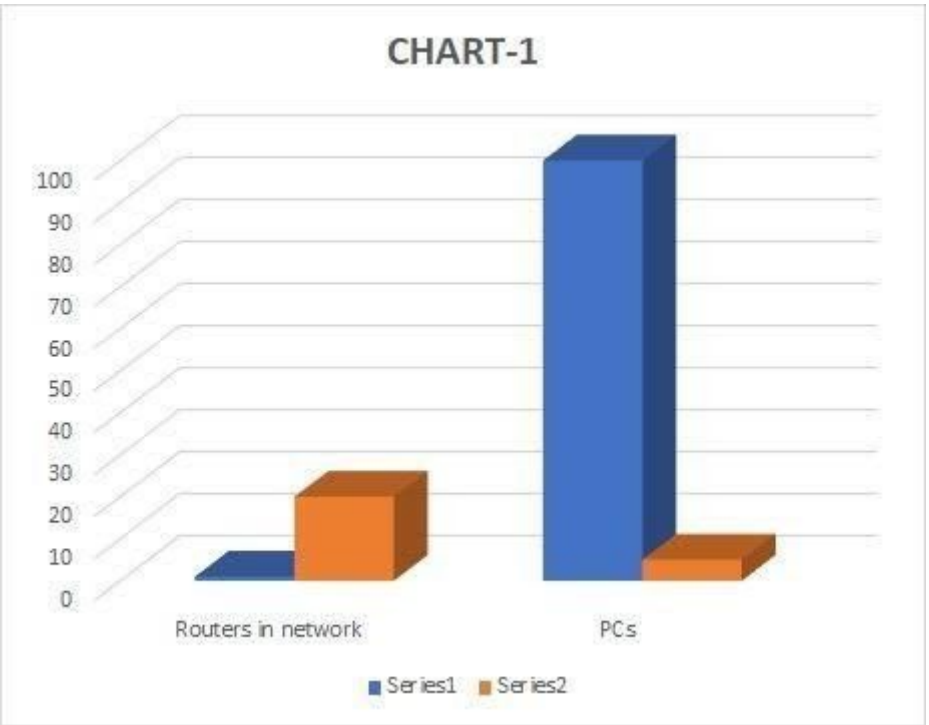
It is Successful and is now part of our organisation.

NETWORK METRICS AND ITS EFFECTS:

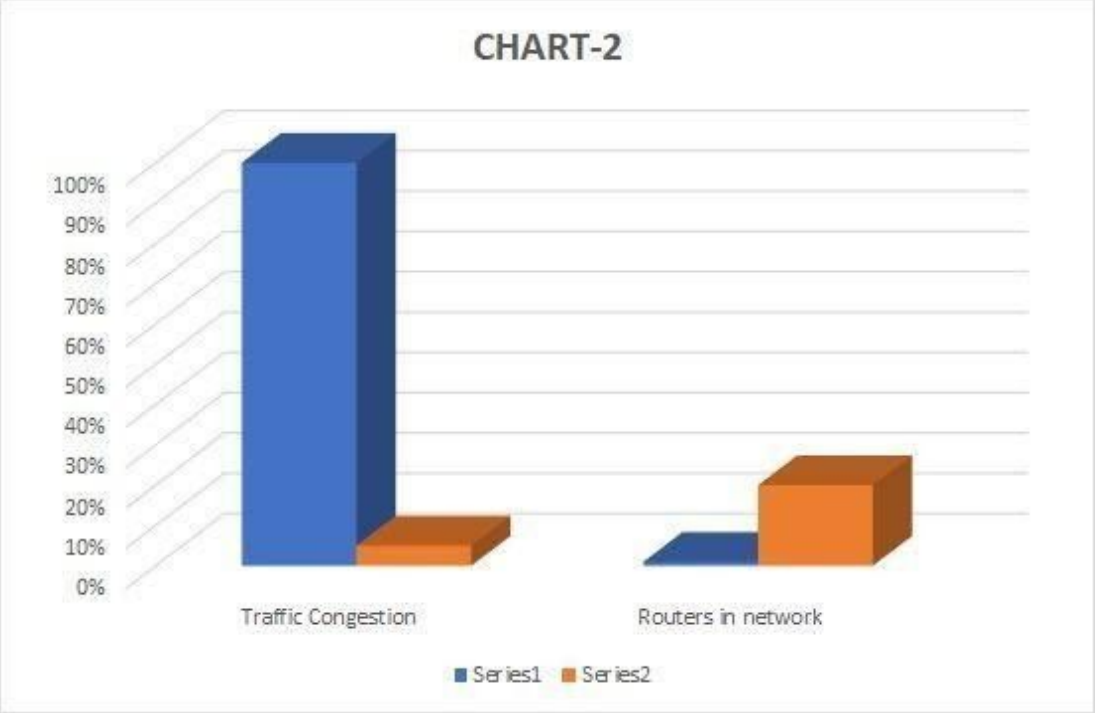
- The main network metrics getting affected at various occasions are:
- Traffic Congestion , Performance of users (by sending and receiving packets) , Security (which already discussed above).
- Both the traffic congestion and performance depend upon the routers and PC's in the organisation. Let's see it with the help of graph:

CHART-1	
Routers in network	PCs
1	100
20	5
CHART-2	
Traffic Congestion	Routers in network
100%	1%
5%	20%
CHART-3	
Performance (of receiving packets)	Traffic Congestion
5%	95%
95%	5%

- Data for the graphs.



For CHART-1 we observe that : 1 router as in series1 consists of 100 PC'S in series 1 and 20 routers as in series2 consists of 5 PC'S in series 2 . Each of the 5 PC'S are attached to each router in the network. This metric is used as a measurement of other metrics as in CHART-2.



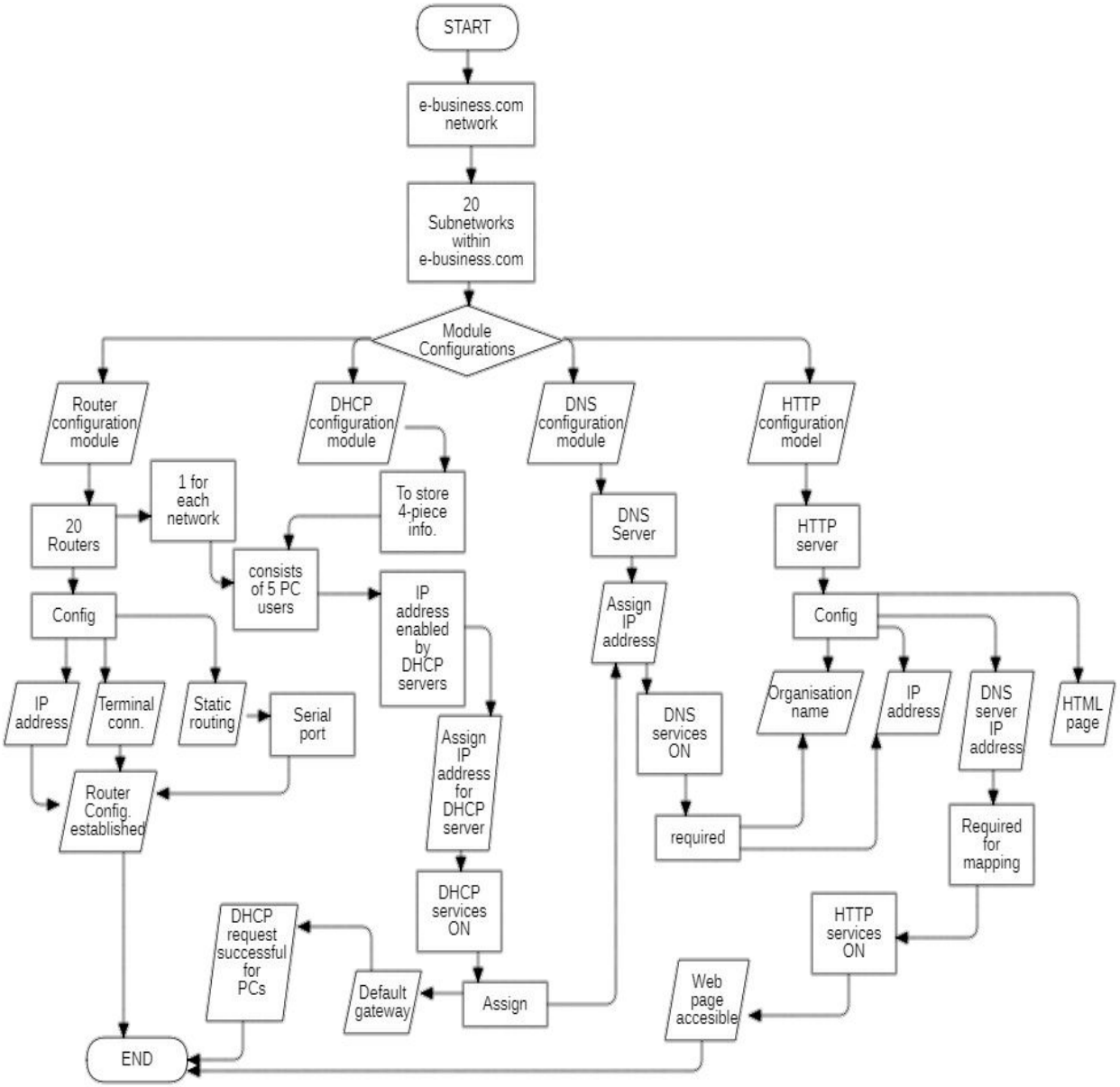
For CHART-2 we observe that : For 1 router as in series 1 it leads to traffic congestion between the PC users about 100 % as in series 1. If we use 20 routers as in series 2 it leads to traffic congestion between the PC users about only 5 % as in series 2. This is the reason we use 20 routers instead of 1 router and the 1st metric is being used here and this 2nd metric will be used in CHART-3.

For CHART-3 we observe that : If the traffic congestion is 95% as in series 1 then performance of PC users of receiving and sending packets across leads to 5% as in series 1. If the traffic congestion is 5% as in series 2 then performance of PC users of receiving and sending packets across leads to 95% as in series 2. So ,we are using the 2nd metric in this 3rd metric.

Thus, all the metrics used here are interconnected to each other.

- Bar Charts are made according to the data calculated across all the metrics and related among them variously , showing how it affects the network .

FLOWCHART - NETWORK DIAGRAMMATIC REPRESENTATION OF MODULES IN THIS PROJECT:



INFERENCES:

- **SECURITY :** We see that Users or the PC's in our organisation do not know the IP Address of the HTTP Server. As the HTTP Server's address is only known to DNS Server and stored only in it.
- But the organisation name e-business.com is mapped to DNS Server and made available to every node by accessing only DNS Services and cannot access the HTTP Server by anyone in the organisation.
- Thus our users can access the public address of HTTP Server i.e address translated into DNS Server's network and cannot access the private address of the HTTP Server of our organisation.
- **PRIVACY :** IP addresses of the PC users are not known by other network members or even by the user of that network , because the IP addresses are assigned dynamically.
- It's because the Privacy of the Users and PCs is maintained by DHCP Servers as mentioned in DHCP Configurations.

CONCLUSION:

Thus a Secure E - Business Server is established by maintaining Security and Privacy of the organisation as mentioned in the above inference. In this way any Secure E-business Server can be established by following the above configuration procedures and implementation.

Maintaining Customers Privacy and Security is the main goal of any business organisation and we have achieved it successfully in this project.

REFERENCES:

1. Behrouz A. Forouzan, " TCP IP PROTOCOL SUITE " , 4th edition , 2010 , McGraw-HillISBN : 0073376043.

2. Used the Internet for specific categories in the project for Information gathering.

CONTRIBUTION TABLE :

NAME	TASKS
AMANDEEP KAUR RA1811028010066	Introduction, Modules Of The Project, Interference and Report formatting.
ASHUTOSH TIWARI RA1811028010067	Objective of the Project, Graphs on network metrics and Snapshots.
VATSAL SAXENA RA1811028010068	Acknowledgements, Network design strategy and Module Description.
MADUGULA SAI KRISHNA TEJA RA1811028010069	Abstract, Network Topology Diagram, Network design, Diagrammatic flow and Implementation