



## Configuring VLANs

---

This chapter describes how to configure VLANs on the Catalyst 6500 series switches.



### Note

For complete syntax and usage information for the commands used in this chapter, refer to the *Cisco IOS Master Command List*, Release 12.2SX at this URL:

[http://www.cisco.com/en/US/docs/ios/mcl/122sxmcl/12\\_2sx\\_mcl\\_book.html](http://www.cisco.com/en/US/docs/ios/mcl/122sxmcl/12_2sx_mcl_book.html)

---

This chapter consists of these sections:

- [Understanding How VLANs Work](#), page 14-1
  - [VLAN Default Configuration](#), page 14-6
  - [VLAN Configuration Guidelines and Restrictions](#), page 14-8
  - [Configuring VLANs](#), page 14-9

## Understanding How VLANs Work

- [VLAN Overview](#), page 14-1
  - [VLAN Ranges](#), page 14-2
  - [Configurable VLAN Parameters](#), page 14-3
  - [Understanding Token Ring VLANs](#), page 14-3

## VLAN Overview

A VLAN is a group of end stations with a common set of requirements, independent of physical location. VLANs have the same attributes as a physical LAN but allow you to group end stations even if they are not located physically on the same LAN segment.

VLANs are usually associated with IP subnetworks. For example, all the end stations in a particular IP subnet belong to the same VLAN. Traffic between VLANs must be routed. LAN port VLAN membership is assigned manually on a port-by-port basis.

## VLAN Ranges


**Note**

You must enable the extended system ID to use 4096 VLANs (see the [“Understanding the Bridge ID” section on page 20-2](#)).

Catalyst 6500 series switches support 4096 VLANs in accordance with the IEEE 802.1Q standard. These VLANs are organized into several ranges; you use each range slightly differently. Some of these VLANs are propagated to other switches in the network when you use the VLAN Trunking Protocol (VTP). The extended-range VLANs are not propagated, so you must configure extended-range VLANs manually on each network device.

Table 14-1 describes the VLAN ranges.

**Table 14-1 VLAN Ranges**

VLANs	Range	Usage	Propagated by VTP
			—
1	Normal	Cisco default. You can use this VLAN but you cannot delete it.	Yes
2–1001	Normal	For Ethernet VLANs; you can create, use, and delete these VLANs.	Yes
1002–1005	Normal	Cisco defaults for FDDI and Token Ring. You cannot delete VLANs 1002–1005.	Yes
1006–4094	Extended	For Ethernet VLANs only.	No

The following information applies to VLAN ranges:

Layer 3 LAN ports, WAN interfaces and subinterfaces, and some software features use internal VLANs in the extended range. You cannot use an extended range VLAN that has been allocated for internal use.

To display the VLANs used internally, enter the **show vlan internal usage**  
**show vlan internal usage**      **show cwan vlans**

## Configurable VLAN Parameters

**Note**

- 
- - 
  -
- 
- - VLAN type (Ethernet, FDDI, FDDI network entity title [NET], TrBRF, or TrCRF)
    - VLAN state (active or suspended)
    - Security Association Identifier (SAID)
    - Bridge identification number for TrBRF VLANs
    - Ring number for FDDI and TrCRF VLANs
    - Parent VLAN number for TrCRF VLANs
    - Spanning Tree Protocol (STP) type for TrCRF VLANs

## Understanding Token Ring VLANs

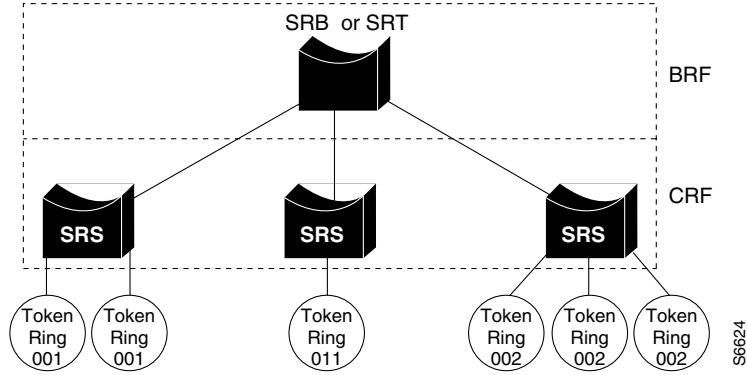
- 
- 

**Note**

## Token Ring TrBRF VLANs

*logical port*

**Figure 14-1 Interconnected Token Ring TrBRF and TrCRF VLANs**



running either the IBM or IEEE STP. If an SRB is used, you can define duplicate MAC addresses on different logical rings.

The Token Ring software runs an instance of STP for each TrBRF VLAN and each TrCRF VLAN. For TrCRF VLANs, STP removes loops in the logical ring. For TrBRF VLANs, STP interacts with external bridges to remove loops from the bridge topology, similar to STP operation on Ethernet VLANs.



**Caution**

---

---

## Token Ring TrCRF VLANs

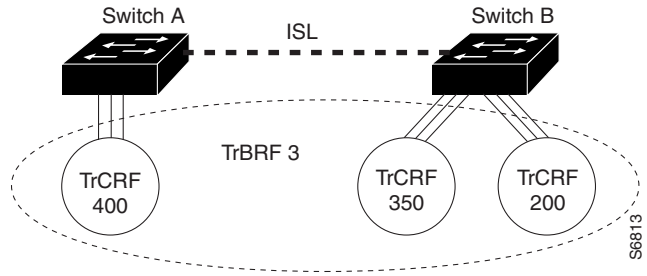


**Note**

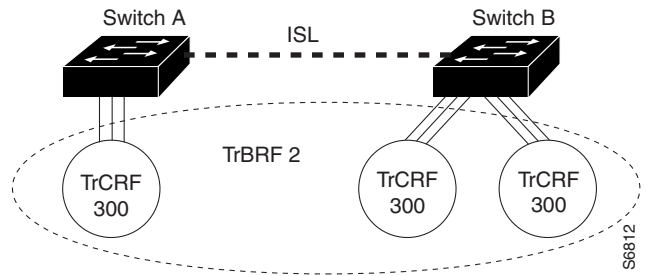
---

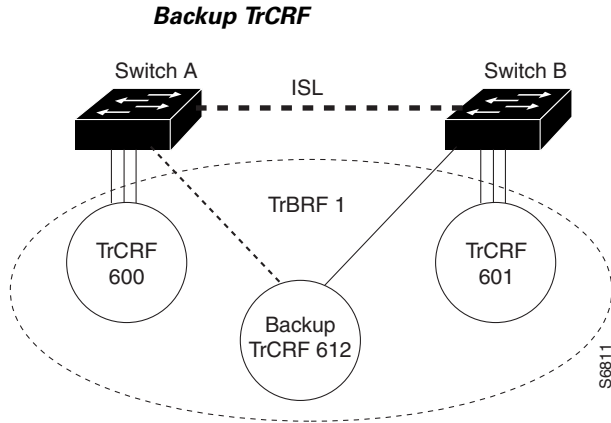
---

**Figure 14-2 Undistributed TrCRFs**



**Figure 14-3 Distributed TrCRF**





# VLAN Default Configuration

*Ethernet VLAN Defaults and Ranges*

Parameter	Default	Range
	<i>vlan_ID</i>	
	<i>vlan_ID</i>	

		1-4294967294
MTU size	1500	1500-18190
Ring number	0	1-4095
Parent VLAN	0	0-1005
Translational bridge 1	0	0-1005




## VLAN Configuration Guidelines and Restrictions

- **vtp file** *file\_name*

RPR+ redundancy (see [Chapter 8, “Configuring RPR and RPR+ Supervisor Engine Redundancy”](#)) does not support a configuration entered in VLAN database mode. Use global configuration mode with RPR+ redundancy.

You can configure extended-range VLANs only in global configuration mode. You cannot configure extended-range VLANs in VLAN database mode. See the [“VLAN Configuration Options” section on page 14-9](#).

Before you can create a VLAN, the Catalyst 6500 series switch must be in VTP server mode or VTP transparent mode. For information on configuring VTP, see [Chapter 13, “Configuring VTP.”](#)

The VLAN configuration is stored in the vlan.dat file, which is stored in nonvolatile memory. You can cause inconsistency in the VLAN database if you manually delete the vlan.dat file. If you want to modify the VLAN configuration or VTP, use the commands described in this guide and in the [Cisco IOS Release 12.2SX publication](#).

To do a complete backup of your configuration, include the vlan.dat file in the backup.

The Cisco IOS **end**

**Ctrl-Z**

-  
-



## VLAN Configuration Options

- 
- 

## VLAN Configuration in Global Configuration Mode



**Note**

- 
-

## VLAN Configuration in VLAN Database Mode



### Note

- 
- 

## Creating or Modifying an Ethernet VLAN

media

	Command	Purpose
Step 1	Router# <b>configure terminal</b>	
	<b>vlan database</b>	
Step 2	Router(config)# vlan_ID{[- ] [, ]} Router(config-vlan)#  Router(vlan)# Router(config)# Router(config-vlan)#  Router(vlan)#	
Step 3	Router(config-vlan)#  Router(vlan)# <b>exit</b>	
Step 4	<b>show vlan id name</b>	

```
configure terminal
vlan 3
end
show vlan id 3
```

VLAN Name	Status	Ports
3 VLAN0003	active	

VLAN Type	SAID	MTU	Parent	RingNo	BridgeNo	Stp	BrdgMode	Trans1	Trans2
3 enet	100003	1500	-	-	-	-	-	0	0

Primary	Secondary	Type	Interfaces

```
Router#
Router(vlan)#
VLAN 3 added:
  Name: VLAN0003
Router(vlan)#
APPLY completed.
Exiting....
```

```
Router# show vlan name VLAN0003
```

## Assigning a Layer 2 LAN Interface to a VLAN



Note

---

---


## Configuring the Internal VLAN Allocation Policy



Note

---

---

<pre>        vlan internal allocation policy ascending descending} Router(config)#</pre>	
<pre>Router(config)#</pre>	
<pre>Router#</pre>	

- 
- 

```
vlan internal allocation policy descending
```



### and Restrictions

- 
- 
- 
- 
- 



Note

Product Number	Number of Ports	Number of Port Groups	Port Ranges per Port Group	Translations per Port Group	VLAN Translation Trunk-Type Support

WS-X6K-S2U-MSFC2 WS-X6K-S2-MSFC2	2	1	1–2	32	802.1Q
WS-X6704-10GE	4	4	1 port in each group	128	ISL 802.1Q
WS-X6502-10GE	1	1	1 port in 1 group	32	802.1Q
WS-X6724-SFP	24	2	1–12 13–24	128	ISL 802.1Q
WS-X6816-GBIC	16	2	1–8 9–16	32	802.1Q
WS-X6516A-GBIC	16	2	1–8 9–16	32	802.1Q
WS-X6516-GBIC	16	2	1–8 9–16	32	802.1Q
WS-X6748-GE-TX	48	4	1–12 13–24 25–36 37–48	128	ISL 802.1Q
WS-X6516-GE-TX	16	2	1–8 9–16	32	802.1Q
WS-X6524-100FX-MM	24	1	1–24	32	ISL 802.1Q
WS-X6548-RJ-45	48	1	1–48	32	ISL 802.1Q
WS-X6548-RJ-21	48	1	1–48	32	ISL 802.1Q




---

**Note**


---

## Configuring VLAN Translation on a Trunk Port

	Command	Purpose
Step 1	<code>type<sup>1</sup> slot/port</code>	Selects the Layer 2 trunk port to configure.
		Enables VLAN translation.
	<code>original_vlan_ID translated_vlan_ID</code>	
	<code>original_vlan_ID translated_vlan_ID</code>	
Step 5	<code>type<sup>1</sup></code>	Verifies the VLAN mapping.

1. `type` = ethernet, fastethernet, gigabitethernet, or

```
interface gigabitethernet 5/2
  switchport vlan mapping 1649 755
end
```

```
show interface gigabitethernet 5/2 vlan mapping
State: enabled
Original VLAN Translated VLAN
-----
1649          755
```

## Enabling VLAN Translation on Other Ports in a Port Group

	Selects the LAN port to configure.
	Enables VLAN translation.
	Disables VLAN translation.

	Command	Purpose
Step 3		
Step 4		

This example shows how to enable VLAN translation on a port:

## Mapping 802.1Q VLANs to ISL VLANs

- 
- 
- 
- 
- 

	Command	Purpose
Step 1	<code>vlan mapping dot1q dot1q_vlan_ID isl_vlan_ID</code>	<i>dot1q_vlan_ID isl_vlan_ID</i>

```
<...output truncated...>
802.1Q Trunk Remapped VLANs:
802.1Q VLAN      ISL VLAN
-----
1003             200
```

**dir vlan.dat**

**copy vlan.dat tftp**

