

CCIE Service Provider Lab Workbook v4.0 (<http://labs.ine.com/workbook/toc/service-provider-v4>) » CCIE SP v4 Advanced Technology Labs - IGP

OSPFv2 Path Selection

« [OSPFv2 Network Types \(/workbook/view/service-provider-v4/task/ospfv2-network-types-MjgyOA%3D%3D\)](/workbook/view/service-provider-v4/task/ospfv2-network-types-MjgyOA%3D%3D) | [OSPFv2 BFD \(/workbook/view/service-provider-v4/task/ospfv2-bfd-MjgzMA%3D%3D\)](/workbook/view/service-provider-v4/task/ospfv2-bfd-MjgzMA%3D%3D) »

Last updated: April 23, 2016

Note:

This task assumes that you have already completed the [OSPFv2](http://labs.ine.com/workbook/view/service-provider-v4/task/ospfv2-MjgyNw%3D%3D) (<http://labs.ine.com/workbook/view/service-provider-v4/task/ospfv2-MjgyNw%3D%3D>) task. Refer to the **Base IPv4 Diagram** in order to complete this task.

Task

- Change the OSPF cost on the link between R6 and XR1 so that bidirectional traffic between R1 and XR2 prefers to use the link between R5 and XR1.

Configuration [Click to collapse](#)

```
R6:
interface GigabitEthernet1.619
 ip ospf cost 100

XR1:
router ospf 1
 area 0
 !
 interface GigabitEthernet0/0/0.619
  cost 100
 !
 !
 !
```

Verification

Prior to making a change, review the forwarding state of the network. XR1 has two equal cost paths to reach R1.

```
RP/0/0/CPU0:XR1#show route ipv4 1.1.1.1/32
```

```
Sun Apr 19 17:49:17.723 UTC
```

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

```
Known via "ospf 1", distance 110, metric 5, type intra area
```

```
Installed Apr 19 17:48:57.484 for 00:00:20
```

```
Routing Descriptor Blocks
```

```
 20.5.19.5, from 1.1.1.1, via GigabitEthernet0/0/0.519
```

```
Route metric is 5
```

```
 20.6.19.6, from 1.1.1.1, via GigabitEthernet0/0/0.619
```

```
Route metric is 5
```

```
No advertising protos.
```

This can also be verified by looking at the FIB.

```
RP/0/0/CPU0:XR1#show cef ipv4 1.1.1.1/32 detail
```

```
Sun Apr 19 17:55:16.468 UTC
```

```
1.1.1.1/32, version 131, internal 0x4000001 0x0 (ptr 0xa0edc074) [1], 0x0 (0xa0ea75a8), 0x0 (0x0)
```

```
Updated Apr 19 17:48:57.504
```

```
local adjacency 20.5.19.5
```

```
Prefix Len 32, traffic index 0, precedence n/a, priority 1
```

```
gateway array (0xa0d30130) reference count 7, flags 0x0, source rib (6), 0 backups
```

```
 [8 type 3 flags 0x8081 (0xa0df180c) ext 0x0 (0x0)]
```

```
LW-LDI[type=3, refc=1, ptr=0xa0ea75a8, sh-ldi=0xa0df180c]
```

```
via 20.5.19.5, GigabitEthernet0/0/0.519, 7 dependencies, weight 0, class 0 [flags 0x0]
```

```
path-idx 0 NHID 0x0 [0xa15365c8 0x0]
```

```
next hop 20.5.19.5
```

```
tx adjacency
```

```
via 20.6.19.6, GigabitEthernet0/0/0.619, 7 dependencies, weight 0, class 0 [flags 0x0]
```

```
path-idx 1 NHID 0x0 [0xa153663c 0x0]
```

```
next hop 20.6.19.6
```

```
tx adjacency
```

```
Load distribution: 0 1 (refcount 8)
```

Hash	OK	Interface	Address
0	Y	GigabitEthernet0/0/0.519	20.5.19.5
1	Y	GigabitEthernet0/0/0.619	20.6.19.6

Similarly, R2 has two equal cost paths to reach XR2.

```
R2#show ip route 20.20.20.20
```

```
Routing entry for 20.20.20.20/32
```

```
Known via "ospf 1", distance 110, metric 5, type intra area
```

```
Last update from 20.2.3.3 on GigabitEthernet1.23, 00:07:59 ago
```

```
Routing Descriptor Blocks:
```

```
* 20.2.4.4, from 20.20.20.20, 00:54:17 ago, via GigabitEthernet1.24
```

```
Route metric is 5, traffic share count is 1
```

```
20.2.3.3, from 20.20.20.20, 00:07:59 ago, via GigabitEthernet1.23
```

```
Route metric is 5, traffic share count is 1
```

```
R2#show ip cef 20.20.20.20/32 detail
```

```
20.20.20.20/32, epoch 2, per-destination sharing
```

```
nexthop 20.2.3.3 GigabitEthernet1.23
```

```
nexthop 20.2.4.4 GigabitEthernet1.24
```

After making the change, the link between R6 and XR1 has its OSPF Cost increased from 1 to 100, making it less preferred.

```
R6#show ip ospf interface | include line protocol|Cost:
```

```
Loopback0 is up, line protocol is up
```

```
Process ID 1, Router ID 6.6.6.6, Network Type LOOPBACK, Cost: 1
```

```
GigabitEthernet1.619 is up, line protocol is up
```

```
Process ID 1, Router ID 6.6.6.6, Network Type BROADCAST, Cost: 100
```

```
GigabitEthernet1.56 is up, line protocol is up
```

```
Process ID 1, Router ID 6.6.6.6, Network Type BROADCAST, Cost: 1
```

```
GigabitEthernet1.46 is up, line protocol is up
```

```
Process ID 1, Router ID 6.6.6.6, Network Type BROADCAST, Cost: 1
```

```
GigabitEthernet1.36 is up, line protocol is up
```

```
Process ID 1, Router ID 6.6.6.6, Network Type BROADCAST, Cost: 1
```

```
RP/0/0/CPU0:XR1#show ospf interface | include "line protocol|Cost"
```

```
Sun Apr 19 17:42:15.732 UTC
```

```
Loopback0 is up, line protocol is up
```

```
Process ID 1, Router ID 19.19.19.19, Network Type LOOPBACK, Cost: 1
```

```
GigabitEthernet0/0/0.519 is up, line protocol is up
```

```
Process ID 1, Router ID 19.19.19.19, Network Type POINT_TO_POINT, Cost: 1
```

```
GigabitEthernet0/0/0.619 is up, line protocol is up
```

```
Process ID 1, Router ID 19.19.19.19, Network Type BROADCAST, Cost: 100
```

```
GigabitEthernet0/0/0.1920 is up, line protocol is up
```

```
Process ID 1, Router ID 19.19.19.19, Network Type BROADCAST, Cost: 1
```

The forwarding tables on R2 and XR1 reflect the change.

```
RP/0/0/CPU0:XR1#show cef ipv4 1.1.1.1/32 detail
```

```
Sun Apr 19 17:59:50.260 UTC
```

```
1.1.1.1/32, version 149, internal 0x4000001 0x0 (ptr 0xa0edc074) [1], 0x0 (0xa0ea75a8), 0x0 (0x0)
```

```
Updated Apr 19 17:59:45.690
```

```
local adjacency 20.5.19.5
```

```
Prefix Len 32, traffic index 0, precedence n/a, priority 1
```

```
gateway array (0xa0d300b8) reference count 14, flags 0x0, source rib (6), 0 backups
```

```
[15 type 3 flags 0x8081 (0xa0df17d0) ext 0x0 (0x0)]
```

```
LW-LDI[type=3, refc=1, ptr=0xa0ea75a8, sh-ldi=0xa0df17d0]
```

```
via 20.5.19.5, GigabitEthernet0/0/0/0.519, 5 dependencies, weight 0, class 0 [flags 0x0]
```

```
path-idx 0 NHID 0x0 [0xa15365c8 0x0]
```

```
next hop 20.5.19.5
```

```
tx adjacency
```

```
Load distribution: 0 (refcount 15)
```

Hash	OK	Interface	Address
0	Y	GigabitEthernet0/0/0/0.519	20.5.19.5

```
R2#show ip cef 20.20.20.20/32 detail
```

```
20.20.20.20/32, epoch 2
```

```
nexthop 20.2.4.4 GigabitEthernet1.24
```

Traffic from R1 to XR2 avoids the link between R6 and XR1 due to its higher cost.

```
R1#traceroute 20.20.20.20
```

```
Type escape sequence to abort.
```

```
Tracing the route to 20.20.20.20
```

```
VRF info: (vrf in name/id, vrf out name/id)
```

```
1 10.1.1.2.2 1 msec 2 msec 1 msec
```

```
2 20.2.4.4 1 msec 1 msec 1 msec
```

```
3 20.4.5.5 2 msec 1 msec 5 msec
```

```
4 20.5.19.19 10 msec 12 msec 13 msec
```

```
5 10.19.20.20 62 msec * 3 msec
```

```
RP/0/0/CPU0:XR2#traceroute 1.1.1.1
```

```
Sun Apr 19 17:43:41.216 UTC
```

```
Type escape sequence to abort.
```

```
Tracing the route to 1.1.1.1
```

```
1 10.19.20.19 0 msec 0 msec 0 msec
```

```
2 20.5.19.5 0 msec 0 msec 0 msec
```

```
3 20.4.5.4 0 msec 0 msec 0 msec
```

```
4 20.2.4.2 0 msec 0 msec 0 msec
```

```
5 10.1.2.1 0 msec * 0 msec
```