Chapter 17
RIP Configuration Guidelines

To configure Routing Information Protocol (RIP), you include statements at the [edit protocols rip] hierarchy level of the configuration. For routing instances, include the statements at the [edit routing-options *routing-instance-name* protocols rip] hierarchy level. You can include the following statements in the configuration:

```
protocols {
    rip {
        authentication-key password;
        authentication-type type;
        (check-zero | no-check-zero);
        graceful-restart {
            disable;
            restart-time seconds;
        }
        holddown seconds;
        import [policy-names];
        message-size number;
        metric-in metric;
        receive receive-options;
        rib-group group-name;
        send send-options;
        traceoptions {
            file name <replace> <size size> <files number> <no-stamp>
                <(world-readable | no-world-readable)>;
            flag flag <flag-modifier> <disable>;
        }
        group group-name {
            export [policy-names];
            metric-out metric
            preference number;
            neighbor neighbor-name {
                authentication-key password;
                authentication-type type;
                (check-zero | no-check-zero);
                import [policy-names];
                message-size number;
                metric-in metric;
                metric-out metric;
                receive receive-options;
                send send-options;
            }
        }
    }
}
```

By default, RIP is disabled.

To have a router exchange routes with other routers, you must configure RIP groups and neighbors. RIP routes received from routers not configured as RIP neighbors are ignored. Likewise, RIP routes are advertised only to routers configured as RIP neighbors.

This chapter discusses the following topics:

For a configuration example, see “Example: Configure RIP” on page 300.

Minimum RIP Configuration

For a router to accept RIP routes, you must include at least the rip, group, and neighbor statements. Routes received from routers that are not configured as neighbors are ignored. All other RIP configuration statements are optional. This minimum configuration defines one neighbor. Include one neighbor statement for each interface on which you want to receive routes. The local router imports all routes by default from this neighbor and does not advertise routes. The router can receive both Version 1 and Version 2 update messages, with 25 route entries per message. For routing instances, include the statements at the [edit routing-options *routing-instance-name* protocols rip] hierarchy level.

```
[edit]
protocols {
    rip {
        group group-name {
            neighbor interface-name {
            }
        }
    }
}
```

When you configure RIP on an interface, you must also configure family inet at the [edit interfaces *interface-name* unit *logical-unit-number*] hierarchy level. For more information about the family inet statement, see the *JUNOS Internet Softw are Configur ation Guide: Netw ork Interfaces and Class of Service* .

Define RIP Global Properties

To define RIP global properties, which apply to all RIP neighbors, include one or more of the following statements at the [edit protocols rip] hierarchy level (for routing instances, include the statements at the [edit routing-options *routing-instance-name* protocols rip] hierarchy level). These statements are explained in separate sections.

```
[edit protocols rip]
authentication-key password;
authentication-type type;
(check-zero | no-check-zero);
import [policy-names];
message-size number;
metric-in metric;
receive receive-options;
rib-group group-name;
send send-options;
```

Define RIP Neighbor Properties

To define neighbor-specific properties, include one or more of the following statements at [edit protocols rip group *group-name*] hierarchy level. The statements are explained in separate sections.

```
[edit protocols rip group group-name]
neighbor neighbor-name {
    authentication-key password;
    authentication-type type;
    (check-zero | no-check-zero);
    import [policy-names];
    message-size number;
    metric-in metric;
    receive receive-options;
    send send-options;
}
```

Configure Authentication

You can configure the router to authenticate RIP route queries. By default, authentication is disabled. You can use the following authentication method:

Simple authentication—Uses a text password that is included in the transmitted packet. The receiving router uses an authentication key (password) to verify the packet.

MD5 authentication—Creates an encoded checksum that is included in the transmitted packet. The receiving router uses an authentication key (password) to verify the packet's MD5 checksum.

To enable authentication and specify an authentication method and password, include the authentication-key and authentication-type statements:

```
authentication-key password;
authentication-type type;
```

The password can be up to 16 contiguous characters and can include any ASCII strings.

To configure authentication globally for all RIP neighbors, include these statements at the [edit protocols rip] hierarchy level. To configure it for an individual neighbor, include the statements at the [edit protocols rip group *group-name interface-name*] hierarchy level (for routing instances, include the statements at the [edit routing-options *routing-instance-name* protocols rip group *group-name interface-name*] hierarchy level).

Modify the Incoming Metric

By default, RIP imports routes from the neighbors configured with the neighbor statement. These routes include those learned from RIP as well as those learned from other protocols. By default, routes that RIP imports from its neighbors have a metric of 1 added to the current route metric.

To change the default metric to be added to incoming routes, include the metric-in statement:

```
metric-in metric;
```

metric can be a value from 1 through 16.

To configure the incoming metric globally for all RIP neighbors, include the metric statement at the [edit protocols rip] hierarchy level). To configure it for an individual neighbor, include the statement at the [edit protocols rip group *group-name* neighbor *neighbor-name*] hierarchy level (for routing instances, include the statements at the [edit routing-options *routing-instance-name* protocols rip group *group-name* neighbor *neighbor-name*] hierarchy level). For routing instances, include the statements at the [edit routing-instances routing-instance-name protocols rip], [edit routing-options *routing-instance-name* protocols rip group *group-name* neighbor *neighbor-name*] *routing-instance-name* protocols rip], [edit protocols rip group *group-name* neighbor *neighbor-name*], and [edit routing-options *routing-instance-name* protocols rip group *group-name* neighbor *neighbor-name*] hierarchy level).

Configure the Holddown Timer

When RIP detects a route with a high metric associated, the router waits for a period of time before making any updates into the routing table. This minimizes the effects of route-flapping to the routing table. The period of time that RIP waits is the holddown timer.

To configure the holddown timer for RIP, include the holddown statement:

```
holddown seconds;
```

seconds can be a value from 10 through 180. The default value is 180 seconds.

To configure the holddown timer globally for all RIP neighbors, include the holddown statement at the [edit protocols rip] hierarchy level. For routing instances, include the statements at the [edit routing-instances routing-instance-name protocols rip].

Configure the Number of Route Entries in an Update Message

By default, RIP includes 25 route entries in each update message. To change the number of route entries in an update message, include the message-size statement:

```
message-size number;
```

To configure the number of route entries globally for all RIP neighbors, include the message-size statement at the [edit protocols rip] hierarchy level). To configure it for an individual neighbor, include the statement at the [edit protocols rip group *group-name* neighbor *address*] hierarchy level. For routing instances, include the statements at the [edit routing-options *routing-instance-name* protocols rip], [edit routing-options *routing-instance-name* protocols rip group *group-name* neighbor *neighbor-name*] hierarchy level).

To ensure interoperability with routers from other vendors, do not change the default number of route entries in a RIP update message.

Accept Packets Whose Reserved Fields Are Nonzero

Some of the reserved fields in RIP Version 1 packets must be zero, while in RIP Version 2 packets most of these reserved fields can contain nonzero values. By default, RIP discards Version 1 packets that have nonzero values in the reserved fields and Version 2 packets that have nonzero values in the fields that must be zero. This default behavior implements the RIP Version 1 and Version 2 specifications.

If you find that you are receiving RIP Version 1 packets with nonzero values in the reserved fields or RIP Version 2 packets with nonzero values in the fields that must be zero, you can configure RIP to receive these packets in spite of the fact that they are being sent in violation of the specifications in RFC 1058 and RFC 2453. To receive packets whose reserved fields are nonzero, include the no-check-zero statement:

```
no-check-zero;
```

To configure this globally for all RIP neighbors, include the no-check-zero statement at the [edit protocols rip] hierarchy level. To configure it for an individual neighbor, include the statement at the [edit protocols rip group *group-name* neighbor *neighbor-name*] hierarchy level.

Configure Update Messages

You can configure whether the RIP update messages conform to RIP Version 1 only, to RIP Version 2 only, or to both versions. You can also disable the sending or receiving of update messages. To configure the sending and receiving of update messages, include the receive and send statements:

```
receive receive-options;
send send-options;
```

To configure the update messages globally for all RIP neighbors, include the receive and send statements at the [edit protocols rip] hierarchy level). To configure it for an individual neighbor, include the statements at the [edit protocols rip group *group-name* neighbor *neighbor-name*] hierarchy level (for routing instances, include the statements at the [edit routing-instances routing-instance-name protocols rip] hierarchy level).

Configure Routing Table Groups

You can install routes learned through RIP into multiple routing tables by configuring a routing table group. RIP routes are installed into each routing table that belongs to that routing table group. To configure a routing table group for RIP routes, include the rib-group statement:

```
rib-group group-name;
```

Apply Import Policy

To filter routes being imported by the local router from its neighbors, include the import statement and list the names of one or more policies to be evaluated. If you specify more than one policy, they are evaluated in order (first to last) and the first matching policy is applied to the route. If no match is found, the local router does not import any routes.

```
[edit protocols rip]
import [ policy-names ];
```

To configure import policy globally for all RIP neighbors, include the import statement at the [edit protocols rip] hierarchy level). To configure it for an individual neighbor, include the statement at the [edit protocols rip group *group-name* neighbor *neighbor-name*] hierarchy level (for routing instances, include the statements at the [edit routing-instances routing-instance-name protocols rip group *group-name* neighbor *neighbor-name*] hierarchy level).

For more information about creating policies, see the *JUNOS Internet Software Configuration Guide: Policy Framework*.

Configure Group-Specific Properties

You can group together neighbors that share the same export policy and export metric defaults. You configure group-specific RIP properties by including the group statement at the [edit protocols rip] hierarchy level. Each group must contain at least one neighbor. You should create a group for every export policy you have. To configure neighbors, see "Define RIP Global Properties" on page 293.

```
[edit protocols rip]
group group-name {
    export [policy-names];
    preference number;
    metric-out metric;
    neighbor neighbor-options;
}
```

This section discusses the following tasks:

Apply Export Policy

By default, RIP does not export routes it has learned to its neighbors. To have RIP export routes, apply one or more export policies. To apply export policies and to filter routes being exported from the local router to its neighbors, include the export statement and list the name of the policy to be evaluated.

```
[edit protocols rip group group-name]
export [policy-names];
```

To configure export policy globally for all RIP neighbors, include the export statement at the [edit protocols rip] hierarchy level. To configure it for an individual neighbor, include the statement at the [edit protocols rip group *group-name* neighbor *neighbor-name*] hierarchy level.

You can define one or more export policies. If no routes match the policies, the local router does not export any routes to its neighbors. Export policies override any metric values determined through calculations involving the metric-in and metric-out values.

For more information about creating policies, see the *JUNOS Internet Software Configuration Guide: Policy Framework*.

Control Route Preference

By default, the JUNOS software assigns a preference of 100 to routes that originate from RIP. When the JUNOS software determines a route's preference to become the active route, the software selects the route with the lowest preference and installs this route into the forwarding table. (For more information about preferences, see "Route Preferences" on page 6.)

To modify the default RIP preference value, include the preference statement at the [edit protocols rip group *group-name*] hierarchy level (for routing instances, include the statement at the [edit routing-options *routing-instance-name* protocols rip group *group-name*] hierarchy level):

```
[edit protocols rip group group-name]
preference preference;
```

preference can be a value from 0 to 4294967295 (2^{32} –1).

Modify the Outgoing Metric

If you have included the export statement, RIP exports routes it has learned to the neighbors configured with the neighbor statement.

If a route being exported was learned from a member of the same RIP group, the metric associated with that route (unless modified by an export policy) is the normal RIP metric. For example, a RIP route with a metric of 5 learned from a neighbor configured with a metric-in value of 2 is advertised with a combined metric of 7 when advertised to RIP neighbors in the same group. However, if this route was learned from a RIP neighbor in a different group or from a different protocol, the route is advertised with the metric value configured for that group with the metric-out statement. The default value for metric-out is 1.

To increase the metric for routes advertised outside a group, include the metric-out statement at the [edit protocols rip group *group-name*] hierarchy level (for routing instances, include the statement at the [edit routing-options *routing-instance-name* protocols rip group *group-name*] hierarchy level):

```
[edit protocols rip group group-name]
metric-out metric;
```

Configure Graceful Restart

Graceful restart is disabled by default. You can globally enable graceful restart for all routing protocols under the [edit routing-options] hierarchy level.

You can configure graceful restart parameters specifically for RIP. To do this, include the graceful-restart statement at the [edit protocols rip] hierarchy level:

```
[edit protocols rip]
graceful-restart {
   disable;
   restart-time seconds;
}
```

To disable graceful restart for RIP, specify the disable statement. To configure a time period for the restart to finish, specify the restart-time statement.

Trace RIP Protocol Traffic

To trace RIP protocol traffic, you can specify options in the global traceoptions statement at the [edit routing-options] hierarchy level, and you can specify RIP-specific options by including the traceoptions statement at the [edit protocols rip] hierarchy level (for routing instances, include the statement at the [edit routing-options *routing-instance-name* protocols rip] hierarchy level):

```
[edit protocols rip]
traceoptions {
   file name <replace> <size size> <files number> <no-stamp>
      <(world-readable | no-world-readable)>;
   flag flag <flag-modifier> <disable>;
}
```

You can specify the following RIP-specific options in the RIP traceoptions statement:

auth—Trace RIP authentication.

error—Trace RIP errors.

expiration—Trace RIP route expiration processing.

holddown—Trace RIP hold-down processing.

packets—Trace all RIP packets.

request—Trace RIP information packets.

trigger—Trace RIP triggered updates.

update—Trace RIP update packets.

For general information about tracing and global tracing options, see “Trace Global Routing Protocol Operations” on page 88.

Example: Trace RIP Protocol Traffic

Trace only unusual or abnormal operations to /var/log/routing-log, and trace detailed information about all RIP packets to /var/log/rip-log:

```
[edit]
routing-options {
   traceoptions {
      file /var/log/routing-log;
      flag errors;
   }
}
protocols {
   rip {
      traceoptions {
         file /var/log/rip-log;
         flag packets detail;
      }
   }
}
```

Example: Configure RIP

Configure RIP (for routing instances, include the statements at the [edit routing-options *routing-instance-name* protocols rip] hierarchy level):

```
[edit policy-options]
policy-statement redist-direct {
   from protocol direct;
   then accept;
}
[edit]
interfaces {
   so-0/0/0 {
      unit 0 {
         inet;
      }
   }
   at-1/1/0 {
      unit 0 {
         inet;
      }
   }
   at-1/1/0 {
      unit 42{
         inet;
      }
   }
   at-1/1/1 {
      unit 42 {
         inet;
      }
   }
}
policy-statement redist-direct {
   from protocol direct;
   then accept;
}
[edit protocols rip]
metric-in 3;
receive both;
group wan {
   metric-out 2;
   export redist-direct;
   neighbor so-0/0/0.0;
   neighbor at-1/1/0.0;
   neighbor at-1/1/0.42;
   neighbor at-1/1/1.42 {
      receive version-2;
   }
}
group local {
   neighbor ge-2/3/0.0 {
      metric-in 1;
      send broadcast;
   }
}
```