



```
interface Ethernet0/1
no ip address
shutdown
half-duplex
!
interface Ethernet0/2
no ip address
shutdown
half-duplex
!
interface Ethernet0/3
ip address 14.0.0.1 255.255.255.0
ip ospf cost 64000
half-duplex
!
router ospf 1
log-adjacency-changes
network 0.0.0.0 255.255.255.255 area 1
!
ip http server
no ip http secure-server
!
!
!
!
!
!
!
!
!
control-plane
!
!
!
!
!
!
!
!
!
!
line con 0
exec-timeout 0 0
logging synchronous
line aux 0
line vty 0 4
!
!
end
```

```
r1#sh ip ro
```

```
Codes: 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

Gateway of last resort is not set

34.0.0.0/24 is subnetted, 1 subnets

O 34.0.0.0 [110/64010] via 14.0.0.4, 00:08:04, Ethernet0/3

1.0.0.0/32 is subnetted, 1 subnets

C 1.1.1.1 is directly connected, Loopback0

2.0.0.0/32 is subnetted, 1 subnets

O E1 2.0.0.2 [110/11] via 12.0.0.2, 00:01:06, Ethernet0/0

3.0.0.0/32 is subnetted, 1 subnets

O E1 3.0.0.3 [110/11] via 12.0.0.2, 00:01:53, Ethernet0/0

4.0.0.0/32 is subnetted, 1 subnets

O 4.4.4.4 [110/64001] via 14.0.0.4, 00:08:04, Ethernet0/3

12.0.0.0/24 is subnetted, 1 subnets

C 12.0.0.0 is directly connected, Ethernet0/0

14.0.0.0/24 is subnetted, 1 subnets

C 14.0.0.0 is directly connected, Ethernet0/3

r1#



```
ip address 2.2.2.2 255.255.255.255
!
interface Loopback1
ip vrf forwarding vpn14
ip address 2.0.0.2 255.255.255.255
!
interface Ethernet0/0
ip address 23.0.0.2 255.255.255.0
half-duplex
mpls ip
!
interface Ethernet0/1
ip vrf forwarding vpn14
ip address 12.0.0.2 255.255.255.0
half-duplex
!
interface Ethernet0/2
no ip address
shutdown
half-duplex
!
interface Ethernet0/3
no ip address
shutdown
half-duplex
!
router ospf 2 vrf vpn14
log-adjacency-changes
redistribute bgp 23 metric-type 1 subnets
network 12.0.0.0 0.0.0.255 area 1
!
router ospf 23
log-adjacency-changes
network 2.2.2.2 0.0.0.0 area 0
network 23.0.0.0 0.0.0.255 area 0
!
router ospf 1234 vrf vpn14
log-adjacency-changes
area 1 sham-link 2.0.0.2 3.0.0.3 cost 10
!
router bgp 23
no synchronization
bgp log-neighbor-changes
neighbor 3.3.3.3 remote-as 23
neighbor 3.3.3.3 update-source Loopback0
no auto-summary
!
address-family vpnv4
neighbor 3.3.3.3 activate
neighbor 3.3.3.3 send-community both
exit-address-family
!
address-family ipv4 vrf vpn14
redistribute ospf 2 vrf vpn14 match internal external 1 external 2
```

```

no synchronization
network 2.0.0.2 mask 255.255.255.255
exit-address-family
!
ip http server
no ip http secure-server
!
!
!
!
!
!
control-plane
!
!
!
!
!
!
!
!
!
!
line con 0
exec-timeout 0 0
logging synchronous
line aux 0
line vty 0 4
!
!
end

```

```

r2#sh ip ro
Codes: 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

```

Gateway of last resort is not set

```

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
O   3.3.3.3 [110/11] via 23.0.0.3, 00:03:07, Ethernet0/0
23.0.0.0/24 is subnetted, 1 subnets
C   23.0.0.0 is directly connected, Ethernet0/0
r2#sh ip ro vrf vpn14

```

Routing Table: vpn14

```

Codes: 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

Gateway of last resort is not set

```
34.0.0.0/24 is subnetted, 1 subnets
O   34.0.0.0 [110/64020] via 12.0.0.1, 00:08:23, Ethernet0/1
1.0.0.0/32 is subnetted, 1 subnets
O   1.1.1.1 [110/11] via 12.0.0.1, 00:08:23, Ethernet0/1
2.0.0.0/32 is subnetted, 1 subnets
C   2.0.0.2 is directly connected, Loopback1
3.0.0.0/32 is subnetted, 1 subnets
B   3.0.0.3 [200/0] via 3.3.3.3, 00:02:13
4.0.0.0/32 is subnetted, 1 subnets
O   4.4.4.4 [110/64011] via 12.0.0.1, 00:08:23, Ethernet0/1
12.0.0.0/24 is subnetted, 1 subnets
C   12.0.0.0 is directly connected, Ethernet0/1
14.0.0.0/24 is subnetted, 1 subnets
O   14.0.0.0 [110/64010] via 12.0.0.1, 00:08:24, Ethernet0/1
```

r2#sh ip os sha

r2#sh ip os sham-links

Sham Link OSPF\_SL0 to address 3.0.0.3 is up

Area 1 source address 2.0.0.2

Run as demand circuit

DoNotAge LSA allowed. Cost of using 10 State POINT\_TO\_POINT,

Timer intervals configured, Hello 10, Dead 40, Wait 40,

Hello due in 00:00:09

Adjacency State FULL (Hello suppressed)

Index 1/1, retransmission queue length 0, number of retransmission 0

First 0x0(0)/0x0(0) Next 0x0(0)/0x0(0)

Last retransmission scan length is 0, maximum is 0

Last retransmission scan time is 0 msec, maximum is 0 msec

r2#show ip route vrf vpn14 4.4.4.4

Routing entry for 4.4.4.4/32

Known via "ospf 2", distance 110, metric 64011, type intra area

Redistributing via bgp 23

Advertised by bgp 23 match internal external 1 & 2

Last update from 12.0.0.1 on Ethernet0/1, 00:14:28 ago

Routing Descriptor Blocks:

\* 12.0.0.1, from 4.4.4.4, 00:14:28 ago, via Ethernet0/1

Route metric is 64011, traffic share count is 1

r2#sh ip ospf

Routing Process "ospf 1234" with ID 12.0.0.2

Domain ID type 0x0005, value 0.0.4.210

Start time: 00:18:16.060, Time elapsed: 00:19:21.240

Supports only single TOS(TOS0) routes

Supports opaque LSA

Supports Link-local Signaling (LLS)

Supports area transit capability

Connected to MPLS VPN Superbackbone, VRF vpn14  
It is an area border router  
Router is not originating router-LSAs with maximum metric  
Initial SPF schedule delay 5000 msec  
Minimum hold time between two consecutive SPFs 10000 msec  
Maximum wait time between two consecutive SPFs 10000 msec  
Incremental-SPF disabled  
Minimum LSA interval 5 secs  
Minimum LSA arrival 1000 msec  
LSA group pacing timer 240 secs  
Interface flood pacing timer 33 msec  
Retransmission pacing timer 66 msec  
Number of external LSA 0. Checksum Sum 0x000000  
Number of opaque AS LSA 0. Checksum Sum 0x000000  
Number of DCbitless external and opaque AS LSA 0  
Number of DoNotAge external and opaque AS LSA 0  
Number of areas in this router is 1. 1 normal 0 stub 0 nssa  
Number of areas transit capable is 0  
External flood list length 0  
Area 1  
Number of interfaces in this area is 1  
Area has no authentication  
SPF algorithm last executed 00:14:38.172 ago  
SPF algorithm executed 3 times  
Area ranges are  
Number of LSA 2. Checksum Sum 0x009E01  
Number of opaque link LSA 0. Checksum Sum 0x000000  
Number of DCbitless LSA 0  
Number of indication LSA 0  
Number of DoNotAge LSA 1  
Flood list length 0

Routing Process "ospf 23" with ID 2.2.2.2  
Start time: 00:10:27.192, Time elapsed: 00:27:11.408  
Supports only single TOS(TOS0) routes  
Supports opaque LSA  
Supports Link-local Signaling (LLS)  
Supports area transit capability  
Router is not originating router-LSAs with maximum metric  
Initial SPF schedule delay 5000 msec  
Minimum hold time between two consecutive SPFs 10000 msec  
Maximum wait time between two consecutive SPFs 10000 msec  
Incremental-SPF disabled  
Minimum LSA interval 5 secs  
Minimum LSA arrival 1000 msec  
LSA group pacing timer 240 secs  
Interface flood pacing timer 33 msec  
Retransmission pacing timer 66 msec  
Number of external LSA 0. Checksum Sum 0x000000  
Number of opaque AS LSA 0. Checksum Sum 0x000000  
Number of DCbitless external and opaque AS LSA 0  
Number of DoNotAge external and opaque AS LSA 0  
Number of areas in this router is 1. 1 normal 0 stub 0 nssa  
Number of areas transit capable is 0



External flood list length 0

Area BACKBONE(0)

Number of interfaces in this area is 2 (1 loopback)

Area has no authentication

SPF algorithm last executed 00:12:41.780 ago

SPF algorithm executed 6 times

Area ranges are

Number of LSA 3. Checksum Sum 0x01D5B3

Number of opaque link LSA 0. Checksum Sum 0x000000

Number of DCbitless LSA 0

Number of indication LSA 0

Number of DoNotAge LSA 0

Flood list length 0

Routing Process "ospf 2" with ID 2.0.0.2

Domain ID type 0x0005, value 0.0.0.2

Start time: 00:12:16.072, Time elapsed: 00:25:23.696

Supports only single TOS(TOS0) routes

Supports opaque LSA

Supports Link-local Signaling (LLS)

Supports area transit capability

Connected to MPLS VPN Superbackbone, VRF vpn14

It is an area border and autonomous system boundary router

Redistributing External Routes from,

bgp 23, includes subnets in redistribution

Router is not originating router-LSAs with maximum metric

Initial SPF schedule delay 5000 msec

Minimum hold time between two consecutive SPF's 10000 msec

Maximum wait time between two consecutive SPF's 10000 msec

Incremental-SPF disabled

Minimum LSA interval 5 secs

Minimum LSA arrival 1000 msec

LSA group pacing timer 240 secs

Interface flood pacing timer 33 msec

Retransmission pacing timer 66 msec

Number of external LSA 4. Checksum Sum 0x008880

Number of opaque AS LSA 0. Checksum Sum 0x000000

Number of DCbitless external and opaque AS LSA 0

Number of DoNotAge external and opaque AS LSA 0

Number of areas in this router is 1. 1 normal 0 stub 0 nssa

Number of areas transit capable is 0

External flood list length 0

Area 1

Number of interfaces in this area is 1

Area has no authentication

SPF algorithm last executed 00:17:43.012 ago

SPF algorithm executed 12 times

Area ranges are

Number of LSA 7. Checksum Sum 0x0242C9

Number of opaque link LSA 0. Checksum Sum 0x000000

Number of DCbitless LSA 0

Number of indication LSA 0

Number of DoNotAge LSA 0

Flood list length 0

r2#

```
r3#sh run
```

```
Building configuration...
```

```
Current configuration : 1756 bytes
```

```
!
```

```
version 12.4
```

```
service timestamps debug datetime msec
```

```
service timestamps log datetime msec
```

```
no service password-encryption
```

```
!
```

```
hostname r3
```

```
!
```

```
boot-start-marker
```

```
boot-end-marker
```

```
!
```

```
!
```

```
no aaa new-model
```

```
memory-size iomem 5
```

```
!
```

```
!
```

```
ip cef
```

```
no ip domain lookup
```

```
!
```

```
!
```

```
ip vrf vpn14
```

```
rd 23:14
```

```
route-target export 23:14
```

```
route-target import 23:14
```

```
!
```

```
!
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```

```
!
```

```
interface Loopback0
```

```
ip address 3.3.3.3 255.255.255.255
!
interface Loopback1
ip vrf forwarding vpn14
ip address 3.0.0.3 255.255.255.255
!
interface Ethernet0/0
ip vrf forwarding vpn14
ip address 34.0.0.3 255.255.255.0
half-duplex
!
interface Ethernet0/1
ip address 23.0.0.3 255.255.255.0
half-duplex
mpls ip
!
interface Ethernet0/2
no ip address
shutdown
half-duplex
!
interface Ethernet0/3
no ip address
shutdown
half-duplex
!
router ospf 3 vrf vpn14
log-adjacency-changes
redistribute bgp 23 metric-type 1 subnets
network 34.0.0.0 0.0.0.255 area 1
!
router ospf 23
log-adjacency-changes
network 3.3.3.3 0.0.0.0 area 0
network 23.0.0.0 0.0.0.255 area 0
!
router ospf 1234 vrf vpn14
log-adjacency-changes
area 1 sham-link 3.0.0.3 2.0.0.2 cost 10
!
router bgp 23
no synchronization
bgp log-neighbor-changes
neighbor 2.2.2.2 remote-as 23
neighbor 2.2.2.2 update-source Loopback0
no auto-summary
!
address-family vpnv4
neighbor 2.2.2.2 activate
neighbor 2.2.2.2 send-community both
exit-address-family
!
address-family ipv4 vrf vpn14
redistribute ospf 3 vrf vpn14 match internal external 1 external 2
```

```
no synchronization
network 3.0.0.3 mask 255.255.255.255
exit-address-family
!
ip http server
no ip http secure-server
!
!
!
!
!
!
!
control-plane
!
!
!
!
!
!
!
!
!
!
line con 0
exec-timeout 0 0
logging synchronous
line aux 0
line vty 0 4
!
!
end
```

```
r3#sh ip ro
```

```
Codes: 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
```

```
Gateway of last resort is not set
```

```
2.0.0.0/32 is subnetted, 1 subnets
O    2.2.2.2 [110/11] via 23.0.0.2, 00:15:46, Ethernet0/1
3.0.0.0/32 is subnetted, 1 subnets
C    3.3.3.3 is directly connected, Loopback0
23.0.0.0/24 is subnetted, 1 subnets
C    23.0.0.0 is directly connected, Ethernet0/1
```

```
r3#sh ip route vrf vpn14
```

```
Routing Table: vpn14
```

Codes: 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

Gateway of last resort is not set

```
34.0.0.0/24 is subnetted, 1 subnets
C   34.0.0.0 is directly connected, Ethernet0/0
   1.0.0.0/32 is subnetted, 1 subnets
O   1.1.1.1 [110/64011] via 34.0.0.4, 00:08:48, Ethernet0/0
   2.0.0.0/32 is subnetted, 1 subnets
B   2.0.0.2 [200/0] via 2.2.2.2, 00:01:50
   3.0.0.0/32 is subnetted, 1 subnets
C   3.0.0.3 is directly connected, Loopback1
   4.0.0.0/32 is subnetted, 1 subnets
O   4.4.4.4 [110/11] via 34.0.0.4, 00:08:48, Ethernet0/0
   12.0.0.0/24 is subnetted, 1 subnets
O   12.0.0.0 [110/64020] via 34.0.0.4, 00:08:49, Ethernet0/0
   14.0.0.0/24 is subnetted, 1 subnets
O   14.0.0.0 [110/64010] via 34.0.0.4, 00:08:49, Ethernet0/0
```

```
r3#sh ip os sham-links
```

```
Sham Link OSPF_SL0 to address 2.0.0.2 is up
```

```
Area 1 source address 3.0.0.3
```

```
Run as demand circuit
```

```
DoNotAge LSA allowed. Cost of using 10 State POINT_TO_POINT,
```

```
Timer intervals configured, Hello 10, Dead 40, Wait 40,
```

```
Hello due in 00:00:09
```

```
Adjacency State FULL (Hello suppressed)
```

```
Index 1/1, retransmission queue length 0, number of retransmission 0
```

```
First 0x0(0)/0x0(0) Next 0x0(0)/0x0(0)
```

```
Last retransmission scan length is 0, maximum is 0
```

```
Last retransmission scan time is 0 msec, maximum is 0 msec
```

```
r3#sh ip route vrf vpn14 1.1.1.1
```

```
Routing entry for 1.1.1.1/32
```

```
Known via "ospf 3", distance 110, metric 64011, type intra area
```

```
Redistributing via bgp 23
```

```
Advertised by bgp 23 match internal external 1 & 2
```

```
Last update from 34.0.0.4 on Ethernet0/0, 00:16:21 ago
```

```
Routing Descriptor Blocks:
```

```
* 34.0.0.4, from 1.1.1.1, 00:16:21 ago, via Ethernet0/0
```

```
Route metric is 64011, traffic share count is 1
```

```
r3#sh ip os
```

```
Routing Process "ospf 1234" with ID 34.0.0.3
```

```
Domain ID type 0x0005, value 0.0.4.210
```

```
Start time: 00:22:27.184, Time elapsed: 00:16:25.100
```

```
Supports only single TOS(TOS0) routes
```

```
Supports opaque LSA
```

Supports Link-local Signaling (LLS)  
Supports area transit capability  
Connected to MPLS VPN Superbackbone, VRF vpn14  
It is an area border router  
Router is not originating router-LSAs with maximum metric  
Initial SPF schedule delay 5000 msec  
Minimum hold time between two consecutive SPFs 10000 msec  
Maximum wait time between two consecutive SPFs 10000 msec  
Incremental-SPF disabled  
Minimum LSA interval 5 sec  
Minimum LSA arrival 1000 msec  
LSA group pacing timer 240 sec  
Interface flood pacing timer 33 msec  
Retransmission pacing timer 66 msec  
Number of external LSA 0. Checksum Sum 0x000000  
Number of opaque AS LSA 0. Checksum Sum 0x000000  
Number of DCbitless external and opaque AS LSA 0  
Number of DoNotAge external and opaque AS LSA 0  
Number of areas in this router is 1. 1 normal 0 stub 0 nssa  
Number of areas transit capable is 0  
External flood list length 0

Area 1

Number of interfaces in this area is 1  
Area has no authentication  
SPF algorithm last executed 00:15:51.220 ago  
SPF algorithm executed 3 times  
Area ranges are  
Number of LSA 2. Checksum Sum 0x009E01  
Number of opaque link LSA 0. Checksum Sum 0x000000  
Number of DCbitless LSA 0  
Number of indication LSA 0  
Number of DoNotAge LSA 1  
Flood list length 0

Routing Process "ospf 23" with ID 3.3.3.3  
Start time: 00:11:20.156, Time elapsed: 00:27:32.652  
Supports only single TOS(TOS0) routes  
Supports opaque LSA  
Supports Link-local Signaling (LLS)  
Supports area transit capability  
Router is not originating router-LSAs with maximum metric  
Initial SPF schedule delay 5000 msec  
Minimum hold time between two consecutive SPFs 10000 msec  
Maximum wait time between two consecutive SPFs 10000 msec  
Incremental-SPF disabled  
Minimum LSA interval 5 sec  
Minimum LSA arrival 1000 msec  
LSA group pacing timer 240 sec  
Interface flood pacing timer 33 msec  
Retransmission pacing timer 66 msec  
Number of external LSA 0. Checksum Sum 0x000000  
Number of opaque AS LSA 0. Checksum Sum 0x000000  
Number of DCbitless external and opaque AS LSA 0  
Number of DoNotAge external and opaque AS LSA 0

Number of areas in this router is 1. 1 normal 0 stub 0 nssa  
Number of areas transit capable is 0  
External flood list length 0  
Area BACKBONE(0)  
Number of interfaces in this area is 2 (1 loopback)  
Area has no authentication  
SPF algorithm last executed 00:26:29.872 ago  
SPF algorithm executed 3 times  
Area ranges are  
Number of LSA 3. Checksum Sum 0x01D5B3  
Number of opaque link LSA 0. Checksum Sum 0x000000  
Number of DCbitless LSA 0  
Number of indication LSA 0  
Number of DoNotAge LSA 0  
Flood list length 0

Routing Process "ospf 3" with ID 3.0.0.3  
Domain ID type 0x0005, value 0.0.0.3  
Start time: 00:12:45.484, Time elapsed: 00:26:07.664  
Supports only single TOS(TOS0) routes  
Supports opaque LSA  
Supports Link-local Signaling (LLS)  
Supports area transit capability  
Connected to MPLS VPN Superbackbone, VRF vpn14  
It is an area border and autonomous system boundary router  
Redistributing External Routes from,  
bgp 23, includes subnets in redistribution  
Router is not originating router-LSAs with maximum metric  
Initial SPF schedule delay 5000 msec  
Minimum hold time between two consecutive SPFs 10000 msec  
Maximum wait time between two consecutive SPFs 10000 msec  
Incremental-SPF disabled  
Minimum LSA interval 5 secs  
Minimum LSA arrival 1000 msec  
LSA group pacing timer 240 secs  
Interface flood pacing timer 33 msec  
Retransmission pacing timer 66 msec  
Number of external LSA 4. Checksum Sum 0x008880  
Number of opaque AS LSA 0. Checksum Sum 0x000000  
Number of DCbitless external and opaque AS LSA 0  
Number of DoNotAge external and opaque AS LSA 0  
Number of areas in this router is 1. 1 normal 0 stub 0 nssa  
Number of areas transit capable is 0  
External flood list length 0  
Area 1  
Number of interfaces in this area is 1  
Area has no authentication  
SPF algorithm last executed 00:18:55.824 ago  
SPF algorithm executed 10 times  
Area ranges are  
Number of LSA 7. Checksum Sum 0x0242C9  
Number of opaque link LSA 0. Checksum Sum 0x000000  
Number of DCbitless LSA 0  
Number of indication LSA 0



Number of DoNotAge LSA 0  
Flood list length 0

r3#



```
half-duplex
!  
interface Ethernet0/1  
ip address 34.0.0.4 255.255.255.0  
half-duplex  
!  
interface Ethernet0/2  
no ip address  
shutdown  
half-duplex  
!  
interface Ethernet0/3  
ip address 14.0.0.4 255.255.255.0  
ip ospf cost 64000  
half-duplex  
!  
router ospf 4  
log-adjacency-changes  
network 0.0.0.0 255.255.255.255 area 1  
!  
ip http server  
no ip http secure-server  
!  
!  
!  
!  
!  
!  
control-plane  
!  
!  
!  
!  
!  
!  
!  
!  
!  
!  
!  
line con 0  
exec-timeout 0 0  
logging synchronous  
line aux 0  
line vty 0 4  
!  
!  
end
```

```
r4#sh ip ro
```

```
Codes: 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

Gateway of last resort is not set

```
34.0.0.0/24 is subnetted, 1 subnets
C   34.0.0.0 is directly connected, Ethernet0/1
1.0.0.0/32 is subnetted, 1 subnets
O   1.1.1.1 [110/64001] via 14.0.0.1, 00:08:15, Ethernet0/3
2.0.0.0/32 is subnetted, 1 subnets
O E1  2.0.0.2 [110/11] via 34.0.0.3, 00:01:16, Ethernet0/1
3.0.0.0/32 is subnetted, 1 subnets
O E1  3.0.0.3 [110/11] via 34.0.0.3, 00:02:04, Ethernet0/1
4.0.0.0/32 is subnetted, 1 subnets
C   4.4.4.4 is directly connected, Loopback0
12.0.0.0/24 is subnetted, 1 subnets
O   12.0.0.0 [110/64010] via 14.0.0.1, 00:08:15, Ethernet0/3
14.0.0.0/24 is subnetted, 1 subnets
C   14.0.0.0 is directly connected, Ethernet0/3
r4#
```

Router1 E0/0 <----> Router2 E0/1  
Router2 E0/0 <----> Router3 E0/1  
Router3 E0/0 <----> Router4 E0/1  
Router4 E0/3 <----> Router1 E0/3