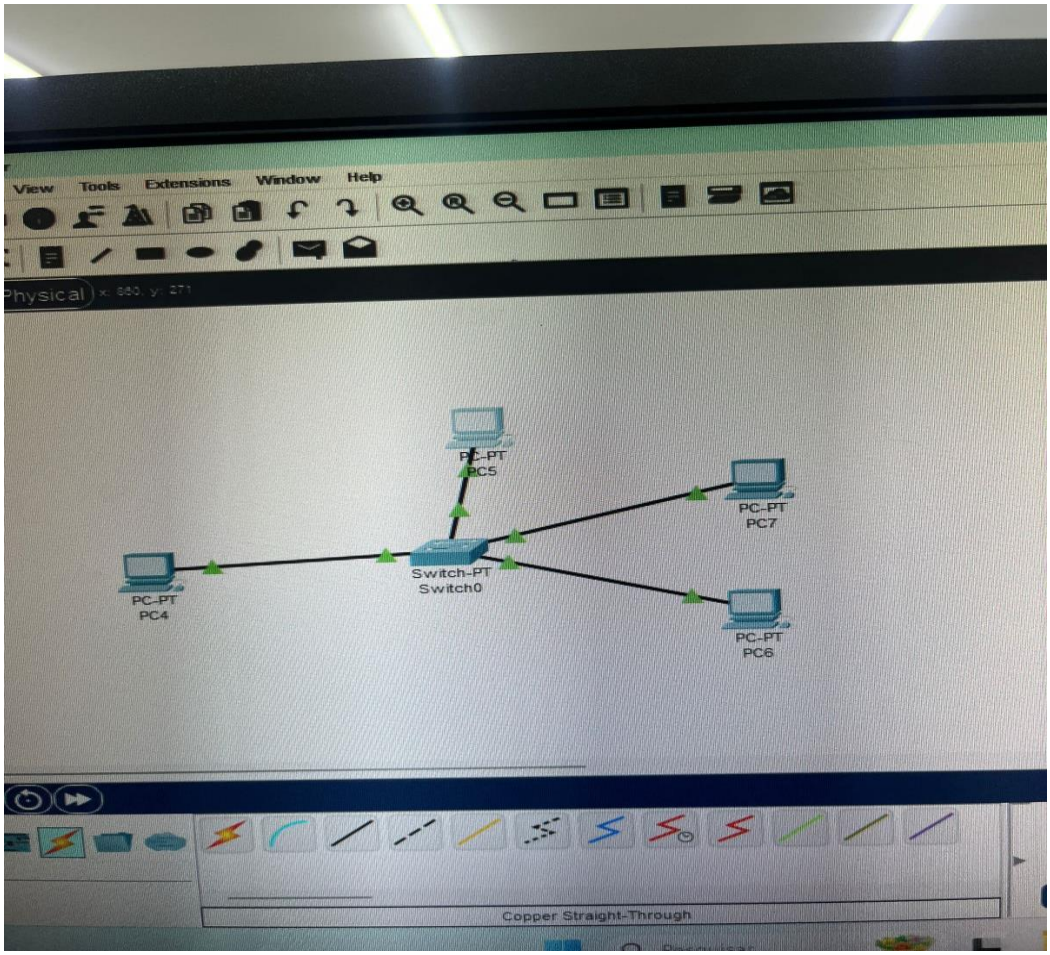
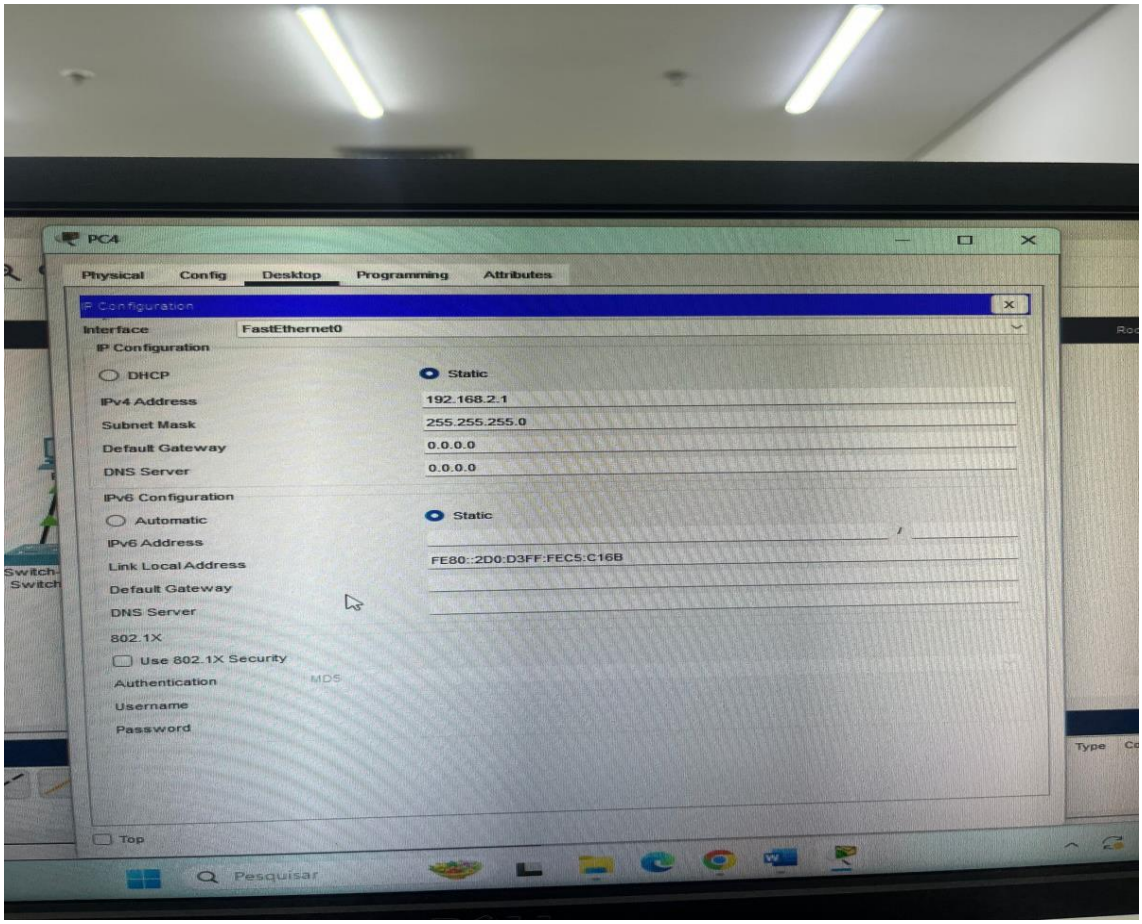
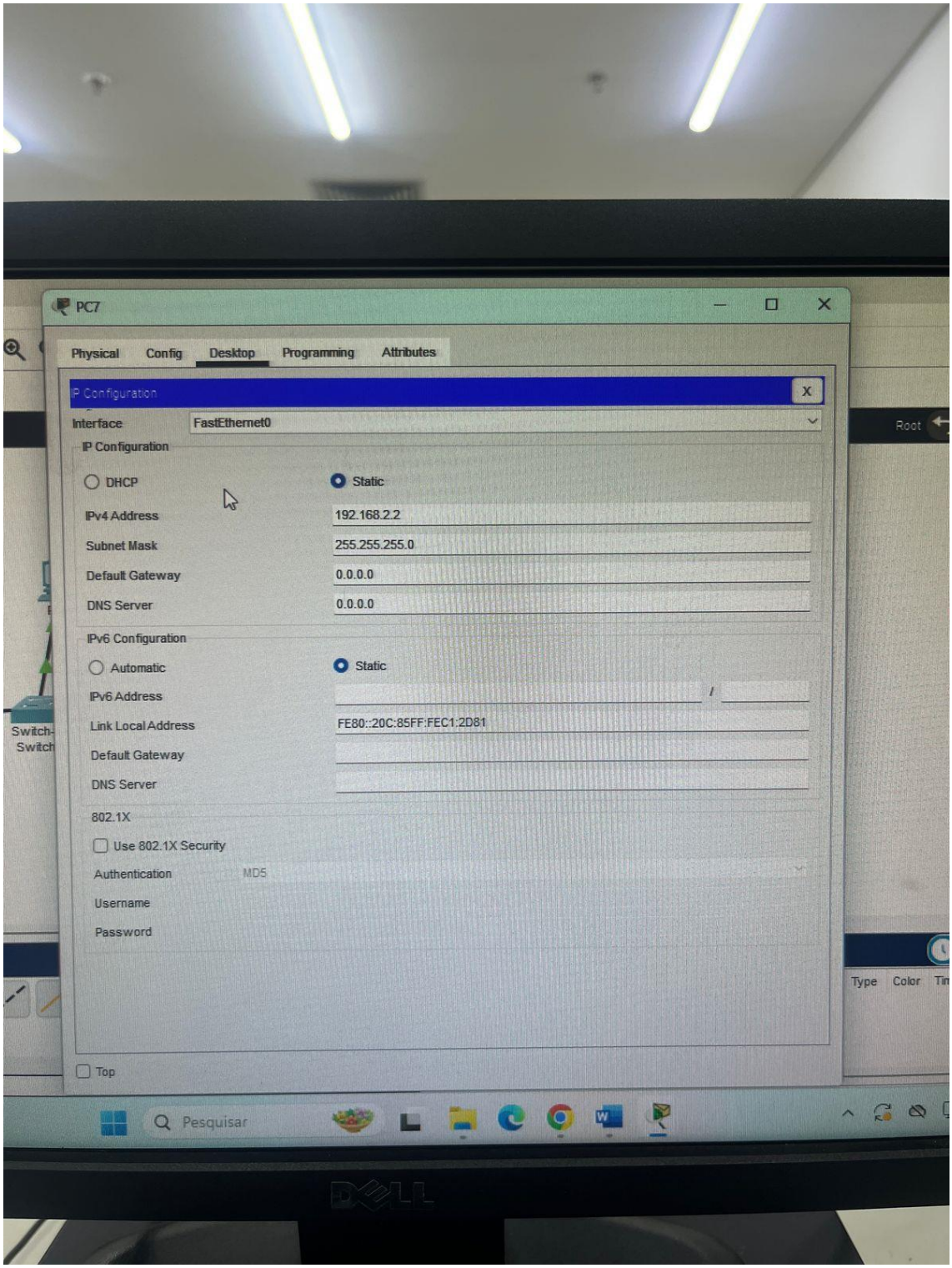
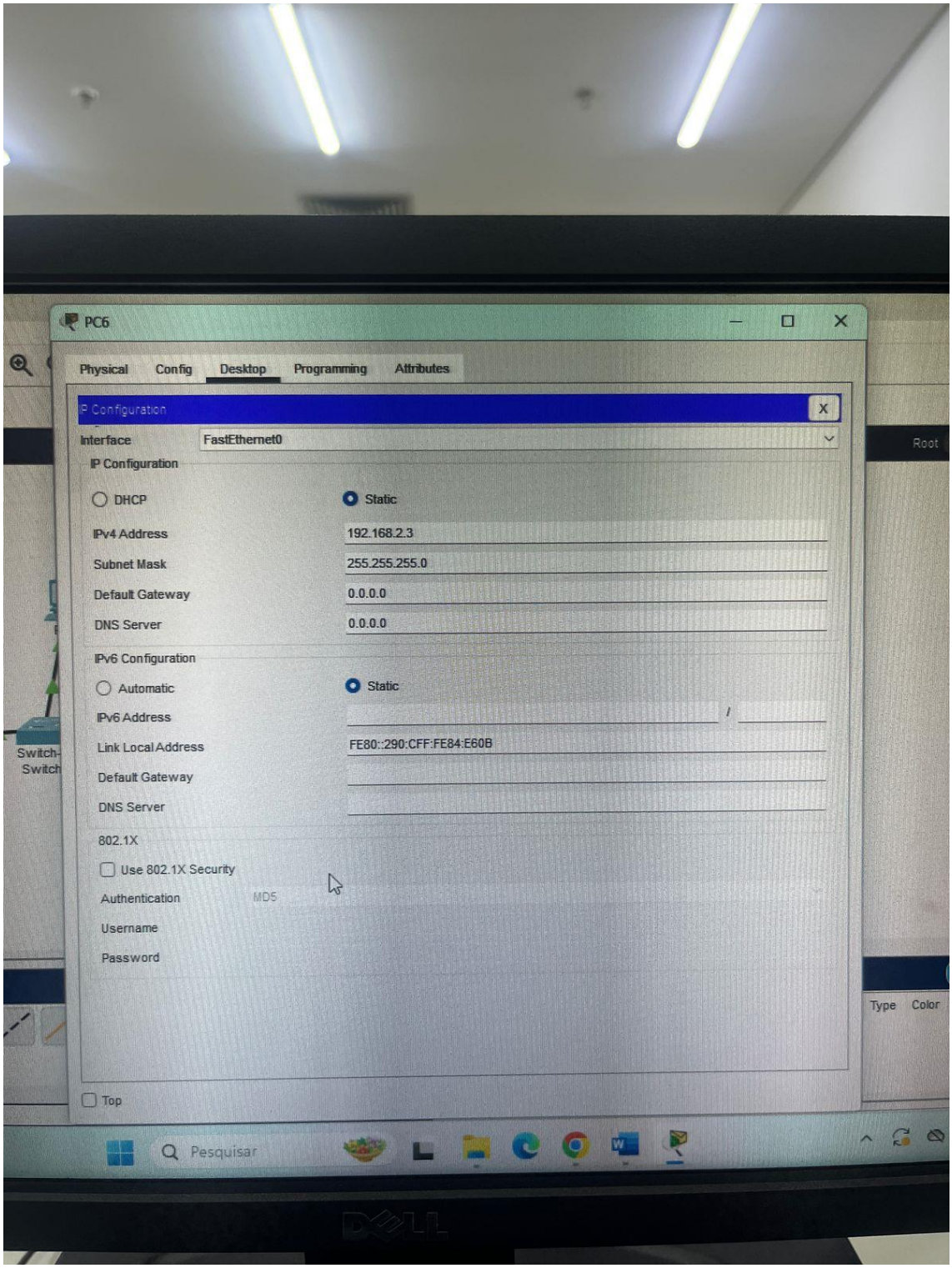
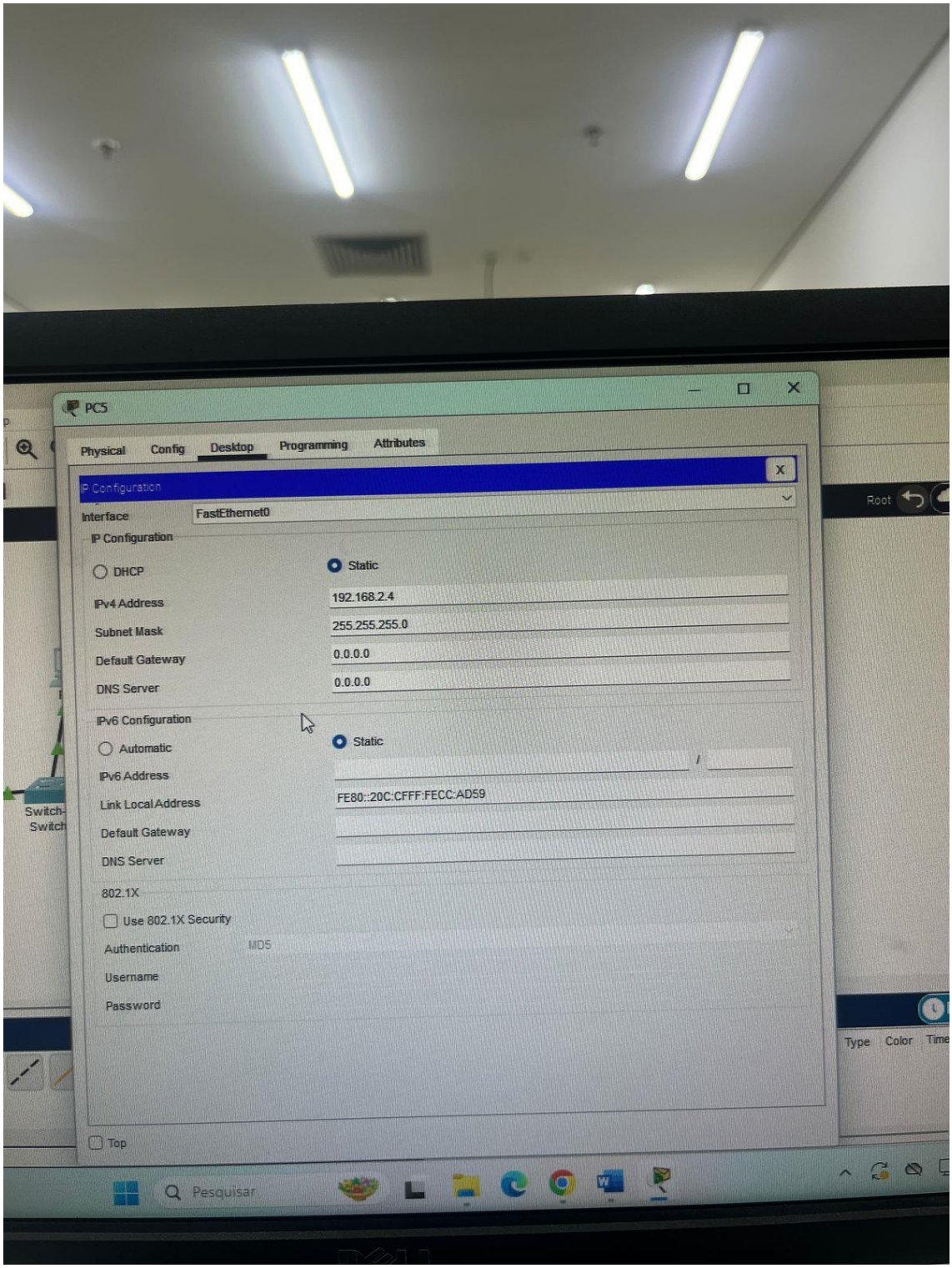
José Cleber Alves da Cruz Mendes RA: 5161815

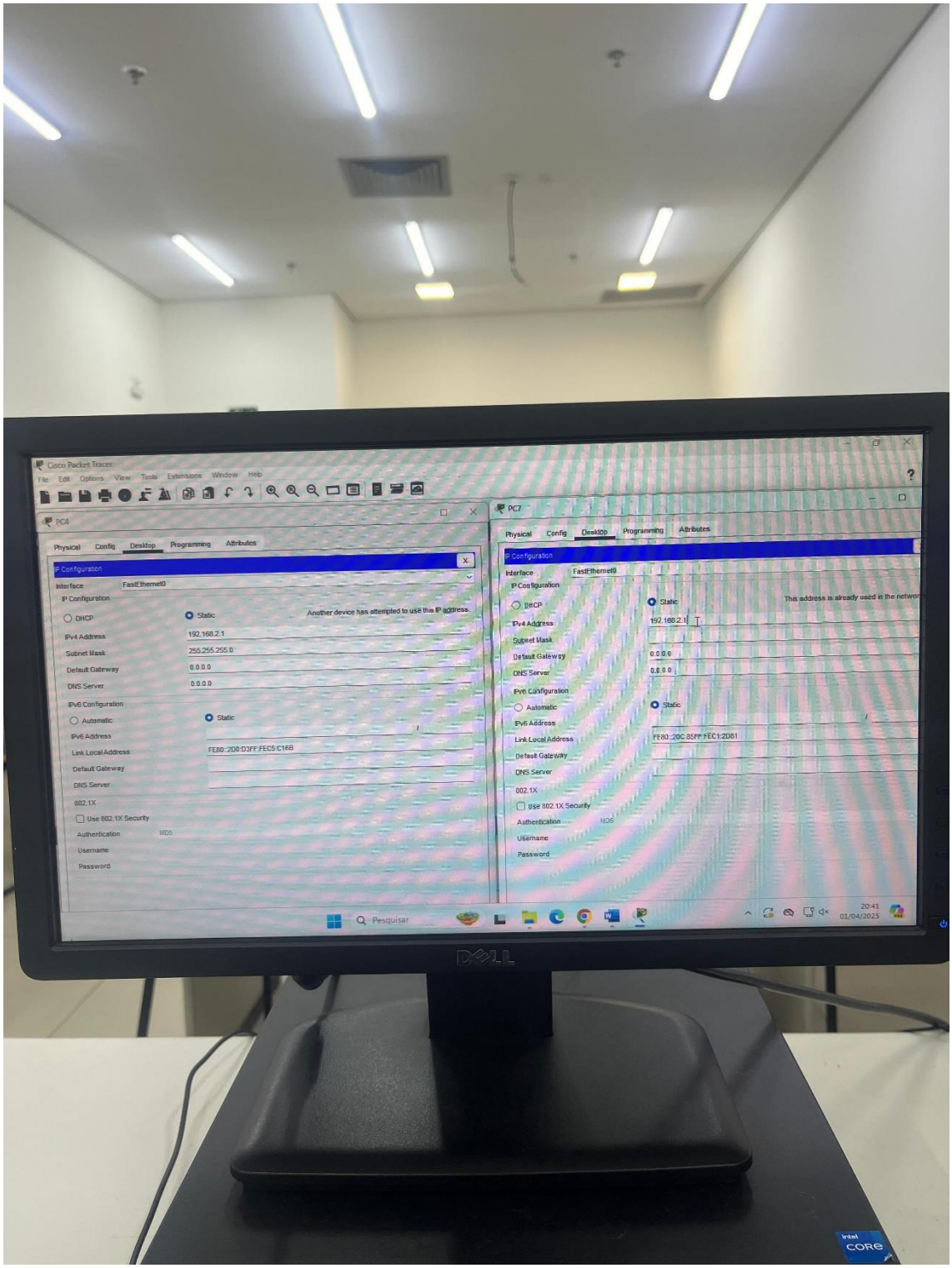


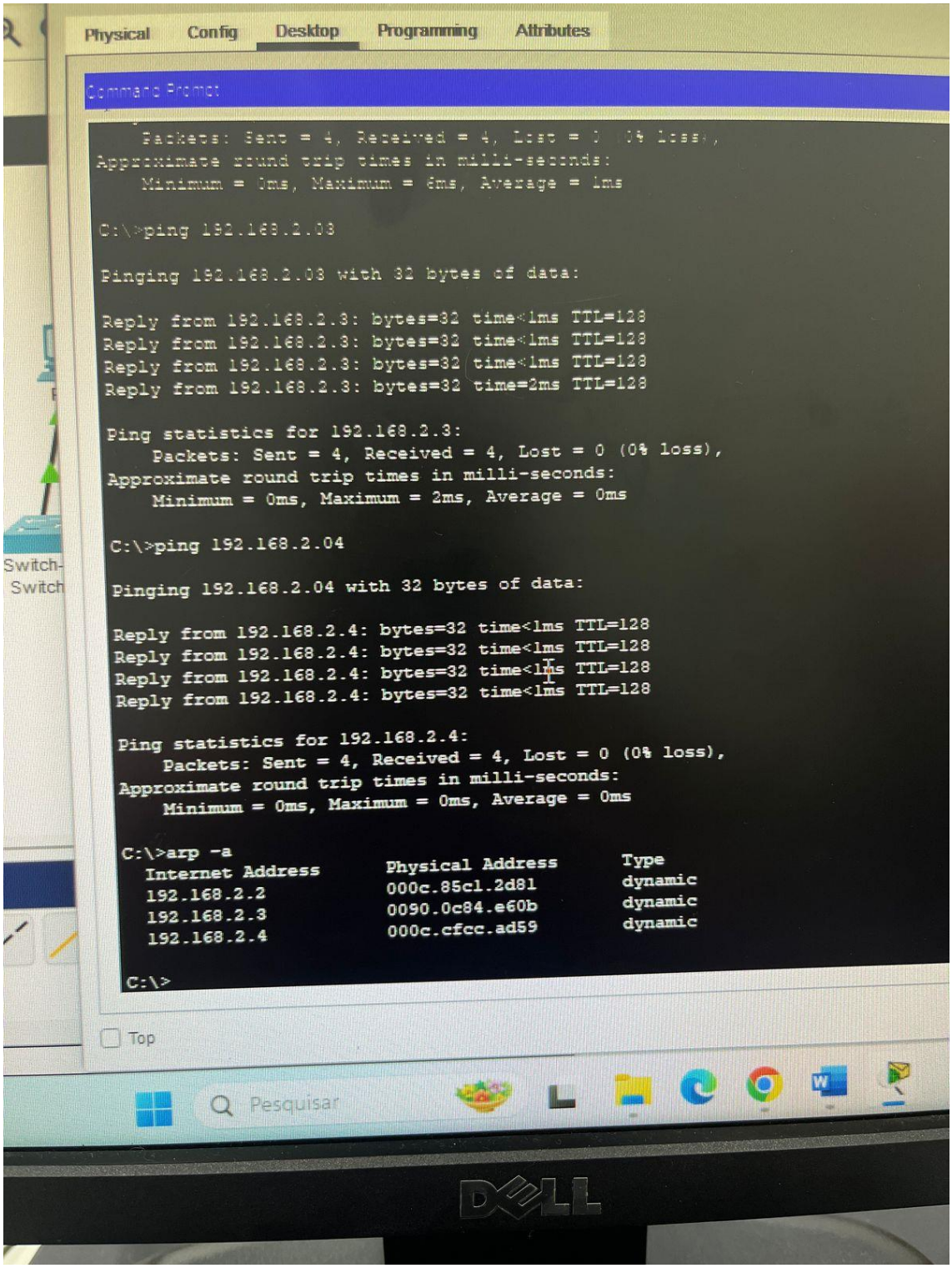

PC4
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
192.168.2.1
Subnet Mask
255.255.255.0
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address
FE80::2D0:D3FF:FEC5:C16B
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top
Pesquisar

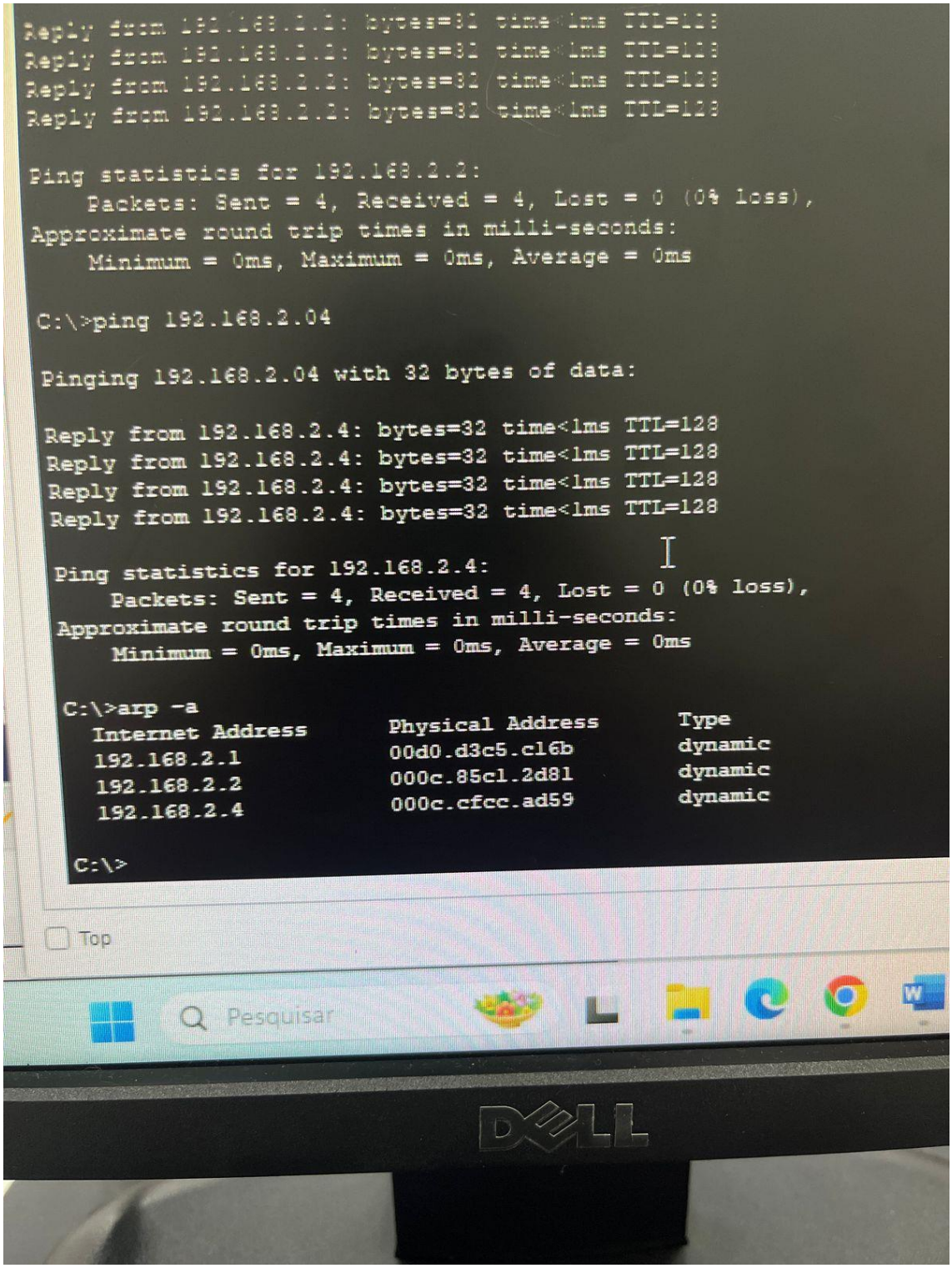

PC7
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
192.168.2.2
Subnet Mask
255.255.255.0
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address
FE80::20C:85FF:FEC1:2D81
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top
Root
Type
Color
Pesquisar

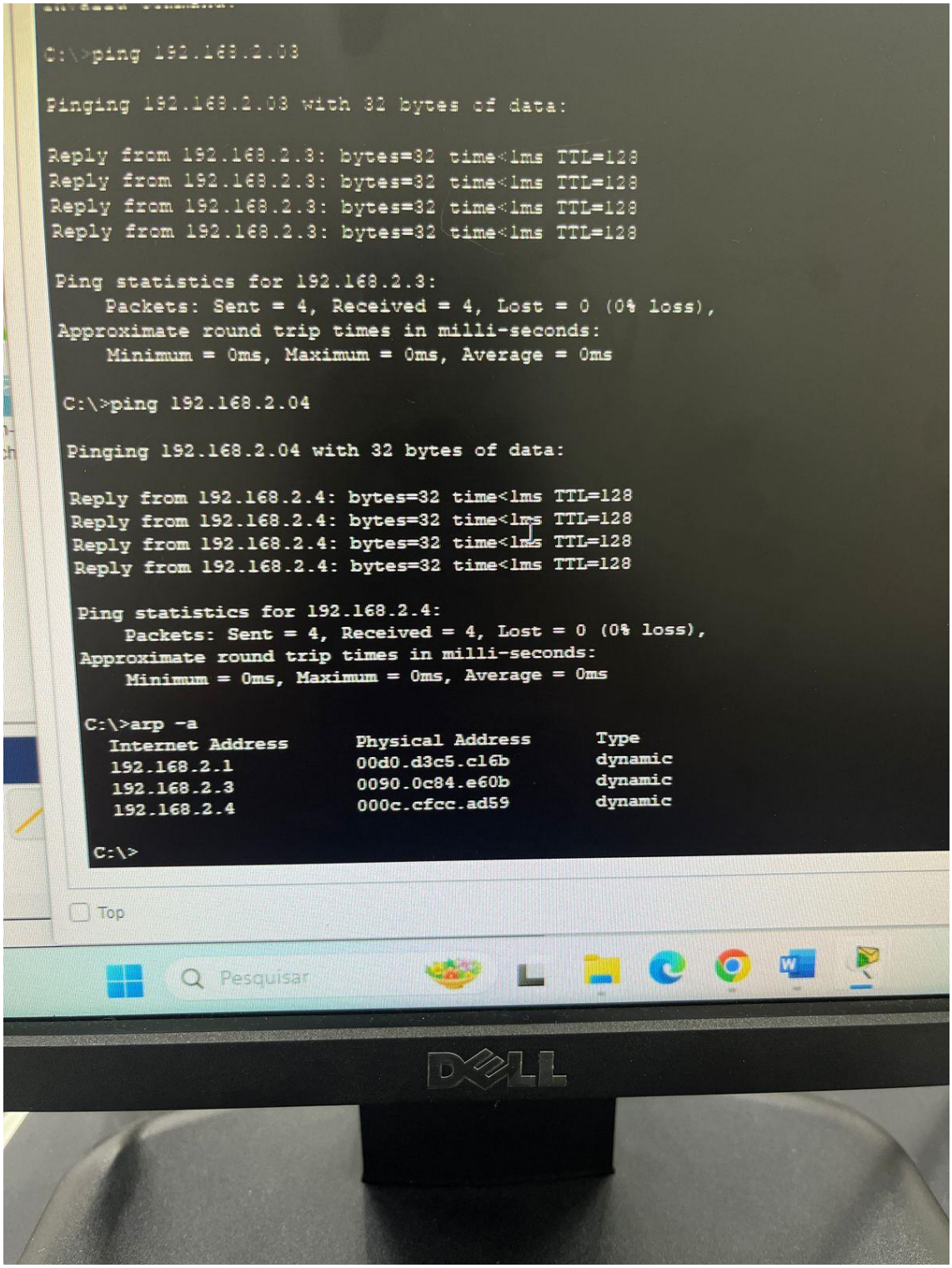

PC6
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
192.168.2.3
Subnet Mask
255.255.255.0
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address
FE80::290:CFF:FE84:E60B
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top
Root
Type
Color
Pesquisar

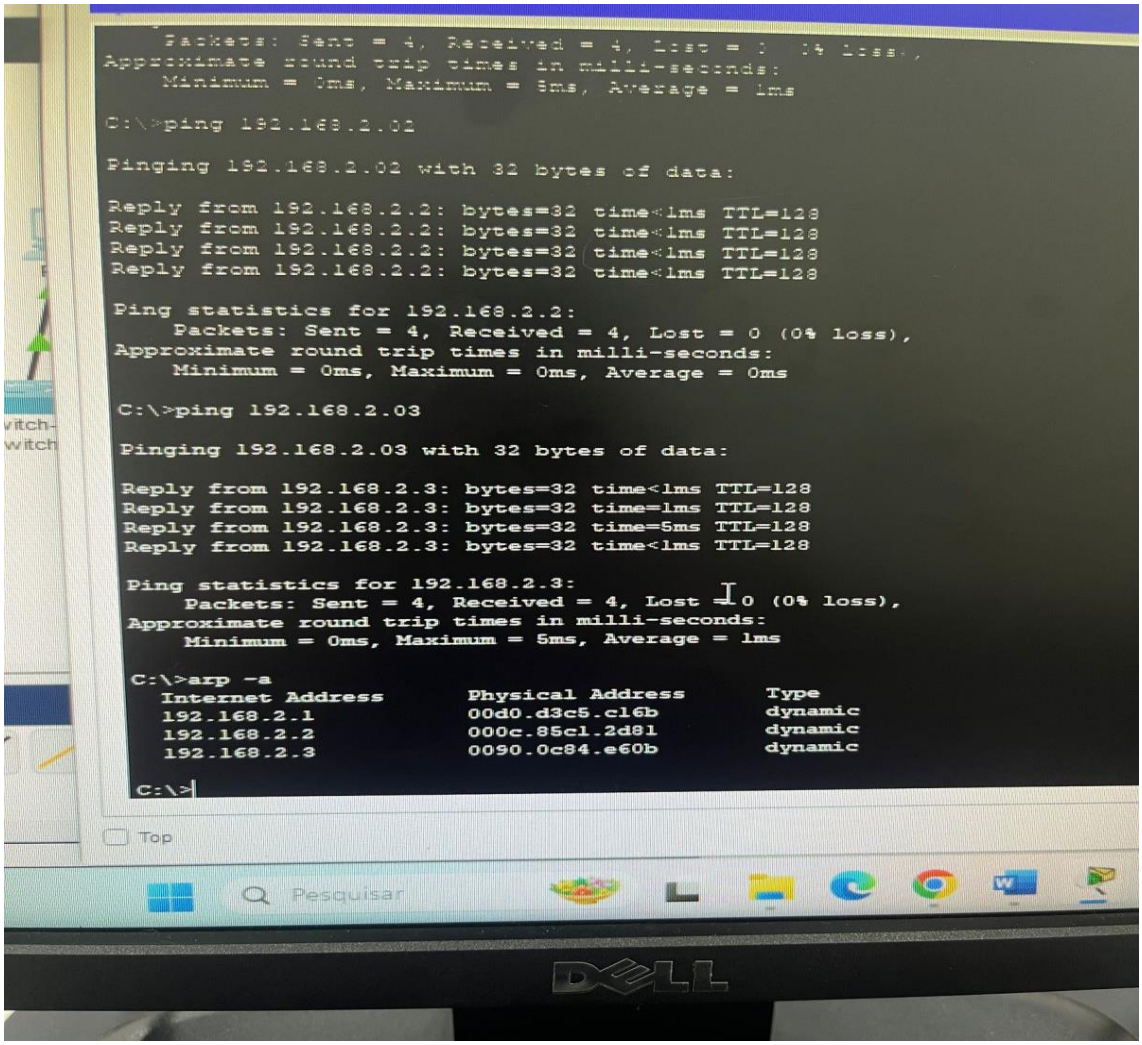

PC5
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
192.168.2.4
Subnet Mask
255.255.255.0
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address
FE80::20C:CFFF:FECC:AD59
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top
Root
Type
Color
Time
Pesquisar


Cisco Packet Tracer
File Edit Options View Tools Extensions Window Help
PC4
Physical Config Desktop Programming Attributes
IP Configuration
Interface FastEthernet0
DHCP
Static
Another device has attempted to use this IP address.
IPv4 Address 192.168.2.1
Subnet Mask 255.255.255.0
Default Gateway 0.0.0.0
DNS Server 0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address FE80::200:D3FF:FEC5:C168
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication MD5
Username
Password
PC7
Physical Config Desktop Programming Attributes
IP Configuration
Interface FastEthernet0
DHCP
Static
This address is already used in the network
IPv4 Address 192.168.2.1
Subnet Mask
Default Gateway 0.0.0.0
DNS Server 0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address FE80::20C:85FF:FEC1:2D81
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication MD5
Username
Password
Pesquisar
20:41
01/04/2025
DELL
intel
CORE


Physical
Config
Desktop
Programming
Attributes
Command Prompt
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 6ms, Average = 1ms
C:\>ping 192.168.2.03
Pinging 192.168.2.03 with 32 bytes of data:
Reply from 192.168.2.3: bytes=32 time<1ms TTL=128
Reply from 192.168.2.3: bytes=32 time<1ms TTL=128
Reply from 192.168.2.3: bytes=32 time<1ms TTL=128
Reply from 192.168.2.3: bytes=32 time=2ms TTL=128
Ping statistics for 192.168.2.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 2ms, Average = 0ms
C:\>ping 192.168.2.04
Pinging 192.168.2.04 with 32 bytes of data:
Reply from 192.168.2.4: bytes=32 time<1ms TTL=128
Reply from 192.168.2.4: bytes=32 time<1ms TTL=128
Reply from 192.168.2.4: bytes=32 time<1ms TTL=128
Reply from 192.168.2.4: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.2.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>arp -a
Internet Address
Physical Address
Type
192.168.2.2
000c.85c1.2d81
dynamic
192.168.2.3
0090.0c84.e60b
dynamic
192.168.2.4
000c.cfcc.ad59
dynamic
C:\>
Top
Switch-
Switch
Pesquisar
DELL


Reply from 192.168.2.2: bytes=32 time<1ms TTL=128
Reply from 192.168.2.2: bytes=32 time<1ms TTL=128
Reply from 192.168.2.2: bytes=32 time<1ms TTL=128
Reply from 192.168.2.2: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.2.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ping 192.168.2.04
Pinging 192.168.2.04 with 32 bytes of data:
Reply from 192.168.2.4: bytes=32 time<1ms TTL=128
Reply from 192.168.2.4: bytes=32 time<1ms TTL=128
Reply from 192.168.2.4: bytes=32 time<1ms TTL=128
Reply from 192.168.2.4: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.2.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>arp -a
Internet Address Physical Address Type
192.168.2.1 00d0.d3c5.c16b dynamic
192.168.2.2 000c.85c1.2d81 dynamic
192.168.2.4 000c.cfcc.ad59 dynamic
C:\>
Top
Pesquisar
DELL


C:\>ping 192.168.2.03
Pinging 192.168.2.03 with 32 bytes of data:
Reply from 192.168.2.3: bytes=32 time<1ms TTL=128
Reply from 192.168.2.3: bytes=32 time<1ms TTL=128
Reply from 192.168.2.3: bytes=32 time<1ms TTL=128
Reply from 192.168.2.3: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.2.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ping 192.168.2.04
Pinging 192.168.2.04 with 32 bytes of data:
Reply from 192.168.2.4: bytes=32 time<1ms TTL=128
Reply from 192.168.2.4: bytes=32 time<1ms TTL=128
Reply from 192.168.2.4: bytes=32 time<1ms TTL=128
Reply from 192.168.2.4: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.2.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>arp -a
Internet Address Physical Address Type
192.168.2.1 00d0.d3c5.c16b dynamic
192.168.2.3 0090.0c84.e60b dynamic
192.168.2.4 000c.cfcc.ad59 dynamic
C:\>
Top
Pesquisar
DELL



Observação das Tabelas ARP e MAC:

A tabela ARP (Address Resolution Protocol), presente em cada dispositivo, contém o mapeamento entre endereços IP e endereços MAC, permitindo a comunicação na rede. Já a tabela MAC, armazenada pelo switch, registra os endereços físicos (MAC) de cada dispositivo e as portas correspondentes.

Durante os testes realizados, foi possível observar que:

A tabela ARP de cada PC foi populada à medida que ocorreram trocas de pacotes na rede.

A tabela MAC do switch armazenou os endereços MAC conforme os dispositivos enviavam dados.

Em condições normais, cada IP estava corretamente vinculado a um único endereço MAC, garantindo a comunicação eficiente entre os PCs.

Impacto da Duplicação de IP:

Quando um dos PCs foi configurado com um endereço IP já utilizado, diversos problemas surgiram:

Conflito de Endereço: Dois dispositivos passaram a responder pelo mesmo IP, causando falhas na comunicação.

Respostas Inconsistentes: O tráfego foi distribuído de forma intermitente entre os dois dispositivos, resultando em perda de pacotes.

Alterações na Tabela ARP: O dispositivo mais recente a enviar pacotes sobrepôs a entrada da tabela ARP, fazendo com que os pacotes fossem enviados ao destino errado em alguns momentos.

Comportamento do Switch:

O switch, operando na Camada 2 (Enlace), não verifica conflitos de IP, mas reage às mudanças nos endereços MAC das portas associadas:

Quando o tráfego chega ao switch, ele atualiza a tabela MAC com o endereço do remetente e a porta correspondente.

Com IP duplicado, dois dispositivos enviavam pacotes usando o mesmo endereço IP, levando o switch a alternar o endereço MAC registrado na tabela MAC, resultando em tráfego instável.

Conclusão:

A análise demonstrou a importância de uma gestão adequada dos endereços IP na rede. A duplicação de IPs causou instabilidades na comunicação e alteração constante nas tabelas ARP e MAC. Para evitar esses problemas, recomenda-se:

Uso de DHCP, para garantir a atribuição automática de endereços IP sem conflitos.

Monitoramento da Rede, para identificar rapidamente problemas como IPs duplicados.

Planejamento de Endereçamento Estático, garantindo que cada dispositivo tenha um IP único e bem documentado.