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CCNA: RIP CHEAT SHEET

Key Characteristics

Type: Distance Vector
Algorithm: Bellman Ford
Standard: RFC 1058 (Version 1), RFC 2453 (Version 2)
Administrative Distance: 120
Metric: Hop Count (16 is infinite)
Transport Protocol/Port Number: UDP/520
Routed Protocol Support: IP
Support for IPv6: Yes (RIPng only)
Supports VLSM & Route Summarization: Yes (RIPv2 and RIPng only)
Authentication: Yes (MD5 supported with RIPv2 and RIPng only)
Convergence: Slower

Metric Calculation

RIP uses hop count as the metric.
Each router increments one hop before advertising to neighbor
Routes with least hop count is installed in routing table
Hop count of 16 is considered infinite and such routes are not installed and advertised

Load Balancing

RIP only support only equal cost load balancing
Routes with equal hop count are installed automatically in the IP routing table

RIP Versions

RIP has two versions

RIP version 1:

1. classful protocol
2. updates are broadcast
3. no support for summarization
4. no authentication support

RIP version 2:

1. classless protocol
2. updates are multicast to address 224.0.0.9
3. support for VLSM and summarization (major network boundary)
4. MD5 authentication support
5. Supports Triggered updates and Route tags

The RIP version can be changed with **"version <1|2>"** command under RIP configuration process

Updates Types

RIP sends periodic updates at a specified timer interval

These updates include full routing table

Disadvantages of Periodic Updates:

1. If updates are sent to frequently it will cause unnecessary bandwidth and CPU utilization.
2. If sent too less, convergence takes longer and routing loops could occur

Routing Loop Avoidance Techniques

Split Horizon: Updates received in an interface can't be sent out the same interface.

Split Horizon with Poison Reverse: Updates sent back with infinite metric (hop count 16) for every update received in an interface

Count to Infinity: To avoid continuous looping of a (bad) routing update. RIP sets the count to infinity with a hop count of 16.

Triggered Updates: supported with RIP version 2. Also known as the flash updates. If a metric is changed it is immediately advertised to neighbors without waiting for the regular scheduled update timer

Timers

Update: send every 30 seconds

Invalid: Interval of time in seconds after which a route is declared invalid; it should be at least three times the value of the update argument. A route becomes invalid when there is an absence of updates that refresh the route. Default 180 seconds

Holddown: Interval in seconds during which routing information regarding better paths is suppressed. Default 180 seconds

Flush: Also called the garbage collector timer. It is set to 240 seconds (60 seconds longer than invalid timer). It specifies the time after which route is removed from routing table

The **"timers <basic update invalid holddown flush>"** command is used to change default values

Configuration Example: RIP version 1



```
Router R1:
interface loopback 0
ip address 10.1.1.1 255.255.255.255
!
interface serial 0/0
ip address 192.168.12.1 255.255.255.0
!
router rip
network 192.168.12.0
network 10.0.0.0
```

```
Router R2:
interface loopback 0
ip address 172.16.2.2 255.255.255.0
!
interface serial 0/0
ip address 192.168.12.2 255.255.255.0
!
router rip
network 192.168.12.0
network 172.16.0.0
```

```
R1#sh ip route | be Gateway
Gateway of last resort is not set
```

```
C 192.168.12.0/24 is directly connected, Serial0/0
R 172.16.0.0/16 [120/1] via 192.168.12.2, 00:00:17, Serial0/0 ← Due to auto summarization
10.0.0.0/24 is subnetted, 1 subnets
C 10.1.1.0 is directly connected, Loopback0
```

Configuration Example: RIP version 2

```
Router R1:
interface loopback 0
ip address 10.1.1.1 255.255.255.255
!
interface serial 0/0
ip address 192.168.12.1 255.255.255.0
!
router rip
version 2
network 192.168.12.0
network 10.0.0.0
```

```
Router R2:
interface loopback 0
ip address 172.16.2.2 255.255.255.0
!
interface serial 0/0
ip address 192.168.12.2 255.255.255.0
!
router rip
version 2
network 192.168.12.0
network 172.16.0.0
```

```
R1#sh ip route | be Gateway
Gateway of last resort is not set
```

```
C 192.168.12.0/24 is directly connected, Serial0/0
R 172.16.0.0/16 [120/1] via 192.168.12.2, 00:00:58, Serial0/0 ← Due to auto summarization
10.0.0.0/24 is subnetted, 1 subnets
C 10.1.1.0 is directly connected, Loopback0
```

Troubleshooting Commands

1. show ip protocols
2. show ip route
3. debug ip rip
4. debug ip rip events
5. debug ip rip database