RIP

RIP Implementations

RIPv1
Original RIP implementation, limited to classful routing (obsolete)

RIPv2
Introduced support for classless routing, authentication, triggered updates, and multicast announcements (RFC 2453)

RIPng (RIP Next Generation)
Extends RIPv2 to support IPv6 routing (RFC 2080); functions very similarly to RIPv2 and is subsequently as limited

Protocols Comparison

<table>
<thead>
<tr>
<th>Protocols</th>
<th>IPv4</th>
<th>IPv6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admin Distance</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>UDP Port</td>
<td>520</td>
<td>521</td>
</tr>
<tr>
<td>Classless</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Adv. Address</td>
<td>Broadcast</td>
<td>224.0.0.9</td>
</tr>
<tr>
<td>Authentication</td>
<td>None</td>
<td>Plain, MD5</td>
</tr>
</tbody>
</table>

RIPv2 Configuration

```
! Enable RIPv2 IPv4 routing
router rip
version 2

! Disable RIPv2 automatic summarization
no auto-summary

! Designate RIPv2 interfaces by network
network network

! Identify unicast-only neighbors
neighbor IP-address

! Originate a default route
default-information originate

! Designate passive interfaces
passive-interface {interface | default}

! Modify timers
timers basic update invalid hold flush
```

RIPng Configuration

```
! Enable IPv6 routing
ipv6 unicast-routing

! Enable RIPng IPv6 routing
ipv6 router rip name

! Toggle split-horizon and poison-reverse
[no] split-horizon
[no] poison-reverse

! Modify timers
timers basic update invalid hold flush
```

Attributes

<table>
<thead>
<tr>
<th>Type</th>
<th>Distance Vector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algorithm</td>
<td>Bellman-Ford</td>
</tr>
<tr>
<td>Admin Distance</td>
<td>120</td>
</tr>
<tr>
<td>Metric</td>
<td>Hop count (max 15)</td>
</tr>
<tr>
<td>Standard</td>
<td>RFCs 2080, 2453</td>
</tr>
<tr>
<td>Protocols</td>
<td>IPv4, IPv6</td>
</tr>
<tr>
<td>Transport</td>
<td>UDP</td>
</tr>
<tr>
<td>Authentication</td>
<td>Plaintext, MD5</td>
</tr>
<tr>
<td>Multicast IP</td>
<td>224.0.0.9/FF02::9</td>
</tr>
</tbody>
</table>

Terminology

Split Horizon
A rule that states a router may not advertise a route back to the neighbor from which it was learned

Route Poisoning
When a network becomes unreachable, an update with an infinite metric is generated to explicitly advertise the route as unreachable

Poison Reverse
A router advertises a network as unreachable through the interface on which it was learned

Timer Defaults

```
Update 30 sec  Flush 240 sec
Invalid 180 sec  Hold-down 180 sec
```

RIPng Interface Configuration

```
! Enable IPv6 routing
ipv6 unicast-routing

! Enable RIPng IPv6 routing
ipv6 router rip name

! Configure manual route summarization
ipv6 rip summary-address rip network mask

! Enable MD5 authentication (RIPv2 only)
ip rip authentication mode md5
ip rip authentication key-chain key-chain
```

Troubleshooting

```
show ip[v6] protocols
show ip[v6] rip database
show ip[v6] route rip
debug ip rip { database | events }
debug ipv6 rip { interface }
```