

Grandstream Networks, Inc.

Dynamic Routing

Routing Information Protocol (RIP) Guide



Overview

RIP (Routing Information Protocol) is one of the oldest and simplest dynamic routing protocols used in networks. It operates by periodically broadcasting the entire routing table to its neighboring routers, ensuring that all devices share a consistent view of the network topology. Using a hop-count metric, RIP determines the best path to a destination, with a maximum allowable hop count of 15, making it ideal for small to medium-sized networks.

Supported Devices

The following device series support RIP, providing robust and dynamic routing capabilities for modern network environments:

Device Type	Series
Switches	GWN78xx Layer 3 Series
Routers	GWN700x Series
Convergence Solutions	GCC601x Series, GCC602x Series

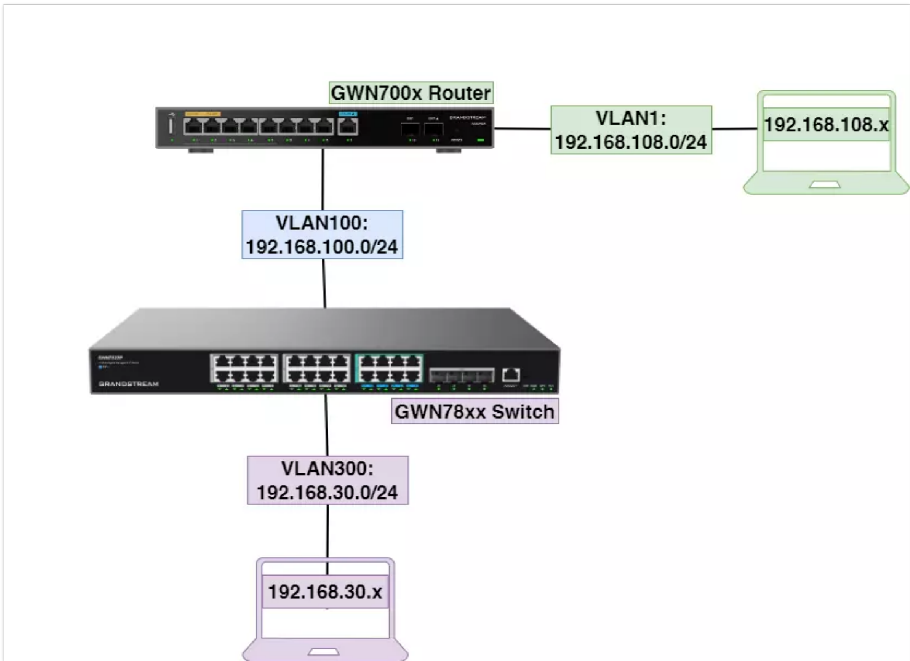
Supported Devices

For more information about these devices, visit [Grandstream](#).

Networking Scenario

RIP facilitates automatic learning and updating of routes in a network. It shares routing information periodically, ensuring updated and efficient communication paths. Below is an example scenario to illustrate RIP in action:

- **Network Topology:** Refer to the diagram below for a visual representation of the network setup. The topology includes:
 - A **GWN700x Router** connected to multiple VLANs through a **GWN78xx Switch**.
 - **VLAN1:** 192.168.108.0/24 (connected to PC1).
 - **VLAN100:** 192.168.100.0/24.
 - **VLAN300:** 192.168.30.0/24 (connected to PC2).
- **Objective:** Ensure seamless communication between devices across VLANs using RIP.



Global Settings

To configure global parameters for RIP, navigate to **Routing** → **RIP** → **Global Settings**. The global settings include:

- **Enable RIP:** Turn on RIP for the router.
- **RIP Distance and Timers:** Configure parameters like Update Timer, Invalid Timer, and Garbage Collection Timer. The screenshot below illustrates the available options for RIP global configuration.

RIP Global Settings

Note:

Enable RIP as well on the switch under **Routing** → **RIP** → **Global**.

Interface Settings

The **Interface Settings** tab enables you to configure individual interfaces efficiently. Key settings include adding or editing interfaces (e.g., VLANs), enabling RIP, and adjusting configurations like RIP Tx/Rx versions and loop protection. These options ensure seamless route propagation and network stability in hybrid environments.

To add an interface, navigate to **Routing** → **RIP** → **Interface Settings** tab, then click on “**Add**” button.

RIP

Global Settings

Interface Settings

Route Advertisement

Neighbor Info

Add

Delete

☒	Name	Enable	Interface	RIP Tx Version	RIP Rx Version	RIPv2 Broadcast	Interface Suppression	Loop Protection	Authentication Type	Operation
☒	VLAN100		VLAN100	Global Settings	Global Settings	Disabled	Disabled	Split Horizon	Off	

RIP Interface Settings page

The screenshot below provides an example of the **Interface Settings** tab, where VLAN100 is configured for RIP:

RIP > **Edit Interface**

*Name	VLAN100
Enable	☒
*Interface	VLAN100(VLAN) ▾
RIP Tx Version	Use Global Settings ▾
RIP Rx Version	Use Global Settings ▾
RIPv2 Broadcast ⓘ	☐
Interface Suppression ⓘ	☐
Loop Protection	Split Horizon ▾
Authentication Type	☒ Off ☐ Simple ☐ MD5
	Cancel Save

RIP addedit Interface Settings

Note:

On the switch, enable the interfaces as well. The configuration steps are nearly identical; in this case, activate VLAN1 and VLAN30.

Route Advertisements

RIP periodically broadcasts route information to neighboring routers. To manage route advertisements:

1. Navigate to the **Route Advertisements** tab.
2. View the advertised routes. The screenshot below shows the advertised subnets configured for RIP:

RIP

Global Settings Interface Settings **Route Advertisement** Neighbor Info

☒ Add

☒ Subnet Address	Mask Length	Operations
☒ 192.168.108.0	24	

RIP Route Advertisement page

3. To add a new advertisement, click the **Add** button and specify the **Subnet Address** and **Mask Length**. The screenshot below demonstrates the configuration for a specific route advertisement:

RIP > **Edit Route Advertisement**

*Subnet Address / Mask Length	192.168.108.0 / 24
	Cancel Save

RIP addedit Route Advertisement

Note:

On the switch, routes can also be advertised similarly; for example, VLAN30.

Neighbor Information

To view details of neighboring routers participating in RIP, navigate to the **Neighbor Info** tab. This step is crucial for confirming connectivity with other routers and troubleshooting issues in the RIP process. This table provides an overview of neighbors detected under the current RIP process. The screenshot below shows an example of neighbor information:

RIP				
Global Settings		Interface Settings	Route Advertisement	Neighbor Info
Refresh				
Interface	RIP Version Info	Default Distance	Neighbor Address	Update Time
VLAN100	2	120	192.168.100.28	21s

RIP Neighbor Info tab

Verifying Route Learning

To ensure that RIP is functioning correctly and routes are being learned:

1. Navigate to **Routing** → **Routing Table** on the router or switch. Check for common issues, such as missing RIP entries, incorrect next-hop addresses, or mismatched administrative distances, which can indicate configuration or connectivity problems.
2. Review the routing table entries.
 - Verify that routes learned via RIP are listed under the **"Protocol Type"** column as **"RIP."**
 - Confirm the next hop and administrative distance values for the RIP-learned routes.

The screenshot below provides an example of a routing table with RIP-learned routes highlighted:

Routing Table

IPv4 Routing Table

IPv6 Routing Table

Refresh

All Outgoing Interfa...

Q Next Hop

IP Address	Protocol Type	Outgoing Interface	Next Hop	Administrative Distance
0.0.0.0/0	-	GWN7002(WAN)	192.168.6.1	0
192.168.6.0/24	-	GWN7002(WAN)	0.0.0.0	0
192.168.6.0/24	Direct	GWN7002(WAN)	0.0.0.0	0
192.168.30.0/24	RIP	VLAN100(VLAN)	192.168.100.28	120
192.168.60.0/24	-	GWN7002(WAN)	0.0.0.0	0
192.168.100.0/24	Direct	VLAN100(VLAN)	0.0.0.0	0
192.168.108.0/24	Direct	Default(VLAN)	0.0.0.0	0

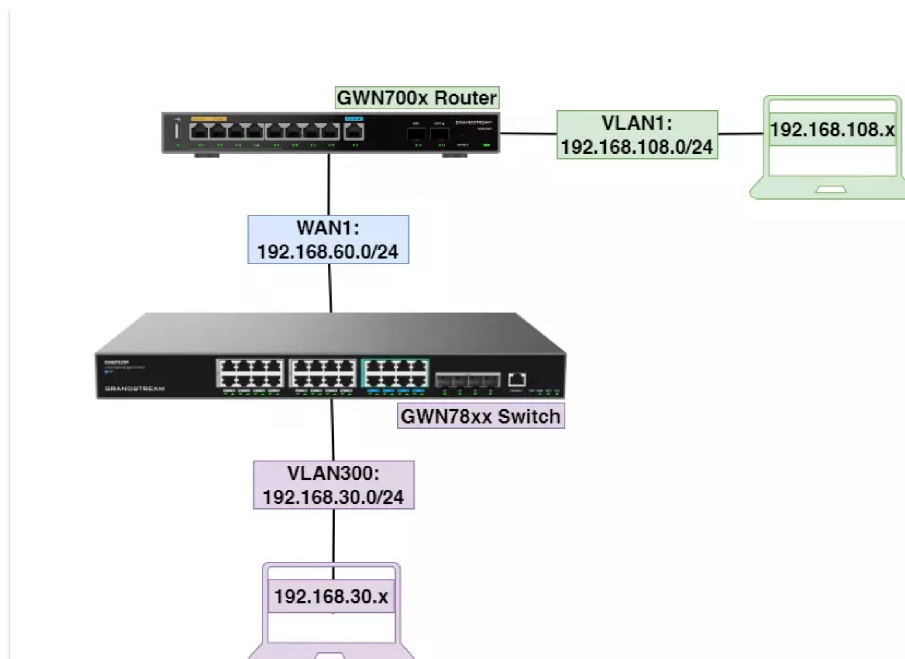
RIP Routing Table

Importing External Routes

This section focuses on scenarios where the router connects to external networks, such as using the WAN port or integrating with another dynamic protocol. Enabling external route import facilitates seamless route exchange and enhances network integration by allowing the router to advertise and learn routes dynamically from diverse sources. This capability is particularly useful for maintaining efficiency in mixed protocol environments or when routing traffic across distinct network segments like WAN and LAN.

Networking Scenario (External Route Import)

- **Topology:** Refer to the diagram below:
 - The **GWN700x Router** connects to the **GWN78xx Switch** via the WAN interface (192.168.60.0/24).
 - **VLAN300** on the switch is 192.168.30.0/24, connected to PC2.
 - **Objective:** Enable communication between devices across the WAN and VLAN using RIP and external route imports.



RIP External Route Import

◦ Enable External Route Import

Enabling external route import simplifies the integration of different routing protocols and allows for seamless inclusion of directly connected networks into the routing process. For example, enabling the **"Direct"** option allows the router to advertise directly connected routes through RIP. This approach improves network flexibility by facilitating efficient route propagation across dynamic and hybrid topologies. It also supports environments with mixed routing protocols, such as **BGP** and **OSPF**, enhancing scalability and optimizing resource use.

To start, navigate to **Routing → RIP → Global Settings** on the router.

- Enable **External Route Import** and select the necessary protocol types (e.g., Direct, Static, OSPF, BGP).
- Configure the **Route Metric** for imported routes to prioritize them in the routing table.

RIP External Route Import Global settings

◦ Enable the WAN Interface

The Router is connected to the Switch using the WAN port, thus the WAN interface has to be enabled under **Interface Settings** tab.

RIP

Global Settings

Interface Settings

Route Advertisement

Neighbor Info

Add

Delete

☒	Name	Enable	Interface	RIP Tx Version	RIP Rx Version	RIPv2 Broadcast	Interface Suppression	Loop Protection	Authentication Type	Operations
☒	GWN7002_WAN1	☒	GWN7002	Global Settings	Global Settings	Disabled	Disabled	Split Horizon	Off	

RIP External Route Import Interface settings

RIP > Edit Interface

* Name

GWN7002_WAN1

Enable

☒

* Interface

GWN7002(WAN)

RIP Tx Version

Use Global Settings

RIP Rx Version

Use Global Settings

RIPv2 Broadcast

☐

Interface Suppression

☐

Loop Protection

Split Horizon

Authentication Type

☒ Off
☐ Simple
☐ MD5

Cancel

Save

RIP External Route Import Addedit Interface settings

Configuring Firewall Rules

To allow RIP to function correctly, appropriate firewall rules must be configured to permit WAN-to-LAN traffic based on VLANs:

Traffic Rules

Inbound Rules

Outbound Rules

Forwarding Rules

Forwarding rules are used to control the traffic forwarded between different networks or terminals within a network. The priority of rules is sorted by serial number. The lower the number, the higher the priority.

Add

Clone

Delete

Move to Top

All Source Groups

All Destination Groups

	No.	Name	Enable	Source Group	Destination Group	Action	Operations
☒	1	WAN-To-LAN-Allow	☒	GWN7002 (WAN)	Default (VLAN)	Accept	
☐	2	WAN2_Allow-ICMP... Default	☒	GWN7002 (WAN)	All	Accept	

RIP Firewall Forwarding Rules

Traffic Rules > Edit Forwarding Rule

* Name

WAN-To-LAN-Allow

Enable

☒

IP Family

☒ Any
☐ IPv4
☐ IPv6

Protocol Type

All

* Source Group

GWN7002 (WAN)

Source MAC Address

: : : : :

Source Address Type

IP Address

Source Address

* Destination Group

Default (VLAN)

Destination Address Type

IP Address

Destination Address

Schedule

None

The absolute date/time set will not take effect in the schedule

Action

☒ Accept
☐ Deny
☐ Drop

RIP Firewall Edit Forwarding rule

1. Navigate to **Firewall** → **Traffic Rules** → **Forwarding Rules**.
2. Add a new rule with the following settings:
 - **Name:** Assign a descriptive name, e.g., **wan-to-lan-accept**.
 - **Source Group:** Select the WAN interface of the router, e.g., **GWN7002 (WAN)**.
 - **Destination Group:** Select the VLAN created on the router, e.g., **Default(VLAN)** for GWN7002.
 - **Action:** Set to **Accept** to allow traffic.
 - **Protocol Type:** Set to **All** or specify the necessary protocol.

Notes:

- Ensure the firewall rule applies to the relevant VLANs for successful communication.
- Fine-tune rules using Source and Destination Address Types as needed.

Verify External Route Propagation

Check the routing table to confirm that external routes are being advertised via RIP.
Ensure proper communication across network segments.

Routing Table				
IPv4 Routing Table		IPv6 Routing Table		
Refresh		All Outgoing Interfa... Next Hop		
IP Address	Protocol Type	Outgoing Interface	Next Hop	Administrative Distance
0.0.0.0/0	-	GWN7002(WAN)	192.168.60.1	0
192.168.30.0/24	RIP	GWN7002(WAN)	192.168.60.1	120
192.168.60.0/24	-	GWN7002(WAN)	0.0.0.0	0
192.168.60.0/24	Direct	GWN7002(WAN)	0.0.0.0	0
192.168.108.0/24	Direct	Default(VLAN)	0.0.0.0	0

RIP External Route Import Routing Table