# Configuring GLBP


- Restrictions for GLBP, on page 1
- Prerequisites for GLBP, on page 1
- Information About GLBP, on page 1
- How to Configure GLBP, on page 6
- Configuration Examples for GLBP, on page 17
- Additional References for GLBP, on page 18
- Feature History for GLBP, on page 18


# Restrictions for GLBP

- Enhanced Object Tracking (EOT) is not stateful switchover (SSO)-aware and cannot be used with GLBP in SSO mode.

# Prerequisites for GLBP

Before configuring GLBP, ensure that the devices can support multiple MAC addresses on the physical interfaces. For each GLBP forwarder to be configured, an additional MAC address is used.

# Information About GLBP

## GLBP Overview

GLBP provides automatic device backup for IP hosts configured with a single default gateway on an IEEE 802.3 LAN. Multiple first-hop devices on the LAN combine to offer a single virtual first-hop IP device while sharing the IP packet forwarding load. Other devices on the LAN act as redundant GLBP devices that will become active if any of the existing forwarding devices fail.

GLBP performs a similar function for the user as HSRP and VRRP. HSRP and VRRP allow multiple devices to participate in a virtual device group configured with a virtual IP address. One member is elected to be the active device to forward packets sent to the virtual IP address for the group. The other devices in the group are redundant until the active device fails. These standby devices have unused bandwidth that the protocol is

not using. Although multiple virtual device groups can be configured for the same set of devices, the hosts must be configured for different default gateways, which results in an extra administrative burden. The advantage of GLBP is that it additionally provides load balancing over multiple devices (gateways) using a single virtual IP address and multiple virtual MAC addresses. The forwarding load is shared among all devices in a GLBP group rather than being handled by a single device while the other devices stand idle. Each host is configured with the same virtual IP address, and all devices in the virtual device group participate in forwarding packets. GLBP members communicate between each other through hello messages sent every 3 seconds to the multicast address 224.0.0.102, UDP port 3222 (source and destination).

### GLBP Packet Types

GLBP uses 3 different packet types to operate. The packet types are Hello, Request, and Reply. The Hello packet is used to advertise protocol information. Hello packets are multicast, and are sent when any virtual gateway or virtual forwarder is in Speak, Standby or Active state. Request and Reply packets are used for virtual MAC assignment. They are both unicast messages to and from the active virtual gateway (AVG).

## GLBP Active Virtual Gateway

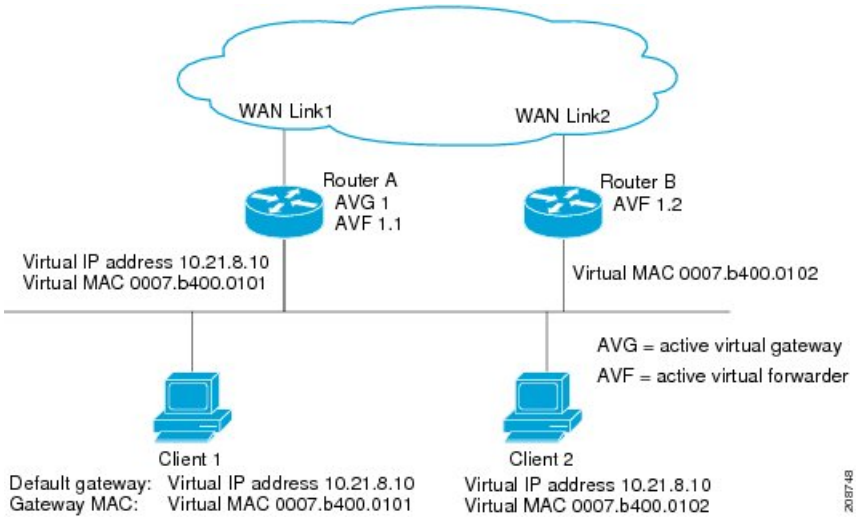
Members of a GLBP group elect one gateway to be the active virtual gateway (AVG) for that group. Other group members provide backup for the AVG if the AVG becomes unavailable. The AVG assigns a virtual MAC address to each member of the GLBP group. Each gateway assumes responsibility for forwarding packets sent to the virtual MAC address assigned to it by the AVG. These gateways are known as active virtual forwarders (AVFs) for their virtual MAC address.

The AVG is also responsible for answering Address Resolution Protocol(ARP) requests for the virtual IP address. Load sharing is achieved by the AVG replying to the ARP requests with different virtual MAC addresses.

When the **no glbp load-balancing**command is configured, if the AVG does not have an AVF, it preferentially responds to ARP requests with the MAC address of the first listening virtual forwarder (VF), which will causes traffic to route via another gateway until that VF migrates back to being the current AVG.

In the figure below, Router A (or Device A) is the AVG for a GLBP group, and is responsible for the virtual IP address 10.21.8.10. Router A is also an AVF for the virtual MAC address 0007.b400.0101. Router B (or Device B) is a member of the same GLBP group and is designated as the AVF for the virtual MAC address 0007.b400.0102. Client 1 has a default gateway IP address of 10.21.8.10 and a gateway MAC address of 0007.b400.0101. Client 2 shares the same default gateway IP address but receives the gateway MAC address 0007.b400.0102 because Router B is sharing the traffic load with Router A.

*Figure 1: GLBP Topology*




If Router A becomes unavailable, Client 1 will not lose access to the WAN because Router B will assume responsibility for forwarding packets sent to the virtual MAC address of Router A, and for responding to packets sent to its own virtual MAC address. Router B will also assume the role of the AVG for the entire GLBP group. Communication for the GLBP members continues despite the failure of a device in the GLBP group.

# GLBP Virtual MAC Address Assignment

A GLBP group allows up to four virtual MAC addresses per group. The AVG is responsible for assigning the virtual MAC addresses to each member of the group. Other group members request a virtual MAC address after they discover the AVG through hello messages. Gateways are assigned the next MAC address in sequence. A virtual forwarder that is assigned a virtual MAC address by the AVG is known as a primary virtual forwarder. Other members of the GLBP group learn the virtual MAC addresses from hello messages. A virtual forwarder that has learned the virtual MAC address is referred to as a secondary virtual forwarder.

# GLBP Virtual Gateway Redundancy

GLBP operates virtual gateway redundancy in the same way as HSRP. One gateway is elected as the AVG, another gateway is elected as the standby virtual gateway, and the remaining gateways are placed in a listen state.

If an AVG fails, the standby virtual gateway will assume responsibility for the virtual IP address. A new standby virtual gateway is then elected from the gateways in the listen state.

# GLBP Virtual Forwarder Redundancy

Virtual forwarder redundancy is similar to virtual gateway redundancy with an AVF. If the AVF fails, one of the secondary virtual forwarders in the listen state assumes responsibility for the virtual MAC address.

The new AVF is also a primary virtual forwarder for a different forwarder number. GLBP migrates hosts away from the old forwarder number using two timers that start as soon as the gateway changes to the active virtual forwarder state. GLBP uses the hello messages to communicate the current state of the timers.

The redirect time is the interval during which the AVG continues to redirect hosts to the old virtual forwarder MAC address. When the redirect time expires, the AVG stops using the old virtual forwarder MAC address in ARP replies, although the virtual forwarder will continue to forward packets that were sent to the old virtual forwarder MAC address.

The secondary holdtime is the interval during which the virtual forwarder is valid. When the secondary holdtime expires, the virtual forwarder is removed from all gateways in the GLBP group. The expired virtual forwarder number becomes eligible for reassignment by the AVG.

# GLBP Gateway Priority

GLBP gateway priority determines the role that each GLBP gateway plays and what happens if the AVG fails.

Priority also determines if a GLBP device functions as a backup virtual gateway and the order of ascendancy to becoming an AVG if the current AVG fails. You can configure the priority of each backup virtual gateway with a value of 1 through 255 using the **glbp priority** command.

In the "GLBP Topology" figure, if Router A (or Device A)—the AVG in a LAN topology—fails, an election process takes place to determine which backup virtual gateway should take over. In this example, Router B (or Device B) is the only other member in the group so it will automatically become the new AVG. If another device existed in the same GLBP group with a higher priority, then the device with the higher priority would be elected. If both devices have the same priority, the backup virtual gateway with the higher IP address would be elected to become the active virtual gateway.

By default, the GLBP virtual gateway preemptive scheme is disabled. A backup virtual gateway can become the AVG only if the current AVG fails, regardless of the priorities assigned to the virtual gateways. You can enable the GLBP virtual gateway preemptive scheme using the **glbp preempt** command. Preemption allows a backup virtual gateway to become the AVG, if the backup virtual gateway is assigned a higher priority than the current AVG.

# GLBP Gateway Weighting and Tracking

GLBP uses a weighting scheme to determine the forwarding capacity of each device in the GLBP group. The weighting assigned to a device in the GLBP group can be used to determine whether it will forward packets and, if so, the proportion of hosts in the LAN for which it will forward packets. Thresholds can be set to disable forwarding when the weighting for a GLBP group falls below a certain value, and when it rises above another threshold, forwarding is automatically reenabled.

The GLBP group weighting can be automatically adjusted by tracking the state of an interface within the device. If a tracked interface goes down, the GLBP group weighting is reduced by a specified value. Different interfaces can be tracked to decrement the GLBP weighting by varying amounts.

By default, the GLBP virtual forwarder preemptive scheme is enabled with a delay of 30 seconds. A backup virtual forwarder can become the AVF if the current AVF weighting falls below the low weighting threshold for 30 seconds. You can disable the GLBP forwarder preemptive scheme using the **no glbp forwarder preempt** command or change the delay using the **glbp forwarder preempt delay minimum** command.

# GLBP MD5 Authentication

GLBP MD5 authentication uses the industry-standard MD5 algorithm for improved reliability and security. MD5 authentication provides greater security than the alternative plain text authentication scheme and protects against spoofing software.

MD5 authentication allows each GLBP group member to use a secret key to generate a keyed MD5 hash that is part of the outgoing packet. A keyed hash of an incoming packet is generated and, if the hash within the incoming packet does not match the generated hash, the packet is ignored.

The key for the MD5 hash can either be given directly in the configuration using a key string or supplied indirectly through a key chain. The key string cannot exceed 100 characters in length.

A device will ignore incoming GLBP packets from devices that do not have the same authentication configuration for a GLBP group. GLBP has three authentication schemes:

- No authentication
- Plain text authentication
- MD5 authentication

GLBP packets will be rejected in any of the following cases:

- The authentication schemes differ on the device and in the incoming packet.
- MD5 digests differ on the device and in the incoming packet.
- Text authentication strings differ on the device and in the incoming packet.

# ISSU-GLBP

This feature is supported on Cisco Catalyst 9600 Series Switches GLBP supports In Service Software Upgrade (ISSU). ISSU allows a high-availability (HA) system to run in Stateful Switchover (SSO) mode even when different versions of Cisco IOS software are running on the active and standby Route Processors (RPs) or line cards.

ISSU provides the ability to upgrade or downgrade from one supported Cisco IOS release to another while continuing to forward packets and maintain sessions, thereby reducing planned outage time. The ability to upgrade or downgrade is achieved by running different software versions on the active RP and standby RP for a short period of time to maintain state information between RPs. This feature allows the system to switch over to a secondary RP running upgraded (or downgraded) software and continue forwarding packets without session loss and with minimal or no packet loss. This feature is enabled by default.

# GLBP SSO

This feature is supported on Cisco Catalyst 9600 Series Switches With the introduction of the GLBP SSO functionality, GLBP is stateful switchover (SSO) aware. GLBP can detect when a device is failing over to the secondary router processor (RP) and continue in its current group state.

SSO functions in networking devices (usually edge devices) that support dual RPs. SSO provides RP redundancy by establishing one of the RPs as the active processor and the other RP as the standby processor. SSO also synchronizes critical state information between the RPs so that network state information is dynamically maintained between RPs.

Without SSO-awareness, if GLBP is deployed on a device with redundant RPs, a switchover of roles between the active RP and the standby RP results in the device relinquishing its activity as a GLBP group member and then rejoining the group as if it had been reloaded. The GLBP SSO feature enables GLBP to continue its activities as a group member during a switchover. GLBP state information between redundant RPs is maintained so that the standby RP can continue the device's activities within the GLBP during and after a switchover.

This feature is enabled by default. To disable this feature, use the command **no glbp sso** in global configuration mode.

# GLBP Benefits

### Load Sharing

You can configure GLBP in such a way that traffic from LAN clients can be shared by multiple devices, thereby sharing the traffic load more equitably among available devices.

### Multiple Virtual Devices

GLBP supports up to 1024 virtual devices (GLBP groups) on each physical interface of a device and up to four virtual forwarders per group.

### Preemption

The redundancy scheme of GLBP enables you to preempt an active virtual gateway (AVG) with a higher priority backup virtual gateway that has become available. Forwarder preemption works in a similar way, except that forwarder preemption uses weighting instead of priority and is enabled by default.

### Authentication

GLBP supports the industry-standard message digest 5 (MD5) algorithm for improved reliability, security, and protection against GLBP-spoofing software. A device within a GLBP group with a different authentication string than other devices will be ignored by other group members. You can alternatively use a simple text password authentication scheme between GLBP group members to detect configuration errors.

# How to Configure GLBP

# Customizing GLBP

Customizing the behavior of GLBP is optional. Be aware that as soon as you enable a GLBP group, that group is operating. It is possible that if you first enable a GLBP group before customizing GLBP, the device could take over control of the group and become the AVG before you have finished customizing the feature. Therefore, if you plan to customize GLBP, it is a good idea to do so before enabling GLBP.

### Procedure

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **enable** | Enables privileged EXEC mode. |

| | Command or Action | Purpose |
|---|---|---|
| | **Example:**<br><br>`Device> enable` | • Enter your password if prompted. |
| **Step 2** | **configure terminal**<br>**Example:**<br><br>`Device# configure terminal` | Enters global configuration mode. |
| **Step 3** | **interface** *type number*<br>**Example:**<br><br>`Device(config)# interface GigabitEthernet 1/0/1` | Specifies an interface type and number, and enters interface configuration mode. |
| **Step 4** | **ip address** *ip-address mask* [**secondary**]<br>**Example:**<br><br>`Device(config-if)# ip address 10.21.8.32 255.255.255.0` | Specifies a primary or secondary IP address for an interface. |
| **Step 5** | **glbp** *group* **timers** [**msec**] *hellotime* [**msec**] *holdtime*<br>**Example:**<br><br>`Device(config-if)# glbp 10 timers 5 18` | Configures the interval between successive hello packets sent by the AVG in a GLBP group.<br>• The *holdtime* argument specifies the interval in seconds before the virtual gateway and virtual forwarder information in the hello packet is considered invalid.<br>• The optional **msec** keyword specifies that the following argument will be expressed in milliseconds, instead of the default seconds. |
| **Step 6** | **glbp** *group* **timers redirect** *redirect timeout*<br>**Example:**<br><br>`Device(config-if)# glbp 10 timers redirect 1800 28800` | Configures the time interval during which the AVG continues to redirect clients to an AVF. The default is 600 seconds (10 minutes).<br>• The *timeout* argument specifies the interval in seconds before a secondary virtual forwarder becomes invalid. The default is 14,400 seconds (4 hours).<br><br>**Note**<br>The zero value for the *redirect* argument cannot be removed from the range of acceptable values because preexisting configurations of Cisco IOS software already using the zero value could be negatively |

| | Command or Action | Purpose |
|---|---|---|
| | | affected during an upgrade. However, a zero setting is not recommended and, if used, results in a redirect timer that never expires. If the redirect timer does not expire, and the device fails, new hosts continue to be assigned to the failed device instead of being redirected to the backup. |
| **Step 7** | **glbp** *group* **load-balancing** [**host-dependent** \| **round-robin** \| **weighted**]<br>**Example:**<br>`Device(config-if)# glbp 10 load-balancing host-dependent` | Specifies the method of load balancing used by the GLBP AVG. |
| **Step 8** | **glbp** *group* **priority** *level*<br>**Example:**<br>`Device(config-if)# glbp 10 priority 254` | Sets the priority level of the gateway within a GLBP group.<br>• The default value is 100. |
| **Step 9** | **glbp** *group* **preempt** [**delay minimum** *seconds*]<br>**Example:**<br>`Device(config-if)# glbp 10 preempt delay minimum 60` | Configures the device to take over as AVG for a GLBP group if it has a higher priority than the current AVG.<br>• This command is disabled by default.<br>• Use the optional **delay** and **minimum** keywords and the *seconds* argument to specify a minimum delay interval in seconds before preemption of the AVG takes place. |
| **Step 10** | **glbp** *group* **client-cache maximum** *number* [**timeout** *minutes*]<br>**Example:**<br>`Device(config-if)# glbp 10 client-cache maximum 1200 timeout 245` | (Optional) Enables the GLBP client cache.<br>• This command is disabled by default.<br>• Use the *number* argument to specify the maximum number of clients the cache will hold for this GLBP group. The range is from 8 to 2000.<br>• Use the optional **timeout** *minutes* keyword and argument pair to configure the maximum amount of time a client entry can stay in the GLBP client cache after the client information was last updated. The range is from 1 to 1440 minutes (one day).<br>**Note** |

| | Command or Action | Purpose |
|---|---|---|
| | | For IPv4 networks, Cisco recommends setting a GLBP client cache timeout value that is slightly longer than the maximum expected end-host Address Resolution Protocol (ARP) cache timeout value. |
| **Step 11** | **glbp** *group* **name** *redundancy-name*<br>**Example:**<br>`Device(config-if)# glbp 10 name abc123` | Enables IP redundancy by assigning a name to the GLBP group.<br>• The GLBP redundancy client must be configured with the same GLBP group name so the redundancy client and the GLBP group can be connected. |
| **Step 12** | **exit**<br>**Example:**<br>`Device(config-if)# exit` | Exits interface configuration mode, and returns the device to global configuration mode. |
| **Step 13** | **no glbp sso**<br>**Example:**<br>`Device(config)# no glbp sso` | (Optional) Disables GLBP support of SSO. |

# Configuring GLBP MD5 Authentication Using a Key String

### Procedure

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **enable**<br>**Example:**<br>`Device> enable` | Enables privileged EXEC mode.<br>• Enter your password if prompted. |
| **Step 2** | **configure terminal**<br>**Example:**<br>`Device# configure terminal` | Enters global configuration mode. |
| **Step 3** | **interface** *type number*<br>**Example:**<br>`Device(config)# interface GigabitEthernet 1/0/1` | Configures an interface type and enters interface configuration mode. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 4** | **ip address** *ip-address mask* [**secondary**]<br>**Example:**<br>`Device(config-if)# ip address 10.0.0.1 255.255.255.0` | Specifies a primary or secondary IP address for an interface. |
| **Step 5** | **glbp** *group-number* **authentication md5 key-string** [ **0** \| **7**] *key*<br>**Example:**<br>`Device(config-if)# glbp 1 authentication md5 key-string d00b4r987654321a` | Configures an authentication key for GLBP MD5 authentication.<br>• The key string cannot exceed 100 characters in length.<br>• No prefix to the *key* argument or specifying **0** means the key is unencrypted.<br>• Specifying **7** means the key is encrypted. The key-string authentication key will automatically be encrypted if the **service password-encryption** global configuration command is enabled. |
| **Step 6** | **glbp** *group-number* **ip** [*ip-address* [**secondary**]]<br>**Example:**<br>`Device(config-if)# glbp 1 ip 10.0.0.10` | Enables GLBP on an interface and identifies the primary IP address of the virtual gateway. |
| **Step 7** | Repeat Steps 1 through 6 on each device that will communicate. | — |
| **Step 8** | **end**<br>**Example:**<br>`Device(config-if)# end` | Returns to privileged EXEC mode. |
| **Step 9** | **show glbp**<br>**Example:**<br>`Device# show glbp` | (Optional) Displays GLBP information.<br>• Use this command to verify your configuration. The key string and authentication type will be displayed if configured. |

# Configuring GLBP MD5 Authentication Using a Key Chain

Perform this task to configure GLBP MD5 authentication using a key chain. Key chains allow a different key string to be used at different times according to the key chain configuration. GLBP will query the appropriate key chain to obtain the current live key and key ID for the specified key chain.

## Procedure

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **enable**<br>**Example:**<br>`Device> enable` | Enables privileged EXEC mode.<br>• Enter your password if prompted. |
| **Step 2** | **configure terminal**<br>**Example:**<br>`Device# configure terminal` | Enters global configuration mode. |
| **Step 3** | **key chain** *name-of-chain*<br>**Example:**<br>`Device(config)# key chain glbp2` | Enables authentication for routing protocols and identifies a group of authentication keys and enters key-chain configuration mode. |
| **Step 4** | **key** *key-id*<br>**Example:**<br>`Device(config-keychain)# key 100` | Identifies an authentication key on a key chain.<br>• The value for the *key-id* argument must be a number. |
| **Step 5** | **key-string** *string*<br>**Example:**<br>`Device(config-keychain-key)# key-string abc123` | Specifies the authentication string for a key and enters key-chain key configuration mode.<br>• The value for the *string* argument can be 1 to 80 uppercase or lowercase alphanumeric characters; the first character cannot be a numeral. |
| **Step 6** | **exit**<br>**Example:**<br>`Device(config-keychain-key)# exit` | Returns to key-chain configuration mode. |
| **Step 7** | **exit**<br>**Example:**<br>`Device(config-keychain)# exit` | Returns to global configuration mode. |
| **Step 8** | **interface** *type number*<br>**Example:**<br>`Device(config)# interface GigabitEthernet 1/0/1` | Configures an interface type and enters interface configuration mode. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 9** | **ip address** *ip-address mask* [**secondary**]<br>**Example:**<br>`Device(config-if)# ip address 10.21.0.1 255.255.255.0` | Specifies a primary or secondary IP address for an interface. |
| **Step 10** | **glbp** *group-number* **authentication md5 key-chain** *name-of-chain*<br>**Example:**<br>`Device(config-if)# glbp 1 authentication md5 key-chain glbp2` | Configures an authentication MD5 key chain for GLBP MD5 authentication.<br>• The key chain name must match the name specified in Step 3. |
| **Step 11** | **glbp** *group-number* **ip** [*ip-address* [**secondary**]]<br>**Example:**<br>`Device(config-if)# glbp 1 ip 10.21.0.12` | Enables GLBP on an interface and identifies the primary IP address of the virtual gateway. |
| **Step 12** | Repeat Steps 1 through 10 on each device that will communicate. | — |
| **Step 13** | **end**<br>**Example:**<br>`Device(config-if)# end` | Returns to privileged EXEC mode. |
| **Step 14** | **show glbp**<br>**Example:**<br>`Device# show glbp` | (Optional) Displays GLBP information.<br>• Use this command to verify your configuration. The key chain and authentication type will be displayed if configured. |
| **Step 15** | **show key chain**<br>**Example:**<br>`Device# show key chain` | (Optional) Displays authentication key information. |

# Configuring GLBP Text Authentication

Text authentication provides minimal security. Use MD5 authentication if security is required.

### Procedure

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **enable** | Enables privileged EXEC mode. |

| | Command or Action | Purpose |
|---|---|---|
| | **Example:**<br>`Device> enable` | • Enter your password if prompted. |
| **Step 2** | **configure terminal**<br>**Example:**<br>`Device# configure terminal` | Enters global configuration mode. |
| **Step 3** | **interface** *type number*<br>**Example:**<br>`Device(config)# interface GigabitEthernet 1/0/1` | Configures an interface type and enters interface configuration mode. |
| **Step 4** | **ip address** *ip-address mask* [**secondary**]<br>**Example:**<br>`Device(config-if)# ip address 10.0.0.1 255.255.255.0` | Specifies a primary or secondary IP address for an interface. |
| **Step 5** | **glbp** *group-number* **authentication text** *string*<br>**Example:**<br>`Device(config-if)# glbp 10 authentication text stringxyz` | Authenticates GLBP packets received from other devices in the group.<br>• If you configure authentication, all devices within the GLBP group must use the same authentication string. |
| **Step 6** | **glbp** *group-number* **ip** [*ip-address* [**secondary**]]<br>**Example:**<br>`Device(config-if)# glbp 1 ip 10.0.0.10` | Enables GLBP on an interface and identifies the primary IP address of the virtual gateway. |
| **Step 7** | Repeat Steps 1 through 6 on each device that will communicate. | — |
| **Step 8** | **end**<br>**Example:**<br>`Device(config-if)# end` | Returns to privileged EXEC mode. |
| **Step 9** | **show glbp**<br>**Example:**<br>`Device# show glbp` | (Optional) Displays GLBP information.<br>• Use this command to verify your configuration. |

# Configuring GLBP Weighting Values and Object Tracking

GLBP weighting is used to determine whether a GLBP group can act as a virtual forwarder. Initial weighting values can be set and optional thresholds specified. Interface states can be tracked and a decrement value set to reduce the weighting value if the interface goes down. When the GLBP group weighting drops below a specified value, the group will no longer be an active virtual forwarder. When the weighting rises above a specified value, the group can resume its role as an active virtual forwarder.

## Procedure

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **enable**<br>**Example:**<br>`Device> enable` | Enables privileged EXEC mode.<br>• Enter your password if prompted. |
| **Step 2** | **configure terminal**<br>**Example:**<br>`Device# configure terminal` | Enters global configuration mode. |
| **Step 3** | **track** *object-number* **interface** *type number* {**line-protocol** \|{**ip** \| **ipv6**} **routing**}<br>**Example:**<br>`Device(config)# track 2 interface GigabitEthernet 1/0/1 ip routing` | Configures an interface to be tracked where changes in the state of the interface affect the weighting of a GLBP gateway, and enters tracking configuration mode.<br>• This command configures the interface and corresponding object number to be used with the **glbp weighting track** command.<br>• The **line-protocol** keyword tracks whether the interface is up. The **ip routing** keywords also check that IP routing is enabled on the interface, and an IP address is configured. |
| **Step 4** | **exit**<br>**Example:**<br>`Device(config-track)# exit` | Returns to global configuration mode. |
| **Step 5** | **interface** *type number*<br>**Example:**<br>`Device(config)# interface GigabitEthernet 1/0/1` | Enters interface configuration mode. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 6** | **glbp** *group* **weighting** *maximum* [**lower** *lower*] [**upper** *upper*]<br>**Example:**<br>`Device(config-if)# glbp 10 weighting 110 lower 95 upper 105` | Specifies the initial weighting value, and the upper and lower thresholds, for a GLBP gateway. |
| **Step 7** | **glbp** *group* **weighting track** *object-number* [**decrement** *value*]<br>**Example:**<br>`Device(config-if)# glbp 10 weighting track 2 decrement 5` | Specifies an object to be tracked that affects the weighting of a GLBP gateway.<br>• The *value* argument specifies a reduction in the weighting of a GLBP gateway when a tracked object fails. |
| **Step 8** | **glbp** *group* **forwarder preempt** [**delay minimum** *seconds*]<br>**Example:**<br>`Device(config-if)# glbp 10 forwarder preempt delay minimum 60` | Configures the device to take over as AVF for a GLBP group if the current AVF for a GLBP group falls below its low weighting threshold.<br>• This command is enabled by default with a delay of 30 seconds.<br>• Use the optional **delay** and **minimum** keywords and the *seconds* argument to specify a minimum delay interval in seconds before preemption of the AVF takes place. |
| **Step 9** | **exit**<br>**Example:**<br>`Device(config-if)# exit` | Returns to privileged EXEC mode. |
| **Step 10** | **show track** [*object-number* \| **brief**] [**interface** [**brief**] \| **ip route** [ **brief**] \| **resolution** \| **timers**]<br>**Example:**<br>`Device# show track 2` | Displays tracking information. |

# Troubleshooting GLBP

GLBP introduces five privileged EXEC mode commands to enable display of diagnostic output concerning various events relating to the operation of GLBP. The **debug condition glbp**,**debug glbp errors**, **debug glbp events**, **debug glbp packets**, and **debug glbp terse** commands are intended only for troubleshooting purposes because the volume of output generated by the software can result in severe performance degradation on the device. Perform this task to minimize the impact of using the **debug glbp** commands.

This procedure will minimize the load on the device created by the **debug condition glbp**or **debug glbp** command because the console port is no longer generating character-by-character processor interrupts. If you cannot connect to a console directly, you can run this procedure via a terminal server. If you must break the

Telnet connection, however, you may not be able to reconnect because the device may be unable to respond due to the processor load of generating the debugging output.

### Before you begin

This task requires a device running GLBP to be attached directly to a console.

## Procedure

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **enable**<br>**Example:**<br>`Device> enable` | Enables privileged EXEC mode.<br>• Enter your password if prompted. |
| **Step 2** | **configure terminal**<br>**Example:**<br>`Device# configure terminal` | Enters global configuration mode. |
| **Step 3** | **no logging console**<br>**Example:**<br>`Device(config)# no logging console` | Disables all logging to the console terminal.<br>• To reenable logging to the console, use the**logging console** command in global configuration mode. |
| **Step 4** | Use Telnet to access a device port and repeat Steps 1 and 2. | Enters global configuration mode in a recursive Telnet session, which allows the output to be redirected away from the console port. |
| **Step 5** | **end**<br>**Example:**<br>`Device(config)# end` | Exits to privileged EXEC mode. |
| **Step 6** | **terminal monitor**<br>**Example:**<br>`Device# terminal monitor` | Enables logging output on the virtual terminal. |
| **Step 7** | **debug condition glbp** *interface-type interface-number group* [*forwarder*]<br>**Example:**<br>`Device# debug condition glbp GigabitEthernet 0/0/0 1` | Displays debugging messages about GLBP conditions.<br>• Try to enter only specific **debug condition glbp** or **debug glbp** commands to isolate the output to a certain subcomponent and minimize the load on the processor. Use appropriate arguments and keywords to generate more detailed debug information on specified subcomponents. |

| | Command or Action | Purpose |
|---|---|---|
| | | • Enter the specific **no debug condition glbp** or **no debug glbp** command when you are finished. |
| **Step 8** | **terminal no monitor**<br>**Example:**<br>`Device# terminal no monitor` | Disables logging on the virtual terminal. |

# Configuration Examples for GLBP

## Example: Customizing GLBP Configuration

```
Device(config)# interface GigabitEthernet 1/0/1
Device(config-if)# ip address 10.21.8.32 255.255.255.0
Device(config-if)# glbp 10 timers 5 18
Device(config-if)# glbp 10 timers redirect 1800 28800
Device(config-if)# glbp 10 load-balancing host-dependent
Device(config-if)# glbp 10 priority 254
Device(config-if)# glbp 10 preempt delay minimum 60

Device(config-if)# glbp 10 client-cache maximum 1200 timeout 245
```

## Example: Configuring GLBP MD5 Authentication Using Key Strings

The following example shows how to configure GLBP MD5 authentication using a key string:

```
Device(config)# interface GigabitEthernet 1/0/1
Device(config-if)# ip address 10.0.0.1 255.255.255.0
Device(config-if)# glbp 2 authentication md5 key-string ThisStringIsTheSecretKey
Device(config-if)# glbp 2 ip 10.0.0.10
```

## Example: Configuring GLBP MD5 Authentication Using Key Chains

In the following example, GLBP queries the key chain “AuthenticateGLBP” to obtain the current live key and key ID for the specified key chain:

```
Device(config)# key chain AuthenticateGLBP
Device(config-keychain)# key 1
Device(config-keychain-key)# key-string ThisIsASecretKey
Device(config-keychain-key)# exit
Device(config-keychain)# exit
Device(config)# interface GigabitEthernet 1/0/1
Device(config-if)# ip address 10.0.0.1 255.255.255.0
Device(config-if)# glbp 2 authentication md5 key-chain AuthenticateGLBP
Device(config-if)# glbp 2 ip 10.0.0.10
```

## Example: Configuring GLBP Text Authentication

```
Device(config)# interface GigabitEthernet 0/0/0
Device(config-if)# ip address 10.21.8.32 255.255.255.0
Device(config-if)# glbp 10 authentication text stringxyz
Device(config-if)# glbp 10 ip 10.21.8.10
```

## Example: Configuring GLBP Weighting

In the following example, the device is configured to track the IP routing state of the POS interface 5/0/0 and 6/0/0, an initial GLBP weighting with upper and lower thresholds is set, and a weighting decrement value of 10 is set. If POS interface 5/0/0 and 6/0/0 go down, the weighting value of the device is reduced.

```
Device(config)# track 1 interface GigabitEthernet 1/0/1 line-protocol
Device(config)# track 2 interface GigabitEthernet 1/0/3 line-protocol
Device(config)# interface TenGigabitEthernet 0/0/1
Device(config-if)# ip address 10.21.8.32 255.255.255.0
Device(config-if)# glbp 10 weighting 110 lower 95 upper 105
Device(config-if)# glbp 10 weighting track 1 decrement 10
Device(config-if)# glbp 10 weighting track 2 decrement 10
```

## Example: Enabling GLBP Configuration

In the following example, the device is configured to enable GLBP, and the virtual IP address of 10.21.8.10 is specified for GLBP group 10:

```
Device(config)# interface GigabitEthernet 0/0/0
Device(config-if)# ip address 10.21.8.32 255.255.255.0
Device(config-if)# glbp 10 ip 10.21.8.10
```

# Additional References for GLBP

### Related Documents

| Related Topic | Document Title |
|---|---|
| For complete syntax and usage information for the commands used in this chapter. | See the IP Multicast Routing Commands section of the *Command Reference (Catalyst 9600 Series Switches)* |

# Feature History for GLBP

This table provides release and related information for the features explained in this module.

These features are available in all the releases subsequent to the one they were introduced in, unless noted otherwise.

| Release | Feature | Feature Information |
|---|---|---|
| Cisco IOS XE Gibraltar 16.12.1 | Gateway Load Balancing Protocol | GLBP protects data traffic from a failed router or circuit, like HSRP and VRRP, while allowing packet load sharing between a group of redundant routers. |
| | GLBP MD5 Authentication | MD5 authentication provides greater security than the alternative plain text authentication scheme. MD5 authentication allows each GLBP group member to use a secret key to generate a keyed MD5 hash that is part of the outgoing packet. A keyed hash of an incoming packet is generated and, if the hash within the incoming packet does not match the generated hash, the packet is ignored. |
| | SSO—GLBP | GLBP is now SSO aware. GLBP can detect when a router is failing over to the secondary RP and continue in its current GLBP group state.<br>Prior to being SSO aware, GLBP was not able to detect that a second RP was installed and configured to take over in the event that the primary RP failed. When the primary failed, the GLBP device would stop participating in the GLBP group and, depending on its role, could trigger another router in the group to take over as the active router. With this enhancement, GLBP detects the failover to the secondary RP and no change occurs to the GLBP group. If the secondary RP fails and the primary is still not available, then the GLBP group detects this and re-elects a new active GLBP router. |
| Cisco IOS XE Cupertino 17.7.1 | Gateway Load Balancing Protocol<br>GLBP MD5 Authentication<br>SSO—GLBP | These features were implemented on supervisor modules C9400X-SUP-2 and C9400X-SUP-2XL, which were introduced in this release. |

Use the Cisco Feature Navigator to find information about platform and software image support.