# IEEE 802.1Q-in-Q VLAN Tag Termination

Encapsulating IEEE 802.1Q VLAN tags within 802.1Q enables service providers to use a single VLAN to support customers who have multiple VLANs. The IEEE 802.1Q-in-Q VLAN Tag Termination feature on the subinterface level preserves VLAN IDs and keeps traffic in different customer VLANs segregated.

**Feature History for the IEEE 802.1Q-in-Q VLAN Tag Termination Feature**

| Release | Modification |
|---|---|
| 12.3(7)T | This feature was introduced. |
| 12.3(7)XI1 | This feature was implemented on the Cisco 10000 series router. |

### Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

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# Prerequisites for IEEE 802.1Q-in-Q VLAN Tag Termination

- You have checked Feature Navigator to verify that your Cisco device and software image support this feature.
- You must be connected to an Ethernet device which supports double VLAN tag imposition/disposition or switching.

# Restrictions for IEEE 802.1Q-in-Q VLAN Tag Termination

The following restrictions apply to the Cisco 10000 series router:

- Supported on Ethernet, FastEthernet, or Gigabit Ethernet interfaces.
- Supports only Point-to-Point Protocol over Ethernet (PPPoE) packets that are double-tagged for Q-in-Q VLAN tag termination.
- IP and Multiprotocol Label Switching (MPLS) packets are not supported.
- Modular QoS can be applied to unambiguous subinterfaces only.
- Limited ACL support.

# Information About IEEE 802.1Q-in-Q VLAN Tag Termination

This section lists the concepts that the user should understand in order to perform the tasks in the "How to Configure IEEE 802.1Q-in-Q VLAN Tag Termination" section on page 6. The following concepts are described in this section:

- IEEE 802.1Q-in-Q VLAN Tag Termination on Subinterfaces, page 2
- Cisco 10000 Series Router Application, page 4
- Unambiguous and Ambiguous Subinterfaces, page 5

## IEEE 802.1Q-in-Q VLAN Tag Termination on Subinterfaces

IEEE 802.1Q-in-Q VLAN Tag Termination simply adds another layer of IEEE 802.1Q tag (called "metro tag" or "PE-VLAN") to the 802.1Q tagged packets that enter the network. The purpose is to expand the VLAN space by tagging the tagged packets, thus producing a "double-tagged" frame. The expanded VLAN space allows the service provider to provide certain services, such as Internet access on specific VLANs for specific customers, and yet still allows the service provider to provide other types of services for their other customers on other VLANs.

Generally the service provider's customers require a range of VLANs to handle multiple applications. Service providers can allow their customers to use this feature to safely assign their own VLAN IDs on subinterfaces because these subinterface VLAN IDs are encapsulated within a service-provider designated VLAN ID for that customer. Therefore there is no overlap of VLAN IDs among customers, nor does traffic from different customers become mixed. The double-tagged frame is "terminated" or assigned on a subinterface with an expanded **encapsulation dot1q** command that specifies the two VLAN ID tags (outer VLAN ID and inner VLAN ID) terminated on the subinterface. See Figure 1 on page 3.

IEEE 802.1Q-in-Q VLAN Tag Termination is generally supported on whichever Cisco IOS features or protocols are supported on the subinterface; the exception is that Cisco 10000 series router only supports PPPoE. For example if you can run PPPoE on the subinterface, you can configure a double-tagged frame for PPPoE. The only restriction is whether you assign ambiguous or unambiguous subinterfaces for the inner VLAN ID. See the "Unambiguous and Ambiguous Subinterfaces" section on page 5.

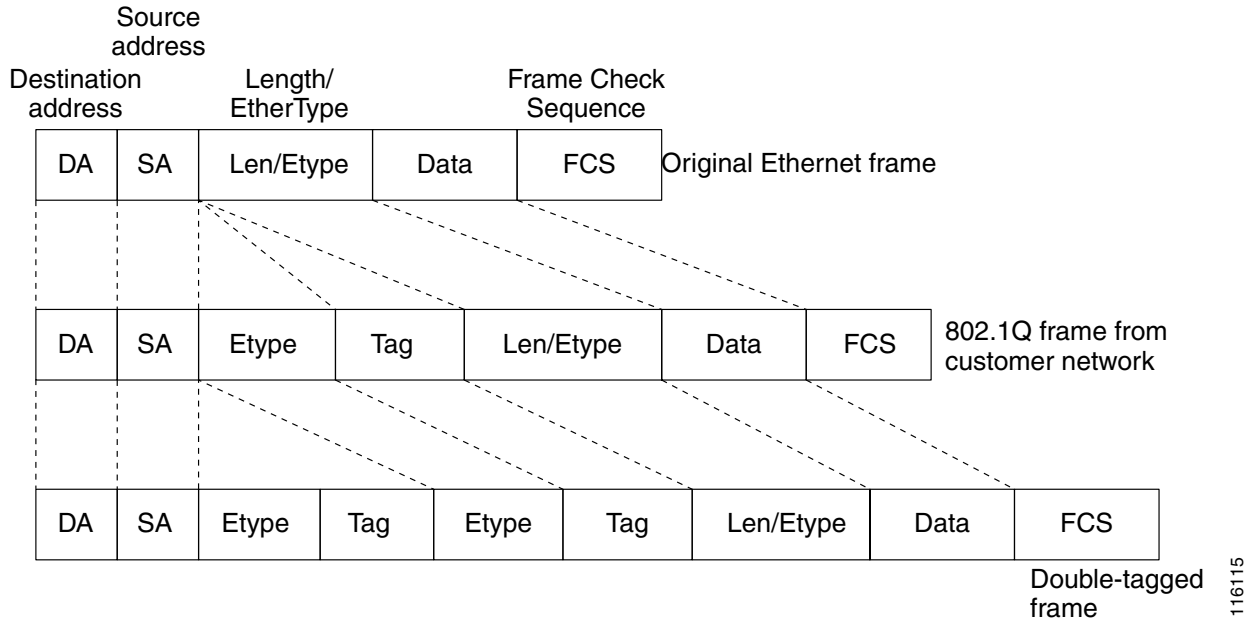
**Note** The Cisco 10000 series router only supports PPPoE over Q-in-Q (PPPoEQinQ).

The primary benefit for the service provider is reduced number of VLANs supported for the same number of customers. Other benefits of this feature include:

- PPPoE scalability. By expanding the available VLAN space from 4096 to approximately 16.8 million (4096 times 4096), the number of PPPoE sessions that can be terminated on a given interface is multiplied.
- When deploying Gigabyte Ethernet DSL Access Multiplexer (DSLAM) in wholesale model, you can assign the inner VLAN ID to represent the end-customer virtual circuit (VC) and assign the outer VLAN ID to represent the service provider ID.

The Q-in-Q VLAN tag termination feature is simpler than the IEEE 802.1Q tunneling feature deployed for the Catalyst 6500 series switches or the Catalyst 3550 and Catalyst 3750 switches. Whereas switches require IEEE 802.1Q tunnels on interfaces to carry double-tagged traffic, routers need only encapsulate Q-in-Q VLAN tags within another level of 802.1Q tags in order for the packets to arrive at the correct destination.

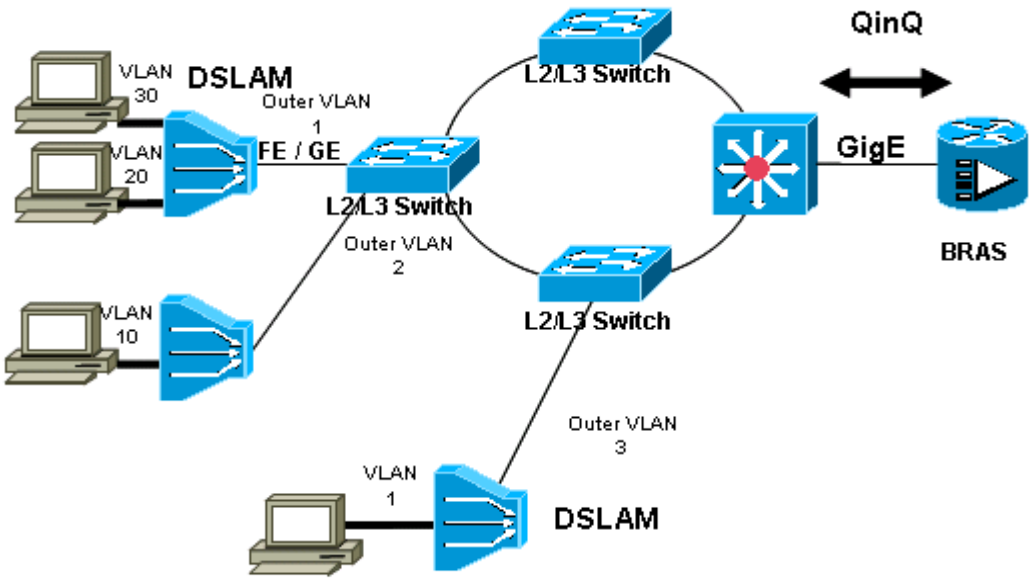
***Figure 1 Untagged, 802.1Q-Tagged, and Double-Tagged Ethernet Frames***



# Cisco 10000 Series Router Application

For the emerging broadband Ethernet-based DSLAM market, the Cisco 10000 router supports Q-in-Q encapsulation. With the Ethernet-based DSLAM model shown in Figure 2, customers typically get their own VLAN and all these VLANs are aggregated on a DSLAM.

*Figure 2 Broadband Ethernet-based DSLAM Model of Q-in-Q VLANs*




VLAN aggregation on a DSLAM will result in a lot of aggregate VLANs that at some point need to be terminated on the broadband remote access servers (BRAS). Although the model could connect the DSLAMs directly to the BRAS, a more common model uses the existing Ethernet-switched network where each DSLAM VLAN ID is tagged with a second tag (Q-in-Q) as it connects into the Ethernet-switched network.

The only model that is supported is PPPoE over Q-in-Q (PPPoEoQinQ). This can either be a PPP terminated session or as a L2TP LAC session. No IP over Q-in-Q is supported.

The Cisco 10000 series router already supports plain PPPoE and PPP over 802.1Q encapsulation. Supporting PPP over Q-in-Q encapsulation is new. PPP over Q-in-Q encapsulation processing is an extension to 802.1q encapsulation processing. A Q-in-Q frame looks like a VLAN 802.1Q frame, only it has two 802.1Q tags instead of one. See Figure 1.

PPP over Q-in-Q encapsulation supports configurable outer tag Ethertype. The configurable Ethertype field values are 0x8100 (default), 0x9100, and 0x9200. See Figure 3.

*Figure 3 Supported Configurable Ethertype Field Values*

## Security ACL Application on the Cisco 10000 Router

The IEEE 802.1Q-in-Q VLAN Tag Termination feature provides limited security access control list (ACL) support for the Cisco 10000 series router.

If you apply an ACL to PPPoE traffic on a Q-in-Q subinterface in a VLAN, apply the ACL directly on the PPPoE session, using virtual access interfaces (VAIs) or RADIUS attribute 11 or 242.

You can apply ACLs to virtual access interfaces by configuring them under virtual template interfaces. You can also configure ACLs by using RADIUS attribute 11 or 242. When you use attribute 242, a maximum of 30,000 sessions can have ACLs.

ACLs that are applied to the VLAN Q-in-Q subinterface have no effect and are silently ignored. In the following example, ACL 1 that is applied to the VLAN Q-in-Q subinterface level will be ignored:

```
Router(config)# interface FastEthernet3/0/0.100
Router(config-subif)# encapsulation dot1q 100 second-dot1q 200
Router(config-subif)# ip access-group 1
```

# Unambiguous and Ambiguous Subinterfaces

The **encapsulation dot1q** command is used to configure Q-in-Q termination on a subinterface. The command accepts an Outer VLAN ID and one or more Inner VLAN IDs. The outer VLAN ID always has a specific value, while inner VLAN ID can either be a specific value or a range of values.

A subinterface that is configured with a single Inner VLAN ID is called an unambiguous Q-in-Q subinterface. In the following example, Q-in-Q traffic with an Outer VLAN ID of 101 and an Inner VLAN ID of 1001 is mapped to the Gigabit Ethernet 1/0.100 subinterface:

```
Router(config)# interface gigabitEehernet1/0.100
Router(config-subif)# encapsulation dot1q 101 second-dot1q 1001
```

A subinterface that is configured with multiple Inner VLAN IDs is called an ambiguous Q-in-Q subinterface. By allowing multiple Inner VLAN IDs to be grouped together, ambiguous Q-in-Q subinterfaces allow for a smaller configuration, improved memory usage and better scalability.

In the following example, Q-in-Q traffic with an Outer VLAN ID of 101 and Inner VLAN IDs anywhere in the 2001-2100 and 3001-3100 range is mapped to the Gigabit Ethernet 1/0.101 subinterface.:

```
Router(config)# interface gigabitethernet1/0.101
Router(config-subif)# encapsulation dot1q 101 second-dot1q 2001-2100,3001-3100
```

Ambiguous subinterfaces can also use the **any** keyword to specify the inner VLAN ID.

See the "Configuration Examples for IEEE 802.1Q-in-Q VLAN Tag Termination" section on page 11 for an example of how VLAN IDs are assigned to subinterfaces, and for a detailed example of how the **any** keyword is used on ambiguous subinterfaces.

Only PPPoE is supported on ambiguous subinterfaces. Standard IP routing is not supported on ambiguous subinterfaces.

**Note** On the Cisco 10000 series router, Modular QoS services are only supported on unambiguous subinterfaces.

# How to Configure IEEE 802.1Q-in-Q VLAN Tag Termination

This section contains the following tasks:

- Configuring the Interfaces for IEEE 802.1Q-in-Q VLAN Tag Termination, page 6 (required)
- Verifying the IEEE 802.1Q-in-Q VLAN Tag Termination, page 8 (optional)

## Configuring the Interfaces for IEEE 802.1Q-in-Q VLAN Tag Termination

Perform this task to configure the main interface used for the Q-in-Q double tagging and to configure the subinterfaces. An optional step in this task shows you how to configure the EtherType field to be 0x9100 for the outer VLAN tag, if that is required. After the subinterface is defined, the 802.1Q encapsulation is configured to use the double tagging.

### Prerequisites

For the Cisco 10000 series router:

- PPPoE is already configured.
- Virtual private dial-up network (VPDN) is enabled.

#### SUMMARY STEPS

Steps to configure EtherType field for outer VLAN tag (Optional):

1. **enable**
2. **configure terminal**
3. **interface** *type number*
4. **dot1q tunneling ethertype** *ethertype*

Steps to configure the Q-in-Q Subinterface (Required):

5. **interface** *type number.subinterface-number*
6. **encapsulation dot1q** *vlan-id* **second-dot1q** {**any** | *vlan-id* | *vlan-id*-*vlan-id*[,*vlan-id*-*vlan-id*]}
7. pppoe enabled [group *group-name*]
8. **exit**
9. Repeat Step 5 to configure another subinterface.
10. Repeat Step 6 and Step 7 to specify the VLAN tags to be terminated on the subinterface and to enable PPPoE sessions on the subinterface.
11. **end**

## DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **enable**<br><br>**Example:**<br>`Router> enable` | Enables privileged EXEC mode.<br>• Enter your password if prompted. |
| **Step 2** | **configure terminal**<br><br>**Example:**<br>`Router# configure terminal` | Enters global configuration mode. |
| **Step 3** | **interface** *type number*<br><br>**Example:**<br>`Router(config)# interface gigabitethernet 1/0/0` | Configures an interface and enters interface configuration mode. |
| **Step 4** | **dot1q tunneling ethertype** *ethertype*<br><br>**Example:**<br>`Router(config-if)# dot1q tunneling ethertype 0x9100` | (Optional) Defines the Ethertype field type used by peer devices when implementing Q-in-Q VLAN tagging.<br>• Use this command if the Ethertype of peer devices is 0x9100 or 0x9200 (0x9200 is only supported on the Cisco 10000 series router).<br>• Cisco 10000 series router supports both the 0x9100 and 0x9200 Ethertype field types. |
| **Step 5** | **interface** *type number.subinterface-number*<br><br>**Example:**<br>`Router(config-if)# interface gigabitethernet 1/0/0.1` | Configures a subinterface and enters subinterface configuration mode. |
| **Step 6** | **encapsulation dot1q** *vlan-id* **second-dot1q** {**any** \| *vlan-id* \| *vlan-id-vlan-id*[**,***vlan-id-vlan-id*]}<br><br>**Example:**<br>`Router(config-subif)# encapsulation dot1q 100 second-dot1q 200` | (Required) Enables the 802.1Q encapsulation of traffic on a specified subinterface in a VLAN.<br>• Use the **second-dot1q** keyword and the *vlan-id* argument to specify the VLAN tags to be terminated on the subinterface.<br>• In this example, an unambiguous Q-in-Q subinterface is configured because only one inner VLAN ID is specified.<br>• Q-in-Q frames with an outer VLAN ID of 100 and an inner VLAN ID of 200 will be terminated. |
| **Step 7** | **pppoe enable** [**group** *group-name*]<br><br>**Example:**<br>`Router(config-subif)# pppoe enable group vpn1` | Enables PPPoE sessions on a subinterface.<br>The example specifies that the PPPoE profile, vpn1, will be used by PPPoE sessions on the subinterface. |
| **Step 8** | **exit**<br><br>**Example:**<br>`Router(config-subif)# exit` | Exits subinterface configuration mode and returns to interface configuration mode.<br>• Repeat this step one more time to exit interface configuration mode. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 9** | Repeat Step 5 to configure another subinterface.<br><br>**Example:**<br>`Router(config-if)# interface gigabitethernet 1/0/0.2` | (Optional) Configures a subinterface and enters subinterface configuration mode. |
| **Step 10** | Repeat Step 6 and Step 7 to specify the VLAN tags to be terminated on the subinterface.<br><br>**Example:**<br>`Router(config-subif)# encapsulation dot1q 100 second-dot1q 100-199,201-600`<br><br>**Example:**<br>`Router(config-subif)# pppoe enable group vpn1` | Step 6 enables the 802.1Q encapsulation of traffic on a specified subinterface in a VLAN.<br>• Use the **second-dot1q** keyword and the *vlan-id* argument to specify the VLAN tags to be terminated on the subinterface.<br>• In the example, an ambiguous Q-in-Q subinterface is configured because a range of inner VLAN IDs is specified.<br>• Q-in-Q frames with an outer VLAN ID of 100 and an inner VLAN ID in the range of 100 to 199 or 201 to 600 will be terminated.<br>Step 7 enables PPPoE sessions on the subinterface. The example specifies that the PPPoE profile, vpn1, will be used by PPPoE sessions on the subinterface.<br>**Note** Step 7 is required for the Cisco 10000 series router because it only supports PPPoEoQinQ traffic. |
| **Step 11** | **end**<br><br>**Example:**<br>`Router(config-subif)# end` | Exits subinterface configuration mode and returns to privileged EXEC mode. |

# Verifying the IEEE 802.1Q-in-Q VLAN Tag Termination

Perform this optional task to verify the configuration of the IEEE 802.1Q-in-Q VLAN Tag Termination feature.

## SUMMARY STEPS

1. **enable**
2. **show running-config**
3. **show vlans dot1q** [**internal** | *interface-type interface-number.subinterface-number* [**detail**] | *outer-id* [*interface-type interface-number* | **second-dot1q** [*inner-id* | **any**]] [**detail**]]

## DETAILED STEPS

**Step 1** **enable**

Enables privileged EXEC mode. Enter your password if prompted.

```
Router> enable
```

**Step 2 show running-config**

Use this command to show the currently running configuration on the device. You can use delimiting characters to display only the relevant parts of the configuration.

The following shows the currently running configuration on a Cisco 7300 series router:

```
Router# show running-config

.
.
.

interface FastEthernet0/0.201
 encapsulation dot1Q 201
 ip address 10.7.7.5 255.255.255.252
!
interface FastEthernet0/0.401
 encapsulation dot1Q 401
 ip address 10.7.7.13 255.255.255.252
!
interface FastEthernet0/0.201999
 encapsulation dot1Q 201 second-dot1q any
 pppoe enable
!
interface FastEthernet0/0.2012001
 encapsulation dot1Q 201 second-dot1q 2001
 ip address 10.8.8.9 255.255.255.252
!
interface FastEthernet0/0.2012002
 encapsulation dot1Q 201 second-dot1q 2002
 ip address 10.8.8.13 255.255.255.252
!
interface FastEthernet0/0.4019999
 encapsulation dot1Q 401 second-dot1q 100-900,1001-2000
 pppoe enable
!
interface GigabitEthernet5/0.101
 encapsulation dot1Q 101
 ip address 10.7.7.1 255.255.255.252
!
interface GigabitEthernet5/0.301
 encapsulation dot1Q 301
 ip address 10.7.7.9 255.255.255.252
!
interface GigabitEthernet5/0.301999
 encapsulation dot1Q 301 second-dot1q any
 pppoe enable
!
interface GigabitEthernet5/0.1011001
 encapsulation dot1Q 101 second-dot1q 1001
 ip address 10.8.8.1 255.255.255.252
!
interface GigabitEthernet5/0.1011002
 encapsulation dot1Q 101 second-dot1q 1002
 ip address 10.8.8.5 255.255.255.252
!
interface GigabitEthernet5/0.1019999
 encapsulation dot1Q 101 second-dot1q 1-1000,1003-2000
 pppoe enable

.
.
```

.
The following shows the currently running configuration on a Cisco 10000 series router:

```
Router# show running-config

.
.
.

interface FastEthernet1/0/0.201
 encapsulation dot1Q 201
 ip address 10.7.7.5 255.255.255.252
!
interface FastEthernet1/0/0.401
 encapsulation dot1Q 401
 ip address 10.7.7.13 255.255.255.252
!
interface FastEthernet1/0/0.201999
 encapsulation dot1Q 201 second-dot1q any
 pppoe enable
!
interface FastEthernet1/0/0.4019999
 encapsulation dot1Q 401 second-dot1q 100-900,1001-2000
 pppoe enable
!
interface GigabitEthernet5/0/0.101
 encapsulation dot1Q 101
 ip address 10.7.7.1 255.255.255.252
!
interface GigabitEthernet5/0/0.301
 encapsulation dot1Q 301
 ip address 10.7.7.9 255.255.255.252
!
interface GigabitEthernet5/0/0.301999
 encapsulation dot1Q 301 second-dot1q any
 pppoe enable
!
interface GigabitEthernet5/0/0.1019999
 encapsulation dot1Q 101 second-dot1q 1-1000,1003-2000
 pppoe enable

.
.
.
```

**Step 3** **show vlans dot1q** [**internal** | *interface-type interface-number.subinterface-number* [**detail**] | *outer-id* [*interface-type interface-number* | **second-dot1q** [*inner-id* | **any**]] [**detail**]]

Use this command to show the statistics for all the 802.1Q VLAN IDs. In this example, only the outer VLAN ID is displayed.

**Note** The **show vlans dot1q command is not supported on the Cisco 10000 series router.**

```
Router# show vlans dot1q

Total statistics for 802.1Q VLAN 1:
   441 packets, 85825 bytes input
   1028 packets, 69082 bytes output
Total statistics for 802.1Q VLAN 101:
   5173 packets, 510384 bytes input
   3042 packets, 369567 bytes output
Total statistics for 802.1Q VLAN 201:
```

```
   1012 packets, 119254 bytes input
   1018 packets, 120393 bytes output
Total statistics for 802.1Q VLAN 301:
   3163 packets, 265272 bytes input
   1011 packets, 120750 bytes output
Total statistics for 802.1Q VLAN 401:
   1012 packets, 119254 bytes input
   1010 packets, 119108 bytes output
```

# Configuration Examples for IEEE 802.1Q-in-Q VLAN Tag Termination

This section contains the following example:

- Configuring any Keyword on Subinterfaces for IEEE 802.1Q-in-Q VLAN Tag Termination: Example, page 11

## Configuring any Keyword on Subinterfaces for IEEE 802.1Q-in-Q VLAN Tag Termination: Example

Some ambiguous subinterfaces can use the **any** keyword for the inner VLAN ID specification. The **any** keyword represents any inner VLAN ID that is not explicitly configured on any other interface. In the following example, seven subinterfaces are configured with various outer and inner VLAN IDs.

**Note** The **any** keyword can be configured on only one subinterface of a specified physical interface and outer VLAN ID.

```
interface GigabitEthernet1/0/0.1
 encapsulation dot1q 100 second-dot1q 100

interface GigabitEthernet1/0/0.2
 encapsulation dot1q 100 second-dot1q 200

interface GigabitEthernet1/0/0.3
 encapsulation dot1q 100 second-dot1q 300-400,500-600

interface GigabitEthernet1/0/0.4
 encapsulation dot1q 100 second-dot1q any

interface GigabitEthernet1/0/0.5
 encapsulation dot1q 200 second-dot1q 50

interface GigabitEthernet1/0/0.6
 encapsulation dot1q 200 second-dot1q 1000-2000,3000-4000

interface GigabitEthernet1/0/0.7
 encapsulation dot1q 200 second-dot1q any
```

Table 1 shows which subinterfaces are mapped to different values of the outer and inner VLAN ID on Q-in-Q frames that come in on Gigabit Ethernet interface 1/0/0.

*Table 1 Subinterfaces Mapped to Outer and Inner VLAN IDs for GE Interface 1/0/0*

| Outer VLAN ID | Inner VLAN ID | Subinterface mapped to |
|---|---|---|
| 100 | 1 through 99 | GigabitEthernet1/0/0.4 |
| 100 | 100 | GigabitEthernet1/0/0.1 |
| 100 | 101 through 199 | GigabitEthernet1/0/0.4 |
| 100 | 200 | GigabitEthernet1/0/0.2 |
| 100 | 201 through 299 | GigabitEthernet1/0/0.4 |
| 100 | 300 through 400 | GigabitEthernet1/0/0.3 |
| 100 | 401 through 499 | GigabitEthernet1/0/0.4 |
| 100 | 500 through 600 | GigabitEthernet1/0/0.3 |
| 100 | 601 through 4095 | GigabitEthernet1/0/0.4 |
| 200 | 1 through 49 | GigabitEthernet1/0/0.7 |
| 200 | 50 | GigabitEthernet1/0/0.5 |
| 200 | 51 through 999 | GigabitEthernet1/0/0.7 |
| 200 | 1000 through 2000 | GigabitEthernet1/0/0.6 |
| 200 | 2001 through 2999 | GigabitEthernet1/0/0.7 |
| 200 | 3000 through 4000 | GigabitEthernet1/0/0.6 |
| 200 | 4001 through 4095 | GigabitEthernet1/0/0.7 |

A new subinterface is now configured:

```
interface GigabitEthernet1/0/0.8
 encapsulation dot1q 200 second-dot1q 200-600,900-999
```

Table 2 shows the changes made to the table for the outer VLAN ID of 200. Notice that subinterface 1/0/0.7 configured with the **any** keyword now has new inner VLAN ID mappings.

*Table 2 Subinterfaces Mapped to Outer and Inner VLAN IDs for GE Interface 1/0/0—Changes Resulting from Configuring GE Subinterface 1/0/0.8*

| Outer VLAN ID | Inner VLAN ID | Subinterface mapped to |
|---|---|---|
| 200 | 1 through 49 | GigabitEthernet1/0/0.7 |
| 200 | 50 | GigabitEthernet1/0/0.5 |
| 200 | 51 through 199 | GigabitEthernet1/0/0.7 |
| 200 | 200 through 600 | GigabitEthernet1/0/0.8 |
| 200 | 601 through 899 | GigabitEthernet1/0/0.7 |
| 200 | 900 through 999 | GigabitEthernet1/0/0.8 |
| 200 | 1000 through 2000 | GigabitEthernet1/0/0.6 |
| 200 | 2001 through 2999 | GigabitEthernet1/0/0.7 |
| 200 | 3000 through 4000 | GigabitEthernet1/0/0.6 |
| 200 | 4001 through 4095 | GigabitEthernet1/0/0.7 |

# Additional References

The following sections provide references related to the IEEE 802.1Q-in-Q VLAN Tag Termination feature.

## Related Documents

| Related Topic | Document Title |
|---|---|
| Interface commands: complete command syntax, command mode, defaults, usage guidelines, and examples | *Cisco IOS Interface and Hardware Component Command Reference*, *Release 12.3 T* |
| Interface configuration examples | *Cisco IOS Interface and Hardware Component Configuration Guide* |

## Standards

| Standards | Title |
|---|---|
| IEEE 802.1Q | — |

## MIBs

| MIBs | MIBs Link |
|---|---|
| No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature. | To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:<br>http://www.cisco.com/go/mibs |

## RFCs

| RFCs | Title |
|---|---|
| No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature. | — |

## Technical Assistance

| Description | Link |
|---|---|
| Technical Assistance Center (TAC) home page, containing 30,000 pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content. | http://www.cisco.com/public/support/tac/home.shtml |

# Command Reference

The following commands are pertinent to this feature. To see the command pages for these commands

and other commands used with this feature, go to the *Cisco IOS Master Commands List*, Release 12.4, at http://www.cisco.com/univercd/cc/td/doc/product/software/ios124/124mindx/124index.htm.

- **dot1q tunneling ethertype**
- **encapsulation dot1q**
- **show vlans dot1q**

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