



Setting Up VLAN Translation

This appendix describes how to set up VLAN translation for L2VPN ERS services. It contains the following sections:

- [VLAN Translation Overview, page A-1](#)
- [Setting Up VLAN Translation, page A-2](#)
- [Platform-Specific Usage Notes, page A-6](#)



Note

Review [Platform-Specific Usage Notes, page A-6](#) for helpful information to be aware of before you create policies and services using VLAN translation.

VLAN Translation Overview

VLAN translation provides flexibility in managing VLANs and Metro Ethernet-related services. There are two types of VLAN translation—one is 1 to 1 translation (1:1), and the other one is 2 to 1 translation (2:1). This feature is available for L2VPN ERS (with and without a CE). Because ISC does not support the Ethernet interface type on L2TPv3 (the IP-based L2VPN service), VLAN translation is not available for L2TPv3. The behavior of L2VPN EWS service remains the same even though it is true that it is possible now for one Q-in-Q port to be shared by both EWS and ERS service. VLAN translation is only for an Ethernet interface, not for other types of interfaces, such as ATM and Frame Relay.

With 1:1 VLAN translation, the VLAN of the incoming traffic (CE VLAN) is replaced by another VLAN (PE VLAN). It means the SP is now able to handle the situation where incoming traffic from two different customers share the same CE VLAN. The SP can map these two CE VLANs to two different PE VLANs, and customer traffic will not be mixed.

With 2:1 VLAN translation, the double tagged (Q-in-Q) traffic at the U-PE UNI port can be mapped to different flows to achieve service multiplexing. The translation is based on the combination of the CE VLAN (inner tag) and the PE VLAN (outer tag). Without this translation, all the traffic from a Q-in-Q port can only go to one place because it is switched only by the outer tag.

Setting Up VLAN Translation

The following sections described how to create and manage policies and service requests to support VLAN translation:

- [Creating a Policy, page A-2](#)
- [Creating a Service Request, page A-3](#)
- [Modifying a Service Request, page A-5](#)
- [Deleting a Service Request, page A-6](#)

Creating a Policy

VLAN translation is specified during policy creation for L2VPN for ERS (with and without a CE). The L2VPN (Point to Point) Editor window contains a new option called “VLAN Translation,” as shown in [Figure A-1](#).

Figure A-1 VLAN Translation Option in the L2VPN (Point to Point) Editor Window

VLAN Translation	☒ No ☐ 1:1 ☐ 2:1	☒
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There are three options for VLAN translation:

- **No**—This is the default choice. No VLAN translation is performed.



Note

If you select **No** and you do not want to deal with any behavior related to VLAN trans during service request creation, then deselect the **Editable** check box. This is the recommendation when you select no VLAN translation.

- **1:1**—1:1 VLAN translation. The VLAN of the incoming traffic (CE VLAN) is replaced by another VLAN (PE VLAN). The specification of the VLAN translation is done during the creation of the service request for the policy, as covered in [Creating a Service Request, page A-3](#).
- **2:1**—2:1 VLAN translation. The double tagged (Q-in-Q) traffic at the U-PE UNI port can be mapped to different flows to achieve service multiplexing. When you select 2:1 VLAN translation, the L2VPN (Point to Point) Editor window dynamically changes to enable you to select where the 2:1 VLAN translation takes place, as shown in [Figure A-2](#).

Figure A-2 Select Where 2:1 VLAN Translation Takes Place

VLAN Translation	☐ No ☐ 1:1 ☒ 2:1	☒
Select where 2:1 translation takes place	☒ Auto ☐ U-PE ☐ PE-AGG ☐ N-PE	☒

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The choices for where 2:1 VLAN translation takes place are:

- **Auto** (This is the default choice.)
- **U-PE**
- **PE-AGG**
- **N-PE**

If you select **Auto**, the 2:1 VLAN translation takes place at the device closest to the UNI port. The other choices come into play only when there is more than one place that 2:1 VLAN translation can be done. If there is only one place where the translation can be done, the choice is ignored.

The actual VLAN values are specified when you create a service request based on this policy. See the [Creating a Service Request, page A-3](#).

Creating a Service Request

When you create a service request based on an L2VPN ERS policy, the VLAN options can be changed if they were set to be editable in the policy. You can overwrite the policy information for the VLAN translation type and the place where translation occurs. This flexibility allows the following provisioning:

- One AC can have 2:1 VLAN translation, while the other AC can have no VLAN translation or 1:1 VLAN translation.
- The VLAN translation for one AC can be on the UNI box, while the translation for the other AC can be on the PE-AGG.



Note Note these modifications can happen only when a new service request is created. They are not allowed during the modification of an existing service request.

The specification of the VLAN translation happens during the creation of the service request within the Link Attributes window. At that point, you can specify which VLAN is translated to which VLAN. The Link Attributes window is accessed after the UNI port is selected on the Attachment Tunnel Editor window. Because you can set the VLAN translation type after the UNI selection, the UNI port display list does not exclude any type for the UNI port. This is because:

- The UNI port list has to include the regular trunk port, in case you later (on the Link Attributes window) decide to perform no VLAN translation or 1:1 VLAN translation.
- The UNI port list has to include an EWS (Q-in-Q) port, in case you decide to do 2:1 VLAN translation.

Even though you have all the ports to start with for VLAN translation, you must select specific types of ports, based on the type of VLAN translation. More specifically:

- For no VLAN translation and 1:1 VLAN translation, you must select an empty port or a trunk port as the UNI.
- For 2:1 VLAN translation, you must select an empty port or a Q-in-Q port as the UNI port.

To help determine the proper port to use, you can click the **Details** button on the Attachment Tunnel Editor window to display the port type and associated service with that port.

The following sections show how the VLAN translation is defined on the Link Attribute window for the different types of VLAN translation.

No VLAN Translation

When you choose no VLAN translation, no additional information needs to be provided.

1:1 VLAN Translation

When you choose 1:1 VLAN translation, the window dynamically changes, as shown in [Figure A-3](#).

Figure A-3 CE VLAN to be Translated From

In the empty field, you must enter which CE VLAN is to be translated from. The VLAN number must be a number from 1 to 4096.

The PE VLAN that the CE VLAN is to be translated can be “auto picked” or manually entered. Select the **VLAN ID AutoPick** check box above (on the Link Attributes window), as shown in [Figure A-4](#), to have PE VLAN automatically assigned.

Figure A-4 Automatic Selection of the PE VLAN

If you deselect the **VLAN ID AutoPick** check box, as shown in [Figure A-5](#), the window displays a Provider VLAN ID, where you can manually enter the PE VLAN.

Figure A-5 Manual Selection of the PE VLAN

Upon completion of the service request creation, ISC does an integrity check before saving the service request. For 1:1 VLAN translation, ISC rejects the service request if the CE VLAN has been used for another 1:1 VLAN translation on the same port.

2:1 VLAN Translation

When choosing 2:1 VLAN translation, the window dynamically changes, as shown in [Figure A-6](#).

Figure A-6 2:1 VLAN Translation Window



Note

If the UNI port has been provisioned with EWS service, the outer VLAN value is grayed out, as shown in [Figure A-7](#).

Figure A-7 2:1 VLAN Translation with Outer VLAN Grayed Out

VLAN Translation	☐ No ☐ 1:1 ☒ 2:1
2 To 1 Translation	From CE VLAN * (1 - 4096) and Outer VLAN 622 to PE VLAN Above
Select where 2:1 translation takes place	☒ Auto ☐ U-PE ☐ PE-Agg ☐ N-PE

In 2:1 VLAN translation, there are three VLANs involved:

- “A”—The CE VLAN to be translated from. You specify this in the “From CE VLAN field.” For out-of-range translation, a value of “*” (asterisk character) should be provided
- “B”—The PE VLAN that is the outer VLAN of the Q-in-Q port. You specify this in the “Outer VLAN” field. You can select this VLAN manually by entering a value, or you can select the **AutoPick** check box to have one automatically assigned.
- “C”—The PE VLAN that the “A” and “B” VLANs are translated to. You specify this in the “VLAN and Other Information” section above (on the Link Attributes window). See [Figure A-4](#) and [Figure A-5](#) in [1:1 VLAN Translation](#), page A-4.

You must specify VLAN “A” (the CE VLAN) and VLAN “C” (the PE VLAN translated to). For VLAN “B” (the Q-in-Q outer VLAN), what to specify depends on the UNI port type:

- If it is an empty port, you must specify VLAN “B.”
- If it is an existing Q-in-Q port, then VLAN “B” has been defined, and it cannot be changed at this point.

Some additional comments on 2:1 VLAN translation:

- For 2:1 VLAN translation, if you build an ERS service on an empty port, then this UNI port will be provisioned as an ERS service. If you later add an EWS service to the same port, the EWS service will overwrite the previous ERS provisioning. The major difference between ERS and EWS is the L2PT BPDU treatment. For ERS, BPDU is blocked. For EWS, BPDU is tunneled.
- As an ERS service, the 2:1 VLAN translation can share the same port, just like a regular ERS port.
- An ERS 2:1 service can be added on top of an existing EWS service.

Upon completion of the service request creation, ISC does an integrity check before saving the service request. For 2:1 VLAN translation, ISC rejects the service request if the CE VLAN and outer tag PE VLAN combination has been used for another 2:1 VLAN translation on the same port.

Modifying a Service Request

For both 1:1 and 2:1 VLAN translation, you can perform the following modifications on an existing service request:

- Change to a new CE VLAN to be translated from.
- All other normal changes for a service request are permitted.

However, the following modifications are not allowed:

- You cannot change the VLAN translation type for a given AC. For instance, you cannot change from 2:1 to 1:1 VLAN translation.
- You cannot change the place where 2:1 VLAN translation occurs.

Deleting a Service Request

During service request deletion, the following resources are released:

For 1:1VLAN translation:

- The CE VLAN becomes available to be translated again.
- The PE VLAN is released.
- If the link being deleted is the last link on the UNI port, then this port is set to new.

For 2:1 VLAN translation:

- The CE VLAN becomes available to be translated again.
- The “translated to” PE VLAN is released.
- If the link being deleted is the last “CE-PE” pair on this UNI port, and there is no EWS service on this port, then this port is set to new. In addition, the outer VLAN is released.

Platform-Specific Usage Notes

VLAN translation is available on 7600 and 3750 ME platforms. The 7600 and 3750 ME have different ways to support VLAN translation. Not only is the command syntax different, but so is the place where the VLAN translation is carried out. On the 7600, for 1:1 VLAN translation, the operation is done on the PFC card. For 2:1 VLAN translation, the operation is done on the uplink GE-WAN (OSM module). On the 3750 ME, however, both translations occur on the uplinks (ES ports).

VLAN Translation on the 3750

Be aware of the following points when performing VLAN translation on the 3750.

- The 3750 where VLAN translation occurs should be designated as a U-PE or PE-AGG role, not N-PE.
- VLAN translation on the up link (ES) port should be performed on the Gigabit 1/1/1 or Gigabit 1/1/2 port.
- If a 1:1 VLAN translation occurs on a ring that is made of 3750 PEs, all the 3750s use the ES port as uplink ports (the “east and west” ports) to connect other ring nodes.

VLAN Translation on the 7600

Be aware of the following points when performing VLAN translation on the 7600.

- 1:1 VLAN translation always occurs on the UNI port. However, not every Ethernet interface will support 1:1 VLAN translation. Such support is dependent on the line card.
- 2:1 VLAN translation always occurs on the GE-WAN port. The port must be an NNI uplink port.
- 2:1 VLAN translation only occurs on a 7600 that is a U-PE or a PE-AGG, not an N-PE. The reason is when the 2:1 VLAN translation is performed on the GE-WAN interface, this interface can no longer perform L3VPN and L2VPN service using the translated new VLAN. The L3/L2VPN service has to be provisioned on another (N-PE) box.

Failed Service Requests When Hardware Does Not Support VLAN Translation

For the 1:1 VLAN translation feature, a service request goes to the **Fail Deployed** state if the target hardware (line card) does not support the VLAN translation. The reason the service request goes to the **Fail Deployed** state instead of **Invalid** is that ISC does not know beforehand whether a particular line card will accept or reject the VLAN translation CLI commands. In this case, ISC attempts to push down the commands and the deployment fails. An **Invalid** status means ISC detects something wrong (in advance) and aborts the provisioning task. No CLI is pushed down in that case. This is a general behavior of ISC when a given hardware does not support a feature. In these cases, it is the user's responsibility to select proper hardware to support the intended service.

