EIGRP

Tags	
Klaar	JA
Week	Week 2

EIGRP Basic Features

The default administrative distance of EIGRP = 90

EIGRP Feature	Description
Diffusing Update Algorithm (DUAL)	• EIGRP uses DUAL as its routing algorithm. • DUAL guarantees loop-free and backup paths throughout the routing domain.
Establishing Neighbor Adjacencies	• EIGRP establishes relationships with directly connected EIGRP routers. • Adjacencies are used to track the status of these neighbors.
Reliable Transport Protocol	• EIGRP RTP provides delivery of EIGRP packets to neighbors. • RTP and neighbor adjacencies are used by DUAL.
Partial and Bounded updates	• Instead of periodic updates, EIGRP sends partial triggered updates when a path or metric changes. • Only those routers that require the information are updated minimizing bandwidth use.
Equal and Unequal Cost Load Balancing	• EIGRP supports equal cost load balancing and unequal cost load balancing, which allows administrators to better distribute traffic flow in their networks.

EIGRP uses protocol-dependent modules (PDMs) to support different protocols such as IPv4, IPv6, and legacy protocols IPX and AppleTalk.

RTP is the EIGRP Transport layer protocol used for the delivery and reception of EIGRP packets.

EIGRP supports authentication and is recommended.
EIGRP authentication ensures that routers only accept routing information from other routers that have been configured with the same password or authentication information.

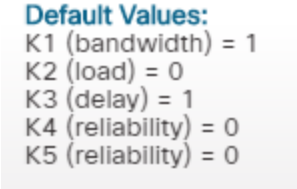
EIGRP uses multicast and unicast rather than broadcast.
As a result, end stations are unaffected by routing updates or queries.
The EIGRP multicast IPv4 address is 224.0.0.10
EIGRP frame contains destination multicast address 01-00-5E-00-00-0A
Queries can use multicast or unicast, whereas Replies are always sent as unicast.

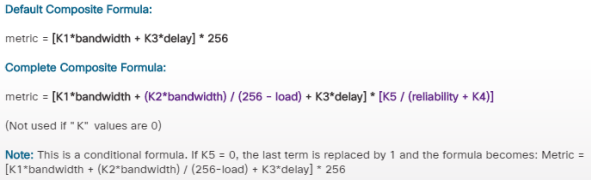
EIGRP Metrics

The EIGRP composite metric formula consists metric weights with values K1 to K5

EIGRP uses a composite metric which can be based on the following metrics:

- **K1** Bandwidth: The lowest bandwidth between source and destination.
- **K2** Load: (Optional) Worst load on a link between source and destination.
- **K3** Delay: The cumulative interface delay along the path
- **K4** Reliability: (Optional) Worst reliability between source and destination.
- **K5** Reliability: (Optional) Worst reliability between source and destination.





BW - Bandwidth of the interface (in kb/s).
DLY - Delay of the interface (in microseconds).
Reliability - Reliability of the interface as a fraction of 255 (255/255 is 100% reliability).
Txload, Rxload - Transmit and receive load on the interface as a fraction of 255 (255/255 is completely saturated), calculated as an exponential average over five minutes.

DUAL and the Topology Table

EIGRP uses the Diffusing Update Algorithm (DUAL) to provide the best and backup loop-free paths.

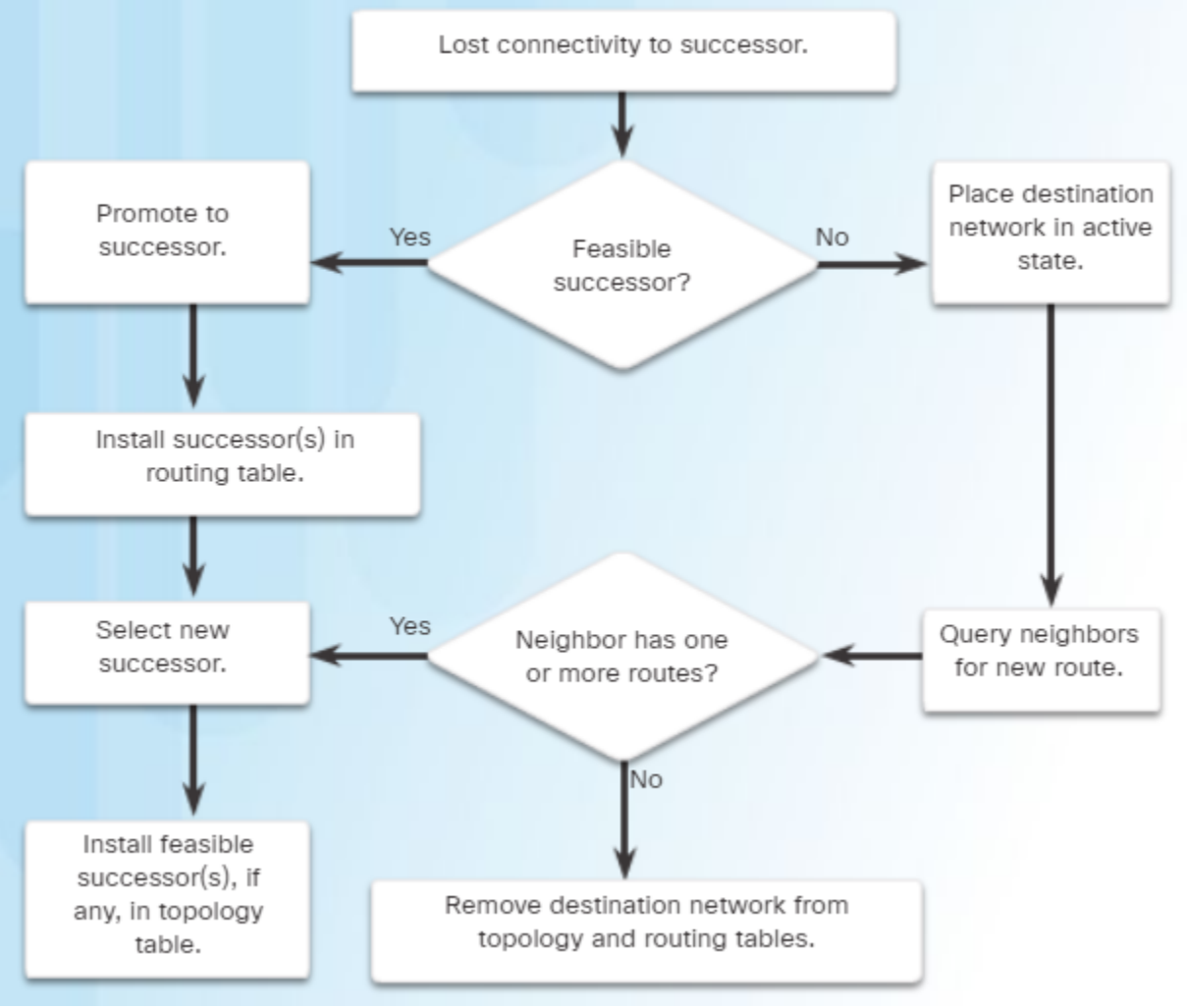
The DUAL algorithm is used to obtain loop-freedom at every instance throughout a route computation.
DUAL uses several terms, which are discussed in more detail throughout this section:

Term	Description
Successor	• Is a neighboring router that is used for packet forwarding and is the least-cost route to the destination network. • The IP address of a successor is shown in a routing table entry right after the word “via”.
Feasible Successors (FS)	• These are the “Backup paths” that are a loop-free. • Must comply to a feasibility condition.
Reported Distance (RD)	• Also called “advertised distance”, this is the reported metric from the neighbor advertising the route. • If the RD metric is less than the FD, then the next-hop router is downstream and there is no loop.
Feasible Distance (FD)	• This is the actual metric of a route from the current router. • Is the lowest calculated metric to reach the destination network. • FD is the metric listed in the routing table entry as the second number inside the brackets.

DUAL and convergence

If the path to the successor fails and there are no FSs, DUAL puts the network into the active state and actively queries its neighbors for a new successor.

- DUAL sends EIGRP queries asking other routers for a path to the network.
- Other routers return EIGRP replies, letting the sender of the EIGRP query know that they have a path to the requested network. If there is no reply, the sender of the query does not have a route to this network.
- If the sender receives EIGRP replies with a path to the requested network, the preferred path is added as the new successor and also added to the routing table.



Configuration example

Router-id

The router-id can be set using the `eigrp router-id xx.xx.xx.xx` command

1. If the router-id is not statically set, then the router-id will be the highest IP-address of the loopback interfaces
2. If there are no loopback interfaces configured, then the router-id will be the highest IP-address of the physical interfaces

Networks

networks must include a wildcard-mask and can be a summary route

en example of a network 192.168.1.0 255.255.255.0 is:

`network 192.168.1.0 0.0.0.255`

Passive interface

Passive interfaces prevent EIGRP updates out a specified router interface.

Prevents neighbor relationships from being established.
Routing updates from a neighbor are ignored.

example to set GIG0/0 to passive:

```
R3(config)# router eigrp 1
R3(config-router)# passive-interface gigabitethernet 0/0
```

Verifying configuration

You can verify EIGRP configuration by using the following commands

`show ip eigrp`

`show ip eigrp neighbors`

`show ip protocols`

`show ip eigrp topology`