

Routing Protocols: RIPv2 vs OSPF vs EIGRP

The key facts, defaults and Cisco IOS commands for the three classic interior routing protocols, on one page.

At a glance

Feature	RIPv2	OSPF (v2)	EIGRP
Type	Distance vector	Link state	Advanced distance vector ("hybrid")
Algorithm	Bellman-Ford	Dijkstra shortest path first (SPF)	DUAL (Diffusing Update Algorithm)
Metric	Hop count	Cost = reference bandwidth (100 Mbps) ÷ interface bandwidth	Composite: bandwidth + delay (default K-values)
Admin distance	120	110	90 internal · 170 external · 5 summary
Hop limit	15 (16 = unreachable)	No hop limit	100 by default (configurable up to 255)
Updates	Full table every 30 s	Only when something changes (LSAs)	Only when something changes (partial, bounded)
Timers (default)	Update 30 · invalid 180 · hold-down 180 · flush 240 s	Hello 10 · dead 40 s (broadcast / point-to-point)	Hello 5 · hold 15 s (LAN and fast links)
Transport / multicast	UDP 520 · 224.0.0.9	IP protocol 89 · 224.0.0.5 / .6	IP protocol 88 · 224.0.0.10
Standard	Open (RFC 2453)	Open (RFC 2328)	Cisco (informational RFC 7868, 2016)
Convergence	Slow	Fast once settled (slow start)	Fastest
Best for	Small, simple networks and labs	Large or mixed-vendor networks	All-Cisco networks needing fast failover

RIPv2 config

```
router rip
version 2
network 192.168.10.0
no auto-summary
passive-interface g0/0
```

Network is the classful address; passive-interface on LAN ports.

Check: show ip rip database · debug ip rip

OSPF config

```
router ospf 1
router-id 1.1.1.1
network 192.168.10.0 0.0.0.255 area 0
passive-interface g0/0
```

Process ID is local; area numbers must match on a link.

Check: show ip ospf neighbor · show ip ospf interface brief

EIGRP config

```
router eigrp 10
network 192.168.10.0 0.0.0.255
no auto-summary
passive-interface g0/0
```

AS number must match; auto-summary is off by default on IOS 15+.

Check: show ip eigrp neighbors · show ip eigrp topology

From my dissertation lab

Same 5-router GNS3 topology, captured with Wireshark. Average convergence duration over a 10-minute run (lower is better).

RIPv2	<div></div>	15.6 – 34.7
OSPF	<div></div>	16.4 – 39.3
EIGRP	<div></div>	0.012 – 0.02

OSPF starts slowest while routers build their maps, then settles. RIPv2 also wastes bandwidth with its 30-second full-table updates.

Handy on every router

- show ip route
- show ip protocols
- show ip interface brief
- clear ip route *

Lowest admin distance wins when two protocols know the same route: connected 0 · static 1 · EIGRP 90 · OSPF 110 · RIPv2 120.

Pick RIPv2 when...

it's a tiny network or a lab, and you want the simplest setup to learn on.

Pick OSPF when...

the network is big, uses areas, or has kit from more than one vendor.

Pick EIGRP when...

it's all Cisco and you want the fastest failover with little tuning.