Post 9

Thursday, January 24, 2019 11:13 PM

ROUTING: ROUTING TABLE BASICS 3

Routing table stores info about:

Directly connected routes	• From active router ints • Adds directly connected route when int is config'd w/IP/activated
Remote routes	• Remote networks connected to other routers • Statically/dynamically config'd using dynamic routing protocols

Routing table: Data file in RAM: Stores route info about directly connected/remote networks

- Contains network/next hop associations
- Associations: Tell router destination can be reached by sending packet to specific router: Represents next hop
- Next hop association: Can also be outgoing/exit int to next destination

Table Sources:

show ip route Display IPv4 table

- Provides: Route info: How route learned/how long in table/which specific int to use to get to destination

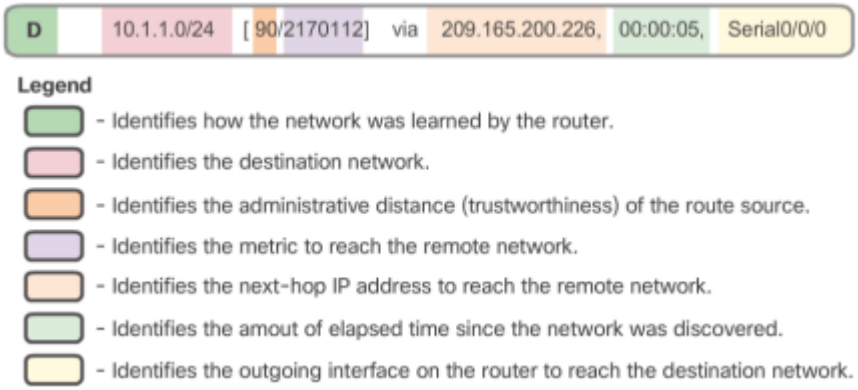
Entries in table can be added

Local route interfaces	• Added when int is config/active • Only displayed IOS 15: Newer for IPv4 • All IOS releases IPv6
Directly connected interfaces	• Added when config/active
Static routes	• When route manually config/exit int is active
Dynamic routing protocol	• Added when protocols dynamically learn about network • (EIGRP/OSPF) implemented/networks ID'd

Sources of entries ID'd by code: How learned

L	ID's address assigned to router's int: Router determine when receives packet for int instead of being fwded
C	Directly connected network
S	Static route created to reach specific network
D	Dynamically learned network from other router (EIGRP)
O	Dynamically learned network from other router (OSPF)

Remote Network Routing Entries



Route source	How route was learned
Destination network	Address of remote network
Administrative Distance (AD)	Trustworthiness of source: Lower is better
Metric	Value assigned to reach remote network: Lower is better
Next-hop	IPv4 address of next router to fwd packet to
Route timestamp	How much time passed since route learned
Outgoing Interface	Exit int to use to fwd packet to final destination

Directly Connected Ints: Before state is [up/up] /added to IPv4 table: Must:

- Assign valid IPv4/6 address
- Activate w/no shutdown
- Receive carrier signal from other device (router/switch/host)
- When int up: Network of int added to table as directly connected

Active: Properly config directly connected int: Creates 2 table entries

Table entry for directly connected ints

Route source	• How route learned • Directly connected ints: 2 route source codes • **C** Directly connected • **L** IPv4 assigned to router int
Designation network	Address of remote network
Outgoing interface	Exit int to use when fwding packets to destination

Prior to IOS 15: Local route routing table entries not displayed in IPv4 table

Static Routes: Static/dynamic routing can be implemented after ints config'd

Static routes	Manual config: Define explicit path between 2 devices Advantages: • Improved security/efficiency/less BW than dynamic • No CPU cycles used to calculate/communicate route Disadvantage: • Not auto updated • Must manually reconfig whenever topology changes

2 common static route types

1. Static route to a specific network
2. Default static route

Route to specific network	• Reach specific remote network • IPv4 config using ip route network mask {*next-hop-ip* | *exit-intf*} [from global config] • **S** Static route
Default static route	• Similar to gateway on host • Exit point to use when routing table doesn't contain path for destination • Useful: When router has 1 exit point to another (connects to central router/service

	provider) ip route 0.0.0.0.0.0.0.0 {*exit-inf* | *next-hop-ip*} [from global config]

***** Possible candidate to be default route

Static IPv6

- Supports static/default static routes

ipv6 route ::/0 {*ipv6-address* | *int-type int-number*} [from global config]

Dynamic routing

- Shares info about reachability/status of remote networks

Network discovery	• Ability of a protocol to share info about networks known w/other routers also using same protocol • Routers auto learn about these networks from others • Networks/best path to each: Added to table • ID as network learned by specific dynamic routing protocol • Exchange routes/update tables • Converge after finishing exchange/updates • Maintains networks in tables

Cisco ISR routers: Support variety of dynamic IPv4 r-protocols: **EIGRP/OSPF/IS-IS (Intermediate Sys-to-Intermediate Sys)/RIP**

router ? [from global config]: Determine which protocols are supported

IPv6: Cisco ISR routers: Support dynamic IPv6 r-protocols: **RIPng (RIP next generation)/OSPFv3/EIGRP for IPv6**

Support depends on HW/IOS vers: Most support longer addresses/different header structures

Enable IPv6 routers to forward traffic: ipv6 unicast-routing [from global config]