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# Configuring EVB

## About EVB

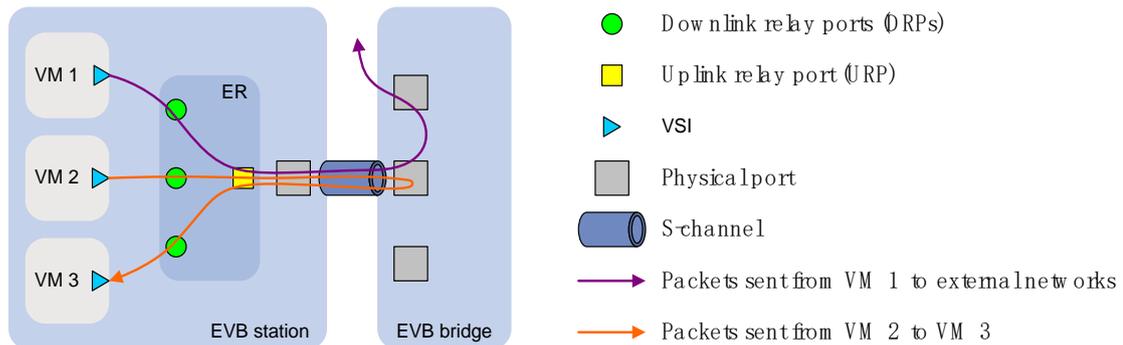
Edge Virtual Bridging (EVB) allows virtual machines (VMs) on a physical server to obtain bridge relay services through a common bridge port. It enables coordinated configuration and management of bridge services for VMs.

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

## Basic components

Figure 1 shows the components on the EVB station and EVB bridge.

Figure 1 EVB architecture



### ER

An Edge Relay (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.

### VSI

A Virtual Station Interface (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. A VSI interface can be considered a subinterface of an S-channel. An EVB bridge uses a VSI interface to implement VM traffic management, including VSI configuration, policy issuing, and packet statistics.

## RR mode

Reflective Relay (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 1](#).

## EVB negotiation process

An EVB station and EVB bridge use the following procedure for negotiation:

1. Use S-channel Discovery and Configuration Protocol (CDCP) to establish an S-channel.  
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 such as RR, ECP parameters, and VDP parameters for the S-channel.
3. Use VSI Discovery and Configuration Protocol (VDP) to associate the VSIs of VMs with the bridge port. The EVB station requests to associate with the EVB bridge for bridge port resources.

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 contains the VSIID, VSI type, and VSI version. The bridge uses the VSI interfaces to manage traffic for VMs.

## VSI manager

A VSI manager stores network policies such as VSI traffic management and deploys the policies when a VM accesses the network.

- 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, and 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, and 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*

## Restrictions: Hardware compatibility with EVB

The S6800 switch series and S6860 switch series support EVB. However, EVB is not supported in an IRF 3.1 system.

The S6820 switch series and S6861 switch series do not support EVB.

## Restrictions: Licensing requirements for EVB

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

# Restrictions and guidelines: EVB configuration

Except for the LLDP and VLAN settings in this chapter, do not configure other settings or enable any other Layer 2 protocols on an interface with EVB enabled.

Do not enable both EVB and TRILL on the same interface. For more information about TRILL, see *TRILL Configuration Guide*.

Do not assign ports that are enabled with EVB but not configured with the `trill evb-support` command to the same VLAN as ports that are enabled with TRILL. For more information about the `trill evb-support` command, see *TRILL Command Reference*.

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

## EVB tasks at a glance (802.1Qbg-based)

To configure 802.1Qbg-based EVB, perform the following tasks:

1. [Enabling EVB](#)
2. [Configuring LLDP](#)
3. (Optional.) [Specifying a default VSI manager](#)
4. (Optional.) [Configuring VDP negotiation parameters](#)
5. (Optional.) [Configuring an S-channel](#)
  - a. [Creating an S-channel](#)
  - b. [Configuring an S-channel interface or S-channel aggregate interface](#)
  - c. [Enabling the RR mode for an S-channel](#)
  - d. [Disabling MAC address learning for an S-channel](#)
  - e. [Restoring the default settings for an S-channel interface or S-channel aggregate interface](#)
6. (Optional.) [Configuring a VSI interface or VSI aggregate interface](#)
  - a. [Creating a VSI interface or VSI aggregate interface](#)
  - b. [Configuring a VSI filter](#)
  - c. [Activating a VSI interface or VSI aggregate interface](#)
  - d. [Restoring the default settings for a VSI interface or VSI aggregate interface](#)

## Enabling EVB

### Restrictions and guidelines

Perform this task to enable EVB on an interface that directly connects to a station.

### Procedure

1. Enter system view.  
`system-view`
2. Enter Layer 2 Ethernet interface view or Layer 2 aggregate interface view.  
`interface interface-type interface-number`
3. Restore the default settings for the interface.  
`default`
4. Set the link type to trunk.  
`port link-type trunk`

By default, the link type is access for an interface.

5. Enable EVB.

**evb enable**

By default, EVB is disabled on an interface.

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

## Configuring LLDP

### About LLDP on EVB

You must configure LLDP because 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.

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

### Procedure

1. Enter system view.

**system-view**

2. Enable LLDP globally.

**lldp global enable**

The default setting varies by the startup configuration.

- If the device starts up with the empty configuration, LLDP is disabled globally.
- If the device starts up with the factory defaults, LLDP is enabled globally.

For more information about the empty configuration and factory defaults, see configuration file management in *Fundamentals Configuration Guide*.

3. Enter Layer 2 Ethernet interface view or Layer 2 aggregate interface view.

**interface interface-type interface-number**

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

### About the default VSI manager

When the bridge receives a VDP packet (except for de-associate packets) from a station, it obtains VSI interface resources and policies for the station from the VSI manager specified in the VDP packet.

The VSI manager ID TLV in a VDP packet carries an IP address of a VSI manager. If the value for the TLV is 0, the VDP packet does not contain a VSI manager IP address. Perform this task to specify a default VSI manager for the bridge.

## Procedure

1. Enter system view.

**system-view**

2. Specify a default VSI manager.

```
evb default-manager { { ip ipv4-address | ipv6 ipv6-address | name name }  
[ port port-number ] | local-server }
```

By default, no default VSI manager is specified.

# Configuring VDP negotiation parameters

## About VDP negotiation parameters

The following parameters are used for VDP negotiation:

- VDP response-wait-delay time

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 does not receive a 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 by using the following formula:

VDP response-wait-delay time =  $2^{\text{VDP resource-wait-delay}} \times 10^{-5}$ . The measurement unit is second.

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

- VDP keepalive time

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 does not receive a keepalive from the station before the timer expires, it releases resources reserved for the association. The VDP keepalive time is calculated by using the following formula:

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

The values 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.

## Restrictions and guidelines

When the total number of VSI interfaces and VSI aggregate interfaces on the device exceeds 512, make sure the VDP keepalive exponent is larger than the default value. If the exponent is not larger than the default value, some VSI interfaces or VSI aggregate interfaces might be automatically deleted.

## Procedure

1. Enter system view.

**system-view**

2. Enter Layer 2 Ethernet interface view or Layer 2 aggregate interface view.

```
interface interface-type interface-number
```

3. Set the VDP resource-wait-delay timer exponent.

```
evb vdp timer resource-wait-delay exponent value
```

The default is 20.

4. Set the VDP keepalive timer exponent.

```
evb vdp timer keepalive exponent value
```

The default is 20.

# Configuring an S-channel

## Creating an S-channel

### About S-channels

An S-channel is automatically created by CDCP, and the system automatically saves the configuration in the configuration file on the bridge. You can perform this task to manually create an S-channel. If you create an S-channel that has the same number as an automatically created S-channel, the (SCID, SVID) pair configuration for the automatically created S-channel takes precedence over the (SCID, SVID) pair configuration for the manually created S-channel.

### Restrictions and guidelines

Create an S-channel on an interface with EVB enabled.

Do not use the SCID or SVID being used by any other S-channels.

To manually create or remove an S-channel, disable CDCP.

### Procedure

1. Enter system view.  
**system-view**
2. Enter Layer 2 Ethernet interface view or Layer 2 aggregate interface view.  
**interface** *interface-type interface-number*
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

### About S-channel interfaces and S-channel aggregate interfaces

Creating an S-channel also creates an S-channel interface or S-channel aggregate interface. Removing an S-channel also removes the S-channel interface or S-channel aggregate interface.

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*.

### Procedure

1. Enter system view.  
**system-view**
2. Enter S-channel interface view or S-channel aggregate interface view.  
**interface** { **s-channel** | **schannel-aggregation** }  
*interface-number:channel-id*
3. (Optional.) Set the expected bandwidth of the interface.

**bandwidth** *bandwidth-value*

By default, the expected bandwidth of an interface is the default maximum bandwidth of the physical port to which the interface belongs.

4. Set the link type to trunk.

**port link-type trunk**

By default, the link type is access for an interface.

If the link type of the interface has been set to trunk, the automatically created S-channel interface or S-channel aggregate interface operates in trunk mode. You do not need to perform this task. For other S-channel interfaces and S-channel aggregate interfaces, you must perform this task.

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, an interface is not administratively down.

## Enabling the RR mode for an S-channel

### About the RR mode for an S-channel

EVB TLVs exchanged through LLDP allow an EVB station and EVB bridge to negotiate the RR mode. If the EVB bridge supports the RR mode, when the EVB station requests the use of the RR mode, the bridge performs the following operations:

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

You can perform this task to manually enable the RR mode for an S-channel.

### Procedure

1. Enter system view.

**system-view**

2. Enter S-channel interface view or S-channel aggregate interface view.

**interface** { **s-channel** | **schannel-aggregation** }  
*interface-number:channel-id*

3. Enable the RR mode for the S-channel.

**evb reflective-relay**

By default, the RR mode is disabled for an S-channel.

## Disabling MAC address learning for an S-channel

### Restrictions and guidelines

For the bridge to successfully forward traffic for VMs on the EVB station, do not disable MAC address learning on an S-channel with the RR mode disabled.

After you disable the MAC address learning function for an S-channel, the bridge will discard packets with an unknown source MAC address.

The **undo evb mac-learning forbidden** command and the **mac-address mac-learning enable** command must be configured together to avoid communication interruption. For more

information about the **mac-address mac-learning enable** command, see *Layer 2—LAN Switching Command References*.

## Procedure

1. Enter system view.  
**system-view**
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*
3. Disable MAC address learning for the S-channel.  
**evb mac-learning forbidden**  
By default, MAC address learning is enabled for an S-channel.

## Restoring the default settings for an S-channel interface or S-channel aggregate interface

### Restrictions and guidelines

The **default** command might interrupt ongoing network services. Make sure you are fully aware of the impacts of this command when you execute it on a live network.

This command might fail to restore the default settings for some commands for reasons such as command dependencies and system restrictions. Use the **display this** command in interface view to identify these commands. Then use their **undo** forms or follow the command reference to individually restore their default settings. If your restoration attempt still fails, follow the error message instructions to resolve the problem.

## Procedure

1. Enter system view.  
**system-view**
2. Enter S-channel interface view or S-channel aggregate interface view.  
**interface { s-channel | schannel-aggregation }**  
*interface-number:channel-id*
3. Restore the default settings for the interface.  
**default**

## Configuring a VSI interface or VSI aggregate interface

## Creating a VSI interface or VSI aggregate interface

### About VSI interfaces and VSI aggregate interfaces

VSI interfaces or VSI aggregate interfaces are typically created by a VSI manager. You can perform this task to create a VSI interface on an S-channel interface or create a VSI aggregate interface on

an S-channel aggregate interface. In addition, you can perform this task to modify the Pre-Associate and Associate properties of a VSI interface or VSI aggregate interface.

## Restrictions and guidelines

Removing an S-channel also removes all its VSI interfaces and VSI aggregate interfaces.

When the total number of VSI interfaces and VSI aggregate interfaces on the device exceeds 512, make sure the VDP keepalive exponent is larger than the default value. If the exponent is not larger than the default value, some VSI interfaces or VSI aggregate interfaces might be automatically deleted.

## Procedure

1. Enter system view.  
**system-view**
2. Enter S-channel interface view or S-channel aggregate interface view.  
**interface { s-channel | schannel-aggregation }**  
*interface-number:channel-id*
3. Create a VSI interface or VSI aggregate interface.  
**evb vsi vsi-local-id { association | pre-association }**

# Configuring a VSI filter

## About VSI filters

The EVB bridge uses a VSI filter to identify VSI traffic for a VM. Typically a VSI manager assigns filters to VMs. Perform this task to manually create or remove a VSI filter.

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.

## Restrictions and guidelines for configuring a VSI filter

When you configure a VSI filter on a VSI interface, follow these restrictions and guidelines:

- When you create a VSI filter, the following interfaces automatically permit the VLAN contained in the VSI filter:
  - The S-channel interface to which the VSI interface belongs.
  - The Layer 2 Ethernet interface where the S-channel that is associated with the S-channel interface is created.
- Before you delete a VSI filter, you must deactivate the VSI interface. When you delete a VSI filter, the following interfaces automatically deny the VLAN in the filter if the VSI filters on the other VSI interfaces created on the same S-channel interface do not contain the VLAN:
  - The S-channel interface to which the VSI interface belongs.
  - The Layer 2 Ethernet interface where the S-channel that is associated with the S-channel interface is created.
- Do not create a VSI filter that contains the same VLAN on the same VSI interface or on other VSI interfaces that belong to the same S-channel interface. If you do so, the system displays an error message.
- Disabling MAC address learning for an S-channel prevents the traffic from the VSI from being forwarded if the VSI filter contains the VLAN to which the traffic belongs.

When you configure a VSI filter on a VSI aggregate interface, follow these restrictions and guidelines:

- When you create a VSI filter, the following interfaces automatically permit the VLAN contained in the VSI filter:
  - The S-channel aggregate interface to which the VSI aggregate interface belongs.
  - The Layer 2 aggregate interface where the S-channel that is associated with the S-channel aggregate interface is created.
- Before you delete a VSI filter, you must deactivate the VSI aggregate interface. When you delete a VSI filter, the following interfaces automatically deny the VLAN in the filter if the VSI filters on the other VSI aggregate interfaces created on the same S-channel aggregate interface do not contain the VLAN:
  - The S-channel aggregate interface to which the VSI aggregate interface belongs.
  - The Layer 2 aggregate interface where the S-channel that is associated with the S-channel aggregate interface is created.
- Do not create a VSI filter that contains the same VLAN on the same VSI aggregate interface or on other VSI aggregate interfaces that belong to the same S-channel aggregate interface. If you do so, the system displays an error message.

## Procedure

1. Enter system view.  
**system-view**
2. Enter VSI interface view or VSI aggregate interface view.  
**interface { s-channel | schannel-aggregation }**  
*interface-number:channel-id.vsi-local-id*
3. Configure a VSI filter.  
**evb vsi filter [ group group-id ] vlan vlan-id [ mac mac-address ]**  
By default, no VSI filters exist.

# Activating a VSI interface or VSI aggregate interface

## Restrictions and guidelines

Traffic policy configuration on a VSI interface or VSI aggregate interface takes effect only when the VSI interface or VSI aggregate interface is activated. When a VSI interface or VSI aggregate interface is not activated, do not configure any settings other than filters on either interface. For more information about traffic policing, see *ACL and QoS Configuration Guide*.

Activate a VSI interface or VSI aggregate interface after configuring a VSI filter.

## Procedure

1. Enter system view.  
**system-view**
2. Enter VSI interface view or VSI aggregate interface view.  
**interface { s-channel | schannel-aggregation }**  
*interface-number:channel-id.vsi-local-id*
3. (Optional.) Set the expected bandwidth of the 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 interface belongs.
4. (Optional.) Configure a description for the interface.  
**description text**

The default description information is "*interface name* **Interface**."

5. Activate the VSI interface or VSI aggregate interface.

```
evb vsi active
```

By default, no VSI interface or VSI aggregate interfaces are activated.

## Restoring the default settings for a VSI interface or VSI aggregate interface

### Restrictions and guidelines

The **default** command might interrupt ongoing network services. Make sure you are fully aware of the impacts of this command when you execute it on a live network.

This command might fail to restore the default settings for some commands for reasons such as command dependencies and system restrictions. Use the **display this** command in interface view to identify these commands. Then use their **undo** forms or follow the command reference to individually restore their default settings. If your restoration attempt still fails, follow the error message instructions to resolve the problem.

### Procedure

1. Enter system view.  
**system-view**
2. Enter VSI interface view or VSI aggregate interface view.  
**interface** { **s-channel** | **schannel-aggregation** }  
*interface-number:channel-id.vsi-local-id*
3. Restore the default settings for the interface.  
**default**

## Display and maintenance commands for EVB

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

Task	Command
Display CDCP negotiation information.	<b>display evb cdcp</b> [ <b>interface</b> <i>interface-type interface-number</i> ]
Display S-channel EVB TLV negotiation information.	<b>display evb evb-tlv</b> [ <b>interface</b> <i>interface-type</i> { <i>interface-number</i>   <i>interface-number:channel-id</i> } ]
Display S-channel information.	<b>display evb s-channel</b> [ <b>interface</b> <i>interface-type interface-number</i> ]
Display EVB summary.	<b>display evb summary</b>
Display VSI interface information.	<b>display evb vsi</b> [ <b>verbose</b> ] [ <b>interface</b> <i>interface-type</i> { <i>interface-number</i>   <i>interface-number:channel-id</i>   <i>interface-number:channel-id.vsi-local-id</i> } ]
Display information about an S-channel interface, an S-channel aggregate interface, a VSI interface, or a VSI aggregate interface.	<b>display interface</b> [ { <b>s-channel</b>   <b>schannel-aggregation</b> } [ <i>interface-number:channel-id</i>   <i>interface-number:channel-id.vsi-local-id</i> ] ]

Task	Command
	[ <b>brief</b> [ <b>description</b>   <b>down</b> ] ]
Clear statistics for an S-channel interface, an S-channel aggregate interface, a VSI interface, or a VSI aggregate interface.	<b>reset counters interface</b> [ { <b>s-channel</b>   <b>schannel-aggregation</b> } [ <i>interface-number:channel-id</i>   <i>interface-number:channel-id.vsi-local-id</i> ] ]

## EVB configuration examples

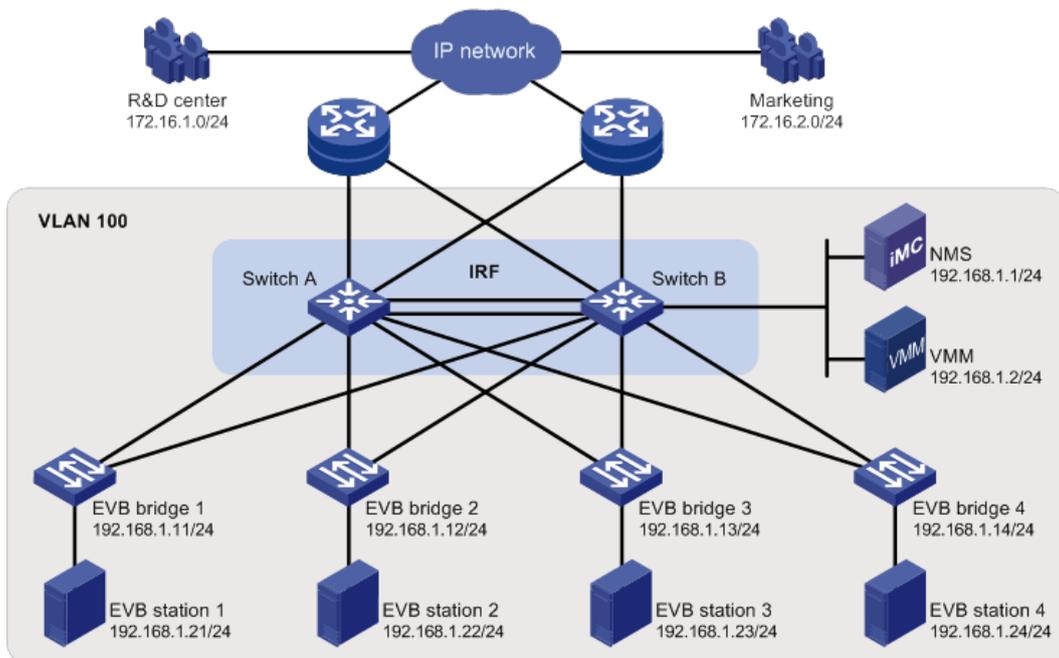
### Example: Configuring basic EVB

#### Network configuration

As shown in [Figure 2](#), the Layer 2 network of a data center contains two switches that form an IRF fabric, four EVB bridges, and four EVB stations. They communicate within VLAN 100.

Create VM 1 with MAC address 0050-5684-21C7 on EVB station 1, and configure 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 2 Network diagram**



#### NOTE:

This section only contains EVB settings.

#### 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 Ten-GigabitEthernet 1/0/1 that connects to EVB station 1, and configure Ten-GigabitEthernet 1/0/1 to operate in trunk mode.

```
[EVB_bridge1] interface ten-gigabitethernet 1/0/1
[EVB_bridge1-Ten-GigabitEthernet1/0/1] evb enable
[EVB_bridge1-Ten-GigabitEthernet1/0/1] port link-type trunk
[EVB_bridge1-Ten-GigabitEthernet1/0/1] quit
```

# Enable LLDP on EVB bridge 1 globally. Enable LLDP on Ten-GigabitEthernet 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 ten-gigabitethernet 1/0/1
[EVB_bridge1-Ten-GigabitEthernet1/0/1] lldp enable
[EVB_bridge1-Ten-GigabitEthernet1/0/1] lldp agent nearest-nontpmr admin-status txrx
[EVB_bridge1-Ten-GigabitEthernet1/0/1] 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

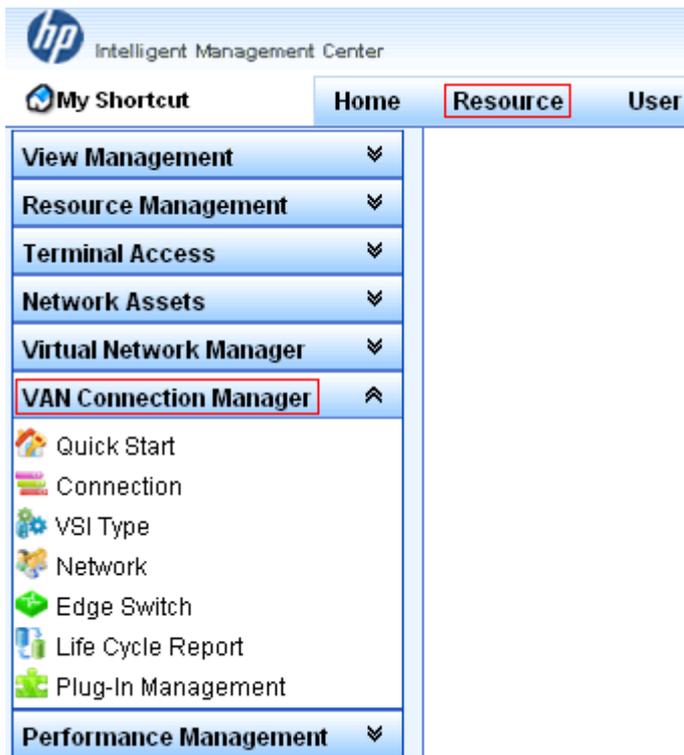
# Configure the EVB station on the VMM. For more information about configuring VMs through the VMM, see the VMM manual. (Details not shown.)

## Configuring the NMS

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

The IMC PLAT 5.2 (E0401) and IMC CRM 5.2 (E0401) versions are used in this section.

**Figure 3 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 3](#)), and perform the following steps:

1. Add an EVB bridge (Edge Switch):
  - a. Select **Edge Switch** from the navigation tree.
  - b. Click **Add** on the page that appears.
  - c. Select the four devices in the IP address range of 192.168.1.11 through 192.168.1.14 from **IP View**.
  - d. 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 4](#).

**Figure 4 Edge Switch List page**

Edge Switch List			
<input type="button" value="Add"/> <input type="button" value="Delete"/> <input type="button" value="Refresh"/>			
1-4 of 4. Page 1 of 1.			
<input type="checkbox"/>	Status	Device Label	Connection Statistics
<input type="checkbox"/>	Normal	EVB bridge 1(192.168.1.11)	Connections Deployed: 0 Connections Undeployed: 0 Service Units: 4
<input type="checkbox"/>	Normal	EVB bridge 2(192.168.1.12)	Connections Deployed: 0 Connections Undeployed: 0 Service Units: 4
<input type="checkbox"/>	Normal	EVB bridge 3(192.168.1.13)	Connections Deployed: 0 Connections Undeployed: 0 Service Units: 4
<input type="checkbox"/>	Normal	EVB bridge 4(192.168.1.14)	Connections Deployed: 0 Connections Undeployed: 0 Service Units: 4

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 on the **Network List** page, as shown in [Figure 5](#).

**Figure 5 Network List page**

Network List				
<input type="button" value="Add"/> <input type="button" value="Delete"/> <input type="button" value="Refresh"/>				
Total Items: 1.				
<input type="checkbox"/>	Network Name	VLAN ID	Max. Connections	Description
<input type="checkbox"/>	For FTP	100	10	

3. Define the VSI type of VM 1:
  - a. Select **VSI Type** from the navigation tree, and click **Add** on the **VSI Type List** page.
  - b. Enter **VM1 VSI** for **Name**.
  - c. Select **For FTP** from the **Network** list, and select the **Bandwidth Control** and **VM Access Control** options.
  - d. Enter **172.16.1.0** for **Client IP** and **0.0.0.255** for **Wildcard Mask**.
  - e. Select **BOTH** from the **Filtering Direction** list.
  - f. Enter **2048** for **CIR (kbps)** and **4096** for **PIR (kbps)**.
  - g. Click **Save and Release**.

The VSI type **VM1 VSI** is displayed on the **VSI Type List** page, as shown in [Figure 6](#).

**Figure 6 VSI Type List page**

VSI Type List				
<input type="button" value="Add"/> <input type="button" value="Delete"/> <input type="button" value="Refresh"/>				
1-1 of 1. Page 1 of 1.				
<a href="#">Expand All</a>   <a href="#">Collapse All</a>				
Name	Status	Network	Service Unit	Description
<input type="checkbox"/> VSI Type List <ul style="list-style-type: none"> <li> <input type="checkbox"/> VM1 VSI                     <ul style="list-style-type: none"> <li>VM1 VSI (V1)</li> </ul> </li> </ul>				

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

The connection **VM1CON** is displayed in the **Connection List** page, as shown in [Figure 7](#).

**Figure 7 Connection List page**

Connection List										
<input type="button" value="Add"/> <input type="button" value="Delete"/> <input type="button" value="Refresh"/> <input type="button" value="vApp Deployment"/>										
1-1 of 1. Page 1 of 1.										
Status	Name	Description	vNIC IP	Primary vNIC	VM	vApp	Physical Server	Network	VSI Type	Access Switch
<input type="checkbox"/>	VM1CON			0050-5684-21c7	WIN7_5.113_32bit		EVB station 1(192.168.1.21)	For FTP	VM1 VSI (V1)	EVB bridge 1 (192.168.1.11)

### 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. (Details not shown.)