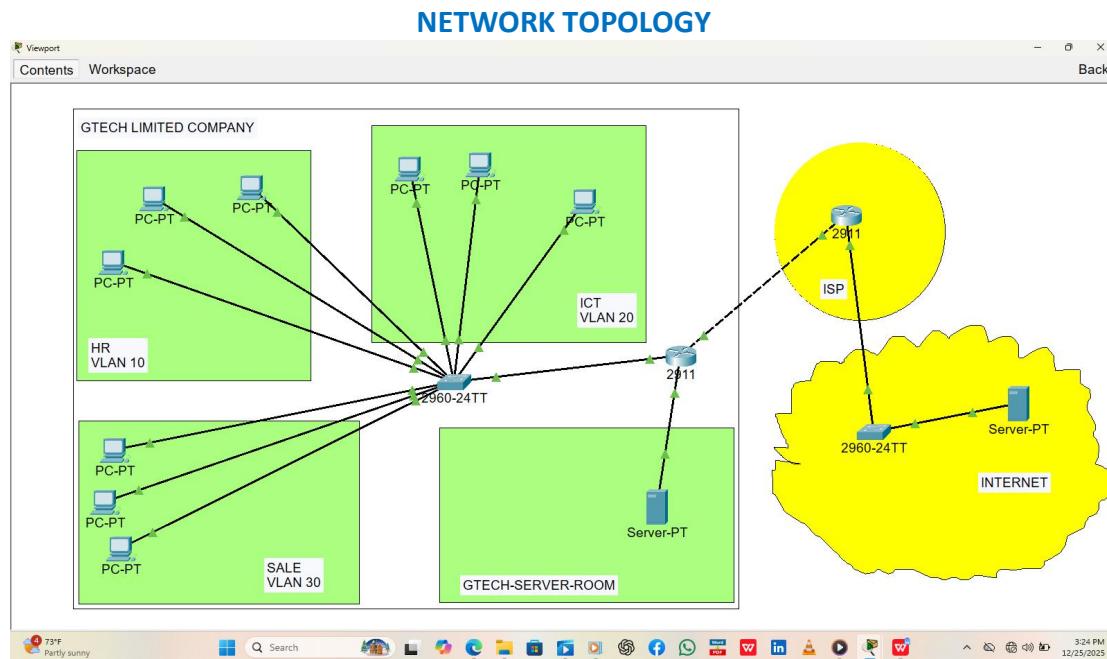


SMALL NETWORK DESIGN- EXPANDED

A week after we designed them this network, they did purchase the server so that it acts as a dhcp server. Point to point address between router and server is 10.0.0.0/30

New topology will be;



We already have the configurations, so the focus here will just be on pool creation on the server, removing the dhcp pools on the router and configuring the helper-address

OBJECTIVE

- Helper-address configuration
- Dhcpc pool creation on the server
- Removing dhcpc pools on the router

TECHNOLOGY USED

- Relay agent
- DHCP
- NAT(STATIC)

VERIFICATION

- Ensuring previous configurations are not affected.

REMOVING DHCP POOLS ON THE ROUTER

Commands

```
No ip dhcp pool HR  
No ip dhcp pool ICT  
No ip dhcp pool SALES  
Do wr
```

On the server let us create the pools, but before that let us configure ip address on the router going to the server

Int gig0/2

Ip add 10.0.0.1 255.255.255.252

Ex

The server interface will have 10.0.0.2 255.255.255.252 as the ip address, now we have the server address let us configure the Relay Agent

RELAY AGENT

Int gig0/0.10

Ip helper-address 10.0.0.2

Ex

Int gig0/0.20

Ip helper-address 10.0.0.2

Ex

Int gig0/0.30

Ip helper-address 10.0.0.2

Ex

Do wr

POOL CONFIGURATION

The screenshot shows a software interface titled 'POOL CONFIGURATION'. On the left, there's a sidebar with a tree view under 'SERVICES' containing options like HTTP, DHCP, DNS, and VM Management. The main area has tabs for 'Physical', 'Config', 'Services' (which is selected), 'Desktop', 'Programming', and 'Attributes'. Under the 'Services' tab, there's a 'DHCP' configuration section with fields for Interface (FastEthernet0), Pool Name (HR), Default Gateway (192.168.0.1), DNS Server (8.8.8.8), Start IP Address (192), Subnet Mask (255), Maximum Number of Users (14), TFTP Server (0.0.0.0), and WLC Address (0.0.0.0). Below this is a table with columns: Pool Name, Default Gateway, DNS Server, Start IP Address, Subnet Mask, Max User, TFTP Server, and WLC Address. The table contains four rows: SALES, ICT, HR, and serverPool. The serverPool row has values: 0.0.0.0, 0.0.0.0, 10.0.0.0, 255.255.255.252, 512, 0.0.0.0, and 0.0.0.0.

Let us go to our hosts and see if they got their ip address from our server
The command is

Ipcconfig

OUTPUT

VLAN 30

PC23

Physical Config Desktop Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ipconfig

FastEthernet0 Connection:(default port)

Connection-specific DNS Suffix..:
Link-local IPv6 Address.....:: FE80::206:2AFF:FE44:B623
IPv6 Address.....:: ::
IPv4 Address.....: 192.168.0.34
Subnet Mask.....: 255.255.255.240
Default Gateway.....:: :
                           192.168.0.33

Bluetooth Connection:

Connection-specific DNS Suffix..:
Link-local IPv6 Address.....:: ::
IPv6 Address.....:: ::
IPv4 Address.....: 0.0.0.0
Subnet Mask.....: 0.0.0.0
Default Gateway.....:: :
                           0.0.0.0

C:\>
```

Top

73°F Partly sunny

Search

3:47 PM
12/25/2025

VLAN 20

PC29

Physical Config Desktop Programming Attributes

Command Prompt X

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ipconfig

FastEthernet0 Connection:(default port)

Connection-specific DNS Suffix..:
Link-local IPv6 Address.....: FE80::2D0:D3FF:FE41:9865
IPv6 Address.....: ::
IPv4 Address.....: 192.168.0.19
Subnet Mask.....: 255.255.255.240
Default Gateway.....: ::
                           192.168.0.17

Bluetooth Connection:

Connection-specific DNS Suffix..:
Link-local IPv6 Address.....: ::
IPv6 Address.....: ::
IPv4 Address.....: 0.0.0.0
Subnet Mask.....: 0.0.0.0
Default Gateway.....: ::
                           0.0.0.0

C:\>
```

VLAN 10

```
Cisco Packet Tracer PC Command Line 1.0
C:>ipconfig

FastEthernet0 Connection:(default port)
  Connection-specific DNS Suffix...:
  Link-local IPv6 Address.....: FE80::209:7CFF:FE78:79D7
  IPv6 Address.....: ::
  IPv4 Address.....: 192.168.0.6
  Subnet Mask.....: 255.255.255.240
  Default Gateway.....: ::1
  192.168.0.1

Bluetooth Connection:
  Connection-specific DNS Suffix...:
  Link-local IPv6 Address.....: ::
  IPv6 Address.....: ::
  IPv4 Address.....: 0.0.0.0
  Subnet Mask.....: 0.0.0.0
  Default Gateway.....: ::

C:>\
```

We can see everything is just fine,
Let us try to reach the ISP or the External server
From any pc
Ping 203.0.113.1

OUTPUT

```
Default Gateway.....: ::1
  0.0.0.0

C:>\
Invalid Command.

C:>ping 203.0.113.1

Pinging 203.0.113.1 with 32 bytes of data:
Reply from 203.0.113.1: bytes=32 time=47ms TTL=254
Reply from 203.0.113.1: bytes=32 time=17ms TTL=254
Reply from 203.0.113.1: bytes=32 time<1ms TTL=254
Reply from 203.0.113.1: bytes=32 time<1ms TTL=254

Ping statistics for 203.0.113.1:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
  Minimum = 0ms, Maximum = 47ms, Average = 16ms

C:>ping 203.0.113.20

Pinging 203.0.113.20 with 32 bytes of data:
Request timed out.
Reply from 203.0.113.20: bytes=32 time=15ms TTL=126
Reply from 203.0.113.20: bytes=32 time=18ms TTL=126
Reply from 203.0.113.20: bytes=32 time=38ms TTL=126

Ping statistics for 203.0.113.20:
  Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
  Minimum = 15ms, Maximum = 38ms, Average = 23ms

C:>\
```

We are still good. Now they want the internal server to be able to receive incoming connection from the outside, we configure static NAT
We go on our router to configure the static NAT
Int gig0/2
Ip nat inside
Ex
Ip nat inside source static 10.0.0.2 203.0.113.14

We have give the server to be using the last ip address in from our subnet 203.0.113.0/28

Let us try to see if the external server can reach our server

Ping 203.0.113.14

OUTPUT

```
Cisco Packet Tracer SERVER Command Line 1.0
C:\>Ping 203.0.113.14

Pinging 203.0.113.14 with 32 bytes of data:

Request timed out.
Reply from 203.0.113.14: bytes=32 time<1ms TTL=126
Reply from 203.0.113.14: bytes=32 time<1ms TTL=126
Reply from 203.0.113.14: bytes=32 time=14ms TTL=126

Ping statistics for 203.0.113.14:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 14ms, Average = 4ms

C:\>
```

Let us try to see if the ISP can reach our server

Ping 203.0.113.14

Let us verify our NAT

On the router we issue a show ip nat translation

```
Router# Physical Config CLI Attributes
IOS Command Line Interface

Enter configuration commands, one per line. End with CNTL/Z.
GTECH-MAIN-ROUTER(config)#int gig0/2
GTECH-MAIN-ROUTER(config-if)#ip nat inside
GTECH-MAIN-ROUTER(config-if)#new
GTECH-MAIN-ROUTER(config)#ip nat inside source ?
    list      Specify access list describing local addresses
    static   Specify static local->global mapping
GTECH-MAIN-ROUTER(config)#ip nat inside source static ?
    A.B.C.D Inside local IP address
    tcp      Transmission Control Protocol
    udp      User Datagram Protocol
GTECH-MAIN-ROUTER(config)#ip nat inside source static 10.0.0.2 ?
    A.B.C.D Inside global IP address
GTECH-MAIN-ROUTER(config)#ip nat inside source static 10.0.0.2 203.0.113.14
GTECH-MAIN-ROUTER(config)#
GTECH-MAIN-ROUTER(config)#
GTECH-MAIN-ROUTER#
SYS-5-CONFIG_3: Configured from console by console

GTECH-MAIN-ROUTER#show ip nat translation
Pro Inside global     Inside local     Outside local     Outside global
--- 203.0.113.14      10.0.0.2          ---             ---
GTECH-MAIN-ROUTER#show ip nat translation
Pro Inside global     Inside local     Outside local     Outside global
icmp 203.0.113.14:1  10.0.0.2:1       203.0.113.1:1  203.0.113.1:1
icmp 203.0.113.14:2  10.0.0.2:2       203.0.113.1:2  203.0.113.1:2
icmp 203.0.113.14:3  10.0.0.2:3       203.0.113.1:3  203.0.113.1:3
icmp 203.0.113.14:4  10.0.0.2:4       203.0.113.1:4  203.0.113.1:4
icmp 203.0.113.14:5  10.0.0.2:5       203.0.113.1:5  203.0.113.1:5
--- 203.0.113.14      10.0.0.2          ---             ---
```

We are good, this is all they wanted for now but again maybe in a month we will come to expand this further; thus putting each vlan in its own switch later redundancy.

For now we end it here.