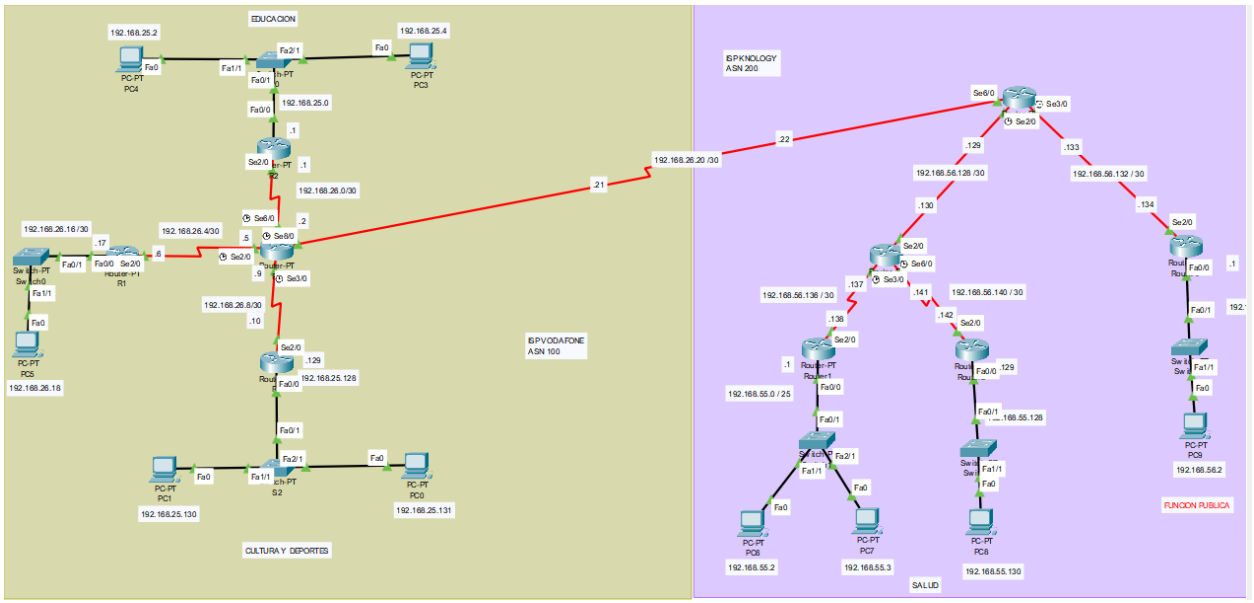
Universidad San Carlos de Guatemala
Facultad de Ingeniería
Escuela de Ciencias y Sistemas
Grupo No. 5

Práctica 2

Manual Técnico

Integrante	Carnet
Josué Alfredo González Caal	201602489
Romael Isaac Pérez Godínez	201213545
Melyza Alejandra Rodríguez Contreras	201314821
Jimmy Yorbany Noriega Chávez	200915691

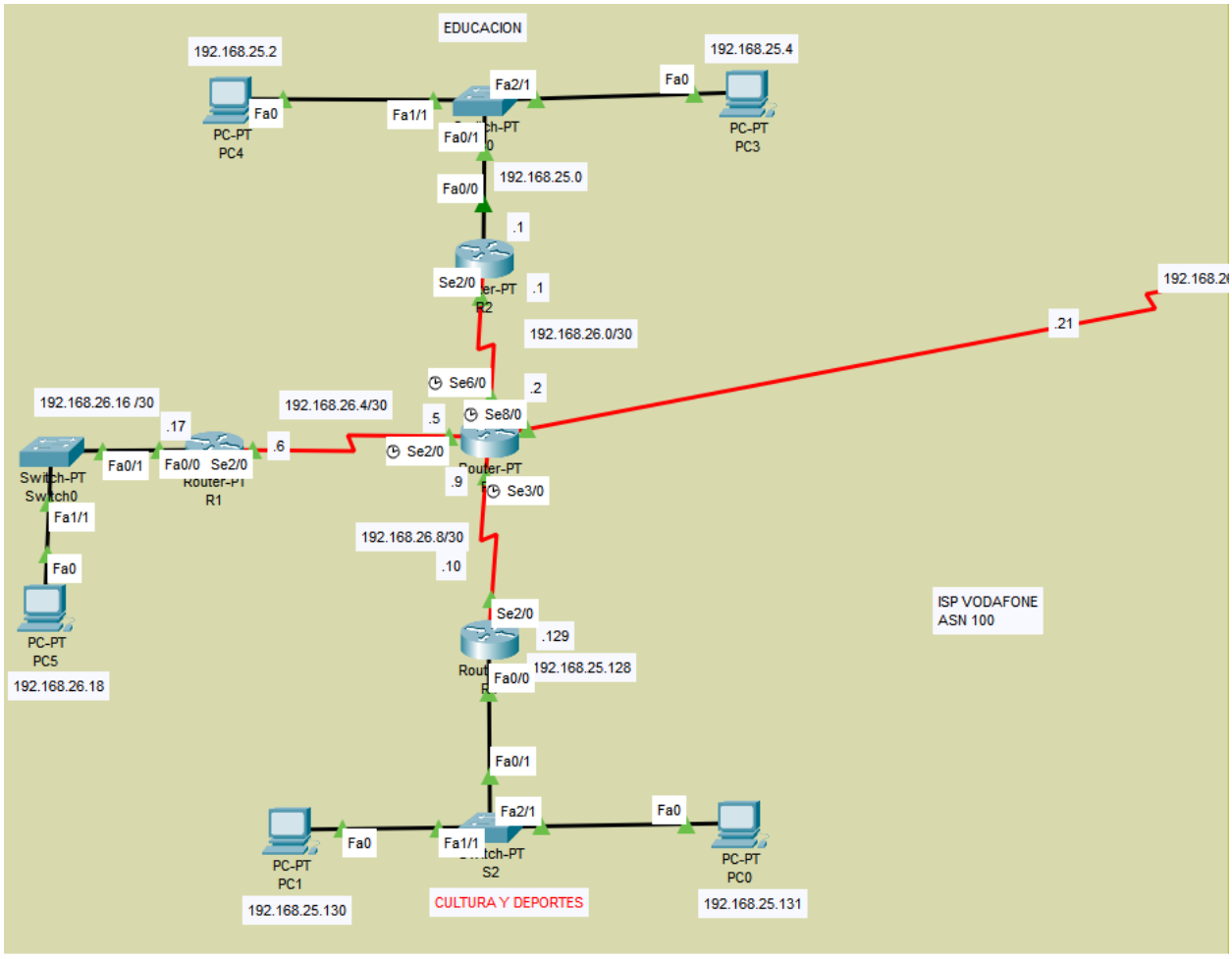
TOPOLOGÍA FINAL



CONFIGURACIÓN ISP VODAFONE

Topología Hub and Spoke

Una topología de red hub and spoke es una topología de red muy utilizada para todo tipo de redes. Esta topología también se conoce como topología en estrella. En esta topología, el punto de acceso principal está conectado a Internet con inalámbrico de un cable; como los radios de una rueda, todos los dispositivos de usuario se conectan al router centro. Todo el tráfico de la red debe pasar por el centro para llegar a otros radios de la red o para conectarse a una red exterior.



Descripción de redes y subredes

La red utilizada para configurar el ISP de VODAFONE fue la siguiente:

192.168.25.0 / 24

La cual se dividió mediante VLSM, obteniendo las siguientes subredes

Red	Submáscara de red / Wildcard	Gateway / Primer Host	Cantidad de Hosts
192.168.25.0 /25	255.255.255.128 / 0.0.0.127	192.168.25.1	126
192.168.25.128 /25	255.255.255.128 / 0.0.0.127	192.168.25.129	126
192.168.26.0 /30	255.255.255.252 / 0.0.0.3	192.168.26.1	2
192.168.26.4 /30	255.255.255.252 / 0.0.0.3	192.168.26.5	2
192.168.26.8 /30	255.255.255.252 / 0.0.0.3	192.168.26.9	2
192.168.26.12 /30	255.255.255.252 / 0.0.0.3	192.168.26.13	2
192.168.26.16 /30	255.255.255.252 / 0.0.0.3	192.168.26.17	2
192.168.26.20 /30	255.255.255.252 / 0.0.0.3	192.168.26.21	2

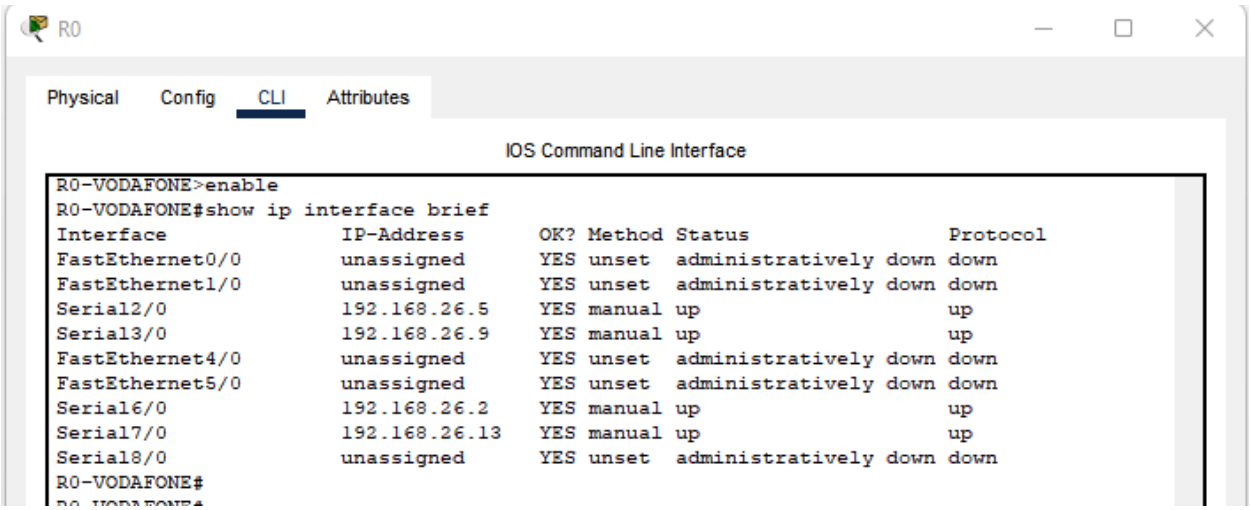
Asignación de direcciones

Equipo	Interface	Dirección	Comandos
R0-VODAFONE	Serial 2/0	192.168.26.5	• enable • configure terminal • interface serial 2/0 • ip address 192.168.26.5 255.255.255.252 • shutdown • no shutdown
R0-VODAFONE	Serial 3/0	192.168.26.9	• enable

			• configure terminal • interface serial 3/0 • ip address 192.168.26.59255.255.255.252 • shutdown • no shutdown
R0-VODAFONE	Serial 6/0	192.168.26.2	• enable • configure terminal • interface serial 6/0 • ip address 192.168.26.2 255.255.255.252 • shutdown • no shutdown
R0-VODAFONE	Serial 7/0	192.168.26.13	• enable • configure terminal • interface serial 7/0 • ip address 192.168.26.13 255.255.255.252 • shutdown • no shutdown
R1-VODAFONE	Serial 2/0	192.168.26.6	• enable • configure terminal • interface serial 2/0 • ip address 192.168.26.6 255.255.255.252 • shutdown • no shutdown
R1-VODAFONE	FastEthernet 0/0	192.168.26.17	• enable • configure terminal • interface fastEthernet 0/0 • ip address 192.168.26.17 255.255.255.252 • shutdown • no shutdown
R2-VODAFONE	Serial 2/0	192.168.26.1	• enable • configure terminal • interface serial 2/0 • ip address 192.168.26.1 255.255.255.252 • shutdown • no shutdown

R2-VODAFONE	FastEthernet 0/0	192.168.5.1	• enable • configure terminal • interface fastEthernet 0/0 • ip address 192.168.25.1 255.255.255.128 • shutdown • no shutdown
R4-VODAFONE	Serial 2/0	192.168.26.10	• enable • configure terminal • interface serial 2/0 • ip address 192.168.26.10 255.255.255.252 • shutdown • no shutdown
R4-VODAFONE	FastEthernet 0/0	192.168.5.129	• enable • configure terminal • interface fastEthernet 0/0 • ip address 192.168.25.129 255.255.255.128 • shutdown • no shutdown

Resultado



R1

Physical Config CLI Attributes

IOS Command Line Interface

```
R1-VODAFONE>enable
R1-VODAFONE#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        192.168.26.17   YES manual up                    up
FastEthernet1/0        unassigned      YES unset  administratively down down
Serial2/0              192.168.26.6    YES manual up                    up
Serial3/0              unassigned      YES unset  administratively down down
FastEthernet4/0        unassigned      YES unset  administratively down down
FastEthernet5/0        unassigned      YES unset  administratively down down
Serial6/0              unassigned      YES unset  administratively down down
Serial7/0              unassigned      YES unset  administratively down down
```

R2

Physical Config CLI Attributes

IOS Command Line Interface

```
R2-VODAFONE#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        192.168.25.1    YES manual up                    up
FastEthernet1/0        unassigned      YES unset  administratively down down
Serial2/0              192.168.26.1    YES manual up                    up
Serial3/0              unassigned      YES unset  administratively down down
FastEthernet4/0        unassigned      YES unset  administratively down down
FastEthernet5/0        unassigned      YES unset  administratively down down
R2-VODAFONE#
```

R4

Physical Config CLI Attributes

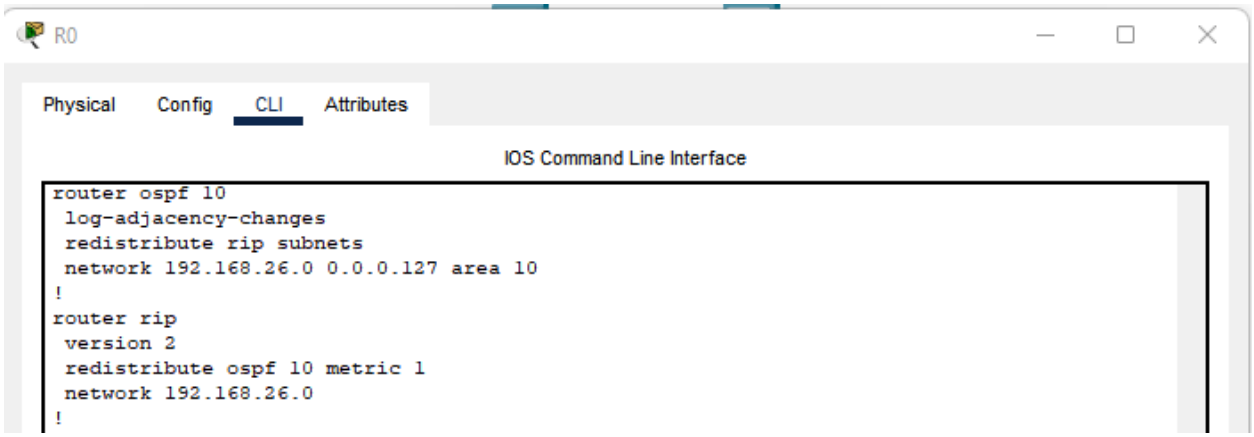
IOS Command Line Interface

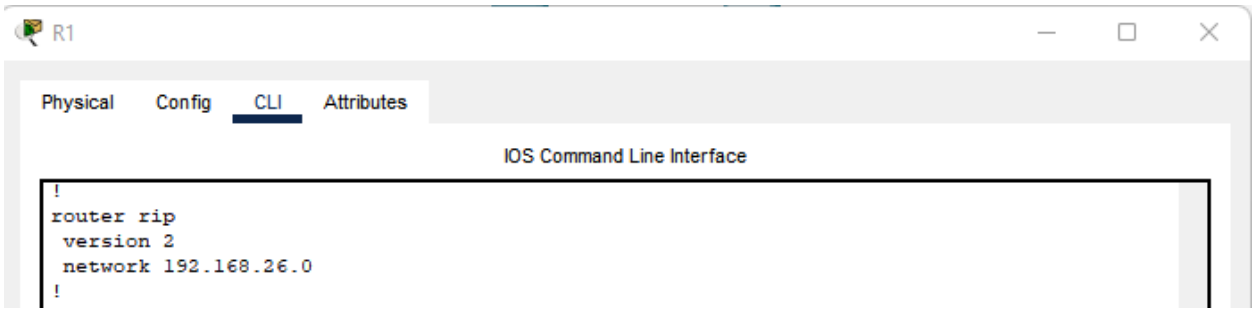
```
R4-VODAFONE>enable
R4-VODAFONE#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        192.168.25.129  YES manual up                    up
FastEthernet1/0        unassigned      YES unset  administratively down down
Serial2/0              192.168.26.10   YES manual up                    up
Serial3/0              unassigned      YES unset  administratively down down
FastEthernet4/0        unassigned      YES unset  administratively down down
FastEthernet5/0        unassigned      YES unset  administratively down down
R4-VODAFONE#
```

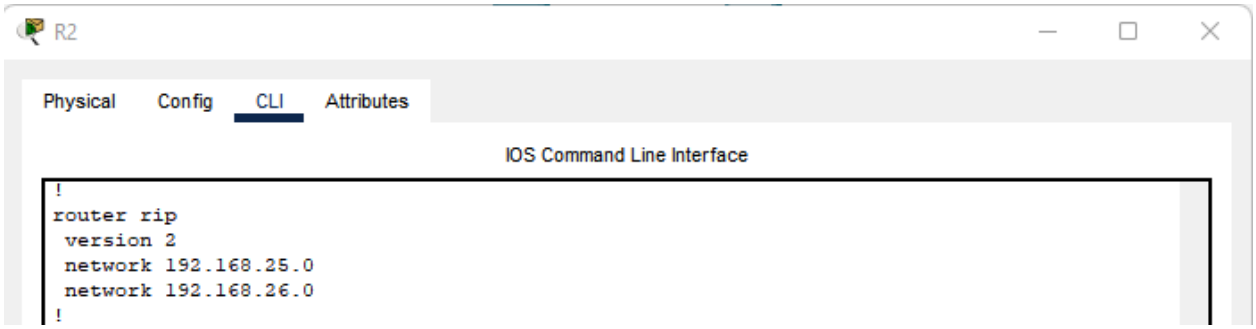
Enrutamiento dinámico

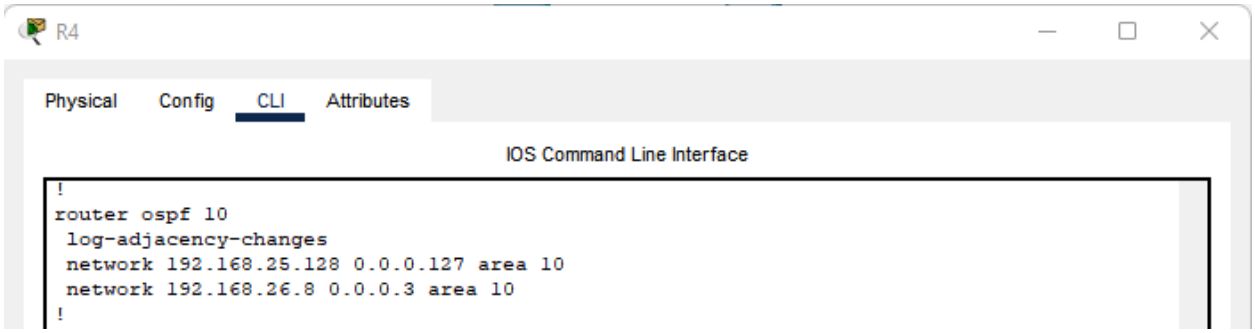
Equipo	Protocolo	Comandos
R1-VODAFONE	RIPv2	• enable • configure terminal • router rip • version 2 • network 192.168.26.16 • network 192.168.26.4 • end • show ip interface brief
R2-VODAFONE	RIPv2	• enable • configure terminal • router rip • version 2 • network 192.168.25.0 • network 192.168.26.0 • end • show ip interface brief
R4-VODAFONE	OSPF	• enable • configure terminal • router ospf 10 • network 192.168.25.0 0.0.0.127 area 10 • network 192.168.26.0 0.0.0.3 area 10 • end • show ip interface brief
R0-VODAFONE	RIP	• enable • configure terminal • router rip • version 2 • network 192.168.26.0 • network 192.168.26.4 • network 192.168.26.8 • end • show ip interface brief
R0-VODAFONE	OSPF	• enable • configure terminal • router ospf 10 • network 192.168.26.0 0.0.0.3 area 10 • network 192.168.26.4 0.0.0.3 area 10 • network 192.168.26.8 0.0.0.3 area 10

		• end • show ip interface brief









PC4

Physical Config Desktop Programming Attributes

Command Prompt

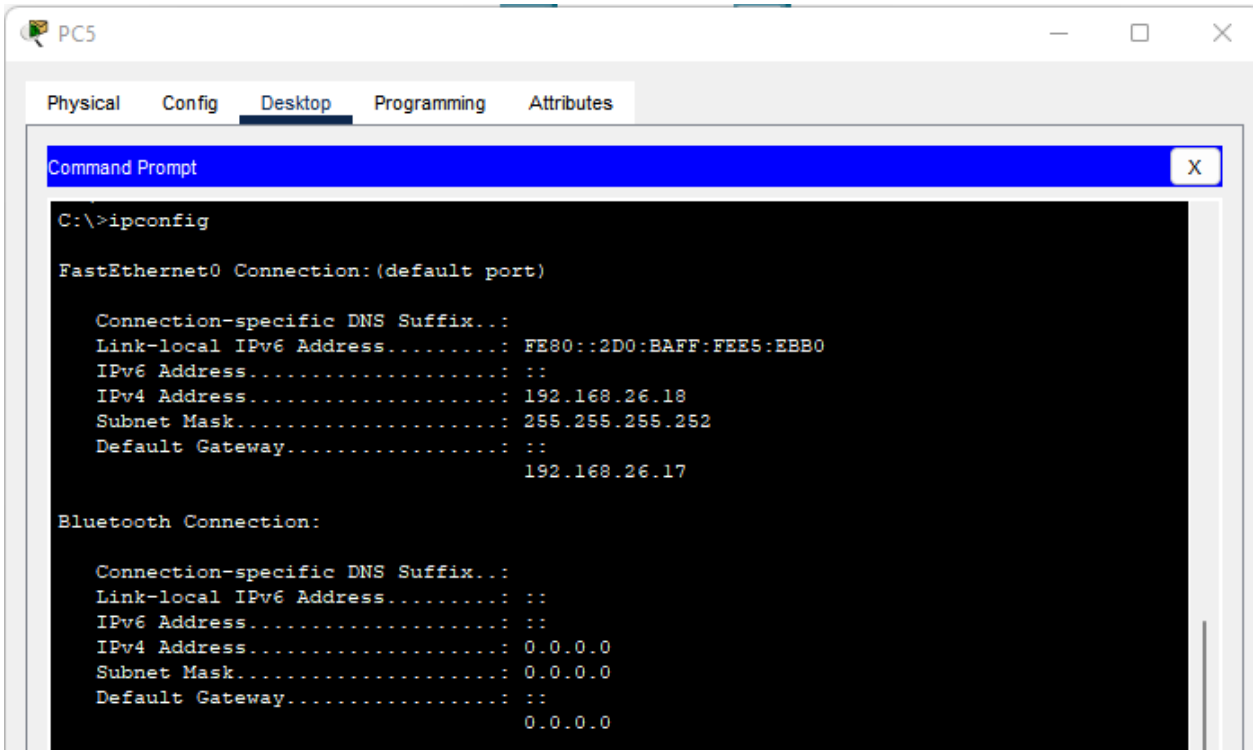
```
Cisco Packet Tracer PC Command Line 1.0
C:\>ipconfig

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: FE80::250:FFF:FE26:A47D
   IPv6 Address.....: ::
   IPv4 Address.....: 192.168.25.2
   Subnet Mask.....: 255.255.255.128
   Default Gateway.....: ::
                                 192.168.25.1

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.....: ::
                                 0.0.0.0

C:\>
```

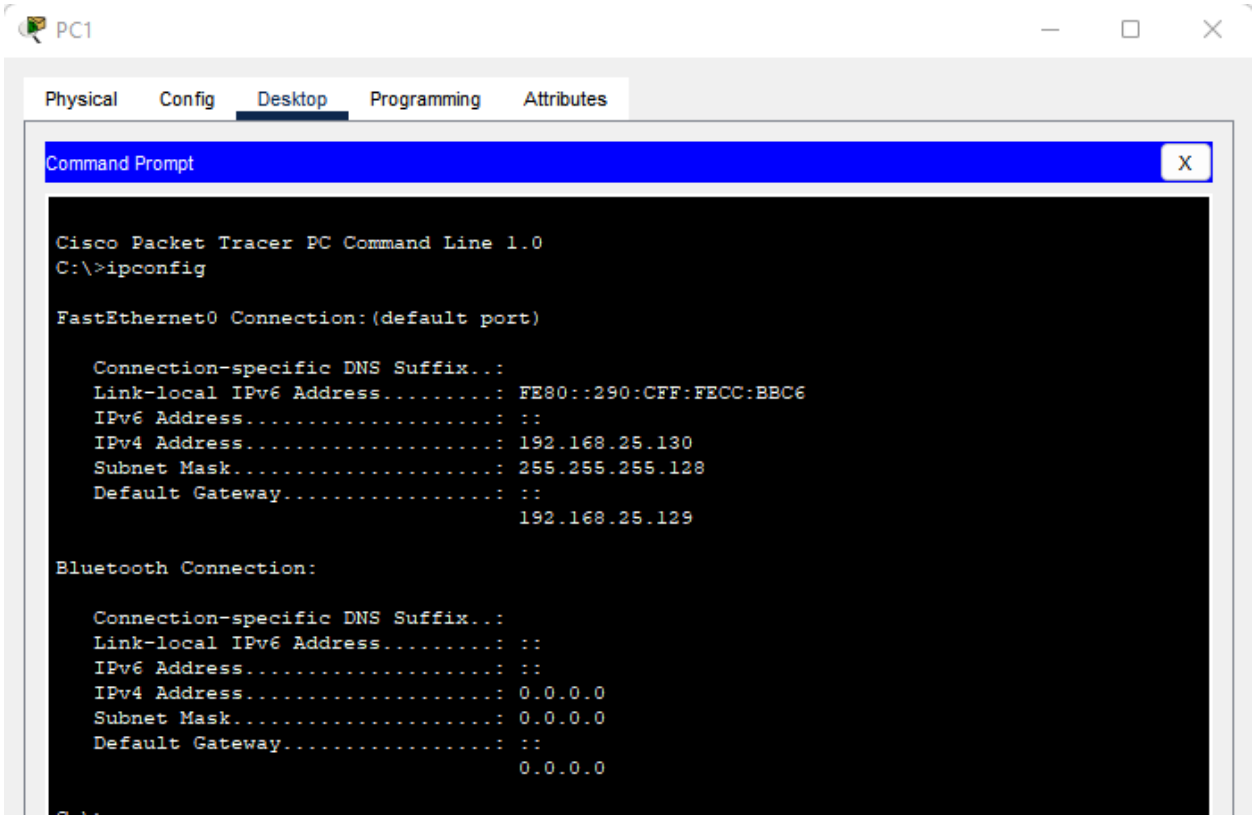
PC3

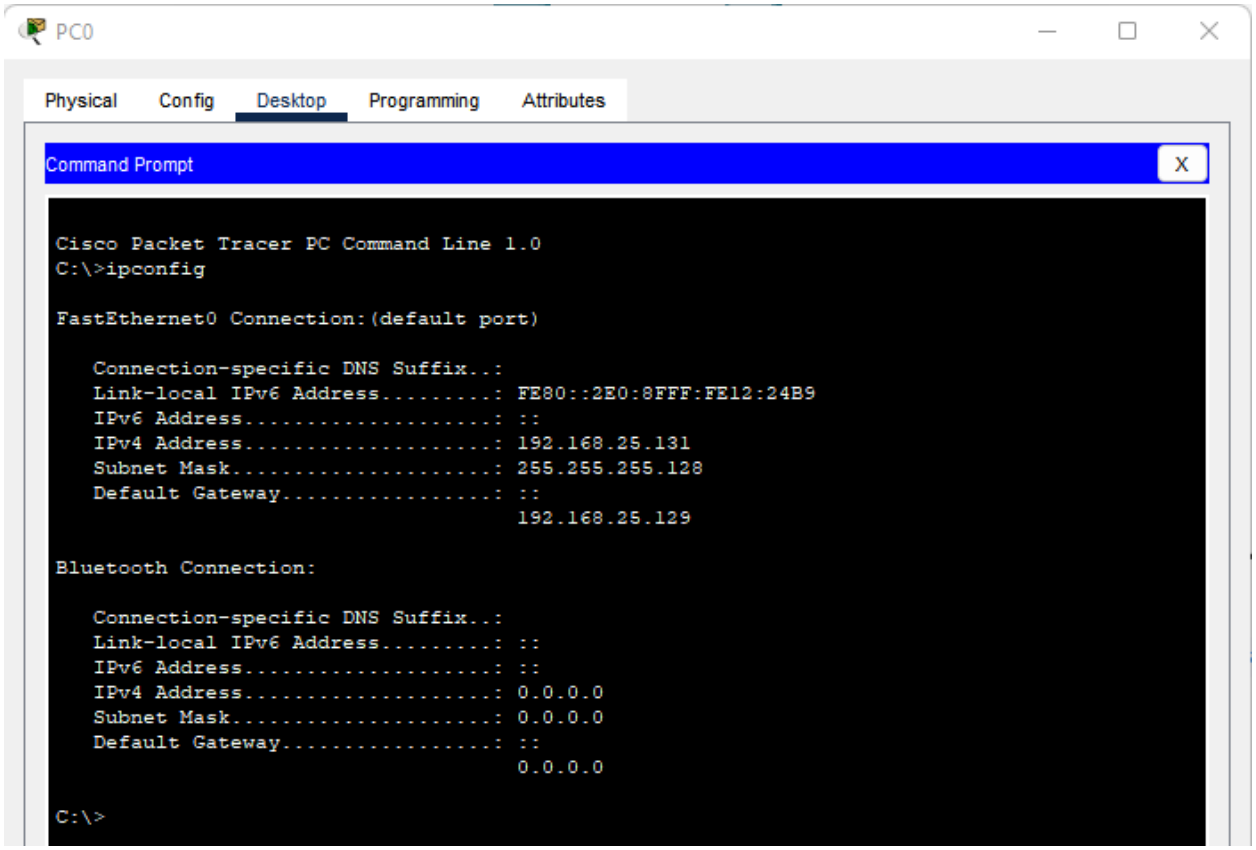
Physical Config Desktop Programming Attributes

Command Prompt

```
C:\>ipconfig

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: FE80::201:42FF:FECC:4450
   IPv6 Address.....: ::
   IPv4 Address.....: 192.168.25.4
   Subnet Mask.....: 255.255.255.128
   Default Gateway.....: ::
                                 192.168.25.1

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.....: ::
                                 0.0.0.0
```

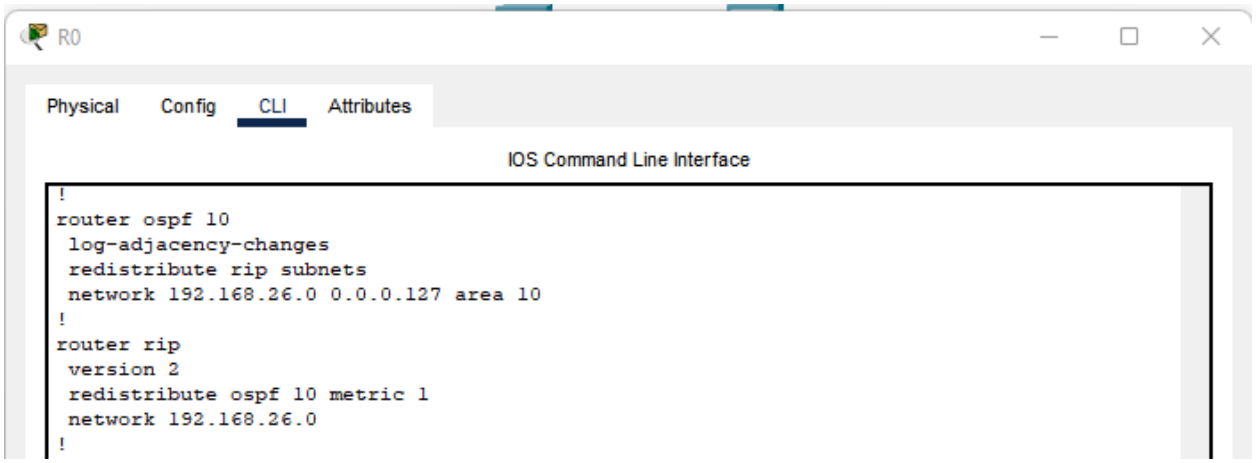

PC5
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
C:\>ipconfig
FastEthernet0 Connection:(default port)
Connection-specific DNS Suffix..:
Link-local IPv6 Address.....: FE80::2D0:BAFF:FEE5:EBB0
IPv6 Address.....: ::
IPv4 Address.....: 192.168.26.18
Subnet Mask.....: 255.255.255.252
Default Gateway.....: ::
192.168.26.17
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


PC1
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::290:CFF:FECC:BBC6
IPv6 Address.....: ::
IPv4 Address.....: 192.168.25.130
Subnet Mask.....: 255.255.255.128
Default Gateway.....: ::
192.168.25.129
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


PC0
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::2E0:8FFF:FE12:24B9
IPv6 Address.....: ::
IPv4 Address.....: 192.168.25.131
Subnet Mask.....: 255.255.255.128
Default Gateway.....: ::
192.168.25.129
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:\>

Redistribución de tráfico (Comunicación entre procotolos)

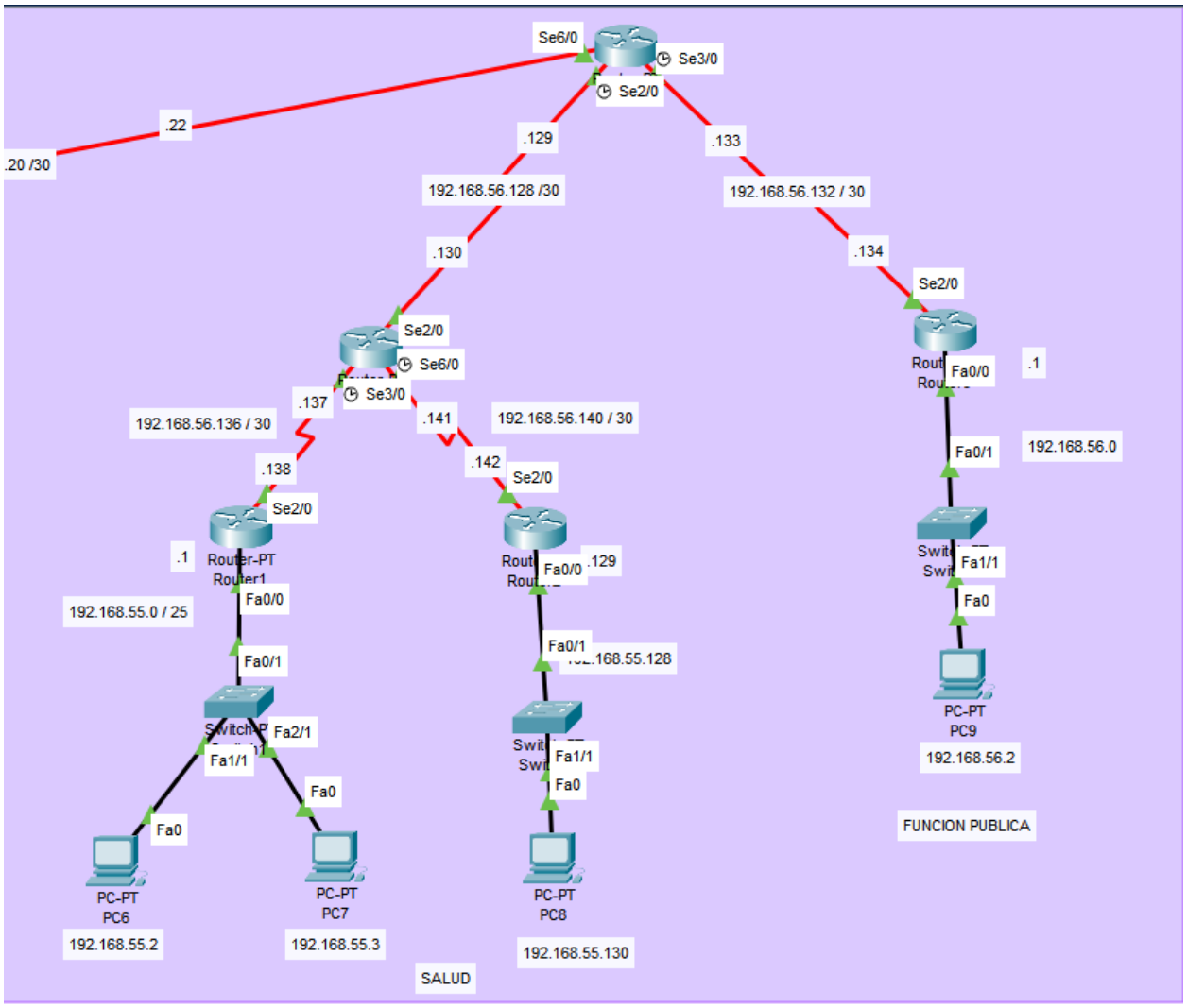
Equipo	Protocolo	Comandos
R0-VODAFONE	RIP	• enable • configure terminal • router rip • version 2 • redistribute ospf 10 metric 1 • end
R0-VODAFONE	OSPF	• enable • configure terminal • router ospf 10 • redistribute rip subnets • end



CONFIGURACIÓN DE ISP KNOLOGY

Topología de Árbol

La topología de árbol es la combinación de la topología de bus y la topología en estrella. Esta combinación permite a los usuarios tener varios servidores en la red. Conecta múltiples topologías en estrella a otra red de topología en estrella. Se conoce también como topología de estrella expandida o topología jerárquica.



Descripción de redes y subredes

La red utilizada para configurar el ISP de VODAFONE fue la siguiente:

192.168.55.0

La cual se dividió mediante VLSM, obteniendo las siguientes subredes

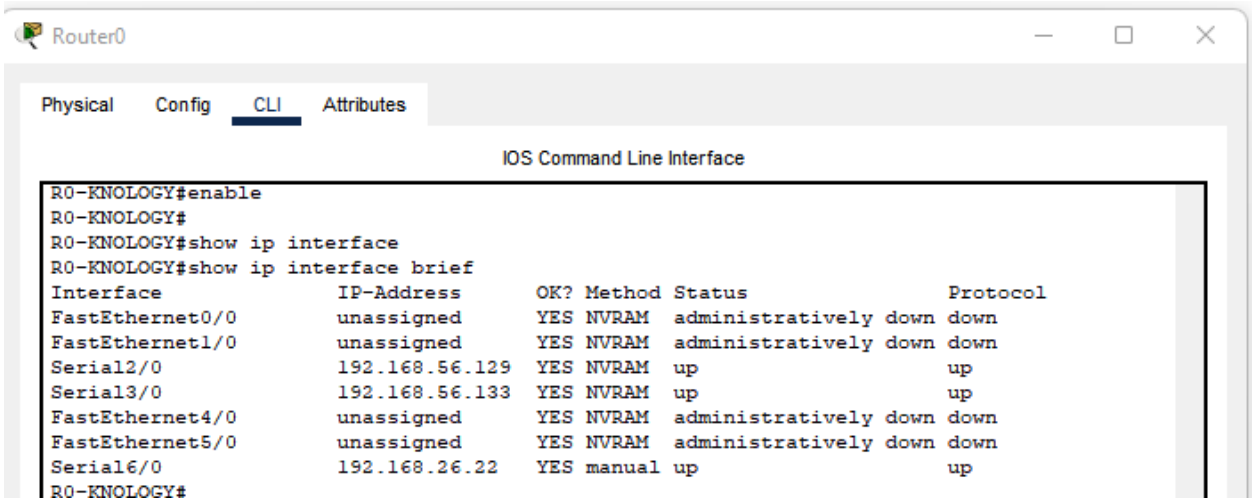
Red	Submáscara de red / Wildcard	Gateway / Primer Host	Cantidad de Hosts
192.168.55.0 /25	255.255.255.128 / 0.0.0.127	192.168.55.1	126
192.168.55.128 /25	255.255.255.128 / 0.0.0.127	192.168.55.129	126
192.168.56.0 /25	255.255.255.128 / 0.0.0.3	192.168.56.1	126
192.168.56.128 /30	255.255.255.252 / 0.0.0.3	192.168.56.129	2
192.168.56.132 /30	255.255.255.252 / 0.0.0.3	192.168.56.133	2
192.168.56.136 /30	255.255.255.252 / 0.0.0.3	192.168.56.137	2
192.168.56.140 /30	255.255.255.252 / 0.0.0.3	192.168.56.141	2
192.168.56.144 /30	255.255.255.252 / 0.0.0.3	192.168.56.145	2

Asignación de direcciones

Equipo	Interface	Dirección	Comandos
R0-KNOLOGY	Serial 2/0	192.168.56.129	• enable • configure terminal • interface serial 2/0 • ip address 192.168.56.129 255.255.255.252 • shutdown • no shutdown • end
R0-KNOLOGY	Serial 3/0	192.168.56.133	• enable • configure terminal • interface serial 3/0

			• ip address 192.168.56.133 255.255.255.252 • shutdown • no shutdown • end
R1-KNOLOGY	Serial 3/0	192.168.56.137	• enable • configure terminal • interface serial 3/0 • ip address 192.168.56.137 255.255.255.252 • shutdown • no shutdown • end
R1-KNOLOGY	Serial 6/0	192.168.56.141	• enable • configure terminal • interface serial 6/0 • ip address 192.168.56.141 255.255.255.252 • shutdown • no shutdown • end
R1-KNOLOGY	Serial 2/0	192.168.56.130	• enable • configure terminal • interface serial 2/0 • ip address 192.168.56.130 255.255.255.252 • shutdown • no shutdown • end
R2-KNOLOGY	Serial 2/0	192.168.56.134	• enable • configure terminal • interface serial 2/0 • ip address 192.168.56.134 255.255.255.252 • shutdown • no shutdown • end
R2-KNOLOGY	FastEthernetl 0/0	192.168.56.1	• enable • configure terminal • interface fastEthernet 0/0 • ip address 192.168.56.1 255.255.255.128 • shutdown • no shutdown • end
R3-KNOLOGY	Serial 2/0	192.168.56.138	• enable • configure terminal

			• interface serial 2/0 • ip address 192.168.56.138 255.255.255.252 • shutdown • no shutdown • end
R3-KNOLOGY	FastEthernet 0/0	192.168.55.1	• enable • configure terminal • interface fastEthernet 0/0 • ip address 192.168.55.1 255.255.255.128 • shutdown • no shutdown • end
R4-KNOLOGY	Serial 2/0	192.168.56.142	• enable • configure terminal • interface serial 2/0 • ip address 192.168.56.142 255.255.255.252 • shutdown • no shutdown • end
R4-KNOLOGY	FastEthernet 0/0	192.168.55.129	• enable • configure terminal • interface fastEthernet 0/0 • ip address 192.168.55.129 255.255.255.252 • shutdown • no shutdown • end



Router4

Physical Config CLI Attributes

IOS Command Line Interface

```
R1-KNOLOGY#sh ip int br
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        unassigned      YES unset  administratively down down
FastEthernet1/0        unassigned      YES unset  administratively down down
Serial2/0              192.168.56.130  YES manual up                    up
Serial3/0              192.168.56.137  YES manual up                    up
FastEthernet4/0        unassigned      YES unset  administratively down down
FastEthernet5/0        unassigned      YES unset  administratively down down
Serial6/0              192.168.56.141  YES manual up                    up
Serial7/0              unassigned      YES unset  administratively down down
R1-KNOLOGY#
```

Router3

Physical Config CLI Attributes

IOS Command Line Interface

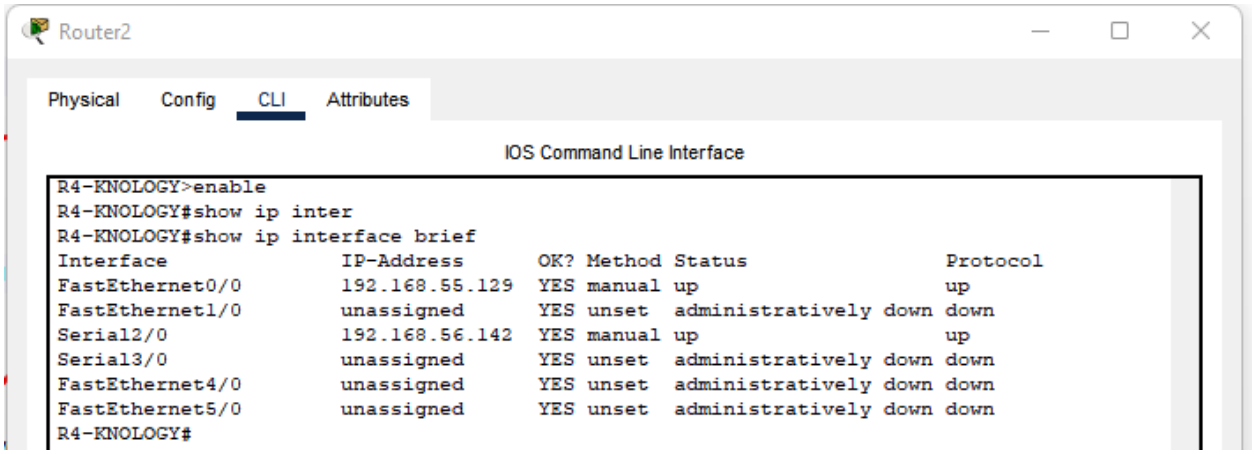
```
R2-KNOLOGY#show ip interf
R2-KNOLOGY#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        192.168.56.1    YES manual up                    up
FastEthernet1/0        unassigned      YES unset  administratively down down
Serial2/0              192.168.56.134  YES manual up                    up
Serial3/0              unassigned      YES unset  administratively down down
FastEthernet4/0        unassigned      YES unset  administratively down down
FastEthernet5/0        unassigned      YES unset  administratively down down
R2-KNOLOGY#
R2-KNOLOGY#
```

Router1

Physical Config CLI Attributes

IOS Command Line Interface

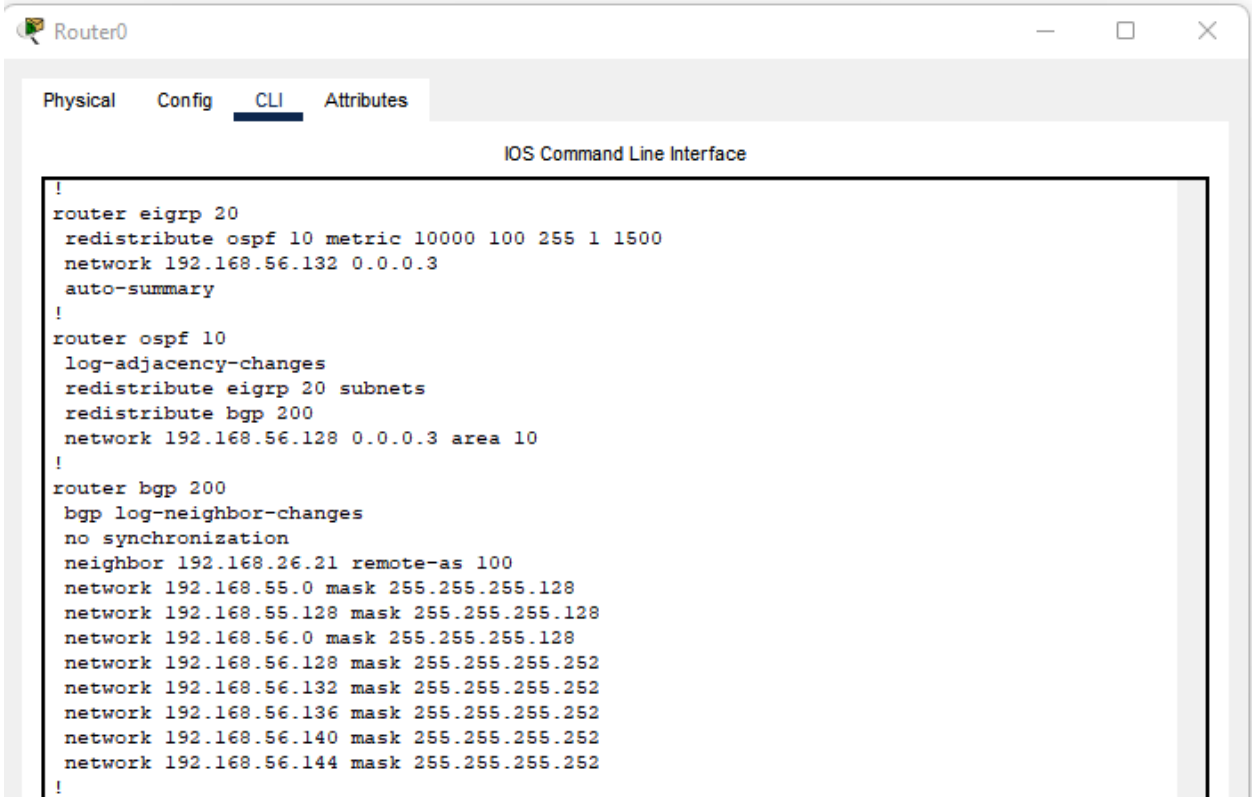
```
R3-KNOLOGY#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        192.168.55.1    YES manual up                    up
FastEthernet1/0        unassigned      YES unset  administratively down down
Serial2/0              192.168.56.138  YES manual up                    up
Serial3/0              unassigned      YES unset  administratively down down
FastEthernet4/0        unassigned      YES unset  administratively down down
FastEthernet5/0        unassigned      YES unset  administratively down down
R3-KNOLOGY#
R3-KNOLOGY#
```



Enrutamiento dinámico

Equipo	Protocolo	Comandos
R1-KNOLOGY	OSPF	• enable • configure terminal • router ospf 10 • network 192.168.56.136 0.0.0.3 area 10 • network 192.168.56.128 0.0.0.3 area 10 • show ip interface brief • end
R3-KNOLOGY	OSPF	• enable • configure terminal • router ospf 10 • network 192.168.56.136 0.0.0.3 area 10 • network 192.168.55.0 0.0.0.127 area 10 • end • show ip interface brief
R4-KNOLOGY	OSPF	• enable • configure terminal • router ospf 10 • network 192.168.55.128 0.0.0.127 area 10 • network 192.168.56.140 0.0.0.3 area 10 • end • show ip interface brief
R2-KNOLOGY	OSPF	• enable • configure terminal • router eigrp 10 • network 192.168.55.132 0.0.0.127 • network 192.168.56.0 0.0.0.3 • end • show ip interface brief

R0-KNOLOGY	OSPF	• enable • configure terminal • router ospf 10 • network 192.168.56.128 0.0.0.3 area 10 • network 192.168.26.20 0.0.0.3 area 10 • network 192.168.56.132 0.0.0.3 area 10 • end • show ip interface brief
R0-KNOLOGY	EIGRP	• enable • configure terminal • router ospf 10 • network 192.168.56.0 0.0.0.3 area 10 • network 192.168.56.4 0.0.0.3 area 10 • network 192.168.56.8 0.0.0.3 area 10 • end • show ip interface brief



Router4

Physical Config CLI Attributes

IOS Command Line Interface

```
!
router ospf 10
 log-adjacency-changes
 network 192.168.56.128 0.0.0.127 area 10
!
ip classless
!
ip flow-export version 9
!
!
```

Router3

Physical Config CLI Attributes

IOS Command Line Interface

```
!
router eigrp 20
 network 192.168.56.0 0.0.0.127
 network 192.168.56.132 0.0.0.3
 auto-summary
!
ip classless
```

Router1

Physical Config CLI Attributes

IOS Command Line Interface

```
!
router ospf 10
 log-adjacency-changes
 network 192.168.55.0 0.0.0.127 area 10
 network 192.168.56.136 0.0.0.3 area 10
!
ip classless
!
ip flow-export version 9
```

Router2

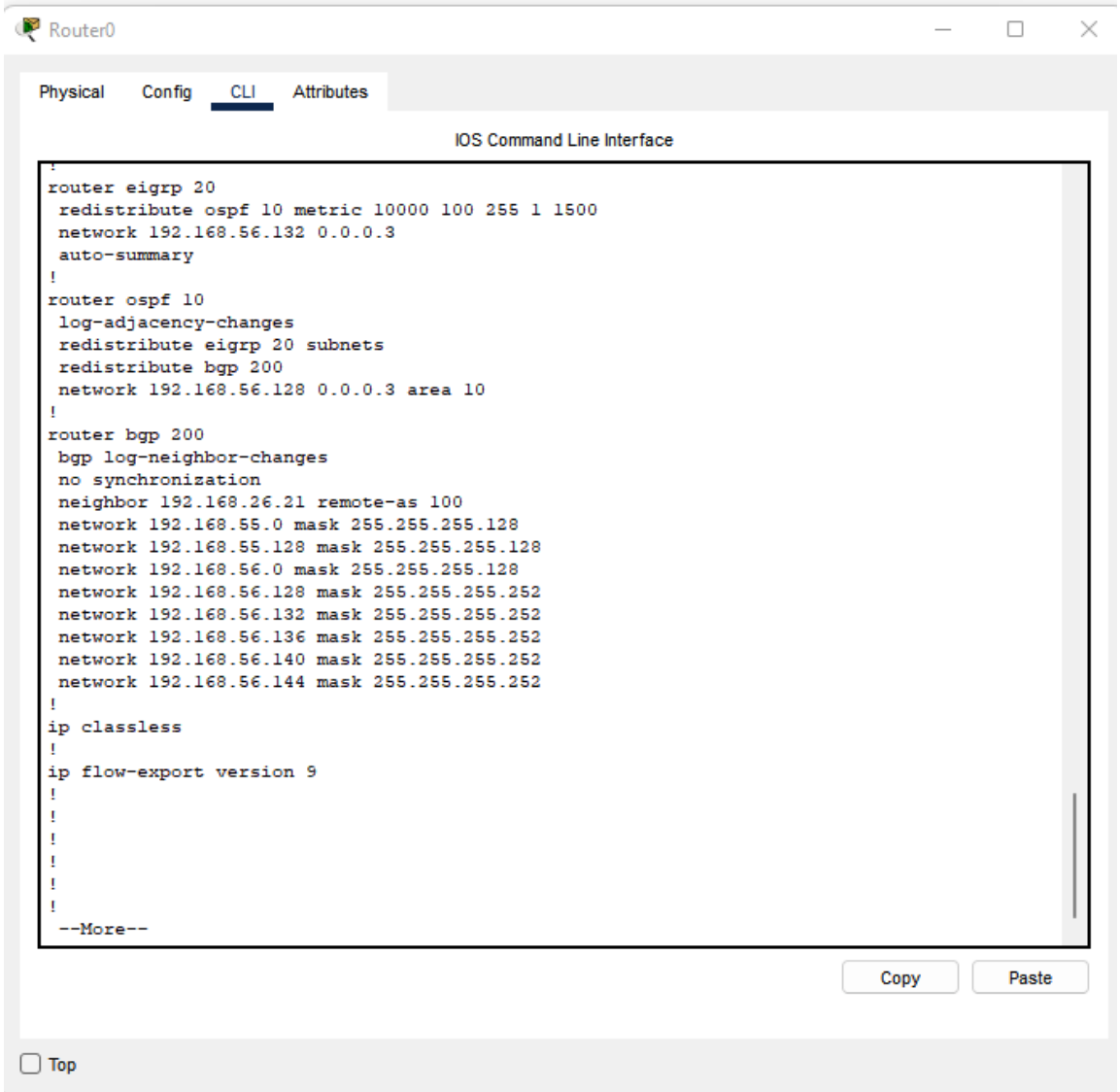
Physical Config CLI Attributes

IOS Command Line Interface

```
!
router ospf 10
 log-adjacency-changes
 network 192.168.56.128 0.0.0.127 area 10
 network 192.168.55.128 0.0.0.3 area 10
!
ip classless
!
```

Redistribución de tráfico

Equipo	Protocolo	Comandos
R0-KNOLOGY	EIGRP	• enable • configure terminal • router eigrp 10 • redistribute ospf metric 10000 100 255 1 1500 • end
R0-KNOLOGY	OSPF	• enable • configure terminal • router ospf 10 • redistribute eigrp subnets • end



CONFIGURACIÓN DE ISP TELEFÓNICA

Topología de Tres Capas

En un diseño jerárquico de la red o modelo jerárquico de tres capas se divide la red en varias capas independientes. Es una red plana que se divide en bloques más pequeños y fáciles de administrar. Se fragmenta para separar las funciones dentro de una red. Cada capa del diseño desempeña una función específica. La división de la red en capas mantiene los problemas de la red aislados por capas, simplifica el diseño, la implementación y la administración y ayuda a seleccionar el equipo y las características que va a necesitar la red.

Descripción de redes y subredes

La red utilizada para configurar el ISP de VODAFONE fue la siguiente:

192.168.1.1

La cual se dividió mediante VLSM, obteniendo las siguientes subredes

Red	Submáscara de red / Wildcard	Gateway / Primer Host	Cantidad de Hosts
192.168.25.0 /25	255.255.255.128 / 0.0.0.127	192.168.25.1	126
192.168.25.128 /25	255.255.255.128 / 0.0.0.127	192.168.25.129	126
192.168.26.0 /30	255.255.255.252 / 0.0.0.3	192.168.26.1	2
192.168.26.4 /30	255.255.255.252 / 0.0.0.3	192.168.26.5	2
192.168.26.8 /30	255.255.255.252 / 0.0.0.3	192.168.26.9	2
192.168.26.12 /30	255.255.255.252 / 0.0.0.3	192.168.26.13	2
192.168.26.16 /30	255.255.255.252 / 0.0.0.3	192.168.26.17	2
192.168.26.20 /30	255.255.255.252 / 0.0.0.3	192.168.26.21	2

Fuentes

Sitio web: TomasRosprim.com
Título del artículo: *Implementación de la topología de red Hub and Spoke en Microsoft Azure*
Fecha de publicación: 23/8/2021
Autor: ADMIN
Fecha de consulta: 6/10/2022
Enlace: https://tomasrosprim.com/es/implementaci%C3%B3n-de-la-topolog%C3%ADa-de-red-hub-and-spoke-en-microsoft-azure/

Sitio web: Wikipedia.com
Título del artículo: *Máscara wildcard*
Fecha de edición: 10/09/2019
Autor: --
Fecha de consulta: 6/10/2022
Enlace: https://es.wikipedia.org/wiki/M%C3%A1scara_wildcard

Sitio web: Lifeder.com
Título del artículo: *Topología de árbol: características, ventajas, desventajas*
Fecha de publicación: 23/10/2019
Autor: Helmut Sy Corvo
Fecha de consulta: 6/10/2022
Enlace: https://es.wikipedia.org/wiki/M%C3%A1scara_wildcard

Sitio web: Wikipedia.com
Título del artículo: *Diseño jerárquico de la red*
Fecha de publicación: 01/12/2021
Autor: --
Fecha de consulta: 6/10/2022
Enlace: https://es.wikipedia.org/wiki/Dise%C3%B1o_jer%C3%A1rquico_de_la_red

PRESENTACIÓN

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