



# Redes II

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# Proyecto Integrador.

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## **Introducción.**

El proyecto de interconexión de redes mediante enrutamiento dinámico tiene como finalidad principal el diseño y configuración de una red compleja, utilizando tecnologías avanzadas de enrutamiento que se encuentran en el núcleo de las comunicaciones modernas. Este proyecto, desarrollado en el contexto de la asignatura Redes II, tiene como objetivo no solo la creación de un entorno de red funcional, sino también la comprensión y aplicación de conceptos avanzados de enrutamiento que son esenciales para la gestión de redes en el mundo real. La implementación práctica de protocolos como RIP, EIGRP y OSPF multiárea permitirá a los estudiantes adquirir experiencia en la configuración de routers, la asignación de direcciones IP, y la optimización del flujo de datos entre distintas subredes. Este ejercicio es crucial para consolidar el aprendizaje teórico, ofreciendo una plataforma para la resolución de problemas técnicos en escenarios simulados que reflejan desafíos reales en el campo de las telecomunicaciones y la gestión de redes.

## **Antecedentes.**

Históricamente, las redes de computadoras han evolucionado desde simples conexiones directas entre dispositivos hasta sistemas altamente complejos que requieren la implementación de protocolos sofisticados para gestionar el tráfico de datos. En las primeras etapas del desarrollo de redes, el enrutamiento estático era la norma; sin embargo, a medida que las redes crecieron en tamaño y complejidad, la necesidad de soluciones más dinámicas y automatizadas se hizo evidente. Fue en este contexto que surgieron los protocolos de enrutamiento dinámico, diseñados para permitir que los routers intercambien información sobre la topología de la red de manera automática y en tiempo real. El Protocolo de Información de Enrutamiento (RIP) fue uno de los primeros en ser ampliamente adoptado, aunque con ciertas limitaciones en cuanto a la escalabilidad. Esto llevó al desarrollo de protocolos más avanzados como EIGRP y OSPF, que ofrecen una mayor eficiencia y capacidad de adaptación en redes de gran escala. Estos protocolos no solo permiten una mayor automatización en la selección de rutas, sino que también proporcionan mecanismos para la recuperación de fallos y la optimización continua de la red, factores esenciales en la actualidad para el funcionamiento de sistemas de comunicación globales.

## Requerimientos.

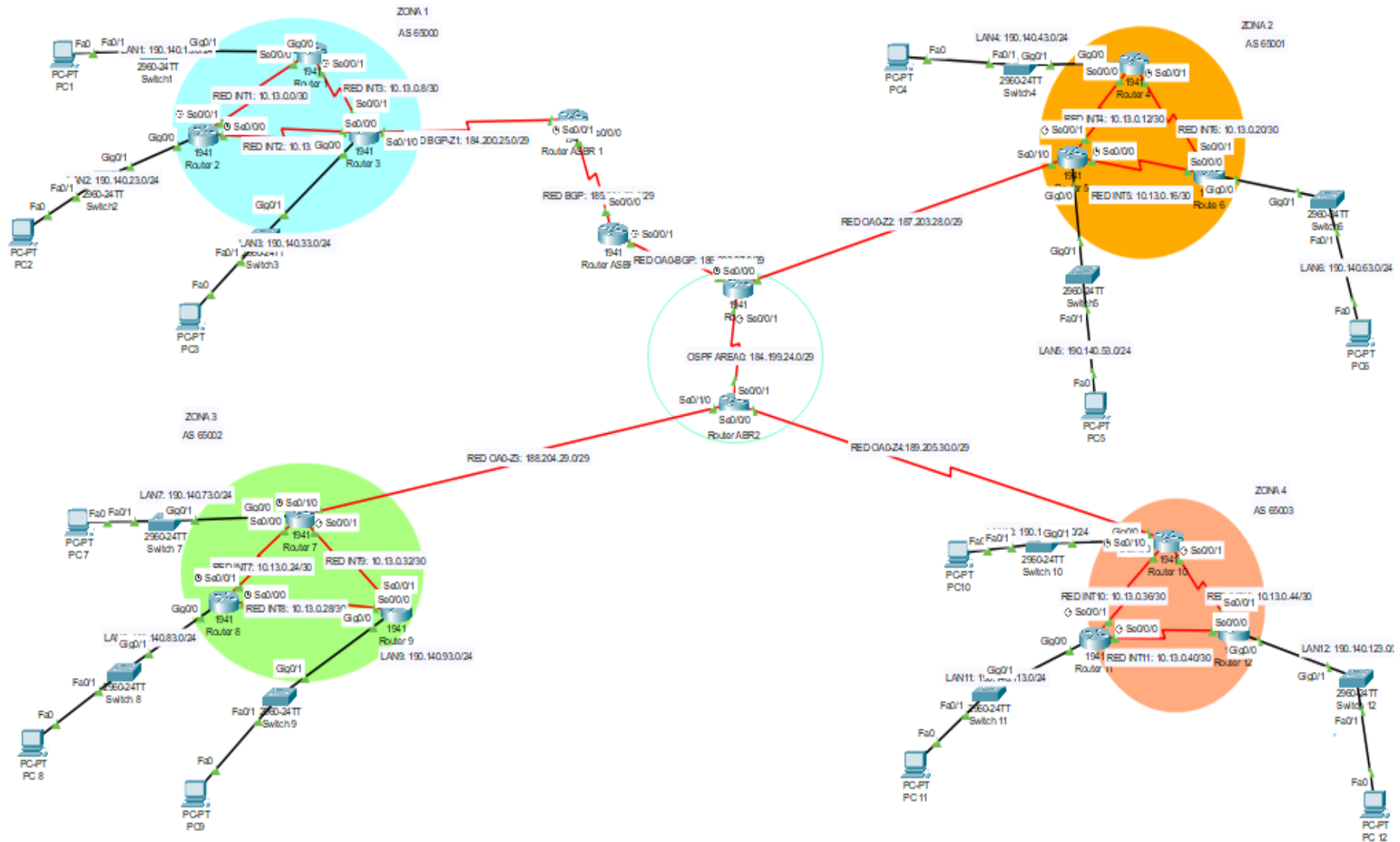
El desarrollo de este proyecto requiere una combinación de recursos técnicos y habilidades de configuración. Los requisitos esenciales incluyen:

- I. **Software de Simulación:** Para la simulación del entorno de red y la configuración de los dispositivos, es necesario utilizar Cisco Packet Tracer. Este software permite la creación de topologías de red virtuales, donde se pueden implementar y probar configuraciones de enrutamiento de manera segura y controlada.
- II. **Documentación Técnica:** Es fundamental documentar todos los pasos realizados durante el desarrollo del proyecto. Esto incluye la creación de un documento en formato Word que detalle la configuración de cada router, la asignación de direcciones IP, y la implementación de los protocolos de enrutamiento. Además, se deben incluir capturas de pantalla que evidencien la correcta configuración de los routers (**comandos como show running-config, show ip route, y show ip protocols**) y pruebas de conectividad entre las distintas subredes.
- III. **Configuración de Protocolos de Enrutamiento:** Los protocolos RIP, EIGRP y OSPF Multiárea deben ser configurados en diferentes partes de la red, según las directrices del proyecto. Cada protocolo tiene sus características y mejores prácticas que deben ser seguidas para garantizar un rendimiento óptimo y una configuración correcta.
- IV. **Asignación de Direccionamiento IP:** Es crucial asignar correctamente las direcciones IP a las interfaces de los routers y a los dispositivos finales (PCs) en cada subred. Esto incluye tanto la configuración de direcciones IP fijas como la definición de máscaras de subred apropiadas que permitan una segmentación eficiente de la red.
- V. **Validación y Pruebas:** Después de configurar la red, se deben realizar pruebas exhaustivas para verificar que el enrutamiento funciona correctamente entre todas las subredes. Esto incluye la ejecución de pruebas de ping entre dispositivos en diferentes subredes y la revisión de las tablas de enrutamiento para asegurarse de que las rutas se están propagando correctamente.

- VI. **Trabajo en Equipo:** Dado que el proyecto está diseñado para ser desarrollado en grupo, es esencial la colaboración efectiva entre los miembros del equipo. Esto implica una división clara de responsabilidades y una comunicación constante para garantizar que todas las partes del proyecto se integren de manera coherente.



## Red General



## Cuadro de configuración.

### ZONA 1.

Dispositivo	Interfaz	Red	Mascara
Router 1	G0/0	190.140.13.1	255.255.255.0
Router 1	S0/0/0	10.13.0.1	255.255.255.252
Router 1	S0/0/1	10.13.0.9	255.255.255.252
Router 2	G0/0	190.140.23.1	255.255.255.0
Router 2	S0/0/0	10.13.0.5	255.255.255.252
Router 2	S0/0/1	10.13.0.2	255.255.255.252
Router 3	G0/0	190.140.33.1	255.255.255.0
Router 3	S0/0/0	10.13.0.6	255.255.255.252
Router 3	S0/0/1	10.13.0.10	255.255.255.252
Router 3	S0/1/0	184.200.25.1	255.255.255.248
Router ASBR 1	S0/0/0	185.201.26.1	255.255.255.248
Router ASBR 1	S0/0/1	184.200.25.2	255.255.255.248
Router ASBR 2	S0/0/0	185.201.26.2	255.255.255.248
Router ASBR 2	S0/0/1	186.202.27.1	255.255.255.248

### ZONA 2.

Dispositivo	Interfaz	Red	Mascara
Router 4	G0/0	190.140.43.1	255.255.255.0
Router 4	S0/0/0	10.13.0.13	255.255.255.252
Router 4	S0/0/1	10.13.0.21	255.255.255.252
Router 5	G0/0	190.140.53.1	255.255.255.0
Router 5	S0/0/0	10.13.0.17	255.255.255.252
Router 5	S0/0/1	10.13.0.14	255.255.255.252
Router 5	S0/1/0	187.203.28.1	255.255.255.248
Router 6	G0/0	190.140.63.1	255.255.255.0
Router 6	S0/0/0	10.13.0.18	255.255.255.252
Router 6	S0/0/1	10.13.0.22	255.255.255.252

**ZONA 3.**

Dispositivo	Interfaz	Red	Mascara
Router 7	G0/0	190.140.73.1	255.255.255.0
Router 7	S0/0/0	10.13.0.25	255.255.255.252
Router 7	S0/0/1	10.13.0.33	255.255.255.252
Router 7	S0/1/0	188.204.29.1	255.255.255.248
Router 8	G0/0	190.140.83.1	255.255.255.0
Router 8	S0/0/0	10.13.0.29	255.255.255.252
Router 8	S0/0/1	10.13.0.26	255.255.255.252
Router 9	G0/0	190.140.93.1	255.255.255.0
Router 9	S0/0/0	10.13.0.30	255.255.255.252
Router 9	S0/0/1	10.13.0.34	255.255.255.252

**ZONA 4.**

Dispositivo	Interfaz	Red	Mascara
Router 10	G0/0	190.140.103.1	255.255.255.0
Router 10	S0/0/0	10.13.0.37	255.255.255.252
Router 10	S0/0/1	10.13.0.45	255.255.255.252
Router 10	S0/1/0	189.205.30.1	255.255.255.248
Router 11	G0/0	190.140.113.1	255.255.255.0
Router 11	S0/0/0	10.13.0.41	255.255.255.252
Router 11	S0/0/1	10.13.0.38	255.255.255.252
Router 12	G0/0	190.140.123.1	255.255.255.0
Router 12	S0/0/0	10.13.0.42	255.255.255.252
Router 12	S0/0/1	10.13.0.46	255.255.255.252

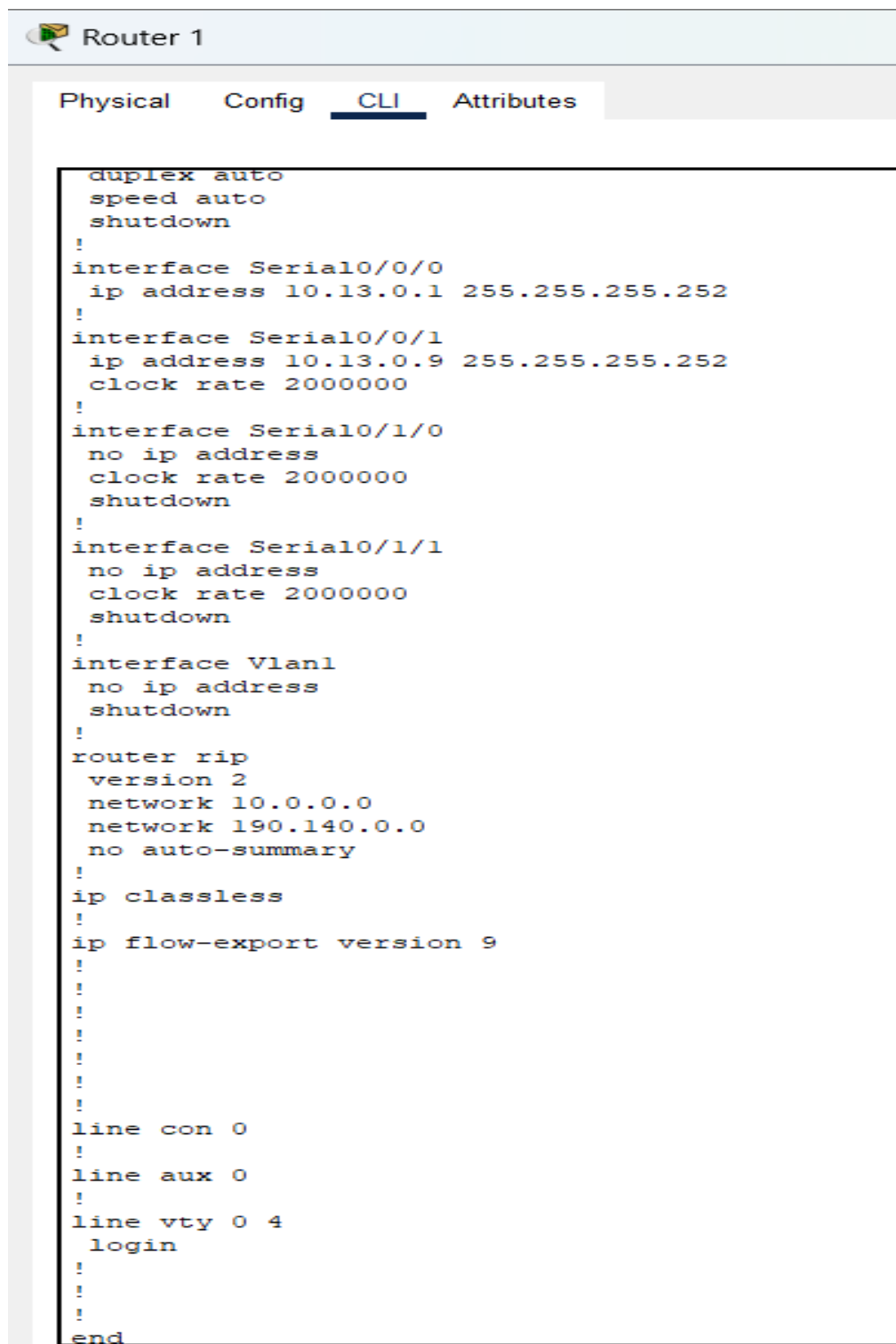
**ZONA 0.**

Dispositivo	Interfaz	Red	Mascara
Router ABR1	S0/0/0	187.203.28.2	255.255.255.248
Router ABR1	S0/0/1	184.199.24.1	255.255.255.248
Router ABR1	S0/1/0	186.202.27.2	255.255.255.248
Router ABR2	S0/0/0	189.205.30.2	255.255.255.248
Router ABR2	S0/0/1	184.199.24.2	255.255.255.248
Router ABR2	S0/1/0	188.204.29.2	255.255.255.248

## Capturas de pantalla.

### ROUTER 1.

1)show running-config.



```
Router 1
Physical Config CLI Attributes
duplex auto
speed auto
shutdown
!
interface Serial0/0/0
ip address 10.13.0.1 255.255.255.252
!
interface Serial0/0/1
ip address 10.13.0.9 255.255.255.252
clock rate 2000000
!
interface Serial0/1/0
no ip address
clock rate 2000000
shutdown
!
interface Serial0/1/1
no ip address
clock rate 2000000
shutdown
!
interface Vlan1
no ip address
shutdown
!
router rip
version 2
network 10.0.0.0
network 190.140.0.0
no auto-summary
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
login
!
!
!
end
```

## 2)show ip route.

Router 1

Physical Config CLI Attributes

IOS Command Line Interface

```

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is 10.13.0.10 to network 0.0.0.0

10.0.0.0/8 is variably subnetted, 14 subnets, 2 masks
C    10.13.0.0/30 is directly connected, Serial0/0/0
L    10.13.0.1/32 is directly connected, Serial0/0/0
R    10.13.0.4/30 [120/1] via 10.13.0.10, 00:00:04, Serial0/0/1
      [120/1] via 10.13.0.2, 00:00:17, Serial0/0/0
C    10.13.0.8/30 is directly connected, Serial0/0/1
L    10.13.0.9/32 is directly connected, Serial0/0/1
R    10.13.0.12/30 [120/4] via 10.13.0.10, 00:00:04, Serial0/0/1
R    10.13.0.16/30 [120/4] via 10.13.0.10, 00:00:04, Serial0/0/1
R    10.13.0.20/30 [120/4] via 10.13.0.10, 00:00:04, Serial0/0/1
R    10.13.0.24/30 [120/4] via 10.13.0.10, 00:00:04, Serial0/0/1
R    10.13.0.28/30 [120/4] via 10.13.0.10, 00:00:04, Serial0/0/1
R    10.13.0.32/30 [120/4] via 10.13.0.10, 00:00:04, Serial0/0/1
R    10.13.0.36/30 [120/4] via 10.13.0.10, 00:00:04, Serial0/0/1
R    10.13.0.40/30 [120/4] via 10.13.0.10, 00:00:04, Serial0/0/1
R    10.13.0.44/30 [120/4] via 10.13.0.10, 00:00:04, Serial0/0/1
184.199.0.0/29 is subnetted, 1 subnets
R    184.199.24.0/29 [120/4] via 10.13.0.10, 00:00:04, Serial0/0/1
184.200.0.0/29 is subnetted, 1 subnets
R    184.200.25.0/29 [120/1] via 10.13.0.10, 00:00:04, Serial0/0/1
185.201.0.0/29 is subnetted, 1 subnets
R    185.201.26.0/29 [120/2] via 10.13.0.10, 00:00:04, Serial0/0/1
186.202.0.0/29 is subnetted, 1 subnets
R    186.202.27.0/29 [120/3] via 10.13.0.10, 00:00:04, Serial0/0/1
187.203.0.0/29 is subnetted, 1 subnets
R    187.203.28.0/29 [120/4] via 10.13.0.10, 00:00:04, Serial0/0/1
188.204.0.0/29 is subnetted, 1 subnets
R    188.204.29.0/29 [120/4] via 10.13.0.10, 00:00:04, Serial0/0/1
189.205.0.0/29 is subnetted, 1 subnets
R    189.205.30.0/29 [120/4] via 10.13.0.10, 00:00:04, Serial0/0/1
190.140.0.0/16 is variably subnetted, 11 subnets, 2 masks
C    190.140.13.0/24 is directly connected, GigabitEthernet0/0
L    190.140.13.1/32 is directly connected, GigabitEthernet0/0
R    190.140.23.0/24 [120/1] via 10.13.0.2, 00:00:17, Serial0/0/0
R    190.140.33.0/24 [120/1] via 10.13.0.10, 00:00:04, Serial0/0/1
R    190.140.53.0/24 [120/4] via 10.13.0.10, 00:00:04, Serial0/0/1
R    190.140.73.0/24 [120/4] via 10.13.0.10, 00:00:04, Serial0/0/1
R    190.140.83.0/24 [120/4] via 10.13.0.10, 00:00:04, Serial0/0/1
R    190.140.93.0/24 [120/4] via 10.13.0.10, 00:00:04, Serial0/0/1
R    190.140.103.0/24 [120/4] via 10.13.0.10, 00:00:04, Serial0/0/1
R    190.140.113.0/24 [120/4] via 10.13.0.10, 00:00:04, Serial0/0/1
R    190.140.123.0/24 [120/4] via 10.13.0.10, 00:00:04, Serial0/0/1
R*   0.0.0.0/0 [120/1] via 10.13.0.10, 00:00:04, Serial0/0/1

```

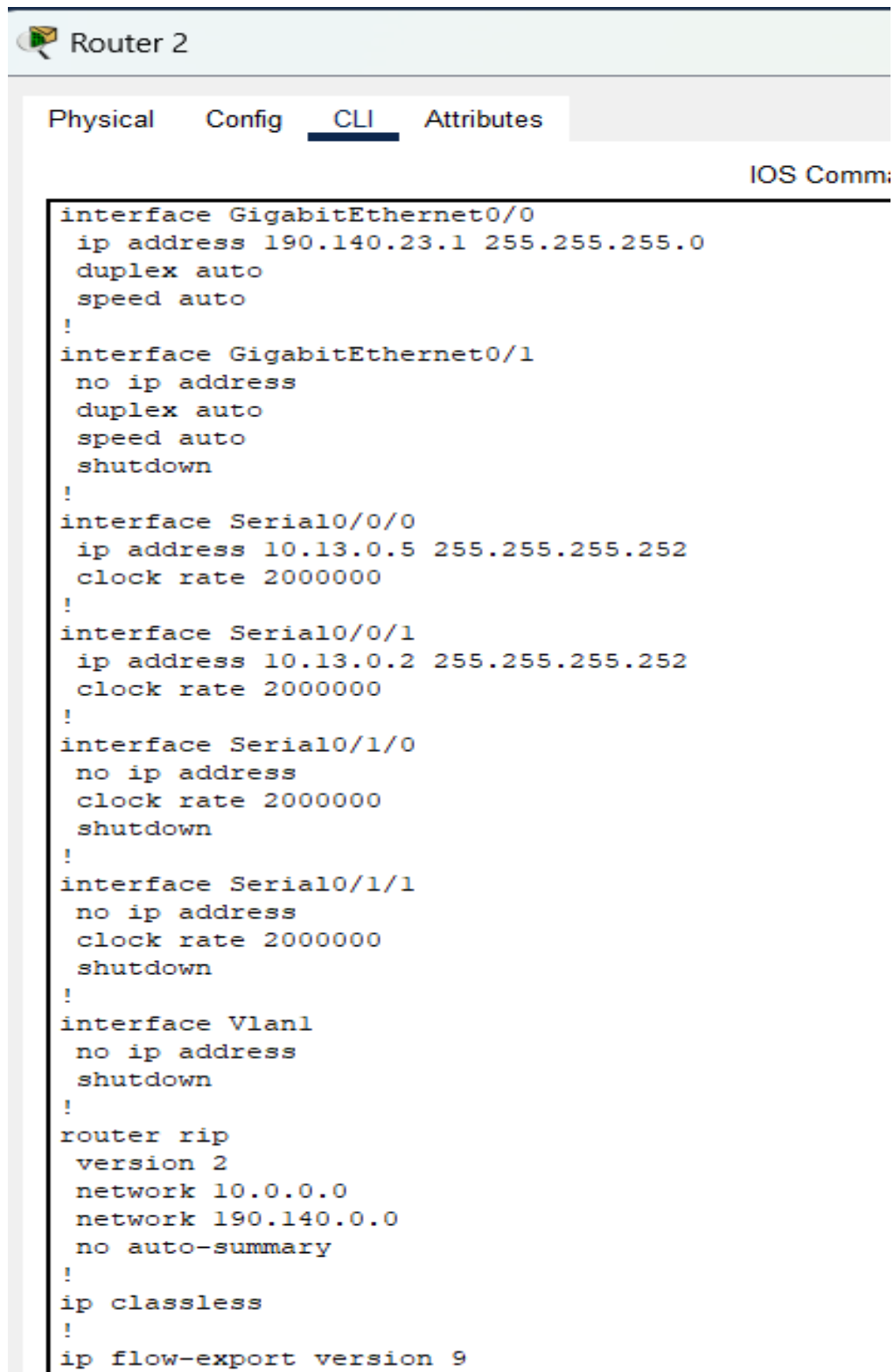
## 3)show ip protocols.

Router 1

Physical Config CLI Attributes

IOS Command Line Interface

```
Router#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 17 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
  Interface          Send  Recv  Triggered RIP  Key-chain
GigabitEthernet0/0    22
Serial0/0/0           22
Serial0/0/1           22
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
  10.0.0.0
  190.140.0.0
Passive Interface(s):
Routing Information Sources:
  Gateway            Distance      Last Update
  10.13.0.10          120           00:00:13
  10.13.0.2           120           00:00:25
Distance: (default is 120)
```

**RUTER 2.****1)show running-config.**

```
Router 2

Physical  Config  CLI  Attributes

IOS Comm:

interface GigabitEthernet0/0
 ip address 190.140.23.1 255.255.255.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/0/0
 ip address 10.13.0.5 255.255.255.252
 clock rate 2000000
!
interface Serial0/0/1
 ip address 10.13.0.2 255.255.255.252
 clock rate 2000000
!
interface Serial0/1/0
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/1/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router rip
 version 2
 network 10.0.0.0
 network 190.140.0.0
 no auto-summary
!
ip classless
!
ip flow-export version 9
```



## 2)show ip route.

Router 2

Physical Config CLI Attributes

IOS Command Line Interface

```


Gateway of last resort is 10.13.0.6 to network 0.0.0.0

 10.0.0.0/8 is variably subnetted, 14 subnets, 2 masks
C    10.13.0.0/30 is directly connected, Serial0/0/1
L    10.13.0.2/32 is directly connected, Serial0/0/1
C    10.13.0.4/30 is directly connected, Serial0/0/0
L    10.13.0.5/32 is directly connected, Serial0/0/0
R    10.13.0.8/30 [120/1] via 10.13.0.6, 00:00:26, Serial0/0/0
R    10.13.0.12/30 [120/4] via 10.13.0.6, 00:00:26, Serial0/0/0
R    10.13.0.16/30 [120/4] via 10.13.0.6, 00:00:26, Serial0/0/0
R    10.13.0.20/30 [120/4] via 10.13.0.6, 00:00:26, Serial0/0/0
R    10.13.0.24/30 [120/4] via 10.13.0.6, 00:00:26, Serial0/0/0
R    10.13.0.28/30 [120/4] via 10.13.0.6, 00:00:26, Serial0/0/0
R    10.13.0.32/30 [120/4] via 10.13.0.6, 00:00:26, Serial0/0/0
R    10.13.0.36/30 [120/4] via 10.13.0.6, 00:00:26, Serial0/0/0
R    10.13.0.40/30 [120/4] via 10.13.0.6, 00:00:26, Serial0/0/0
R    10.13.0.44/30 [120/4] via 10.13.0.6, 00:00:26, Serial0/0/0
 184.199.0.0/29 is subnetted, 1 subnets
R    184.199.24.0/29 [120/4] via 10.13.0.6, 00:00:26, Serial0/0/0
 184.200.0.0/29 is subnetted, 1 subnets
R    184.200.25.0/29 [120/1] via 10.13.0.6, 00:00:26, Serial0/0/0
 185.201.0.0/29 is subnetted, 1 subnets
R    185.201.26.0/29 [120/2] via 10.13.0.6, 00:00:26, Serial0/0/0
 186.202.0.0/29 is subnetted, 1 subnets
R    186.202.27.0/29 [120/3] via 10.13.0.6, 00:00:26, Serial0/0/0
 187.203.0.0/29 is subnetted, 1 subnets
R    187.203.28.0/29 [120/4] via 10.13.0.6, 00:00:26, Serial0/0/0
 188.204.0.0/29 is subnetted, 1 subnets
R    188.204.29.0/29 [120/4] via 10.13.0.6, 00:00:26, Serial0/0/0
 189.205.0.0/29 is subnetted, 1 subnets
R    189.205.30.0/29 [120/4] via 10.13.0.6, 00:00:26, Serial0/0/0
 190.140.0.0/16 is variably subnetted, 11 subnets, 2 masks
R    190.140.13.0/24 [120/1] via 10.13.0.1, 00:00:26, Serial0/0/1
C    190.140.23.0/24 is directly connected, GigabitEthernet0/0
L    190.140.23.1/32 is directly connected, GigabitEthernet0/0
R    190.140.33.0/24 [120/1] via 10.13.0.6, 00:00:26, Serial0/0/0
R    190.140.53.0/24 [120/4] via 10.13.0.6, 00:00:26, Serial0/0/0
R    190.140.73.0/24 [120/4] via 10.13.0.6, 00:00:26, Serial0/0/0
R    190.140.83.0/24 [120/4] via 10.13.0.6, 00:00:26, Serial0/0/0
R    190.140.93.0/24 [120/4] via 10.13.0.6, 00:00:26, Serial0/0/0
R    190.140.103.0/24 [120/4] via 10.13.0.6, 00:00:26, Serial0/0/0
R    190.140.113.0/24 [120/4] via 10.13.0.6, 00:00:26, Serial0/0/0
R    190.140.123.0/24 [120/4] via 10.13.0.6, 00:00:26, Serial0/0/0
R*   0.0.0.0/0 [120/1] via 10.13.0.6, 00:00:26, Serial0/0/0

Router#

```

## 3)show ip protocols.

 Router 2

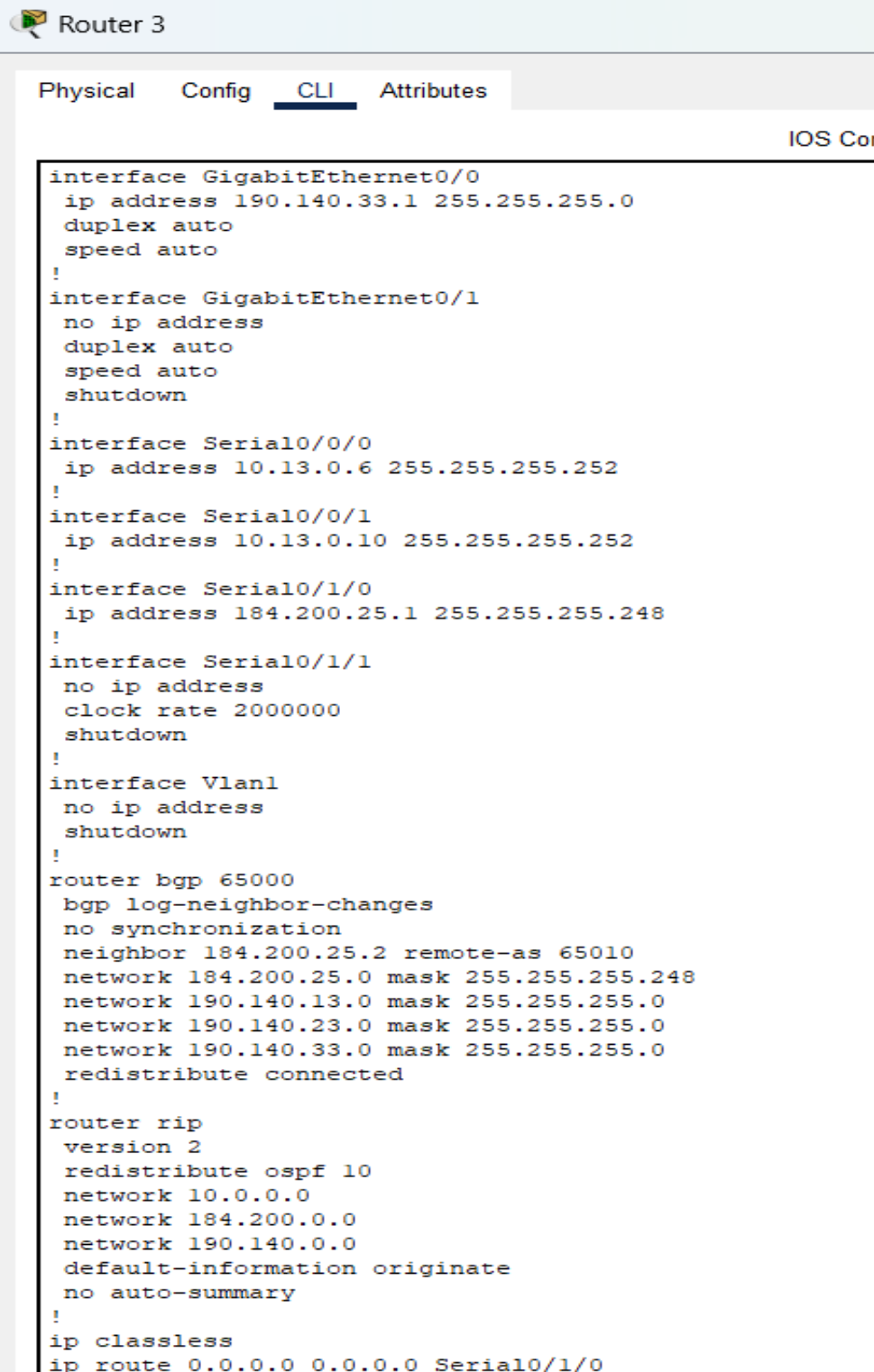
Physical Config CLI Attributes

IOS Command Line Interface

```
Router#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 13 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
  Interface          Send Recv Triggered RIP Key-chain
GigabitEthernet0/0   22
Serial10/0/0         22
Serial10/0/1         22
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
  10.0.0.0
  190.140.0.0
Passive Interface(s):
Routing Information Sources:
  Gateway           Distance      Last Update
  10.13.0.6          120          00:00:16
  10.13.0.1          120          00:00:16
Distance: (default is 120)
```

### RUTER 3.

1)show running-config.



```

Router 3

Physical Config CLI Attributes

IOS Cor

interface GigabitEthernet0/0
 ip address 190.140.33.1 255.255.255.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/0/0
 ip address 10.13.0.6 255.255.255.252
!
interface Serial0/0/1
 ip address 10.13.0.10 255.255.255.252
!
interface Serial0/1/0
 ip address 184.200.25.1 255.255.255.248
!
interface Serial0/1/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router bgp 65000
 bgp log-neighbor-changes
 no synchronization
 neighbor 184.200.25.2 remote-as 65010
 network 184.200.25.0 mask 255.255.255.248
 network 190.140.13.0 mask 255.255.255.0
 network 190.140.23.0 mask 255.255.255.0
 network 190.140.33.0 mask 255.255.255.0
 redistribute connected
!
router rip
 version 2
 redistribute ospf 10
 network 10.0.0.0
 network 184.200.0.0
 network 190.140.0.0
 default-information originate
 no auto-summary
!
ip classless
ip route 0.0.0.0 0.0.0.0 Serial0/1/0

```

## 2)show ip route.

Router 3

Physical Config CLI Attributes

IOS Command Line Interface

```

* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is 0.0.0.0 to network 0.0.0.0

  10.0.0.0/8 is variably subnetted, 14 subnets, 2 masks
R    10.13.0.0/30 [120/1] via 10.13.0.5, 00:00:10, Serial0/0/0
C    10.13.0.4/30 is directly connected, Serial0/0/0
L    10.13.0.6/32 is directly connected, Serial0/0/0
C    10.13.0.8/30 is directly connected, Serial0/0/1
L    10.13.0.10/32 is directly connected, Serial0/0/1
R    10.13.0.12/30 [120/3] via 184.200.25.2, 00:00:28, Serial0/1/0
R    10.13.0.16/30 [120/3] via 184.200.25.2, 00:00:28, Serial0/1/0
R    10.13.0.20/30 [120/3] via 184.200.25.2, 00:00:28, Serial0/1/0
R    10.13.0.24/30 [120/3] via 184.200.25.2, 00:00:28, Serial0/1/0
R    10.13.0.28/30 [120/3] via 184.200.25.2, 00:00:28, Serial0/1/0
R    10.13.0.32/30 [120/3] via 184.200.25.2, 00:00:28, Serial0/1/0
R    10.13.0.36/30 [120/3] via 184.200.25.2, 00:00:28, Serial0/1/0
R    10.13.0.40/30 [120/3] via 184.200.25.2, 00:00:28, Serial0/1/0
R    10.13.0.44/30 [120/3] via 184.200.25.2, 00:00:28, Serial0/1/0
  184.199.0.0/29 is subnetted, 1 subnets
B    184.199.24.0/29 [20/0] via 184.200.25.2, 00:00:00
  184.200.0.0/16 is variably subnetted, 2 subnets, 2 masks
C    184.200.25.0/29 is directly connected, Serial0/1/0
L    184.200.25.1/32 is directly connected, Serial0/1/0
  185.201.0.0/29 is subnetted, 1 subnets
B    185.201.26.0/29 [20/0] via 184.200.25.2, 00:00:00
  186.202.0.0/29 is subnetted, 1 subnets
B    186.202.27.0/29 [20/0] via 184.200.25.2, 00:00:00
  187.203.0.0/29 is subnetted, 1 subnets
B    187.203.28.0/29 [20/0] via 184.200.25.2, 00:00:00
  188.204.0.0/29 is subnetted, 1 subnets
B    188.204.29.0/29 [20/0] via 184.200.25.2, 00:00:00
  189.205.0.0/29 is subnetted, 1 subnets
B    189.205.30.0/29 [20/0] via 184.200.25.2, 00:00:00
  190.140.0.0/16 is variably subnetted, 11 subnets, 2 masks
R    190.140.13.0/24 [120/1] via 10.13.0.9, 00:00:27, Serial0/0/1
R    190.140.23.0/24 [120/1] via 10.13.0.5, 00:00:10, Serial0/0/0
C    190.140.33.0/24 is directly connected, GigabitEthernet0/0
L    190.140.33.1/32 is directly connected, GigabitEthernet0/0
B    190.140.53.0/24 [20/0] via 184.200.25.2, 00:00:00
B    190.140.73.0/24 [20/0] via 184.200.25.2, 00:00:00
R    190.140.83.0/24 [120/3] via 184.200.25.2, 00:00:28, Serial0/1/0
R    190.140.93.0/24 [120/3] via 184.200.25.2, 00:00:28, Serial0/1/0
R    190.140.103.0/24 [120/3] via 184.200.25.2, 00:00:28, Serial0/1/0
R    190.140.113.0/24 [120/3] via 184.200.25.2, 00:00:28, Serial0/1/0
R    190.140.123.0/24 [120/3] via 184.200.25.2, 00:00:28, Serial0/1/0
S*   0.0.0.0/0 is directly connected, Serial0/1/0

Router#

```

## 3)show ip protocols.

Router 3

Physical Config CLI Attributes

IOS Command Line Interface

```

Router#show ip protocols
Routing Protocol is "bgp 65000"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  IGP synchronization is disabled
  Automatic route summarization is disabled
  Neighbor(s):
    Address          FiltIn FiltOut DistIn DistOut Weight RouteMap
    184.200.25.2
  Maximum path: 1
  Routing Information Sources:
    Gateway          Distance      Last Update
    184.200.25.2          20          00:00:00
  Distance: external 20 internal 200 local 200
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 24 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Redistributing: rip, ospf 10
  Default version control: send version 2, receive 2
  Interface          Send Recv Triggered RIP Key-chain
  GigabitEthernet0/0    22
  Serial10/0/0          22
  Serial10/0/1          22
  Serial10/1/0          22
  Automatic network summarization is not in effect
  Maximum path: 4
  Routing for Networks:
    10.0.0.0
    184.200.0.0
    190.140.0.0
  Passive Interface(s):
  Routing Information Sources:
    Gateway          Distance      Last Update
    10.13.0.5          120          00:00:29
    10.13.0.9          120          00:00:21
    184.200.25.2       120          00:00:21
  Distance: (default is 120)

```

## RUTER 4.

1)show running-config .

 Router 4  

Physical Config CLI Attributes

IOS Command Line

```
!
!
!
!
!
interface GigabitEthernet0/0
 ip address 190.140.43.1 255.255.255.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/0/0
 ip address 10.13.0.13 255.255.255.252
!
interface Serial0/0/1
 ip address 10.13.0.21 255.255.255.252
 clock rate 2000000
!
interface Serial0/1/0
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/1/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router ospf 65001
 log-adjacency-changes
 network 190.140.43.0 0.0.0.255 area 2
 network 10.13.0.12 0.0.0.3 area 2
 network 10.13.0.20 0.0.0.3 area 2
!
ip classless
!
ip flow-export version 9
```



## 2)show ip route.

Router 4

Physical Config CLI Attributes

IOS Command Line Interface

```


Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

    10.0.0.0/8 is variably subnetted, 14 subnets, 2 masks
O E2   10.13.0.0/30 [110/20] via 10.13.0.14, 01:08:06, Serial0/0/0
O E2   10.13.0.4/30 [110/20] via 10.13.0.14, 01:08:06, Serial0/0/0
O E2   10.13.0.8/30 [110/20] via 10.13.0.14, 01:08:06, Serial0/0/0
C       10.13.0.12/30 is directly connected, Serial0/0/0
L       10.13.0.13/32 is directly connected, Serial0/0/0
O       10.13.0.16/30 [110/128] via 10.13.0.14, 01:25:26, Serial0/0/0
        [110/128] via 10.13.0.22, 01:25:26, Serial0/0/1
C       10.13.0.20/30 is directly connected, Serial0/0/1
L       10.13.0.21/32 is directly connected, Serial0/0/1
O E2   10.13.0.24/30 [110/20] via 10.13.0.14, 01:07:16, Serial0/0/0
O E2   10.13.0.28/30 [110/20] via 10.13.0.14, 01:07:16, Serial0/0/0
O E2   10.13.0.32/30 [110/20] via 10.13.0.14, 01:07:16, Serial0/0/0
O E2   10.13.0.36/30 [110/20] via 10.13.0.14, 01:08:06, Serial0/0/0
O E2   10.13.0.40/30 [110/20] via 10.13.0.14, 01:08:06, Serial0/0/0
O E2   10.13.0.44/30 [110/20] via 10.13.0.14, 01:08:06, Serial0/0/0
    184.199.0.0/29 is subnetted, 1 subnets
O IA    184.199.24.0/29 [110/192] via 10.13.0.14, 01:08:06, Serial0/0/0
    184.200.0.0/29 is subnetted, 1 subnets
O E2    184.200.25.0/29 [110/20] via 10.13.0.14, 01:08:06, Serial0/0/0
    185.201.0.0/29 is subnetted, 1 subnets
O E2    185.201.26.0/29 [110/20] via 10.13.0.14, 01:08:06, Serial0/0/0
    186.202.0.0/29 is subnetted, 1 subnets
O IA    186.202.27.0/29 [110/192] via 10.13.0.14, 01:45:13, Serial0/0/0
    187.203.0.0/29 is subnetted, 1 subnets
O IA    187.203.28.0/29 [110/128] via 10.13.0.14, 01:45:13, Serial0/0/0
    188.204.0.0/29 is subnetted, 1 subnets
O IA    188.204.29.0/29 [110/256] via 10.13.0.14, 01:07:06, Serial0/0/0
    189.205.0.0/29 is subnetted, 1 subnets
O IA    189.205.30.0/29 [110/256] via 10.13.0.14, 01:08:06, Serial0/0/0
    190.140.0.0/16 is variably subnetted, 13 subnets, 2 masks
O E2    190.140.13.0/24 [110/20] via 10.13.0.14, 01:08:06, Serial0/0/0
O E2    190.140.23.0/24 [110/20] via 10.13.0.14, 01:08:06, Serial0/0/0
O E2    190.140.33.0/24 [110/20] via 10.13.0.14, 01:08:06, Serial0/0/0
C       190.140.43.0/24 is directly connected, GigabitEthernet0/0
L       190.140.43.1/32 is directly connected, GigabitEthernet0/0
O       190.140.53.0/24 [110/65] via 10.13.0.14, 01:27:07, Serial0/0/0
O       190.140.63.0/24 [110/65] via 10.13.0.22, 01:25:26, Serial0/0/1
O IA    190.140.73.0/24 [110/257] via 10.13.0.14, 01:08:06, Serial0/0/0
O E2    190.140.83.0/24 [110/20] via 10.13.0.14, 01:07:26, Serial0/0/0

```

**3)show ip protocols.**

 Router 4

Physical Config CLI Attributes

IOS Command Line Interface

```
Router#show ip protocols

Routing Protocol is "ospf 65001"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 190.140.43.1
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    190.140.43.0 0.0.0.255 area 2
    10.13.0.12 0.0.0.3 area 2
    10.13.0.20 0.0.0.3 area 2
  Routing Information Sources:
    Gateway         Distance      Last Update
    190.140.43.1          110         00:29:08
    190.140.53.1          110         00:28:07
    190.140.63.1          110         00:26:54
  Distance: (default is 110)

Router#
```



**ROUTER 5.****1)show running-config**

Router 5

Physical Config CLI Attributes

IOS Command Line Interface

```

interface GigabitEthernet0/0
 ip address 190.140.53.1 255.255.255.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/0/0
 ip address 10.13.0.17 255.255.255.252
 clock rate 2000000
!
interface Serial0/0/1
 ip address 10.13.0.14 255.255.255.252
 clock rate 2000000
!
interface Serial0/1/0
 ip address 187.203.28.1 255.255.255.248
!
interface Serial0/1/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router ospf 65001
 log-adjacency-changes
 network 190.140.53.0 0.0.0.255 area 2
 network 10.13.0.12 0.0.0.3 area 2
 network 10.13.0.16 0.0.0.3 area 2
 network 187.203.28.0 0.0.0.7 area 0
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
line con 0
!

```

## 2)show ip route.

Router 5

Physical Config CLI Attributes

IOS Command Line Interface

```


Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

    10.0.0.0/8 is variably subnetted, 14 subnets, 2 masks
O E2   10.13.0.0/30 [110/20] via 187.203.28.2, 01:49:43, Serial0/1/0
O E2   10.13.0.4/30 [110/20] via 187.203.28.2, 01:12:49, Serial0/1/0
O E2   10.13.0.8/30 [110/20] via 187.203.28.2, 01:12:49, Serial0/1/0
C       10.13.0.12/30 is directly connected, Serial0/0/1
L       10.13.0.14/32 is directly connected, Serial0/0/1
C       10.13.0.16/30 is directly connected, Serial0/0/0
L       10.13.0.17/32 is directly connected, Serial0/0/0
O       10.13.0.20/30 [110/128] via 10.13.0.18, 01:29:51, Serial0/0/0
        [110/128] via 10.13.0.13, 01:29:51, Serial0/0/1
O E2   10.13.0.24/30 [110/20] via 187.203.28.2, 01:11:51, Serial0/1/0
O E2   10.13.0.28/30 [110/20] via 187.203.28.2, 01:11:51, Serial0/1/0
O E2   10.13.0.32/30 [110/20] via 187.203.28.2, 01:11:51, Serial0/1/0
O E2   10.13.0.36/30 [110/20] via 187.203.28.2, 01:12:49, Serial0/1/0
O E2   10.13.0.40/30 [110/20] via 187.203.28.2, 01:12:49, Serial0/1/0
O E2   10.13.0.44/30 [110/20] via 187.203.28.2, 01:12:49, Serial0/1/0
    184.199.0.0/29 is subnetted, 1 subnets
O       184.199.24.0/29 [110/128] via 187.203.28.2, 01:12:49, Serial0/1/0
    184.200.0.0/29 is subnetted, 1 subnets
O E2   184.200.25.0/29 [110/20] via 187.203.28.2, 01:12:49, Serial0/1/0
    185.201.0.0/29 is subnetted, 1 subnets
O E2   185.201.26.0/29 [110/20] via 187.203.28.2, 01:12:49, Serial0/1/0
    186.202.0.0/29 is subnetted, 1 subnets
O       186.202.27.0/29 [110/128] via 187.203.28.2, 01:12:39, Serial0/1/0
    187.203.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       187.203.28.0/29 is directly connected, Serial0/1/0
L       187.203.28.1/32 is directly connected, Serial0/1/0
    188.204.0.0/29 is subnetted, 1 subnets
O       188.204.29.0/29 [110/192] via 187.203.28.2, 01:11:41, Serial0/1/0
    189.205.0.0/29 is subnetted, 1 subnets
O       189.205.30.0/29 [110/192] via 187.203.28.2, 01:12:49, Serial0/1/0
    190.140.0.0/16 is variably subnetted, 13 subnets, 2 masks
O E2   190.140.13.0/24 [110/20] via 187.203.28.2, 01:12:49, Serial0/1/0
O E2   190.140.23.0/24 [110/20] via 187.203.28.2, 01:12:49, Serial0/1/0
O E2   190.140.33.0/24 [110/20] via 187.203.28.2, 01:12:49, Serial0/1/0
O       190.140.43.0/24 [110/65] via 10.13.0.13, 01:32:19, Serial0/0/1
C       190.140.53.0/24 is directly connected, GigabitEthernet0/0
L       190.140.53.1/32 is directly connected, GigabitEthernet0/0

```

**3)show ip protocols.**

 Router 5

Physical Config **CLI** Attributes

IOS Command Line Interface


```
Router#show ip protocols

Routing Protocol is "ospf 65001"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 190.140.53.1
  Number of areas in this router is 2. 2 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    190.140.53.0 0.0.0.255 area 2
    10.13.0.12 0.0.0.3 area 2
    10.13.0.16 0.0.0.3 area 2
    187.203.28.0 0.0.0.7 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
    186.202.27.1     110          00:17:01
    187.203.28.2     110          00:13:23
    189.205.30.2     110          00:12:20
    190.140.43.1     110          00:02:35
    190.140.53.1     110          00:01:21
    190.140.63.1     110          00:00:23
    190.140.73.1     110          00:26:05
    190.140.103.1    110          00:21:42
  Distance: (default is 110)

Router#
```

## ROUTER 6.

### 1)show running-config

 Route 6

Physical Config **CLI** Attributes


IOS Command Line Interface

```

!
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface GigabitEthernet0/0
 ip address 190.140.63.1 255.255.255.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/0/0
 ip address 10.13.0.18 255.255.255.252
!
interface Serial0/0/1
 ip address 10.13.0.22 255.255.255.252
!
interface Serial0/1/0
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/1/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router ospf 65001
 log-adjacency-changes
 network 190.140.63.0 0.0.0.255 area 2
 network 10.13.0.16 0.0.0.3 area 2
 network 10.13.0.20 0.0.0.3 area 2
!
ip classless
!
ip flow-export version 9
!

```

## 2)show ip route.

 Route 6

Physical   Config   CLI   Attributes

IOS Command Line Interface


```

Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

    10.0.0.0/8 is variably subnetted, 14 subnets, 2 masks
O E2   10.13.0.0/30 [110/20] via 10.13.0.17, 01:22:11, Serial0/0/0
O E2   10.13.0.4/30 [110/20] via 10.13.0.17, 01:22:11, Serial0/0/0
O E2   10.13.0.8/30 [110/20] via 10.13.0.17, 01:22:11, Serial0/0/0
O      10.13.0.12/30 [110/128] via 10.13.0.17, 01:39:40, Serial0/0/0
           [110/128] via 10.13.0.21, 01:39:40, Serial0/0/1
C      10.13.0.16/30 is directly connected, Serial0/0/0
L      10.13.0.18/32 is directly connected, Serial0/0/0
C      10.13.0.20/30 is directly connected, Serial0/0/1
L      10.13.0.22/32 is directly connected, Serial0/0/1
O E2   10.13.0.24/30 [110/20] via 10.13.0.17, 01:21:31, Serial0/0/0
O E2   10.13.0.28/30 [110/20] via 10.13.0.17, 01:21:31, Serial0/0/0
O E2   10.13.0.32/30 [110/20] via 10.13.0.17, 01:21:31, Serial0/0/0
O E2   10.13.0.36/30 [110/20] via 10.13.0.17, 01:22:11, Serial0/0/0
O E2   10.13.0.40/30 [110/20] via 10.13.0.17, 01:22:11, Serial0/0/0
O E2   10.13.0.44/30 [110/20] via 10.13.0.17, 01:22:11, Serial0/0/0
    184.199.0.0/29 is subnetted, 1 subnets
O IA   184.199.24.0/29 [110/192] via 10.13.0.17, 01:22:11, Serial0/0/0
    184.200.0.0/29 is subnetted, 1 subnets
O E2   184.200.25.0/29 [110/20] via 10.13.0.17, 01:22:11, Serial0/0/0
    185.201.0.0/29 is subnetted, 1 subnets
O E2   185.201.26.0/29 [110/20] via 10.13.0.17, 01:22:11, Serial0/0/0
    186.202.0.0/29 is subnetted, 1 subnets
O IA   186.202.27.0/29 [110/192] via 10.13.0.17, 01:59:22, Serial0/0/0
    187.203.0.0/29 is subnetted, 1 subnets
O IA   187.203.28.0/29 [110/128] via 10.13.0.17, 01:59:22, Serial0/0/0
    188.204.0.0/29 is subnetted, 1 subnets
O IA   188.204.29.0/29 [110/256] via 10.13.0.17, 01:21:21, Serial0/0/0
    189.205.0.0/29 is subnetted, 1 subnets
O IA   189.205.30.0/29 [110/256] via 10.13.0.17, 01:22:11, Serial0/0/0
    190.140.0.0/16 is variably subnetted, 13 subnets, 2 masks
O E2   190.140.13.0/24 [110/20] via 10.13.0.17, 01:22:11, Serial0/0/0
O E2   190.140.23.0/24 [110/20] via 10.13.0.17, 01:22:11, Serial0/0/0
O E2   190.140.33.0/24 [110/20] via 10.13.0.17, 01:22:11, Serial0/0/0
O      190.140.43.0/24 [110/65] via 10.13.0.21, 01:41:51, Serial0/0/1
O      190.140.53.0/24 [110/65] via 10.13.0.17, 01:59:32, Serial0/0/0
C      190.140.63.0/24 is directly connected, GigabitEthernet0/0
L      190.140.63.1/32 is directly connected, GigabitEthernet0/0
O IA   190.140.73.0/24 [110/257] via 10.13.0.17, 01:22:11, Serial0/0/0
          
```

## 3)show ip protocols.

 Route 6

Physical Config CLI Attributes

IOS Command Line Interface

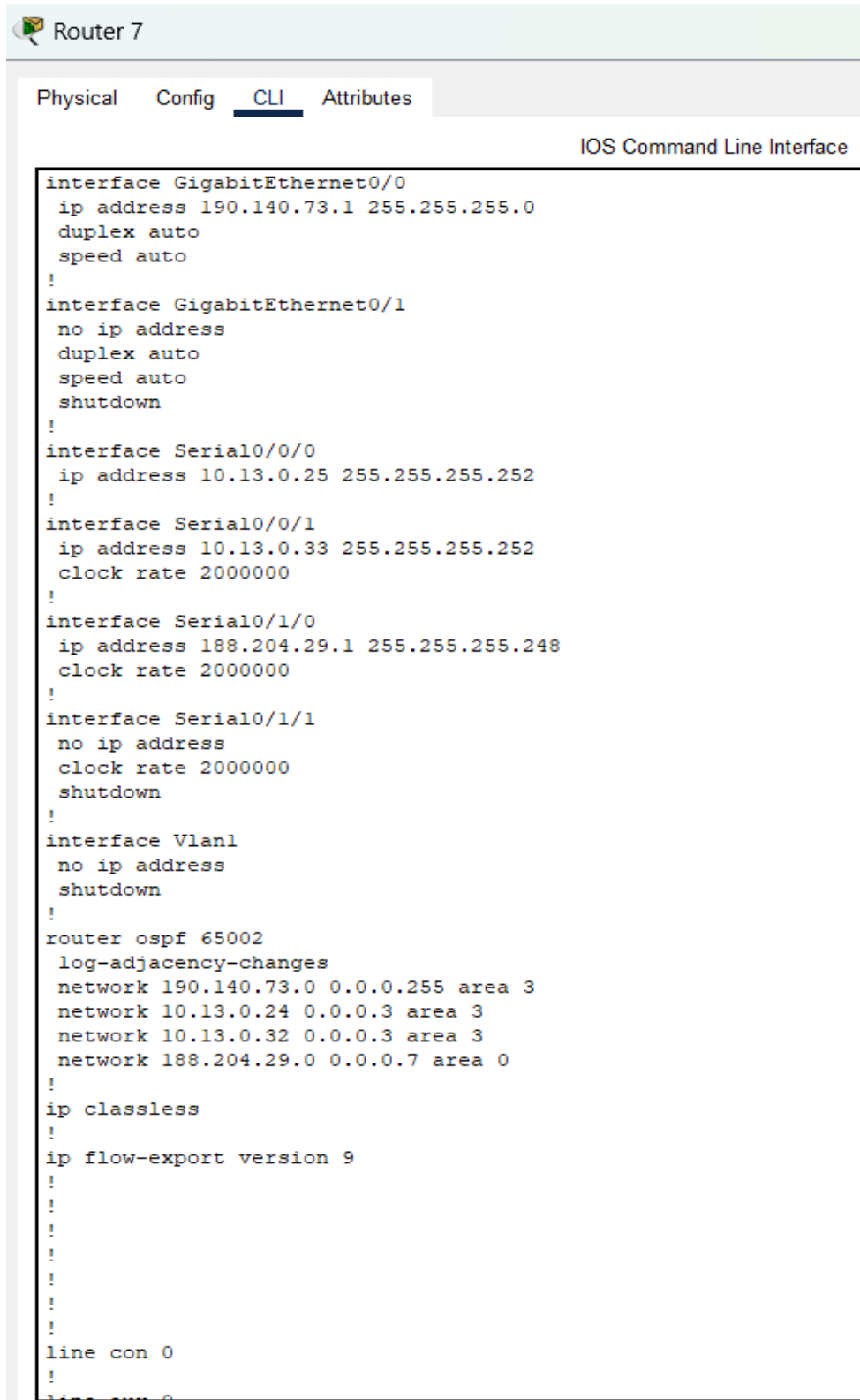
```
Router#show ip protocols

Routing Protocol is "ospf 65001"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 190.140.63.1
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    190.140.63.0 0.0.0.255 area 2
    10.13.0.16 0.0.0.3 area 2
    10.13.0.20 0.0.0.3 area 2
  Routing Information Sources:
    Gateway         Distance      Last Update
    190.140.43.1      110          00:12:19
    190.140.53.1      110          00:11:18
    190.140.63.1      110          00:10:06
  Distance: (default is 110)

Router#
```

## ROUTER 7.

### 1)show running-config.




```

Router 7
Physical Config CLI Attributes
IOS Command Line Interface

interface GigabitEthernet0/0
 ip address 190.140.73.1 255.255.255.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/0/0
 ip address 10.13.0.25 255.255.255.252
!
interface Serial0/0/1
 ip address 10.13.0.33 255.255.255.252
 clock rate 2000000
!
interface Serial0/1/0
 ip address 188.204.29.1 255.255.255.248
 clock rate 2000000
!
interface Serial0/1/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router ospf 65002
 log-adjacency-changes
 network 190.140.73.0 0.0.0.255 area 3
 network 10.13.0.24 0.0.0.3 area 3
 network 10.13.0.32 0.0.0.3 area 3
 network 188.204.29.0 0.0.0.7 area 0
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
line con 0
!
line aux 0

```

## 2)show ip route.

 Router 7

Physical   Config   CLI   Attributes

IOS Command Line Interface

```

Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route


Gateway of last resort is not set

    10.0.0.0/8 is variably subnetted, 14 subnets, 2 masks
O E2   10.13.0.0/30 [110/20] via 188.204.29.2, 02:02:35, Serial0/1/0
O E2   10.13.0.4/30 [110/20] via 188.204.29.2, 01:51:16, Serial0/1/0
O E2   10.13.0.8/30 [110/20] via 188.204.29.2, 01:51:16, Serial0/1/0
O E2   10.13.0.12/30 [110/20] via 188.204.29.2, 01:24:47, Serial0/1/0
O E2   10.13.0.16/30 [110/20] via 188.204.29.2, 01:24:47, Serial0/1/0
O E2   10.13.0.20/30 [110/20] via 188.204.29.2, 01:24:47, Serial0/1/0
C       10.13.0.24/30 is directly connected, Serial0/0/0
L       10.13.0.25/32 is directly connected, Serial0/0/0
O       10.13.0.28/30 [110/128] via 10.13.0.26, 01:36:08, Serial0/0/0
        [110/128] via 10.13.0.34, 01:36:08, Serial0/0/1
C       10.13.0.32/30 is directly connected, Serial0/0/1
L       10.13.0.33/32 is directly connected, Serial0/0/1
O E2   10.13.0.36/30 [110/20] via 188.204.29.2, 02:02:35, Serial0/1/0
O E2   10.13.0.40/30 [110/20] via 188.204.29.2, 02:02:35, Serial0/1/0
O E2   10.13.0.44/30 [110/20] via 188.204.29.2, 02:02:35, Serial0/1/0
    184.199.0.0/29 is subnetted, 1 subnets
O       184.199.24.0/29 [110/128] via 188.204.29.2, 02:02:35, Serial0/1/0
    184.200.0.0/29 is subnetted, 1 subnets
O E2   184.200.25.0/29 [110/20] via 188.204.29.2, 01:30:23, Serial0/1/0
    185.201.0.0/29 is subnetted, 1 subnets
O E2   185.201.26.0/29 [110/20] via 188.204.29.2, 01:30:23, Serial0/1/0
    186.202.0.0/29 is subnetted, 1 subnets
O       186.202.27.0/29 [110/192] via 188.204.29.2, 02:02:35, Serial0/1/0
    187.203.0.0/29 is subnetted, 1 subnets
O       187.203.28.0/29 [110/192] via 188.204.29.2, 02:02:35, Serial0/1/0
    188.204.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       188.204.29.0/29 is directly connected, Serial0/1/0
L       188.204.29.1/32 is directly connected, Serial0/1/0
    189.205.0.0/29 is subnetted, 1 subnets
O       189.205.30.0/29 [110/128] via 188.204.29.2, 02:02:35, Serial0/1/0
    190.140.0.0/16 is variably subnetted, 13 subnets, 2 masks
O E2   190.140.13.0/24 [110/20] via 188.204.29.2, 01:51:16, Serial0/1/0
O E2   190.140.23.0/24 [110/20] via 188.204.29.2, 01:51:16, Serial0/1/0
O E2   190.140.33.0/24 [110/20] via 188.204.29.2, 01:51:16, Serial0/1/0
O E2   190.140.43.0/24 [110/20] via 188.204.29.2, 01:45:45, Serial0/1/0
O IA   190.140.53.0/24 [110/193] via 188.204.29.2, 02:02:35, Serial0/1/0
O E2   190.140.63.0/24 [110/20] via 188.204.29.2, 01:43:17, Serial0/1/0
C       190.140.73.0/24 is directly connected, GigabitEthernet0/0

```



## 3)show ip protocols.

 Router 7

Physical Config CLI Attributes

IOS Command Line Interface

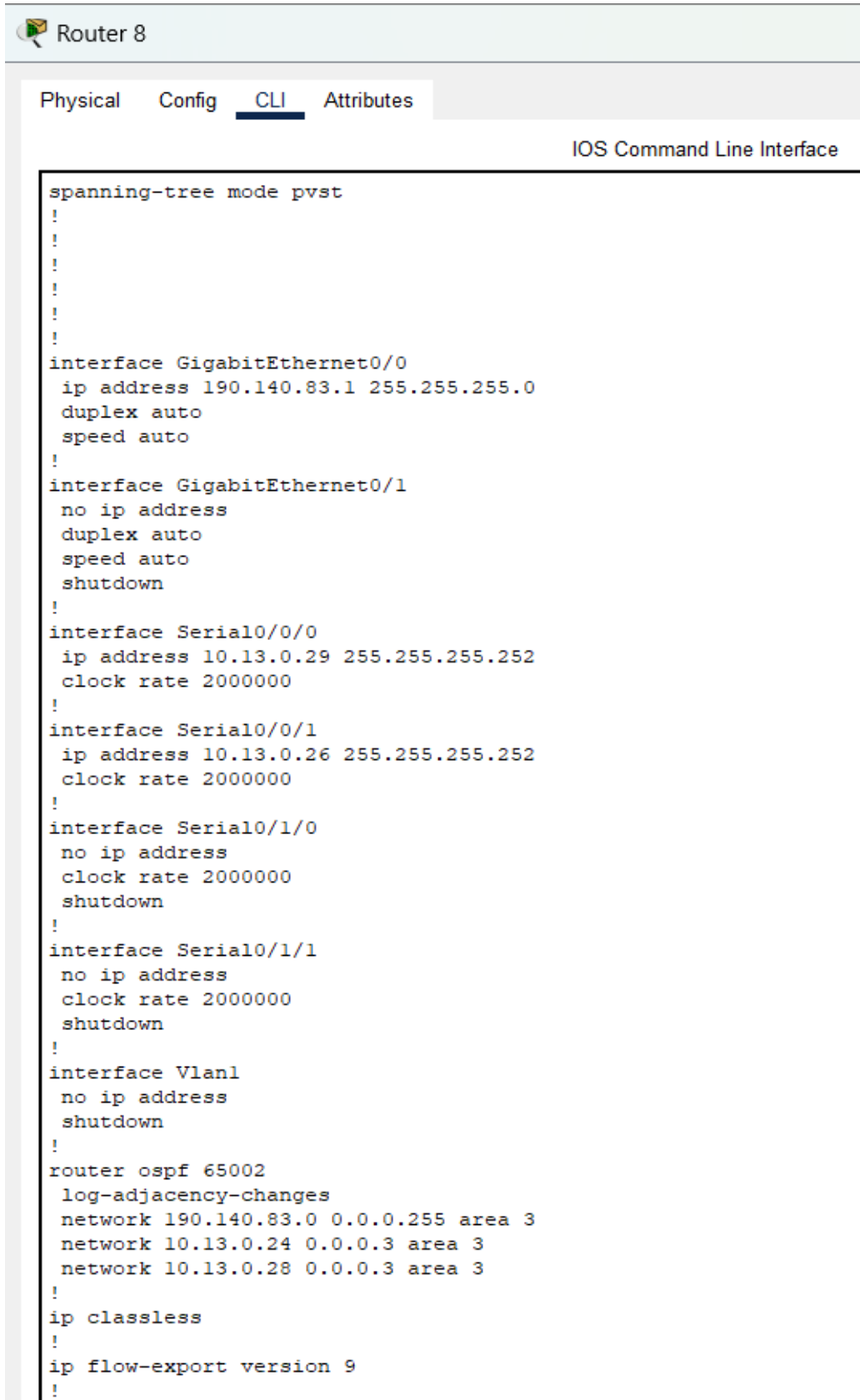
```
Router#show ip protocols

Routing Protocol is "ospf 65002"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 190.140.73.1
  Number of areas in this router is 2. 2 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    190.140.73.0 0.0.0.255 area 3
    10.13.0.24 0.0.0.3 area 3
    10.13.0.32 0.0.0.3 area 3
    188.204.29.0 0.0.0.7 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
    186.202.27.1     110          00:00:42
    187.203.28.2     110          00:27:06
    189.205.30.2     110          00:26:02
    190.140.53.1     110          00:15:04
    190.140.73.1     110          00:09:46
    190.140.83.1     110          00:08:11
    190.140.93.1     110          00:07:08
    190.140.103.1    110          00:05:25
  Distance: (default is 110)

Router#
```

## ROUTER 8.

### 1)show running-config.



The screenshot shows the configuration of Router 8 in the CLI mode. The interface has tabs for Physical, Config, CLI (selected), and Attributes. The title bar says "Router 8" and the subtitle is "IOS Command Line Interface". The configuration is as follows:

```

spanning-tree mode pvst
!
!
!
!
!
!
interface GigabitEthernet0/0
 ip address 190.140.83.1 255.255.255.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/0/0
 ip address 10.13.0.29 255.255.255.252
 clock rate 2000000
!
interface Serial0/0/1
 ip address 10.13.0.26 255.255.255.252
 clock rate 2000000
!
interface Serial0/1/0
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/1/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router ospf 65002
 log-adjacency-changes
 network 190.140.83.0 0.0.0.255 area 3
 network 10.13.0.24 0.0.0.3 area 3
 network 10.13.0.28 0.0.0.3 area 3
!
ip classless
!
ip flow-export version 9
!

```

## 2)show ip route.

Router 8

Physical
Config
CLI
Attributes

IOS Command Line Interface

---

```


Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

    10.0.0.0/8 is variably subnetted, 14 subnets, 2 masks
O E2   10.13.0.0/30 [110/20] via 10.13.0.25, 01:54:49, Serial0/0/1
O E2   10.13.0.4/30 [110/20] via 10.13.0.25, 01:55:04, Serial0/0/1
O E2   10.13.0.8/30 [110/20] via 10.13.0.25, 01:55:04, Serial0/0/1
O E2   10.13.0.12/30 [110/20] via 10.13.0.25, 01:28:30, Serial0/0/1
O E2   10.13.0.16/30 [110/20] via 10.13.0.25, 01:28:30, Serial0/0/1
O E2   10.13.0.20/30 [110/20] via 10.13.0.25, 01:28:30, Serial0/0/1
C       10.13.0.24/30 is directly connected, Serial0/0/1
L       10.13.0.26/32 is directly connected, Serial0/0/1
C       10.13.0.28/30 is directly connected, Serial0/0/0
L       10.13.0.29/32 is directly connected, Serial0/0/0
O       10.13.0.32/30 [110/128] via 10.13.0.30, 01:39:57, Serial0/0/0
           [110/128] via 10.13.0.25, 01:39:57, Serial0/0/1
O E2   10.13.0.36/30 [110/20] via 10.13.0.25, 02:06:18, Serial0/0/1
O E2   10.13.0.40/30 [110/20] via 10.13.0.25, 02:06:18, Serial0/0/1
O E2   10.13.0.44/30 [110/20] via 10.13.0.25, 02:06:18, Serial0/0/1
    184.199.0.0/29 is subnetted, 1 subnets
O IA    184.199.24.0/29 [110/192] via 10.13.0.25, 02:06:18, Serial0/0/1
    184.200.0.0/29 is subnetted, 1 subnets
O E2    184.200.25.0/29 [110/20] via 10.13.0.25, 01:54:49, Serial0/0/1
    185.201.0.0/29 is subnetted, 1 subnets
O E2    185.201.26.0/29 [110/20] via 10.13.0.25, 01:54:49, Serial0/0/1
    186.202.0.0/29 is subnetted, 1 subnets
O IA    186.202.27.0/29 [110/256] via 10.13.0.25, 02:06:18, Serial0/0/1
    187.203.0.0/29 is subnetted, 1 subnets
O IA    187.203.28.0/29 [110/256] via 10.13.0.25, 02:06:18, Serial0/0/1
    188.204.0.0/29 is subnetted, 1 subnets
O IA    188.204.29.0/29 [110/128] via 10.13.0.25, 02:06:28, Serial0/0/1
    189.205.0.0/29 is subnetted, 1 subnets
O IA    189.205.30.0/29 [110/192] via 10.13.0.25, 02:06:18, Serial0/0/1
    190.140.0.0/16 is variably subnetted, 13 subnets, 2 masks
O E2    190.140.13.0/24 [110/20] via 10.13.0.25, 01:55:04, Serial0/0/1
O E2    190.140.23.0/24 [110/20] via 10.13.0.25, 01:55:04, Serial0/0/1
O E2    190.140.33.0/24 [110/20] via 10.13.0.25, 01:55:04, Serial0/0/1
O E2    190.140.43.0/24 [110/20] via 10.13.0.25, 01:49:27, Serial0/0/1
O IA    190.140.53.0/24 [110/257] via 10.13.0.25, 02:06:18, Serial0/0/1
O E2    190.140.63.0/24 [110/20] via 10.13.0.25, 01:47:09, Serial0/0/1
O       190.140.73.0/24 [110/65] via 10.13.0.25, 01:43:03, Serial0/0/1
C       190.140.83.0/24 is directly connected, GigabitEthernet0/0

```

## 3)show ip protocols.

 Router 8

Physical Config CLI Attributes

IOS Command Line Interface

```
Router#show ip protocols

Routing Protocol is "ospf 65002"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 190.140.83.1
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    190.140.83.0 0.0.0.255 area 3
    10.13.0.24 0.0.0.3 area 3
    10.13.0.28 0.0.0.3 area 3
  Routing Information Sources:
    Gateway         Distance      Last Update
    190.140.73.1      110          00:13:20
    190.140.83.1      110          00:11:27
    190.140.93.1      110          00:10:24
  Distance: (default is 110)

Router#
```

## ROUTER 9.

### 1)show running-config.

Router 9

Physical Config CLI Attributes


IOS Command Line Interface

```

spanning-tree mode pvst
!
!
!
!
!
!
interface GigabitEthernet0/0
 ip address 190.140.93.1 255.255.255.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/0/0
 ip address 10.13.0.30 255.255.255.252
!
interface Serial0/0/1
 ip address 10.13.0.34 255.255.255.252
!
interface Serial0/1/0
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/1/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router ospf 65002
 log-adjacency-changes
 network 190.140.93.0 0.0.0.255 area 3
 network 10.13.0.28 0.0.0.3 area 3
 network 10.13.0.32 0.0.0.3 area 3
!
ip classless
!
ip flow-export version 9
!
!
!
.

```

## 2)show ip route.

 Router 9

Physical    Config    CLI    Attributes

IOS Command Line Interface

---


```

Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

    10.0.0.0/8 is variably subnetted, 14 subnets, 2 masks
O E2   10.13.0.0/30 [110/20] via 10.13.0.33, 01:48:25, Serial0/0/1
O E2   10.13.0.4/30 [110/20] via 10.13.0.33, 01:48:25, Serial0/0/1
O E2   10.13.0.8/30 [110/20] via 10.13.0.33, 01:48:25, Serial0/0/1
O E2   10.13.0.12/30 [110/20] via 10.13.0.33, 01:34:14, Serial0/0/1
O E2   10.13.0.16/30 [110/20] via 10.13.0.33, 01:34:14, Serial0/0/1
O E2   10.13.0.20/30 [110/20] via 10.13.0.33, 01:34:14, Serial0/0/1
O      10.13.0.24/30 [110/128] via 10.13.0.29, 01:45:41, Serial0/0/0
           [110/128] via 10.13.0.33, 01:45:41, Serial0/0/1
C      10.13.0.28/30 is directly connected, Serial0/0/0
L      10.13.0.30/32 is directly connected, Serial0/0/0
C      10.13.0.32/30 is directly connected, Serial0/0/1
L      10.13.0.34/32 is directly connected, Serial0/0/1
O E2   10.13.0.36/30 [110/20] via 10.13.0.33, 01:48:25, Serial0/0/1
O E2   10.13.0.40/30 [110/20] via 10.13.0.33, 01:48:25, Serial0/0/1
O E2   10.13.0.44/30 [110/20] via 10.13.0.33, 01:48:25, Serial0/0/1
    184.199.0.0/29 is subnetted, 1 subnets
O IA   184.199.24.0/29 [110/192] via 10.13.0.33, 01:48:25, Serial0/0/1
    184.200.0.0/29 is subnetted, 1 subnets
O E2   184.200.25.0/29 [110/20] via 10.13.0.33, 01:48:25, Serial0/0/1
    185.201.0.0/29 is subnetted, 1 subnets
O E2   185.201.26.0/29 [110/20] via 10.13.0.33, 01:48:25, Serial0/0/1
    186.202.0.0/29 is subnetted, 1 subnets
O IA   186.202.27.0/29 [110/256] via 10.13.0.33, 01:48:25, Serial0/0/1
    187.203.0.0/29 is subnetted, 1 subnets
O IA   187.203.28.0/29 [110/256] via 10.13.0.33, 01:48:25, Serial0/0/1
    188.204.0.0/29 is subnetted, 1 subnets
O IA   188.204.29.0/29 [110/128] via 10.13.0.33, 01:48:25, Serial0/0/1
    189.205.0.0/29 is subnetted, 1 subnets
O IA   189.205.30.0/29 [110/192] via 10.13.0.33, 01:48:25, Serial0/0/1
    190.140.0.0/16 is variably subnetted, 13 subnets, 2 masks
O E2   190.140.13.0/24 [110/20] via 10.13.0.33, 01:48:25, Serial0/0/1
O E2   190.140.23.0/24 [110/20] via 10.13.0.33, 01:48:25, Serial0/0/1
O E2   190.140.33.0/24 [110/20] via 10.13.0.33, 01:48:25, Serial0/0/1
O E2   190.140.43.0/24 [110/20] via 10.13.0.33, 01:34:24, Serial0/0/1
O IA   190.140.53.0/24 [110/257] via 10.13.0.33, 01:48:25, Serial0/0/1
O E2   190.140.63.0/24 [110/20] via 10.13.0.33, 01:34:24, Serial0/0/1
O      190.140.73.0/24 [110/65] via 10.13.0.33, 01:48:25, Serial0/0/1
O      190.140.83.0/24 [110/65] via 10.13.0.29, 01:46:57, Serial0/0/0
    
```

**3)show ip protocols.**

 Router 9

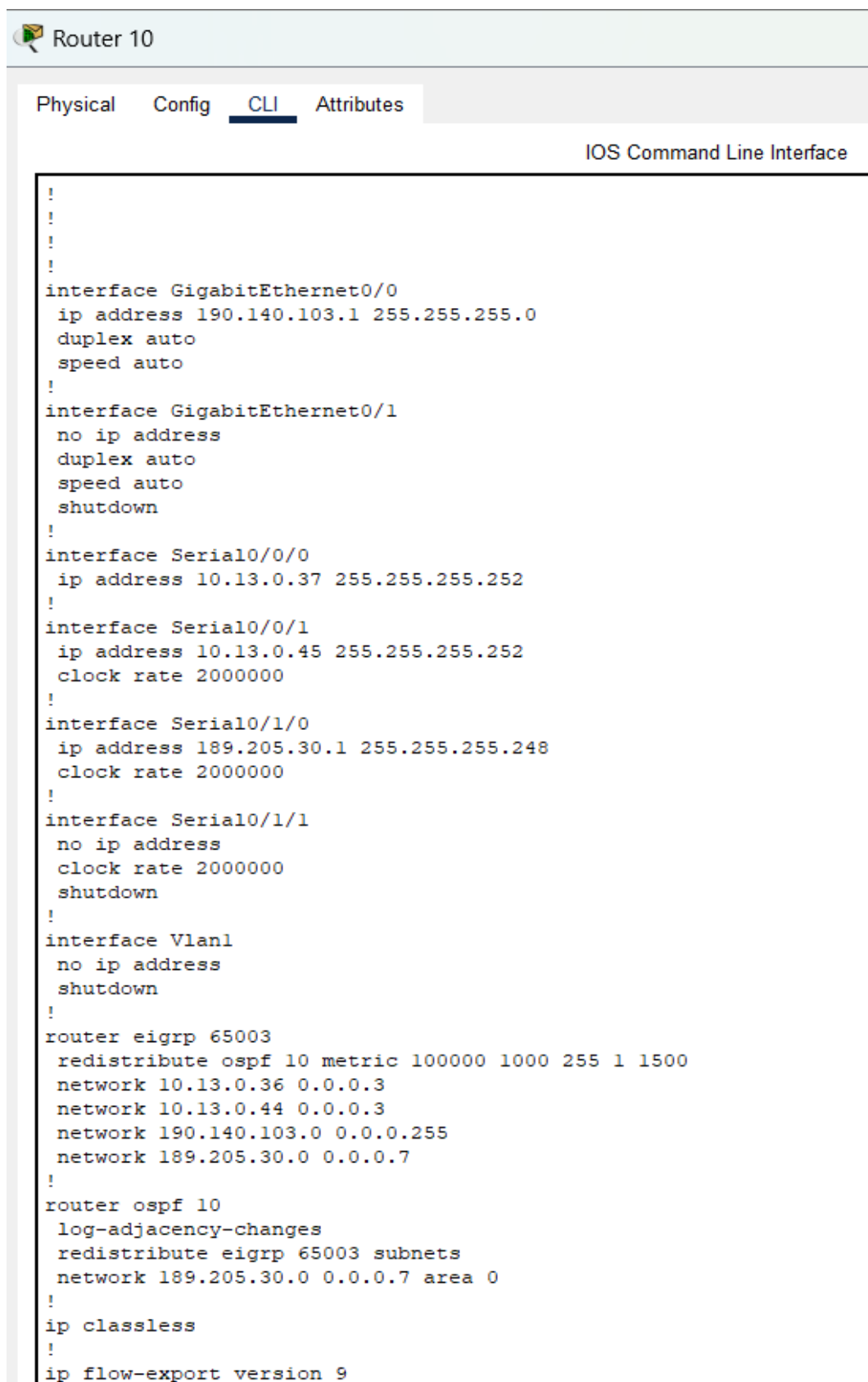
Physical Config CLI Attributes

IOS Command Line Interface

```
Router#show ip protocols

Routing Protocol is "ospf 65002"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 190.140.93.1
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    190.140.93.0 0.0.0.255 area 3
    10.13.0.28 0.0.0.3 area 3
    10.13.0.32 0.0.0.3 area 3
  Routing Information Sources:
    Gateway         Distance      Last Update
    190.140.73.1     110          00:19:00
    190.140.83.1     110          00:17:08
    190.140.93.1     110          00:16:04
  Distance: (default is 110)

Router#
```

**ROUTER 10.****1)show running-config.**


The screenshot shows the configuration page for Router 10. The 'CLI' tab is selected, displaying the running configuration. The configuration includes settings for several interfaces (GigabitEthernet0/0, GigabitEthernet0/1, Serial0/0/0, Serial0/0/1, Serial0/1/0, Serial0/1/1, and Vlan1), EIGRP and OSPF routing protocols, and various system parameters like classless IP and flow-export.

```

!
!
!
!
interface GigabitEthernet0/0
 ip address 190.140.103.1 255.255.255.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/0/0
 ip address 10.13.0.37 255.255.255.252
!
interface Serial0/0/1
 ip address 10.13.0.45 255.255.255.252
 clock rate 2000000
!
interface Serial0/1/0
 ip address 189.205.30.1 255.255.255.248
 clock rate 2000000
!
interface Serial0/1/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router eigrp 65003
 redistribute ospf 10 metric 100000 1000 255 1 1500
 network 10.13.0.36 0.0.0.3
 network 10.13.0.44 0.0.0.3
 network 190.140.103.0 0.0.0.255
 network 189.205.30.0 0.0.0.7
!
router ospf 10
 log-adjacency-changes
 redistribute eigrp 65003 subnets
 network 189.205.30.0 0.0.0.7 area 0
!
ip classless
!
ip flow-export version 9

```



## 2)show ip route.

Router 10

Physical Config CLI Attributes

IOS Command Line Interface

Router# show ip route

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP  
 D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area  
 N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2  
 E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP  
 i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area  
 \* - candidate default, U - per-user static route, o - ODR  
 P - periodic downloaded static route


Gateway of last resort is not set

```

    10.0.0.0/8 is variably subnetted, 14 subnets, 2 masks
O E2   10.13.0.0/30 [110/20] via 189.205.30.2, 02:15:56, Serial0/1/0
O E2   10.13.0.4/30 [110/20] via 189.205.30.2, 02:04:19, Serial0/1/0
O E2   10.13.0.8/30 [110/20] via 189.205.30.2, 02:04:19, Serial0/1/0
O E2   10.13.0.12/30 [110/20] via 189.205.30.2, 01:38:04, Serial0/1/0
O E2   10.13.0.16/30 [110/20] via 189.205.30.2, 01:38:04, Serial0/1/0
O E2   10.13.0.20/30 [110/20] via 189.205.30.2, 01:38:04, Serial0/1/0
O E2   10.13.0.24/30 [110/20] via 189.205.30.2, 01:38:04, Serial0/1/0
O E2   10.13.0.28/30 [110/20] via 189.205.30.2, 01:38:04, Serial0/1/0
O E2   10.13.0.32/30 [110/20] via 189.205.30.2, 01:38:04, Serial0/1/0
C       10.13.0.36/30 is directly connected, Serial0/0/0
L       10.13.0.37/32 is directly connected, Serial0/0/0
D       10.13.0.40/30 [90/2681856] via 10.13.0.38, 01:46:48, Serial0/0/0
        [90/2681856] via 10.13.0.46, 01:46:05, Serial0/0/1
C       10.13.0.44/30 is directly connected, Serial0/0/1
L       10.13.0.45/32 is directly connected, Serial0/0/1
    184.199.0.0/29 is subnetted, 1 subnets
D       184.199.24.0/29 [90/2681856] via 189.205.30.2, 01:38:21, Serial0/1/0
    184.200.0.0/29 is subnetted, 1 subnets
O E2   184.200.25.0/29 [110/20] via 189.205.30.2, 01:43:44, Serial0/1/0
    185.201.0.0/29 is subnetted, 1 subnets
O E2   185.201.26.0/29 [110/20] via 189.205.30.2, 01:43:44, Serial0/1/0
    186.202.0.0/29 is subnetted, 1 subnets
O       186.202.27.0/29 [110/192] via 189.205.30.2, 01:38:44, Serial0/1/0
    187.203.0.0/29 is subnetted, 1 subnets
O       187.203.28.0/29 [110/192] via 189.205.30.2, 02:15:56, Serial0/1/0
    188.204.0.0/29 is subnetted, 1 subnets
D       188.204.29.0/29 [90/2681856] via 189.205.30.2, 01:38:06, Serial0/1/0
    189.205.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       189.205.30.0/29 is directly connected, Serial0/1/0
L       189.205.30.1/32 is directly connected, Serial0/1/0
    190.140.0.0/16 is variably subnetted, 13 subnets, 2 masks
O E2   190.140.13.0/24 [110/20] via 189.205.30.2, 02:04:19, Serial0/1/0
O E2   190.140.23.0/24 [110/20] via 189.205.30.2, 02:04:19, Serial0/1/0
O E2   190.140.33.0/24 [110/20] via 189.205.30.2, 02:04:19, Serial0/1/0
O E2   190.140.43.0/24 [110/20] via 189.205.30.2, 01:38:44, Serial0/1/0
O IA   190.140.53.0/24 [110/193] via 189.205.30.2, 02:15:56, Serial0/1/0
O E2   190.140.63.0/24 [110/20] via 189.205.30.2, 01:38:44, Serial0/1/0
O IA   190.140.73.0/24 [110/129] via 189.205.30.2, 02:15:56, Serial0/1/0
O E2   190.140.83.0/24 [110/20] via 189.205.30.2, 01:50:48, Serial0/1/0

```

## 3)show ip protocols.

 Router 10
 

Physical
 Config
 CLI
 Attributes

IOS Command Line Interface

```

Router#show ip protocols

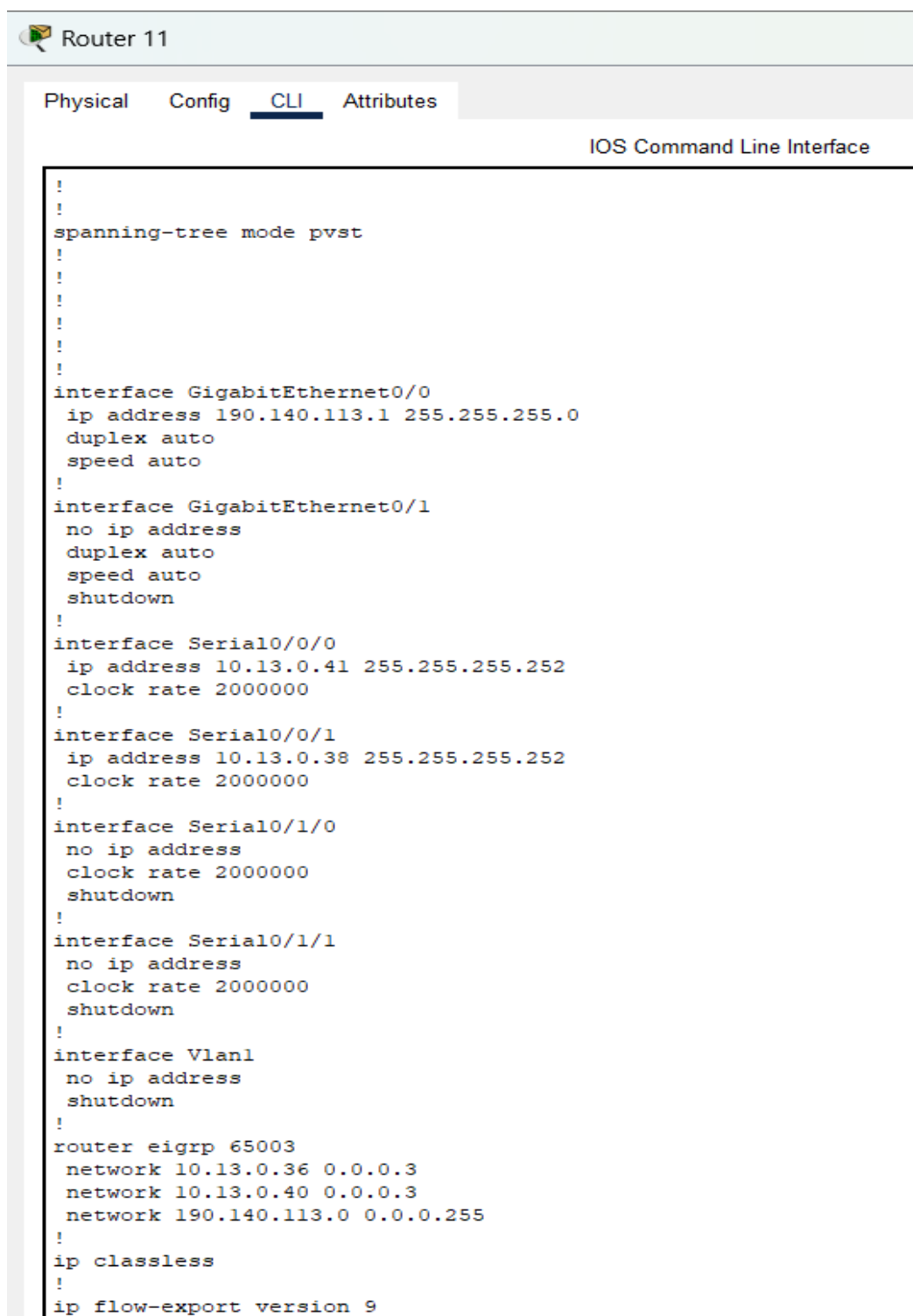
Routing Protocol is "eigrp 65003 "
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Default networks flagged in outgoing updates
  Default networks accepted from incoming updates
  Redistributing: eigrp 65003, ospf 10
  EIGRP-IPv4 Protocol for AS(65003)
    Metric weight K1=1, K2=0, K3=1, K4=0, K5=0
    NSF-aware route hold timer is 240
    Router-ID: 10.13.0.37
    Topology : 0 (base)
      Active Timer: 3 min
      Distance: internal 90 external 170
      Maximum path: 4
      Maximum hopcount 100
      Maximum metric variance 1

  Automatic Summarization: disabled
  Automatic address summarization:
  Maximum path: 4
  Routing for Networks:
    10.13.0.36/30
    10.13.0.44/30
    190.140.103.0/24
    189.205.30.0/29
  Routing Information Sources:
    Gateway         Distance      Last Update
    10.13.0.38       90            1700555
    10.13.0.46       90            1712768
    189.205.30.2     90            1727563
  Distance: internal 90 external 170

Routing Protocol is "ospf 10"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 190.140.103.1
  It is an autonomous system boundary router
  Redistributing External Routes from,
    eigrp 65003
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    189.205.30.0 0.0.0.7 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
    186.202.27.1     110          00:14:04
    187.203.28.2     110          00:10:26
    189.205.30.2     110          00:09:23
    190.140.53.1     110          00:28:26
    190.140.73.1     110          00:23:08
    190.140.103.1    110          00:18:46
  Distance: (default is 110)

Router#

```

**ROUTER 11.****1)show running-config.**

The screenshot shows the configuration of Router 11 in the CLI mode. The interface has tabs for Physical, Config, CLI (selected), and Attributes. The title bar says "Router 11" and the subtitle is "IOS Command Line Interface". The configuration text is as follows:

```
!
!
spanning-tree mode pvst
!
!
!
!
!
!
interface GigabitEthernet0/0
 ip address 190.140.113.1 255.255.255.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial0/0/0
 ip address 10.13.0.41 255.255.255.252
 clock rate 2000000
!
interface Serial0/0/1
 ip address 10.13.0.38 255.255.255.252
 clock rate 2000000
!
interface Serial0/1/0
 no ip address
 clock rate 2000000
 shutdown
!
interface Serial0/1/1
 no ip address
 clock rate 2000000
 shutdown
!
interface Vlan1
 no ip address
 shutdown
!
router eigrp 65003
 network 10.13.0.36 0.0.0.3
 network 10.13.0.40 0.0.0.3
 network 190.140.113.0 0.0.0.255
!
ip classless
!
ip flow-export version 9
```

## 2)show ip route.

Router 11

Physical Config CLI Attributes

IOS Command Line Interface

```

Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

10.0.0.0/8 is variably subnetted, 14 subnets, 2 masks
D EX 10.13.0.0/30 [170/2425856] via 10.13.0.37, 01:53:01, Serial0/0/1
D EX 10.13.0.4/30 [170/2425856] via 10.13.0.37, 01:50:25, Serial0/0/1
D EX 10.13.0.8/30 [170/2425856] via 10.13.0.37, 01:50:25, Serial0/0/1
D EX 10.13.0.12/30 [170/2425856] via 10.13.0.37, 01:44:34, Serial0/0/1
D EX 10.13.0.16/30 [170/2425856] via 10.13.0.37, 01:44:34, Serial0/0/1
D EX 10.13.0.20/30 [170/2425856] via 10.13.0.37, 01:44:34, Serial0/0/1
D EX 10.13.0.24/30 [170/2425856] via 10.13.0.37, 01:44:34, Serial0/0/1
D EX 10.13.0.28/30 [170/2425856] via 10.13.0.37, 01:44:34, Serial0/0/1
D EX 10.13.0.32/30 [170/2425856] via 10.13.0.37, 01:44:35, Serial0/0/1
C 10.13.0.36/30 is directly connected, Serial0/0/1
L 10.13.0.38/32 is directly connected, Serial0/0/1
C 10.13.0.40/30 is directly connected, Serial0/0/0
L 10.13.0.41/32 is directly connected, Serial0/0/0
D 10.13.0.44/30 [90/2681856] via 10.13.0.37, 01:53:01, Serial0/0/1
                  [90/2681856] via 10.13.0.42, 01:52:28, Serial0/0/0
184.199.0.0/29 is subnetted, 1 subnets
D 184.199.24.0/29 [90/3193856] via 10.13.0.37, 01:44:52, Serial0/0/1
184.200.0.0/29 is subnetted, 1 subnets
D EX 184.200.25.0/29 [170/2425856] via 10.13.0.37, 01:49:12, Serial0/0/1
185.201.0.0/29 is subnetted, 1 subnets
D EX 185.201.26.0/29 [170/2425856] via 10.13.0.37, 01:49:12, Serial0/0/1
186.202.0.0/29 is subnetted, 1 subnets
D EX 186.202.27.0/29 [170/2425856] via 10.13.0.37, 01:45:15, Serial0/0/1
187.203.0.0/29 is subnetted, 1 subnets
D EX 187.203.28.0/29 [170/2425856] via 10.13.0.37, 01:53:01, Serial0/0/1
188.204.0.0/29 is subnetted, 1 subnets
D 188.204.29.0/29 [90/3193856] via 10.13.0.37, 01:44:37, Serial0/0/1
189.205.0.0/29 is subnetted, 1 subnets
D 189.205.30.0/29 [90/2681856] via 10.13.0.37, 01:53:01, Serial0/0/1
190.140.0.0/16 is variably subnetted, 13 subnets, 2 masks
D EX 190.140.13.0/24 [170/2425856] via 10.13.0.37, 01:50:25, Serial0/0/1
D EX 190.140.23.0/24 [170/2425856] via 10.13.0.37, 01:50:25, Serial0/0/1
D EX 190.140.33.0/24 [170/2425856] via 10.13.0.37, 01:50:24, Serial0/0/1
D EX 190.140.43.0/24 [170/2425856] via 10.13.0.37, 01:45:15, Serial0/0/1
D EX 190.140.53.0/24 [170/2425856] via 10.13.0.37, 01:53:01, Serial0/0/1
D EX 190.140.63.0/24 [170/2425856] via 10.13.0.37, 01:45:15, Serial0/0/1
D EX 190.140.73.0/24 [170/2425856] via 10.13.0.37, 01:53:01, Serial0/0/1
D EX 190.140.83.0/24 [170/2425856] via 10.13.0.37, 01:53:01, Serial0/0/1
D EX 190.140.93.0/24 [170/2425856] via 10.13.0.37, 01:44:34, Serial0/0/1
D 190.140.103.0/24 [90/2170112] via 10.13.0.37, 01:53:01, Serial0/0/1
C 190.140.113.0/24 is directly connected, GigabitEthernet0/0
L 190.140.113.1/32 is directly connected, GigabitEthernet0/0
D 190.140.123.0/24 [90/2170112] via 10.13.0.42, 01:52:45, Serial0/0/0

Router#

```

## 3)show ip protocols.

Router 11

Physical Config CLI Attributes

IOS Command Line Interface

```

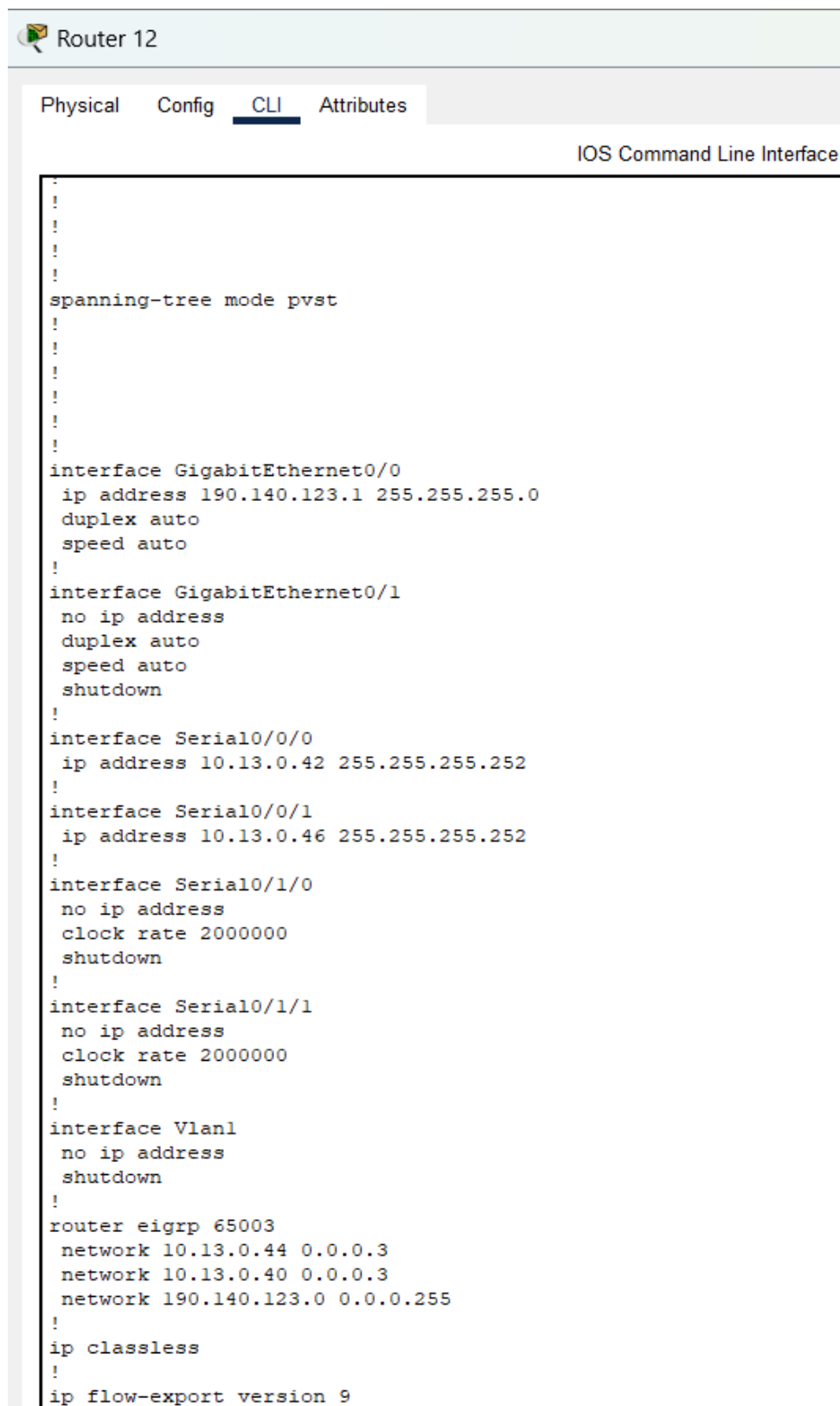
Router# show ip protocols

Routing Protocol is "eigrp 65003 "
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Default networks flagged in outgoing updates
  Default networks accepted from incoming updates
  Redistributing: eigrp 65003
  EIGRP-IPv4 Protocol for AS(65003)
    Metric weight K1=1, K2=0, K3=1, K4=0, K5=0
    NSF-aware route hold timer is 240
    Router-ID: 10.13.0.38
    Topology : 0 (base)
      Active Timer: 3 min
      Distance: internal 90 external 170
      Maximum path: 4
      Maximum hopcount 100
      Maximum metric variance 1

  Automatic Summarization: disabled
  Automatic address summarization:
  Maximum path: 4
  Routing for Networks:
    10.13.0.36/30
    10.13.0.40/30
    190.140.113.0/24
  Routing Information Sources:
    Gateway         Distance      Last Update
    10.13.0.42       90            1777830
    10.13.0.37       90            1791781
  Distance: internal 90 external 170

Router#

```

**ROUTER 12.****1)show running-config.**


The screenshot shows the configuration interface for Router 12. The 'CLI' tab is selected, displaying the running configuration. The configuration includes settings for spanning-tree mode, interfaces GigabitEthernet0/0, GigabitEthernet0/1, Serial10/0/0, Serial10/0/1, Serial10/1/0, Serial10/1/1, and Vlan1, as well as EIGRP settings and flow-export version.

```


Router 12
Physical Config CLI Attributes
IOS Command Line Interface

!
!
!
!
!
spanning-tree mode pvst
!
!
!
!
!
interface GigabitEthernet0/0
ip address 190.140.123.1 255.255.255.0
duplex auto
speed auto
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
shutdown
!
interface Serial10/0/0
ip address 10.13.0.42 255.255.255.252
!
interface Serial10/0/1
ip address 10.13.0.46 255.255.255.252
!
interface Serial10/1/0
no ip address
clock rate 2000000
shutdown
!
interface Serial10/1/1
no ip address
clock rate 2000000
shutdown
!
interface Vlan1
no ip address
shutdown
!
router eigrp 65003
network 10.13.0.44 0.0.0.3
network 10.13.0.40 0.0.0.3
network 190.140.123.0 0.0.0.255
!
ip classless
!
ip flow-export version 9

```



## 2)show ip route.

 Router 12
 

Physical   Config   CLI   Attributes

IOS Command Line Interface

```


Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

    10.0.0.0/8 is variably subnetted, 14 subnets, 2 masks
D EX   10.13.0.0/30 [170/2425856] via 10.13.0.45, 01:56:18, Serial0/0/1
D EX   10.13.0.4/30 [170/2425856] via 10.13.0.45, 01:54:17, Serial0/0/1
D EX   10.13.0.8/30 [170/2425856] via 10.13.0.45, 01:54:17, Serial0/0/1
D EX   10.13.0.12/30 [170/2425856] via 10.13.0.45, 01:48:28, Serial0/0/1
D EX   10.13.0.16/30 [170/2425856] via 10.13.0.45, 01:48:28, Serial0/0/1
D EX   10.13.0.20/30 [170/2425856] via 10.13.0.45, 01:48:28, Serial0/0/1
D EX   10.13.0.24/30 [170/2425856] via 10.13.0.45, 01:48:28, Serial0/0/1
D EX   10.13.0.28/30 [170/2425856] via 10.13.0.45, 01:48:28, Serial0/0/1
D EX   10.13.0.32/30 [170/2425856] via 10.13.0.45, 01:48:28, Serial0/0/1
D       10.13.0.36/30 [90/2681856] via 10.13.0.41, 01:56:29, Serial0/0/0
           [90/2681856] via 10.13.0.45, 01:56:18, Serial0/0/1
C       10.13.0.40/30 is directly connected, Serial0/0/0
L       10.13.0.42/32 is directly connected, Serial0/0/0
C       10.13.0.44/30 is directly connected, Serial0/0/1
L       10.13.0.46/32 is directly connected, Serial0/0/1
    184.199.0.0/29 is subnetted, 1 subnets
D       184.199.24.0/29 [90/3193856] via 10.13.0.45, 01:48:45, Serial0/0/1
    184.200.0.0/29 is subnetted, 1 subnets
D EX   184.200.25.0/29 [170/2425856] via 10.13.0.45, 01:53:05, Serial0/0/1
    185.201.0.0/29 is subnetted, 1 subnets
D EX   185.201.26.0/29 [170/2425856] via 10.13.0.45, 01:53:05, Serial0/0/1
    186.202.0.0/29 is subnetted, 1 subnets
D EX   186.202.27.0/29 [170/2425856] via 10.13.0.45, 01:49:08, Serial0/0/1
    187.203.0.0/29 is subnetted, 1 subnets
D EX   187.203.28.0/29 [170/2425856] via 10.13.0.45, 01:56:18, Serial0/0/1
    188.204.0.0/29 is subnetted, 1 subnets
D       188.204.29.0/29 [90/3193856] via 10.13.0.45, 01:48:30, Serial0/0/1
    189.205.0.0/29 is subnetted, 1 subnets
D       189.205.30.0/29 [90/2681856] via 10.13.0.45, 01:56:18, Serial0/0/1
    190.140.0.0/16 is variably subnetted, 13 subnets, 2 masks
D EX   190.140.13.0/24 [170/2425856] via 10.13.0.45, 01:54:17, Serial0/0/1
D EX   190.140.23.0/24 [170/2425856] via 10.13.0.45, 01:54:17, Serial0/0/1
D EX   190.140.33.0/24 [170/2425856] via 10.13.0.45, 01:54:17, Serial0/0/1
D EX   190.140.43.0/24 [170/2425856] via 10.13.0.45, 01:49:08, Serial0/0/1
D EX   190.140.53.0/24 [170/2425856] via 10.13.0.45, 01:56:18, Serial0/0/1
D EX   190.140.63.0/24 [170/2425856] via 10.13.0.45, 01:49:08, Serial0/0/1
D EX   190.140.73.0/24 [170/2425856] via 10.13.0.45, 01:56:18, Serial0/0/1
D EX   190.140.83.0/24 [170/2425856] via 10.13.0.45, 01:56:18, Serial0/0/1
D EX   190.140.93.0/24 [170/2425856] via 10.13.0.45, 01:48:28, Serial0/0/1
D       190.140.103.0/24 [90/2170112] via 10.13.0.45, 01:56:18, Serial0/0/1
D       190.140.113.0/24 [90/2170112] via 10.13.0.41, 01:56:29, Serial0/0/0
C       190.140.123.0/24 is directly connected, GigabitEthernet0/0
L       190.140.123.1/32 is directly connected, GigabitEthernet0/0

Router#
  
```

## 3)show ip protocols.

 Router 12

Physical   Config   CLI   Attributes

IOS Command Line Interface

```

Router# show ip protocols

Routing Protocol is "eigrp 65003 "
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Default networks flagged in outgoing updates
  Default networks accepted from incoming updates
  Redistributing: eigrp 65003
  EIGRP-IPv4 Protocol for AS(65003)
    Metric weight K1=1, K2=0, K3=1, K4=0, K5=0
    NSF-aware route hold timer is 240
    Router-ID: 10.13.0.42
    Topology : 0 (base)
      Active Timer: 3 min
      Distance: internal 90 external 170
      Maximum path: 4
      Maximum hopcount 100
      Maximum metric variance 1

  Automatic Summarization: disabled
  Automatic address summarization:
  Maximum path: 4
  Routing for Networks:
    10.13.0.44/30
    10.13.0.40/30
    190.140.123.0/24
  Routing Information Sources:
    Gateway         Distance         Last Update
    10.13.0.41       90               1816431
    10.13.0.45       90               1827077
  Distance: internal 90 external 170

Router#

```



**ROUTER ASBR 1.****1)show running-config.**

Router ASBR 1

Physical Config CLI Attributes

IOS Command Line Interface

```

interface GigabitEthernet0/0
  no ip address
  duplex auto
  speed auto
  shutdown
!
interface GigabitEthernet0/1
  no ip address
  duplex auto
  speed auto
  shutdown
!
interface Serial0/0/0
  ip address 185.201.26.1 255.255.255.248
  clock rate 2000000
!
interface Serial0/0/1
  ip address 184.200.25.2 255.255.255.248
  clock rate 2000000
!
interface Serial0/1/0
  no ip address
  clock rate 2000000
  shutdown
!
interface Serial0/1/1
  no ip address
  clock rate 2000000
  shutdown
!
interface Vlan1
  no ip address
  shutdown
!
router bgp 65010
  bgp log-neighbor-changes
  no synchronization
  neighbor 184.200.25.1 remote-as 65000
  neighbor 185.201.26.2 remote-as 65020
  network 184.200.25.0 mask 255.255.255.248
  network 185.201.26.0 mask 255.255.255.248
!
router rip
  version 2
  network 184.200.0.0
  network 185.201.0.0
  no auto-summary
!
ip classless
!
ip flow-export version 9

```

## 2)show ip route.

Router ASBR 1

Physical
Config
CLI
Attributes

IOS Command Line Interface

```

Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 184.200.25.1 to network 0.0.0.0

    10.0.0.0/30 is subnetted, 12 subnets
R       10.13.0.0/30 [120/2] via 184.200.25.1, 00:00:05, Serial0/0/1
          [120/2] via 185.201.26.2, 00:00:06, Serial0/0/0
B       10.13.0.4/30 [20/0] via 184.200.25.1, 00:00:00
B       10.13.0.8/30 [20/0] via 184.200.25.1, 00:00:00
R       10.13.0.12/30 [120/2] via 185.201.26.2, 00:00:06, Serial0/0/0
R       10.13.0.16/30 [120/2] via 185.201.26.2, 00:00:06, Serial0/0/0
R       10.13.0.20/30 [120/2] via 185.201.26.2, 00:00:06, Serial0/0/0
R       10.13.0.24/30 [120/2] via 185.201.26.2, 00:00:06, Serial0/0/0
R       10.13.0.28/30 [120/2] via 185.201.26.2, 00:00:06, Serial0/0/0
R       10.13.0.32/30 [120/2] via 185.201.26.2, 00:00:06, Serial0/0/0
R       10.13.0.36/30 [120/2] via 185.201.26.2, 00:00:06, Serial0/0/0
R       10.13.0.40/30 [120/2] via 185.201.26.2, 00:00:06, Serial0/0/0
R       10.13.0.44/30 [120/2] via 185.201.26.2, 00:00:06, Serial0/0/0
    184.199.0.0/29 is subnetted, 1 subnets
B       184.199.24.0/29 [20/0] via 185.201.26.2, 00:00:00
    184.200.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       184.200.25.0/29 is directly connected, Serial0/0/1
L       184.200.25.2/32 is directly connected, Serial0/0/1
    185.201.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       185.201.26.0/29 is directly connected, Serial0/0/0
L       185.201.26.1/32 is directly connected, Serial0/0/0
    186.202.0.0/29 is subnetted, 1 subnets
B       186.202.27.0/29 [20/0] via 185.201.26.2, 00:00:00
    187.203.0.0/29 is subnetted, 1 subnets
B       187.203.28.0/29 [20/0] via 185.201.26.2, 00:00:00
    188.204.0.0/29 is subnetted, 1 subnets
B       188.204.29.0/29 [20/0] via 185.201.26.2, 00:00:00
    189.205.0.0/29 is subnetted, 1 subnets
B       189.205.30.0/29 [20/0] via 185.201.26.2, 00:00:00
    190.140.0.0/24 is subnetted, 10 subnets
B       190.140.13.0/24 [20/0] via 184.200.25.1, 00:00:00
B       190.140.23.0/24 [20/0] via 184.200.25.1, 00:00:00
B       190.140.33.0/24 [20/0] via 184.200.25.1, 00:00:00
B       190.140.53.0/24 [20/0] via 185.201.26.2, 00:00:00
B       190.140.73.0/24 [20/0] via 185.201.26.2, 00:00:00
R       190.140.83.0/24 [120/2] via 185.201.26.2, 00:00:06, Serial0/0/0
R       190.140.93.0/24 [120/2] via 185.201.26.2, 00:00:06, Serial0/0/0
R       190.140.103.0/24 [120/2] via 185.201.26.2, 00:00:06, Serial0/0/0
R       190.140.113.0/24 [120/2] via 185.201.26.2, 00:00:06, Serial0/0/0
  
```

## 3)show ip protocols.

Router ASBR 1


Physical Config CLI Attributes

IOS Command Line Interface

```

Router#show ip protocols
Routing Protocol is "bgp 65010"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  IGP synchronization is disabled
  Automatic route summarization is disabled
  Neighbor(s):
    Address          FiltIn FiltOut DistIn DistOut Weight RouteMap
    184.200.25.1
    185.201.26.2
  Maximum path: 1
  Routing Information Sources:
    Gateway          Distance      Last Update
    185.201.26.2          20          00:00:00
    184.200.25.1          20          00:00:00
  Distance: external 20 internal 200 local 200
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 17 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Redistributing: rip
  Default version control: send version 2, receive 2
    Interface          Send Recv Triggered RIP Key-chain
    Serial0/0/0          22
    Serial0/0/1          22
  Automatic network summarization is not in effect
  Maximum path: 4
  Routing for Networks:
    184.200.0.0
    185.201.0.0
  Passive Interface(s):
  Routing Information Sources:
    Gateway          Distance      Last Update
    184.200.25.1          120          00:00:28
    185.201.26.2          120          00:00:03
  Distance: (default is 120)
Router#

```

**ROUTER ASBR 2.****1)show running-config.**
 Router ASBR 2
 

Physical   Config   CLI   Attributes


IOS Command Line Interface

```

interface GigabitEthernet0/0
  no ip address
  duplex auto
  speed auto
  shutdown
!
interface GigabitEthernet0/1
  no ip address
  duplex auto
  speed auto
  shutdown
!
interface Serial0/0/0
  ip address 185.201.26.2 255.255.255.248
!
interface Serial0/0/1
  ip address 186.202.27.1 255.255.255.248
  clock rate 2000000
!
interface Serial0/1/0
  no ip address
  clock rate 2000000
  shutdown
!
interface Serial0/1/1
  no ip address
  clock rate 2000000
  shutdown
!
interface Vlan1
  no ip address
  shutdown
!
router ospf 10
  log-adjacency-changes
  network 186.202.27.0 0.0.0.7 area 0
!
router bgp 65020
  bgp log-neighbor-changes
  no synchronization
  neighbor 185.201.26.1 remote-as 65010
  neighbor 186.202.27.2 remote-as 65030
  network 185.201.26.0 mask 255.255.255.248
  network 186.202.27.0 mask 255.255.255.248
!
router rip
  version 2
  network 185.201.0.0
  network 186.202.0.0
  no auto-summary

```

## 2)show ip route.

 Router ASBR 2

Physical   Config   CLI   Attributes

IOS Command Line Interface

```


Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 186.202.27.2 to network 0.0.0.0

    10.0.0.0/30 is subnetted, 12 subnets
O E2   10.13.0.0/30 [110/20] via 186.202.27.2, 02:34:36, Serial0/0/1
B       10.13.0.4/30 [20/0] via 185.201.26.1, 00:00:00
B       10.13.0.8/30 [20/0] via 185.201.26.1, 00:00:00
O E2   10.13.0.12/30 [110/20] via 186.202.27.2, 01:56:52, Serial0/0/1
O E2   10.13.0.16/30 [110/20] via 186.202.27.2, 01:56:52, Serial0/0/1
O E2   10.13.0.20/30 [110/20] via 186.202.27.2, 01:56:52, Serial0/0/1
O E2   10.13.0.24/30 [110/20] via 186.202.27.2, 01:56:52, Serial0/0/1
O E2   10.13.0.28/30 [110/20] via 186.202.27.2, 01:56:52, Serial0/0/1
O E2   10.13.0.32/30 [110/20] via 186.202.27.2, 01:56:52, Serial0/0/1
O E2   10.13.0.36/30 [110/20] via 186.202.27.2, 02:34:36, Serial0/0/1
O E2   10.13.0.40/30 [110/20] via 186.202.27.2, 02:34:36, Serial0/0/1
O E2   10.13.0.44/30 [110/20] via 186.202.27.2, 02:34:36, Serial0/0/1
    184.199.0.0/29 is subnetted, 1 subnets
B       184.199.24.0/29 [20/64] via 186.202.27.2, 00:00:00
    184.200.0.0/29 is subnetted, 1 subnets
B       184.200.25.0/29 [20/0] via 185.201.26.1, 00:00:00
    185.201.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       185.201.26.0/29 is directly connected, Serial0/0/0
L       185.201.26.2/32 is directly connected, Serial0/0/0
    186.202.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       186.202.27.0/29 is directly connected, Serial0/0/1
L       186.202.27.1/32 is directly connected, Serial0/0/1
    187.203.0.0/29 is subnetted, 1 subnets
B       187.203.28.0/29 [20/64] via 186.202.27.2, 00:00:00
    188.204.0.0/29 is subnetted, 1 subnets
B       188.204.29.0/29 [20/128] via 186.202.27.2, 00:00:00
    189.205.0.0/29 is subnetted, 1 subnets
B       189.205.30.0/29 [20/128] via 186.202.27.2, 00:00:00
    190.140.0.0/24 is subnetted, 12 subnets
B       190.140.13.0/24 [20/0] via 185.201.26.1, 00:00:00
B       190.140.23.0/24 [20/0] via 185.201.26.1, 00:00:00
B       190.140.33.0/24 [20/0] via 185.201.26.1, 00:00:00
O E2   190.140.43.0/24 [110/20] via 186.202.27.2, 01:57:34, Serial0/0/1
B       190.140.53.0/24 [20/65] via 186.202.27.2, 00:00:00
O E2   190.140.63.0/24 [110/20] via 186.202.27.2, 01:57:34, Serial0/0/1
B       190.140.73.0/24 [20/129] via 186.202.27.2, 00:00:00
O E2   190.140.83.0/24 [110/20] via 186.202.27.2, 02:09:39, Serial0/0/1
O E2   190.140.93.0/24 [110/20] via 186.202.27.2, 01:56:52, Serial0/0/1
O E2   190.140.103.0/24 [110/20] via 186.202.27.2, 02:34:36, Serial0/0/1
O E2   190.140.113.0/24 [110/20] via 186.202.27.2, 02:34:36, Serial0/0/1
O E2   190.140.123.0/24 [110/20] via 186.202.27.2, 02:34:36, Serial0/0/1
R*    0.0.0.0/0 [120/1] via 186.202.27.2, 00:00:25, Serial0/0/1

Router#
    
```

## 3)show ip protocols.

 Router ASBR 2
 

Physical
 Config
 CLI
 Attributes

 IOS Command Line Interface
 

```

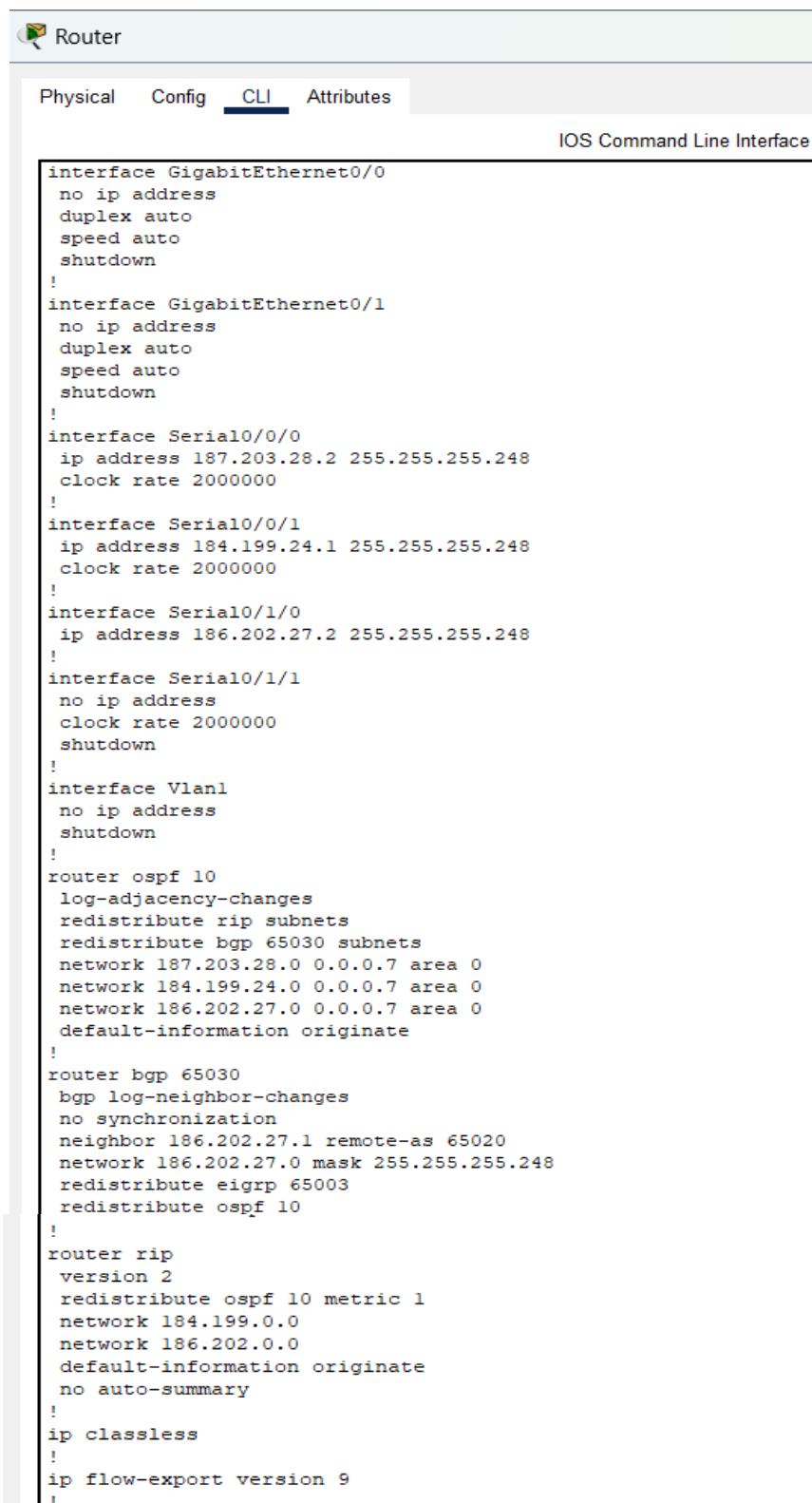
Router#show ip protocols
Routing Protocol is "bgp 65020"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  IGP synchronization is disabled
  Automatic route summarization is disabled
  Neighbor(s):
    Address                FiltIn FiltOut DistIn DistOut Weight RouteMap
    185.201.26.1
    186.202.27.2
  Maximum path: 1
  Routing Information Sources:
    Gateway                Distance    Last Update
    185.201.26.1            20          00:00:00
    186.202.27.2            20          00:00:00
  Distance: external 20 internal 200 local 200
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 25 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Redistributing: rip
  Default version control: send version 2, receive 2
    Interface                Send Recv Triggered RIP Key-chain
    Serial0/0/0                22
    Serial0/0/1                22
  Automatic network summarization is not in effect
  Maximum path: 4
  Routing for Networks:
    185.201.0.0
    186.202.0.0
  Passive Interface(s):
  Routing Information Sources:
    Gateway                Distance    Last Update
    186.202.27.2            120         00:00:07
    185.201.26.1            120         00:00:11
  Distance: (default is 120)

Routing Protocol is "ospf 10"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 186.202.27.1
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    186.202.27.0 0.0.0.7 area 0
  Routing Information Sources:
    Gateway                Distance    Last Update
    186.202.27.1            110         00:02:50
    187.203.28.2            110         00:29:13
    189.205.30.2            110         00:28:10
    190.140.53.1            110         00:17:12
    190.140.73.1            110         00:11:55
    190.140.103.1           110         00:07:34
  Distance: (default is 110)

Router#
  
```

## ZONA 0 ROUTER ABR1

### 1)show running-config.



```


Router
Physical Config CLI Attributes
IOS Command Line Interface

interface GigabitEthernet0/0
  no ip address
  duplex auto
  speed auto
  shutdown
!
interface GigabitEthernet0/1
  no ip address
  duplex auto
  speed auto
  shutdown
!
interface Serial0/0/0
  ip address 187.203.28.2 255.255.255.248
  clock rate 2000000
!
interface Serial0/0/1
  ip address 184.199.24.1 255.255.255.248
  clock rate 2000000
!
interface Serial0/1/0
  ip address 186.202.27.2 255.255.255.248
!
interface Serial0/1/1
  no ip address
  clock rate 2000000
  shutdown
!
interface Vlan1
  no ip address
  shutdown
!
router ospf 10
  log-adjacency-changes
  redistribute rip subnets
  redistribute bgp 65030 subnets
  network 187.203.28.0 0.0.0.7 area 0
  network 184.199.24.0 0.0.0.7 area 0
  network 186.202.27.0 0.0.0.7 area 0
  default-information originate
!
router bgp 65030
  bgp log-neighbor-changes
  no synchronization
  neighbor 186.202.27.1 remote-as 65020
  network 186.202.27.0 mask 255.255.255.248
  redistribute eigrp 65003
  redistribute ospf 10
!
router rip
  version 2
  redistribute ospf 10 metric 1
  network 184.199.0.0
  network 186.202.0.0
  default-information originate
  no auto-summary
!
ip classless
!
ip flow-export version 9
!

```



## 2) show ip route.

 Router

Physical
Config
CLI
Attributes

IOS Command Line Interface

```

Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
        i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
        * - candidate default, U - per-user static route, o - ODR
        P - periodic downloaded static route

Gateway of last resort is not set

    10.0.0.0/30 is subnetted, 12 subnets
O E2   10.13.0.0/30 [110/20] via 184.199.24.2, 02:03:40, Serial0/0/1
B      10.13.0.4/30 [20/0] via 186.202.27.1, 00:00:00
B      10.13.0.8/30 [20/0] via 186.202.27.1, 00:00:00
O E2   10.13.0.12/30 [110/20] via 184.199.24.2, 02:03:28, Serial0/0/1
O E2   10.13.0.16/30 [110/20] via 184.199.24.2, 02:03:28, Serial0/0/1
O E2   10.13.0.20/30 [110/20] via 184.199.24.2, 02:03:28, Serial0/0/1
O E2   10.13.0.24/30 [110/20] via 184.199.24.2, 02:03:28, Serial0/0/1
O E2   10.13.0.28/30 [110/20] via 184.199.24.2, 02:03:28, Serial0/0/1
O E2   10.13.0.32/30 [110/20] via 184.199.24.2, 02:03:28, Serial0/0/1
O E2   10.13.0.36/30 [110/20] via 184.199.24.2, 02:41:22, Serial0/0/1
O E2   10.13.0.40/30 [110/20] via 184.199.24.2, 02:41:22, Serial0/0/1
O E2   10.13.0.44/30 [110/20] via 184.199.24.2, 02:41:22, Serial0/0/1
    184.199.0.0/16 is variably subnetted, 2 subnets, 2 masks
C      184.199.24.0/29 is directly connected, Serial0/0/1
L      184.199.24.1/32 is directly connected, Serial0/0/1
    184.200.0.0/29 is subnetted, 1 subnets
B      184.200.25.0/29 [20/0] via 186.202.27.1, 00:00:00
    185.201.0.0/29 is subnetted, 1 subnets
B      185.201.26.0/29 [20/0] via 186.202.27.1, 00:00:00
    186.202.0.0/16 is variably subnetted, 2 subnets, 2 masks
C      186.202.27.0/29 is directly connected, Serial0/1/0
L      186.202.27.2/32 is directly connected, Serial0/1/0
    187.203.0.0/16 is variably subnetted, 2 subnets, 2 masks
C      187.203.28.0/29 is directly connected, Serial0/0/0
L      187.203.28.2/32 is directly connected, Serial0/0/0
    188.204.0.0/29 is subnetted, 1 subnets
O      188.204.29.0/29 [110/128] via 184.199.24.2, 02:03:18, Serial0/0/1
    189.205.0.0/29 is subnetted, 1 subnets
O      189.205.30.0/29 [110/128] via 184.199.24.2, 02:41:22, Serial0/0/1
    190.140.0.0/24 is subnetted, 12 subnets
B      190.140.13.0/24 [20/0] via 186.202.27.1, 00:00:00
B      190.140.23.0/24 [20/0] via 186.202.27.1, 00:00:00
B      190.140.33.0/24 [20/0] via 186.202.27.1, 00:00:00
O E2   190.140.43.0/24 [110/20] via 184.199.24.2, 02:04:08, Serial0/0/1
O IA   190.140.53.0/24 [110/65] via 187.203.28.1, 02:41:22, Serial0/0/0
O E2   190.140.63.0/24 [110/20] via 184.199.24.2, 02:04:08, Serial0/0/1
O IA   190.140.73.0/24 [110/129] via 184.199.24.2, 02:41:22, Serial0/0/1
O E2   190.140.83.0/24 [110/20] via 184.199.24.2, 02:16:14, Serial0/0/1
O E2   190.140.93.0/24 [110/20] via 184.199.24.2, 02:03:28, Serial0/0/1
O E2   190.140.103.0/24 [110/20] via 184.199.24.2, 02:41:22, Serial0/0/1
O E2   190.140.113.0/24 [110/20] via 184.199.24.2, 02:41:22, Serial0/0/1
O E2   190.140.123.0/24 [110/20] via 184.199.24.2, 02:41:22, Serial0/0/1

```

Router#



### 3)show ip protocols.

```

Router
Physical Config CLI Attributes
IOS Command Line Interface

Router#show ip protocols
Routing Protocol is "bgp 65030"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  IGP synchronization is disabled
  Automatic route summarization is disabled
  Neighbor(s):
    Address          FiltIn FiltOut DistIn DistOut Weight RouteMap
    186.202.27.1
  Maximum path: 1
  Routing Information Sources:
    Gateway          Distance      Last Update
    186.202.27.1      20            00:00:00
  Distance: external 20 internal 200 local 200
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 20 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Redistributing: rip, ospf 10
  Default version control: send version 2, receive 2
    Interface          Send Recv Triggered RIP Key-chain
    Serial0/0/1         22
    Serial0/1/0         22
  Automatic network summarization is not in effect
  Maximum path: 4
  Routing for Networks:
    184.199.0.0
    186.202.0.0
  Passive Interface(s):
  Routing Information Sources:
    Gateway          Distance      Last Update
    186.202.27.1      120           00:00:24
  Distance: (default is 120)

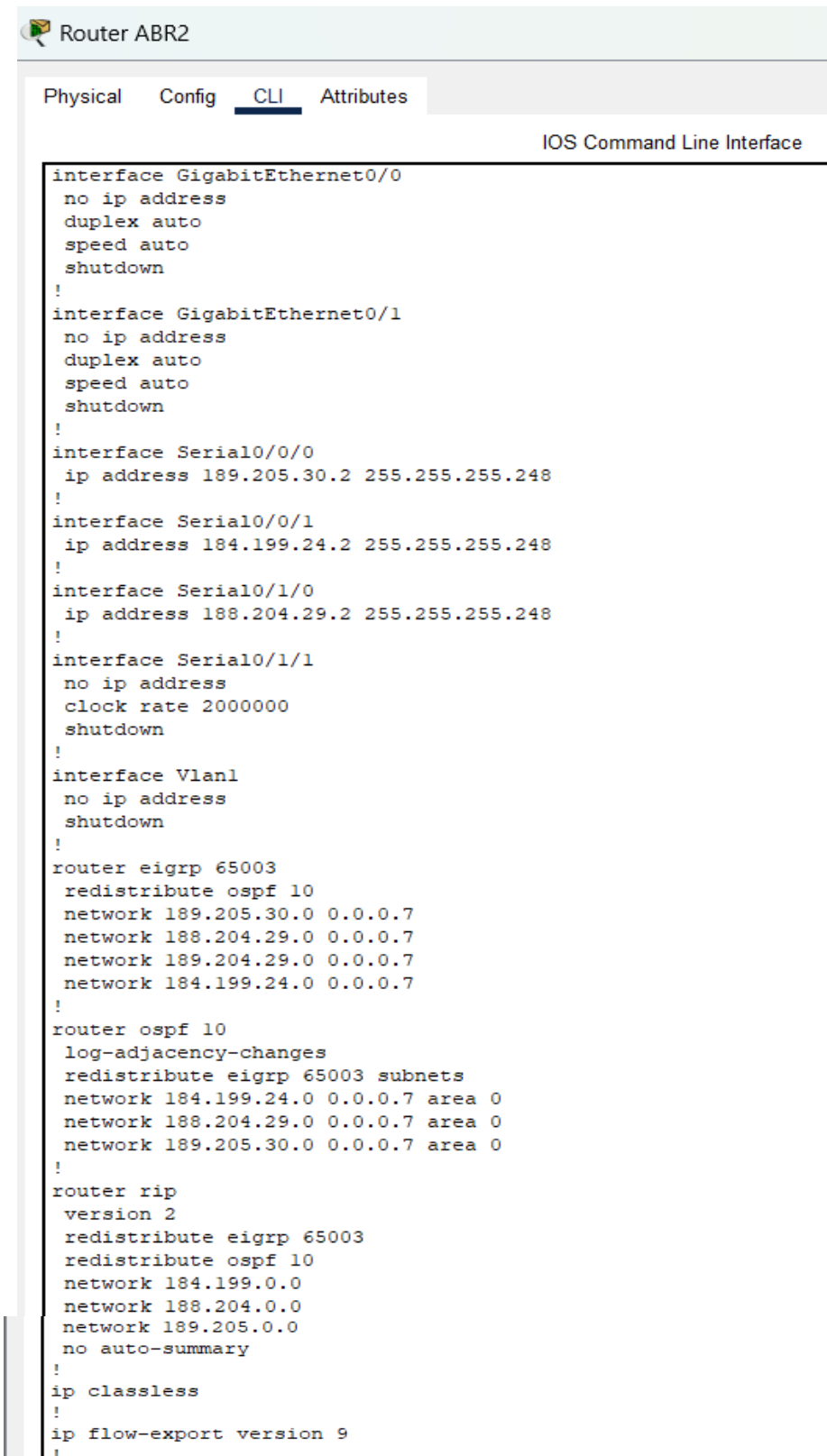
Routing Protocol is "ospf 10"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 187.203.28.2
  It is an autonomous system boundary router
  Redistributing External Routes from,
    rip
    bgp 65030
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    187.203.28.0 0.0.0.7 area 0
    184.199.24.0 0.0.0.7 area 0
    186.202.27.0 0.0.0.7 area 0
  Routing Information Sources:
    Gateway          Distance      Last Update
    186.202.27.1      110           00:09:12
    187.203.28.2       110           00:05:34
    189.205.30.2       110           00:04:31
    190.140.53.1       110           00:23:34
    190.140.73.1       110           00:18:17
    190.140.103.1      110           00:13:56
  Distance: (default is 110)

Router#

```

## ZONA 0 ROUTER ABR2

### 1)show running-config.



The screenshot shows the CLI of Router ABR2. The tabs at the top are Physical, Config, CLI (selected), and Attributes. The title bar says 'Router ABR2'. The main window displays the running configuration for the IOS Command Line Interface.

```

interface GigabitEthernet0/0
  no ip address
  duplex auto
  speed auto
  shutdown
!
interface GigabitEthernet0/1
  no ip address
  duplex auto
  speed auto
  shutdown
!
interface Serial0/0/0
  ip address 189.205.30.2 255.255.255.248
!
interface Serial0/0/1
  ip address 184.199.24.2 255.255.255.248
!
interface Serial0/1/0
  ip address 188.204.29.2 255.255.255.248
!
interface Serial0/1/1
  no ip address
  clock rate 2000000
  shutdown
!
interface Vlan1
  no ip address
  shutdown
!
router eigrp 65003
  redistribute ospf 10
  network 189.205.30.0 0.0.0.7
  network 188.204.29.0 0.0.0.7
  network 189.204.29.0 0.0.0.7
  network 184.199.24.0 0.0.0.7
!
router ospf 10
  log-adjacency-changes
  redistribute eigrp 65003 subnets
  network 184.199.24.0 0.0.0.7 area 0
  network 188.204.29.0 0.0.0.7 area 0
  network 189.205.30.0 0.0.0.7 area 0
!
router rip
  version 2
  redistribute eigrp 65003
  redistribute ospf 10
  network 184.199.0.0
  network 188.204.0.0
  network 189.205.0.0
  no auto-summary
!
ip classless
!
ip flow-export version 9
!
  
```

## 2) show ip route.

Router ABR2

Physical Config **CLI** Attributes

IOS Command Line Interface

```

Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 184.199.24.1 to network 0.0.0.0

    10.0.0.0/30 is subnetted, 12 subnets
O E2   10.13.0.0/30 [110/20] via 184.199.24.1, 02:49:59, Serial0/0/1
O E2   10.13.0.4/30 [110/20] via 184.199.24.1, 01:33:51, Serial0/0/1
O E2   10.13.0.8/30 [110/20] via 184.199.24.1, 01:33:51, Serial0/0/1
D EX   10.13.0.12/30 [170/2425856] via 189.205.30.1, 02:12:02, Serial0/0/0
D EX   10.13.0.16/30 [170/2425856] via 189.205.30.1, 02:12:02, Serial0/0/0
D EX   10.13.0.20/30 [170/2425856] via 189.205.30.1, 02:12:02, Serial0/0/0
D EX   10.13.0.24/30 [170/2425856] via 189.205.30.1, 02:12:02, Serial0/0/0
D EX   10.13.0.28/30 [170/2425856] via 189.205.30.1, 02:12:02, Serial0/0/0
D EX   10.13.0.32/30 [170/2425856] via 189.205.30.1, 02:12:02, Serial0/0/0
D      10.13.0.36/30 [90/2681856] via 189.205.30.1, 02:12:26, Serial0/0/0
D      10.13.0.40/30 [90/3193856] via 189.205.30.1, 02:12:26, Serial0/0/0
D      10.13.0.44/30 [90/2681856] via 189.205.30.1, 02:12:26, Serial0/0/0
184.199.0.0/16 is variably subnetted, 2 subnets, 2 masks
C      184.199.24.0/29 is directly connected, Serial0/0/1
L      184.199.24.2/32 is directly connected, Serial0/0/1
184.200.0.0/29 is subnetted, 1 subnets
O E2   184.200.25.0/29 [110/20] via 184.199.24.1, 01:46:21, Serial0/0/1
185.201.0.0/29 is subnetted, 1 subnets
O E2   185.201.26.0/29 [110/20] via 184.199.24.1, 01:46:21, Serial0/0/1
186.202.0.0/29 is subnetted, 1 subnets
O      186.202.27.0/29 [110/128] via 184.199.24.1, 02:12:39, Serial0/0/1
187.203.0.0/29 is subnetted, 1 subnets
O      187.203.28.0/29 [110/128] via 184.199.24.1, 02:49:59, Serial0/0/1
188.204.0.0/16 is variably subnetted, 2 subnets, 2 masks
C      188.204.29.0/29 is directly connected, Serial0/1/0
L      188.204.29.2/32 is directly connected, Serial0/1/0
189.205.0.0/16 is variably subnetted, 2 subnets, 2 masks
C      189.205.30.0/29 is directly connected, Serial0/0/0
L      189.205.30.2/32 is directly connected, Serial0/0/0
190.140.0.0/24 is subnetted, 12 subnets
O E2   190.140.13.0/24 [110/20] via 184.199.24.1, 01:33:51, Serial0/0/1
O E2   190.140.23.0/24 [110/20] via 184.199.24.1, 01:33:51, Serial0/0/1
O E2   190.140.33.0/24 [110/20] via 184.199.24.1, 01:33:51, Serial0/0/1
D EX   190.140.43.0/24 [170/2425856] via 189.205.30.1, 02:12:26, Serial0/0/0
O IA   190.140.53.0/24 [110/129] via 184.199.24.1, 02:49:49, Serial0/0/1
D EX   190.140.63.0/24 [170/2425856] via 189.205.30.1, 02:12:26, Serial0/0/0
O IA   190.140.73.0/24 [110/65] via 188.204.29.1, 02:49:59, Serial0/1/0
D EX   190.140.83.0/24 [170/2425856] via 189.205.30.1, 02:12:26, Serial0/0/0
D EX   190.140.93.0/24 [170/2425856] via 189.205.30.1, 02:12:01, Serial0/0/0
D      190.140.103.0/24 [90/2170112] via 189.205.30.1, 02:12:26, Serial0/0/0
D      190.140.113.0/24 [90/2682112] via 189.205.30.1, 02:12:26, Serial0/0/0
D      190.140.123.0/24 [90/2682112] via 189.205.30.1, 02:12:26, Serial0/0/0
R*    0.0.0.0/0 [120/1] via 184.199.24.1, 00:00:15, Serial0/0/1
  
```

Router#

## 3)show ip protocols.

Router ABR2

Physical Config CLI Attributes

IOS Command Line Interface

```
Router#show ip protocols

Routing Protocol is "eigrp 65003 "
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Default networks flagged in outgoing updates
  Default networks accepted from incoming updates
  Redistributing: eigrp 65003, ospf 10
  EIGRP-IPv4 Protocol for AS(65003)
    Metric weight K1=1, K2=0, K3=1, K4=0, K5=0
    NSF-aware route hold timer is 240
    Router-ID: 184.199.24.2
    Topology : 0 (base)
      Active Timer: 3 min
      Distance: internal 90 external 170
      Maximum path: 4
      Maximum hopcount 100
      Maximum metric variance 1

  Automatic Summarization: disabled
  Automatic address summarization:
  Maximum path: 4
  Routing for Networks:
    189.205.30.0/29
    188.204.29.0/29
    189.204.29.0/29
    184.199.24.0/29
  Routing Information Sources:
    Gateway         Distance      Last Update
    189.205.30.1     90           2273895
  Distance: internal 90 external 170

Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 25 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Redistributing: rip, eigrp 65003, ospf 10
  Default version control: send version 2, receive 2
  Interface          Send Recv Triggered RIP Key-chain
  Serial0/0/0         22
  Serial0/0/1         22
  Serial0/1/0         22
  Automatic network summarization is not in effect
  Maximum path: 4
  Routing for Networks:
    184.199.0.0
    188.204.0.0
    189.205.0.0
  Passive Interface(s):
```

```

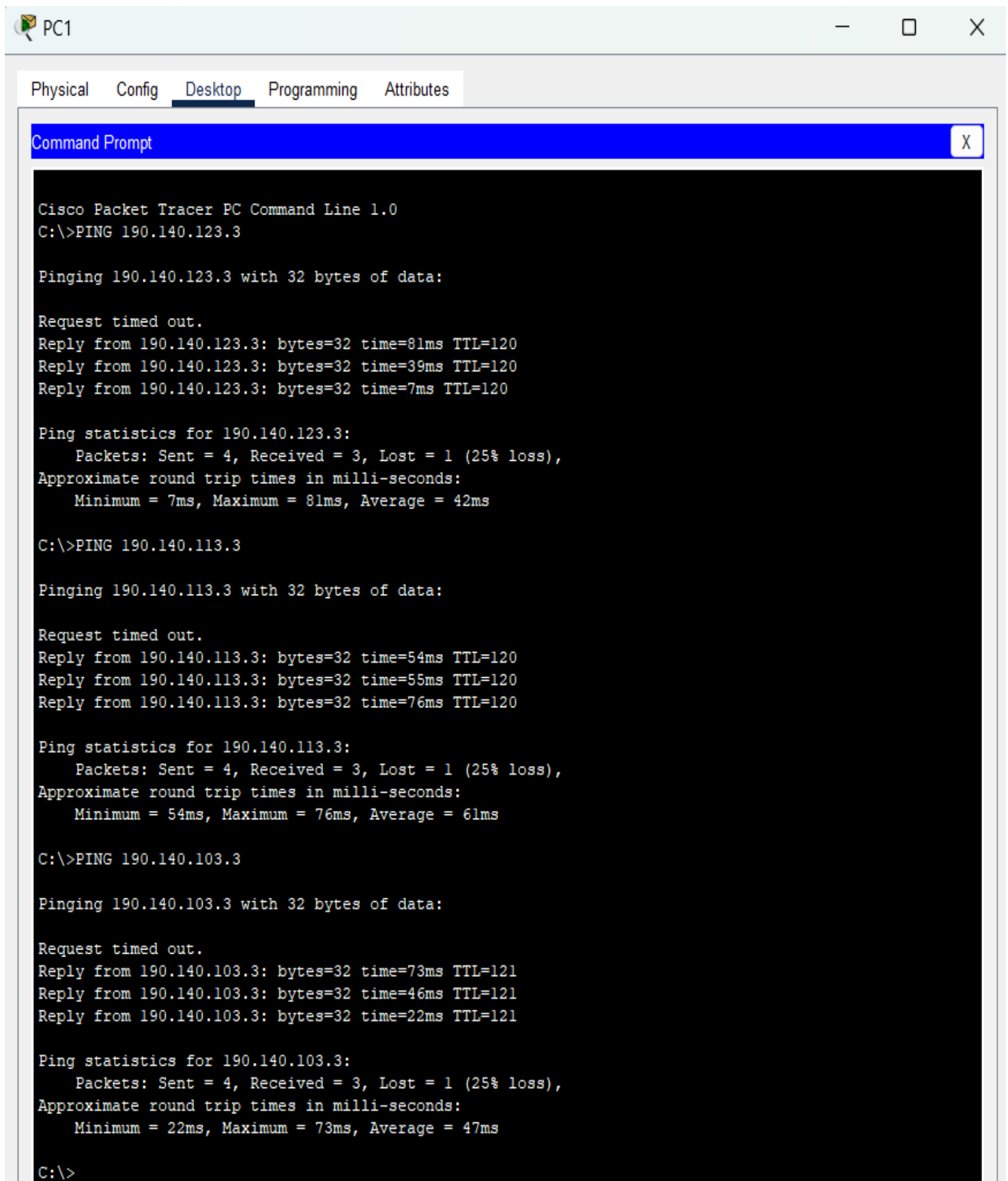
Routing Information Sources:
      Gateway      Distance      Last Update
      184.199.24.1      120      00:00:24
Distance: (default is 120)

Routing Protocol is "ospf 10"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 189.205.30.2
  It is an autonomous system boundary router
  Redistributing External Routes from,
    eigrp 65003
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    184.199.24.0 0.0.0.7 area 0
    188.204.29.0 0.0.0.7 area 0
    189.205.30.0 0.0.0.7 area 0
  Routing Information Sources:
    Gateway      Distance      Last Update
    186.202.27.1      110      00:18:10
    187.203.28.2      110      00:14:32
    189.205.30.2      110      00:13:29
    190.140.53.1      110      00:02:32
    190.140.73.1      110      00:27:15
    190.140.103.1      110      00:22:54
  Distance: (default is 110)

Router#

```

# Ping.



The screenshot shows a Cisco Packet Tracer PC Command Line window for PC1. The window has tabs for Physical, Config, Desktop, Programming, and Attributes, with Desktop selected. The Command Prompt window displays the following text:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>PING 190.140.123.3

Pinging 190.140.123.3 with 32 bytes of data:

Request timed out.
Reply from 190.140.123.3: bytes=32 time=81ms TTL=120
Reply from 190.140.123.3: bytes=32 time=39ms TTL=120
Reply from 190.140.123.3: bytes=32 time=7ms TTL=120

Ping statistics for 190.140.123.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 7ms, Maximum = 81ms, Average = 42ms

C:\>PING 190.140.113.3

Pinging 190.140.113.3 with 32 bytes of data:

Request timed out.
Reply from 190.140.113.3: bytes=32 time=54ms TTL=120
Reply from 190.140.113.3: bytes=32 time=55ms TTL=120
Reply from 190.140.113.3: bytes=32 time=76ms TTL=120

Ping statistics for 190.140.113.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 54ms, Maximum = 76ms, Average = 61ms

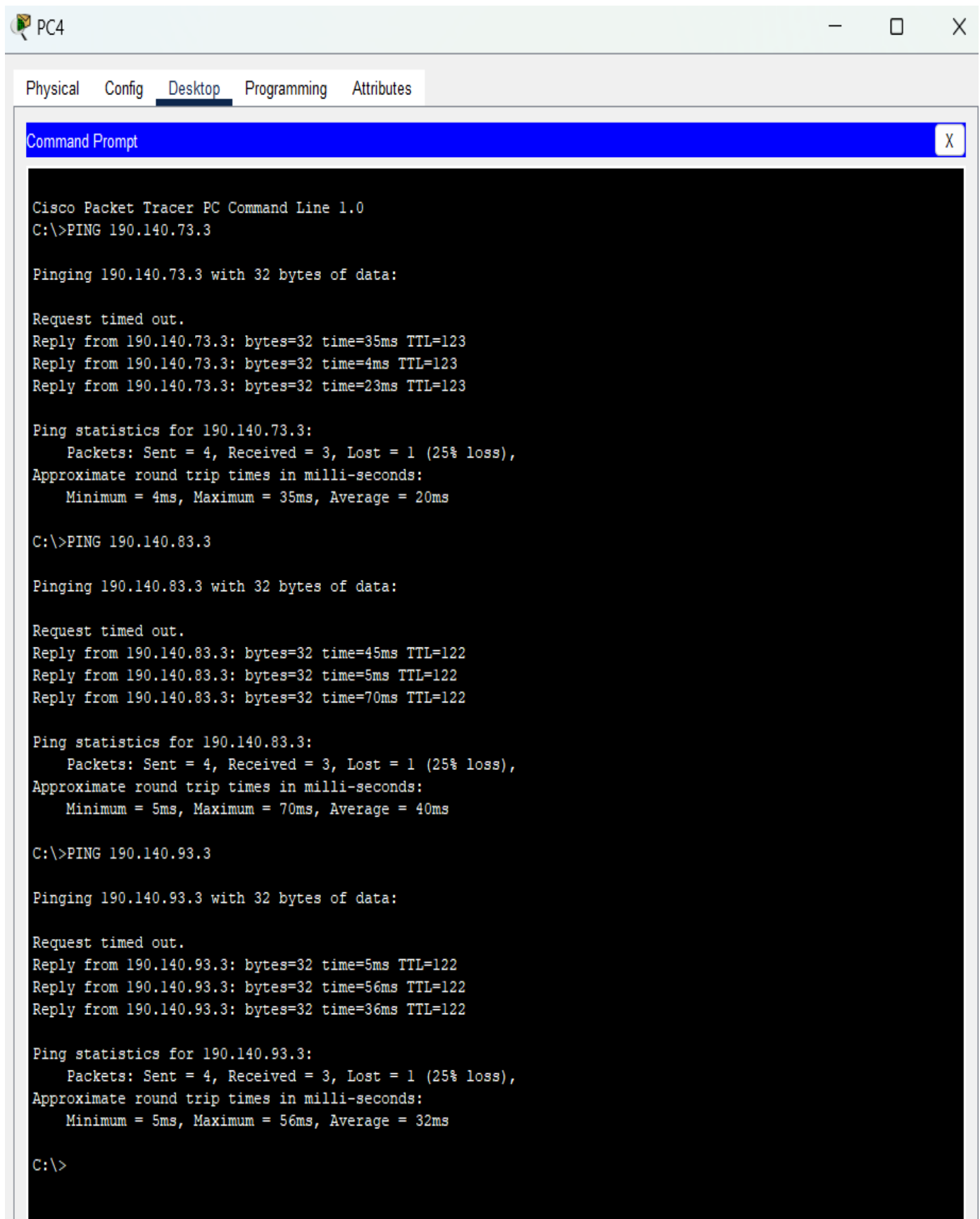
C:\>PING 190.140.103.3

Pinging 190.140.103.3 with 32 bytes of data:

Request timed out.
Reply from 190.140.103.3: bytes=32 time=73ms TTL=121
Reply from 190.140.103.3: bytes=32 time=46ms TTL=121
Reply from 190.140.103.3: bytes=32 time=22ms TTL=121

Ping statistics for 190.140.103.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 22ms, Maximum = 73ms, Average = 47ms

C:\>
```



## ANÁLISIS DE RESULTADOS

- **Configuración del enrutador:** Se configuro los routers siguiendo las pautas establecidas, asignando a cada puerto una IP adecuada y asegurándose de que las subredes definidas en el proyecto estén correctamente implementadas. Esto incluye la configuración de protocolos de enrutamiento dinámico como RIP, EIGRP y OSPF en función de las áreas y grupos asignados.
- **Verificación de la configuración:** La verificación se realiza mediante comandos como (**show running-config, show ip route y show ip protocols,**) los cuales permiten comprobar que el enrutador esté configurado correctamente y que la tabla de enrutamiento refleje la topología de red planificada.
- **Prueba de conexión:** Las pruebas de conexión entre diferentes redes y la computadora se han realizado con éxito. Comandos como ping desde una computadora en una red a otras computadoras en otra red demuestran que las comunicaciones funcionan según lo esperado, confirmando la correcta propagación de rutas y la funcionalidad de los protocolos de enrutamiento configurados.
- **Rendimiento de enrutamiento:** El análisis del rendimiento de enrutamiento mostró que los protocolos dinámicos seleccionados para este proyecto gestionaron eficientemente el tráfico de datos entre redes. El uso de OSPF en múltiples dominios permite una mejor segmentación y gestión del tráfico, mientras que EIGRP y RIP han demostrado ser eficaces en sus respectivos dominios.



## CONCLUSION.

El proyecto fue un éxito en términos de implementación y configuración de redes con enrutamiento dinámico. Se cumplieron todos los requisitos especificados, lo que dio como resultado una red estable y completamente funcional que permite una comunicación eficiente entre diferentes subredes. El uso de protocolos de enrutamiento dinámico apropiados para cada área ayuda a administrar el tráfico de la red y mejora la eficiencia y la escalabilidad del sistema. El proyecto no sólo demostró la capacidad de implementar redes complejas, sino que también destacó la importancia de elegir los protocolos de enrutamiento adecuados para diferentes topologías y requisitos de red.

En implementaciones futuras, una mayor exploración de la optimización de rutas y el análisis del rendimiento en condiciones de tráfico más denso ayudarán a garantizar que el sistema pueda soportar condiciones de red de mayor escala o más exigentes.