### EIGRP Protocol Header

<table>
<thead>
<tr>
<th>Field</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version</td>
<td>8</td>
</tr>
<tr>
<td>Opcode</td>
<td>16</td>
</tr>
<tr>
<td>Checksum</td>
<td>24</td>
</tr>
<tr>
<td>Flags</td>
<td>32</td>
</tr>
<tr>
<td>Sequence Number</td>
<td></td>
</tr>
<tr>
<td>Acknowledgment Number</td>
<td></td>
</tr>
<tr>
<td>Autonomous System Number</td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td></td>
</tr>
<tr>
<td>Value</td>
<td></td>
</tr>
</tbody>
</table>

#### Metric Formula

\[
256 \times \left( K_1 \times \text{bw} + \frac{K_2 \times \text{bw}}{256 - \text{load}} + K_3 \times \text{delay} \right) \times \frac{K_5 \times \text{rel}}{K_4} = \text{Metric}
\]

- \( \text{bw} \) = \( 10^7 \) / minimum path bandwidth in kbps
- \( \text{delay} \) = interface delay in \( \mu \text{secs} / 10 \)

### EIGRP Configuration

#### Protocol Configuration

- Enable EIGRP:
  ```
  router eigrp <ASN>
  ```
- Add networks to advertise:
  ```
  network <IP address> <wildcard mask>
  ```
- Configure K values to manipulate metric formula:
  ```
  metric weights 0 <k1> <k2> <k3> <k4> <k5>
  ```
- Disable automatic route summarization:
  ```
  no auto-summary
  ```
- Designate passive interfaces:
  ```
  passive-interface (<interface> | default)
  ```
- Enable stub routing:
  ```
  eigrp stub [receive-only | connected | static | summary]
  ```
- Statically identify neighboring routers:
  ```
  neighbor <IP address> <interface>
  ```

#### Interface Configuration

- Set maximum bandwidth EIGRP can consume:
  ```
  ip bandwidth-percent eigrp <AS> <percentage>
  ```
- Configure manual summarization of outbound routes:
  ```
  ip summary-address eigrp <AS> <IP address> <mask> [<AD>]
  ```
- Enable MD5 authentication:
  ```
  ip authentication mode eigrp <AS> md5
  ```
- Configure hello and hold timers:
  ```
  ip hello-interval eigrp <AS> <seconds>
  ip hold-time eigrp <AS> <seconds>
  ```
- Disable split horizon for EIGRP:
  ```
  no ip split-horizon eigrp <AS>
  ```

### Terminology

- **Feasible Distance**: The metric for a route advertised by a neighbor
- **Reported Distance**: The metric for a route advertised by a neighbor plus the cost to get to that neighbor
- **Stuck In Active (SIA)**: The condition when a route becomes unreachable and not all queries for it are answered; adjacencies with unresponsive neighbors are reset
- **Passive Interface**: An interface which does not participate in EIGRP but whose network is advertised
- **Stub Router**: A router which advertises only a subset of routes, and is omitted from the route query process

### Troubleshooting

- Show IP EIGRP interfaces:
  ```
  show ip eigrp interfaces
  ```
- Show IP EIGRP neighbors:
  ```
  show ip eigrp neighbors
  ```
- Show IP EIGRP topology:
  ```
  show ip eigrp topology
  ```
- Show IP EIGRP traffic:
  ```
  show ip eigrp traffic
  ```
- Clear IP EIGRP traffic:
  ```
  clear ip eigrp traffic
  ```
- Debug IP EIGRP:
  ```
  debug ip eigrp [packet | neighbors]
  ```

### Attributes

- **Type**: Distance Vector
- **Algorithm**: DUAL
- **Internal AD**: 90
- **External AD**: 170
- **Summary AD**: 5
- **Standard**: Cisco proprietary
- **Protocols**: IP, IPX, Appletalk
- **Transport**: IP/88
- **Multicast IP**: 224.0.0.10
- **Hello Timers**: 5/60
- **Hold Timers**: 15/180