

# RIP (Routing Information Protocol)

## FEATURE OVERVIEW AND CONFIGURATION GUIDE

### Introduction

This guide contains basic RIP configuration examples. To see details on the RIP commands used in these examples, or to see the outputs of the validation commands, refer to the RIP commands chapter in the software reference.

To use this feature, you may need a Premium license. Premium licenses are not available with software version 5.4.4A. Please contact your authorized Allied Telesis representative for more information.

### Products and software version that apply to this guide

This guide applies to AlliedWare Plus™ products that support RIP, running version 5.4.4 or later:

To see whether your product supports RIP, see the following documents:

- The [product's Datasheet](#)
- The [AlliedWare Plus Datasheet](#)
- The product's [Command Reference](#)

These documents are available from the above links on our website at [alliedtelesis.com](http://alliedtelesis.com).

Most features described in this document are supported from AlliedWare Plus software version 5.4.4. or later. From software version 5.4.8, route summarization for RIPv2 is supported.

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## Enabling RIP

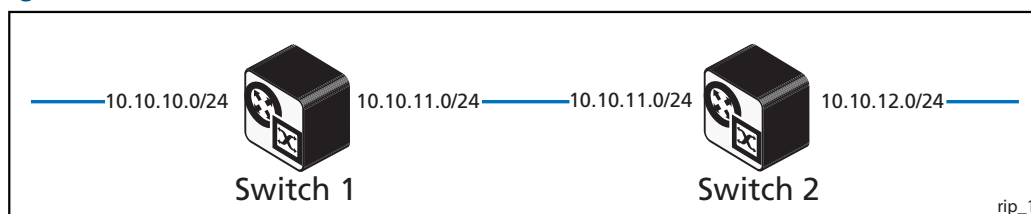
This example shows the minimum configuration required for enabling two devices to exchange routing information using RIP. The routing devices in this example are Allied Telesis managed Layer 3 Switches. **Switch 1** and **Switch 2** are two neighbors connecting to network 10.10.11.0/24. Switch 1 and Switch 2 are also connected to networks 10.10.10.0/24 and 10.10.12.0/24 respectively. This example assumes that the devices have already been configured with IP interfaces in those subnets.

To enable RIP, first define the RIP routing process then associate a network with the routing process.

Associating a network with the process has the effect that:

1. The network's connected route is imported into the RIP route table, and is then available to be advertised by RIP.
2. Any interfaces whose IP address falls within the address range covered by the network become active RIP interfaces (unless explicitly configured not to).

**Figure 1: Associate a network with RIP**



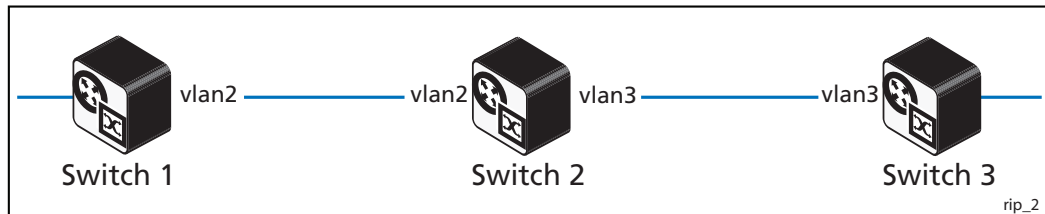
### Switch 1

<code>awplus# configure terminal</code>	Enter the Global Configuration mode.
<code>awplus (config) # router rip</code>	Define a RIP routing process and enter the Router Configuration mode.
<code>awplus (config-router) # network 10.10.10.0/24</code>	Associate network 10.10.10.0/24 with the RIP process.
<code>awplus# network 10.10.11.0/24</code>	Associate network 10.10.11.0/24 with the RIP process.
<code>awplus# configure terminal</code>	Enter the Global Configuration mode.
<code>awplus (config) # router rip</code>	Define a RIP routing process and enter the Router Configuration mode.
<code>awplus (config-router) # network 10.10.11.0/24</code>	Associate networks with the RIP process
<code>awplus (config-router) # network 10.10.12.0/24</code>	Associate networks with the RIP process

## Specifying the RIP Version

Configure a router to receive and send specific versions of RIP packets on a VLAN interface. The routing devices in this example are Allied Telesis managed Layer 3 Switches. In this example, Switch 2 is configured to receive and send RIP version 1 and version 2 information on both **vlan2** and **vlan3** interfaces.

**Figure 2: Specify a RIP version**



### Switch 2

<code>awplus#</code>	Enter the Global Configuration mode.
<code>configure terminal</code>	
<code>awplus(config)#</code>	Enable the RIP routing process.
<code>router rip</code>	
<code>awplus(config-router)#</code>	Return to the Global Configuration mode
<code>exit</code>	
<code>awplus(config)#</code>	Specify vlan2 as an interface you want to configure.
<code>interface vlan2</code>	
<code>awplus(config-if)#</code>	Allow sending RIP version 1 and version 2 packets out of this interface.
<code>ip rip send version 1 2</code>	
<code>awplus(config-if)#</code>	Allow receiving of RIP version 1 and version 2 packets from the vlan2 interface.
<code>ip rip receive version 1 2</code>	
<code>awplus(config-if)#</code>	Exit the Interface mode and return to Global Configuration mode to configure the next interface.
<code>exit</code>	
<code>awplus(config)#</code>	Specify interface vlan3 as the interface you want to configure.
<code>interface vlan3</code>	
<code>awplus(config-if)#</code>	Allow sending RIP version 1 and version 2 packets out of this interface.
<code>ip rip send version 1 2</code>	
<code>awplus(config-if)#</code>	Allow receiving of RIP version 1 and version 2 packets from the vlan3 interface.
<code>ip rip receive version 1 2</code>	

## RIPv2 Authentication (Single Key)

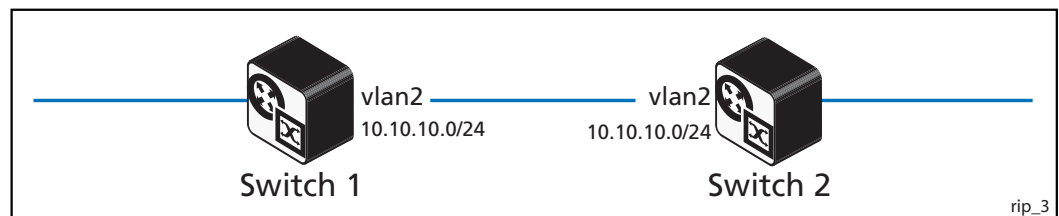
AlliedWare Plus provides single or multiple key authentication for RIPv2. The routing devices in this example are Allied Telesis managed Layer 3 Switches using single key authentication.

Switch 1 and Switch 2 are running RIP and exchange routing updates. To configure single key authentication on Switch 1:

- specify an interface and then define a key or password for that interface.
- next, specify an authentication mode.

Any RIP packet received on this specified interface should have the same string as the password. For an exchange of updates between Switch 1 and Switch 2, define the same password and authentication mode on Switch 2.

**Figure 3: Configuring RIPv2 authentication - single key**



### Switch 1

<code>awplus#</code> <code>configure terminal</code>	Enter the Configure mode.
<code>awplus (config) #</code> <code>router rip</code>	Define a RIP routing process and enter the Router Configuration mode.
<code>awplus (config-router) #</code> <code>network 10.10.10.0/24</code>	Associate network 10.10.10.0/24 with the RIP process.
<code>awplus (config-router) #</code> <code>redistribute connected</code>	Enable redistributing from connected routes.
<code>awplus (config-router) #</code> <code>exit</code>	Exit the Router Configuration mode and return to the Configure mode.
<code>awplus (config) #</code> <code>interface vlan2</code>	Specify the VLAN interface (vlan2) for authentication.
<code>awplus (config-if) #</code> <code>ip rip authentication string</code> <code>Secret</code>	Specify the authentication string (Secret) for this interface.
<code>awplus (config-if) #</code> <code>ip rip authentication mode md5</code>	Specify the authentication mode to be MD5.

## Switch 2

<code>awplus# configure terminal</code>	Enter the Global Configuration mode.
<code>awplus (config) # router rip</code>	Define a RIP routing process and enter the Router Configuration mode.
<code>awplus (config-router) # network 10.10.10.0/24</code>	Associate network 10.10.10.0/24 with the RIP process.
<code>awplus (config-router) # redistribute connected</code>	Enable redistributing from connected routes.
<code>awplus (config-router) # exit</code>	Exit the Router Configuration mode and return to the Global Configuration mode.
<code>awplus (config) # interface vlan2</code>	Specify the VLAN interface (vlan2) for authentication.
<code>awplus (config-if) # ip rip authentication string Secret</code>	Specify the authentication string (Secret) on this interface.
<code>awplus (config-if) # ip rip authentication mode md5</code>	Specify the authentication mode to be md5.

## RIPv2 Text Authentication (Multiple Keys)

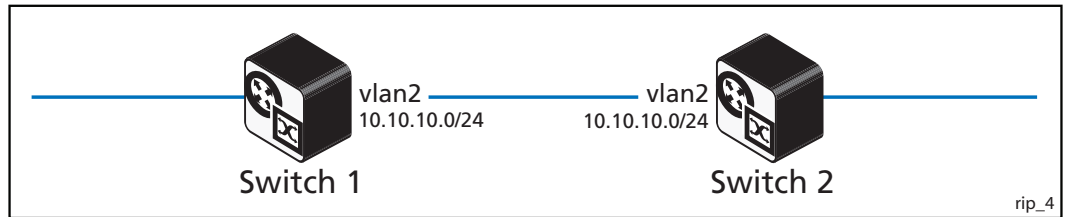
This example illustrates text authentication of the routing information exchange process for RIP using multiple keys. The routing devices in this example are Allied Telesis managed Layer 3 Switches. Switch 1 and Switch 2 are running RIP and exchanging routing updates.

To configure authentication on Switch 1:

- define a key chain, specify keys in the key chain and then define the authentication string or passwords to be used by the keys.
- set the time period during which it is valid to receive or send the authentication key by specifying the accept and send lifetimes.
- specify the key chain (or the set of keys) that will be used for authentication on each interface and also the authentication mode to be used.

Switch 1 accepts all packets that contain any key string that matches one of the key strings included in the specified key chain (within the accept lifetime) on that interface. The key ID is not considered for matching. For additional security, the accept lifetime and send lifetime are configured such that every fifth day the key ID and key string changes. To maintain continuity, the accept lifetimes should be configured to overlap. This will accommodate inexact time synchronization on machines. However, the send lifetime does not need to overlap and we recommend not configuring overlapping send lifetimes.

Figure 4: Configuring RIPv2 text authentication - multiple key



## Switch 1

<code>awplus#</code>	Enter the Global Configuration mode.
<code>configure terminal</code>	
<code>awplus (config) #</code>	Define a RIP routing process and enter the Router Configuration mode.
<code>router rip</code>	
<code>awplus (config-router) #</code>	Associate network 10.10.10.0/24 with the RIP process.
<code>network 10.10.10.0/24</code>	
<code>awplus (config-router) #</code>	Enable redistributing of connected routes.
<code>redistribute connected</code>	
<code>awplus (config-router) #</code>	Exit the Router Configuration mode and return to the Global Configuration mode.
<code>exit</code>	
<code>awplus (config) #</code>	Enter the key chain management mode to add keys to the key chain SUN.
<code>key chain SUN</code>	
<code>awplus (config-keychain) #</code>	Add authentication key ID (10) to the key chain SUN.
<code>key 10</code>	
<code>awplus (config-keychain-key) #</code>	Specify a password (Secret) to be used by the specified key.
<code>key-string Secret</code>	
<code>awplus (config-keychain-key) #</code>	Specify the time period during which authentication key string <b>Secret</b> can be received. In this case, key string <b>Secret</b> can be received from noon of March 2 to 2 pm March 7, 2007.
<code>accept-lifetime 12:00:00 Mar 2 2007 14:00:00 Mar 7 2007</code>	
<code>awplus (config-keychain-key) #</code>	Specify the time period during which authentication key string <b>Secret</b> can be send. In this case, key string <b>Secret</b> can be received from noon of March 2 to noon of March 7, 2007.
<code>send-lifetime 12:00:00 Mar 2 2007 12:00:00 Mar 7 2007</code>	
<code>awplus (config-keychain-key) #</code>	Exit the keychain-key mode and return to keychain mode.
<code>exit</code>	
<code>awplus (config-keychain) #</code>	Add another authentication key (20) to the key chain <b>SUN</b> .
<code>key 20</code>	
<code>awplus (config-keychain-key) #</code>	Specify a password ( <b>Earth</b> ) to be used by the specified key.
<code>key-string Earth</code>	
<code>awplus (config-keychain-key) #</code>	Specify the time period during which authentication key string <b>Earth</b> can be received. In this case, key string <b>Earth</b> can be received from noon of March 7 to 2 pm March 12, 2007.
<code>accept-lifetime 12:00:00 Mar 7 2007 14:00:00 Mar 12 2007</code>	

## Switch 1 (Continued)

<pre>awplus (config-keychain-key) # send-lifetime 12:00:00 Mar 7 2007 12:00:00 Mar 12 2007</pre>	Specify the time period during which authentication key string <b>Earth</b> can be sent. In this case, key string <b>Secret</b> can be received from noon of March 7 to noon of March 12, 2007.
<pre>awplus (config-keychain-key) # end</pre>	Enter Privileged Exec mode.
<pre>awplus# configure terminal</pre>	Enter the Global Configuration mode.
<pre>awplus (config) # interface vlan2</pre>	Specify VLAN interface (vlan2) as the interface you want to configure on Switch 1.
<pre>awplus (config-if) # ip rip authentication key- chain SUN</pre>	Enable RIPv2 authentication on the <b>vlan2</b> interface and specify the key chain <b>SUN</b> to be used for authentication.
<pre>awplus (config-if) # ip rip authentication mode text</pre>	Specify text authentication mode to be used for RIP packets. This step is optional, as text is the default mode.

## Switch 2

<pre>awplus# configure terminal</pre>	Enter the Global Configuration mode.
<pre>awplus (config) # router rip</pre>	Define a RIP routing process and enter the Router Configuration mode.
<pre>awplus (config-router) # network 10.10.10.0/24</pre>	Associate network 10.10.10.0/24 with the RIP process.
<pre>awplus (config-router) # redistribute connected</pre>	Enable redistributing from connected routes.
<pre>awplus (config-router) # exit</pre>	Exit the Router Configuration mode and return to the Global Configuration mode.
<pre>awplus (config) # key chain MOON</pre>	Enter the key chain management mode to add keys to the key chain <b>MOON</b> .
<pre>awplus (config-keychain) # key 30</pre>	Add authentication key ID ( <b>30</b> ) to the key chain <b>MOON</b> .
<pre>awplus (config-keychain-key) # key-string Secret</pre>	Specify a password ( <b>Secret</b> ) to be used by the specified key.
<pre>awplus (config-keychain-key) # accept-lifetime 12:00:00 Mar 2 2007 14:00:00 Mar 7 2007</pre>	Specify the time period during which authentication key string <b>Secret</b> can be received. In this case, key string <b>Secret</b> can be received from noon of March 2 to 2 pm March 7, 2007.



## Switch 2 (Continued)

<pre>awplus (config-keychain-key) # send-lifetime 12:00:00 Mar 2 2007 12:00:00 Mar 7 2007</pre>	Specify the time period during which authentication key string <b>Secret</b> can be send. In this case, key string <b>Secret</b> can be received from noon of March 2 to noon of March 7, 2007.
<pre>awplus (config-keychain) # key 40</pre>	Add another authentication key ( <b>40</b> ) to the key chain <b>MOON</b> .
<pre>awplus (config-keychain-key) # key-string Earth</pre>	Specify a password ( <b>Earth</b> ) to be used by the specified key.
<pre>awplus (config-keychain-key) # accept-lifetime 12:00:00 Mar 7 2007 14:00:00 Mar 12 2007</pre>	Specify the time period during which authentication key string <b>Earth</b> can be received. In this case, key string <b>Earth</b> can be received from noon of March 7 to 2 pm March 12, 2007.
<pre>awplus (config-keychain-key) # send-lifetime 12:00:00 Mar 7 2007 12:00:00 Mar 12 2007</pre>	Specify the time period during which authentication key string <b>Earth</b> can be sent. In this case, key string <b>Secret</b> can be received from noon of March 7 to noon of March 12, 2007.
<pre>awplus (config-keychain-key) # end</pre>	Enter Privileged Exec mode.
<pre>awplus# configure terminal</pre>	Enter the Global Configuration mode.
<pre>awplus (config) # interface vlan2</pre>	Specify the VLAN interface that you want to configure on Switch 2.
<pre>awplus (config-if) # ip rip authentication key- chain MOON</pre>	Enable RIPv2 authentication on the vlan2 interface, and specify the key chain MOON to be used for authentication.
<pre>awplus (config-if) # ip rip authentication mode text</pre>	Specify authentication mode to be used for RIP packets. This step is optional, as text is the default mode.

## RIPv2 MD5 Authentication (Multiple Keys)

This example illustrates the MD5 authentication of the routing information exchange process for RIP using multiple keys. The routing devices in this example are Allied Telesis managed Layer 3 Switches. Switch 1 and Switch 2 are running RIP and exchange routing updates.

To configure authentication on Switch 1:

- define a key chain, specify keys in the key chain and then define the authentication string or passwords to be used by the keys.
- set the time period during which it is valid to receive or send the authentication key by specifying the accept and send lifetimes.
- specify the key chain (or the set of keys) that will be used for authentication on the interface and the authentication mode to be used.

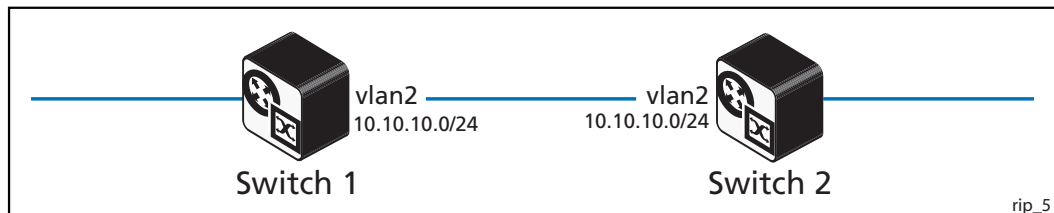
Configure Switch 2 and Switch 3 to have the same key ID and key string as Switch 1 for the time that updates need to be exchanged.

In MD5 authentication, both the key ID and key string are matched for authentication. Switch 1 will receive only packets that match both the key ID and the key string in the specified key chain (within the accept lifetime) on that interface.

In the following example, Switch 2 has the same key ID and key string as Switch 1.

For additional security, the accept lifetime and send lifetime are configured such that every fifth day the key ID and key string changes. To maintain continuity, the accept lifetimes should be configured to overlap; however, the send lifetime should not be overlapping.

**Figure 5: Configuring MD5 authentication - multiple key**



### Switch 1

<code>awplus#</code>	Enter the Global Configuration mode.
<code>configure terminal</code>	
<code>awplus (config)#</code>	Define a RIP routing process and enter the Router Configuration mode.
<code>router rip</code>	
<code>awplus (config-router)#</code>	Associate network <b>10.10.10.0/24</b> with the RIP process.
<code>network 10.10.10.0/24</code>	
<code>awplus (config-router)#</code>	Enable redistributing from connected routes.
<code>redistribute connected</code>	
<code>awplus (config-router)#</code>	Exit the Router Configuration mode and return to the Global Configuration mode.
<code>exit</code>	

## Switch 1 (Continued)

awplus (config) # key chain SUN	Enter the key chain management mode to add keys to the key chain <b>SUN</b> .
awplus (config-keychain) # key 1	Add authentication key ID ( <b>1</b> ) to the key chain <b>SUN</b> .
awplus (config-keychain-key) # key-string Secret	Specify a password ( <b>Secret</b> ) to be used by the specified key.
awplus (config-keychain-key) # accept-lifetime 12:00:00 Mar 2 2007 14:00:00 Mar 7 2007	Specify the time period during which authentication key string <b>Secret</b> can be received. In this case, key string <b>Secret</b> can be received from noon of March 2 to 2 pm March 7, 2007.
awplus (config-keychain-key) # send-lifetime 12:00:00 Mar 2 2007 12:00:00 Mar 7 2007	Specify the time period during which authentication key string <b>Secret</b> can be send. In this case, key string <b>Secret</b> can be received from noon of March 2 to noon of March 7, 2007.
awplus (config-keychain-key) # exit	Exit the <b>keychain-key</b> mode and return to <b>keychain</b> mode.
awplus (config-keychain) # key 2	Add another authentication key ( <b>2</b> ) to the key chain <b>SUN</b> .
awplus (config-keychain-key) # key-string Earth	Specify a password ( <b>Earth</b> ) to be used by the specified key.
awplus (config-keychain-key) # accept-lifetime 12:00:00 Mar 7 2007 14:00:00 Mar 12 2007	Specify the time period during which authentication key string <b>Earth</b> can be received. In this case, key string <b>Earth</b> can be received from noon of March 7 to 2 pm March 12, 2007.
awplus (config-keychain-key) # send-lifetime 12:00:00 Mar 7 2007 12:00:00 Mar 12 2007	Specify the time period during which authentication key string <b>Earth</b> can be send. In this case, key string <b>Secret</b> can be received from noon of March 7 to noon of March 12, 2007.
awplus (config-keychain-key) # end	Enter Privileged Exec mode.
awplus # configure terminal	Enter the Global Configuration mode.
awplus (config) # interface vlan2	Specify interface <b>vlan2</b> as the VLAN interface you want to configure on Switch 1.
awplus (config-if) # ip rip authentication key-chain SUN	Enable RIPv2 authentication on the <b>vlan2</b> interface and specify the key chain <b>SUN</b> to be used for authentication.
awplus (config-if) # ip rip authentication mode md5	Specify the <b>md5</b> authentication mode to be used for RIP packets.

## Switch 2

awplus# configure terminal	Enter the Global Configuration mode.
awplus (config) # router rip	Define a RIP routing process and enter the Router Configuration mode.
awplus (config-router) # network 10.10.10.0/24	Associate network 10.10.10.0/24 with the RIP process.
awplus (config-router) # redistribute connected	Enable redistributing from connected routes.
awplus (config-router) # exit	Exit the Router Configuration mode and return to the Global Configuration mode.
awplus (config) # key chain MOON	Enter the key chain management mode to add keys to the key chain <b>MOON</b> .
awplus (config-keychain) # key 1	Add authentication key ID (1) to the key chain <b>MOON</b> .
awplus (config-keychain-key) # key-string Secret	Specify a password ( <b>Secret</b> ) to be used by the specified key.
awplus (config-keychain-key) # accept-lifetime 12:00:00 Mar 2 2007 14:00:00 Mar 7 2007	Specify the time period during which authentication key string <b>Secret</b> can be received. In this case, key string <b>Secret</b> can be received from noon of March 2 to 2 pm March 7, 2007.
awplus (config-keychain-key) # send-lifetime 12:00:00 Mar 2 2007 12:00:00 Mar 7 2007	Specify the time period during which authentication key string <b>Secret</b> can be send. In this case, key string <b>Secret</b> can be received from noon of March 2 to noon of March 7, 2007.
awplus (config-keychain) # key 2	Add another authentication key (2) to the key chain <b>MOON</b> .
awplus (config-keychain-key) # key-string Earth	Specify a password ( <b>Earth</b> ) to be used by the specified key.
awplus (config-keychain-key) # accept-lifetime 12:00:00 Mar 7 2007 14:00:00 Mar 12 2007	Specify the time period during which authentication key string <b>Earth</b> can be received. In this case, key string <b>Earth</b> can be received from noon of March 7 to 2 pm March 12, 2007.
awplus (config-keychain-key) # send-lifetime 12:00:00 Mar 7 2007 12:00:00 Mar 12 2007	Specify the time period during which authentication key string <b>Earth</b> can be send. In this case, key string <b>Secret</b> can be received from noon of March 7 to noon of March 12, 2007.
awplus (config-keychain-key) # end	Enter Privileged Exec mode.
awplus# configure terminal	Enter the Global Configuration mode.

**Switch 2 (Continued)**

<code>awplus (config) # interface vlan2</code>	Specify vlan2 as the VLAN interface you want to configure on Switch 2.
<code>awplus (config-if) # ip rip authentication key- chain MOON</code>	Enable RIPv2 authentication on the <b>vlan2</b> interface and specify the key chain <b>MOON</b> to be used for authentication.
<code>awplus (config-if) # ip rip authentication mode md5</code>	Specify the md5 authentication mode to be used for RIP packets.

## Route Summarization for RIPv2

Many large networks have multiple inter-connecting devices with multiple LANs and network segment splits. When this is the case, routing tables become larger and consume large amounts of memory and processing capability. This means that routing devices will take longer to search their routing table in order to route a packet.

Route summarization is a technique that helps network administrators in reducing the size of the routing tables by advertising a single super-network that covers a range of subnets.

### Why should you use route summarization?

Route summarization for RIPv2 allows you to configure and advertise one summarized route which has a shorter prefix length to replace several matching routes which have longer prefix lengths.

Route summarization improves scalability and efficiency in large networks because it:

- eliminates the need for child routes in the RIP routing table. Child routes are any combination of the individual IP addresses contained within a summary advertisement.
- reduces the size of the routing table.
- increases router processing capability, as less CPU cycle time needs to be dedicated to route table lookups due to the smaller route table size.

### How do you configure route summarization?

You statically configure an IP summary address on a router interface. The router then advertises the summary address downstream through this interface.

This means all the routers that are downstream from the configured interface will receive only the summary route, and none of the child routes via the RIP advertisement.

As long as any of the child routes is valid, the router will propagate the summary route. But when the last child that is part of the summarized range disappears, then the router will stop advertising the summary route through the interface.

## Configuration example

In this example, we configure the summary route 10.4.0.0/16. on vlan1. The summary route 10.4.0.0/16 advertises the subnets 10.4.3.0/25, 10.4.3.128/25, 10.4.4.0/24, 10.4.5.0/24 via RIP.

The summary route has a 16 bit mask as all subnets fall within and match that shorter prefix range. If the summary-address was not configured, then by default all four routes with their class C net masks would be advertised via RIP.

Here are the commands to configure the example route summary address:

<code>awplus#</code> <code>configure terminal</code>	Enter the Global Configuration mode.
<code>awplus(config)#</code> <code>interface vlan1</code>	Enter interface mode for vlan1
<code>awplus(config-if)#</code> <code>ip summary-address rip</code> <code>10.4.0.0/16</code>	Enter the summarization command.

## RIPv2 route summarization show commands

There are two show commands that display RIPv2 route summarization configuration:

- `show ip protocols`
- `show ip rip database`

The output for these two show commands is provided below.

**Figure 6: Output from show ip protocols**

```
awplus#show ip protocols
Routing Protocol is "rip"
  Sending updates every 30 seconds with +/-5 seconds, next due in 21
seconds
  Timeout after 180 seconds, garbage collect after 120 seconds
  Outgoing update filter list for all interface is not set
  Incoming update filter list for all interface is not set
  Default redistribution metric is 1
  Redistributing:
  Default version control: send version 2, receive version 2
    Interface      Send Recv   Key-chain
  vlan1           2      2
  vlan4           2      2
  Address Summarization for RIPv2:
    10.4.0.0/16 for vlan1
  Routing for Networks:
    192.168.1.0/24
    192.168.4.0/24
    192.168.5.0/24
  Routing Information Sources:
    Gateway         Distance  Last Update  Bad Packets  Bad Routes
  192.168.1.2       120      00:00:00     0             0
  Number of routes (including connected): 4
  Distance: (default is 120)
Routing Protocol is "ospf 1"
  Redistributing:
  Routing for Networks:
    192.168.1.0/24
  Distance: (default is 110)
```

**Figure 7: output from show ip rip database**

```
awplus#show ip rip database

Codes: R - RIP, Rc - RIP connected, Rs - RIP static, Rsu - RIP summary
       C - Connected, S - Static, O - OSPF, B - BGP, * - child route

   Network          Next Hop           Metric From        If      Time
Rsu 10.4.0.0/16
R * 10.4.2.0/24     192.168.4.2        3 192.168.4.2      vlan4   02:52
R * 10.4.3.0/24     192.168.4.3        4 192.168.4.3      vlan4   02:53
R * 10.4.4.0/24     192.168.4.4        5 192.168.4.4      vlan4   02:53
R * 10.4.5.0/24     192.168.4.5        6 192.168.4.5      vlan4   02:53
R * 10.4.6.0/24     192.168.4.6        7 192.168.4.6      vlan4   02:53
R * 10.4.7.0/24     192.168.4.7        8 192.168.4.7      vlan4   02:53
R * 10.4.8.0/24     192.168.4.8        9 192.168.4.8      vlan4   02:53
R * 10.4.9.0/24     192.168.4.9       10 192.168.4.9      vlan4   02:53
R * 10.4.10.0/24    192.168.4.10      11 192.168.4.10     vlan4   02:53
Rc 192.168.1.0/24   1                   1                   vlan1
R 192.168.2.0/24   192.168.1.2        2 192.168.1.2      vlan1   02:46
Rc 192.168.4.0/24   1                   1                   vlan4
R 192.168.6.0/24   192.168.1.2        2 192.168.1.2      vlan1   02:46
awplus#
```