# 配置建立中继在CatOS交换机和外部路由器之间的FEC和ISL/802.1q

## Contents



# Introduction

运行CatalystOS的本文为快速以太通道(FEC)、交换机间链路(ISL)和802.1q中继提供配置示例在Catalyst 6500 switch之间(CatOS)和Cisco 7500路由器。执行命令时，每个命令的结果都将显示出来。虽然Catalyst 6000 switch用于此配置，您可能替代运行CatOS的Catalyst 4000或Catalyst 5000系列交换机。

# Prerequisites

## Requirements

尝试进行此配置之前，请确保满足以下要求：

- Catalyst 6000 Series SwitchesCSX或以上要求CatOS版本5.1(1)支持EtherChannel
- Cisco 7000或7500系列路由器有7000系列路由交换机处理器(RSP7000)或机箱接口的(RSP7000CI)思科7000系列路由器，或者思科7500系列路由器用快速以太网接口处理器(FEIP)或通用接口处理器(VIP2)端口适配器如果使用PA-2FEISL端口适配器，您必须有硬件Revision 1.2或以上。有关此问题的示例，请参阅 Field Notice：*Expired* FN - 8791_11301999 - PA-2FEISL 2端口快速以太网ISL替换建议欲知更多信息。**encapsulation**

**dot1Q native命令**在Cisco IOS软件版本12.1(3) T.被引入。此命令更改配置。早于12.1(3)T本文的部分请参阅Cisco 7500 802.1Q配置关于Cisco IOS Software Releases欲知更多信息。默认情况下Cisco快速转发在思科7500系列路由器被启用。然而， IP路由的Cisco快速转发技术支持在IEEE 802.1Q VLAN之间不是可用的直到Cisco IOS Software Release 12.2和12.2T。配置在早先版本的802.1Q封装是可能的，但是您必须首先发出global no ip cef命令禁用Cisco快速转发。当7500系列路由器为多协议标签交换(MPLS)和FEC时被配置，技术支持对路由(MPLS “IP)从MPLS接口流到FEC接口的信息包是目前不可用的。所以，没有建议MPLS和FEC配置在单个路由器共存。Cisco IOS Software Release 11.1(14)CA或以上要求支持EtherChannel。加上功能集)或以后要求Cisco IOS Software Release 11.3(1)T (其中任一支持ISL中继。加上功能集)或以后要求Cisco IOS Software Release 12.0(1)T (其中任一支持IEEE 802.1Q建立中继。

## Components Used

本文档中的信息基于以下软件和硬件版本：

- 运行CatOS版本5.5.14的Catalyst 6500
- 运行Cisco IOS Software Release 12.2 .7b的Cisco 7500

The information in this document was created from the devices in a specific lab environment.All of the devices used in this document started with a cleared (default) configuration.If your network is live, make sure that you understand the potential impact of any command.

## 注意事项

- 记住Catalyst 4000 series switches不支持ISL中继。另外，在Catalyst 5000 series switches的一些交换模块不是能够的EtherChannel。发出*show port capabilities module命令*确定一个特定模块是否是能够的EtherChannel，并且什么中继封装支持。
- 有EtherChannel和Trunking的配置某些指南。总是请参见您的交换机软件文档。例如，如果运行在Catalyst 5000的软件版本5.5.x，您会是指软件配置指南(5.5)和认真地检查所有配置指南和限制在配置快速以太信道和千兆EtherChannel部分。

## EtherChannel

准许多重点指向链路将被捆绑的FEC或千兆以太网通道(GEC)功能到一个逻辑链接。Catalyst 6000在全双工模式下支持最多八个端口，提供1600 Mbps或1.6 Gbps吞吐量FEC的和16 Gbps GEC的。Cisco 7500系列支持最多每个FEC四个端口， 800 Mbps的。EtherChannel功能和性能根据交换机或路由器是不同的。参考系统要求实现在Catalyst交换机的EtherChannel欲知更多信息。

如果一个或更多链路发生故障， EtherChannel分发在所有的数据流链路间并且提供冗余。参考了解EtherChannel负载均衡和冗余在Catalyst交换机 欲知更多信息和配置示例与EtherChannel有关。

请参见Cisco技术支持&文档EtherChannel页欲知更多信息。

## 建立中继

Trunking是方式运载从多个VLAN的数据流在一条点到点链路或在两个设备之间的一个EtherChannel套件。这些是以太网中继可以是被实施的两种方式：

- ISL (Cisco所有权中继线封装)
- 802.1Q (IEEE标准中继线封装)

请参见Cisco技术支持&文档VLAN中继协议页欲知更多信息。

## Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

# Configure

本部分提供有关如何配置本文档所述功能的信息。

**Note:** 有关本文档所用命令的详细信息，请使用命令查找工具（仅限注册用户）。

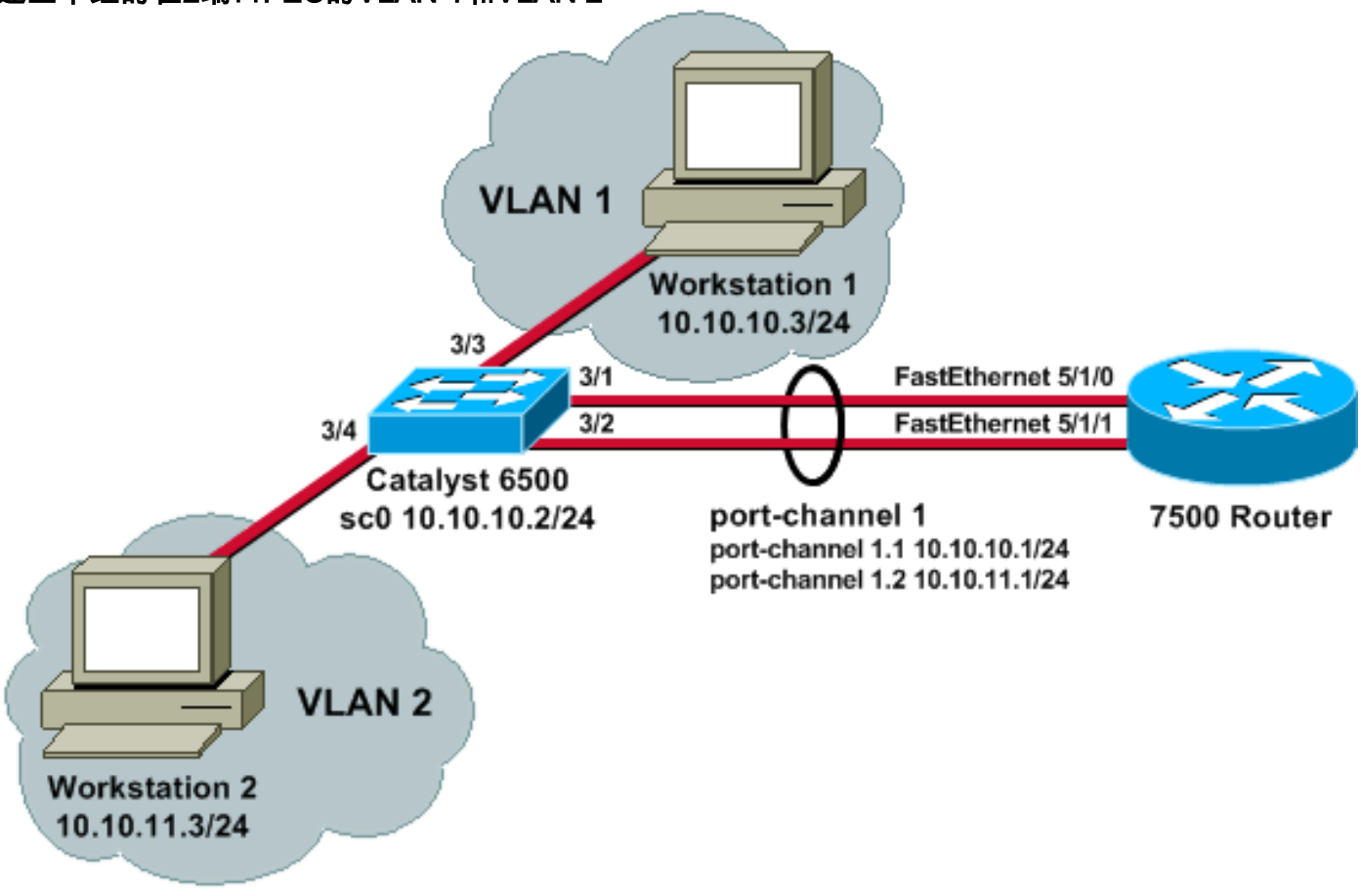
这些配置示例显示您如何做这些事：

- 配置两个接入端口在VLAN 1的Workstation1的和在VLAN 2的Workstation2的在Catalyst 6500。
- 配置默认网关Workstation1的能是10.10.10.1 /24和是的Workstation2的能10.10.11.1/24在Cisco 7500。
- 配置ISL和802.1q中继在两端口的FEC在Catalyst 6500 switch和Cisco 7500路由器之间。
- 用VLAN之间路由的IP地址配置两个端口信道子接口。

## Network Diagram

本文档使用以下网络设置：

**建立中继的在2端口FEC的VLAN 1和VLAN 2**



## 配置

本文档使用以下配置：

- Catalyst 6500 交换机
- Cisco 7500 Router
- Cisco 7500 Cisco IOS Software Releases的802.1Q配置早于12.1(3)T

**Catalyst 6500 交换机**

```
!--- Set the IP address and default gateway for VLAN 1
for management purposes. Catalyst6500> (enable) set
interface sc0 10.10.10.2 255.255.255.0

Interface sc0 IP address and netmask set.

Catalyst6500> (enable) set ip route default 10.10.10.1

Route added.
!--- Set the VTP mode. In this example, the mode is set
to be transparent. Depending on your !--- network, set
the VTP mode accordingly. !--- For details on VTP, refer
to Understanding and Configuring VLAN Trunk Protocol
(VTP). Catalyst6500> (enable) set vtp mode transparent

VTP domain modified
!--- Add VLAN 2. VLAN 1 already exists by default.
Catalyst6500> (enable) set vlan 2

VLAN 2 configuration successful
!--- Add port 3/4 to VLAN 2. Port 3/3 is already in VLAN
1 by default. Catalyst6500> (enable) set vlan 2 3/4

VLAN 2 modified.
VLAN 1 modified.
VLAN  Mod/Ports
---- ------------------------
2     3/4
!--- Set the port speed to 100 and duplex to full. One
of the requirements for EtherChannel !--- to work is for
speed and duplex to be the same on both sides. To
guarantee this, hard !--- code both speed and duplex on
ports 3/1 and 3/2. Catalyst6500> (enable) set port speed
3/1-2 100

Ports 3/1-2 transmission speed set to 100Mbps.

Catalyst6500> (enable) set port duplex 3/1-2 full

Ports 3/1-2 set to full-duplex.
!--- Enable FEC on ports 3/1 and 3/2. Because routers do
not understand Port Aggregation !--- Protocol (PAgP),
set the channel mode to one which causes ports to
channel but which !--- does not generate PAgP frames.
Catalyst6500> (enable) set port channel 3/1-2 on

Port(s) 3/1-2 are assigned to admin group 105.
Port(s) 3/1-2 channel mode set to on.
!--- Enable trunking on ports 3/1 and 3/2. Because
```

```
routers do not understand Dynamic !--- Trunking Protocol
(DTP), set the trunking mode to nonegotiate, which
causes ports to !--- trunk but which does not generate
DTP frames. !--- Note: Because EtherChannel is
configured first, any trunk settings that are applied !-
-- now to one port automatically apply to all other
ports in the channel. !--- Enter the trunking
encapsulation as either ISL…

Catalyst6500> (enable) set trunk 3/1 nonegotiate isl

Port(s) 3/1-2 trunk mode set to nonegotiate.
Port(s) 3/1-2 trunk type set to isl.
!--- …or as dot1q. !--- Ensure that the native VLAN
(default is VLAN 1) matches across the link. For more !-
-- information about the native VLAN and 802.1Q
trunking, refer to Trunking Between !--- Catalyst
4500/4000, 5500/5000, and 6500/6000 Series Switches
Using 802.1Q !--- Encapsulation with Cisco CatOS System
Software. Catalyst6500> (enable) set trunk 3/1
nonegotiate dot1q

Port(s) 3/1-2 trunk mode set to nonegotiate.
Port(s) 3/1-2 trunk type set to dot1q.

Catalyst6500> (enable) show config

This command shows non-default configurations only.
Use 'show config all' to show both default and non-
default configurations.
.........
...................
..

begin
!
# ***** NON-DEFAULT CONFIGURATION *****
!
!
#time: Thu May 2 2002, 01:26:26
!
#version 5.5(14)
!
!
#system
set system name  Catalyst6500
!
#!
#vtp
set vtp mode transparent
set vlan 1 name default type ethernet mtu 1500 said
100001 state active
set vlan 2 name VLAN0002 type ethernet mtu 1500 said
100002 state active
set vlan 1002 name fddi-default type fddi mtu 1500 said
101002 state active
set vlan 1004 name fddinet-default type fddinet mtu 1500
said 101004 state active stp ieee
set vlan 1005 name trnet-default type trbrf mtu 1500
said 101005 state active stp ibm
set vlan 1003 name token-ring-default type trcrf mtu
1500 said 101003 state active
mode srb aremaxhop 7 stemaxhop 7
backupcrf off
```

```
!
#ip
set interface sc0 1 10.10.10.2/255.255.255.0
10.10.10.255

set ip route 0.0.0.0/0.0.0.0 10.10.10.1
!
#set boot command
set boot config-register 0x2102
set boot system flash bootflash:cat6000-sup.5-5-14.bin
!
#port channel
set port channel 3/1-2 105
!
# default port status is enable
!
!
#module 1 empty
!
#module 2 : 2-port 1000BaseX Supervisor
!
#module 3 : 48-port 10/100BaseTX Ethernet
set vlan 2    3/4
set port disable    3/5

set port speed      3/1-2  100
set port duplex     3/1-2  full
set trunk 3/1  nonegotiate isl 1-1005
set trunk 3/2  nonegotiate isl 1-1005
!--- If IEEE 802.1Q is configured, you will see this
output instead: set trunk 3/1 nonegotiate dot1q 1-1005
set trunk 3/2 nonegotiate dot1q 1-1005

set port channel 3/1-2 mode on
!
#module 4 : 24-port 100BaseFX MM Ethernet
!
#module 5 empty
!
#module 6 empty
!
#module 15 empty
!
#module 16 empty
end
```

## Cisco 7500 Router

```
!--- Configure a port-channel interface to enable FEC.
7500# configure terminal

 Enter configuration commands, one per line. End with
CNTL/Z.

7500(config)# interface port-channel 1

01:34:10: %LINEPROTO-5-UPDOWN: Line protocol on
Interface Port-channel1, changed
          state to down
!--- Configure full-duplex to match the duplex setting
on the Catalyst switch side. 7500(config-if)# full-
duplex
```

```
7500(config-if)# exit
!--- If you are using ISL trunking, configure two port-
channel sub-interfaces and issue the !--- encapsulation
isl <VLAN> command to enable ISL trunking. !---
Configure IP addresses for InterVLAN routing.

7500(config)# interface port-channel 1.1

7500(config-subif)# encapsulation isl 1

7500(config-subif)# ip address 10.10.10.1 255.255.255.0

7500(config-subif)# exit

7500(config)# interface port-channel 1.2

7500(config-subif)# encapsulation isl 2

7500(config-subif)# ip address 10.10.11.1 255.255.255.0

7500(config-subif)# exit
!--- If you are using 802.1Q trunking, issue the
encapsulation dot1Q <vlan> native !--- command to
configure two port-channel sub-interfaces and enable
802.1Q trunking. !--- Configure the IP addresses for
InterVLAN routing. !--- Note: The encapsulation dot1Q 1
native command was added in Cisco IOS Software !---
Release 12.1(3)T. If you are using an earlier version of
Cisco IOS, see the !--- Cisco 7500 802.1Q Configuration
for Cisco IOS Software Releases Earlier than 12.1(3)T !-
-- section of this document, to configure 802.1Q
trunking on the router. !--- Ensure that the native VLAN
(default is VLAN 1) matches across the link. For more !-
-- information about the native VLAN and 802.1Q
trunking, refer to Trunking Between !--- Catalyst
4500/4000, 5500/5000, and 6500/6000 Series Switches
Using 802.1Q !--- Encapsulation with Cisco CatOS System
Software. 7500(config)# interface port-channel 1.1

7500(config-subif)# encapsulation dot1Q 1 native

7500(config-subif)# ip address 10.10.10.1 255.255.255.0

7500(config-subif)# exit

7500(config)# interface port-channel 1.2

7500(config-subif)# encapsulation dot1Q 2

7500(config-subif)# ip address 10.10.11.1 255.255.255.0

7500(config-subif)# exit
!--- Configure the FastEthernet interfaces for speed
100, depending on the port adapter. !--- Some
FastEthernet port adapters can autonegotiate speed (10
or 100) and duplex (half !--- or full). Others are only
capable of 100 (half or full). 7500(config)# interface
fastethernet 5/1/0

7500(config-if)# speed 100
!--- Issue the channel-group command, to configure the
FastEthernet interfaces to be !--- members of port-
channel 1.
```

```
7500(config-if)# channel-group 1

%Interface MTU set to channel-group MTU 1500.

7500(config-if)# no shut

7500(config-if)#
%Interface MTU set to channel-group MTU 1500.

FastEthernet5/1/0 added as member-1 to port-channel1

01:46:09: %LINK-3-UPDOWN: Interface FastEthernet5/1/0,
changed state to up
01:46:10: %LINEPROTO-5-UPDOWN: Line protocol on
Interface FastEthernet5/1/0,
          changed state to up
01:46:12: %LINEPROTO-5-UPDOWN: Line protocol on
Interface Port-channel1,
          changed state to up

Router(config-if)# exit

Router(config)# interface fastethernet 5/1/1

Router(config-if)# speed 100

Router(config-if)# channel-group 1

%Interface MTU set to channel-group MTU 1500.

Router(config-if)# no shut

Router(config-if)#
%Interface MTU set to channel-group MTU 1500.

FastEthernet5/1/1 added as member-2 to port-channel1

01:54:52: %LINK-3-UPDOWN: Interface FastEthernet5/1/1,
changed state to up
01:54:53: %LINEPROTO-5-UPDOWN: Line protocol on
Interface FastEthernet5/1/1,
          changed state to up

Router(config-if)# exit
!--- Remember to save the configuration. 7500# write
memory

Building configuration...
[OK]
7500#
!--- Note: To make this setup work and to successfully
ping between Workstation 1 and !--- Workstation 2, you
must ensure that the default gateways on the
workstations are setup !--- properly. For Workstation 1,
the default gateway should be 10.10.10.1; and for !---
Workstation 2, the default gateway should be 10.10.11.1.

7500# show running-config

Building configuration...

Current configuration : 1593 bytes
!
```

```
version 12.2
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
no service single-slot-reload-enable
!
hostname 7500
!
boot system disk1:rsp-jsv-mz.122-7b.bin
!
ip subnet-zero
!
ip cef
call rsvp-sync
!
!
!
interface Port-channel1
 no ip address
 full-duplex
 hold-queue 300 in
!
interface Port-channel1.1
 encapsulation isl 1
 ip address 10.10.10.1 255.255.255.0
!
interface Port-channel1.2
 encapsulation isl 2
 ip address 10.10.11.1 255.255.255.0
!--- If 802.1Q trunking is configured, you will see this
output instead: interface Port-channel1.1 encapsulation
dot1Q 1 native ip address 10.10.10.1 255.255.255.0 !
interface Port-channel1.2 encapsulation dot1Q 2 ip
address 10.10.11.1 255.255.255.0

!
interface FastEthernet5/1/0
 no ip address
 no ip mroute-cache
 speed 100
 full-duplex
 channel-group 1
!
interface FastEthernet5/1/1
 no ip address
 no ip mroute-cache
 speed 100
 full-duplex
 channel-group 1
!
!
ip classless
no ip http server
ip pim bidir-enable
!
!
!
!
line con 0
line aux 0
line vty 0 4
 login
!
```

```
end
```

## Cisco 7500 Cisco IOS Software Releases的802.1Q配置早于12.1(3)T

在Cisco IOS版本中早于12.1(3)T， **encapsulation dot1Q 1 native命令**在子接口下不是可用的。然而，匹配在链路间的本地VLAN如所描述以前是仍然必要的。要配置在软件版本的802.1q中继早于12.1(3)T，请配置VLAN的1 IP地址在主要port-channel1接口，不是端口信道子接口。

```
!--- Configure a port-channel interface to enable FEC.
7500# configure terminal

 Enter configuration commands, one per line. End with
CNTL/Z.

7500(config)# interface port-channel 1

01:34:10: %LINEPROTO-5-UPDOWN: Line protocol on
Interface Port-channel1, changed
          state to down
!--- Configure full-duplex to match the duplex setting
on the Catalyst switch side. 7500(config-if)# full-
duplex

7500(config-if)# exit
!--- Do not configure an interface port-channel 1.1 !---
Instead, create a port-channel 1 main interface and
configure the IP address !--- for VLAN 1 here.
7500(config)# interface port-channel 1

7500(config-if)# full-duplex

7500(config-if)# ip address 10.10.10.1 255.255.255.0

7500(config-if)# exit

7500(config)#
!--- It is still necessary to create a subinterface for
VLAN 2. 7500(config)# interface port-channel 1.2

7500(config-subif)# encapsulation dot1Q 2

7500(config-subif)# ip address 10.10.11.1 255.255.255.0

7500(config-subif)# exit
!--- Configure the FastEthernet interfaces for speed
100, depending on the port adapter. !--- Some
FastEthernet port adapters can autonegotiate speed (10
or 100) and duplex (half !--- or full). Others are only
capable of 100 (half or full). 7500(config)# interface
fastethernet 5/1/0

7500(config-if)# speed 100
!--- Issue the channel-group command to configure the
FastEthernet interfaces to be !--- members of port-
channel 1.

7500(config-if)# channel-group 1

%Interface MTU set to channel-group MTU 1500.
```

```
7500(config-if)# no shut

7500(config-if)#
%Interface MTU set to channel-group MTU 1500.

FastEthernet5/1/0 added as member-1 to port-channel1

01:46:09: %LINK-3-UPDOWN: Interface FastEthernet5/1/0,
changed state to up
01:46:10: %LINEPROTO-5-UPDOWN: Line protocol on
Interface FastEthernet5/1/0,
          changed state to up
01:46:12: %LINEPROTO-5-UPDOWN: Line protocol on
Interface Port-channel1,
          changed state to up

Router(config-if)# exit

Router(config)# interface fastethernet 5/1/1

Router(config-if)# speed 100

Router(config-if)# channel-group 1

%Interface MTU set to channel-group MTU 1500.

Router(config-if)# no shut

Router(config-if)#
%Interface MTU set to channel-group MTU 1500.

FastEthernet5/1/1 added as member-2 to port-channel1

01:54:52: %LINK-3-UPDOWN: Interface FastEthernet5/1/1,
changed state to up
01:54:53: %LINEPROTO-5-UPDOWN: Line protocol on
Interface FastEthernet5/1/1,
          changed state to up

Router(config-if)# exit
!--- Remember to save the configuration. 7500# write
memory

Building configuration...
[OK]
7500#
!--- Note: Remember also that—in any version of software
previous to 12.2 or 12.2T for the !--- 7000/7500
series—you will have to issue the no ip cef command
globally before you !--- configure 802.1Q trunking on a
subinterface. Otherwise, you will see this error !---
message: 802.1q encapsulation not supported with CEF
configured on the interface. !--- See the Components
Used section of this document for more information.
7500# show running-config

Building configuration...

Current configuration : 1593 bytes
!
version 12.1
no service pad
service timestamps debug uptime
service timestamps log uptime
```

```
no service password-encryption
!
hostname 7500
!
!
ip subnet-zero
!
no ip cef
!
!
!
interface Port-channel1
ip address 10.10.10.1 255.255.255.0
 full-duplex
 hold-queue 300 in
!
interface Port-channel1.2
 encapsulation dot1Q 2
 ip address 10.10.11.1 255.255.255.0
!
interface FastEthernet5/1/0
 no ip address
 no ip mroute-cache
 speed 100
 full-duplex
 channel-group 1
!
interface FastEthernet5/1/1
 no ip address
 no ip mroute-cache
 speed 100
 full-duplex
 channel-group 1
!
!
ip classless
no ip http server
!
!
!
line con 0
line aux 0
line vty 0 4
 login
!
end

7500#
```

# Verify

Use this section to confirm that your configuration works properly.

命令输出解释程序（仅限注册用户）(OIT) 支持某些 **show** 命令。使用 OIT 可查看对 show 命令输出的分析。

## Catalyst 6500显示命令

- **show interface** —显示sc0管理接口IP地址和VLAN。在本例中，使用默认VLAN (VLAN 1)。

```
Catalyst6500> (enable) show interface

sl0: flags=51<UP,POINTOPOINT,RUNNING>
        slip 0.0.0.0 dest 0.0.0.0
sc0: flags=63<UP,BROADCAST,RUNNING>
        VLAN 1 inet 10.10.10.2 netmask 255.255.255.0 broadcast 10.10.10.255
Catalyst6500> (enable)
```

- **show ip route** —显示默认网关。在本例中， 10.10.10.1是port-channel1的IP地址(802.1q中继)或的Port-Channel 1.1 (ISL中继)。

```
Catalyst6500> (enable) show ip route

Fragmentation   Redirect   Unreachable
-------------   --------   -----------
enabled         enabled    enabled

The primary gateway: 10.10.10.1
Destination      Gateway          RouteMask    Flags   Use       Interface
---------------  ---------------  ----------   -----   --------  ---------
default          10.10.10.1       0x0          UG      0           sc0
10.10.10.0       10.10.10.2       0xffffff00   U       8           sc0
default          default          0xff000000   UH      0           sl0
Catalyst6500> (enable)
```

- **show port capabilities mod/port** —产生快速查找在交换模块的硬件功能。在本例中，您能看到端口3/1 (和3/2)是能够的EtherChannel，中继封装它支持和其他信息。

```
Catalyst6500> (enable) show port capabilities 3/1

Model                   WS-X6248-RJ-45
Port                    3/1
Type                    10/100BaseTX
Speed                   auto,10,100
Duplex                  half,full
Trunk encap type        802.1q,ISL
Trunk mode              on,off,desirable,auto,nonegotiate
Channel                 yes
Broadcast suppression   percentage(0-100)
Flow control            receive-(off,on),send-(off)
Security                yes
Membership              static,dynamic
Fast start              yes
QOS scheduling          rx-(1q4t),tx-(2q2t)
CoS rewrite             yes
ToS rewrite             DSCP
UDLD                    yes
Inline power            no
AuxiliaryVlan           1..1000,untagged,dot1p,none
SPAN                    source,destination
COPS port group         not supported
Catalyst6500> (enable)
```

- **show port counters** *mod/端口*—产生快速查找在可能的端口错误。在本例中，此端口免于所有错误。如果经历在端口的错误，请参见排除交换端口故障并且建立接口问题欲知更多信息。

```
Catalyst6500> (enable) show port counters 3/1

Port  Align-Err  FCS-Err    Xmit-Err   Rcv-Err    UnderSize
----- ---------- ---------- ---------- ---------- ---------
 3/1           0          0          0          0         0

Port  Single-Col Multi-Coll Late-Coll  Excess-Col Carri-Sen Runts     Giants
----- ---------- ---------- ---------- ---------- --------- --------- ---------
 3/1           0          0          0          0         0         0         -

Last-Time-Cleared
--------------------------
```

```
Thu May 2 2002, 02:11:55
Catalyst6500> (enable)
```

- **show port *mod*** —显示端口状态、VLAN、Trunk和速度和双工信息。在本例中，Workstation1的接入端口是3/3，在VLAN 1。Workstation2的接入端口是3/4，是VLAN 2.端口3/1和3/2是Trunking和FEC端口。

```
Catalyst6500> (enable) show port 3

Port  Name                 Status     VLAN       Duplex Speed Type
----- -------------------- ---------- ---------- ------ ----- ------------
 3/1                       connected  trunk        full   100 10/100BaseTX
 3/2                       connected  trunk        full   100 10/100BaseTX
 3/3                       connected  1          a-half  a-10 10/100BaseTX
 3/4                       connected  2          a-full a-100 10/100BaseTX
!--- Output suppressed.
```

- **show VLAN** —显示哪些端口分配到特定VLAN。注意在本例中的中继端口(3/1和3/2)在此输出中没出现，是正常的。

```
Catalyst6500> (enable) show vlan

VLAN Name                             Status    IfIndex Mod/Ports, Vlans
---- -------------------------------- --------- ------- ------------------------
1    default                          active    119     2/1-2
                                                        3/3,3/5-48
                                                        4/1-24
2    VLAN0002                         active    124     3/4
!--- Output suppressed.
```

- **show trunk** —显示中继模式，封装类型，提供VLAN和激活VLAN。在本例中， VLAN 1 (默认情况下总是允许和激活)和VLAN 2是Trunk的当前活跃的VLAN。注意两个中继端口在VLAN 1。

```
Catalyst6500> (enable) show trunk

* - indicates vtp domain mismatch
Port      Mode         Encapsulation  Status        Native vlan
--------  -----------  -------------  ------------  -----------
 3/1      nonegotiate  isl            trunking      1
 3/2      nonegotiate  isl            trunking      1

Port      VLANs allowed on trunk
--------  ---------------------------------------------------------------------
 3/1      1-1005
 3/2      1-1005

Port      VLANs allowed and active in management domain
--------  ---------------------------------------------------------------------
 3/1      1-2
 3/2      1-2

Port      VLANs in spanning tree forwarding state and not pruned
--------  ---------------------------------------------------------------------
 3/1      1-2
 3/2      1-2
```

对于802.1q中继，前面的命令的输出更改到此：

```
Catalyst6500> (enable) show trunk

* - indicates vtp domain mismatch
Port      Mode         Encapsulation  Status        Native VLAN
--------  -----------  -------------  ------------  -----------
 3/1      nonegotiate  dot1q          trunking      1
 3/2      nonegotiate  dot1q          trunking      1

Port      VLANs allowed on trunk
--------  ---------------------------------------------------------------------
 3/1      1-1005
```

```
 3/2      1-1005

Port      VLANs allowed and active in management domain
--------  -------------------------------------------------------------------
 3/1      1-2
 3/2      1-2

Port      VLANs in spanning tree forwarding state and not pruned
--------  -------------------------------------------------------------------
 3/1      1-2
 3/2      1-2
Catalyst6500> (enable)
```

- **show port channel** —显示EtherChannel状态。在本例中，有，防止PAgP帧的2端口FEC (端口3/1和3/2)传输。您能也看到7500路由器的远程端口信道接口。

```
Catalyst6500> (enable)  show port channel

Port  Status     Channel              Admin Ch
                 Mode                 Group Id
----- ---------- -------------------- ----- -----
 3/1  connected  on                     105   833
 3/2  connected  on                     105   833
----- ---------- -------------------- ----- -----

Port  Device-ID                        Port-ID                   Platform
----- -------------------------------- ------------------------- ----------------
3/1  7500                            Port-channel1.1           cisco RSP4
3/2
----- -------------------------------- ------------------------- ----------------
Catalyst6500> (enable)
```

对于与802.1q中继的FEC，前面的命令的输出更改到此：

```
Catalyst6500> (enable) show port channel

Port  Status     Channel              Admin Ch
                 Mode                 Group Id
----- ---------- -------------------- ----- -----
 3/1   connected  on                     257   769
 3/2   connected  on                     257   769
----- ---------- -------------------- ----- -----

Port  Device-ID                        Port-ID                   Platform
----- -------------------------------- ------------------------- ----------------
 3/1       7500                            FastEthernet5/1/0         cisco RSP4
 3/2       7500                            FastEthernet5/1/1         cisco RSP4
----- -------------------------------- ------------------------- ----------------
Catalyst6500> (enable)
```

如果有输出的一**show-tech support命令**从您的Cisco设备，您能使用Output Interpreter工具(仅限注册用户)显示潜在问题和修正。

## Cisco 7500 Router显示命令

- **show interface port-channel*信道数***—给予成员物理接口的状态。在本例中， 2端口FEC被配置在Catalyst 6000的端口3/1和3/2之间和在7500的interface fastethernet 5/1/0和5/1/1之间。Port-channel1显示如up/up。安排一个IP地址配置它，在这种情况下意味着它是802.1q中继的本地VLAN IP地址。早于12.1(3)T本文的部分请参阅Cisco 7500 802.1Q配置关于Cisco IOS Software Releases欲知更多信息。输出为VLAN 2 802.1Q子接口也显示，从**show interface port channel 1.2命令**。

```
7500# show interface port-channel 1

Port-channel1 is up, line protocol is up
```

```
  Hardware is FEChannel, address is 0001.6490.f8a8 (bia 0000.0000.0000)
  Internet address is 10.10.10.1/24
  MTU 1500 bytes, BW 200000 Kbit, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, Unknown Speed
  ARP type: ARPA, ARP Timeout 04:00:00
    No. of active members in this channel: 2
        Member 0 : FastEthernet5/1/0
        Member 1 : FastEthernet5/1/1
  Last input 00:00:14, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/300/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue :0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     6720 packets input, 923310 bytes, 0 no buffer
     Received 5010 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
     0 watchdog
     0 input packets with dribble condition detected
     1902 packets output, 573088 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 babbles, 0 late collision, 0 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out
7500#

7500# show interface port-channel 1.2

Port-channel1.2 is up, line protocol is up
  Hardware is FEChannel, address is 0001.6490.f8a8 (bia 0000.0000.0000)
  Internet address is 10.10.11.1/24
  MTU 1500 bytes, BW 200000 Kbit, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation 802.1q Virtual LAN, Vlan ID  2.
  ARP type: ARPA, ARP Timeout 04:00:00
```

这是ISL中继和FEC的输出：

```
7500# show interface port-channel 1

Port-channel1 is up, line protocol is up
  Hardware is FEChannel, address is 0001.6490.f8a8 (bia 0000.0000.0000)
  MTU 1500 bytes, BW 200000 Kbit, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, Unknown Speed
  ARP type: ARPA, ARP Timeout 04:00:00
    No. of active members in this channel: 2
        Member 0 : FastEthernet5/1/0
        Member 1 : FastEthernet5/1/1
  Last input 00:00:01, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/300/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue :0/40 (size/max)
  5 minute input rate 0 bits/sec, 1 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     113 packets input, 7278 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
```

```
     0 watchdog
     0 input packets with dribble condition detected
  13 packets output, 2264 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 babbles, 0 late collision, 0 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out

7500# show interface port-channel 1.1

Port-channel1.1 is up, line protocol is up
  Hardware is FEChannel, address is 0001.6490.f8a8 (bia 0000.0000.0000)
  Internet address is 10.10.10.1/24
  MTU 1500 bytes, BW 200000 Kbit, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ISL Virtual LAN, Color 1.
  ARP type: ARPA, ARP Timeout 04:00:00

7500# show interface port-channel 1.2

Port-channel1.2 is up, line protocol is up
  Hardware is FEChannel, address is 0001.6490.f8a8 (bia 0000.0000.0000)
  Internet address is 10.10.11.1/24
  MTU 1500 bytes, BW 200000 Kbit, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ISL Virtual LAN, Color 2.
  ARP type: ARPA, ARP Timeout 04:00:00
```

- **show interfaces fastethernet *slot/端口适配器/端口*—**显示路由器的物理接口的状况，并且任何错误是否在接口存在。在本例中，它是无错的。

```
7500# show interface fastethernet 5/1/0

FastEthernet5/1/0 is up, line protocol is up
  Hardware is cyBus FastEthernet Interface, address is 0001.6490.f8a8
  (bia 0001.6490.f8a8)
  MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 100Mb/s, 100BaseTX/FX
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 1d00h, output 00:00:07, output hang never
  Last clearing of "show interface" counters 1d00h
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue :0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     2929 packets input, 425318 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
     0 watchdog
     0 input packets with dribble condition detected
     12006 packets output, 1539768 bytes, 0 underruns
     0 output errors, 0 collisions, 6 interface resets
     0 babbles, 0 late collision, 0 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out
7500#
```

# Troubleshoot

目前没有针对此配置的故障排除信息。

## Related Information

- LAN 产品支持页
- EtherChannel 支持页
- LAN 交换技术支持页
- Technical Support & Documentation - Cisco Systems