CCNP BSCI Notes - EIGRP Principles

Supports routed protocols like IP and IPv6 via protocol-dependent modules Uses Reliable Transport Protocol (RTP, Cisco proprietary) for some traffic (updates, queries, and replies) Uses hellos to identify/monitor neighbors Uses the Diffusing Update Algorithm (DUAL) to select routes EIGRP is IP protocol 88. EIGRP supports proportional unequal-cost load-balancing among feasible routes. Packet types **   Hello** - Identify neighbors, sent as periodic multicasts **   Update** - Advertises routes, only sent when there is a change, multicast to 224.0.0.10 **   Ack** - Acknowledges receipt of an update **   Query** - Used to query routes from neighbors (multicast; unicast attempted up to 16 times if multicast gets no response)
**   Reply** - Used to answer a query (unicast) Metric calculation Metric = 256 * (K1 * bandwidth + ((K2 * bandwidth) / (256 - load)) + K3 * delay) * (K5 / (reliability + K4)) K values are used to distribute weight to different path aspects: bandwidth - Defined as 107 divided by the speed of the slowest link in the path, in Kbps
           load - 8-bit value, not considered by default
           reliability - 8-bit value, not considered by default
           delay - constant value associated with interface type; EIGRP uses the sum of all delays in the path K defaults: K1 = 1, K2 = 0, K3 = 1, K4 = 0, K5 = 0 K values can be manipulated by an admin, but routers must have matching K values to become neighbors DUAL
**   Advertised distance** - Cost advertised by a neighbor to get to a destination
**   Feasible distance** - Advertised distance + cost get to that neighbor The feasibility requirement states "if my neighbor's advertised distance is less than my feasible distance, the path will be loop free."
**   Successor** - The neighbor with the best path
**   Feasible successor** - All other neighbors which meet the feasibility requirement **   Split-horizon** - A network is not advertised on the link from which is learned. Queries When a router loses its successor and has no feasible successors, it will query all remaining neighbors for a new route. Queries are recursive and will be forwarded to other neighbors until either a route is found, or a summarization boundary is reached. Stuck in Active (SIA) - Queries which do not return a route before the active timer expires (usually 3 minutes), the router is considered stuck in active mode. EIGRP Tables **Neighbor table** Stores information about neighboring EIGRP routers: Network address (IP)
          Connected interface
          Holdtime - how long the router will wait to receive another HELLO before dropping the neighbor; default = 3 * hello timer   Uptime - how long the neighborship has been established   Sequence numbers
          Retransmission Timeout (RTO) - how long the router will wait for an ack before retransmitting the packet; calculated by SRTT   Smooth Round Trip Time (SRTT) - time it takes for an ack to be received once a packet has been transmitted
          Queue count - number of packets waiting in queue; a high count indicates line congestion Topology table Holds all routes received from neighbors, is built from updates, calculated by DUAL, and contains all the information required by the routing table Routing table Route types:
           Internal - Paths directly within EIGRP
           Summary - Internal paths which have been summarized
           External - Routes redistributes into EIGRP