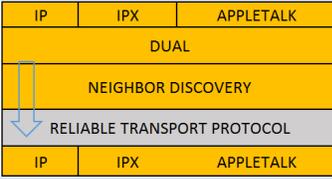# EIGRP Cheat Sheet

WWW.NETWORKINGINFO.IN

Version 1.0
Update by Dinesh Jangid

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Stands for – Enhanced Interior Gateway Routing Protocol

Characteristics and Key features

Protocol Type	Hybrid Protocol Now days open standard
Algorithm	DUAL (Diffusing Update Algorithm)
Transport Protocol	Reliable Transport Protocol in IP Protocol with port Number - 88
Routed Protocol Support	IP, IPv6, IPX, APPLETALK using PIM module
Metric	**Composite Metrics**

K1 (Default)	Bandwidth
K2	Load
K3 (Default)	Delay
K4	Reliability
K5	MTU

Multicast	224.0.0.10
Authentication	MD5
Administrative Distance	1. Internal – 90 2. External – 170 3. Summary - 5
VLSM Support	Yes, It is classless routing protocol
Convergence	Fast Convergence
Load Balancing	Equal and Unequal
Hop Count	Maximum – 255, Default - 100

Metric Calculation

Default composite formula:

Metric = [K1 * bandwidth + K3 * delay]

Complete Composite formula:

Metric = [K1*bandwidth+(k2*bandwidth)/(256-load) + k3*delay] * [K5/reliability+k4)]

Note – Bandwidth in kbps and delay in micro seconds

EIGRP Tables

Neighbour Table	Keeps neighbour information
Topology Table	Keeps all the available path info
Routing Table	Keeps best path information

Packet types

Hello	Discovers neighbours Unreliable Unicast and Multicast packet

Link type	**Hello**	**Hold**
1.54 Mb or Slower	60 sec	180 sec
Multi-access Net	5 sec	15 sec

Ack	Unreliable Unicast
Update	Keeps route information, Non-periodic, Bounded and partial update. Reliable unicast and multicast update.
Query/Reply	Used by DUAL when searching for the networks, Query can be unicast and multicast but Reply is always unicast.
Request	Get specific information. Unreliable unicast and multicast packet

DUAL Concepts

Reported distance/Advertised Distance	A Metric advertised by neighbour to reach destination
Feasible Distance	Total metric from local router to reach destination
Successor	Route with lowed FD to the destination (Best Route), Get installed in the routing table.
Feasible Successor	Backup route with loop free path. Feasible successor gets installed in routing table if it matches feasibility condition.
Feasible Condition	RD of feasible successor must be less than FD of current successor **RD of FS < FD of Successor**

Stub Concept

Connected	Advertises connected routes
Summary	Advertises summary routes
Redistribute	Advertises Redistribute routes
Receive-Only	Does not advertise, Only receives
Static	Advertises static routes used with "redistribute static" command
Stub Router	Sends special peer information packet to the all neighbours to tell not to send query. It advertises only subset of routes. By default connected and summary gets advertised

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Terminologies

RTO	The time in milliseconds, that the router waits for an acknowledgement before retransmitting a reliable packet
SRT	Total time for an EIGRP packet to be sent and receive acknowledgement of the packet between neighbours
SIA	The state when a route becomes unavailable and queries are not answered.
Passive	Route is reachable
Active	Route is unreachable, means FS doesn't exist
Passive Interface	No Hellos and no neighbour adjacency on this interface but interface is still advertised
Null0 Summary	Summarization creates a null0 summary route to prevent loop.

Router-id	A valid and unique 32-bit number same as an IP address.
	
	Router ID Selection
	    1- Manually configuration
	    2- Highest Loopback IP
	    3- Highest physical interface IP

Route Types	Internal = "D" External = "EX"
Route Preference	Internal Routes (90) > External Route (170)
Graceful Shutdown	A goodbye message is broadcast when EIGRP process is shut down, to inform peers about the impending topology change. Helps in quick convergence.

Verification and troubleshooting command

Show ip eigrp neighbour
Show ip eigrp topology
Show ip eigrp interface
Show ip protocols
Show ip eigrp traffic
Debug ip eigrp {packet| neighbours}
Debug eigrp packet {hello|ack|query|reply|update}
Debug eigrp fsm

EIGRP Basic Configuration commands

! Enabling EIGRP
R1(config)# Router eigrp **<1-65535>**

! Enable routing on an IP network
R1(config-router)# network <**IP address**><**wildcard mask**>
               Or
R1(config-router)# network <**IP address**> <**subnet mask**>

! Disable automatic network number summarization
R1(config-router)# no auto-summary

! Suppress routing updates on an interface
R1(config-router)# passive-interface <**interface name**> or <**default**>

! Modify IGRP routing metrics and parameters
R1(config-router)# metric weights 0 <**k1**> <**k2**> <**k3**> <**k4**> <**k5**>

! Control load balancing variance
R1(config-router)# variance <**1-128**>

! Static neighbour for unicast update
R1(config-router)# neighbour <**Neighbour IP address**> <**Interface**>

! Enabling Stub
R1(config-router)# eigrp stub {receive-only | connected | static | summary}

EIGRP Interface level commands

! Perform manual address summarization
R1(config-if)# ip summary-address eigrp <**ASN**> <**IP Address**> <**Subnet**>

! Peform MD5 authentication
R1(config-if)# ip authentication mode eigrp <**ASN**> md5
R1(config-if)# ip authentication key-chain eigrp <**ASN**> <**key-chain**>

! Configures IP-EIGRP hello interval and hold time
R1(config-if)#ip hello-interval eigrp <**ASN**> <**seconds**>
R1(config-if)#ip hold-time eigrp <**ASN**> <**seconds**>

! Changing bandwidth percentage
R1(config-if)# ip bandwidth-percent eigrp <**ASN**> <**percentage**>

! Disabling split horizon
R1(config-if)# no ip split-horizon eigrp <**ASN**>

! Changing Delay
R1(config-if)# delay <**tens of microseconds**>

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