

UNIVERSIDAD NACIONAL ABIERTA Y A DISTANCIA UNAD

ESCUELA DE CIENCIAS BASICAS, TECNOLOGIA E INGENIERIA

Curso:

DIPLOMADO DE PROFUNDIZACIÓN CISCO

DISEÑO E IMPLEMENTACIÓN DE SOLUCIONES INTEGRADAS LAN / WAN

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28 de mayo de 2018

CONTENIDO

INTRODUCCION..... 4

CONFIGURAR EL DIRECCIONAMIENTO IP ACORDE CON LA TOPOLOGÍA DE RED PARA CADA UNO DE LOS DISPOSITIVOS QUE FORMAN PARTE DEL ESCENARIO 6

R1 6

CONFIGURAR EL PROTOCOLO DE ENRUTAMIENTO OSPFV2 BAJO LOS SIGUIENTES CRITERIOS:..... 6

R1 7

Configuración OSPF V2 7

Configurar todas las interface LAN como pasivas..... 7

Establecer el ancho de banda para enlaces seriales en 128 Kb/s..... 7

Ajustar el costo en la métrica de S0/0 a 7500 7

R2 7

Configuración OSPF V2 7

Ajustar el costo en la métrica de S0/0 a 7500 8

Establecer el ancho de banda para enlaces seriales en 128 Kb/s..... 8

R3 8

Configuración OSPF V2 8

Configurar todas las interface LAN como pasivas..... 8

Ajustar el costo en la métrica de S0/0 a 7500 8

Establecer el ancho de banda para enlaces seriales en 128 Kb/s..... 8

VERIFICAR INFORMACIÓN DE OSPF VISUALIZAR TABLAS DE ENRUTAMIENTO Y ROUTERS CONECTADOS POR OSPFV2..... 9

R1 9

R2 9

R3 9

VISUALIZAR LISTA RESUMIDA DE INTERFACES POR OSPF EN DONDE SE ILUSTRE EL COSTO DE CADA INTERFACE..... 10

R1 10

R2 11

R3 11

VISUALIZAR EL OSPF PROCESS ID, ROUTER ID, ADDRESS SUMMARIZATIONS, ROUTING NETWORKS, AND PASSIVE INTERFACES CONFIGURADAS EN CADA ROUTER..... 12

R1 12

R2 12

R3	13
CONFIGURAR VLANS, PUERTOS TRONCALES, PUERTOS DE ACCESO, ENCAPSULAMIENTO, INTER-VLAN ROUTING Y SEGURIDAD EN LOS SWITCHES ACORDE A LA TOPOLOGÍA DE RED ESTABLECIDA.....	13
SW1	13
IMPLEMENT DHCP AND NAT FOR IPV4 CONFIGURAR R1 COMO SERVIDOR DHCP PARA LAS VLANS 30 Y 40.	20
RESERVAR LAS PRIMERAS 30 DIRECCIONES IP DE LAS VLAN 30 Y 40 PARA CONFIGURACIONES ESTÁTICAS.	22
Configurar DHCP pool para VLAN 30 y 40 para configuraciones estáticas.	22
CONFIGURAR NAT EN R2 PARA PERMITIR QUE LOS HOST PUEDAN SALIR A INTERNET	23
CONFIGURAR AL MENOS DOS LISTAS DE ACCESO DE TIPO ESTÁNDAR A SU CRITERIO EN PARA RESTRINGIR O PERMITIR TRÁFICO DESDE R1 O R3 HACIA R2.....	23
CONFIGURAR AL MENOS DOS LISTAS DE ACCESO DE TIPO EXTENDIDO O NOMBRADAS A SU CRITERIO EN PARA RESTRINGIR O PERMITIR TRÁFICO DESDE R1 O R3 HACIA R2.....	23
VERIFICAR PROCESOS DE COMUNICACIÓN Y REDIRECCIONAMIENTO DE TRÁFICO EN LOS ROUTERS MEDIANTE EL USO DE PING Y TRACEROUTE.....	24
PING	24
TRACERT	27
Todos los equipos se ven a nivel de ping y tracert	30
CONCLUSIONES.....	32
BIBLOGRAFIA.....	32

RESUMEN

En este trabajo se realiza la configuración de una serie de equipos los cuales están instalados en una red de una empresa que tiene sedes en tres diferentes ciudades y es necesario que tengan comunicación entre sus equipos a través de una red, para lo cual es necesario aplicar una serie de instrucciones entregadas en la guía entregada por los instructores de la plataforma y verificar que estén interconectados todos los equipos instalados en la red; realizando pruebas de enrutamiento y verificación de conectividad por medio de ping entre los equipos.

ABSTRACT

In this work the configuration of a series of equipment is realized which are installed in a network of a company that has headquarters in three different cities and it is necessary that they have communication between their equipment through a network, for which it is necessary to apply a series of instructions delivered in the guide delivered by the instructors of the platform and verify that all the equipment installed in the network is interconnected; Conducting routing tests and verification of connectivity by means of ping between the teams.

INTRODUCCION

En el siguiente trabajo se pone en práctica todas las diferentes configuraciones que realizamos a los equipos instalados en diferentes redes, implementando niveles de seguridad y enrutamiento de acuerdo a los requerimientos de las guías entregadas dentro de la plataforma del diplomado y en la academia CISCO.

1. CONFIGURAR EL DIRECCIONAMIENTO IP ACORDE CON LA TOPOLOGÍA DE RED PARA CADA UNO DE LOS DISPOSITIVOS QUE FORMAN PARTE DEL ESCENARIO

R1

```
interface GigabitEthernet0/0
ip address 192.168.99.1 255.255.255.0
duplex auto
speed auto
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
shutdown
!
interface Serial0/0/0
ip address 172.31.21.2 255.255.255.252
clock rate 2000000
!
```

2. CONFIGURAR EL PROTOCOLO DE ENRUTAMIENTO OSPFV2 BAJO LOS SIGUIENTES CRITERIOS:

OSPFv2 area 0

Configuration Item or Task	Specification
Router ID R1	1.1.1.1
Router ID R2	2.2.2.2
Router ID R3	3.3.3.3
Configurar todas las interfaces LAN como pasivas	
Establecer el ancho de banda para enlaces seriales en	128 Kb/s
Ajustar el costo en la métrica de S0/0 a	7500

R1

Configuración OSPF V2

Configurar todas las interface LAN como pasivas.

```
R1(config-router)#router ospf 1
R1(config-router)#router-id 1.1.1.1
R1(config-router)#network 172.31.21.0 0.0.0.3 area 0
R1(config-router)#network 192.168.30.0 0.0.0.255 area 0
R1(config-router)#network 192.168.40.0 0.0.0.255 area 0
R1(config-router)#network 192.168.99.0 0.0.0.255 area 0
R1(config-router)#passive-interface default
R1(config-router)#no passive-interface s0/0/0
R1(config-router)#auto-cost
R1(config-router)#auto-cost reference-bandwidth 1000
% OSPF: Reference bandwidth is changed.
Please ensure reference bandwidth is consistent across
all routers.
R1(config-router)#
R1(config-router)#int s0/0/0
R1(config-if)#bandwidth 128
R1(config-if)#ip ospf cost 7500
```

Establecer el ancho de banda para enlaces seriales en 128 Kb/s

```
R1(config-router)#int s0/0/0
R1(config-if)#bandwidth 128
```

Ajustar el costo en la métrica de S0/0 a 7500

```
R1(config-if)#ip ospf cost 7500
```

R2

Configuración OSPF V2

```
R2(config-router)#router ospf 1
R2(config-router)#router-id 2.2.2.2
R2(config-router)#network 10.10.10.10 0.0.0.7 area 0
R2(config-router)#network 172.31.21.0 0.0.0.3 area 0
R2(config-router)#network 172.31.23.0 0.0.0.3 area 0
R2(config-router)#no passive-interface g0/0
R2(config-router)#auto-cost reference-bandwidth 1000
```


Ajustar el costo en la métrica de S0/0 a 7500

```
R2(config-if)#ip ospf cost 7500
R2(config-if)#
```

Establecer el ancho de banda para enlaces seriales en 128 Kb/s

```
R2(config-if)#int s0/0/0
R2(config-if)#bandwidth 128
R2(config-if)#int s0/0/1
R2(config-if)#bandwidth 128
```

R3

Configuración OSPF V2

```
R3(config)#router ospf 1
R3(config-router)#router-id 3.3.3.3
R3(config-router)#network 172.31.23.0 0.0.0.3 area 0
R3(config-router)#network 192.168.4.0 0.0.0.255 area 0
R3(config-router)#network 192.168.5.0 0.0.0.255 area 0
R3(config-router)#network 192.168.6.0 0.0.0.255 area 0
```

Configurar todas las interface LAN como pasivas.

```
R3(config-router)#passive-interface loopback 4
R3(config-router)#passive-interface loopback 5
R3(config-router)#passive-interface loopback 6
```

Ajustar el costo en la métrica de S0/0 a 7500

```
R3(config-if)#ip ospf cost 7500
```

Establecer el ancho de banda para enlaces seriales en 128 Kb/s

```
R3(config-router)#int s0/0/1
R3(config-if)#bandwidth 128
```


3. VERIFICAR INFORMACIÓN DE OSPF VISUALIZAR TABLAS DE ENRUTAMIENTO Y ROUTERS CONECTADOS POR OSPFV2

R1

```
R1#sh ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address
Interface				
2.2.2.2	0	FULL/ -	00:00:34	172.31.21.2
Serial0/0/0				

R2

```
R2#sh ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address
Interface				
1.1.1.1	0	FULL/ -	00:00:38	172.31.21.1
Serial0/0/1				
3.3.3.3	0	FULL/ -	00:00:32	172.31.23.2
Serial0/0/0				

R3

```
R3#sh ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address
Interface				
2.2.2.2	0	FULL/ -	00:00:37	172.31.23.1
Serial0/0/1				

4. VISUALIZAR LISTA RESUMIDA DE INTERFACES POR OSPF EN DONDE SE ILUSTRE EL COSTO DE CADA INTERFACE

R1

```
R1#sh ip ospf interface

GigabitEthernet0/0.30 is up, line protocol is up
  Internet address is 192.168.30.1/24, Area 0
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost:
  1
  Transmit Delay is 1 sec, State WAITING, Priority 1
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40,
  Retransmit 5
  No Hellos (Passive interface)
  Index 1/1, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
GigabitEthernet0/0.40 is up, line protocol is up
  Internet address is 192.168.40.1/24, Area 0
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost:
  1
  Transmit Delay is 1 sec, State WAITING, Priority 1
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40,
  Retransmit 5
  No Hellos (Passive interface)
  Index 2/2, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 0, Adjacent neighbor count is 0
  Suppress hello for 0 neighbor(s)
GigabitEthernet0/0.99 is up, line protocol is up
  Internet address is 192.168.99.1/24, Area 0
  Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost:

Serial0/0/0 is up, line protocol is up
  Internet address is 172.31.21.1/30, Area 0
  Process ID 1, Router ID 1.1.1.1, Network Type POINT-TO-POINT,
  Cost: 7500
```

R2

```
R2#sh ip ospf interface

Loopback0 is up, line protocol is up
  Internet address is 10.10.10.10/32, Area 0
  Process ID 1, Router ID 2.2.2.2, Network Type LOOPBACK, Cost: 0
  Loopback interface is treated as a stub Host
Serial0/0/0 is up, line protocol is up
  Internet address is 172.31.23.1/30, Area 0
  Process ID 1, Router ID 2.2.2.2, Network Type POINT-TO-POINT,
Cost: 7500
  Transmit Delay is 1 sec, State POINT-TO-POINT, Priority 0
  No designated router on this network
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40,
Retransmit 5
  Hello due in 00:00:07
  Index 2/2, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 1, maximum is 1
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1 , Adjacent neighbor count is 1
    Adjacent with neighbor 3.3.3.3
  Suppress hello for 0 neighbor(s)
Serial0/0/1 is up, line protocol is up
  Internet address is 172.31.21.2/30, Area 0
  Process ID 1, Router ID 2.2.2.2, Network Type POINT-TO-POINT,
```

R3

```
R3#sh ip ospf interface

Serial0/0/1 is up, line protocol is up
  Internet address is 172.31.23.2/30, Area 0
  Process ID 1, Router ID 3.3.3.3, Network Type POINT-TO-POINT,
Cost: 7500
```


VISUALIZAR EL OSPF PROCESS ID, ROUTER ID, ADDRESS SUMMARIZATIONS, ROUTING NETWORKS, AND PASSIVE INTERFACES CONFIGURADAS EN CADA ROUTER.

R1

```

R1#sh ip protocols

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 1.1.1.1
  ...

R1>ena
R1#show ip route ospf 1
  10.0.0.0/32 is subnetted, 1 subnets
  O   10.10.10.10 [110/7500] via 172.31.21.2, 00:35:02,
  Serial0/0/0
  172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks
  O   172.31.23.0 [110/15000] via 172.31.21.2, 00:35:02,
  Serial0/0/0
  192.168.4.0/32 is subnetted, 1 subnets
  O   192.168.4.1 [110/15000] via 172.31.21.2, 00:35:02,
  Serial0/0/0
  192.168.5.0/32 is subnetted, 1 subnets
  O   192.168.5.1 [110/15000] via 172.31.21.2, 00:35:02,
  Serial0/0/0
  192.168.6.0/32 is subnetted, 1 subnets
  O   192.168.6.1 [110/15000] via 172.31.21.2, 00:35:02,
  Serial0/0/0
  
```

R2

```

R2#sh ip protocols

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 2.2.2.2
  ...

R2>ena
R2#show ip route ospf 1
  192.168.4.0/32 is subnetted, 1 subnets
  O   192.168.4.1 [110/7500] via 172.31.23.2, 00:43:16,
  Serial0/0/0
  192.168.5.0/32 is subnetted, 1 subnets
  O   192.168.5.1 [110/7500] via 172.31.23.2, 00:43:16,
  Serial0/0/0
  192.168.6.0/32 is subnetted, 1 subnets
  O   192.168.6.1 [110/7500] via 172.31.23.2, 00:43:16,
  Serial0/0/0
  O   192.168.30.0 [110/648] via 172.31.21.1, 00:37:49,
  Serial0/0/1
  O   192.168.40.0 [110/648] via 172.31.21.1, 00:37:49,
  Serial0/0/1
  O   192.168.99.0 [110/648] via 172.31.21.1, 00:37:49,
  Serial0/0/1
  
```

R3

```
R3#sh ip protocols
```

```
Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 3.3.3.3
```

```
R3>ena
```

```
R3#show ip route ospf 1
  10.0.0.0/32 is subnetted, 1 subnets
  O   10.10.10.10 [110/7500] via 172.31.23.1, 00:44:02,
Serial0/0/1
  172.31.0.0/16 is variably subnetted, 3 subnets, 2 masks
  O   172.31.21.0 [110/8147] via 172.31.23.1, 00:38:30,
Serial0/0/1
  O   192.168.30.0 [110/8148] via 172.31.23.1, 00:38:30,
Serial0/0/1
  O   192.168.40.0 [110/8148] via 172.31.23.1, 00:38:30,
Serial0/0/1
  O   192.168.99.0 [110/8148] via 172.31.23.1, 00:38:30,
Serial0/0/1
```

5. CONFIGURAR VLANS, PUERTOS TRONCALES, PUERTOS DE ACCESO, ENCAPSULAMIENTO, INTER-VLAN ROUTING Y SEGURIDAD EN LOS SWITCHES ACORDE A LA TOPOLOGÍA DE RED ESTABLECIDA.

SW1

```
Switch1#sh run
```

```
Building configuration...
```

```
Current configuration : 2394 bytes
```

```
!
```

```
version 12.2
```

```
no service timestamps log datetime msec
```

```
no service timestamps debug datetime msec
```

```
service password-encryption
```

```
!
```

```
hostname Switch1
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
spanning-tree mode pvst
```

```
spanning-tree extend system-id
```

```
!
```

```
interface FastEthernet0/1
```

```
switchport access vlan 40
```

```
switchport mode trunk
```

```

!
interface FastEthernet0/2
switchport mode access
shutdown
!
interface FastEthernet0/3
switchport access vlan 40
switchport mode trunk
!
interface FastEthernet0/4
switchport mode access
shutdown
!
interface FastEthernet0/5
switchport mode access
shutdown
!
interface FastEthernet0/6
switchport mode access
shutdown
!
interface FastEthernet0/7
switchport mode access
shutdown
!
interface FastEthernet0/8
switchport mode access
shutdown
!
interface FastEthernet0/9
switchport mode access
shutdown
!
interface FastEthernet0/10
switchport mode access
shutdown
!
interface FastEthernet0/11
switchport mode access
shutdown
!
interface FastEthernet0/12
switchport mode access
shutdown
!
interface FastEthernet0/13
switchport mode access

```

```

shutdown
!
interface FastEthernet0/14
switchport mode access
shutdown
!
interface FastEthernet0/15
switchport mode access
shutdown
!
interface FastEthernet0/16
switchport mode access
shutdown
!
interface FastEthernet0/17
switchport mode access
shutdown
!
interface FastEthernet0/18
switchport mode access
shutdown
!
interface FastEthernet0/19
switchport mode access
shutdown
!
interface FastEthernet0/20
switchport mode access
shutdown
!
interface FastEthernet0/21
switchport mode access
shutdown
!
interface FastEthernet0/22
switchport mode access
shutdown
!
interface FastEthernet0/23
switchport mode access
shutdown
!
interface FastEthernet0/24
switchport access vlan 99
switchport mode trunk
!
interface GigabitEthernet0/1

```



```

switchport mode access
shutdown
!
interface GigabitEthernet0/2
switchport mode access

hutdown
!
interface Vlan1
ip address 192.168.99.2 255.255.255.0
!
interface Vlan30
mac-address 0030.a37c.e601
ip address 192.168.30.2 255.255.255.0
!
interface Vlan40
mac-address 0030.a37c.e602
ip address 192.168.40.2 255.255.255.0
!
interface Vlan99
mac-address 0030.a37c.e603
ip address 192.168.99.2 255.255.255.0
!
ip default-gateway 192.168.21.1
!
!
!
!
line con 0
password 7 0822455D0A16
login
!
line vty 0 4
password 7 0822455D0A16
login
line vty 5 15
password 7 0822455D0A16
login
!
!

witch1#
Switch1#

```

SW3

```

Switch3#sh run
Building configuration...

Current configuration : 2132 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname Switch3
!
!
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
switchport access vlan 40
switchport mode access
!
interface FastEthernet0/2
switchport mode access
shutdown
!
interface FastEthernet0/3
switchport mode trunk
!
interface FastEthernet0/4
switchport mode access

```

```

shutdown
!
interface FastEthernet0/5
switchport mode access
shutdown
!
interface FastEthernet0/6
switchport mode access
shutdown
!
interface FastEthernet0/7
switchport mode access
shutdown
!
interface FastEthernet0/8
switchport mode access
shutdown
!
interface FastEthernet0/9
switchport mode access
shutdown
!
interface FastEthernet0/10
switchport mode access
shutdown
!
interface FastEthernet0/11
switchport mode access
shutdown
!
interface FastEthernet0/12
switchport mode access
shutdown
!
interface FastEthernet0/13
switchport mode access
shutdown
!
interface FastEthernet0/14
switchport mode access
shutdown
!

```

```
interface FastEthernet0/15
switchport mode access
shutdown
!
interface FastEthernet0/16

switchport mode access
shutdown
!
interface FastEthernet0/17
switchport mode access
shutdown
!
interface FastEthernet0/18
switchport mode access
shutdown
!
interface FastEthernet0/19
switchport mode access
shutdown
!
interface FastEthernet0/20
switchport mode access
shutdown
!
interface FastEthernet0/21
switchport mode access
shutdown
!
interface FastEthernet0/22
switchport mode access
shutdown
!
interface FastEthernet0/23
switchport mode access
shutdown
!
interface FastEthernet0/24
switchport mode access
shutdown
!
interface GigabitEthernet0/1
switchport mode access
shutdown
```

```

!
interface GigabitEthernet0/2
switchport mode access
shutdown
!
interface Vlan1
no ip address
shutdown
!
interface Vlan99
mac-address 00d0.5831.5c01
ip address 192.168.99.3 255.255.255.0
!
!
!
!
line con 0
password 7 0822455D0A16
login
!
line vty 0 4
password 7 0822455D0A16
login
line vty 5 15
password 7 0822455D0A16
login
!
!
!
end

```

Switch3#

```

Switch3(config)#hostname Switch3
Switch3(config)#line console 0
Switch3(config-line)#password cisco
Switch3(config-line)#login
Switch3(config-line)#exit
Switch3(config)#line vty 0 15
Switch3(config-line)#password cisco
Switch3(config-line)#login
Switch3(config-line)#service password-encrypt

```

4. En el Switch 3 des-habilitar DNS lookup

```
Switch3# conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch3(config)#No ip domain lookup
Switch3(config)#
```

5. Asignar direcciones IP a los Switches acorde a los lineamientos. SW1

```
interface Vlan99
  mac-address 0030.a37c.e603
  ip address 192.168.99.2 255.255.255.0
```

SW2

```
interface Vlan99
  mac-address 00d0.5831.5c01
  ip address 192.168.99.3 255.255.255.0
!
```

6. Desactivar todas las interfaces que no sean utilizadas en el esquema de red.

SW1

```
Switch1(config-if-range)#interface range f 0/2, f 0/4-23, g 0/1-2
Switch1(config-if-range)#switchport mode access
Switch1(config-if-range)#shutdown
Switch1(config-if-range)#
```

SW3

```
interface range f 0/4-23, g 0/1-2
Switch3(config-if-range)#sh
```

7. Implement DHCP and NAT for IPv4

```
R2(config)#ip nat inside source static 10.10.10.10 209.165.200.229
```

8. Configurar R1 como servidor DHCP para las VLANs 30 y 40.


```
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.31
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.31
```

9.Reservar las primeras 30 direcciones IP de las VLAN 30 y 40 para configuraciones estáticas.

```
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.31
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.31
```

IMPLEMENTAR DHCP AND NAT FOR IPV4

```
R2(config)#ip nat inside source static 10.10.10.10 209.165.200.229
```

CONFIGURAR R1 COMO SERVIDOR DHCP PARA LAS VLANS 30 Y 40.

```
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.31
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.31
```

RESERVAR LAS PRIMERAS 30 DIRECCIONES IP DE LAS VLAN 30 Y 40 PARA CONFIGURACIONES ESTÁTICAS

```
R1(config)#ip dhcp excluded-address 192.168.30.1 192.168.30.31
R1(config)#ip dhcp excluded-address 192.168.40.1 192.168.40.31
```

CONFIGURAR DHCP POOL PARA VLAN 30 Y 40 PARA CONFIGURACIONES ESTÁTICAS

Configurar DHCP pool para VLAN 30	Name: ADMINISTRACION DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com Establecer default gateway.
Configurar DHCP pool para VLAN 40	Name: MERCADEO DNS-Server: 10.10.10.11 Domain-Name: ccna-unad.com Establecer default gateway.

```
R1(dhcp-config)#
R1(dhcp-config)#ip dhcp pool ADMINISTRACION
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#default-router 192.168.30.1
R1(dhcp-config)#ip domain-name ccna-unad.com
R1(config)#
R1(config)#ip dhcp pool MERCADEO
R1(dhcp-config)#dns-server 10.10.10.11
R1(dhcp-config)#default-router 192.168.40.1
R1(dhcp-config)#ip domain-name ccna-unad.com
R1(config)#
```


CONFIGURAR NAT EN R2 PARA PERMITIR QUE LOS HOST PUEDAN SALIR A INTERNET

```
R2(config)#ip nat inside source static 10.10.10.10 209.165.200.229
```

CONFIGURAR AL MENOS DOS LISTAS DE ACCESO DE TIPO ESTÁNDAR A SU CRITERIO EN PARA RESTRINGIR O PERMITIR TRÁFICO DESDE R1 O R3 HACIA R2.

```
(config)#access-list 101 permit tcp any host 209.165.200.229 eq www  
(config)#access-list 101 permit icmp any any
```

CONFIGURAR AL MENOS DOS LISTAS DE ACCESO DE TIPO EXTENDIDO O NOMBRADAS A SU CRITERIO EN PARA RESTRINGIR O PERMITIR TRÁFICO DESDE R1 O R3 HACIA R2.

```
Extended IP access list 101  
 10 permit tcp any host 209.165.200.229 eq www  
 20 permit icmp any any  
Standard IP access list ADMIN-MANTEN  
 10 permit 172.16.12.0 0.0.0.3
```

VERIFICAR PROCESOS DE COMUNICACIÓN Y REDIRECCIONAMIENTO DE TRÁFICO EN LOS ROUTERS MEDIANTE EL USO DE PING Y TRACERROUTE.

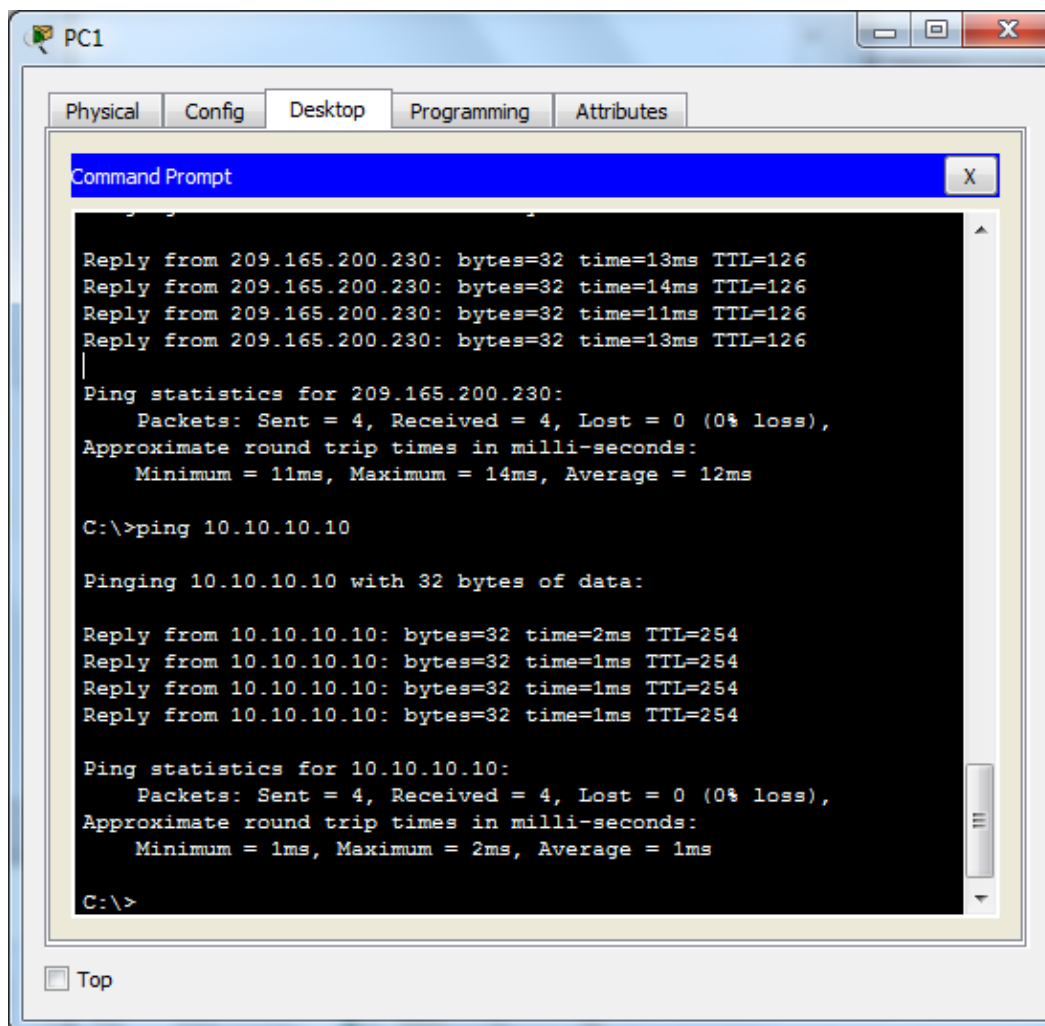
PING

```
BOGOTA(config-std-nacl)#do ping 172.31.21.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.21.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/15/75 ms

BOGOTA(config-std-nacl)#do ping 172.31.23.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.31.23.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/6/24 ms
```



The screenshot shows a Windows desktop environment with a taskbar at the top. A window titled 'PC2' is open, containing a 'Command Prompt' window. The Command Prompt displays the following text:

```

Packet Tracer PC Command Line 1.0
C:\>ipconfig

FastEthernet0 Connection: (default port)

    Link-local IPv6 Address . . . . . : FE80::202:17FF:FEA2:D379
    IP Address. . . . . : 192.168.40.32
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.40.1

C:\>ping 192.168.30.32

Pinging 192.168.30.32 with 32 bytes of data:

Reply from 192.168.30.32: bytes=32 time=17ms TTL=127
Reply from 192.168.30.32: bytes=32 time<1ms TTL=127
Reply from 192.168.30.32: bytes=32 time<1ms TTL=127
Reply from 192.168.30.32: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.30.32:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 17ms, Average = 4ms

C:\>
  
```

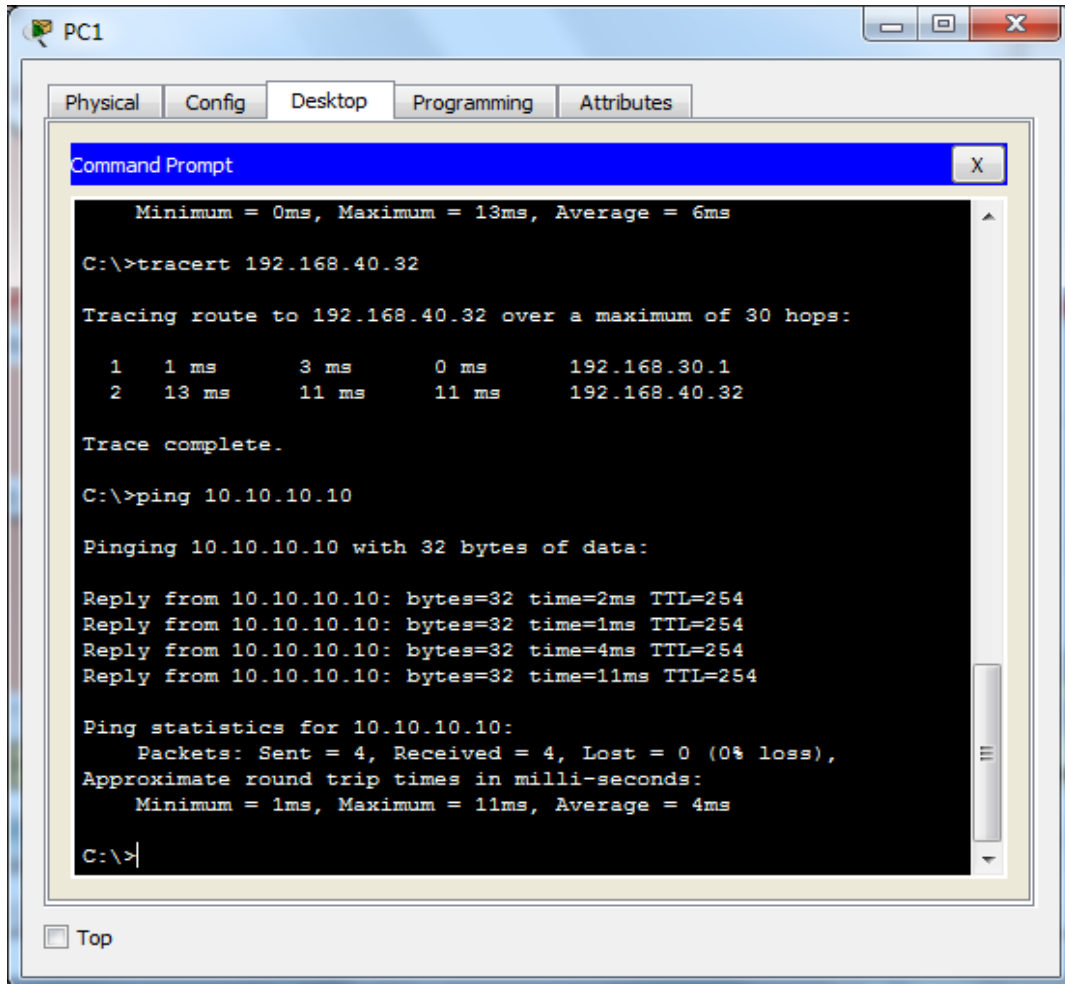
At the bottom of the Command Prompt window, there is a 'Top' button.

```

BOGOTA>ena
BOGOTA#ping 209.165.200.230

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.165.200.230, timeout is 2
seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/1
ms

BOGOTA#
  
```



The screenshot shows a Windows desktop environment for PC1. The desktop has tabs for Physical, Config, Desktop, Programming, and Attributes. A Command Prompt window is open, displaying the results of a traceroute and a ping command.

```
Minimum = 0ms, Maximum = 13ms, Average = 6ms

C:\>tracert 192.168.40.32

Tracing route to 192.168.40.32 over a maximum of 30 hops:

  0  0 ms    0 ms    0 ms    192.168.30.1
  1  1 ms    3 ms    0 ms    192.168.30.1
  2  13 ms   11 ms   11 ms   192.168.40.32

Trace complete.

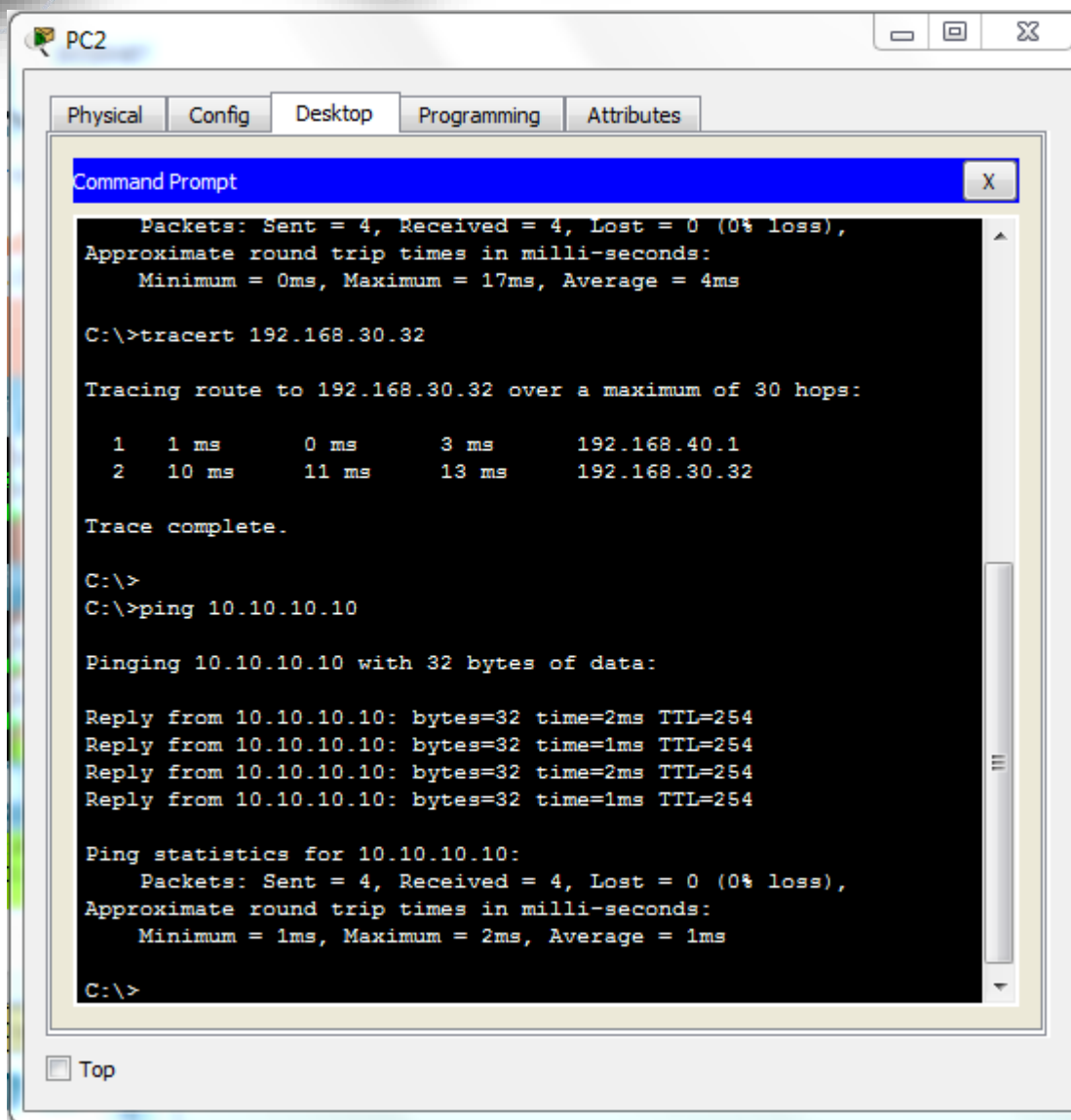
C:\>ping 10.10.10.10

Pinging 10.10.10.10 with 32 bytes of data:

Reply from 10.10.10.10: bytes=32 time=2ms TTL=254
Reply from 10.10.10.10: bytes=32 time=1ms TTL=254
Reply from 10.10.10.10: bytes=32 time=4ms TTL=254
Reply from 10.10.10.10: bytes=32 time=11ms TTL=254

Ping statistics for 10.10.10.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 11ms, Average = 4ms

C:\>
```



PC2

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 = 17ms, Average = 4ms

C:\>tracert 192.168.30.32

Tracing route to 192.168.30.32 over a maximum of 30 hops:

  0  0 ms    0 ms    0 ms    192.168.40.1
  1  1 ms    0 ms    3 ms    192.168.40.1
  2 10 ms   11 ms   13 ms    192.168.30.32

Trace complete.

C:\>
C:\>ping 10.10.10.10

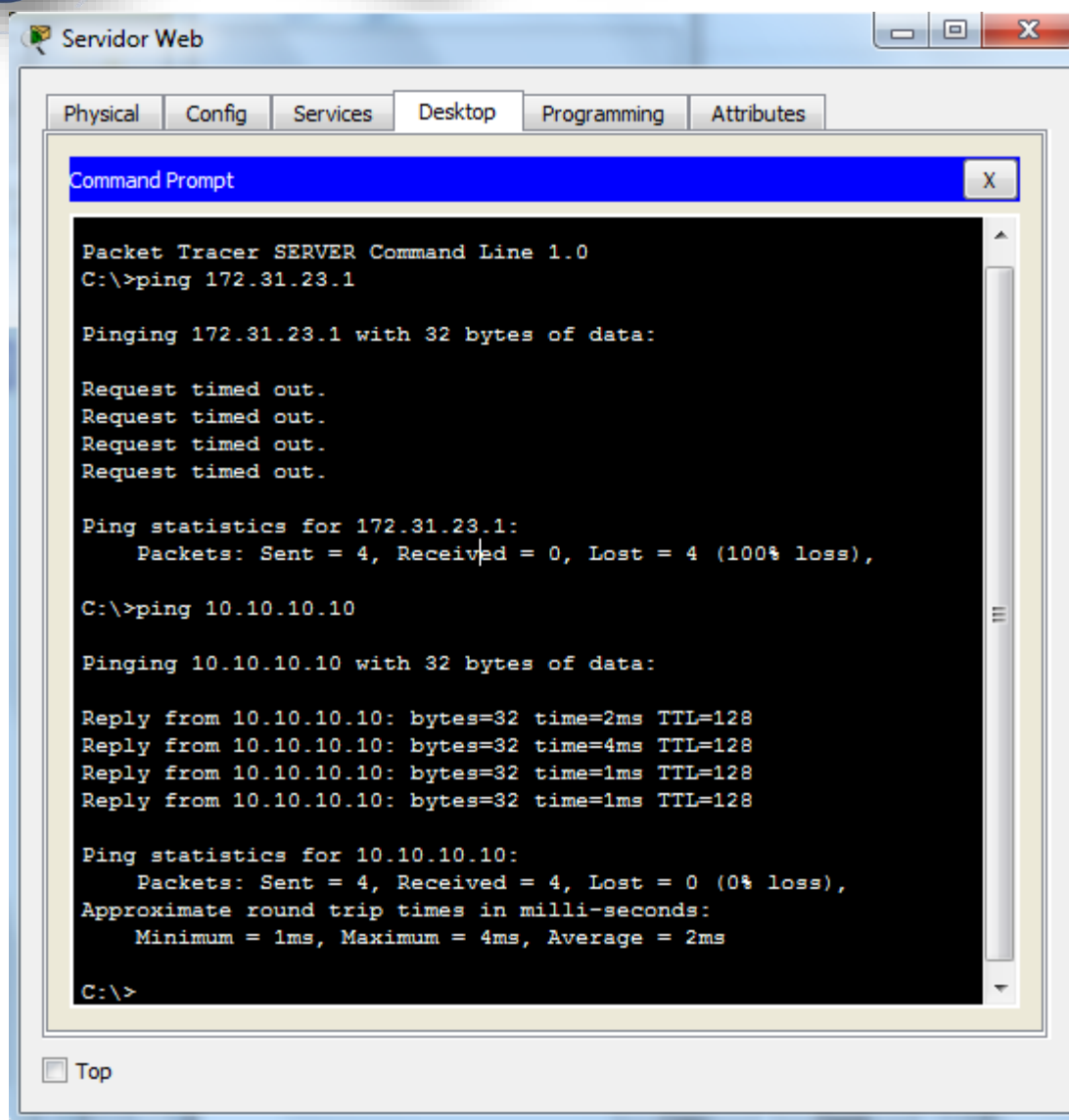
Pinging 10.10.10.10 with 32 bytes of data:

Reply from 10.10.10.10: bytes=32 time=2ms TTL=254
Reply from 10.10.10.10: bytes=32 time=1ms TTL=254
Reply from 10.10.10.10: bytes=32 time=2ms TTL=254
Reply from 10.10.10.10: bytes=32 time=1ms TTL=254

Ping statistics for 10.10.10.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
      Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\>
```

Top



```
BOGOTA#
BOGOTA#ping 209.165.200.230

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.165.200.230, timeout is 2
seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/3
ms
```

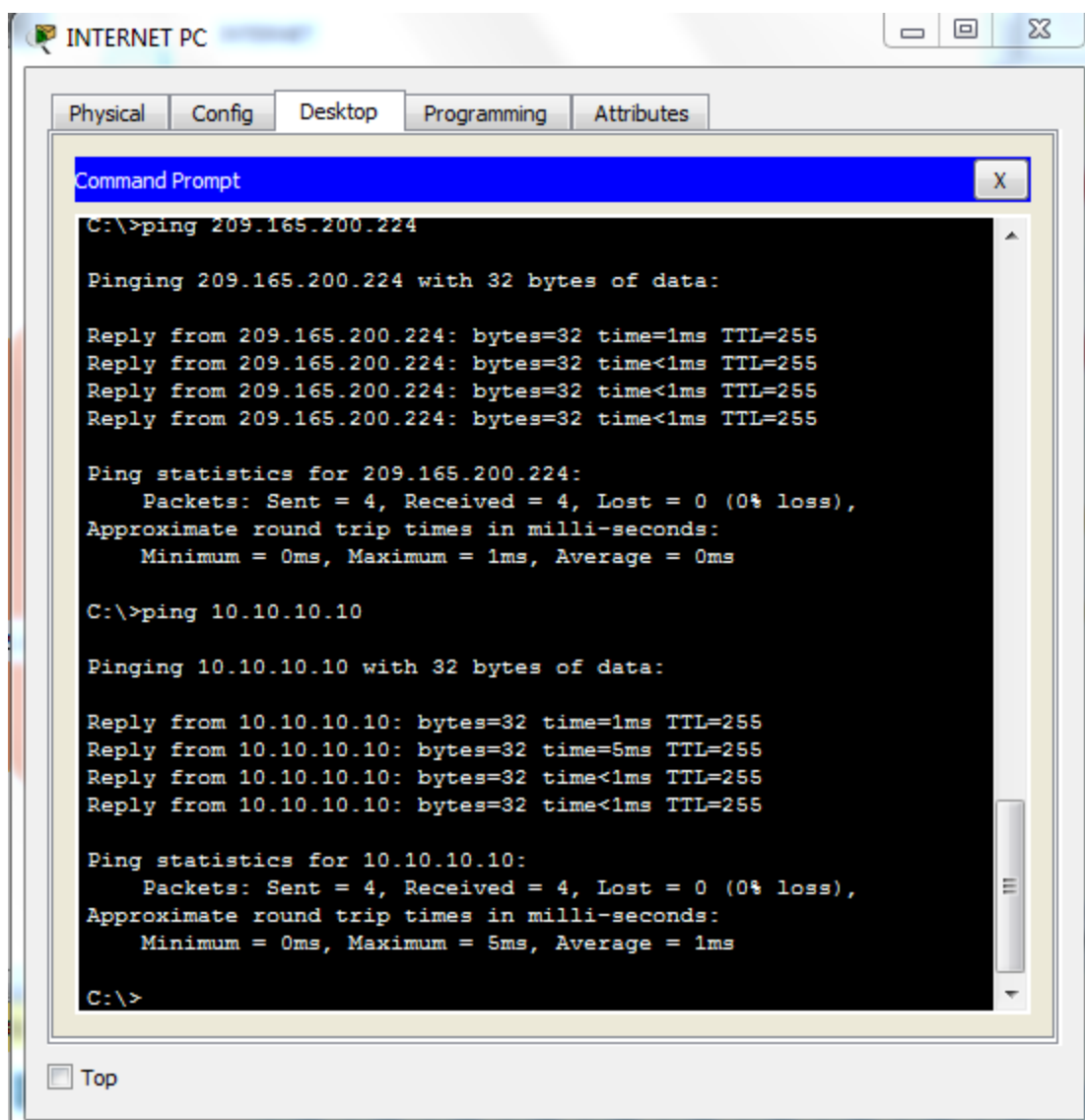


```
C:\>ping 209.165.200.224

Pinging 209.165.200.224 with 32 bytes of data:

Reply from 209.165.200.224: bytes=32 time=1ms TTL=255
Reply from 209.165.200.224: bytes=32 time<1ms TTL=255
Reply from 209.165.200.224: bytes=32 time<1ms TTL=255
Reply from 209.165.200.224: bytes=32 time<1ms TTL=255

Ping statistics for 209.165.200.224:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```




```

PC1
Physical Config Desktop Programming Attributes
Command Prompt
Reply from 209.165.200.230: bytes=32 time=13ms TTL=126
Reply from 209.165.200.230: bytes=32 time=14ms TTL=126
Reply from 209.165.200.230: bytes=32 time=11ms TTL=126
Reply from 209.165.200.230: bytes=32 time=13ms TTL=126
Ping statistics for 209.165.200.230:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 11ms, Maximum = 14ms, Average = 12ms
C:\>ping 10.10.10.10
Pinging 10.10.10.10 with 32 bytes of data:
Reply from 10.10.10.10: bytes=32 time=2ms TTL=254
Reply from 10.10.10.10: bytes=32 time=1ms TTL=254
Reply from 10.10.10.10: bytes=32 time=1ms TTL=254
Reply from 10.10.10.10: bytes=32 time=1ms TTL=254
Ping statistics for 10.10.10.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms
C:\>
  
```

TRACERT

```

C:\>tracert 192.168.30.32
Tracing route to 192.168.30.32 over a maximum of 30 hops:
  0  0 ms  0 ms  0 ms  192.168.30.1
  1  1 ms  0 ms  3 ms  192.168.40.1
  2  10 ms  11 ms  13 ms  192.168.30.32
Trace complete.
  
```

```

C:\>tracert 192.168.40.32
Tracing route to 192.168.40.32 over a maximum of 30 hops:
  0  0 ms  0 ms  0 ms  192.168.30.1
  1  1 ms  3 ms  0 ms  192.168.30.1
  2  13 ms  11 ms  11 ms  192.168.40.32
Trace complete.
  
```

```

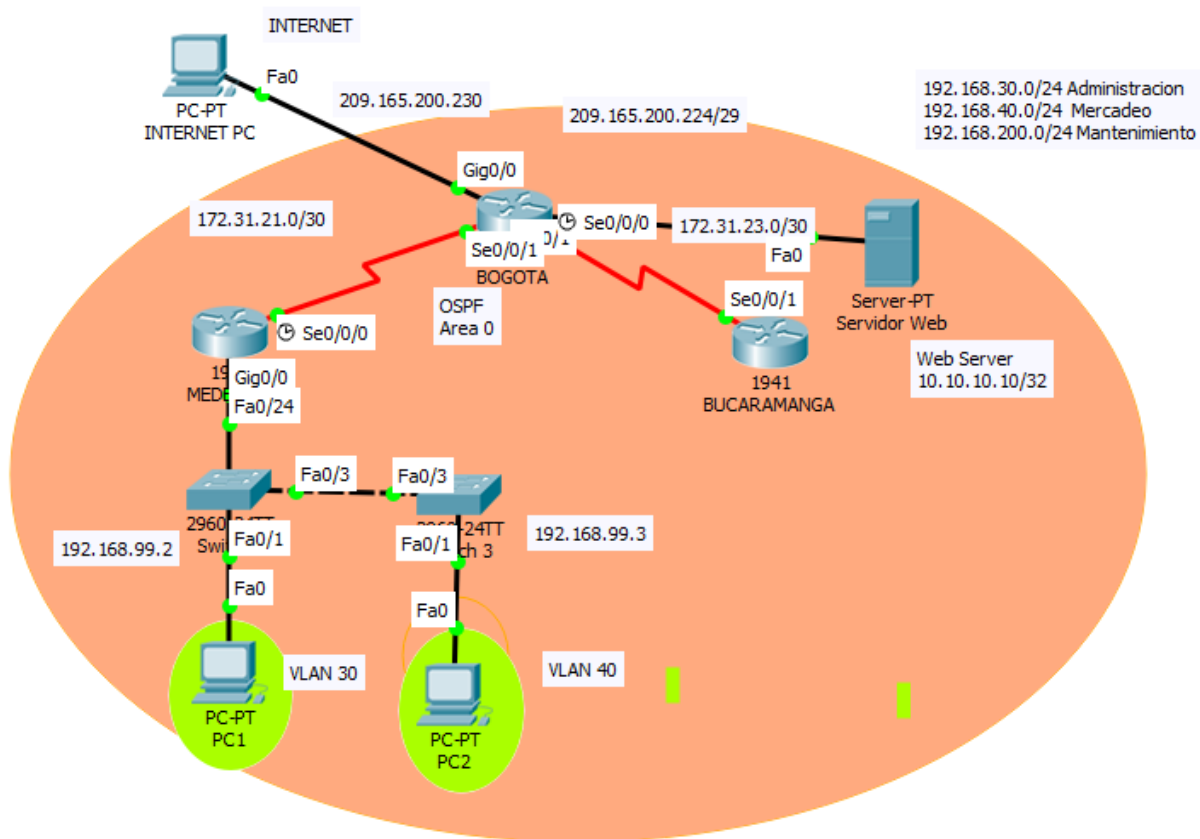
BOGOTA(config-std-nacl)#do traceroute 172.31.23.1
Type escape sequence to abort.
Tracing the route to 172.31.23.1

 1  172.31.23.2      2 msec    0 msec    0 msec
 2  172.31.23.1      3 msec    1 msec    2 msec
BOGOTA(config-std-nacl)#do traceroute 172.31.21.1
Type escape sequence to abort.
Tracing the route to 172.31.21.1

 1  172.31.21.1     22 msec   0 msec    1 msec
BOGOTA(config-std-nacl)#

```

Todos los equipos se ven a nivel de ping y tracert



CONCLUSIONES

Con la realización de este trabajo se puso en práctica todas las posibles configuraciones para lograr la comunicación de gran cantidad y variedad de equipos dentro de una red, permitiendo que una empresa o cualquier entidad pueda estar enlazada desde cualquier parte del mundo y pueda revisar cualquiera de sus procesos por medio de instrucciones de programación y dar seguridad a cada uno de los procesos.

BIBLOGRAFIA

<https://www.netacad.com/>

<https://www.unad.edu.co>