

IGRP

(Interior Gateway Routing Protocol)

- Distance Vector Routing Protocol
- **Cisco Proprietary** Protocol
- Cisco Proprietary means, it works only with Cisco Routers.
- Cisco created it to overcome the problems associated with RIP.
- It supports maximum hop count of **255** with the default being **100**, so it is helpful in larger networks and solves the problem of 15 hops being the maximum possible in a RIP network.
- IGRP metric = bandwidth + line delay (by default)
- Can also supports = reliability + load + MTU
- Default Administrative Distance = **100**
- Uses an Autonomous system number for activation.
- Supports only Classful networks.
- Gives a route table update every 90 secs.
- IGRP Timers
 - Route update timer - 90 secs
 - Route invalid timer - 270 secs
 - Holddown timer - 280 secs
 - Route flush timer - 630 secs

IGRP Configuration

```
Router(config)#router igrp <ASN>  
Router(config-router)#network <network address>
```

Example

```
Router(config)#router igrp 111  
Router(config-router)#network 192.168.1.0
```

```
Router#show ip route  
Router#show ip protocols
```

EIGRP

(Enhanced Interior Gateway Routing Protocol)

- **Cisco Proprietary** Protocol.
- It is most widely used protocol.
- It is Hybrid of Distance Vector and Link State.
- Based on IGRP, with many enhancements built into it.
- Supports both **Ipv4** and **Ipv6**.
- Supports **Classful** and **Classless** Addressing both.
- Supports **VLSM/CIDR**
- Support for **summaries** and **discontiguous** networks.
- Efficient **neighbor discovery**.
- Supports **Multipath Routing**, EIGRP has the ability to use **equal** and **unequal** cost for multipath routing.
- Communication via **Reliable Transport Protocol** (RTP).
- Best path selection via Diffusing Update Algorithm.
- Like IGRP, it supports maximum hop count of **255** with the default being **100**.
- Administrative Distance = **90**
- Uses an **Autonomous system number** for activation.
- EIGRP metric = Bandwidth + Reliability
- Multicast Address = **224.0.0.10**

EIGRP Packets

Hello Packets

This is used to discover and maintain neighbors. Hello packets are multicast which help discover neighbors. Hello packets contain IP addresses of the sending router. Hello packets are sent every **5** seconds on high speed bandwidth, whereas on low speed bandwidths, they are sent every **30** seconds. If a router does not get a Hello packet update, it considers the neighbor as invalid.

Update Packets

These packets are used to update routing information. Topology Tables are

passed in the update packets. Update packets are sent in two scenarios, first when the neighbor establishes information, and second when there is an change takes place in the network.

Query and Reply Packets

if a route is lost, then query packets are sent to neighbors to ask whether they know about the lost route. Neighbors reply back for query packets with reply packets.

ACK Packets

These packets do not have data. They are used to acknowledge packets that are sent by RTP (Reliable Transport Protocol).

EIGRP Terminologies

Successor

A Successor route is the best route to a remote network. A Successor route is used by EIGRP to forward traffic to a destination and it is stored in the Routing Table. It is backed up by a feasible successor route that is stored in the Topology Table-if one is available.

Feasible Successor

A destination entry is moved from the Topology Table to the Routing Table when there is a Feasible Successor. A Feasible Successor is a path whose Reported Distance is less than the Feasible Distance , and it is considered as a backup route. EIGRP will keep up to six Feasible Successors in the Topology Table. Only the one with the best metric (the successor) is placed in the Routing Table.

Feasible Distance

This is the best path along all paths to a remote network, including the metric to the neighbor that is advertising that remote network. The metric of a

feasible distance is the metric reported by the neighbor (called reported distance), plus the metric to the neighbor reporting the route.

Reported Distance

This is the metric of a remote network, as reported by a neighbor. It is also the routing table metric of the neighbor, and is the same as the number after the slash in the topology table.

Feasibility Condition

When metric of a route's reported distance is less than feasible distance, we say that the route has met the **feasibility condition**. The route which meets the feasibility condition is either installed or kept as a stand-by route.

Active and Passive Route States

When route is operating normally, it is in a **passive State**. Now, when the route becomes invalid, DUAL comes into action and goes through the Topology Table to get a Feasible Successor. If no Feasible Successor is found, the route goes into an **active State** and DUAL starts computing by sending query packets to other routers to find a replacement path.

EIGRP Tables

Neighbor Table

Each router keeps state information about adjacent neighbors. When a newly discovered neighbor is learned, the address and interface of the neighbor are recorded, and this information is held in the neighbor table, stored in RAM.

Router#show ip eigrp neighbor

Topology Table

It contains all destinations advertised by neighboring routers, holding each destination address and a list of neighbors that have advertised the destination.

Router#show ip eigrp topology

Routing Table

This table contains the actual route which will be used to forward traffic. The best metric path (The Successor) to the destination is placed in the Routing Table.

Router#show ip route