H3C S6800 Switch Series

EVB Configuration Guide

New H3C Technologies Co., Ltd.
http://www.h3c.com

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Preface

This configuration guide describes the application scenarios, fundamentals, and configuration of EVB.

This preface includes the following topics about the documentation:

- Audience.
- Conventions.
- Documentation feedback.

Audience

This documentation is intended for:

- Network planners.
- Field technical support and servicing engineers.
- Network administrators working with the S6800 switch series.

Conventions

The following information describes the conventions used in the documentation.

Command conventions

Convention	Description
Boldface	**Bold** text represents commands and keywords that you enter literally as shown.
Italic	*Italic* text represents arguments that you replace with actual values.
[ ]	Square brackets enclose syntax choices (keywords or arguments) that are optional.
{ x | y | ... }	Braces enclose a set of required syntax choices separated by vertical bars, from which you select one.
[x | y | ...]	Square brackets enclose a set of optional syntax choices separated by vertical bars, from which you select one or none.
{ x | y | ... } *	Asterisk marked braces enclose a set of required syntax choices separated by vertical bars, from which you select a minimum of one.
[x | y | ...] *	Asterisk marked square brackets enclose optional syntax choices separated by vertical bars, from which you select one choice, multiple choices, or none.
&<1-n>	The argument or keyword and argument combination before the ampersand (&) sign can be entered 1 to n times.
#	A line that starts with a pound (#) sign is comments.

GUI conventions

Convention	Description
Boldface	Window names, button names, field names, and menu items are in Boldface. For example, the **New User** window opens; click **OK**.
>	Multi-level menus are separated by angle brackets. For example, **File** > **Create** > **Folder**.

Symbols

Convention	Description
WARNING!	An alert that calls attention to important information that if not understood or followed can result in personal injury.
CAUTION:	An alert that calls attention to important information that if not understood or followed can result in data loss, data corruption, or damage to hardware or software.
IMPORTANT:	An alert that calls attention to essential information.
NOTE:	An alert that contains additional or supplementary information.
TIP:	An alert that provides helpful information.

Network topology icons

Convention	Description
	Represents a generic network device, such as a router, switch, or firewall.
	Represents a routing-capable device, such as a router or Layer 3 switch.
	Represents a generic switch, such as a Layer 2 or Layer 3 switch, or a router that supports Layer 2 forwarding and other Layer 2 features.
	Represents an access controller, a unified wired-WLAN module, or the access controller engine on a unified wired-WLAN switch.
	Represents an access point.
	Represents a wireless terminator unit.
	Represents a wireless terminator.
	Represents a mesh access point.
	Represents omnidirectional signals.
	Represents directional signals.
	Represents a security product, such as a firewall, UTM, multiservice security gateway, or load balancing device.
	Represents a security module, such as a firewall, load balancing, NetStream, SSL VPN, IPS, or ACG module.

Examples provided in this document

Examples in this document might use devices that differ from your device in hardware model, configuration, or software version. It is normal that the port numbers, sample output, screenshots, and other information in the examples differ from what you have on your device.

Documentation feedback

You can e-mail your comments about product documentation to info@h3c.com.

We appreciate your comments.

Contents

Configuring EVB

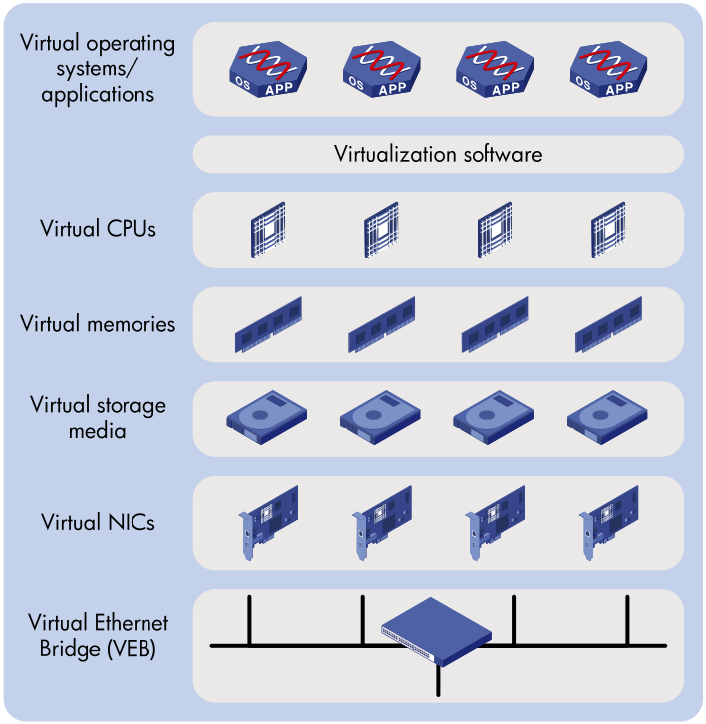
Overview

Edge Virtual Bridging (EVB) allows virtual machines (VMs) on a physical server to obtain bridge relay services through a common bridge port. It enables coordinated configuration and management of bridge services for VMs.

EVB requires a license to run on your device. For information about obtaining a license, see *Fundamentals Configuration Guide*.

Data center virtualization includes network virtualization, storage virtualization, and server virtualization. Server virtualization uses specific virtualization software such as VMware to create VMs on a single physical server. Each VM operates independently and has its own operating system, applications, and virtual hardware environments as shown in Figure 1.

Figure 1 Server virtualization



VMs on a physical server communicate with each other or with the outside network through a Virtual Ethernet Bridge (VEB). VEBs are implemented through software or hardware such as NICs. Both implementation methods have the following limitations:

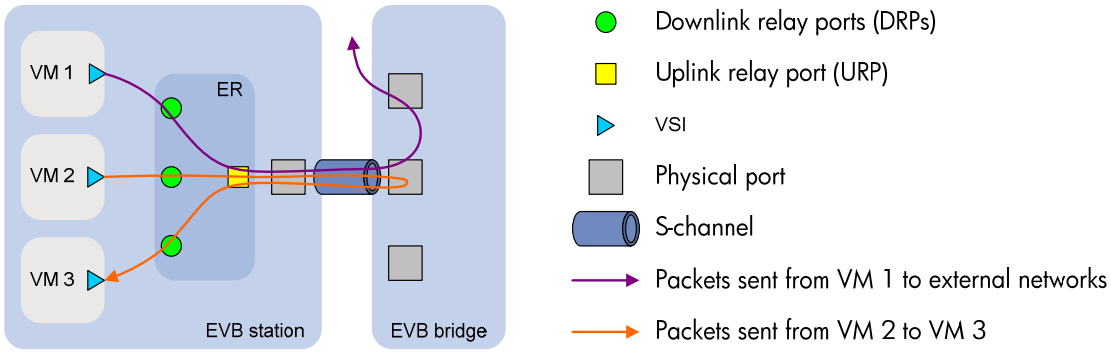
- Lack of traffic monitoring capabilities such as packets statistics, traffic mirroring, and NetStream.
- Lack of network policy enforcement capabilities, such as QoS.
- Lack of management scalability, especially in unified deployment of the internal server network and the external network.

EVB solves these limitations. It uses a physical switch (called EVB bridge) to switch traffic for VMs on a directly connected physical server (called EVB station). EVB implements traffic monitoring, network policy enforcement, and unified network deployment and management for VMs.

Basic concepts

Figure 2 shows the components on the EVB station and EVB bridge.

Figure 2 EVB architecture



- **Edge Relay**—An ER transfers packets between one URP and one or more DRPs. An ER has one or more DRPs and one URP. Both URP and DRPs are called ER ports. An EVB station can have multiple ERs.
- **S-channel**—A point-to-point S-VLAN established between a Port-mapping S-VLAN component in an EVB station and a Port-mapping S-VLAN component in an EVB bridge. An S-channel corresponds to the URP of an ER. On an EVB bridge, the end point of an S-channel is known as an S-channel interface. An S-channel is identified by the S-VLAN Identifier (SVID) and the S-channel Identifier (SCID), and the two values together are called an (SCID, SVID) pair.
- **Virtual Station Interface**—A VSI is a port on a VM that directly connects to the DRP of an ER. A VSI is associated with a logical entity called VSI instance, which is identified by the VSI Instance Identifier (VSIID). A VSI is associated with a virtual interface called VSI interface on the EVB bridge port to implement VM traffic management and policy configuration. A VSI interface can be considered as a subinterface of an S-channel.
- **Reflective Relay**—A RR is an operation mode in which a received frame on a port that supports this function can be forwarded out of the same port. The EVB bridge uses this mode to forward traffic among VMs on an EVB station, as shown in Figure 2.

EVB working mechanism

An EVB station and an EVB bridge go through the following steps to implement VM traffic management:

1. Use the S-channel Discovery and Configuration Protocol (CDCP) to establish an S-channel.

   CDCP is used to configure S-channels between stations and bridges. When a station creates or deletes an S-channel, CDCP sends a CDCP TLV in an LLDP packet that is addressed using the Nearest non-TPMR Bridge address to the bridge. The bridge creates or deletes the S-channel.
2. Exchange EVB TLVs through LLDP to negotiate EVB capabilities for the S-channel, such as RR, ECP parameters, and VDP parameters.
3. Use the VSI Discovery and Configuration Protocol (VDP) to associate the VSIs of VMs with the bridge port.

   The bridge uses the VSI interfaces to manage traffic for VMs.

   VDP manages the association between a VSI and a station-facing bridge port (SBP) on a bridge. VDP uses the Edge Control Protocol (ECP) to carry VDP TLVs. A VDP TLV comprises the VSIID, VSI type, and VSI version.

   When a station creates a VM, it sends a VDP pre-associate, pre-associate with resource reservation, or associate packet to the bridge. The bridge sends the request to a VSI manager. The VSI manager notifies the bridge to create a VSI interface and apply policies.

When a station shuts down a VM, it sends a VDP de-associate packet to the bridge. The bridge sends the request to the VSI manager. The VSI manager notifies the bridge to delete the VSI interface.

Protocols and standards

- IEEE P802.1Qbg/D2.2, *Draft Standard for Local and Metropolitan Area Networks—MAC Bridges and Virtual Bridged Local Area Networks - Amendment XX: Edge Virtual Bridging*

EVB configuration task list

This document only describes EVB bridge configuration. For information about EVB station configuration, see the station manual.

Tasks at a glance
Enabling EVB
Configuring LLDP
(Optional.) Specifying a default VSI manager
(Optional.) Configuring VDP negotiation parameters
(Optional.) Configuring an S-channel: • Creating an S-channel • Configuring an S-channel interface or S-channel aggregate interface • Configuring the RR mode for an S-channel • Configuring MAC address learning for an S-channel
(Optional.) Configuring a VSI interface or VSI aggregate interface: • Creating a VSI interface or VSI aggregate interface • Configuring VSI filters • Activating a VSI interface or VSI aggregate interface

Enabling EVB

Perform this task to enable EVB on an interface that directly connects to a station. After that, you must configure the interface to operate in trunk mode. Otherwise, EVB does not work because VSI filter configuration (see "Configuring VSI filters") does not take effect.

After EVB is enabled on an interface, the device cannot perform Layer 3 forwarding to the data received on the interface.

A default S-channel is created on an interface after EVB is enabled on the interface. Both SCID and SVID are 1. After an S-channel is created, an S-channel interface or S-channel aggregate interface is created and operates in access mode.

Do not enable both EVB and VLAN mapping, both EVB and TRILL, or both EVB and QinQ on the same interface.

Do not create a service instance for an interface enabled with EVB, and vice versa.

Do not assign interfaces enabled with EVB and not configured with the **trill evb-support** command to the same VLAN as interfaces enabled with TRILL. For more information about TRILL, see *TRILL Configuration Guide*. For more information about the **trill evb-support** command, see *TRILL Command Reference*.

To enable EVB:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter Layer 2 Ethernet interface view or Layer 2 aggregate interface view.	**interface** *interface-type interface-number*	N/A
3. Enable EVB.	**evb enable**	By default, EVB is disabled on an interface.

Configuring LLDP

EVB uses LLDP to transmit CDCP TLVs, and CDCP TLVs are carried by the LLDP packet that is addressed using the Nearest non-TPMR Bridge address, so you must configure LLDP.

For detailed information about the **lldp global enable**, **lldp enable** and **lldp agent nearest-nontpmr admin-status** commands, see *Layer 2—LAN Switching Command Reference*.

To configure LLDP:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enable LLDP globally.	**lldp global enable**	By default, LLDP is disabled globally.
3. Enter Layer 2 Ethernet interface view or Layer 2 aggregate interface view.	**interface** *interface-type interface-number*	N/A
4. Enable LLDP on the interface	**lldp enable**	By default, LLDP is enabled on an interface.
5. Configure the Nearest non-TPMR Bridge agent for LLDP to operate in TxRx mode.	**lldp agent nearest-nontpmr admin-status txrx**	The default mode is **disable**.

Specifying a default VSI manager

When the bridge receives a VDP packet (except for a De-Associate packet) from a station, it contacts the VSI manager specified in the VDP packet to get VSI interface resources and policies.

The VSI manager ID TLV in a VDP packet carries the VSI manager's IP address. If the value for the TLV is 0, the VDP packet does not contain a VSI manager's IP address, so the bridge communicates with the specified default VSI manager.

To specify a default VSI manager:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Specify a default VSI manager.	**evb default-manager** { { **ip** *ip-address* | **ipv6** *ipv6-address* | **name** *name* } [**port** *port-number*] | **local-server** }	By default, no default VSI manager is specified.

Configuring VDP negotiation parameters

After a station sends a VDP request other than a De-Associate request to the bridge, the bridge requests the VSI interface resources and policies from the VSI manager. If the bridge receives no response from the VSI manager before the VDP response-wait-delay time expires, the VDP negotiation fails. The VDP response-wait-delay time on the EVB bridge is calculated as:

VDP response-wait-delay time (seconds) = $2^{\text{VDP resource-wait-delay}} \times 10^{-5}$.

The value of the VDP resource wait-delay exponent is the larger of the values proposed by the station and bridge through EVB TLV.

When a Pre-Associate, Pre-Associate with Resource Reservation, or Associate request from a station is successfully handled, the VSI manager notifies the bridge to create a VSI interface for the corresponding VM. Then the bridge starts a "VDP keepalive timer" for the VSI interface. If the bridge receives no keepalive from the station before the timer expires, it releases resources reserved for the association. The VDP keepalive time is calculated as:

VDP keepalive time (seconds) = $1.5 \times [\ 2^{\text{VDP keepalive}} + (2 \times \text{ECP maximum retransmission time} + 1) \times 2^{\text{ECP retransmission}}\ ] \times 10^{-5}$.

The value assigned to the VDP keepalive exponent, the ECP maximum retransmission time, and the ECP retransmission exponent are the larger of the values proposed for each by the station and bridge through EVB TLV.

To configure VDP negotiation parameters:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter Layer 2 Ethernet interface view or Layer 2 aggregate interface view.	**interface** *interface-type interface-number*	N/A
3. Configure the VDP resource-wait-delay timer exponent.	**evb vdp timer resource-wait-delay exponent** *value*	The default is 20.
4. Configure the VDP keepalive timer exponent.	**evb vdp timer keepalive exponent** *value*	The default is 20.

Configuring an S-channel

Creating an S-channel

An S-channel is automatically created by CDCP, and the system automatically saves the configuration in the configuration file on the bridge. You can also manually create an S-channel by performing this task. If an (SCID, SVID) pair for an S-channel is created both automatically and manually, the one automatically created takes precedence.

After an S-channel is created, an S-channel interface or S-channel aggregate interface is generated. Removing an S-channel also removes the S-channel interface or S-channel aggregate interface. A manually created S-channel interface or S-channel aggregate interface operates in access mode. An S-channel interface or S-channel aggregate interface that is automatically created through CDCP operates in trunk mode.

An S-channel interface is associated with the S-channel that is created on a Layer 2 Ethernet interface. An S-channel aggregate interface is associated with the S-channel that is created on a Layer 2 aggregate interface. You can also create an S-channel bundle interface. An S-channel

bundle interface is a bundle of S-channel interfaces. For more information about S-channel bundle interfaces, see *Layer 2—LAN Switching Configuration Guide*.

The device checks C-VLAN tagged frames (frames taking the original VLAN tags) entering an S-channel for their C-VLAN tags. If the C-VLAN does not belong to the VLANs that the S-channel and the port where the S-channel is created permit, the device cannot transmit the frames. Therefore, you must specify the C-VLAN range for the frames that an S-channel can transmit before you assign the S-channel and the port where the S-channel is created to these C-VLANs. For more information about assigning ports to a VLAN, see *Layer 2—LAN Switching Configuration Guide*.

When you create an S-channel, follow these guidelines:

- Create an S-channel on an interface with EVB enabled. Otherwise, an error message appears.
- After EVB is enabled on an interface, a default S-channel (with both SCID and SVID as 1) is automatically created.
- When you manually create an S-channel, do not use the SCID or SVID being used by any other S-channel.
- To manually create or remove S-channel, disable CDCP that automatically performs these operations.

To create an S-channel:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter Layer 2 Ethernet interface view or Layer 2 aggregate interface view.	**interface** *interface-type interface-number*	N/A
3. Create an S-channel.	**evb s-channel** *channel-id* **service-vlan** *svlan-id*	By default, only an automatically created default S-channel (with both SCID and SVID as 1) exists on an interface with EVB enabled.

Configuring an S-channel interface or S-channel aggregate interface

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter S-channel interface or S-channel aggregate interface view.	**interface** { **s-channel** | **schannel-aggregation** } *interface-number*:*channel-id*	N/A
3. (Optional.) Configure the expected bandwidth of the interface.	**bandwidth** *bandwidth-value*	By default, the expected bandwidth of an S-channel interface or S-channel aggregate interface is the default maximum bandwidth of the physical port to which the interface belongs.
4. (Optional.) Restore the default settings for the interface.	**default**	N/A
5. (Optional.) Configure a description for the interface.	**description** *text*	The default description information is "*interface name* Interface."
6. Bring up the interface.	**undo shutdown**	By default, the S-channel interface or S-channel aggregate

Step	Command	Remarks
		interface is up.

Configuring the RR mode for an S-channel

EVB TLVs exchanged through LLDP allow an EVB station and EVB bridge to negotiate the use of reflective relay. When the EVB station requests the use of the RR mode and the EVB bridge supports the RR mode, the bridge performs the following tasks:

- Automatically enables the RR mode for the S-channel.
- Saves the configuration in the configuration file on the bridge.

You can also manually enable the RR mode for an S-channel by performing this task.

To configure the RR mode for an S-channel:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter S-channel interface view or S-channel aggregate interface view.	**interface** { **s-channel** | **schannel-aggregation** } *interface-number*:*channel-id*	N/A
3. Enable the RR mode for the S-channel.	**evb reflective-relay**	By default, the RR mode is disabled for an S-channel.

Configuring MAC address learning for an S-channel

You can manually disable the MAC address learning function for an S-channel by performing this task.

To disable MAC address learning for an S-channel:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter interface view.	• Enter S-channel interface view: **interface s-channel** *interface-number*:*channel-id* • Enter S-channel aggregate interface view: **interface schannel-aggregation** *interface-number*:*channel-id* • Enter S-channel bundle interface view: **interface schannel-bundle** *interface-number*	Use one method. For more information about S-channel bundle interfaces, see *Layer 2—LAN Switching Configuration Guide*.
3. Disable MAC address learning for the S-channel.	**evb mac-learning forbidden**	By default, the MAC address learning function is enabled for an S-channel. **IMPORTANT:** • For an S-channel with the RR mode disabled, do not

Step	Command	Remarks
		disable its MAC address learning function. Otherwise, the bridge might fail to forward traffic for VMs on the EVB station. • After you disable the MAC address learning function for an S-channel, the bridge will discard packets with an unknown source MAC address.

Configuring a VSI interface or VSI aggregate interface

Creating a VSI interface or VSI aggregate interface

A VSI interface is created on an S-channel interface through this task, and it is a subinterface of the S-channel interface. A VSI aggregate interface is created on an S-channel aggregate interface, and it is a subinterface of the S-channel aggregate interface. Removing an S-channel also removes all its VSI interfaces and VSI aggregate interfaces.

VSI interfaces or VSI aggregate interfaces are typically created by a VSI manager. You can create a VSI interface or VSI aggregate interface, or modify its Pre-Associate and Associate properties through this task.

To create a VSI interface or VSI aggregate interface:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter S-channel interface view or S-channel aggregate interface view.	**interface** { **s-channel** | **schannel-aggregation** } *interface-number*:*channel-id*	N/A
3. Create a VSI interface or VSI aggregate interface.	**evb vsi** *vsi-local-id* { **association** | **pre-association** }	By default, no VSI interface or VSI aggregate interface exists on an S-channel.

Configuring VSI filters

The EVB bridge uses a VSI filter to identify VSI traffic for a VM. Filters are usually assigned by a VSI manager. You can manually create or remove VSI filters through this task.

A VSI filter contains a set of VID values, MAC addresses, and group ID values. EVB supports the following filter info formats:

- VLAN ID
- VLAN ID + MAC
- Group ID + VLAN ID
- Group ID + VLAN ID + MAC

When you configure VSI filters on a VSI interface, follow these guidelines:

- Before you configure a VSI filter on a VSI interface, make sure the S-channel interface to which the VSI interface belongs operates in trunk mode. Otherwise, the VSI filter configuration fails.
- After you configure a VSI filter on a VSI interface, an S-channel interface automatically permits the VLAN that is configured in the VSI filter for the subordinate VSI interface. The same rule takes effect on Layer 2 interfaces associated with S-channels.
- When you delete a VSI filter that contains information about a VLAN on a VSI interface, the other VSI filters on all VSI interfaces of an S-channel interface might not contain the VLAN. If they do not, the S-channel interface automatically denies traffic from the VLAN that is configured on the VSI filter. The same rule takes effect on Layer 2 interfaces associated with S-channels.
- When a filter configured on a VSI contains information about a VLAN, you must not configure the filter on the same VSI interface again or on other VSI interfaces of the S-channel interface. If you do, an error message appears.
- If the VSI filter is a set of VID values, and the MAC address learning function for the corresponding S-channel is disabled, traffic for the VSI cannot be forwarded.
- Activate a VSI interface after configuring a VSI filter, and deactivate a VSI interface before removing a VSI filter.

When you configure VSI filters on a VSI aggregate interface, follow these guidelines:

- Before you configure a VSI filter on a VSI aggregate interface, make sure the S-channel aggregate interface to which the VSI aggregate interface belongs operates in trunk mode. Otherwise, the VSI filter configuration fails.
- After you configure a VSI filter on a VSI aggregate interface, an S-channel aggregate interface automatically permits the VLAN that is configured in the VSI filter for the subordinate VSI aggregate interface. The same rule takes effect on Layer 2 aggregate interfaces associated with S-channels.
- When you delete a VSI filter that contains information about a VLAN on a VSI aggregate interface, the other VSI filters on all VSI aggregate interfaces of an S-channel aggregate interface might not contain the VLAN. If they do not, the S-channel aggregate interface automatically denies traffic from the VLAN that is configured on the VSI filter. The same rule takes effect on Layer 2 aggregate interfaces associated with S-channels.
- When a filter configured on a VSI aggregate interface contains information about a VLAN, you must not configure the filter on the same VSI aggregate interface again or on other VSI aggregate interfaces of the S-channel aggregate interface. If you do, an error message appears.
- Activate a VSI aggregate interface after configuring a VSI filter, and deactivate a VSI aggregate interface before removing a VSI filter.

To configure a VSI filter:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter VSI interface view or VSI aggregate interface view.	**interface** { **s-channel** | **schannel-aggregation** } *interface-number*:*channel-id*.*vsi-local-id*	N/A
3. Configure a VSI filter.	**evb vsi filter** [**group** *group-id*] **vlan** *vlan-id* [**mac** *mac-address*]	By default, no VSI filter is configured.

Activating a VSI interface or VSI aggregate interface

Configurations such as traffic monitoring (see *ACL and QoS Configuration Guide*) on a VSI interface or VSI aggregate interface take effect only after the VSI interface or VSI aggregate interface is

activated. When a VSI interface or VSI aggregate interface is not activated, only configure filters on the VSI interface or VSI aggregate interface.

Activate a VSI interface or VSI aggregate interface after configuring a VSI filter, and deactivate a VSI interface or VSI aggregate interface before removing a VSI filter.

To activate a VSI interface or VSI aggregate interface:

Step	Command	Remarks
1. Enter system view.	**system-view**	N/A
2. Enter VSI interface view or VSI aggregate interface view.	**interface** { **s-channel** | **schannel-aggregation** } *interface-number:channel-id.vsi-local-id*	N/A
3. (Optional.) Configure the expected bandwidth of the VSI interface or VSI aggregate interface.	**bandwidth** *bandwidth-value*	By default, the expected bandwidth of a VSI interface or VSI aggregate interface is the default maximum bandwidth of the physical port to which the VSI interface or VSI aggregate interface belongs.
4. (Optional.) Restore the default settings for the VSI interface or VSI aggregate interface.	**default**	N/A
5. (Optional.) Configure a description for the VSI interface or VSI aggregate interface.	**description** *text*	The default description information is "*interface name* Interface."
6. Activate the VSI interface or VSI aggregate interface.	**evb vsi active**	By default, no VSI interface or VSI aggregate interface is activated.

Displaying and maintaining EVB

Execute **display** commands in any view and the **reset** command in user view.

Task	Command
Display CDCP negotiation information.	**display evb cdcp** [**interface** *interface-type interface-number*]
Display S-channel EVB TLV negotiation information.	**display evb evb-tlv** [**interface** *interface-type* { *interface-number* | *interface-number*:*channel-id* }]
Display S-channel information.	**display evb s-channel** [**interface** *interface-type interface-number*]
Display EVB summary.	**display evb summary**
Display VSI interface information.	**display evb vsi** [**verbose**] [**interface** *interface-type* { *interface-number* | *interface-number*:*channel-id* | *interface-number*:*channel-id*.*vsi-local-id* }]
Display information about an S-channel interface, S-channel aggregate interface, VSI interface, or a VSI aggregate interface.	• **display interface** [**s-channel** | **schannel-aggregation**] [**brief** [**down**]] • **display interface** [{ **s-channel** | **schannel-aggregation** } [*interface-number*:*channel-id* | *interface-number*:*channel-id*.*vsi-local-id*]] [**brief** [**description**]]
Clear statistics for an S-channel interface, S-channel aggregate	**reset counters interface** [{ **s-channel** | **schannel-aggregation** } [*interface-number*:*channel-id* |

Task	Command
interface, VSI interface, or a VSI aggregate interface.	*interface-number*:*channel-id*.*vsi-local-id*]]

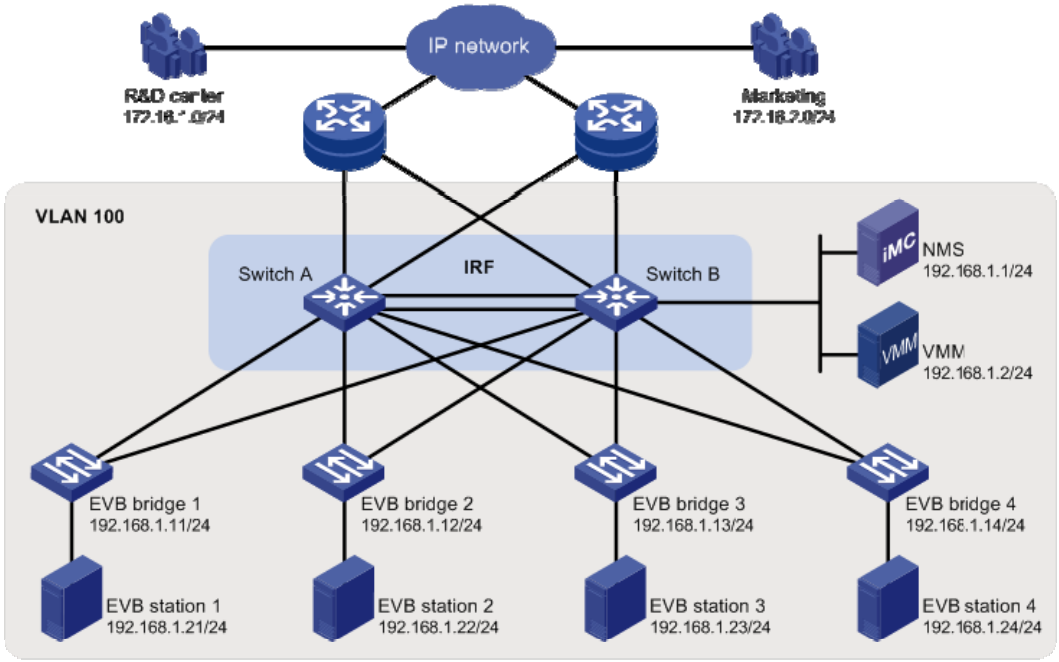
EVB configuration example

Network requirements

As shown in Figure 3, the Layer 2 network of a data center comprises two switches that form an IRF fabric, four EVB bridges, and four EVB stations. They communicate within VLAN 100.

Create VM 1 with a MAC address of 0050-5684-21C7 on EVB station 1, and set VM1 as the FTP server with a CIR of 2048 kbps and a PIR of 4096 kbps. Only the R&D center is allowed to access the network.

Figure 3 Network diagram



Configuration procedure

This section only contains EVB configurations.

Configuring the EVB bridge

Create VLAN 100 on EVB bridge 1.

```
<EVB_bridge1> system-view
[EVB_bridge1] vlan 100
[EVB_bridge1-vlan100] quit
```

Enable EVB on FortyGigE 1/0/1 that connects to EVB station 1, and configure FortyGigE 1/0/1 to operate in trunk mode.

```
[EVB_bridge1] interface FortyGigE 1/0/1
[EVB_bridge1-FortyGigE1/0/1] evb enable
```

```
[EVB_bridge1-FortyGigE1/0/1] port link-type trunk
[EVB_bridge1-FortyGigE1/0/1] quit
```

Enable LLDP on EVB bridge 1 globally. Enable LLDP on FortyGigE 1/0/1, and configure the Nearest non-TPMR Bridge agent for LLDP to operate in TxRx mode.

```
[EVB_bridge1] lldp global enable
[EVB_bridge1] interface FortyGigE 1/0/1
[EVB_bridge1-FortyGigE1/0/1] lldp enable
[EVB_bridge1-FortyGigE1/0/1] lldp agent nearest-nontpmr admin-status txrx
[EVB_bridge1-FortyGigE1/0/1] quit
```

Specify the IP address and port number for the default VSI manager on EVB bridge 1.

```
[EVB_bridge1] evb default-manager ip 192.168.1.1 port 8080
```

Configure other EVB bridges in the same way. (Details not shown.)

Configuring the EVB station

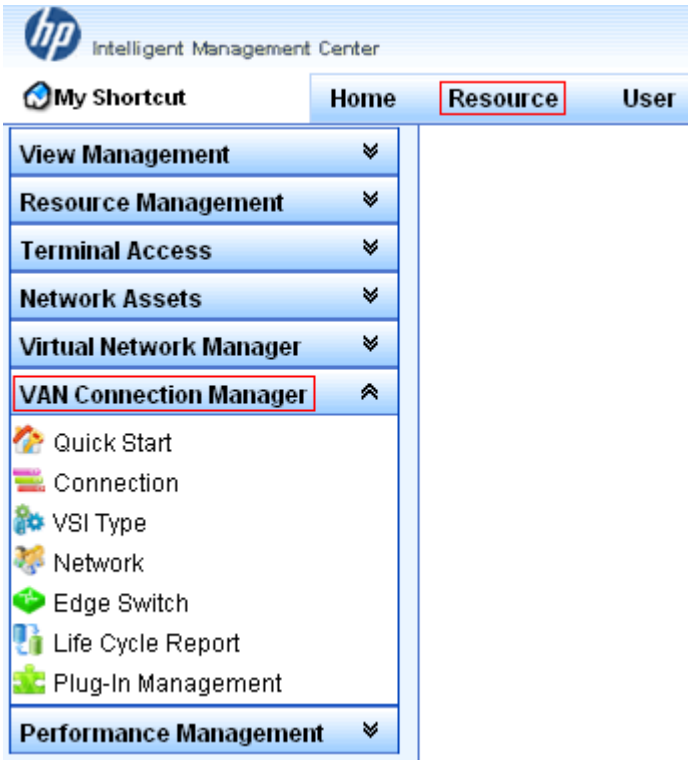
Configure the EVB station on the VMM. For more information about configuring VMs through the VMM, see the VMM manual. (Details not shown.)

Configuring the NMS

Use **VAN Connection Manager** of IMC on the NMS to configure network resources.

The IMC VCM 5.2 (E0401L01) version is used in this section.

Figure 4 VAN Connection Manager



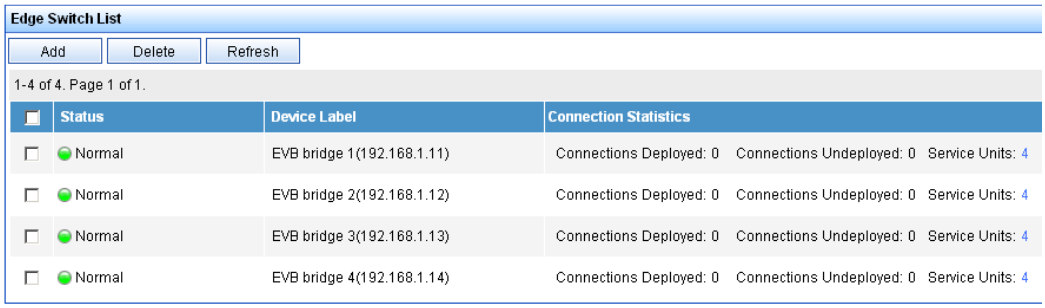
To configure the NMS, log in to IMC, click the **Resource** tab, and select **VAN Connection Manager** from the navigation tree (see Figure 4), and perform the following steps:

1. Add an EVB bridge (Edge Switch):

   Select **Edge Switch** from the navigation tree, click **Add** on the page that appears, select the four devices in the IP address range of 192.168.1.11 through 192.168.1.14 from **IP View**, and click **OK**.

EVB bridge 1, EVB bridge 2, EVB bridge 3, and EVB bridge 4 are displayed in the **Edge Switch List** page, as shown in Figure 5.

Figure 5 Edge Switch List page

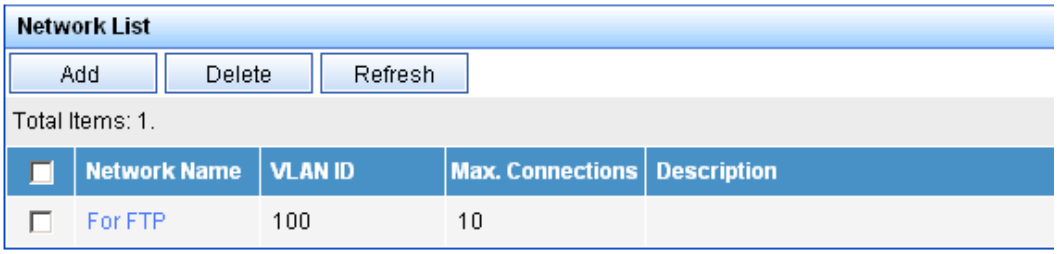


2. Add an FTP network:

   Select **Network** from the navigation tree, click **Add** on the page that appears, enter **For FTP** for **Name**, **100** for **VLAN ID**, and **10** for **Max. Connections**, and click **OK**.

   The network name **For FTP** is displayed in the **Network List** page, as shown in Figure 6.

   Figure 6 Network List page



3. Define the VSI type of VM 1:

   a. Select **VSI Type** from the navigation tree. The **VSI Type List** page appears.

   b. Click **Add**.

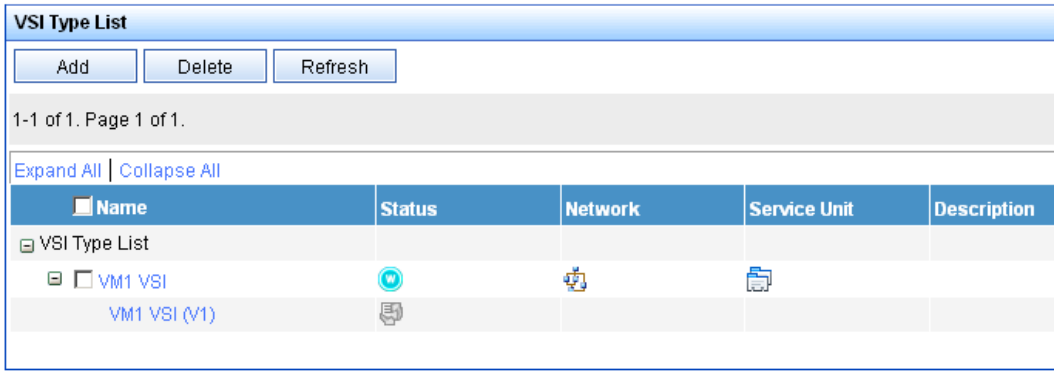
   c. On the page that appears, do the following:

   - Enter **VM1 VSI** for **Name**.
   - Select **For FTP** from the **Network** list, and select the **Bandwidth Control** and **VM Access Control** options.
   - Enter **172.16.1.0** for **Client IP** and **0.0.0.255** for **Wildcard Mask**.
   - Select **BOTH** from the **Filtering Direction** list.
   - Enter **2048** for **CIR (kbps)** and **4096** for **PIR (kbps)**.

   d. Click **Save and Release**.

   The VSI type **VM1 VSI** is displayed in the **VSI Type List** page, as shown in Figure 7.

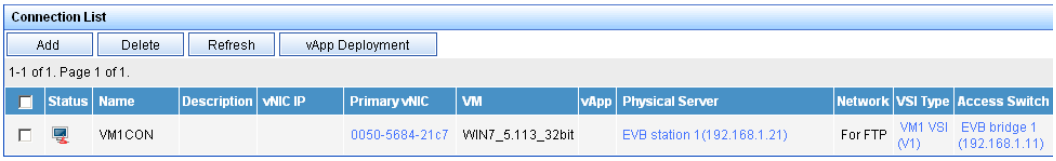
Figure 7 VSI Type List page



4. Bind the VSI type **VM1 VSI** to the vNIC of VM 1 to define the connection:
   a. Select **Connection** from the navigation tree. The **Connection List** page appears.
   b. Click **Add**.
   c. On the page that appears, do the following:
      – Enter **VM1CON** for **Name**.
      – Click **Select** on the right side of the page, select the **VM1** option from the popup window, and then click **OK** (the MAC address **0050-5684-21c7** of VM 1 is displayed in the **vNIC** field).
      – Select **For FTP** from the **Network** list, **VM1 VSI** from **VSI Type**, and **VM1 VSI (V1)** from **VSI Type Version**.
   d. Click **OK**.

      The connection **VM1CON** is displayed in the **Connection List** page, as shown in Figure 8.

Figure 8 Connection List page



Verifying the configuration

After VM 1 starts, the **VAN Connection Manager** service component of IMC deploys the VSI type **VM1 VSI** on EVB bridge 1. Only the R&D center can use the FTP service on VM 1.

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