在Catalyst 2948G-L3和Catalyst 2900/3500XL或2970系列交換機之間配置ISL中繼

目錄

簡介

本文探討如何在Cisco Catalyst 2948G-L3和Catalyst 2900/3500XL或2970系列交換器之間設定交換器間連結(ISL)通訊協定中繼。將Catalyst 2948G-L3連線到交換器時，設定任務與將路由器連線到交換器的設定任務相同。本文中的組態範例使用Catalyst 2948G-L3作為路由器，使用Catalyst 3500XL作為第2層(L2)交換器。出於本文的目的，您可以將Catalyst 2900XL或2970替換為3500XL。

要在Catalyst 2948G-L3上使用VLAN的概念，必須使用網橋組。每個網橋組都被視為一個單獨的VLAN。這些網橋組對應於所連線交換機的VLAN號。

必要條件

需求

在嘗試此組態之前，請確認連線2900/3500XL或2970和2948G-L3之間的交叉纜線。通常，在路由器和交換器之間使用直通纜線；但是在Catalyst 2948G-L3中，您可使用交叉纜線連線到另一台交換器。這是您用於交換器到交換器連線的交叉纜線。

本文檔的讀者應瞭解以下主題：

- Catalyst 2940和2950/2955系列交換器不支援ISL封裝。有關Catalyst交換機的ISL封裝支援和其他中繼要求的資訊，請參閱實施中繼的系統要求。
- Catalyst 2948G-L3已達到壽命終止(EoL)。 有關詳細資訊和推薦的更換產品，請參閱適用於Cisco Catalyst 2948G-L3和4908G-L3交換機的EoL/EoS。

採用元件

本檔案中的資訊是根據以下軟體版本：

- 適用於第3層(L3)交換器/路由器的Cisco IOS®軟體版本12.0(25)W5(27)(CAT2948G-IN-M)
- Cisco IOS軟體版本12.0(5)WC9(C3500XL-C3H2S-M)(fc1)

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。

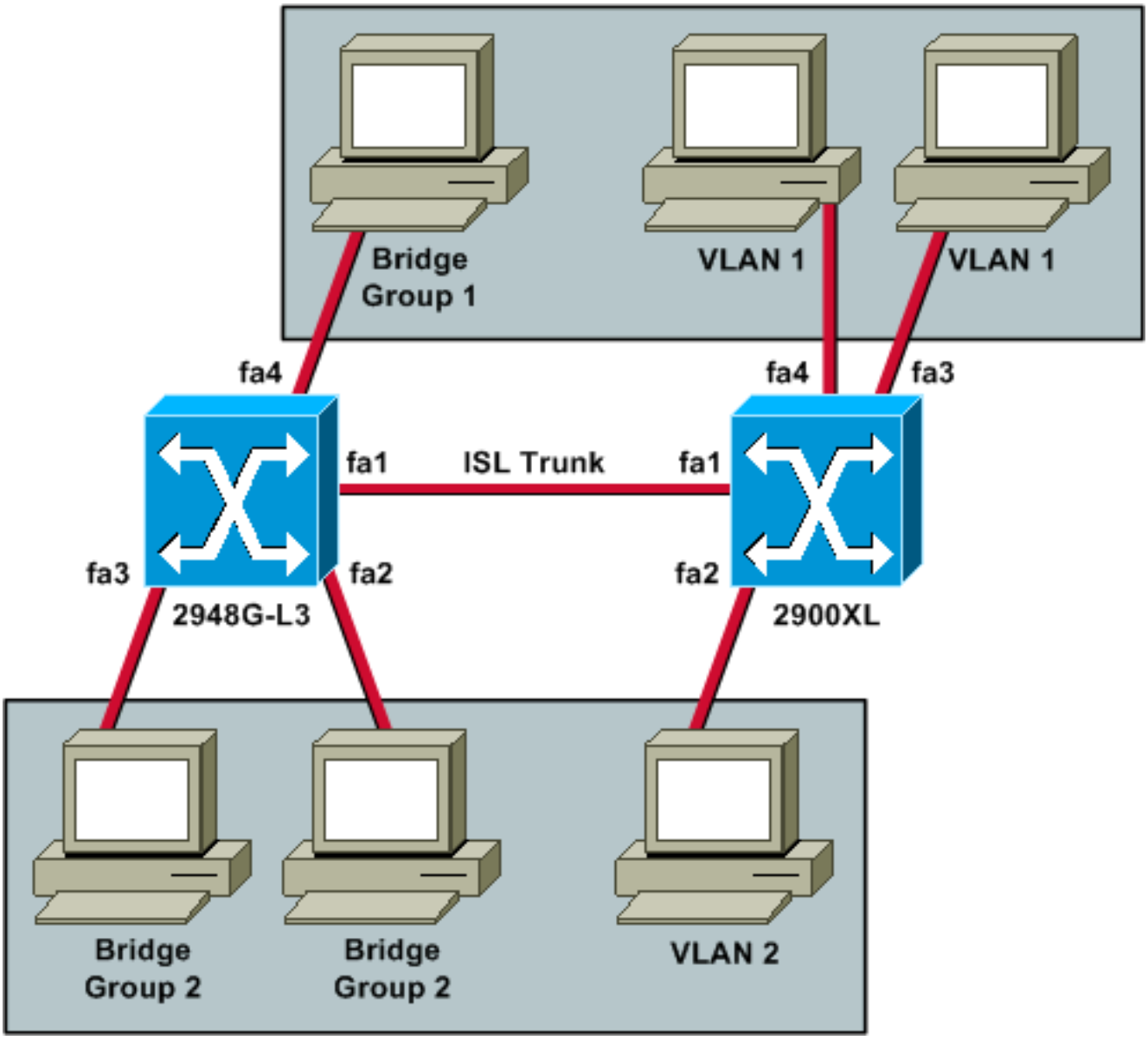
設定

本節提供設定本檔案中所述功能的資訊。

注意：要查詢有關本文檔中命令的其他資訊，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：



如果您希望所有三台PC能夠彼此ping通並擁有預設網關，則必須使用整合路由和橋接(IRB)橋接。

在此案例中，Catalyst 2948G-L3是L3裝置。因為它是第3層裝置，所以不能在同一子網中有兩個第3層介面。因此，您需要在介面上使用網橋組，並將它們與網橋虛擬介面(BVI)、BVI 2聯絡在一起。

BVI 2 IP地址是VLAN 2或網橋組2中所有電腦和裝置的預設網關。

組態

本檔案會使用以下設定：

- 2948G-L3
- 2900/3500XL或2970

2948G-L3

```
Building configuration...

Current configuration:
!
version 12.0
```

```
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname 2948G-L3
!
!
ip subnet-zero
bridge irb
!
!
!
interface FastEthernet1
!--- This interface is the ISL trunk to the switch. no
ip address no ip directed-broadcast ! interface
FastEthernet1.1 encapsulation isl 1 no ip redirects no
ip directed-broadcast bridge-group 1 !--- Use bridge-
group 1 for the trunk subinterface. !--- You can not use
an IP address here because of the subnet !--- overlap
that would occur due to BVI 1, which is in the !--- same
subnet. ! interface FastEthernet1.2 encapsulation isl 2
no ip redirects no ip directed-broadcast bridge-group 2
! interface FastEthernet2 no ip address no ip directed-
broadcast bridge-group 2 !--- This port belongs to VLAN
2. ! interface FastEthernet3 no ip address no ip
directed-broadcast bridge-group 2 !--- This port belongs
to VLAN 2. ! interface FastEthernet4 no ip address no ip
directed-broadcast bridge-group 1 !--- This port belongs
to VLAN 1. ! interface BVI1 ip address 10.1.1.1
255.255.0.0 !--- This is the IP address of BVI 1. no ip
directed-broadcast no ip route-cache cef ! interface
BVI2 !--- This is the IP address of BVI 2. ip address
10.2.2.2 255.255.0.0 no ip directed-broadcast no ip
route-cache cef ! ip classless ! bridge 1 protocol ieee
!--- Choose IEEE as the Spanning Tree Protocol. bridge 1
route ip !--- Allow routing to occur for IP. bridge 2
protocol ieee bridge 2 route ip ! line con 0 transport
input none line aux 0 line vty 0 4 login ! end
```

2900/3500XL或2970

```
!--- First, add VLAN 2 to the VLAN database for a
2900/3500XL !--- switch: 3500XL# vlan database

3500XL(vlan)# vlan 2

VLAN 2 added:
    Name: VLAN0002

3500XL(vlan)# exit

APPLY completed.
Exiting....
3500XL#
!--- The Catalyst 2970 gives you the option to configure
VLANs !--- from the VLAN database or from global
configuration mode: 2970# configure terminal

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

```
2970(config)# vlan 2

2970(config-vlan)# end

2970#
```

```
!--- The switchport configurations on the Catalyst
2900/3500XL !--- and on the 2970 are identical, for the
purposes of this !--- document. Remember that the
Catalyst 2970 has 10/100/1000 !--- ports (1000Base-T),
so the interfaces in this output !--- would instead be
labeled Gigabit Ethernet 0/1, 0/2, !--- and so forth.
Current configuration: ! version 12.0 no service pad
service timestamps debug uptime service timestamps log
uptime no service password-encryption ! hostname 3500XL
! interface FastEthernet0/1 switchport mode trunk !---
This port is an ISL trunk. ! interface FastEthernet0/2
switchport access vlan 2 !--- This port is in VLAN 2. !
interface FastEthernet0/3 !--- This port is in the
default VLAN 1. ! interface FastEthernet0/4 ! !
interface VLAN1 ip address 10.1.1.100 255.255.0.0 !---
This is the IP address of the management interface. no
ip directed-broadcast no ip route-cache ! snmp-server
engineID local 000000090200000AF484CC80 snmp-server
community public RO ! line con 0 exec-timeout 0 0
transport input none stopbits 1 line vty 0 4 login line
vty 5 15 login ! end
```

驗證

本節提供的資訊用於確認您的組態是否正常運作。

輸出直譯器工具(僅供註冊客戶使用)支援某些show命令，此工具可讓您檢視show命令輸出的分析。

- **show interface fa0/1 switchport** — 檢驗2900/3500XL或2970上中繼線的狀態並檢視哪些VLAN處於活動狀態。

```
3500XL# show interface fa0/1 switchport

Name: Fa0/1
Switchport: Enabled
Administrative mode: trunk
Operational Mode: trunk
Administrative Trunking Encapsulation: isl
Operational Trunking Encapsulation: isl
Negotiation of Trunking: Disabled
Access Mode VLAN: 0 ((Inactive))
Trunking Native Mode VLAN: 1 (default)
Trunking VLANs Enabled: ALL
Trunking VLANs Active: 1,2
Pruning VLANs Enabled: 2-1001

Priority for untagged frames: 0
Override vlan tag priority: FALSE
Voice VLAN: none
Appliance trust: none
Self Loopback: No
3500XL#
```

- **show vlan** — 驗證2900/3500XL或2970上的連線埠是否已指派給正確的VLAN。

```
3500XL# show vlan
```

```
VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/3, Fa0/4, Fa0/5, Fa0/6,
                                                Fa0/7, Fa0/8, Fa0/9, Fa0/10,
                                                Fa0/11, Fa0/12, Fa0/13, Fa0/14,
                                                Fa0/15, Fa0/16, Fa0/17, Fa0/18,
                                                Fa0/19, Fa0/20, Fa0/21, Fa0/22,
                                                Fa0/23, Fa0/24, Gi0/1, Gi0/2
2    VLAN0002                         active    Fa0/2
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
2    enet  100002     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
1005 trnet 101005     1500  -      -      -        ibm  -        0      0
3500XL#
```

- **show interface bvi 1** — 驗證2948G-L3 BVI介面和線路協定在2948G-L3上均處於運行狀態。

```
2948G-L3# show interface bvi 1

BVI1 is up, line protocol is up
  Hardware is BVI, address is 0001.c75c.680a (bia 0000.0000.0000)
  Internet address is 10.1.1.1/16
  MTU 1500 bytes, BW 10000 Kbit, DLY 5000 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set
  ARP type: ARPA, ARP Timeout 04:00:00
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue 0/0 (size/max)
2948G-L3#
```

- **show bridge 1** — 檢驗網橋1是否正在轉發。您還可以使用**show spanning-tree**命令驗證生成樹協定是否已啟用並轉發。

```
2948G-L3# show bridge 1

Total of 300 station blocks, 299 free
Codes: P - permanent, S - self

Bridge Group 1:

    Address       Action   Interface
00ee.1e9f.50c0   forward   Fa1.1

2948G-L3#
```

疑難排解

本節提供提示和輸出示例以幫助對配置進行故障排除。

- 驗證是否可以ping通其它裝置。
- 檢驗PC是否可以ping通其它VLAN中的其它PC。
- 確保預設網關正確。在此案例中，預設閘道是2948G-L3上各自的BVI。

```
2948G-L3# ping 10.1.1.100

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.1.100, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/6/12 ms

2948G-L3# show arp

Protocol  Address          Age (min)  Hardware Addr   Type   Interface
Internet  10.2.2.2                -   0030.40d6.4008  ARPA   BVI2
Internet  10.1.1.1                -   0030.40d6.400a  ARPA   BVI1
Internet  10.1.1.100              1   00ee.1e9f.50c0  ARPA   BVI1
2948G-L3#
```

相關資訊

- LAN 產品支援頁面
- LAN 交換支援頁面
- 技術支援與文件 - Cisco Systems