

# 運行CatOS和Cisco IOS系統軟體的Catalyst交換機之間的802.1Q中繼

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## 簡介

本文提供執行Catalyst OS(CatOS)系統軟體的Catalyst交換器與執行Cisco IOS®系統軟體的模組化第3層(L3)交換器之間的IEEE 802.1Q主幹組態範例。執行CatOS的交換器包括Catalyst 4500/4000、5500/5000和6500/6000系列交換器。執行Cisco IOS軟體的模組化L3交換器包括Catalyst 4500/4000和Catalyst 6500/6000系列交換器。[Catalyst 4000\(CatOS\)和Catalyst 6500 \( Cisco IOS軟體 \) 的組態範例使用，但前面提到的所有交換器都可能用於達成相同的結果。](#)

主幹連線是在兩個裝置之間，透過點對點連結，從多個 VLAN 攜帶流量的方式。實現乙太網中繼的兩種方法是：

- 交換器間連結通訊協定(ISL) ( 思科專有通訊協定 )
- 802.1Q ( IEEE標準 )

## 必要條件

### 需求

有關Catalyst交換機上與802.1Q和ISL相關的系統要求、准則和限制，請參閱：[實施中繼的系統要求](#)。

### 採用元件

若要建立本檔案中的範例，已使用以下交換器：

- 搭載Supervisor Engine II(WS-X4013)的Catalyst 4000交換器 ( 執行CatOS軟體版本8.1.3 )
- 搭載Supervisor Engine 2的Catalyst 6509/多層次交換功能卡2(MSFC2)(在Supervisor Engine和MSFC2上執行Cisco IOS軟體版本12.1(20)E2)

本文中的資訊是根據特定實驗室環境內的裝置所建立。文中使用到的所有裝置皆從已清除 ( 預設 ) 的組態來啟動。如果您的網路正在作用，請確保您已瞭解任何指令可能造成的影響。

## 慣例

如需文件慣例的詳細資訊，請參閱[思科技術提示慣例](#)。

## 背景理論

本檔案僅包含交換器的組態檔以及相關範例show命令的輸出。有關如何在Catalyst交換器之間設定802.1Q主幹的詳細資訊，請參閱[LAN產品支援頁面](#)。

在802.1Q中繼中，除了本徵VLAN外，所有VLAN資料包都標籤在中繼鏈路上。本徵VLAN資料包在TRUNK鏈路上無標籤傳送。因此，為中繼配置的兩台交換機上的本地VLAN應該相同。這樣，當您收到沒有標籤的幀時，可以推斷幀屬於哪個VLAN。預設情況下，VLAN 1是所有交換機上的本地VLAN。

- 在CatOS中，本徵VLAN可以透過發出**set vlan *vlan-id* mod/port** 命令來變更，其中*mod/port* 為主干連線埠。
- 在Cisco IOS軟體中，可以通過在中繼連線埠上設定的**switchport trunk native vlan *vlan-id*** interface命令來變更本地VLAN。

## 設定

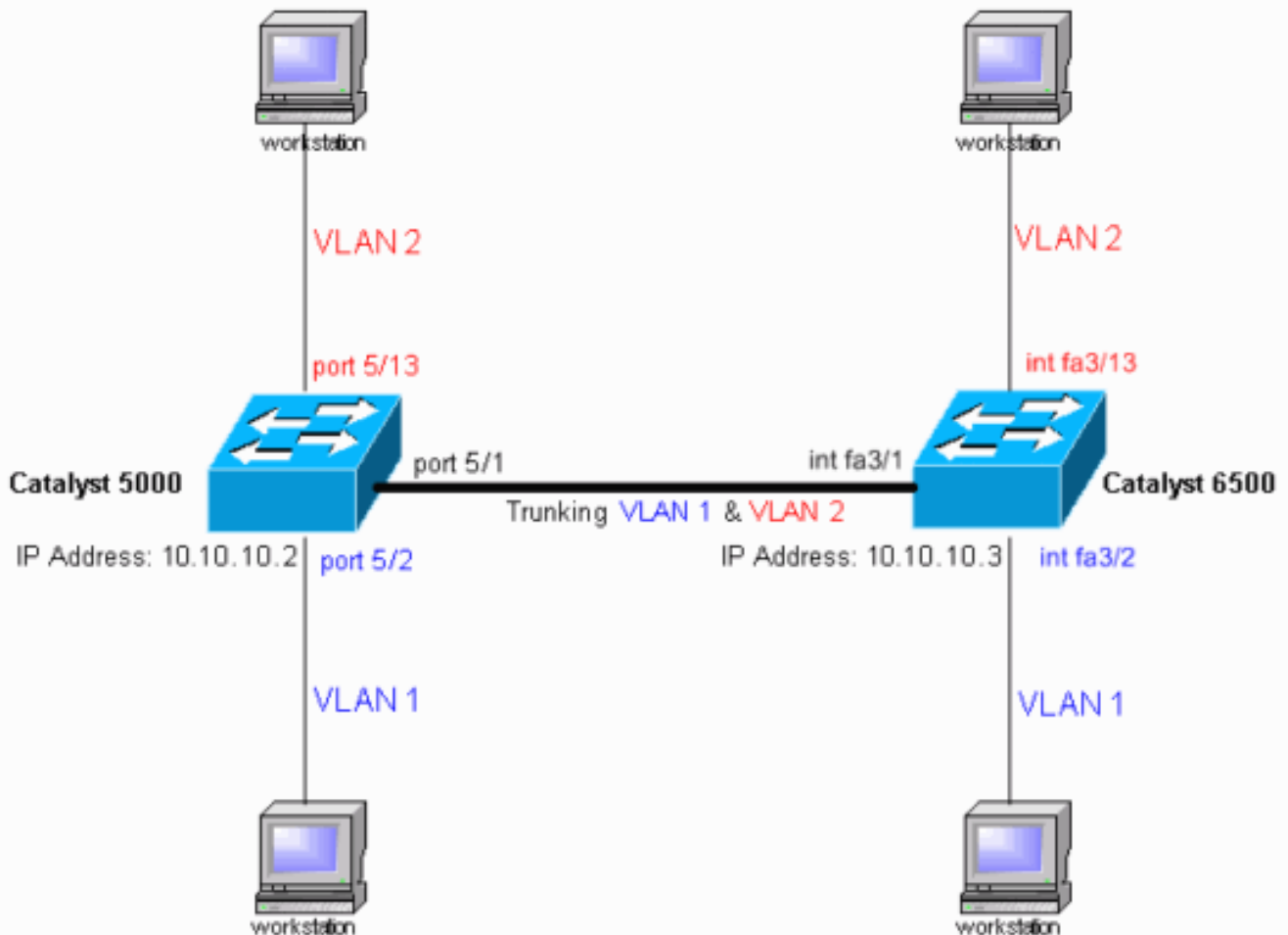
本節提供用於設定本文件中所述功能的資訊。

本文檔中的配置是在隔離的實驗室環境中實施的。使用前，請確認您已瞭解任何組態或指令可能對網路造成的影響。已使用**clear config all**和**write erase**命令清除所有裝置上的配置，以確保它們具有預設配置。

**注意：**要查詢有關本文檔中使用的命令的其他資訊，請使用[命令查詢工具](#) (僅限註冊客戶)。

## 網路圖表

本檔案會使用以下網路設定：



## 組態

本檔案會使用以下設定：

- [Catalyst 4000交換器](#)
- [Catalyst 6500交換器](#)

注意：註釋和說明以藍色斜體顯示。

### Catalyst 4000交換器

```
#version 8.1(3)
!
!
#system web interface version(s)
!
#system
set system name  cat4000
!
#frame distribution method
set port channel all distribution mac both
!
#vtp
set vtp domain cisco
!--- In this example, the VLAN Trunk Protocol (VTP)
domain name is the same !--- on both sides. This is
required for the autonegotiation of the trunk !--- by
the Dynamic Trunking Protocol (DTP). set vtp mode client
```

```

vlan
!--- In this example, the VTP mode is set to client. !--
- Set the VTP mode according to your network
requirements. !--- For more details, refer to !---
Understanding and Configuring VLAN Trunk Protocol \(VTP\).
! #ip set interface sc0 1 10.10.10.2/255.255.255.0
10.10.10.255
!--- This is the IP address used for management. !---
Output suppressed. ! #module 1 : 2-port 1000BaseX
Supervisor ! #module 2 empty ! #module 3 empty ! #module
4 empty ! #module 5 : 48-port Inline Power Module set
vlan 2 5/13-24
!--- Ports 5/13-24 have been assigned to VLAN 2. set
trunk 5/1 desirable dot1q 1-1005,1025-4094
!--- The trunking mode is set to desirable mode, which
means !--- the port automatically tries to form a trunk
with a !--- neighboring port set to desirable, auto, or
on mode. !--- For recommended trunk mode settings, refer
to !--- the Dynamic Trunking Protocol section of !---
Best Practices for Catalyst 4500/4000, 5500/5000, and
6500/6000 Series Switches Running CatOS Configuration
and Management. !--- Output suppressed. set spantree
portfast 5/2-24 enable
set port channel 5/2-24 mode off
!--- The macro command set port host 5/2-24 was used to
do three things: !--- disable trunking, disable port
channeling, and enable spantree portfast. !--- For
details on using the set port host command, refer to !--
- Using Portfast and Other Commands to Fix Workstation
Startup Connectivity Delays. ! #module 6 empty end

```

## Catalyst 6500交換器

```

Current configuration : 4408 bytes
!
version 12.1
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname cat6500
!
boot system flash sup-bootflash:c6sup22-jsv-mz.121-20.E2
enable password mysecret
!--- This is the privileged mode password used in the
example. ! ip subnet-zero ! ! mls flow ip destination
mls flow ipx destination ! redundancy mode rpr-plus
main-cpu auto-sync running-config auto-sync standard ! !
! interface GigabitEthernet2/1 no ip address shutdown !
interface GigabitEthernet2/2 no ip address shutdown !
interface fastethernet3/1
switchport
!--- The switchport command must be entered once, !---
without any keywords, to configure the interface as a
Layer 2 port. !--- The interface is now automatically
configured with the default command !--- switchport mode
dynamic desirable. !--- This means the interface is
ready to autonegotiate trunking !--- encapsulation and
form a trunk link (using DTP) with a neighbor port !---
in desirable, auto, or on mode. !--- For recommended
trunk mode settings, refer to !--- the "Dynamic Trunking
Protocol" section of !--- Best Practices for Catalyst
6500/6000 Series and Catalyst 4500/4000 Series Switches

```

```

Running Cisco IOS Software. ! interface FastEthernet3/2
switchport
switchport mode access
spanning-tree portfast

!--- The interface range fastethernet mod/beginport -
endport !--- command is used to configure interfaces 3/2
- 24 at once. !--- Next, the switchport command is
issued (if this has not been done already).

switchport mode access
spanning-tree portfast
!--- Next, issue the macro command switchport host 3/2 -
24 to automatically !--- configure these ports as access
ports and to enable spantree portfast. !--- For details
on using the switchport host command, refer to !---
Using Portfast and Other Commands to Fix Workstation
Startup Connectivity Delays. ! interface
FastEthernet3/13 switchport switchport access vlan 2
!--- Interfaces 3/13 - 24 are placed in VLAN 2 !---
using the switchport access vlan 2 command.

switchport mode access
spanning-tree portfast

!--- Output suppressed. ! interface FastEthernet3/24
shutdown switchport switchport access vlan 2 switchport
mode access spanning-tree portfast !--- Output
suppressed. ! interface FastEthernet3/48 no ip address
shutdown ! interface vlan 1
ip address 10.10.10.3 255.255.255.0
!--- This is the IP address used for management. ! ip
classless no ip http server !!! line con 0 line vty 0
4 password mysecret

!--- This is the Telnet password used in the example.
login transport input lat pad mop telnet rlogin udptn
nasi !! end cat6500#

```

## 驗證

本節提供的資訊可用於確認您的組態是否正常運作。

## show命令

[Output Interpreter](#) (僅供註冊客戶使用)工具支援某些show命令，此工具可讓您檢視show命令輸出的分析。

在執行CatOS的Catalyst交換器上，使用以下命令：

- show port capabilities *module/port*
- show port *module/port*
- show trunk *module/port*
- show vtp domain

在執行Cisco IOS軟體的Catalyst 6000交換器上，使用以下命令：

- show interfaces *interface-type module/port* trunk
- show vlan

## show命令輸出示例

### Catalyst 4000交換器

**show port capabilities *module/port*** 命令用於檢查連線埠是否可建立主幹。

```
cat4000> (enable) show port capabilities 5/1
Model                WS-X4148-RJ45V
Port                 5/1
Type                 10/100BaseTX
Speed                auto,10,100
Duplex                half,full
Trunk encap type     802.1Q
Trunk mode            on,off,desirable,auto,nonegotiate
Channel              5/1-48
Flow control         no
Security              yes
Dot1x                yes
Membership            static,dynamic
Fast start            yes
QOS scheduling        rx-(none),tx-(2q1t)
CoS rewrite           no
ToS rewrite           no
Rewrite               no
UDLD                  yes
Inline power         auto,off,static
AuxiliaryVlan        1..1000,1025..4094,untagged,none
SPAN                  source,destination,reflector
Link debounce timer  yes
IGMPFilter            yes
Dot1q-all-tagged     no
cat4000> (enable)
```

**show port *module/port*** 命令會顯示特定連線埠的狀態以及它是否為主幹。

```
cat4000> (enable) show port status 5/1
Port Name           Status      Vlan      Level Duplex Speed Type
-----
5/1                  connected  trunk    normal a-full a-100 10/100BaseTX
cat4000> (enable)
```

**show trunk**命令用於驗證中繼狀態和配置。

```
cat4000> (enable) show trunk
* - indicates vtp domain mismatch
# - indicates dot1q-all-tagged enabled on the port
Port      Mode           Encapsulation  Status      Native vlan
-----
5/1       desirable     dot1q          trunking    1

Port      Vlans allowed on trunk
-----
5/1       1-1005,1025-4094

Port      Vlans allowed and active in management domain
```

```

-----
5/1      1-2
Port      Vlans in spanning tree forwarding state and not pruned
-----
5/1      1-2
cat4000> (enable)

```

**show vtp domain**命令用於檢查VTP資訊。

```

cat4000> (enable) show vtp domain
Version      : running VTP1 (VTP3 capable)
Domain Name : cisco                               Password  : not configured
Notifications: disabled                           Updater ID: 10.10.10.3

```

```

Feature      Mode      Revision
-----
VLAN       Client   21

```

```

Pruning      : disabled
VLANs prune eligible: 2-1000

```

### [Catalyst 6500交換器](#)

**show interfaces 介面型別模組/port trunk**命令會告知連線埠是否為主幹。

```

cat6500# show interfaces fastethernet 3/1 trunk

Port      Mode      Encapsulation  Status      Native vlan
Fa3/1    desirable  n-802.1q      trunking   1

Port      Vlans allowed on trunk
Fa3/1     1-4094

Port      Vlans allowed and active in management domain
Fa3/1     1-2

Port      Vlans in spanning tree forwarding state and not pruned
Fa3/1     1-2
cat6500#

```

**show VLAN**命令會提供有關VLAN以及屬於特定VLAN的連線埠的資訊。

```

cat6500# show vlan

VLAN Name      Status      Ports
-----
1    default      active      Fa3/2, Fa3/3, Fa3/4, Fa3/5
                    Fa3/6, Fa3/7, Fa3/8, Fa3/9
                    Fa3/10, Fa3/11, Fa3/12
2    VLAN0002     active      Fa3/13, Fa3/14, Fa3/15, Fa3/16
                    Fa3/17, Fa3/18, Fa3/19, Fa3/20
                    Fa3/21, Fa3/22, Fa3/23, Fa3/24
1002 fddi-default  act/unsup
1003 token-ring-default  act/unsup
1004 fddinet-default  act/unsup
1005 trnet-default  act/unsup

```

*!--- Output suppressed.* cat6500#

**注意：**僅顯示配置為第2層非中繼埠的埠。

## 疑難排解

目前尚無適用於此組態的具體疑難排解資訊。

## 相關資訊

- [LAN 產品支援頁面](#)
- [LAN 交換支援頁面](#)
- [技術支援 - Cisco Systems](#)