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Chapter 1 GVRP Configuration

1.1 Introduction to GVRP

GVRP (GARP VLAN Registration Protocol) is an application of GARP (Generic Attribute Registration Protocol). GVRP is based on the work scheme of GARP; it maintains dynamic VLAN registration information and propagates the information to other switches.

Note:

GARP is a generic attribute registration protocol. This protocol provides a scheme to register, distribute and propagate the information about VLANs, multicast addresses, and so on, between the switching members in a switching network.

After the GVRP feature is enabled on a switch, the switch can receive the VLAN registration information from other switches to dynamically update the local VLAN registration information (including current VLAN members, which ports these VLAN members get to), and propagate the local VLAN registration information to other switches so that all the switching devices in the same switching network can have the same VLAN information. The VLAN registration information not only includes the static registration information configured locally, but also includes the dynamic registration information from other switches.

1.1.1 GVRP Working Scheme

I. GARP Timers

The information exchange between GARP members is completed by messages. The messages performing important functions for GARP fall into three types: Join, Leave and LeaveAll.

- When a GARP entity expects other switches to register certain attribute information of its own, it sends out a Join message.
- When a GARP entity expects other switches to unregister certain attribute information of its own, it sends out a Leave message.
- Once a GARP entity starts up, it starts the LeaveAll timer. After the timer times out, the GARP entity sends out a LeaveAll message.

The join message and the Leave message are used together to complete the unregistration and re-registration of information. Through message exchange, all the

attribute information to be registered can be propagated to all the switches in the same switching network.

GARP has the following timers:

- **Hold:** When a GARP entity receives a piece of registration information, it does not send out a Join message immediately. Instead, it starts the Hold timer, and sends out a Join message after the timer times out, so that all the registration information received before the timer times out can be put into the same frame that will be sent to save the bandwidth resources.
- **Join:** After the Join timer times out, the GARP entity sends out a Join message to indicate other GARP entities to register the information of its own.
- **Leave:** When a GARP entity expects to unregister a piece of attribute information, it sends out a Leave message. Any GARP entity receives this message starts its Leave timer, and unregister the attribute information after the timer times out if it does not receives a Join message again before the timeout.
- **LeaveAll:** Once a GARP entity starts up, it starts the LeaveAll timer, and sends out a LeaveALL message after the timer times out, so that other GARP entities can re-register all the attribute information on this entity. After that, the entity restarts the LeaveAll timer to begin a new cycle.

II. GVRP port registration mode

GVRP has the following port registration modes:

- **Normal:** In this mode, both dynamic and manual creation, registration and unregistration of VLAN are allowed.
- **Fixed:** In this mode, when you created a static VLAN on a switch and the packets of this VLAN are allowed to pass through the current port, the switch joins the current port to this VLAN and add a VLAN entry to the local GVRP database (a table maintained by GVRP); but GVRP cannot learn dynamic VLAN through this port, and the dynamic VLANs learned through other ports on this switch cannot be pronounced through this port.
- **Forbidden:** In this mode, all the VLANs except VLAN 1 are unregistered on the port, and no other VLANs can be created or registered on the port.

III. GARP operation porcedure

Through the working scheme of GARP, the configuration information on a GARP member will be propagate to the whole switching network. A GARP can be a terminal workstation or a bridge; it informs other GARP member to register/unregister its attribute information by declaration/recant, and register/unregister other GARP member's attribute information according to other member's declaration/recant.

The protocol packets of GARP entity use specific multicast MAC addresses as their destination MAC addresses. When receiving these packets, the switch distinguishes

them packet by their destination MAC addressed and delivers them to different GARP application (for example, GVRP) for further processing.

1.1.2 GVRP Packet Format

The GVRP packets are in the following format:

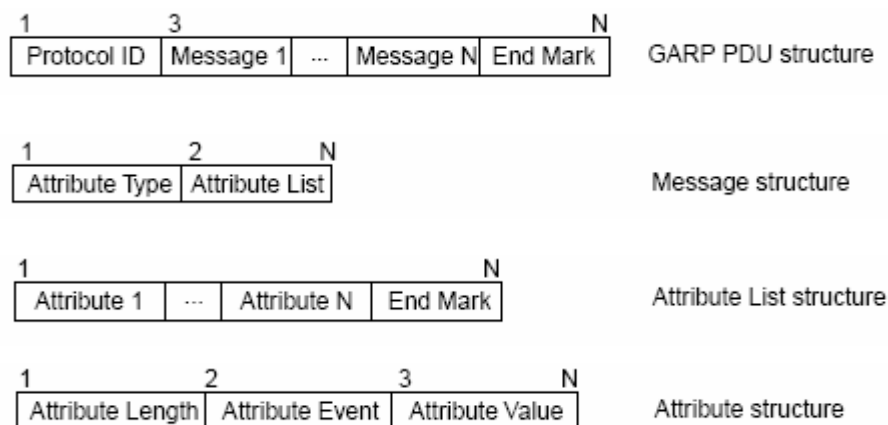


Figure 1-1 Format of GVRP packets

The following table describes the packet fields in the above figure.

Table 1-1 Description of the packet fields

Field	Description	Value
Protocol ID	Protocol ID	1
Message	Each message consists of two parts: Attribute Type and Attribute List.	—
Attribute Type	It is defined by specific GARP application.	The attribute type of GVRP is 0x01.
Attribute List	It contains multiple attributes.	—
Attribute	Each general attribute consists of three parts: Attribute Length, Attribute Event, Attribute Value. Each LeaveAll attribute consists of two parts: Attribute Length and LeaveAll Event.	—
Attribute Length	The length of the attribute	2 to 255

Field	Description	Value
Attribute Event	The event described by the attribute	0: LeaveAll Event 1: JoinEmpty 2: JoinIn 3: LeaveEmpty 4: LeaveIn 5: Empty
Attribute Value	The value of the attribute	The attribute value of GVRP is the VID.
End Mark	End mark of the GVRP PDU.	—

1.1.3 Protocol Specifications

GVRP is defined in IEEE 802.1Q standard.

1.2 GVRP Configuration

The GVRP configuration tasks include configuring the timers, enabling GVRP, and configuring the GVRP port registration mode.

1.2.1 Configuration Prerequisite

The port on which GVRP will be enabled must be configured to the Trunk port.

1.2.2 Configuration Procedure

Table 1-2 Configuration procedure

Operation	Command	Description
Enter system view	system-view	-
Enable GVRP globally.	gvrp	Required By default, GVRP is disabled globally.
Configure the LeaveAll timer	garp timer leaveall <i>timer-value</i>	Optional By default, the LeaveAll timer is set to 1,000 centiseconds.
Enter Ethernet port view	interface <i>interface-type</i> <i>interface-number</i>	This port must be a Trunk port.

Operation	Command	Description
Enable GVRP on the port	gvrp	Required By default, GVRP is disabled on port. After enabling GVRP on the Trunk port, you are not allowed to change the port type from Trunk to another.
Configure the Hold, Join, and Leave timers	garp timer { hold join leave } timer-value	Optional By default, the Hold, Join, and Leave timers are set to 10, 20, and 60 centiseconds respectively.
Configure GVRP port registration mode	gvrp registration { normal fixed forbidden }	Optional You can choose one of the three modes. By default, GVRP port registration mode is normal.
Display the GARP statistics	display garp statistics [interface interface-list]	You can execute the display commands in any view.
Display the values of the GARP timers	display garp timer [interface interface-list]	
Display the GVRP statistics	display gvrp statistics [interface interface-list]	
Display global GVRP status	display gvrp status	

You can use the **reset garp statistics [interface interface-list]** command to clear the GARP statistics.

The ranges of the timers vary depending on the values of other timers. You can set a timer to a value out of the current range by set the associated timer to another value.

The following table describes the relations between the timers:

Table 1-3 Relations between the timers

Timer	Lower threshold	Upper threshold
Hold	10 centiseconds	This upper threshold is less than or equal to one-half of the value of the Join timer. You can change the threshold by changing the value of the Join timer.

Timer	Lower threshold	Upper threshold
Join	This lower threshold is greater than or equal to twice the value of the Hold timer. You can change the threshold by changing the value of the Hold timer.	This upper threshold is less than one-half of the value of the Leave timer. You can change the threshold by changing the value of the Leave timer.
Leave	This lower threshold is greater than twice the value of the Join timer. You can change the threshold by changing the value of the Join timer.	This upper threshold is less than the value of the LeaveAll timer. You can change the threshold by changing the value of the LeaveAll timer.
LeaveAll	This lower threshold is greater than the value of the Leave timer. You can change threshold by changing the value of the Leave timer.	32,765 centiseconds

1.2.3 Configuration Example

I. Network requirements

You should enable GVRP on the switches to implement the dynamic registration and update of VLAN information between the switches.

II. Network diagram

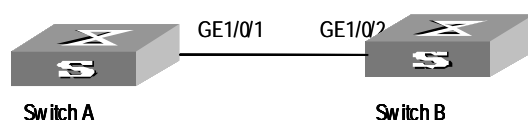


Figure 1-2 Network diagram for GVRP configuration

III. Configuration procedure

- Configure switch A:

Enable GVRP globally.

```
<Quidway> system-view
[Quidway] gvrp
```

Configure the port GigabitEthernet1/0/1 to the Trunk port, and allow all VLAN packets to pass through the port.

```
[Quidway] interface GigabitEthernet1/0/1
[Quidway-GigabitEthernet1/0/1] port link-type trunk
[Quidway-GigabitEthernet1/0/1] port trunk permit vlan all
```

Enable GVRP on the Trunk port.

```
[Quidway-Ethernet1/0/1] gvrp
```

- Configure switch B:

Enable GVRP globally.

```
<Quidway> system-view
```

```
[Quidway] gvrp
```

Configure the port GigabitEthernet1/0/2 to the Trunk port, and allow all VLAN packets to pass

```
[Quidway] interface GigabitEthernet1/0/2
```

```
[Quidway-GigabitEthernet1/0/2] port link-type trunk
```

```
[Quidway-GigabitEthernet1/0/2] port trunk permit vlan all
```

Enable GVRP on the Trunk port.

```
[Quidway-GigabitEthernet1/0/2] gvrp
```

1.3 Displaying GVRP

You can use the **display** commands here to display the GVRP configuration. You can execute the **display** commands in any view.

Table 1-4 Displaying GVRP

Operation	Command
Display the GARP statistics	display garp statistics [interface <i>interface-list</i>]
Display the values of GARP timers	display garp timer [interface <i>interface-list</i>]
Display the GVRP statistics	display gvrp statistics [interface <i>interface-list</i>]
Display the global GVRP status	display gvrp status
Clear the GARP statistics (in user view).	reset garp statistics [interface <i>interface-list</i>]

Chapter 2 GARP and GVRP Configuration Commands

2.1 GARP Configuration Commands

2.1.1 display garp statistics

Syntax

display garp statistics [**interface** *interface-list*]

View

Any view

Parameter

interface-list: Ethernet port list, in the format of *interface-list* = { *interface-type interface-number* [**to** *interface-type interface-number*] }&<1-10>. Where, *interface-type* is the port type, *interface-number* is the port number (refer to the parameter description in the Port part of the *Quidway S5600 Series Ethernet Switches Command Manual* for the meanings and ranges of the two parameter), and &<1-10> is the repeatable times of the expression (from 1 to 10). The GARP statistics about the ports in this list will be displayed.

Description

Use the **display garp statistics** command to display the GARP statistics.

The displayed information includes:

- Number of GMRP packets the port received
- Number of GVRP packets the port received
- Number of GMRP packets the port received
- Number of GVRP packets the port received
- Number of packets the port discarded

Example

Display the GARP statistics on the port GigabitEthernet1/0/1.

```
<Quidway> display garp statistics interface GigabitEthernet1/0/1
      GARP statistics on port GigabitEthernet1/0/1
      Number Of GMRP Frames Received           : 0
      Number Of GVRP Frames Received           : 0
      Number Of GMRP Frames Transmitted        : 0
```

```
Number Of GVRP Frames Transmitted      : 0
Number Of Frames Discarded              : 0
```

2.1.2 display garp timer

Syntax

display garp timer [**interface** *interface-list*]

View

Any view

Parameter

interface-list: Ethernet port list, in the format of *interface-list* = { *interface-type interface-number* [**to** *interface-type interface-number*] }&<1-10>. Where, *interface-type* is the port type, *interface-number* is the port number (refer to the parameter description in the Port part of the *Quidway S5600 Series Ethernet Switches Command Manual* for the meanings and ranges of the two parameter), and &<1-10> is the repeatable times of the expression (from 1 to 10). The timer information about the ports in this list will be displayed.

Description

Use the **display garp timer** command to display the values of the GARP timers.

The displayed information includes:

- Value of the Join timer
- Value of the Leave timer
- Value of the LeaveAll timer
- Value of the Hold timer

Related command: **garp timer**, **garp timer leaveall**.

Example

Display the values of GARP timers of the port GigabitEthernet1/0/1.

```
<Quidway> display garp timer interface GigabitEthernet1/0/1
GARP timers on port GigabitEthernet1/0/1
```

```
Garp Join Time           : 20 centiseconds
Garp Leave Time          : 60 centiseconds
Garp LeaveAll Time       : 1000 centiseconds
Garp Hold Time           : 10 centiseconds
```

2.1.3 garp timer

Syntax

garp timer { **hold** | **join** | **leave** } *timer-value*

undo garp timer { **hold** | **join** | **leave** }

View

Ethernet port view

Parameter

hold: GARP Hold timer. When a GARP entity receives a piece of registration information, it does not send out the Join message immediately. Instead, it starts the Hold timer, and sends out a Join message after the timer times out, so that all the registration information received before the timer times out can be put into the same frame that will be sent to save the bandwidth resources.

join: GARP Join timer. After the Join timer times out, the GARP entity sends out a Join message to indicate other GARP entities to register the information of its own.

leave: GARP Leave timer. When a GARP entity expects to unregister a piece of attribute information, it sends out a Leave message. Any GARP entity receives this message starts its Leave timer, and unregister the attribute information after the timer times out if it does not receives a Join message again before the timeout.

timer-value: Value of the specified GARP timer (Hold, Join or Leave) in centiseconds, with a step size of five. By default, it is 10, 20, and 60 for Hold, Join and Leave timers respectively.

Description

Use the **garp timer** command to set the GARP Hold, Join or Leaver timer of the port to a specified value.

Use the **undo garp timer** command to restore the default value of the GARP Hold, Join or Leaver timer of the port.

The ranges of the timers vary depending on the values of other timers. You can set a timer to a value out of the current range by set the associated timer to another value.

The following table describes the relations between the timers:

Table 2-1 Relations between the timers

Timer	Lower threshold	Upper threshold
Hold	10 centiseconds	This upper threshold is less than or equal to one-half of the value of the Join timer. You can change the threshold by changing the value of the Join timer.

Timer	Lower threshold	Upper threshold
Join	This lower threshold is greater than or equal to twice the value of the Hold timer. You can change the threshold by changing the value of the Hold timer.	This upper threshold is less than one-half of the value of the Leave timer. You can change the threshold by changing the value of the Leave timer.
Leave	This lower threshold is greater than twice the value of the Join timer. You can change the threshold by changing the value of the Join timer.	This upper threshold is less than the value of the LeaveAll timer. You can change the threshold by changing the value of the LeaveAll timer.
LeaveAll	This lower threshold is greater than the value of the Leave timer. You can change threshold by changing the value of the Leave timer.	32,765 centiseconds

Related command: **display garp timer**.

Example

Set the GARP Join timer to 20 centiseconds.

```
<Quidway> system-view
System View: return to User View with Ctrl+Z.
[Quidway] interface GigabitEthernet1/0/1
[Quidway-GigabitEthernet1/0/1] garp timer join 20
```

2.1.4 garp timer leaveall

Syntax

garp timer leaveall *timer-value*

undo garp timer leaveall

View

System view

Parameter

timer-value: Value of the GARP LeaveAll timer in centiseconds, ranging from 65 to 32,765, with a step size of five. This value must be greater than the value of the Leave timer. By default, it is 1,000 centiseconds (that is, 10 seconds).

Description

Use the **garp timer leaveall** command to set the GARP LeaveAll timer to a specified value.

Use the **undo garp timer leaveall** command to restore the default value of the GARP LeaveAll timer.

Once a GARP entity starts up, it starts the LeaveAll timer, and sends out a LeaveALL message after the timer times out, so that other GARP entities can re-register all the attribute information on this entity. After that, the entity restarts the LeaveAll timer to begin a new cycle.

Related command: **display garp timer**.

Example

Set the GARP LeaveAll timer to 100 centiseconds.

```
<Quidway> system-view
System View: return to User View with Ctrl+Z.
[Quidway] garp timer leaveall 100
```

2.1.5 reset garp statistics

Syntax

reset garp statistics [**interface** *interface-list*]

View

User view

Parameter

interface-list: Ethernet port list, in the format of *interface-list* = { *interface-type interface-number* [**to** *interface-type interface-number*] }&<1-10>. Where, *interface-type* is the port type, *interface-number* is the port number (refer to the parameter description in the Port part of the *Quidway S5600 Series Ethernet Switches Command Manual* for the meanings and ranges of the two parameter), and &<1-10> is the repeatable times of the expression (from 1 to 10).

Description

Use the **reset garp statistics** command to clear the GARP statistics (such as the information about the packets received/sent/discarded by GVRP/GMRP).

Executing the **reset garp statistics** command without parameter will clear the GARP statistics about all ports.

Related command: **display garp statistics**.

Example

```
# Clear GARP statistics about all ports.
```

```
<Quidway> reset garp statistics
```

2.2 GVRP Configuration Commands

2.2.1 display gvrp statistics

Syntax

```
display gvrp statistics [ interface interface-list ]
```

View

Any view

Parameter

interface-list: Ethernet port list, in the format of *interface-list* = { *interface-type interface-number* [**to** *interface-type interface-number*] }&<1-10>. Where, *interface-type* is the port type, *interface-number* is the port number (refer to the parameter description in the Port part of the *Quidway S5600 Series Ethernet Switches Command Manual* for the meanings and ranges of the two parameter), and &<1-10> is the repeatable times of the expression (from 1 to 10).

Description

Use the **display gvrp statistics** command to display the GVRP statistics about all or specified Trunk ports.

The displayed information includes:

- GVRP status
- Whether GVRP is running
- Number of the failed GVRP registrations
- The source MAC address of the last GVRP PDU
- GVRP registration type of the port

Example

```
# Display the GVRP statistics about the port GigabitEthernet1/0/1.
```

```
<Quidway> display gvrp statistics interface GigabitEthernet1/0/1  
GVRP statistics on port GigabitEthernet1/0/1
```

```
GVRP Status           : Enabled  
GVRP Running          : YES  
GVRP Failed Registrations : 0  
GVRP Last Pdu Origin   : 0000-0000-0000
```

GVRP Registration Type : Normal

2.2.2 display gvrp status

Syntax

display gvrp status

View

Any view

Parameter

None

Description

Use the **display gvrp status** command to display the enable/disable status of global GVRP.

Example

Display the enable/disable status of global GVRP.

```
<Quidway> display gvrp status  
GVRP is enabled
```

The above information indicates GVRP is enabled globally.

2.2.3 gvrp

Syntax

gvrp
undo gvrp

View

System view or Ethernet port view

Parameter

None

Description

Use the **gvrp** command to enable GVRP globally (in system view) or on a port (in Ethernet port view).

Use the **undo gvrp** command to disable GVRP globally (in system view) or on a port (in Ethernet port view).

By default, GVRP is disabled both globally and on ports.

Note that:

- Before enabling GVRP on a port, you must first enable GVRP globally.
- If GVRP is disabled globally, it is also disabled on ports and you are not allowed to enable it on port.
- You can enable/disable GVRP only on Trunk port.
- After enabling GVRP on the Trunk port, you are not allowed to change the port type from Trunk to another.

Related command: **display gvrp status**.

Example

Enable GVRP globally.

```
<Quidway> system-view
System View: return to User View with Ctrl+Z.
[Quidway] gvrp
```

2.2.4 gvrp registration

Syntax

gvrp registration { fixed | forbidden | normal }
undo gvrp registration

View

Ethernet port view

Parameter

fixed: Allows the manual creation and registration of VLAN on the current port, and inhibits the dynamic registration and unregistration of VLAN on the current port.

forbidden: Unregisters all the VLANs except VLAN 1 on the current port, and inhibits the creation and registration of any other VLAN on the current port.

normal: Allows both manual and dynamic creation, registration, and unregistration of VLANs on the current port.

Description

Use the **gvrp registration** command to configure the GVRP registration type on a port.

Use the **undo gvrp registration** command to restore the default GVRP registration type on a port.

By default, the registration type is **normal**.

Note that these commands can be operated only on Trunk port.

Related command: **display gvrp statistics**

Example

Configure the GVRP registration type on the port GigabitEthernet1/0/1 to fixed.

```
<Quidway> system-view
```

System View: return to User View with Ctrl+Z.

```
[Quidway] interface GigabitEthernet1/0/1
```

```
[Quidway-GigabitEthernet1/0/1] gvrp registration fixed
```