

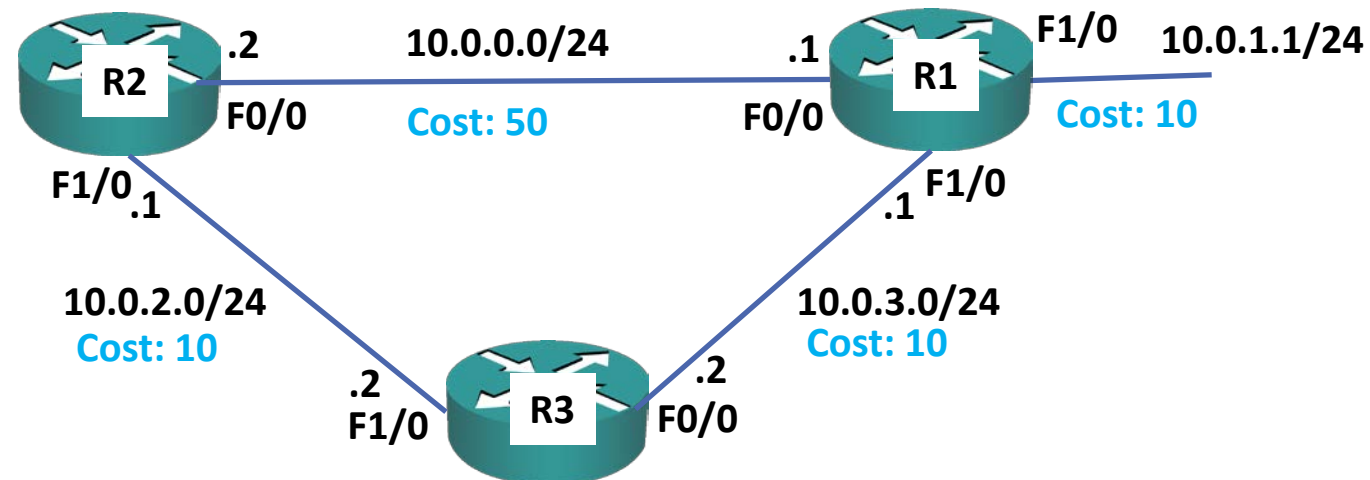
OSPF Metric Calculation



- As OSPF is a Link State routing protocol, the router will learn about all destinations in its area, the links and their cost
- The router will select routes based on its lowest cost to get to the destination

OSPF Metric Calculation

- In this example R2 will choose the path via R3 to get to the 10.0.1.0/24 network as it is lower cost



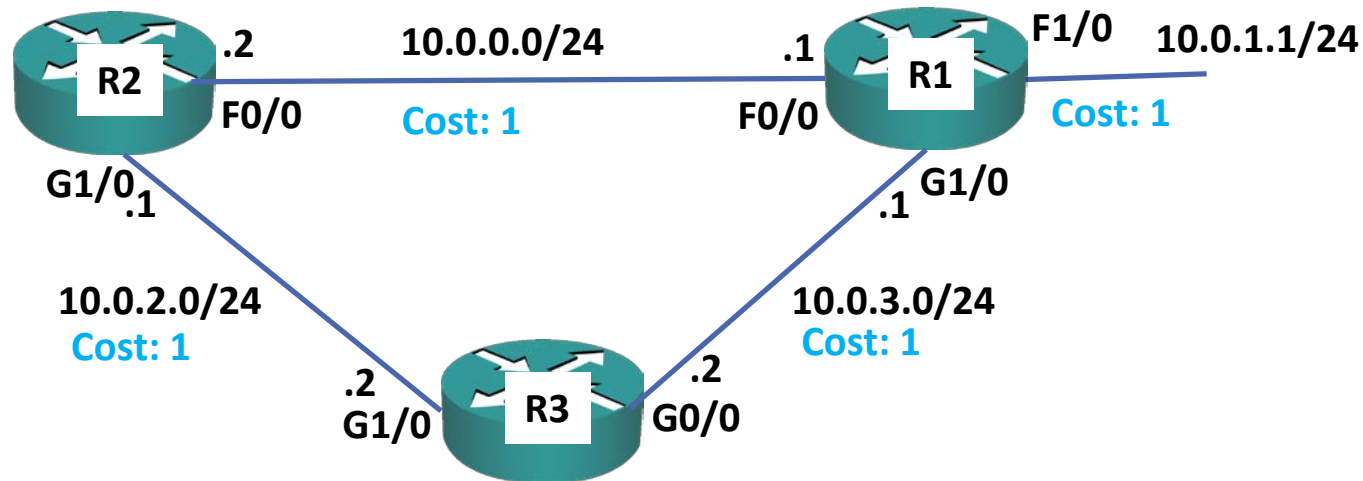
Reference Bandwidth



- The cost is automatically derived from the interface bandwidth
- $\text{Cost} = \text{Reference Bandwidth} / \text{Interface Bandwidth}$
- The default reference bandwidth is 100 Mbps
- FastEthernet link cost defaults to 1 (100 / 100)
- T1 link cost defaults to 64 (100 / 1.544)

Reference Bandwidth

- OSPF treats all interfaces of 100 Mbps or faster as equal
- FastEthernet, Gigabit Ethernet, 10 Gigabit Ethernet etc. all default to a cost of 1
- This can cause undesirable routing in modern networks

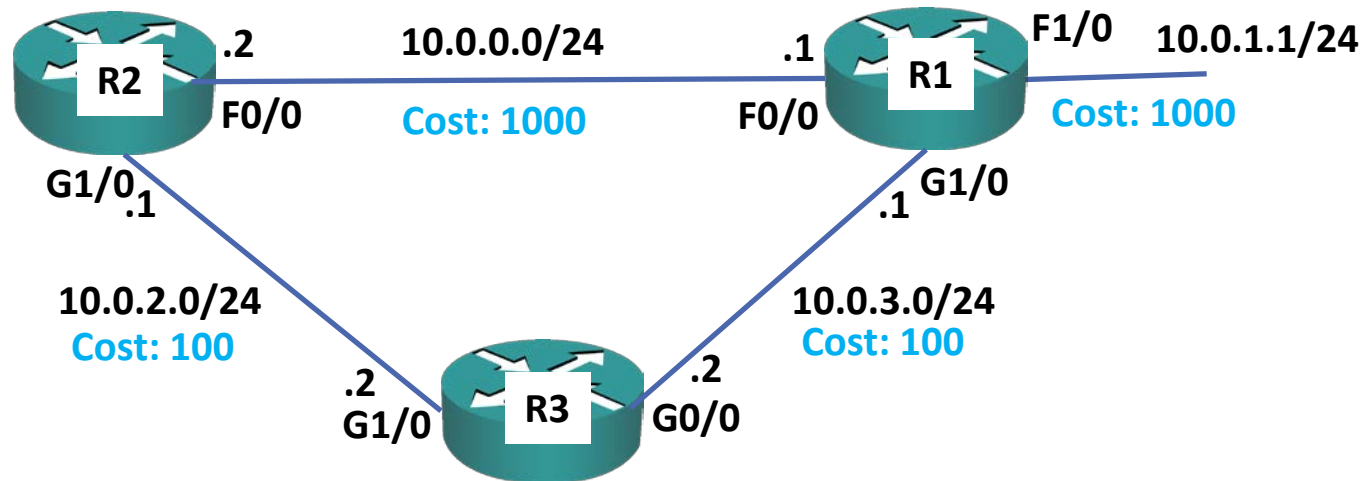


Reference Bandwidth

```
R1(config)#router ospf 1
```

```
R1(config-router)#auto-cost reference-bandwidth 100000
```

- The reference bandwidth should be changed on all routers



Manipulating the OSPF Metric



- OSPF takes the bandwidth of an interface into account when calculating the metric, so paths along higher bandwidth links will be preferred
- The most desirable path will typically be automatically selected

Manipulating the OSPF Metric (Cont.)

- If you want to use a different path, you can manipulate this by manually changing the bandwidth or OSPF cost on interfaces
- It is recommended to use cost because the bandwidth setting can affect many features other than OSPF (such as QoS)

OSPF Metric - Bandwidth



```
R1#show interface serial1/0
Serial1/0 is administratively down, line protocol is down
Hardware is M4T
  MTU 1500 bytes, BW 1544 Kbit/sec, DLY 20000 usec,
  reliability 255/255, txload 1/255, rxload 1/255
```

```
!
R1(config)#interface serial1/0
R1(config-if)#bandwidth 768
```

```
!
R1#show interface serial1/0
Serial1/0 is administratively down, line protocol is down
Hardware is M4T
  MTU 1500 bytes, BW 768 Kbit/sec, DLY 20000 usec,
  reliability 255/255, txload 1/255, rxload 1/255
```


OSPF Metric - Cost



- A manually configured OSPF cost overrides the value automatically derived from the bandwidth

```
R1(config)#interface FastEthernet 0/0  
R1(config-if)#ip ospf cost 50
```

OSPF Metric - Cost



R1#show ip ospf interface FastEthernet 0/0

FastEthernet0/0 is up, line protocol is up

Internet Address 10.0.0.1/24, Area 0, Attached via Network Statement
Process ID 1, Router ID 192.168.0.1, Network Type BROADCAST, Cost: 1

Topology-MTID	Cost	Disabled	Shutdown	Topology Name
0	50	no	no	Base

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
oob-resync timeout 40

Hello due in 00:00:02

Neighbor Count is 1, Adjacent neighbor count is 1

Adjacent with neighbor 10.1.0.2 (Designated Router)

! truncated

Lab

