

Grandstream Networks, Inc.

Dynamic Routing

Border Gateway Protocol (BGP) Guide



Overview

BGP (Border Gateway Protocol) is a flexible and scalable routing protocol used to exchange network information between different systems, known as autonomous systems (AS). It uses path-vector routing to ensure optimal data paths and allows fine-grained control over routing policies. This flexibility makes BGP essential for connecting organizational networks or internet service providers (ISPs), enabling efficient traffic management and global data exchange.

Supported Devices

The following device series support BGP, 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

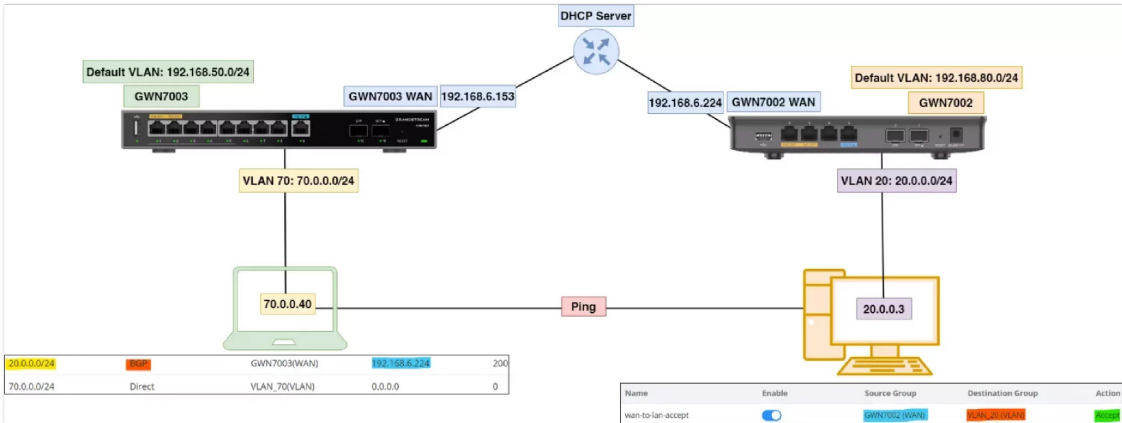
Supported Devices

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

Networking Scenario

Note:

This example will be referenced throughout the guide to provide consistency and practical context for each configuration step.



Example Networking Scenario

Overview:

1. Devices:

- **Router 1 (GWN7003):** Default VLAN: 192.168.50.0/24, WAN IP: 192.168.6.153, VLAN 70: 70.0.0.0/24.
- **Router 2 (GWN7002):** Default VLAN: 192.168.80.0/24, WAN IP: 192.168.6.224, VLAN 20: 20.0.0.0/24.

2. BGP Details:

- Router 1 (AS 1) peers with Router 2 (AS 1).
- Router 1 advertises VLAN 70.
- Router 2 advertises VLAN 20.

3. **Firewall Rule:** A WAN-to-LAN rule is enabled to permit communication between the routers.

Global Settings

Follow these steps to configure BGP Global Settings for the router (e.g, GWN7002 and GWN7003). Additionally, enabling direct routing allows the router to dynamically learn and manage routes directly from connected networks or protocols without relying on intermediary configurations. This ensures seamless communication by automatically updating routing tables with the most accurate and efficient paths:

BGP

Global Settings Peer Route Advertisement Peer Info

BGP ☒

* AS 1 Range 1~4294967295

* Router ID 2.2.2.2 IPv4 Format

External Route Import

Protocol Type ☒ Direct ☒ Static ☒ OSPF ☒ RIP

Please go to Firewall → Rule Policy/Traffic Rules to set the acceptance rules for the WAN port.

* Direct Route Metric 0 Default 0, range 0~4294967295

* Static Route Metric 0 Default 0, range 0~4294967295

* OSPF Route Metric 0 Default 0, range 0~4294967295

* RIP Route Metric 0 Default 0, range 0~4294967295

Cancel Save

BGP Global Configuration

1. Navigate to **Routing** → **BGP** → **Global Settings** to access the global configuration options.
2. Enable BGP Protocol: Check the option to enable BGP.
3. Set the **AS Number**: Enter the unique Autonomous System number.
4. Assign a **Router ID**: This should be a unique identifier for the device.
5. Optionally, import external routes from **Direct, Static, OSPF, or RIP** protocols.

Configuring Firewall Rules

To allow BGP 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

Name	Enable	Source Group	Destination Group	Action	Operations
wan-to-lan-accept	☒	GWN7002 (WAN)	VLAN_20 (VLAN)	Accept	

Firewall Forwarding Rules

* Name: wan-to-lan-accept

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: VLAN_20 (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

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., **GWN7003 (WAN)**.
 - **Destination Group:** Select the VLAN created on the router, e.g., **VLAN_70 (VLAN)** for GWN7003.
 - **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.

Establishing Peers

Navigate to **Routing** → **BGP** → **Peer** to configure peer relationships:

To exchange BGP messages between devices, establish a peer relationship. For example, Router 1 (GWN7003) can be configured to peer with Router 2 (GWN7002) by setting Router 1's Remote AS to match Router 2's AS (**1**) and using Router 2's WAN IP (**192.168.6.224**) as the peer address. The configuration is the same for both GWN7002 and GWN7003 routers.

BGP

Global Settings

Peer

Route Advertisement

Peer Info

Add

Delete

☒	Name	Enable	Remote AS	Remote Address	Connection Hold Time (Sec)	Connect Retry Time (Sec)	Keepalive Time (Sec)	MD5	Operation
☒	GWN7003_peer	☒	1	192.168.6.153	180	120	60	Disabled	

BGP Peer page

BGP > **Edit Peer**

*Name 1~64 characters

Enable ☒

*Remote AS Range 1~4294967295

*Remote Address

*Connection Hold Time (Sec) Default 180, range 10~65535

*Connect Retry Time (Sec) Default 120, range 3~255

*Keepalive Time (Sec) Default 60, range 1~1800

MD5 ☐

BGP AddEdit peer

1. Navigate to the **Peer** tab.
2. Click the **Add** button.
3. Configure the following:
 - **Name**: Assign a descriptive name, e.g., **GWN7003_peer**.
 - **Enable**: Toggle to enable the peer.
 - **Remote AS**: Set to **1**.
 - **Remote Address**: Use the WAN IP of the peer router, e.g., **192.168.6.153** for GWN7003.
 - **Connection Hold Time (Sec)**: Set to **180** (default).
 - **Connect Retry Time (Sec)**: Set to **120** (default).
 - **Keepalive Time (Sec)**: Set to **60** (default).

Note:

Use IBGP for internal routing, ensuring all routers share the same AS number. Use EBGP for external connectivity and peering, requiring different AS numbers across separate organizations.

Route Advertisement

Navigate to **Routing** → **BGP** → **Route Advertisement** to configure subnets that will be advertised to peers. The configuration is the same for both routers.

BGP

Global Settings Peer **Route Advertisement** Peer Info

☒	Subnet Address	Mask Length	Operations
☒	20.0.0.0	24	Edit Delete

BGP Route Advertisement

BGP > **Edit Route Advertisement**

*Subnet Address / Mask Length /

BGP AddEdit route Advertisement

1. Navigate to the **Route Advertisement** tab.

2. Click the **Add** button.
3. Enter the following details:
 - **Subnet Address:** Specify the subnet address, e.g., **20.0.0.0** for GWN7002 or **70.0.0.0** for GWN7003.
 - **Mask Length:** Set to **24**.
4. Save the configuration.

Monitoring Peer Information

Navigate to **Routing** → **BGP** → **Peer Info** to monitor the status of BGP peers. The configuration and view are the same for both routers.

BGP				
Global Settings Peer Route Advertisement Peer Info				
<button>Refresh</button>				
BGP Version Info	Peer Address	Peer AS	Status	Uptime
4	192.168.6.153	1	Established	2h 54min

BGP Peer Info

- **Peer Address:** Confirm the IP address of the peer, e.g., **192.168.6.153** for GWN7002.
- **Status:** Check if the connection status is **Established**.

Viewing Routing Tables

Navigate to **Routing** → **Routing Table** to view and verify BGP routes. The configuration and view are the same for both routers.

Routing Table				
IPv4 Routing Table IPv6 Routing Table				
<button>Refresh</button> 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
10.10.12.0/24	-	WiregurardMobile(VPN)	0.0.0.0	0
10.10.12.0/24	Direct	WiregurardMobile(VPN)	0.0.0.0	0
20.0.0.0/24	Direct	VLAN_20(VLAN)	0.0.0.0	0
70.0.0.0/24	BGP	GWN7002(WAN)	192.168.6.153	200
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
192.168.20.0/24	-	WiregurardMobile(VPN)	0.0.0.0	0
192.168.50.0/24	BGP	GWN7002(WAN)	192.168.6.153	200
192.168.80.0/24	Direct	Default(VLAN)	0.0.0.0	0

Routing Table

Inspect the table to ensure the following routes are learned.

- Subnet: **20.0.0.0/24** via BGP on GWN7003.
- Subnet: **70.0.0.0/24** via BGP on GWN7002.