RIP

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This document applies to MikroTik RouterOS V2.8

Table of Contents

General Information

Summary

MikroTik RouterOS implements RIP Version 1 (RFC1058) and Version 2 (RFC 2453). RIP enables routers in an autonomous system to exchange routing information. It always uses the best path (the path with the fewest number of hops (i.e. routers)) available.

Specifications

Packages required: *routing*
License required: *level3*
Home menu level: */routing rip*
Standards and Technologies: *RIPv1, RIPv2*
Hardware usage: *Not significant*

Related Documents

- *Package Management*

- *IP Addresses and ARP*

- *Routes, Equal Cost Multipath Routing, Policy Routing*

Description

Routing Information Protocol (RIP) is one protocol in a series of routing protocols based on Bellman-Ford (or distance vector) algorithm. This Interior Gateway Protocol (IGP) lets routers exchange routing information across a single autonomous system in the way of periodic RIP updates. Routers transmit their own RIP updates to neighboring networks and listen to the RIP updates from the routers on those neighboring networks to ensure their routing table reflects the current state of the network and all the best paths are available. Best path considered to be a path with the fewest hop count (*id est* that include fewer routers).

The routes learned by RIP protocol are installed in the route list (**/ip route print**) with the distance of 120.

Additional Documents

- *RIPv1 Protocol*

- *RIPv2 Protocol*

- *Cisco Systems RIP protocol overview*

General Setup

Property Description

redistribute-static (yes | no; default: **no**) - specifies whether to redistribute static routes to neighbour routers or not

redistribute-connected (yes | no; default: **no**) - specifies whether to redistribute connected routes to neighbour routers or not

redistribute-ospf (yes | no; default: **no**) - specifies whether to redistribute routes learned via OSPF protocol to neighbour routers or not

redistribute-bgp (yes | no; default: **no**) - specifies whether to redistribute routes learned via bgp protocol to neighbour routers or not

metric-static (*integer*; default: **1**) - specifies metric (the number of hops) for the static routes

metric-connected (*integer*; default: **1**) - specifies metric (the number of hops) for the connected

routes

metric-ospf (*integer*; default: **1**) - specifies metric (the number of hops) for the routes learned via OSPF protocol

metric-bgp (*integer*; default: **1**) - specifies metric (the number of hops) for the routes learned via BGP protocol

update-timer (*time*; default: **30s**) - specifies frequency of RIP updates

timeout-timer (*time*; default: **3m**) - specifies time interval after which the route is considered invalid

garbage-timer (*time*; default: **2m**) - specifies time interval after which the invalid route will be dropped from neighbor router table

Notes

The maximum metric of RIP route is **15**. Metric higher than **15** is considered 'infinity' and routes with such metric are considered unreachable. Thus RIP cannot be used on networks with more than 15 hops between any two routers, and using **redistribute** metrics larger that **1** further reduces this maximum hop count.

Example

To enable RIP protocol to redistribute the routes to the connected networks:

```
[admin@MikroTik] routing rip> set redistribute-connected=yes
[admin@MikroTik] routing rip> print
        redistribute-static: no
     redistribute-connected: yes
          redistribute-ospf: no
           redistribute-bgp: no
              metric-static: 1
           metric-connected: 1
               metric-ospf: 1
                 metric-bgp: 1
               update-timer: 30s
              timeout-timer: 3m
              garbage-timer: 2m
[admin@MikroTik] routing rip>
```

Interfaces

Home menu level: */routing rip interface*

Description

In general you do not have to configure interfaces in order to run RIP. This command level is provided only for additional configuration of specific RIP interface parameters.

Property Description

interface (*name*; default: **all**) - interface on which RIP runs
  • **all** - sets defaults for interfaces not having any specific settings

send (*v1 | v1-2 | v2*; default: **v2**) - specifies RIP protocol update versions to distribute

receive (*v1 | v1-2 | v2*; default: **v2**) - specifies RIP protocol update versions the router will be able to receive

authentication (*none | simple | md5*; default: **none**) - specifies authentication method to use for RIP messages

- **none** - no authentication performed
- **simple** - plain text authentication
- **md5** - Keyed Message Digest 5 authentication

authentication-key (*text*; default: **""**) - specifies authentication key for RIP messages

prefix-list-in (*name*; default: **""**) - name of the filtering prefix list for received routes

prefix-list-out (*name*; default: **""**) - name of the filtering prefix list for advertised routes

Notes

It is recommended not to use RIP version 1 wherever it is possible due to security issues

Example

To add an entry that specifies that when advertising routes through the **ether1** interface, prefix list **plout** should be applied:

```
[admin@MikroTik] routing rip> interface add interface=ether1 \
\... prefix-list-out=plout
[admin@MikroTik] routing rip> interface print
Flags: I - inactive
  0    interface=ether1 receive=v2 send=v2 authentication=none
       authentication-key="" prefix-list-in=plout prefix-list-out=none

[admin@MikroTik] routing rip>
```

Networks

Home menu level: */routing rip network*

Description

To start the RIP protocol, you have to define the networks on which RIP will run.

Property Description

address (*IP address/mask*; default: **0.0.0.0/0**) - specifies the network on which RIP will run. Only directly connected networks of the router may be specified

netmask (*IP address*; default: **0.0.0.0**) - specifies the network part of the address (if it is not specified in the address argument)

Notes

For point-to-point links you should specify the remote endpoint IP address as the network IP address. For this case the correct **netmask** will be **/32**.

Example

To enable RIP protocol on **10.10.1.0/24** network:

```
[admin@MikroTik] routing rip network> add address=10.10.1.0/24
[admin@MikroTik] routing rip network> print
  # ADDRESS
  0 10.10.1.0/24
[admin@MikroTik] routing rip>
```

Neighbors

Description

This submenu is used to define a neighboring routers to exchange routing information with. Normally there is no need to add the neighbors, if multicasting is working properly within the network. If there are problems with exchanging routing information, neighbor routers can be added to the list. It will force the router to exchange the routing information with the neighbor using regular unicast packets.

Property Description

address (*IP address*; default: **0.0.0.0**) - IP address of neighboring router

Example

To force RIP protocol to exchange routing information with the **10.0.0.1** router:

```
[admin@MikroTik] routing rip> neighbor add address=10.0.0.1
[admin@MikroTik] routing rip> neighbor print
Flags: I - inactive
  #   ADDRESS
  0   10.0.0.1
[admin@MikroTik] routing rip>
```

Routes

Home menu level: ***/routing rip route***

Property Description

dst-address (*read-only: IP address/mask*) - network address and netmask of destination

gateway (*read-only: IP address*) - last gateway on the route to destination

metric (*read-only: integer*) - distance vector length to the destination network

from (*IP address*) - specifies the IP address of the router from which the route was received

Notes

This list shows routes learned by all dynamic routing protocols (RIP, OSPF and BGP)

Example

To view the list of the routes:

```
[admin@MikroTik] routing rip route> print
Flags: S - static, R - rip, O - ospf, C - connect, B - bgp
  0 O dst-address=0.0.0.0/32 gateway=10.7.1.254 metric=1 from=0.0.0.0

...

 33 R dst-address=159.148.10.104/29 gateway=10.6.1.1 metric=2 from=10.6.1.1

 34 R dst-address=159.148.10.112/28 gateway=10.6.1.1 metric=2 from=10.6.1.1

[admin@MikroTik] routing rip route>
```

Application Examples

Example

Let us consider an example of routing information exchange between MikroTik router, a Cisco router and the ISP (also MikroTik) routers:
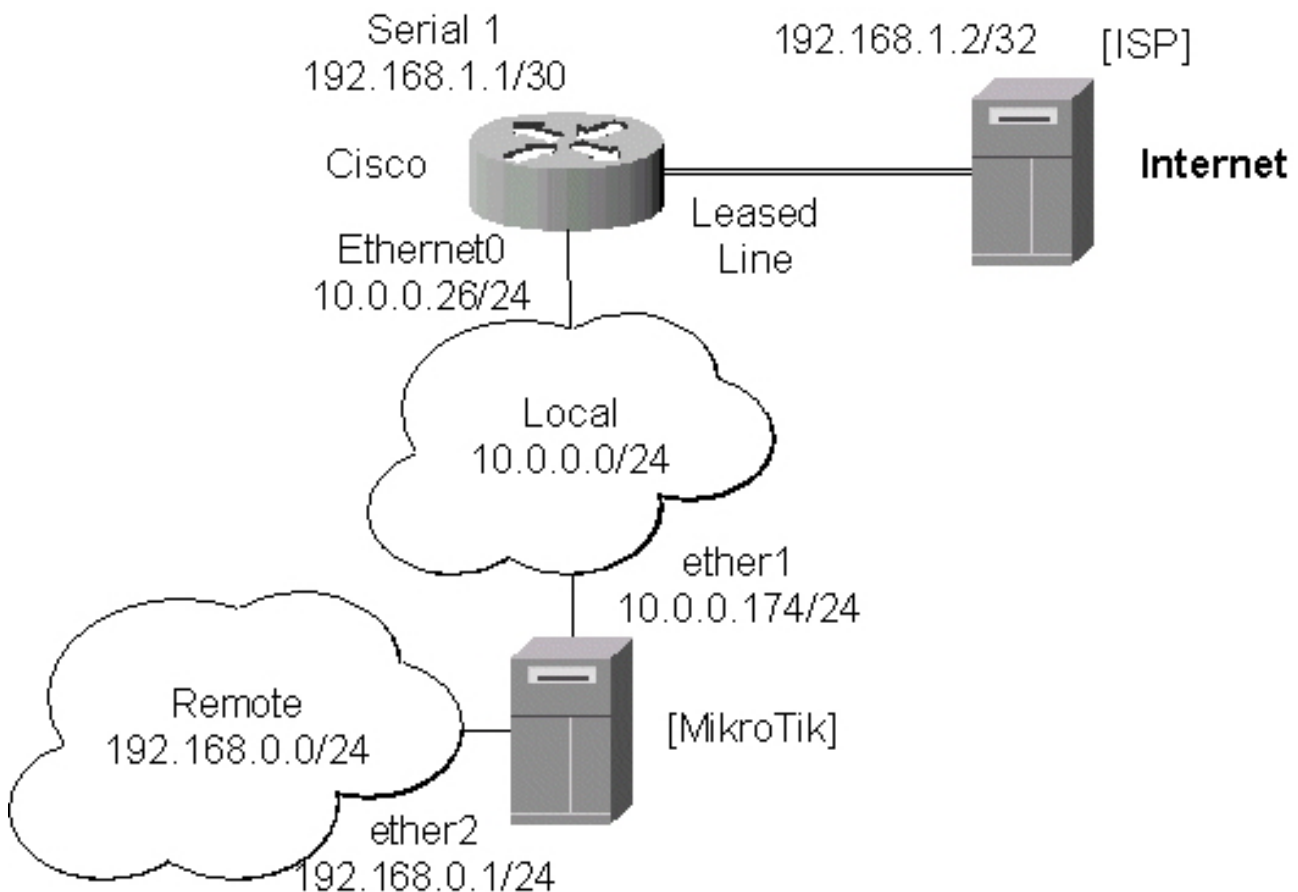
- MikroTik Router Configuration

```
[admin@MikroTik] > interface print
Flags: X - disabled, D - dynamic, R - running
  #    NAME                   TYPE             MTU
```

```
   0  R ether1                 ether          1500
   1  R ether2                 ether          1500
[admin@MikroTik] > ip address print
Flags: X - disabled, I - invalid, D - dynamic
   #   ADDRESS            NETWORK         BROADCAST        INTERFACE
   0   10.0.0.174/24      10.0.0.174      10.0.0.255       ether1
   1   192.168.0.1/24     192.168.0.0     192.168.0.255    ether2
[admin@MikroTik] > ip route print
Flags: X - disabled, I - invalid, D - dynamic, J - rejected,
C - connect, S - static, R - rip, O - ospf, B - bgp
     #    DST-ADDRESS        G GATEWAY         DISTANCE INTERFACE
     0 DC 192.168.0.0/24     r 0.0.0.0         0        ether2
     1 DC 10.0.0.0/24        r 0.0.0.0         0        ether1
[admin@MikroTik] >
```

Note, that no default route has been configured. The route will be obtained using the RIP. The necessary configuration of the RIP general settings is as follows:

```
[admin@MikroTik] routing rip> set redistribute-connected=yes
[admin@MikroTik] routing rip> print
         redistribute-static: no
      redistribute-connected: yes
           redistribute-ospf: no
            redistribute-bgp: no
               metric-static: 1
            metric-connected: 1
                 metric-ospf: 1
                  metric-bgp: 1
                update-timer: 30s
               timeout-timer: 3m
               garbage-timer: 2m

[admin@MikroTik] routing rip>
```

The minimum required configuration of RIP interface is just enabling the network associated with the ether1 interface:

```
[admin@MikroTik] routing rip network> add address=10.0.0.0/2
[admin@MikroTik] routing rip network> print
  # ADDRESS
  0 10.0.0.0/24

[admin@MikroTik] routing rip network>
```

Note, that there is no need to run RIP on the ether2, as no propagation of RIP information is required into the Remote network in this example. The routes obtained by RIP can be viewed in the /routing rip route menu:

```
[admin@MikroTik] routing rip> route print
Flags: S - static, R - rip, O - ospf, C - connect, B - bgp
  0 R dst-address=0.0.0.0/0 gateway=10.0.0.26 metric=2 from=10.0.0.26

  1 C dst-address=10.0.0.0/24 gateway=0.0.0.0 metric=1 from=0.0.0.0

  2 C dst-address=192.168.0.0/24 gateway=0.0.0.0 metric=1 from=0.0.0.0

  3 R dst-address=192.168.1.0/24 gateway=10.0.0.26 metric=1 from=10.0.0.26

  4 R dst-address=192.168.3.0/24 gateway=10.0.0.26 metric=1 from=10.0.0.26

[admin@MikroTik] routing rip>
```

The regular routing table is:

```
[MikroTik] routing rip> /ip route print
Flags: X - disabled, I - invalid, D - dynamic, J - rejected,
C - connect, S - static, R - rip, O - ospf, B - bgp
     #    DST-ADDRESS        G GATEWAY         DISTANCE INTERFACE
     0  R 0.0.0.0/0          r 10.0.0.26       120      ether1
     1  R 192.168.3.0/24     r 10.0.0.26       120      ether1
     2  R 192.168.1.0/24     r 10.0.0.26       120      ether1
     3 DC 192.168.0.0/24     r 0.0.0.0         0        ether2
     4 DC 10.0.0.0/24        r 0.0.0.0         0        ether1
```

```
[admin@MikroTik] routing rip>
```

- Cisco Router Configuration

```
Cisco#show running-config
...
interface Ethernet0
 ip address 10.0.0.26 255.255.255.0
 no ip directed-broadcast
!
interface Serial1
 ip address 192.168.1.1 255.255.255.252
 ip directed-broadcast
!
router rip
 version 2
 redistribute connected
 redistribute static
 network 10.0.0.0
 network 192.168.1.0
!
ip classless
!
...
```

The routing table of the Cisco router is:

```
Cisco#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, * - candidate default
       U - per-user static route, o - ODR

Gateway of last resort is 192.168.1.2 to network 0.0.0.0

     10.0.0.0/24 is subnetted, 1 subnets
C       10.0.0.0 is directly connected, Ethernet0
R    192.168.0.0/24 [120/1] via 10.0.0.174, 00:00:19, Ethernet0
     192.168.1.0/30 is subnetted, 1 subnets
C       192.168.1.0 is directly connected, Serial1
R    192.168.3.0/24 [120/1] via 192.168.1.2, 00:00:05, Serial1
R*   0.0.0.0/0 [120/1] via 192.168.1.2, 00:00:05, Serial1
Cisco#
```

As we can see, the Cisco router has learned RIP routes both from the MikroTik router (192.168.0.0/24), and from the ISP router (0.0.0.0/0 and 192.168.3.0/24).