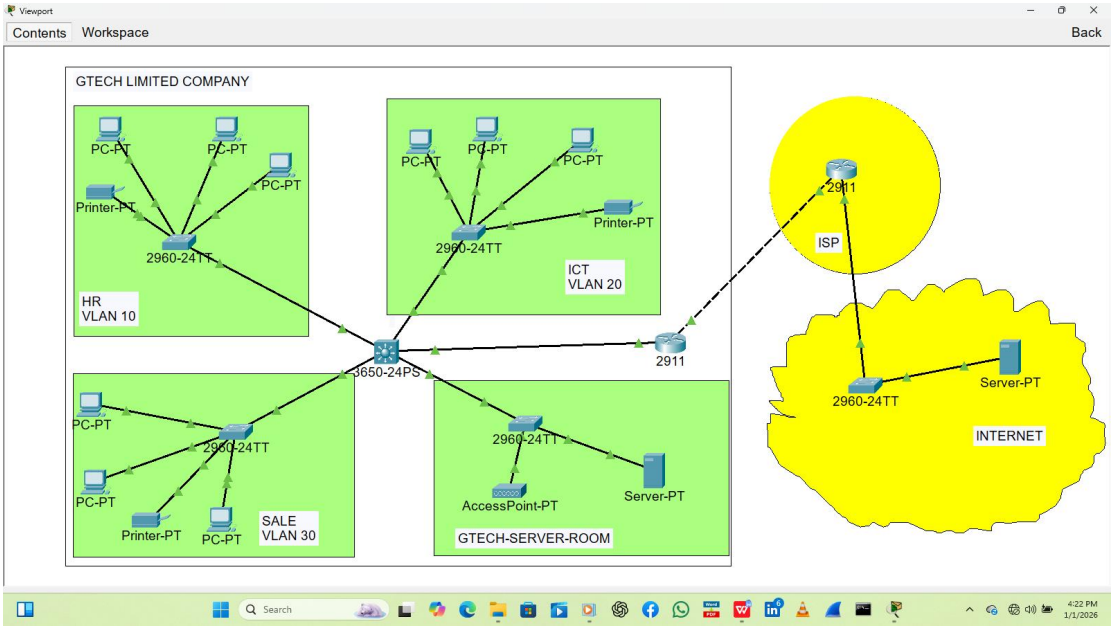
SMALL NETWORK DESIGN- EXPANDED

Two months after setting up a server, GTECH did manage to buy more switches,they want us to put each vlan on a separate switch,they have 4 layer2 switches and a multlayer switch to do the routing and and a router to do the NAT.

NETWORK TOPOLOGY



LAYER TWO CONFIGURATIONS

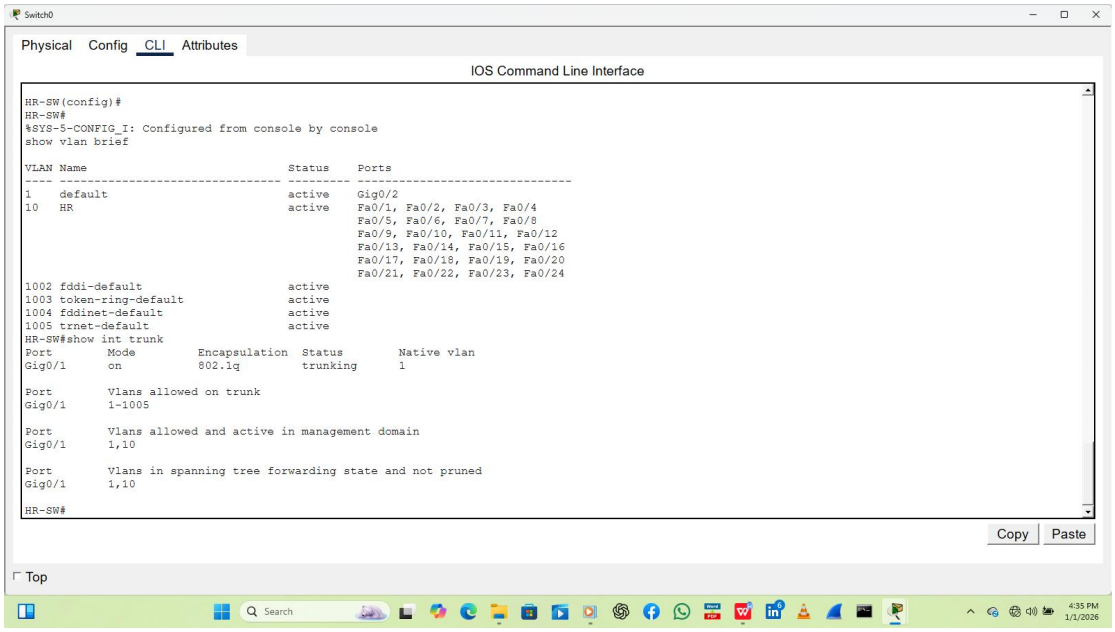
Enable secret Admin
Username Admin Password Admin123
Line console 0
Login local
Exit
Line vty 0 15
Login local
Exit
Service password-encryption
Banner motd # ADMINS ONLY#
DO WR
!VLAN 10
Vlan 10
Name HR
Ex
Hostname HR-SW
Int range fa0/1-24
Switchport mode access
Switchport access vlan 10
Ex
Int gig0/1
Switchport mode trunk
Do wr
Ex

!VLAN 20
Vlan 20
Name ICT
Ex
Hostname ICT-SW
Int range fa0/1-24
Switchport mode access
Switchport access vlan20
Ex
Int gig0/1
Switchport mode trunk
Do wr
Ex

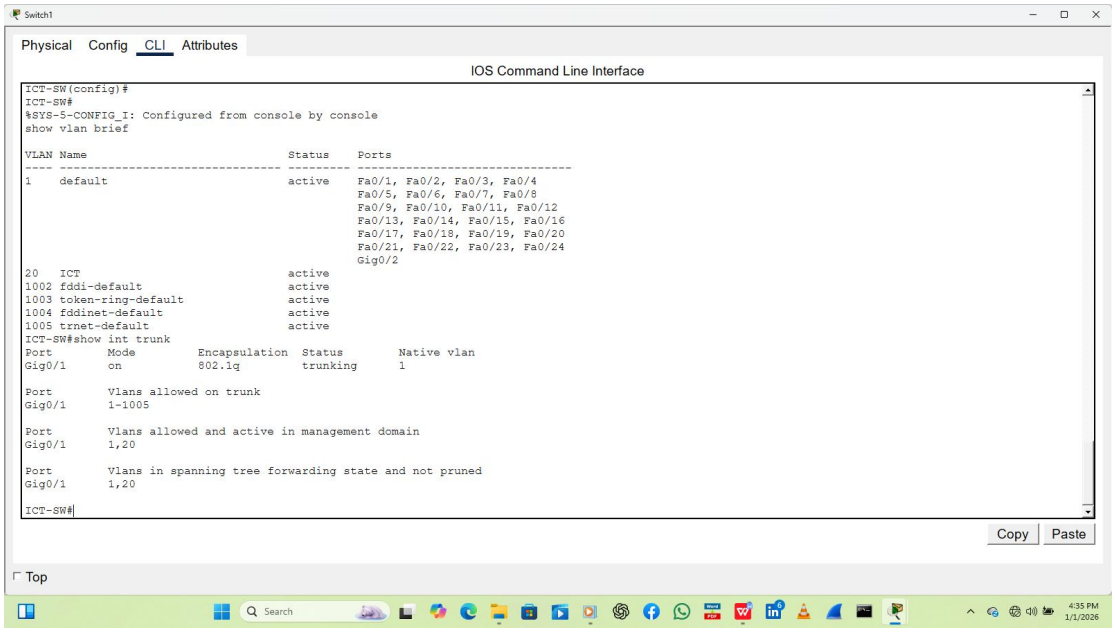
!VLAN 30
Vlan 30
Name SALES
Ex
Hostname SALES-SW
Int range fa0/1-24
Switchport mode access
Switchport access vlan 30
Ex
Int gig0/1
Switchport mode trunk
Do wr
Ex
!VLAN 40
Vlan 40
Name SERVER-ROOM
Ex
Hostname SERVER-ROOM-SW
Int range fa0/1-24
Switchport mode access
Switchport access vlan 40
Ex
Int gig0/1
Switchport mode trunk
Do wr
Ex

Let us verify our vlans

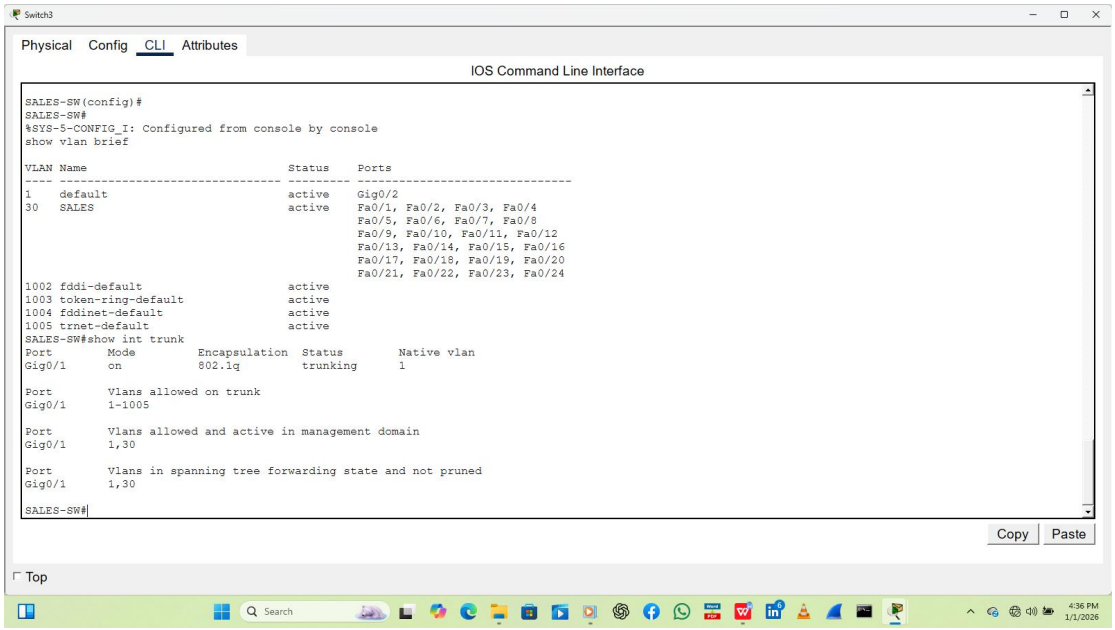
Vlan 10 TRUNK INTERFACE



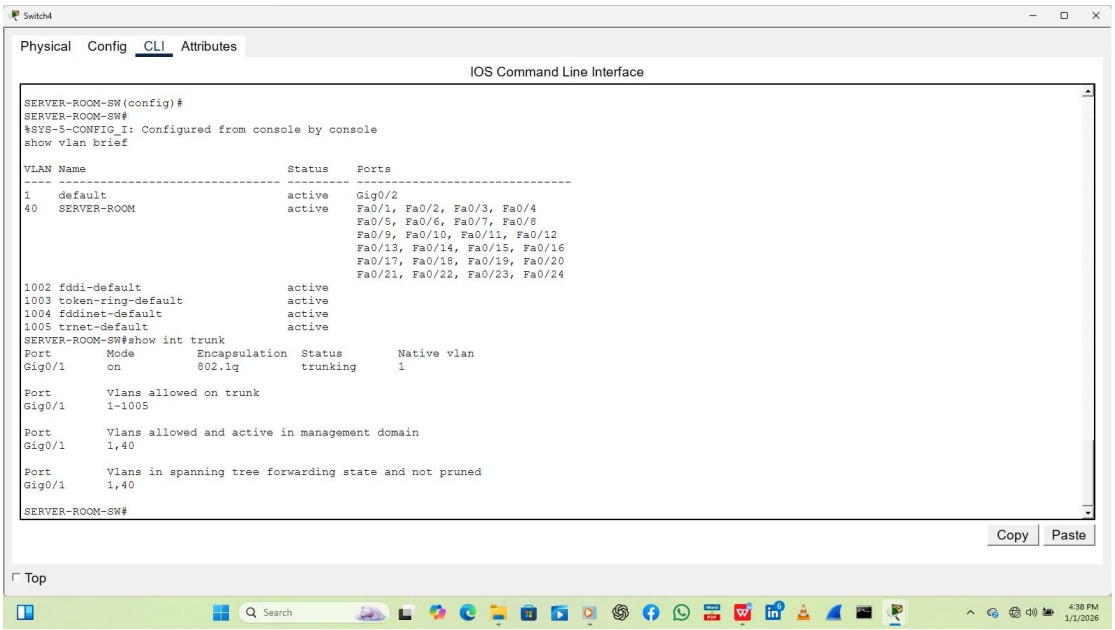
VLAN 20 TRUNK INTERFACE



VLAN 30 TRUNK INTERFACE



VLAN 40 AND TRUNK INTERFACE



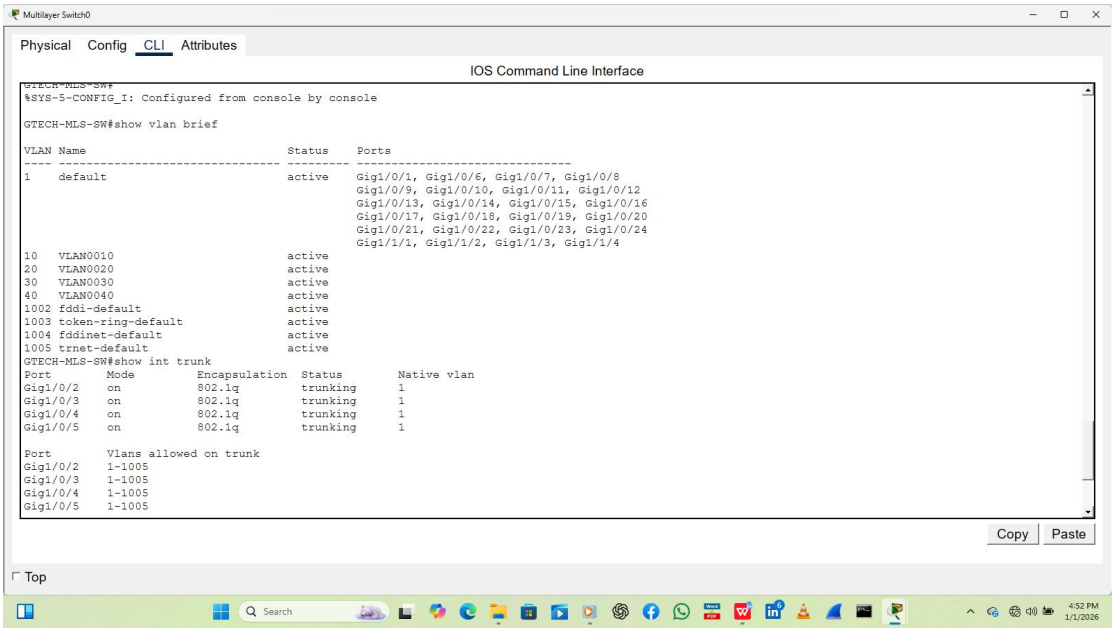
We are good with layer two configurations(access switches)
Next lets go to our MLS

MULTILAYER SWITCH CONFIGURATIONS

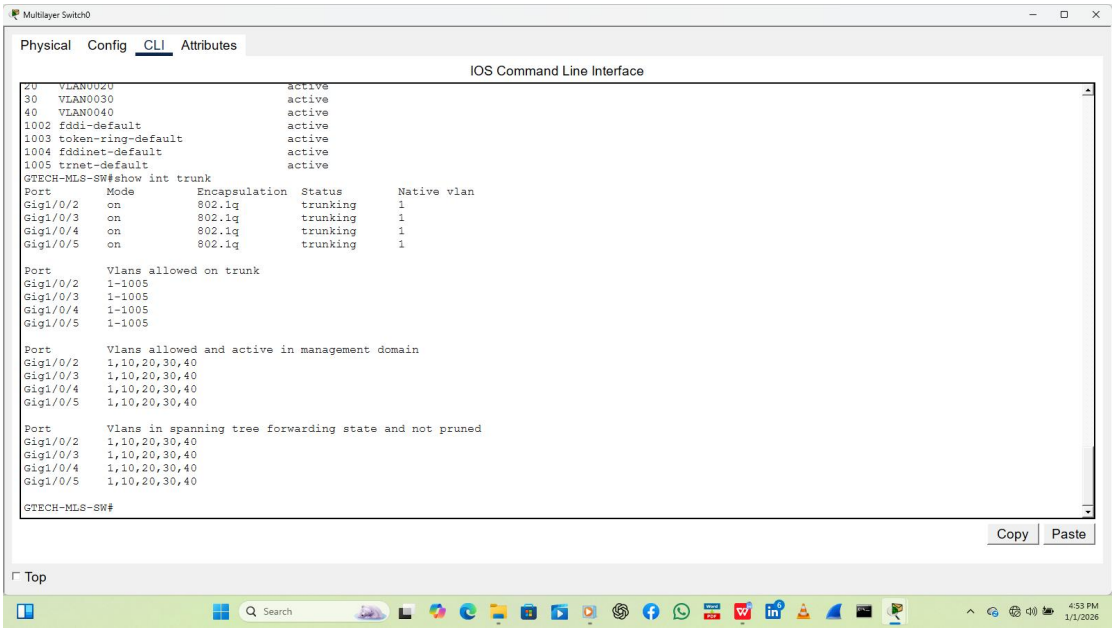
Hostname GTECH-MLS-SW
Enable secret Admin3
Username Admin Password Admin123
Line console 0
Login local
Exit
Line vty 0 15
Login local
Exit

Service password-encryption
Banner motd # ADMINS ONLY#
DO WR
Int range gig1/0/2-5
Switchport mode trunk
Ex
Vlan 10
Ex
Vlan 20
Ex
Vlan 30
Ex
Vlan 40
Ex
Int vlan 10
Ip add 192.168.0.1 255.255.255.240
No shut
Ex
Int vlan 20
Ip add 192.168.0.17 255.255.255.240
No shut
Ex
Int vlan 30
Ip add 192.168.0.33 255.255.255.240
No shut
Ex
Int vlan 40
Ip add 192.168.0.49 255.255.255.240
No shut
Ex
Do wr

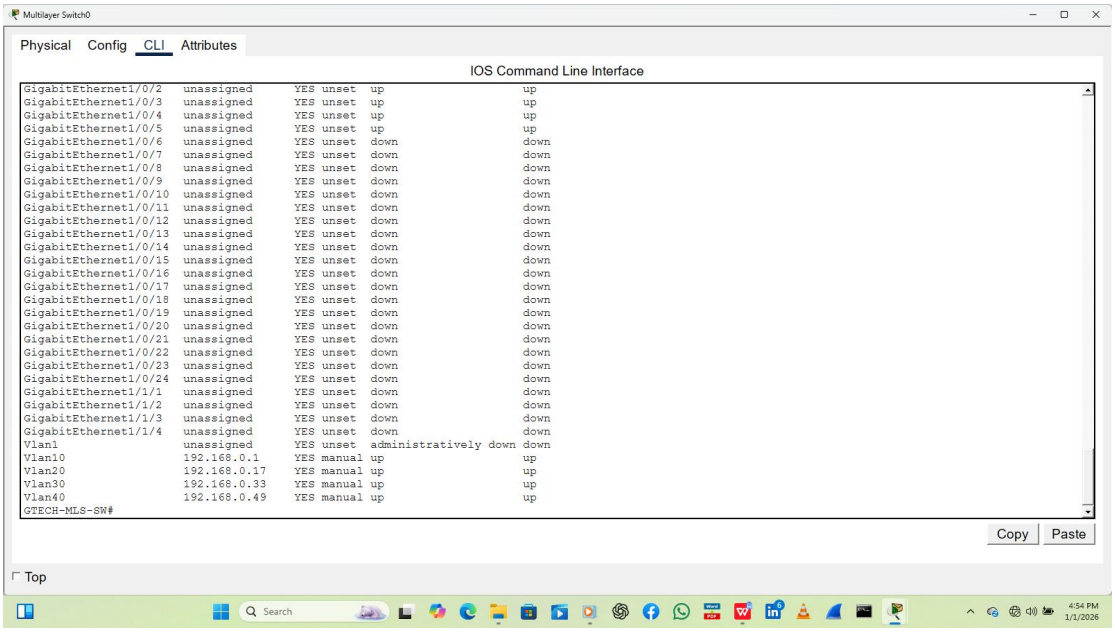
Let us verify our configurations, vlans, interfaces and trunk ports
VLANS TRUNK PORTS



CONTINUATION



INTERFACES

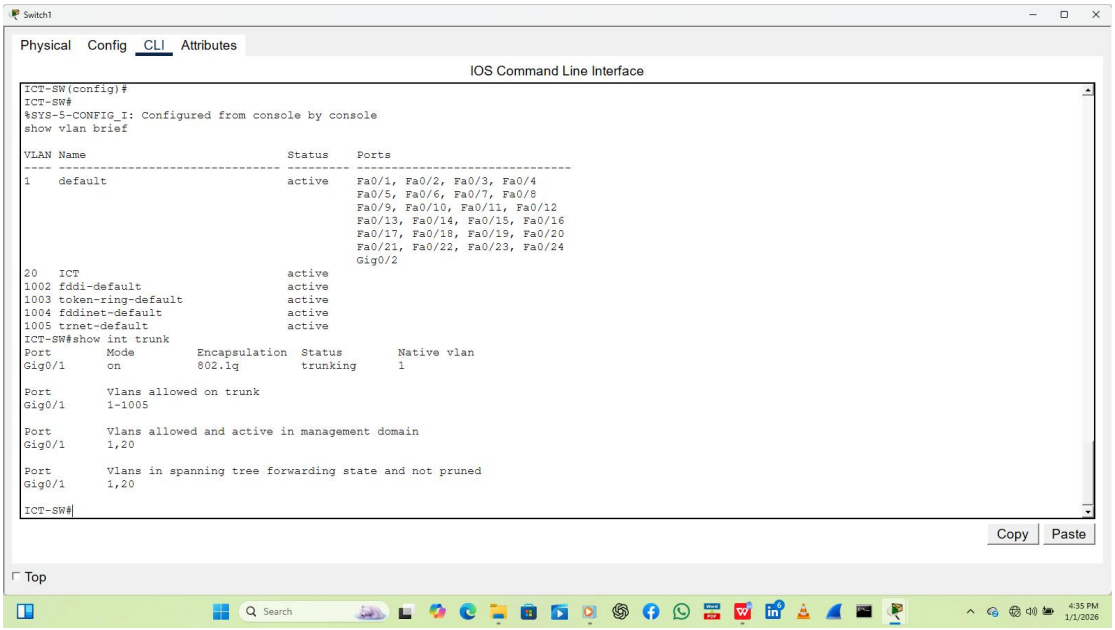


We are good so far, next we configure dhcp

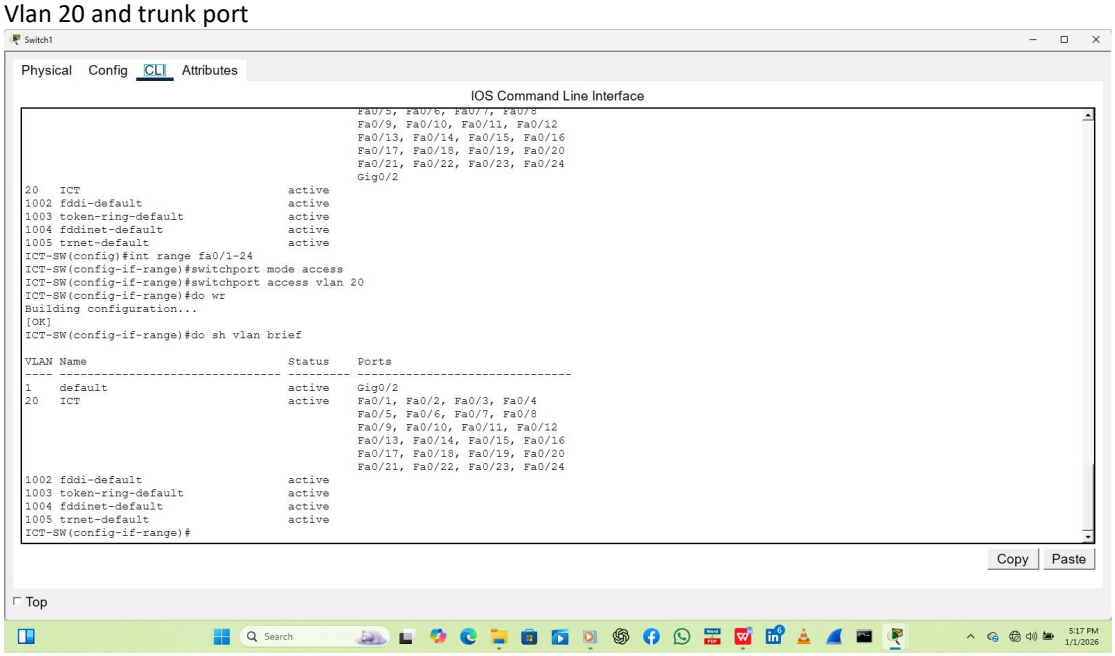
DHCP CONFIGURATIONS

Ip dhcp excluded-address 192.168.0.1 192.168.0.3
Ip dhcp pool HR-pool
Network 192.168.0.0 255.255.255.240
Default-router 192.168.0.1
Dns-server 8.8.8.8
Ex
Do wr
Ip dhcp excluded-address 192.168.0.17 192.168.0.19
Ip dhcp pool ICT-pool
Network 192.168.0.16 255.255.255.240
Default-router 192.168.0.17

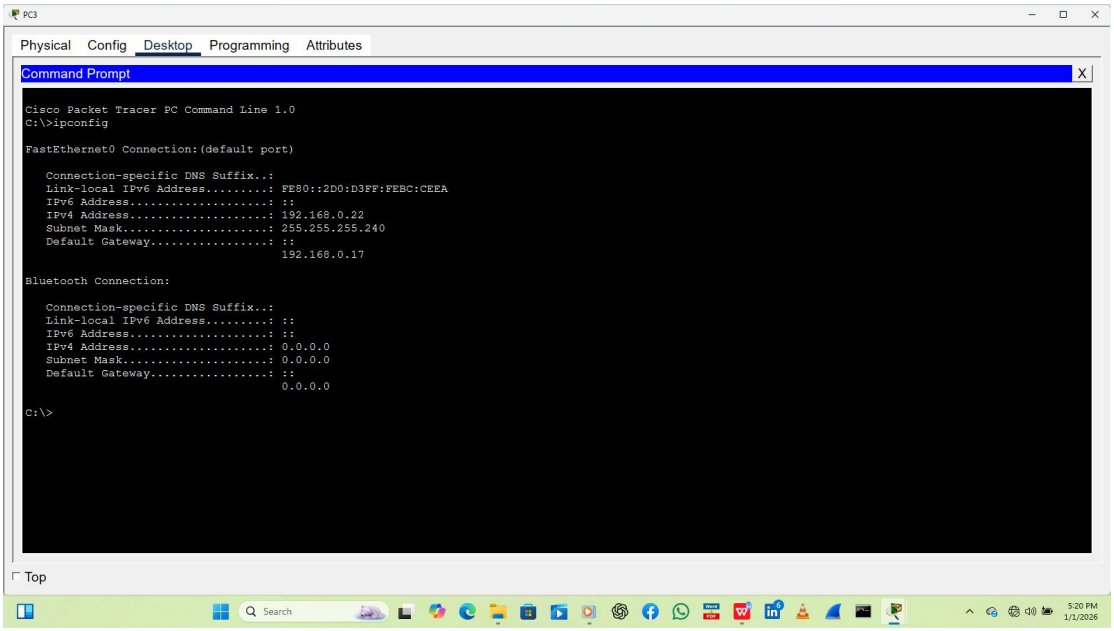
Dns-server 8.8.8.8
Ex
Do wr
Ip dhcp excluded-address 192.168.0.33 192.168.0.35
Ip dhcp pool SALES-pool
Network 192.168.0.32 255.255.255.240
Default-router 192.168.0.33
Dns-server 8.8.8.8
Ex
Ip dhcp excluded-address 192.168.0.49 192.168.0.51
Ip dhcp pool SERVER-ROOM-pool
Network 192.168.0.48 255.255.255.240
Default-router 192.168.0.49
Dns-server 8.8.8.8
Ex
We have a problem, vlan 20 Hosts are unable to get ip addresses despite the pool being well configured, lets us go and do a clear vlan verification on vlan 20
VLAN 20 and trunk port



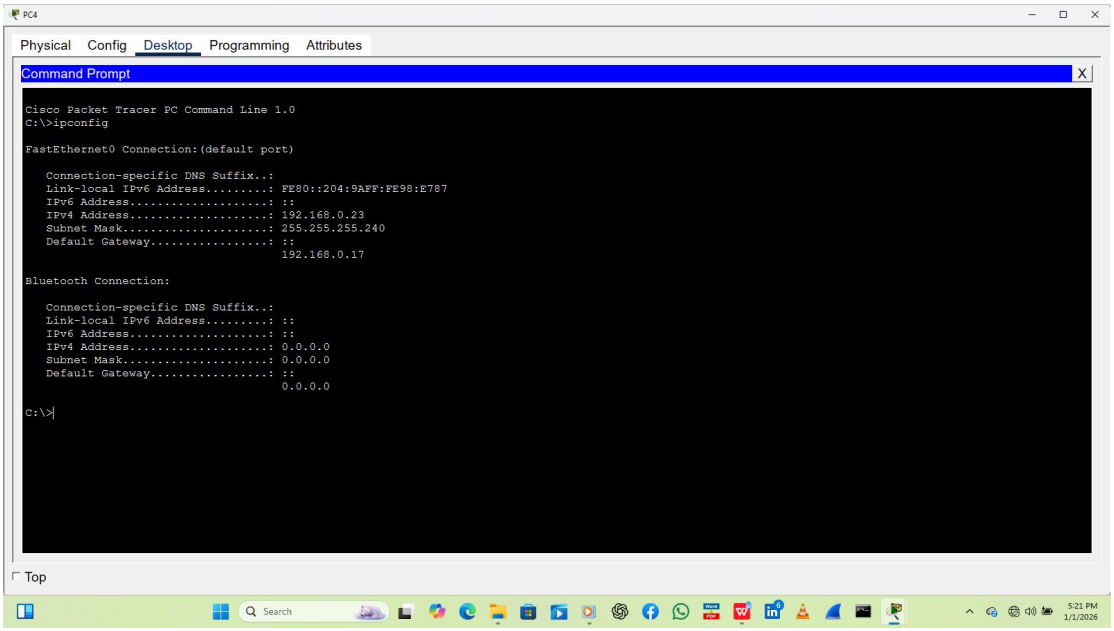
We can see that the interfaces belong to the default vlan which is vlan 1, let us put all the interfaces into vlan 20
Vlan 20 and trunk port



Let us check if our PCs got ip addresses now
Command is ipconfig
PC-1

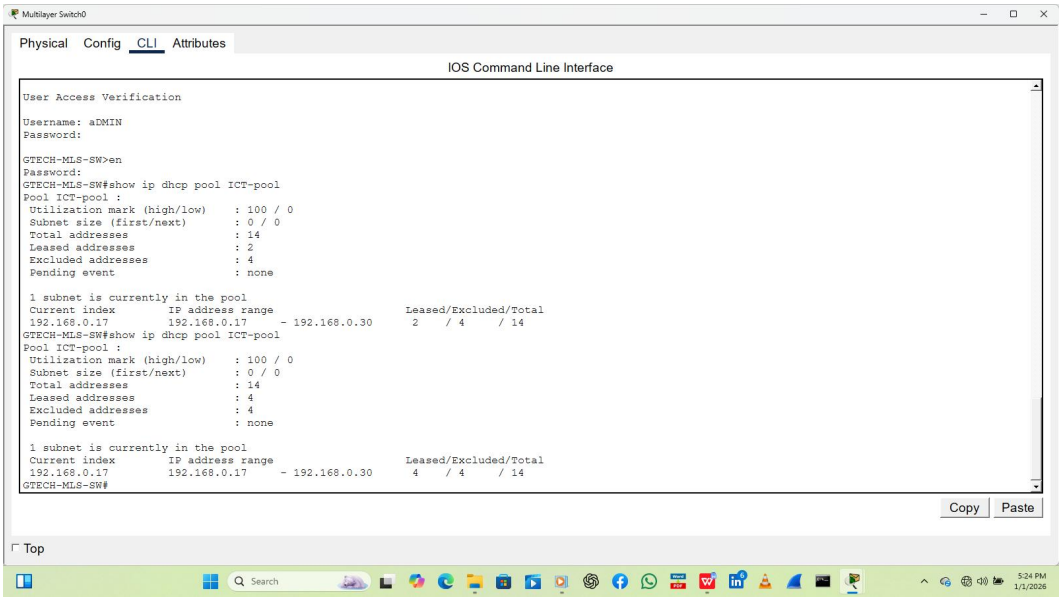


Let us check the second pc
PC-2



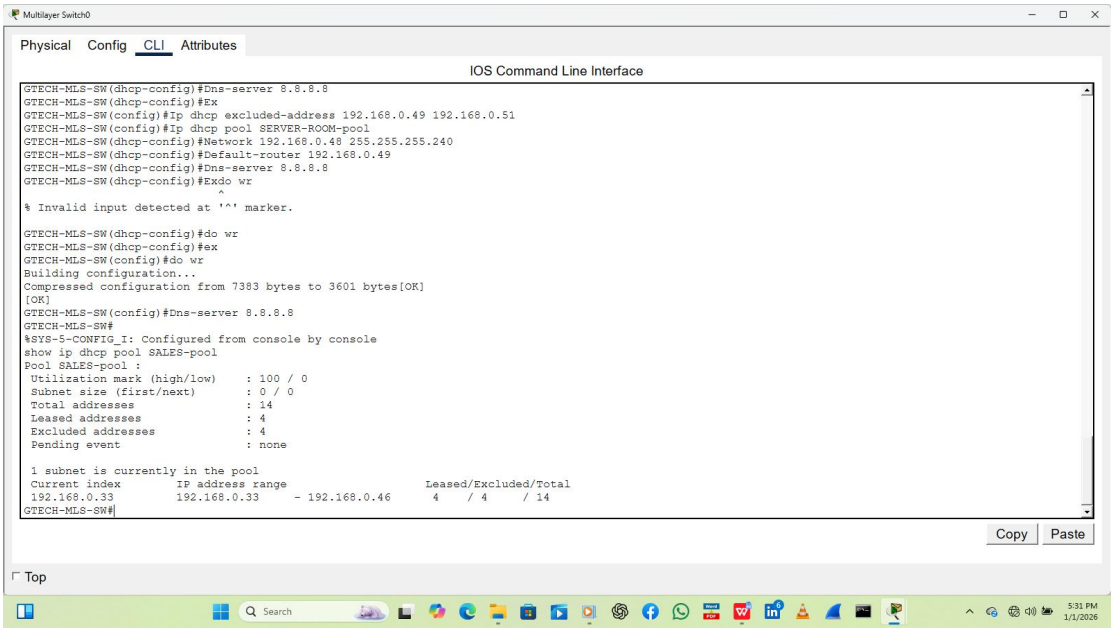
We could do PC by PC but to summarize this we issue the show ip dhcp pool for SALES and ICT

ICT POOL VERIFICATION



We can see that 4 ip addresses has been leased,that's for the 3 PCs and a printer

SALES POOL VERIFICATION



We are done with our dhcp pools

Next we configure the interface to the router and static route

Int gig1/0/1

No switchport

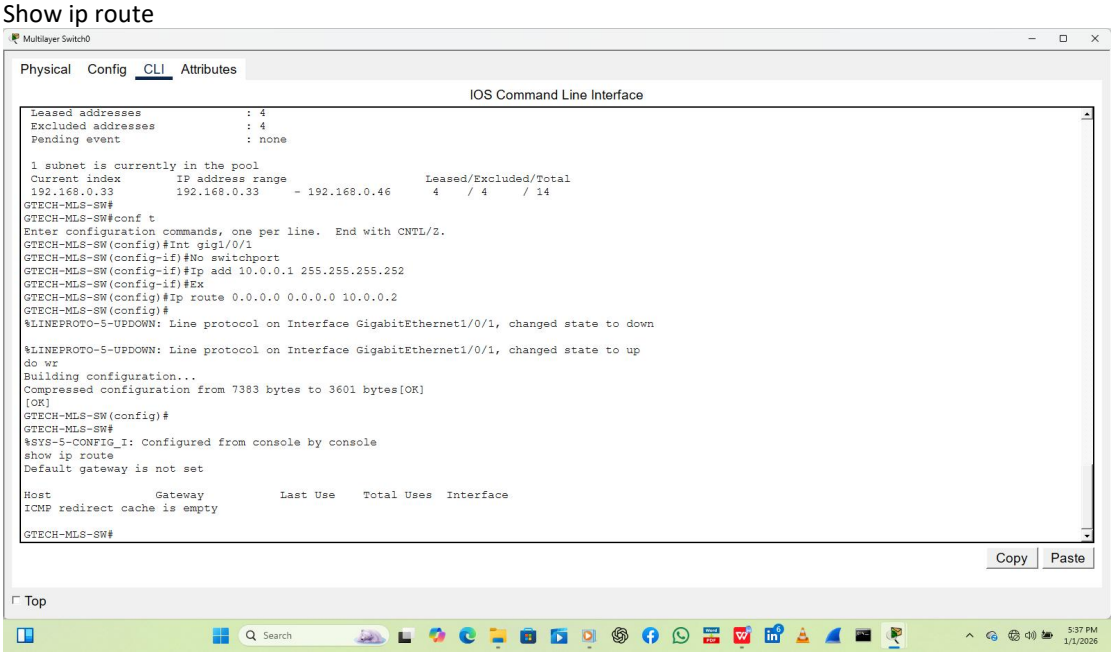
Ip add 10.0.0.1 255.255.255.252

Ex

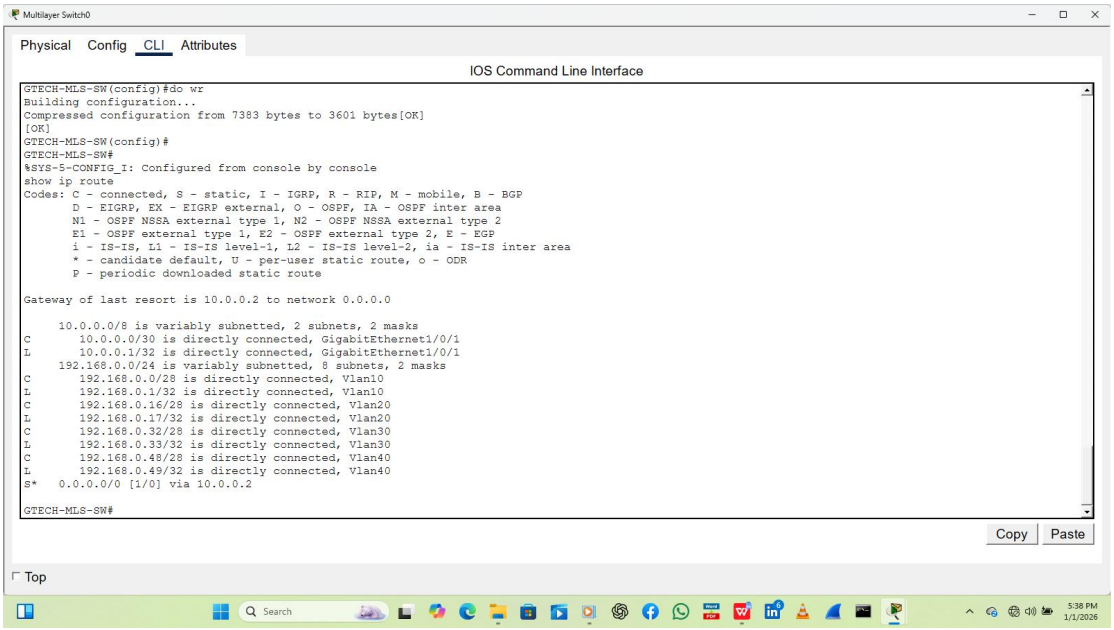
Ip route 0.0.0.0 0.0.0.0 10.0.0.2

Let us verify the static route

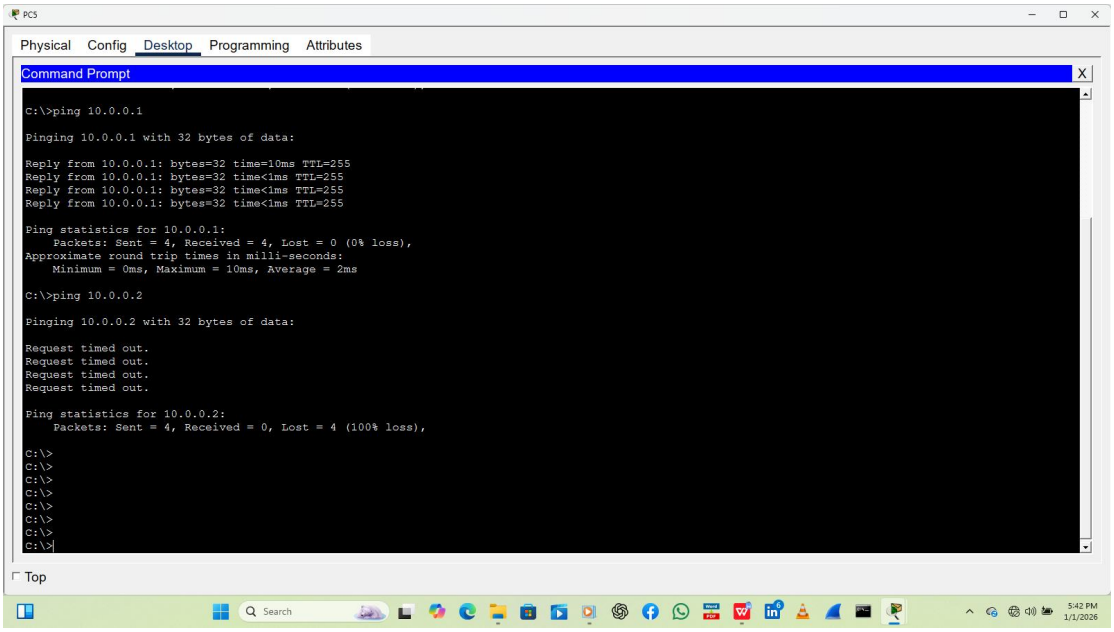
Show ip route



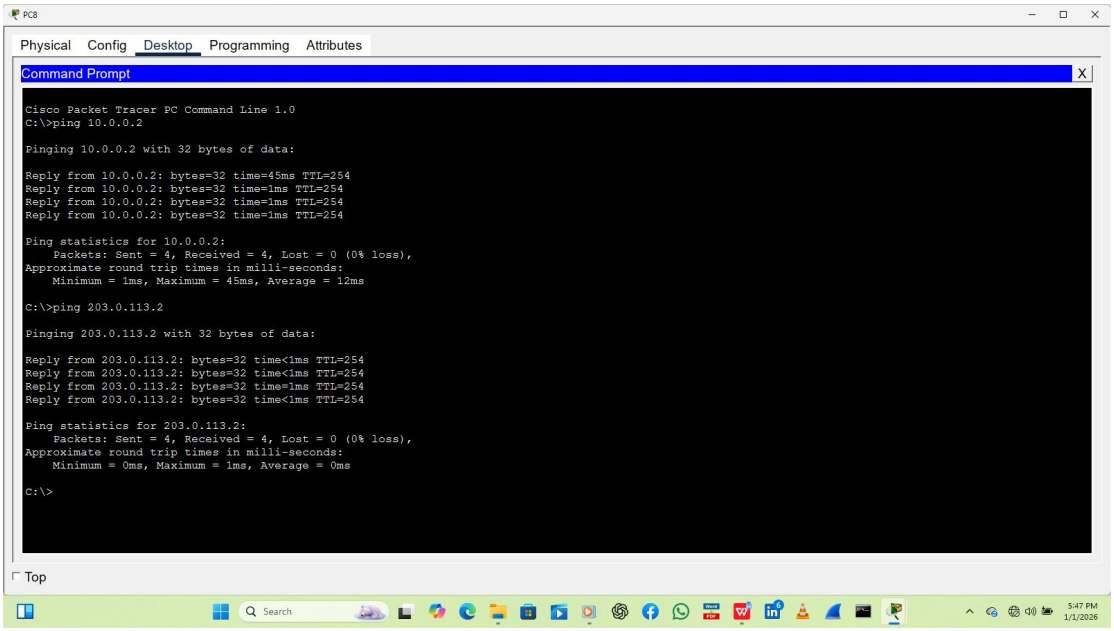
We have to enable ip routing
Let us do that
Ip routing



We are good now, lets us finish up with our edge router
Let us try to ping the gateway to the edge router on our MLS and the edge router itself
Ping from any PC
Ping 10.0.0.1 and ping 10.0.0.2

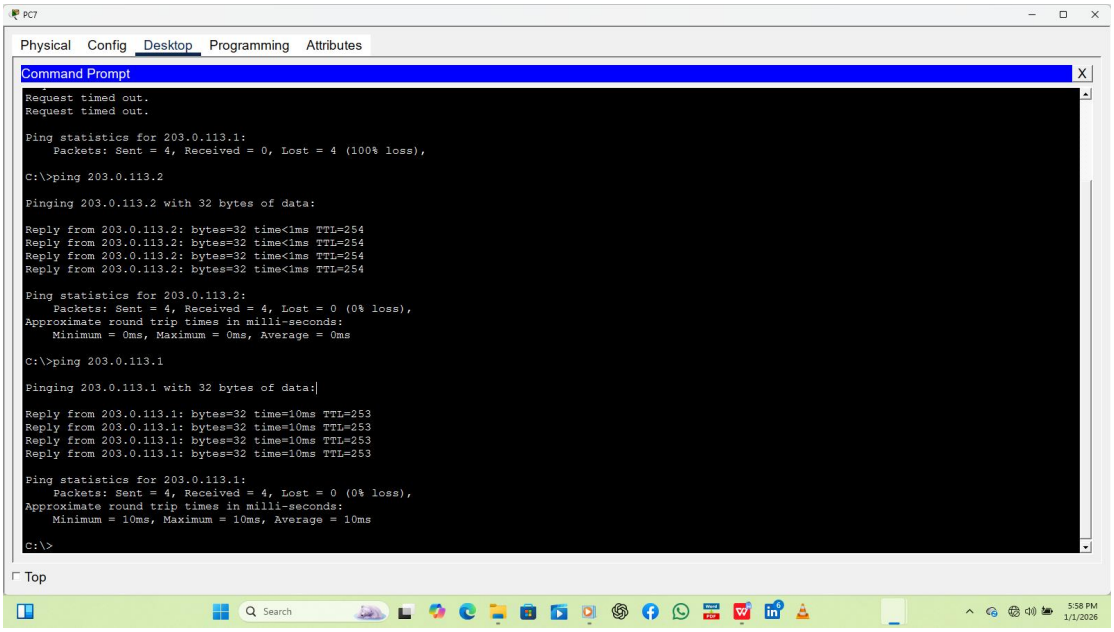


We are unable to ping the edge router, let us configure routing protocol in this case ospf
On both our MLS and edge router
MLS
Router ospf 1
Router-id 1.1.1.1
Network 10.0.0.0 0.0.0.3 area 0
Network 192.168.0.0 0.0.0.15 area 0
Network 192.168.0.16 0.0.0.15 area 0
Network 192.168.0.32 0.0.0.15 area 0
Network 192.168.0.48 0.0.0.15 area 0
Do wr
Let us try ro ping again
FROM ANY PC

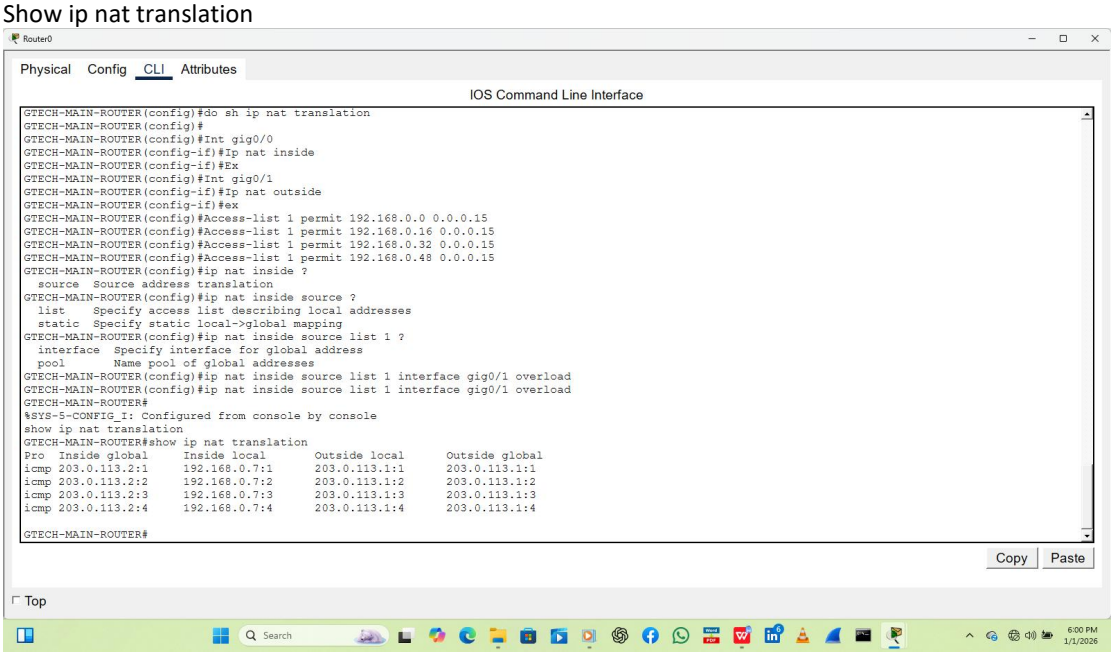


We are now good to go, let us configure NAT

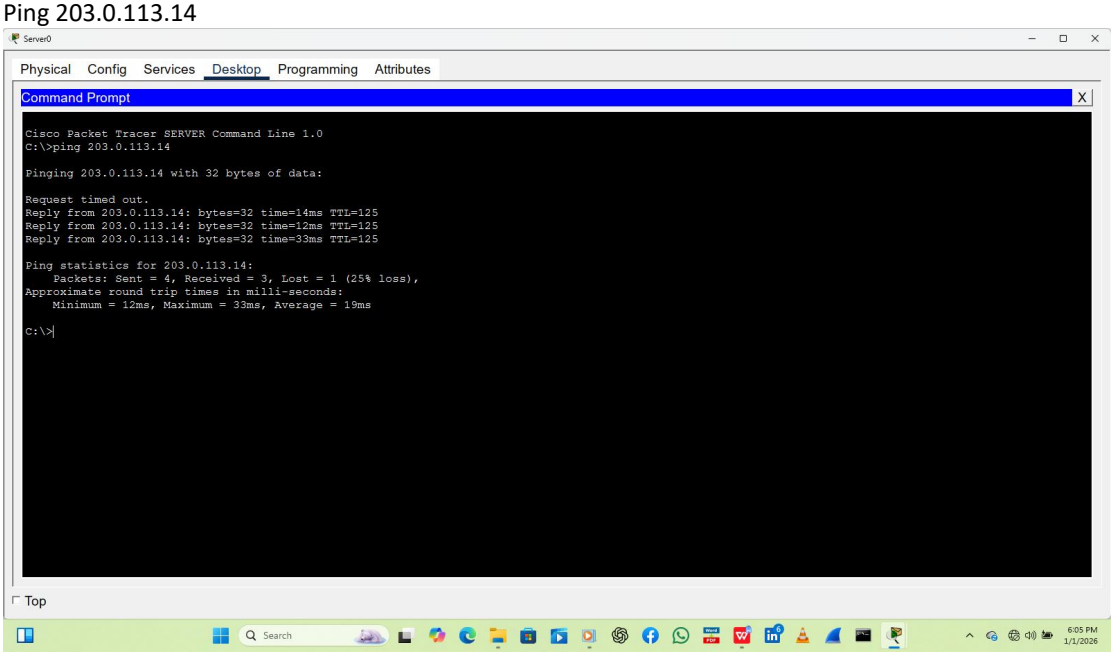
Int gig0/0
Ip nat inside
Ex
Int gig0/1
Ip nat outside
ex
Access-list 1 permit 192.168.0.0 0.0.0.15
Access-list 1 permit 192.168.0.16 0.0.0.15
Access-list 1 permit 192.168.0.32 0.0.0.15
Access-list 1 permit 192.168.0.48 0.0.0.15
Ip nat inside source list 1 int gig0/1 overload
Do wr
Before configuring NAT the PC was unable to ping the ISP, no that we have configured it lets try again



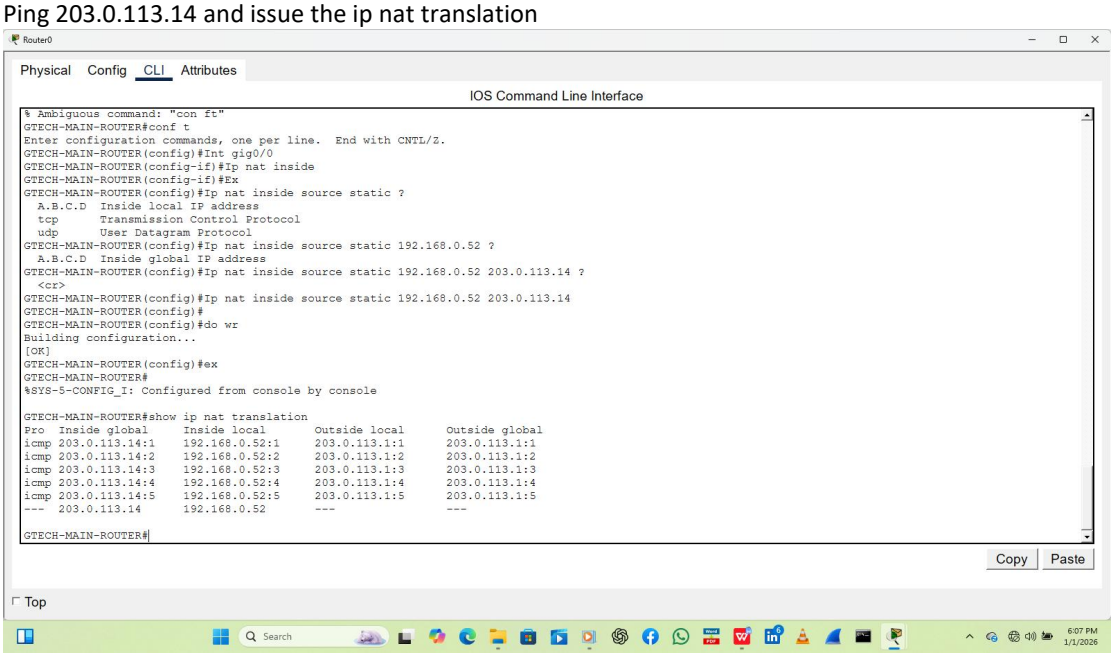
We are good, now let us verify out NAT
Show ip nat translation



To make this short I will not do the ping from all PCs in all vlans to the ISP, one is enough,
Now the server also must be able to receive the incoming traffic from the outside gtech network
Let us translate the server ip to public
Int gig0/0
Ip nat inside
Ex
Ip nat inside source static 192.168.0.52 203.0.113.14
Do wr
Let us try to ping our internal server from the external server
Ping 203.0.113.14



Next we try from the ISP
Ping 203.0.113.14 and issue the ip nat translation



We are done for now.
End of the project

VLAN 30