BASIC MPLS - Cisco Express Forwarding

Cisco Express Forwarding (CEF) is advanced, Layer 3 IP switching technology. CEF improves network performance and scalability.

CEF is less CPU-intensive than fast switching route caching. More CPU processing power can be dedicated to Layer 3 services such as quality of service (QoS) and encryption. CEF also offers full switching capacity at each line card when distributed CEF (dCEF) mode is active. Finally, CEF offers unparalleled switching stability and performance in large networks. In ever changing networks, fast switching cache entries are often wrong due to routing changes. These changes can cause traffic to be process switched using the routing table, rather than fast switched using the route cache. The Forwarding Information Base (FIB) lookup table contains all known routes that exist in the routing table, it eliminates route cache maintenance and the fast switch/process switch forwarding scenario. CEF can switch traffic more efficiently than typical demand caching schemes.

Configuration

When you enable CEF or dCEF globally, all interfaces that support CEF are enabled by default.

MPLS Forwarding

```
NetStepByStep-R2(config)# ip cef
```

- Enables standard CEF operation
- Use in global configuration mode.
- To disable CEF, use the **no** form of this command.

Verification

```
show ip cef summary
```

- Display a summary of the FIB
- Use in user EXEC or privileged EXEC mode.

```
NetStepByStep-R2# show ip cef summary
IP CEF with switching (Table Version 42), flags=0x0
  36 routes, 0 reresolve, 0 unresolved (0 old, 0 new), peak 0
  4 instant recursive resolutions, 0 used background process
  36 leaves, 51 nodes, 58624 bytes, 44 inserts, 8 invalidations
  2 load sharing elements, 752 bytes, 2 references
  universal per-destination load sharing algorithm, id 0FDE3D1C
  3(0) CEF resets, 3 revisions of existing leaves
  Resolution Timer: Exponential (currently 1s, peak 1s)
  2 in-place/0 aborted modifications
  refcounts:  13398 leaf, 13312 node

  Table epoch: 0 (36 entries at this epoch)

Adjacency Table has 2 adjacencies
```

show ip cef

- Display entries in the Forwarding Information Base (FIB)
- Use in user EXEC or privileged EXEC mode.

```
NetStepByStep-R2# show ip cef
Prefix              Next Hop             Interface
0.0.0.0/0           drop                 Null0 (default route handler entry)
0.0.0.0/32          receive
2.2.2.2/32          receive
3.3.3.3/32          23.23.23.3           Ethernet0/1
4.4.4.4/32          24.24.24.4           Ethernet0/2
5.5.5.5/32          23.23.23.3           Ethernet0/1
6.6.6.6/32          24.24.24.4           Ethernet0/2
12.12.12.0/24       attached             Ethernet0/3
12.12.12.0/32       receive
12.12.12.2/32       receive
12.12.12.255/32     receive
22.22.22.0/24       attached             Loopback22
22.22.22.0/32       receive
22.22.22.22/32      receive
22.22.22.255/32     receive
23.23.23.0/24       attached             Ethernet0/1
23.23.23.0/32       receive
23.23.23.2/32       receive
23.23.23.3/32       23.23.23.3           Ethernet0/1
23.23.23.255/32     receive
24.24.24.0/24       attached             Ethernet0/2
24.24.24.0/32       receive
Prefix              Next Hop             Interface
```

```
24.24.24.2/32        receive
24.24.24.4/32        24.24.24.4          Ethernet0/2
24.24.24.255/32      receive
33.33.33.0/24        23.23.23.3          Ethernet0/1
34.34.34.0/24        24.24.24.4          Ethernet0/2
                     23.23.23.3          Ethernet0/1
35.35.35.0/24        23.23.23.3          Ethernet0/1
44.44.44.0/24        24.24.24.4          Ethernet0/2
46.46.46.0/24        24.24.24.4          Ethernet0/2
55.55.55.0/24        23.23.23.3          Ethernet0/1
56.56.56.0/24        24.24.24.4          Ethernet0/2
                     23.23.23.3          Ethernet0/1
66.66.66.0/24        24.24.24.4          Ethernet0/2
224.0.0.0/4          drop
224.0.0.0/24         receive
255.255.255.255/32   receive
```

Troubleshoot

```
debug ip cef table
```

- Record CEF table events related to the forwarding information base (FIB) table
- Use in privileged EXEC mode.
- To disable debugging output, use the **no** form of this command.

Video Cheat Sheet

R2

```
conf t
ip cef
```