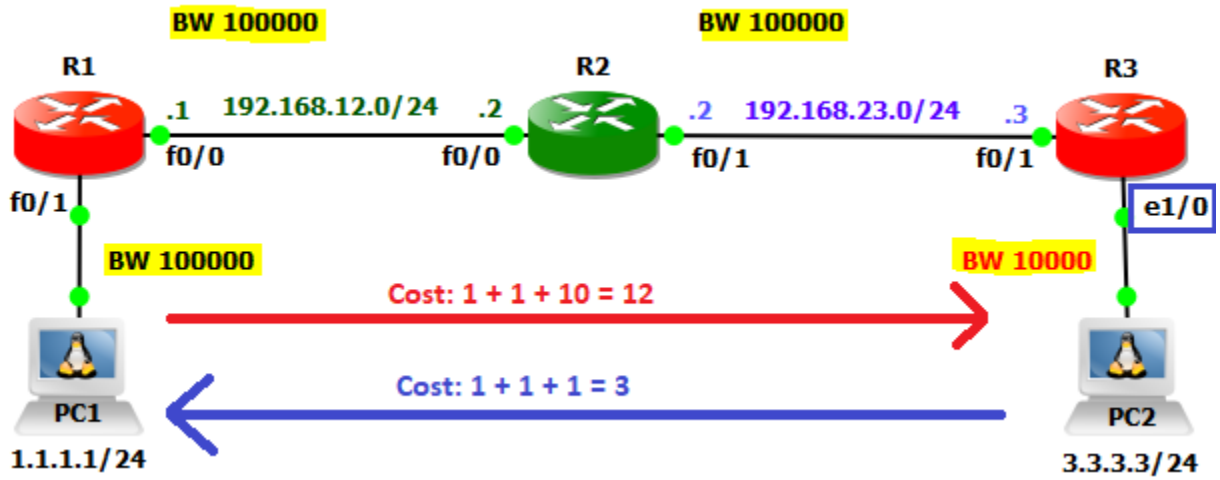
OSPF Metric:

OSPF uses a metric called **cost,** which is based on the bandwidth of an interface.

Cost = Reference Bandwidth / Interface Bandwidth

the reference bandwidth is a default value on Cisco routers which is a 100Mbit (10^8) interface. Divide the reference bandwidth by the bandwidth of the interface and get the cost. The lower the cost the better the path is. In route, that has lowest cumulative cost value between source and destination will be selected for routing table. If two paths are equal cost, OSPF will use both paths and will load balance among them 50/50.

Default Cost of Interfaces			
Interface Type	**Bandwidth**	**Metric Calculation**	**Cost**
Ethernet Link	10Mbps	100000000/10000000 = 10	10
FastEthernet Link	100Mbps	100000000/100000000 = 1	1
Serial Link	1544Kbps	100000000/1544000 = 64.76	64
Gigabyte Link	1 Gbps		1
10 Gigabit Link	10 Gbps		1
40 Gigabit Link	40 Gbps		1
100 Gigabit Link	100 Gbps		1



From PC1 to PC2 total OSPF cost is 12 because in the way one Ethernet link which is connected between R3 to PC2. Cost is counting from outgoing interfaces to reach destination. Therefore, from PC1 to PC2 OSPF total cost is cost is 12 of R1, R2 and R3 outgoing interfaces.

```
R1#show ip route ospf
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
 Gateway of last resort is not set

      3.0.0.0/24 is subnetted, 1 subnets
O        3.3.3.0 [110/12] via 192.168.12.2, 00:12:49, FastEthernet0/0
O     192.168.23.0/24 [110/2] via 192.168.12.2, 00:12:49, FastEthernet0/0
```

```
R1#show ip ospf int f0/0 | sec Cost
  Process ID 1, Router ID 192.168.12.1, Network Type BROADCAST, Cost: 1
  Topology-MTID    Cost    Disabled    Shutdown      Topology Name
        0           1         no          no            Base
```

```
R2#show ip ospf interface f0/1 | sec Cost
  Process ID 1, Router ID 192.168.23.2, Network Type BROADCAST, Cost: 1
  Topology-MTID    Cost    Disabled    Shutdown      Topology Name
        0           1         no          no            Base
```

```
R3#show ip ospf interface e1/0 | sec Cost
  Process ID 1, Router ID 192.168.23.3, Network Type BROADCAST, Cost: 10
  Topology-MTID    Cost    Disabled    Shutdown      Topology Name
        0           10        no          no            Base
```

From PC2 to PC1 total OSPF cost is 3 as all link are FastEthernet. Cost is counting from outgoing interfaces to reach destination. Therefore, from PC2 to PC1 OSPF total cost is cost is 3 of R3, R2 and R1 outgoing interfaces.

```
R3#show ip route ospf
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, + - replicated route

Gateway of last resort is not set

      1.0.0.0/24 is subnetted, 1 subnets
O        1.1.1.0 [110/3] via 192.168.23.2, 00:25:43, FastEthernet0/1
O     192.168.12.0/24 [110/2] via 192.168.23.2, 00:25:43, FastEthernet0/1
```

```
R3#show ip ospf interface f0/1 | sec Cost
  Process ID 1, Router ID 192.168.23.3, Network Type BROADCAST, Cost: 1
  Topology-MTID    Cost    Disabled    Shutdown      Topology Name
        0           1         no          no            Base
```

```
R2#show ip ospf interface f0/0 | sec Cost
  Process ID 1, Router ID 192.168.23.2, Network Type BROADCAST, Cost: 1
  Topology-MTID    Cost    Disabled    Shutdown      Topology Name
        0           1         no          no            Base
```

```
R1#show ip ospf int f0/1 | sec Cost
  Process ID 1, Router ID 192.168.12.1, Network Type BROADCAST, Cost: 1
  Topology-MTID    Cost    Disabled    Shutdown      Topology Name
        0           1         no          no            Base
```