



## Configuring GVRP

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This chapter describes how to configure the GARP VLAN Registration Protocol (GVRP).



**Note**

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For complete syntax and usage information for the commands used in this chapter, refer to the *Command Reference* publication for your switch.

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## Understanding How GVRP Works

GARP VLAN Registration Protocol (GVRP) is a Generic Attribute Registration Protocol (GARP) application that provides 802.1Q-compliant VLAN pruning and dynamic VLAN creation on 802.1Q trunk ports.

With GVRP, the switch can exchange VLAN configuration information with other GVRP switches, prune unnecessary broadcast and unknown unicast traffic, and dynamically create and manage VLANs on switches connected through 802.1Q trunk ports.



**Note**

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GARP and GVRP are industry-standard protocols described in IEEE 802.1p.

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## GVRP Hardware and Software Requirements

GVRP requires these software and hardware versions:

- Supervisor engine software release 5.1 or later
- IEEE 802.1Q-capable switching modules (refer to the documentation for your hardware, or use the **show port capabilities** command)

# Default GVRP Configuration

Table 14-1 shows the default GVRP configuration.

**Table 14-1 GVRP Default Configuration**

Feature	Default Value
GVRP global enable state	Disabled
GVRP per-trunk enable state	Disabled on all ports
GVRP dynamic creation of VLANs	Disabled
GVRP registration mode	<b>normal</b> , with VLAN 1 set to <b>fixed</b> , for all ports
GVRP applicant state	<b>normal</b> (ports do not declare VLANs when in the STP <sup>1</sup> blocking state)
GARP timers	<ul style="list-style-type: none"> <li>• Join time: 200 ms</li> <li>• Leave time: 600 ms</li> <li>• Leaveall time: 10,000 ms</li> </ul>

1. STP = Spanning-Tree Protocol

## GVRP Configuration Guidelines

Follow these guidelines when configuring GVRP:

- You can configure the per-port GVRP state only on 802.1Q-capable ports.
- You must enable GVRP on both ends of an 802.1Q trunk link.
- The GVRP registration mode for VLAN 1 is always **fixed** and is not configurable. VLAN 1 is always carried by 802.1Q trunks on which GVRP is enabled.
- When VTP pruning is enabled, it runs on all GVRP-disabled 802.1Q trunk ports.

## Configuring GVRP

These sections describe how to configure GVRP:

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## Enabling GVRP Globally

You must enable GVRP globally before any GVRP processing occurs on the switch. Enabling GVRP globally enables GVRP to perform VLAN pruning on IEEE 802.1Q trunk links. Pruning occurs only on GVRP-enabled trunks. For information on setting the per-trunk port GVRP enable state, see the “Enabling GVRP on Individual 802.1Q Trunk Ports” section on page 14-3.

To enable dynamic VLAN creation, you must explicitly enable dynamic VLAN creation globally on the switch as well. For information on enabling dynamic VLAN creation, see the “Enabling GVRP Dynamic VLAN Creation” section on page 14-4.

To enable GVRP globally on the switch, perform this task in privileged mode:

	Task	Command
Step 1	Enable GVRP on the switch.	<b>set gvrp enable</b>
Step 2	Verify the configuration.	<b>show gvrp configuration</b>

This example shows how to enable GVRP and verify the configuration:

```

Console> (enable) set gvrp enable
GVRP enabled
Console> (enable) show gvrp configuration
Global GVRP Configuration:
GVRP Feature is currently enabled on the switch.
GVRP dynamic VLAN creation is disabled.
GVRP Timers(milliseconds)
Join = 200
Leave = 600
LeaveAll = 10000

Port based GVRP Configuration:
Port                                     GVRP Status Registration
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2/1-2,3/1-8,7/1-24,8/1-24             Enabled          Normal

GVRP Participants running on 3/7-8.
Console>

```

## Enabling GVRP on Individual 802.1Q Trunk Ports



### Note

You can change the per-trunk GVRP configuration regardless of whether GVRP is enabled globally. However, GVRP will not function on any ports until you enable it globally. For information on configuring GVRP globally on the switch, see the “Enabling GVRP Globally” section on page 14-3.

There are two per-port GVRP states:

- The static GVRP state configured in the CLI and stored in NVRAM
- The actual GVRP state of the ports (active GVRP participants)

You can configure the static GVRP port-state on any 802.1Q-capable switch ports, regardless of the global GVRP enable state or whether the port is an 802.1Q trunk. However, in order for the port to become an active GVRP participant, you must enable GVRP globally and the port must be an 802.1Q trunk port, either through CLI configuration or Dynamic Trunking Protocol (DTP) negotiation.

To enable GVRP on individual 802.1Q-capable ports, perform this task in privileged mode:

	Task	Command
Step 1	Enable GVRP on an individual 802.1Q-capable port.	<code>set port gvrp enable mod_num/port_num</code>
Step 2	Verify the configuration.	<code>show gvrp configuration</code>

This example shows how to enable GVRP on 802.1Q-capable port 1/1:

```
Console> (enable) set port gvrp enable 1/1
GVRP enabled on 1/1.
Console> (enable)
```

## Enabling GVRP Dynamic VLAN Creation

You can enable GVRP dynamic VLAN creation only if these conditions are met:

- The switch is in VTP transparent mode
- All trunk ports on the switch are 802.1Q trunks
- GVRP is enabled on all trunk ports



### Note

Dynamic VLAN creation supports all VLAN types.

If you enable dynamic VLAN creation, these configuration restrictions are imposed:

- You cannot change the switch to VTP server or client mode
- You cannot disable GVRP on a trunk port running GVRP

If any port on the switch becomes an ISL trunk (either by CLI configuration or negotiated using Dynamic Trunking Protocol [DTP]) while dynamic VLAN creation is enabled, dynamic VLAN creation is automatically disabled until the conditions for enabling dynamic VLAN creation are restored.



### Note

VLANs can only be created dynamically on 802.1Q trunks in the **normal** registration mode.

To enable GVRP dynamic VLAN creation on the switch, perform this task in privileged mode:

	Task	Command
Step 1	Enable dynamic VLAN creation on the switch.	<code>set gvrp dynamic-vlan-creation enable</code>
Step 2	Verify the configuration.	<code>show gvrp configuration</code>

This example shows how to enable dynamic VLAN creation on the switch:

```
Console> (enable) set gvrp dynamic-vlan-creation enable
Dynamic VLAN creation enabled.
Console> (enable)
```

## Configuring GVRP Registration

These sections describe how to configure GVRP registration modes on switch ports:

- Setting GVRP Normal Registration, page 14-5
- Setting GVRP Fixed Registration, page 14-5
- Setting GVRP Forbidden Registration, page 14-6

### Setting GVRP Normal Registration

Configuring an IEEE 802.1Q trunk port in **normal** registration mode allows dynamic creation (if dynamic VLAN creation is enabled), registration, and deregistration of VLANs on the trunk port. Normal mode is the default.

To configure GVRP normal registration on an 802.1Q trunk port, perform this task in privileged mode:

	Task	Command
Step 1	Configure normal registration on an 802.1Q trunk port.	<b>set gvrp registration normal</b> <i>mod_num/port_num</i>
Step 2	Verify the configuration.	<b>show gvrp configuration</b>

This example shows how to configure normal registration on an 802.1Q trunk port:

```
Console> (enable) set gvrp registration normal 1/1
Registrar Administrative Control set to normal on port 1/1.
Console> (enable)
```

### Setting GVRP Fixed Registration

Configuring an IEEE 802.1Q trunk port in **fixed** registration mode allows manual creation and registration of VLANs, prevents VLAN deregistration, and registers all known VLANs on other ports on the trunk port.

To configure GVRP fixed registration on an 802.1Q trunk port, perform this task in privileged mode:

	Task	Command
Step 1	Configure fixed registration on an 802.1Q trunk port.	<b>set gvrp registration fixed</b> <i>mod_num/port_num</i>
Step 2	Verify the configuration.	<b>show gvrp configuration</b>

This example shows how to configure fixed registration on an 802.1Q trunk port:

```
Console> (enable) set gvrp registration fixed 1/1
Registrar Administrative Control set to fixed on port 1/1.
Console> (enable)
```

## Setting GVRP Forbidden Registration

Configuring an IEEE 802.1Q trunk port in **forbidden** registration mode deregisters all VLANs (except VLAN 1) and prevents any further VLAN creation or registration on the trunk port.

To configure GVRP forbidden registration on an 802.1Q trunk port, perform this task in privileged mode:

	Task	Command
Step 1	Configure forbidden registration on an 802.1Q trunk port.	<b>set gvrp registration forbidden</b> <i>mod_num/port_num</i>
Step 2	Verify the configuration.	<b>show gvrp configuration</b>

This example shows how to configure forbidden registration on an 802.1Q trunk port:

```
Console> (enable) set gvrp registration forbidden 1/1
Registrar Administrative Control set to forbidden on port 1/1.
Console> (enable)
```

## Sending GVRP VLAN Declarations from Blocking Ports

To prevent undesirable Spanning-Tree Protocol (STP) topology reconfiguration on a port connected to a device that does not support per-VLAN STP, configure the GVRP active applicant state on the port. Ports in the GVRP active applicant state send GVRP VLAN declarations when they are in the STP blocking state, which prevents the STP bridge protocol data units (BPDUs) from being pruned from the other port.



### Note

Configuring fixed registration on the other device's port would also prevent undesirable STP topology reconfiguration.

To configure an 802.1Q trunk port to send VLAN declarations when in the blocking state, perform this task in privileged mode:

Task	Command
Configure an 802.1Q trunk port to send VLAN declarations when in the blocking state.	<b>set gvrp applicant state {normal   active}</b> <i>mod_num/port_num</i>

This example shows how to configure a group of 802.1Q trunk ports to send VLAN declarations when in the blocking state:

```
Console> (enable) set gvrp applicant active 4/2-3,4/9-10,4/12-24
Applicant was set to active on port(s) 4/2-3,4/9-10,4/12-24.
Console> (enable)
```

Use the **normal** keyword to return to the default state (active mode disabled).

## Setting the GARP Timers



**Note** The commands **set gvrp timer** and **show gvrp timer** are aliases for **set garp timer** and **show garp timer**. The aliases may be used if desired.



**Note** Modifying the GARP timer values affects the behavior of *all* GARP applications running on the switch, not just GVRP. (For example, GMRP uses the same timers.)

You can modify the default GARP timer values on the switch.

When setting the timer values, the value for **leave** must be greater than three times the **join** value (**leave**  $\geq$  **join** \* 3). The value for **leaveall** must be greater than the value for **leave** (**leaveall**  $>$  **leave**).

If you attempt to set a timer value that does not adhere to these rules, an error is returned. For example, if you set the **leave** timer to 600 ms and you attempt to configure the **join** timer to 350 ms, an error is returned. Set the **leave** timer to at least 1050 ms and then set the **join** timer to 350 ms.



**Caution** Set the same GARP timer values on all Layer 2-connected devices. If the GARP timers are set differently on Layer 2-connected devices, GARP applications (for example, GMRP and GVRP) do not operate successfully.

To adjust the GARP timer values, perform this task in privileged mode:

	Task	Command
Step 1	Set the GARP timer values.	<b>set garp timer {join   leave   leaveall} timer_value</b>
Step 2	Verify the configuration.	<b>show garp timer</b>

This example shows how to set GARP timers and verify the configuration:

```

Console> (enable) set garp timer leaveall 10000
GMRP/GARP leaveAll timer value is set to 10000 milliseconds.
Console> (enable) set garp timer leave 600
GMRP/GARP leave timer value is set to 600 milliseconds.
Console> (enable) set garp timer join 200
GMRP/GARP join timer value is set to 200 milliseconds.
Console> (enable) show garp timer
Timer      Timer Value (milliseconds)
-----
Join       200
Leave       600
LeaveAll    10000
Console> (enable)

```

## Displaying GVRP Statistics

To display GVRP statistics on the switch, perform this task:

Task	Command
Display GVRP statistics.	<b>show gvrp statistics</b> [ <i>mod_num/port_num</i> ]

This example shows how to display GVRP statistics for port 1/1:

```
Console> (enable) show gvrp statistics 1/1
Join Empty Received:      0
Join In Received:        0
Empty Received:          0
LeaveIn Received:         0
Leave Empty Received:     0
Leave All Received:       40
Join Empty Transmitted:  156
Join In Transmitted:     0
Empty Transmitted:       0
Leave In Transmitted:     0
Leave Empty Transmitted:  0
Leave All Transmitted:    41
VTP Message Received:    0
Console> (enable)
```

## Clearing GVRP Statistics

To clear all GVRP statistics on the switch, perform this task in privileged mode:

Task	Command
Clear GVRP statistics.	<b>clear gvrp statistics</b> { <i>mod_num/port_num</i>   <b>all</b> }

This example shows how to clear all GVRP statistics on the switch:

```
Console> (enable) clear gvrp statistics all
GVRP Statistics cleared for all ports.
Console> (enable)
```

## Disabling GVRP on Individual 802.1Q Trunk Ports

To disable GVRP on individual 802.1Q trunk ports, perform this task in privileged mode:

	Task	Command
<b>Step 1</b>	Disable GVRP on an individual 802.1Q trunk port.	<b>set port gvrp disable</b> <i>mod_num/port_num</i>
<b>Step 2</b>	Verify the configuration.	<b>show gvrp configuration</b>

This example shows how to disable GVRP on 802.1Q trunk port 1/1:

```
Console> (enable) set gvrp disable 1/1  
GVRP disabled on 1/1.  
Console> (enable)
```

## Disabling GVRP Globally

To disable GVRP globally on the switch, perform this task in privileged mode:

Task	Command
Disable GVRP on the switch.	<b>set gvrp disable</b>

This example shows how to disable GVRP globally on the switch:

```
Console> (enable) set gvrp disable  
GVRP disabled  
Console> (enable)
```

