عنوان آزمایش :پیاده‌سازی Route Reflector درBGP

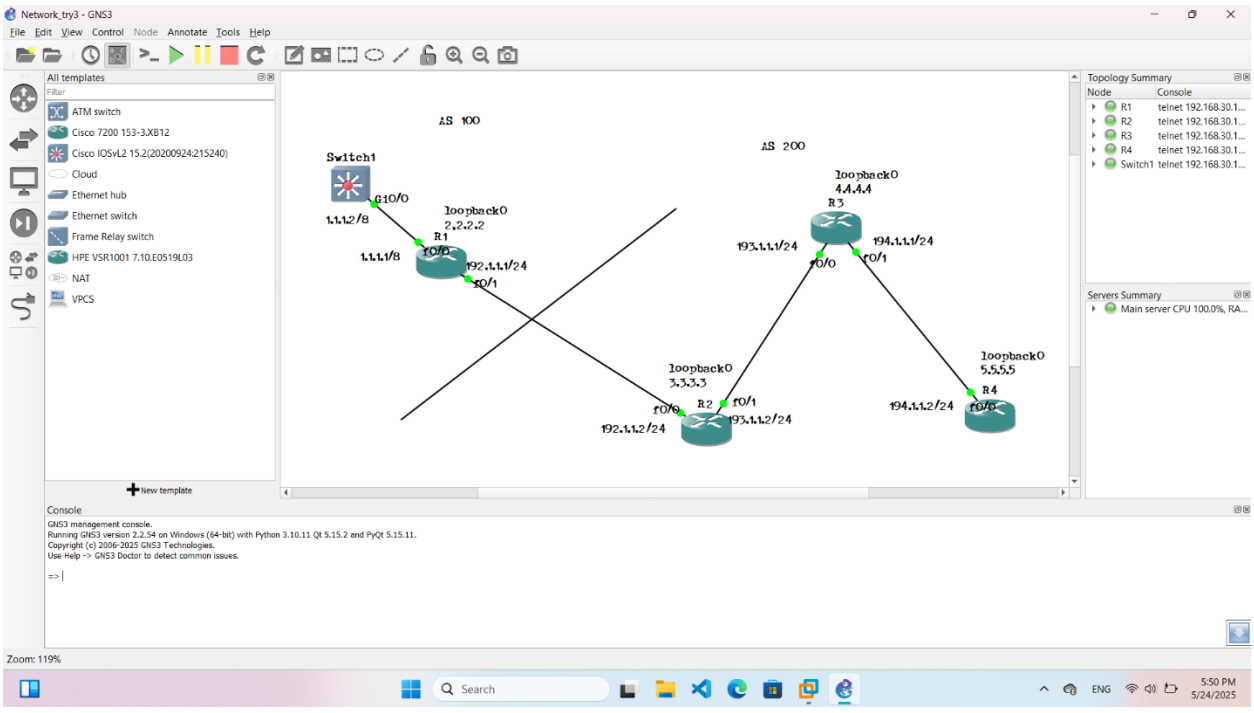
هدف:

هدف از این آزمایش، پیاده‌سازی و بررسی عملکرد **Route Reflector**در پروتکل BGP به منظور کاهش تعداد ارتباطات iBGP در یک AS است. با استفاده ازRoute Reflector ، نیازی به پیکربندی Full Mesh (هرروتر (یا نود) در یک مجموعه، با **تمام روترهای دیگر** به‌صورت مستقیم ارتباط داشته باشه) بین همه روترهای iBGP نیست.

تجهیزات مورد استفاده:

- 4روتر(AS100) R1 :، (AS200) R2، R3، R4
- اتصال بین R1 و R2 از طریق eBGP و بینR2 ، R3و R4 از طریق iBGP برقرار شد .به عنوان Route Reflectorتعریف شده و R2 و R4 به عنوانClient های آن پیکربندی شدند.
- شبکه‌های اتصال بین روترها:

روتر	نقش	Loopbacck (Router ID)	AS
R1	ارسال‌کننده مسیر از(eBGP) AS 100	2.2.2.2	100
R2	RR Client	3.3.3.3	200
R3	Route Reflector	4.4.4.4	200
R4	RR Client	5.5.5.5	200



مرحله 1: پیکربندی روتر R1 (AS100)

1. تنظیم آدرس‌ها:

R1#confi te

Enter configuration commands, one per line. End with CNTL/Z.

R1(config)#interface loopback 0

*May 24 13:47:12.539: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up

R1(config-if)#ip address 2.2.2.2 255.255.255.255

R1(config-if)#no shutdown

R1(config-if)#exit

R1(config)#interface fastEthernet0/0

R1(config-if)#ip address 1.1.1.1 255.0.0.0

R1(config-if)#no shutdown

R1(config-if)#exit

R1(config)#

*May 24 13:48:07.047: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up

*May 24 13:48:08.047: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

R1(config)#interface fa0/1

R1(config-if)#ip address 192.1.1.1 255.255.255.0

R1(config-if)#no shutdown

*May 24 13:48:40.815: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up

*May 24 13:48:41.815: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

R1(config-if)#exit

2. پیکربندیBGP :

R1(config)#router bgp 100

R1(config-router)#bgp router-id 2.2.2.2

R1(config-router)#nei 192.1.1.2 remote-as 200

R1(config-router)#net 1.0.0.0 mask 255.0.0.0

R1(config-router)#net 2.2.2.2 mask 255.255.255.255

R1(config-router)#exit

R1(config)#

*May 24 13:53:56.023: %BGP-5-ADJCHANGE: neighbor 192.1.1.2 Up

R1(config)#exit

R1#s

*May 24 14:14:13.715: %SYS-5-CONFIG_I: Configured from console by console

R1#show ip bgp summary

BGP router identifier 2.2.2.2, local AS number 100

BGP table version is 5, main routing table version 5

4 network entries using 576 bytes of memory

4 path entries using 320 bytes of memory

3/3 BGP path/bestpath attribute entries using 408 bytes of memory

1 BGP AS-PATH entries using 24 bytes of memory

0 BGP route-map cache entries using 0 bytes of memory

0 BGP filter-list cache entries using 0 bytes of memory

BGP using 1328 total bytes of memory

BGP activity 4/0 prefixes, 4/0 paths, scan interval 60 secs

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
192.1.1.2	4	200	57	58	5	0	0	00:48:40	2

R1#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

i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP

+ - replicated route, % - next hop override

Gateway of last resort is not set

1.0.0.0/8 is variably subnetted, 2 subnets, 2 masks

C 1.0.0.0/8 is directly connected, FastEthernet0/0

L 1.1.1.1/32 is directly connected, FastEthernet0/0

2.0.0.0/32 is subnetted, 1 subnets

C 2.2.2.2 is directly connected, Loopback0

3.0.0.0/32 is subnetted, 1 subnets

B 3.3.3.3 [20/0] via 192.1.1.2, 00:48:04

5.0.0.0/32 is subnetted, 1 subnets

B 5.5.5.5 [20/0] via 192.1.1.2, 00:46:23

192.1.1.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.1.1.0/24 is directly connected, FastEthernet0/1

L 192.1.1.1/32 is directly connected, FastEthernet0/1

R1#show ip bgp

BGP table version is 5, local router ID is 2.2.2.2

Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,

r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,

x best-external, a additional-path, c RIB-compressed,

Origin codes: i - IGP, e - EGP, ? - incomplete

RPKI validation codes: V valid, I invalid, N Not found

	Network	Next Hop	Metric	LocPrf	Weight	Path
*>	1.0.0.0	0.0.0.0	0		32768	i
*>	2.2.2.2/32	0.0.0.0	0		32768	i
*>	3.3.3.3/32	192.1.1.2	0		0	200 i
*>	5.5.5.5/32	192.1.1.2			0	200 i

مسیر مربوط به R4 از طریق eBGP دریافت شده است.

R1#

مرحله 2: پیکربندی روتر R2 (AS 200 – RR Client)

1. تنظیم آدرس‌ها:

R2#conf t

Enter configuration commands, one per line. End with CNTL/Z.

R2(config)#interface loopback 0

R2(config-if)#

*May 24 13:51:20.099: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up

R2(config-if)#ip address 3.3.3.3 255.255.255.255

R2(config-if)#no shutdown

R2(config-if)#exit

R2(config)#interface fa0/0

R2(config-if)#ip address 192.1.1.2 255.255.255.0

R2(config-if)#no shutdown

R2(config-if)#exit

*May 24 13:52:11.843: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up

*May 24 13:52:12.851: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

R2(config)#interface fa0/1

R2(config-if)#ip address 193.1.1.2 255.255.255.0

R2(config-if)#no shutdown

R2(config-if)#exit

R2(config)#

*May 24 13:52:36.783: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up

*May 24 13:52:37.783: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

R2(config)#

2. پیکربندیBGP :

R2(config)#router bgp 200

bgp router-id 3.3.3.3

R2(config-router)#nei 192.1.1.1 remote-as 100

*May 24 13:53:56.403: %BGP-5-ADJCHANGE: neighbor 192.1.1.1 Up

R2(config-router)#neighbor 4.4.4.4 remote-as 200

R2(config-router)# neighbor 4.4.4.4 update-source loopback0

R2(config-router)#net 3.3.3.3 mask 255.255.255.255

R2(config-router)#exit

R2(config)#

*May 24 14:02:00.219: %OSPF-5-ADJCHG: Process 10, Nbr 4.4.4.4 on FastEthernet0/1 from LOADING to FULL, Loading Done

3. پیاده سازی OSPF:

R2(config)#router ospf 10

R2(config-router)#network 3.3.3.3 0.0.0.0 area 0

```
R2(config-router)#network 192.1.1.0 0.0.0.255 area 0
R2(config-router)#network 193.1.1.0 0.0.0.255 area 0
R2(config-router)#exit
R2#ping 5.5.5.5
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 5.5.5.5, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 20/24/40 ms
R2#ping 194.1.1.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 194.1.1.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 20/28/40 ms
R2#show ip bgp summary
  BGP router identifier 3.3.3.3, local AS number 200
  BGP table version is 13, main routing table version 13
  8 network entries using 1152 bytes of memory
  9 path entries using 720 bytes of memory
  4/4 BGP path/bestpath attribute entries using 544 bytes of memory
  1 BGP AS-PATH entries using 24 bytes of memory
  0 BGP route-map cache entries using 0 bytes of memory
  0 BGP filter-list cache entries using 0 bytes of memory
  BGP using 2440 total bytes of memory
  BGP activity 8/0 prefixes, 13/4 paths, scan interval 60 secs

  Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
  4.4.4.4         4          200      45      49       13    0    0 00:23:23        4
```

192.1.1.1 4 100 38 49 13 0 0 00:25:40 3

R2#

R2#ping 1.0.0.0

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 1.0.0.0, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 16/20/24 ms

R2#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

i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP

+ - replicated route, % - next hop override

Gateway of last resort is not set

B 1.0.0.0/8 [20/0] via 192.1.1.1, 00:53:57

2.0.0.0/32 is subnetted, 1 subnets

B 2.2.2.2 [20/0] via 192.1.1.1, 00:53:57

3.0.0.0/32 is subnetted, 1 subnets

C 3.3.3.3 is directly connected, Loopback0

4.0.0.0/32 is subnetted, 1 subnets

O 4.4.4.4 [110/2] via 193.1.1.1, 00:53:39, FastEthernet0/1

5.0.0.0/32 is subnetted, 1 subnets

O 5.5.5.5 [110/3] via 193.1.1.1, 00:52:22, FastEthernet0/1

192.1.1.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.1.1.0/24 is directly connected, FastEthernet0/0

L 192.1.1.2/32 is directly connected, FastEthernet0/0

193.1.1.0/24 is variably subnetted, 2 subnets, 2 masks

C 193.1.1.0/24 is directly connected, FastEthernet0/1

L 193.1.1.2/32 is directly connected, FastEthernet0/1

O 194.1.1.0/24 [110/2] via 193.1.1.1, 00:52:32, FastEthernet0/1

R2#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

i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP

+ - replicated route, % - next hop override

Gateway of last resort is not set

B 1.0.0.0/8 [20/0] via 192.1.1.1, 00:10:56

2.0.0.0/32 is subnetted, 1 subnets

B 2.2.2.2 [20/0] via 192.1.1.1, 00:10:56

3.0.0.0/32 is subnetted, 1 subnets

C 3.3.3.3 is directly connected, Loopback0

4.0.0.0/32 is subnetted, 1 subnets

O 4.4.4.4 [110/2] via 193.1.1.1, 00:10:56, FastEthernet0/1

5.0.0.0/32 is subnetted, 1 subnets

O 5.5.5.5 [110/3] via 193.1.1.1, 00:10:56, FastEthernet0/1

192.1.1.0/24 is variably subnetted, 2 subnets, 2 masks

C 192.1.1.0/24 is directly connected, FastEthernet0/0

L 192.1.1.2/32 is directly connected, FastEthernet0/0

193.1.1.0/24 is variably subnetted, 2 subnets, 2 masks

C 193.1.1.0/24 is directly connected, FastEthernet0/1

L 193.1.1.2/32 is directly connected, FastEthernet0/1

- 194.1.1.0/24 [110/2] via 193.1.1.1, 00:10:56, FastEthernet0/1

R2#show ip bgp

BGP table version is 5, local router ID is 3.3.3.3

Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,

r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,

x best-external, a additional-path, c RIB-compressed,

Origin codes: i - IGP, e - EGP, ? - incomplete

RPKI validation codes: V valid, I invalid, N Not found

	Network	Next Hop	Metric	LocPrf	Weight	Path
*>	1.0.0.0	192.1.1.1	0		0	100 i
*>	2.2.2.2/32	192.1.1.1	0		0	100 i
*>	3.3.3.3/32	0.0.0.0	0		32768	i
r>i	5.5.5.5/32	5.5.5.5	0	100	0	i

مسیر R4 دیده شده ولی به علت وجود مسیر بهتر در RIB قرار نگرفته است.

R2#wr

Warning: Attempting to overwrite an NVRAM configuration previously written

by a different version of the system image.

Overwrite the previous NVRAM configuration?[confirm]

Building configuration...

[OK]

R2#

مرحله 3: پیکربندی روتر(R3 (OSPF Router

1. تنظیم آدرس‌ها:

R3#conf t

Enter configuration commands, one per line. End with CNTL/Z.

R3(config)#interface loopback 0

*May 24 13:59:44.919: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up

R3(config-if)#ip address 4.4.4.4 255.255.255.255

R3(config-if)#no shutdown

R3(config-if)#exit

R3(config)#interface fa0/0

R3(config-if)#ip address 193.1.1.1 255.255.255.0

R3(config-if)#no shutdown

R3(config-if)#exit

*May 24 14:00:48.223: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up

*May 24 14:00:49.223: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

R3(config)#interface fa0/1

R3(config-if)#ip address 194.1.1.1 255.255.255.0

R3(config-if)#no shutdown

R3(config-if)#exit

R3(config)#

*May 24 14:01:15.543: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up

*May 24 14:01:16.543: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

R3(config)#router ospf 10

R3(config-router)#network 4.4.4.4 0.0.0.0 area 0

R3(config-router)#network 193.1.1.0 0.0.0.255 area 0

R3(config-router)#network 194.1.1.0 0.0.0.255 area 0

2. پیکربندی BGP :

R3(config)#router bgp 200

R3(config-router)#bgp router-id 4.4.4.4

همچنین باید R2 , R3را به عنوان RR Client بشناسد:

R3(config-router)#neighbor 3.3.3.3 remote-as 200

R3(config-router)#neighbor 3.3.3.3 update-source loopback0

R3(config-router)#neighbor 3.3.3.3 route-reflector-client

همچنین باید R3هم R4 را به عنوان RR Client بشناسد:

neighbor 5.5.5.5 remote-as 200

neighbor 5.5.5.5 update-source loopback0

neighbor 5.5.5.5 route-reflector-client

R3(config-router)#

*May 24 14:05:02.843: %OSPF-5-ADJCHG: Process 10, Nbr 5.5.5.5 on FastEthernet0/1 from LOADING to FULL, Loading Done

R3(config-router)#exit

R3(config)#exit

*May 24 14:14:37.275: %SYS-5-CONFIG_I: Configured from console by console

در این مرحله، R3همسایگی OSPF با R2 و R4 را برقرار می‌کند.

R3#show ip bgp summary

BGP router identifier 4.4.4.4, local AS number 200

BGP table version is 5, main routing table version 5

4 network entries using 576 bytes of memory

4 path entries using 320 bytes of memory

2/2 BGP path/bestpath attribute entries using 272 bytes of memory

1 BGP AS-PATH entries using 24 bytes of memory

0 BGP route-map cache entries using 0 bytes of memory

0 BGP filter-list cache entries using 0 bytes of memory

BGP using 1192 total bytes of memory

BGP activity 4/0 prefixes, 4/0 paths, scan interval 60 secs

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
3.3.3.3	4	200	67	69	5	0	0	00:56:43	3
5.5.5.5	4	200	66	68	5	0	0	00:55:34	1

R3#show ip route

R3#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

i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP

+ - replicated route, % - next hop override

Gateway of last resort is not set

B 1.0.0.0/8 [200/0] via 192.1.1.1, 00:59:00

2.0.0.0/32 is subnetted, 1 subnets

B 2.2.2.2 [200/0] via 192.1.1.1, 00:59:00

3.0.0.0/32 is subnetted, 1 subnets

O 3.3.3.3 [110/2] via 193.1.1.2, 01:00:13, FastEthernet0/0

4.0.0.0/32 is subnetted, 1 subnets

C 4.4.4.4 is directly connected, Loopback0

5.0.0.0/32 is subnetted, 1 subnets

O 5.5.5.5 [110/2] via 194.1.1.2, 00:59:08, FastEthernet0/1

O 192.1.1.0/24 [110/2] via 193.1.1.2, 01:00:13, FastEthernet0/0

193.1.1.0/24 is variably subnetted, 2 subnets, 2 masks

C 193.1.1.0/24 is directly connected, FastEthernet0/0

L 193.1.1.1/32 is directly connected, FastEthernet0/0

194.1.1.0/24 is variably subnetted, 2 subnets, 2 masks

C 194.1.1.0/24 is directly connected, FastEthernet0/1

L 194.1.1.1/32 is directly connected, FastEthernet0/1

R3#show ip bgp

BGP table version is 5, local router ID is 4.4.4.4

Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,

r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,

x best-external, a additional-path, c RIB-compressed,

Origin codes: i - IGP, e – EGP, ? - incomplete

RPKI validation codes: V valid, I invalid, N Not found

Network	Next Hop	Metric	LocPrf	Weight	Path
*>i 1.0.0.0	192.1.1.1	0	100	0	100 i
*>i 2.2.2.2/32	192.1.1.1	0	100	0	100 i
r>i 3.3.3.3/32	3.3.3.3	0	100	0	i
r>i 5.5.5.5/32	5.5.5.5	0	100	0	i

مسیر از R1 به درستی دریافت شده و بهClient ها بازتاب شده است.

R3#

R3#wr

Warning: Attempting to overwrite an NVRAM configuration previously written

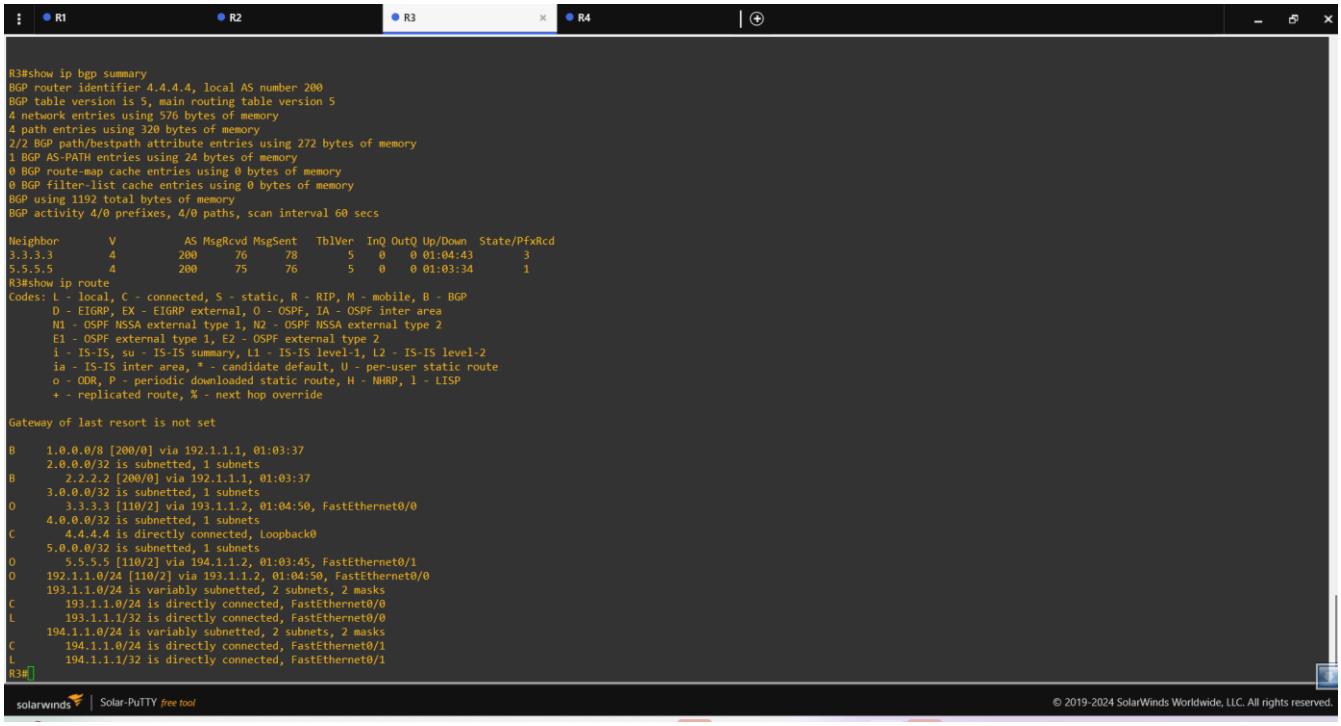
by a different version of the system image.

Overwrite the previous NVRAM configuration?[confirm]

Building configuration...

[OK]

R3#



مرحله 4: پیکربندی روتر R4 (OSPF Router)

1. تنظیم آدرس‌ها:

R4#conf t

Enter configuration commands, one per line. End with CNTL/Z.

R4(config)#inter loopback 0

R4(config-if)#

*May 24 14:03:28.391: %LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up

R4(config-if)#ip address 5.5.5.5 255.255.255.255

R4(config-if)#no shutdown

R4(config-if)#exit

R4(config)#inter fa0/0

R4(config-if)#ip add 194.1.1.2 255.255.255.0

R4(config-if)#no shutdown

R4(config-if)#exit

*May 24 14:04:29.419: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up

*May 24 14:04:30.419: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

*May 24 14:05:03.187: %OSPF-5-ADJCHG: Process 10, Nbr 4.4.4.4 on FastEthernet0/0 from LOADING to FULL, Loading Done

2. پیکربندی BGP:

R4(config)#router bgp 200

R4(config-router)#bgp router-id 5.5.5.5

R4(config-router)#network 5.5.5.5 mask 255.255.255.255

R4(config-router)#neighbor 4.4.4.4 remote-as 200

R4(config-router)#neighbor 4.4.4.4 update-source loopback0

3. R4از طریق OSPF به R3 متصل شده و از آنجا به کل شبکه دسترسی پیدا می‌کند.

R4(config)#router ospf 10

R4(config-router)#network 5.5.5.5 0.0.0.0 area 0

R4(config-router)#network 194.1.1.0 0.0.0.255 area 0

R4(config-router)#exit

R4(config)#exit

R4#

*May 24 14:14:57.415: %SYS-5-CONFIG_I: Configured from console by console

R4#show ip bgp summary

BGP router identifier 5.5.5.5, local AS number 200

BGP table version is 5, main routing table version 5

4 network entries using 576 bytes of memory

4 path entries using 320 bytes of memory

3/3 BGP path/bestpath attribute entries using 408 bytes of memory

1 BGP rrinfo entries using 24 bytes of memory

1 BGP AS-PATH entries using 24 bytes of memory

0 BGP route-map cache entries using 0 bytes of memory

0 BGP filter-list cache entries using 0 bytes of memory

BGP using 1352 total bytes of memory

BGP activity 4/0 prefixes, 4/0 paths, scan interval 60 secs

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
4.4.4.4	4	200	79	77	5	0	0	01:05:55	3

R4#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

i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP

+ - replicated route, % - next hop override

Gateway of last resort is not set

B 1.0.0.0/8 [200/0] via 192.1.1.1, 01:07:41

2.0.0.0/32 is subnetted, 1 subnets

B 2.2.2.2 [200/0] via 192.1.1.1, 01:07:41

3.0.0.0/32 is subnetted, 1 subnets

O 3.3.3.3 [110/3] via 194.1.1.1, 01:07:50, FastEthernet0/0

4.0.0.0/32 is subnetted, 1 subnets

O 4.4.4.4 [110/2] via 194.1.1.1, 01:07:50, FastEthernet0/0

5.0.0.0/32 is subnetted, 1 subnets

C 5.5.5.5 is directly connected, Loopback0

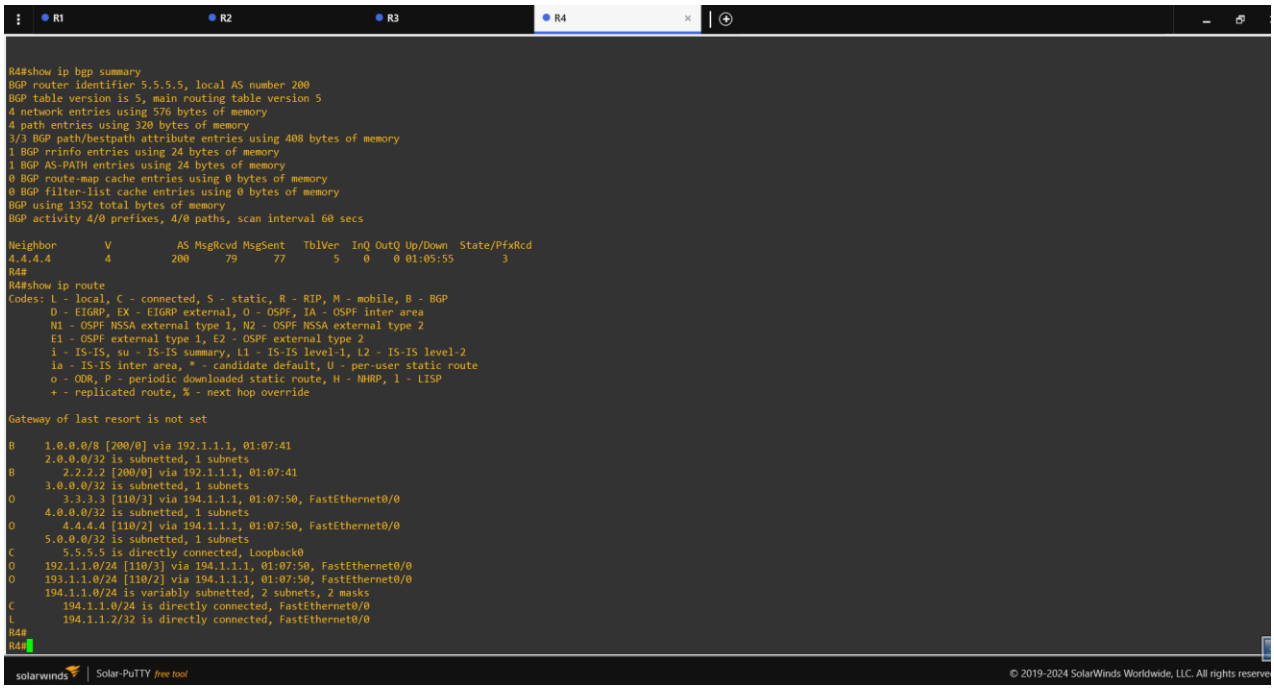
O 192.1.1.0/24 [110/3] via 194.1.1.1, 01:07:50, FastEthernet0/0

```
O    193.1.1.0/24 [110/2] via 194.1.1.1, 01:07:50, FastEthernet0/0
     194.1.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       194.1.1.0/24 is directly connected, FastEthernet0/0
L       194.1.1.2/32 is directly connected, FastEthernet0/0
R4#show ip bgp
BGP table version is 5, local router ID is 5.5.5.5
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
              r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
              x best-external, a additional-path, c RIB-compressed,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found

     Network          Next Hop            Metric LocPrf Weight Path
 *>i 1.0.0.0          192.1.1.1                0    100      0 100 i
 *>i 2.2.2.2/32       192.1.1.1                0    100      0 100 i
 r>i 3.3.3.3/32       3.3.3.3                  0    100      0 i
 *>  5.5.5.5/32       0.0.0.0                  0         32768 i
R4#
```

مسیر 1.0.0.0از طریق iBGP از R3 یادگرفته شده و به عنوان بهترین مسیر انتخاب شده است.

```
Overwrite the previous NVRAM configuration?[confirm]
Building configuration...
[OK]
R4#
```



بررسی جدول مسیریابی(Routing Tables)

نتیجه‌گیری:

با استفاده از Route Reflector در R3 ، تمامی مسیرهای مربوط به شبکه مبدا (8/1.0.0.0) به سایر روترهای AS200 یعنی R2 و R4توزیع شدند، بدون نیاز به Full Mesh شدن بین روترهای .iBGP عملکرد Route Reflector کاملاً صحیح و مطابق با اهداف طراحی BGP عمل کرد.