在 Catalyst 2948G-L3和Catalyst 2900/3500XL /2970 系列交换机上配置ISL中继

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简介

本文档讨论如何在Cisco Catalyst 2948G-L3和Catalyst 2900/3500XL或2970系列交换机之间配置交换机间链路(ISL)协议中继。将Catalyst 2948G-L3连接到交换机时，配置任务与将路由器连接到交换机时的配置任务相同。本文档中的配置示例使用Catalyst 2948G-L3作为路由器，并使用Catalyst 3500XL作为第2层(L2)交换机。为本文档之目的，您可以用Catalyst 2900XL或2970替代3500XL。

要在Catalyst 2948G-L3上使用VLAN的概念，必须使用网桥组。每个网桥组都是一个独立的 VLAN。这些网桥组对应于所连接交换机的 VLAN 编号。

先决条件

要求

尝试此配置之前，请确保在2900/3500XL或2970与2948G-L3之间连接交叉电缆。通常，在路由器和交换机之间使用直通电缆；但是，使用Catalyst 2948G-L3时，您使用交叉电缆连接到另一台交换机。这是交换机到交换机连接的交叉电缆。

本文档的读者应掌握以下这些主题的相关知识：

- Catalyst 2940和2950/2955系列交换机不支持ISL封装。有关Catalyst交换机的ISL封装支持和其他中继要求的信息，请参阅实施中继的系统要求。
- Catalyst 2948G-L3 已停产 (EoL)。 有关详细信息和推荐的更换产品，请参阅Cisco Catalyst 2948G-L3和4908G-L3交换机的EoL/EoS。

使用的组件

本文档中的信息基于以下软件版本：

- 适用于第3层(L3)交换机/路由器(CAT2948G-IN-M)的思科IOS®软件版本12.0(25)W5(27)
- 思科IOS软件版本12.0(5)WC9(C3500XL-C3H2S-M)(fc1)

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您使用的是真实网络，请确保您已经了解所有命令的潜在影响。

规则

有关文件规则的更多信息请参见“ Cisco技术提示规则”。

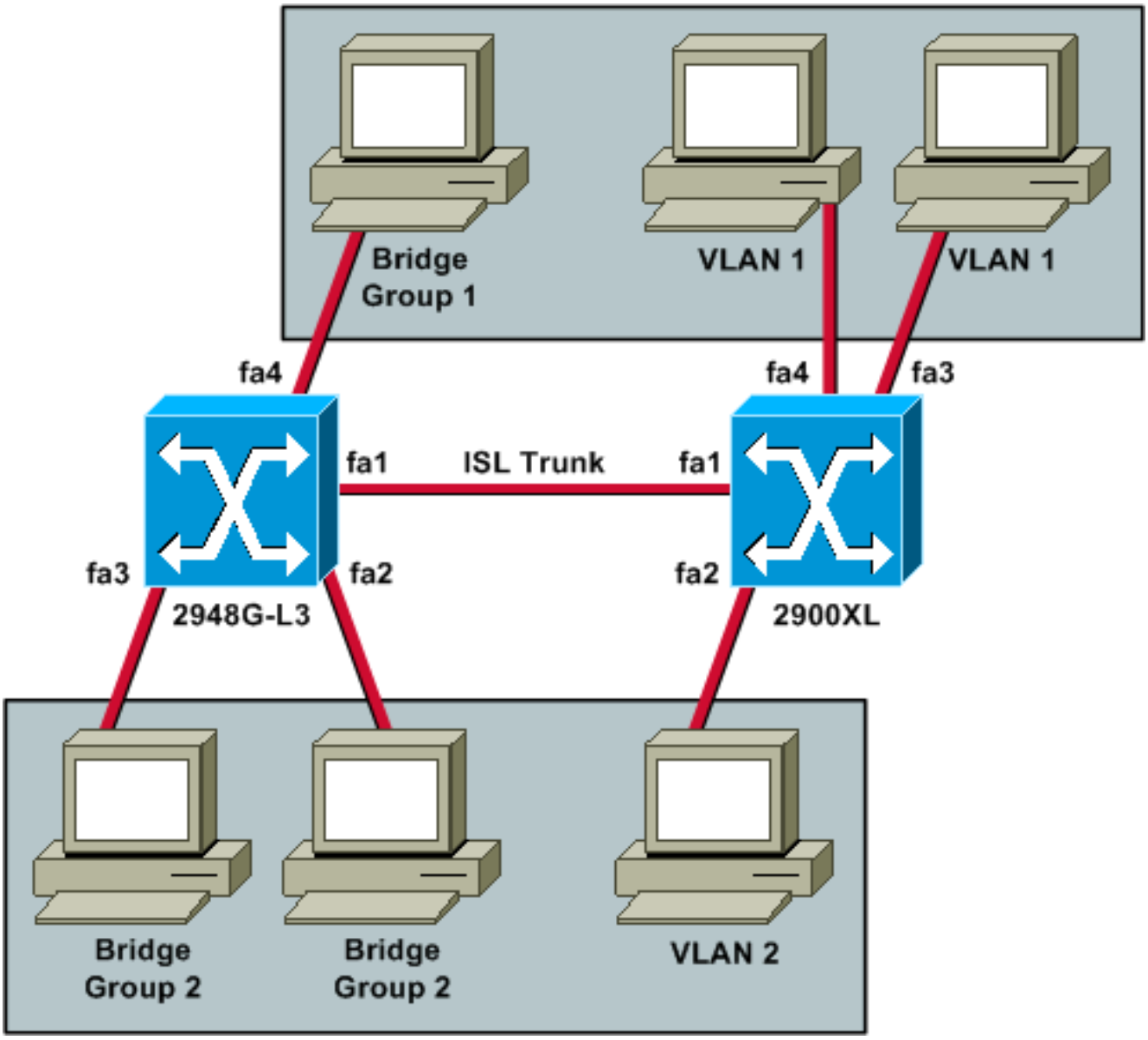
配置

此部分提供本文描述的功能的配置信息。

注：要查找有关本文档中命令的其他信息，请使用命令查找工具(仅注册客户)。

网络图

本文档使用以下网络设置：



如果希望所有三台PC都能相互ping通并拥有默认网关，则必须使用集成路由和桥接(IRB)的桥接。

在此场景中，Catalyst 2948G-L3是L3设备。由于它是第3层设备，因此不能在同一子网中有两个第3层接口。因此，您需要在接口上使用网桥组，并将它们与网桥虚拟接口(BVI)、BVI 2绑定在一起。

BVI 2 IP地址是VLAN 2或网桥组2中所有PC和设备的默认网关。

配置

本文档使用以下配置：

- 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
```

验证

此部分提供信息确认您的配置适当地工作。

命令输出解释程序工具（仅限注册用户）支持某些 **show 命令，使用此工具可以查看对 show 命令输出的分析。**

- **show interface fa0/1 switchport** — 检验2900/3500XL或2970上中继的状态，并查看哪些VLAN处于活动状态。

```
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** — 检验2900/3500XL或2970上的端口是否已分配给正确的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** — 验证2948G-L3 BVI接口和线路协议在2948G-L3是否都处于打开状态。

```
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** — 检验网桥1是否正在转发。您还可以使用show spanning-tree命令验证生成树协议是否已启**用并转发**。

```
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#
```

故障排除

本节提供有助于排除配置故障的提示和示例输出。

- 检验您是否可以ping通其它设备。
- 检验PC是否能ping通其他VLAN中的其它PC。

- 确保默认网关正确。在此场景中，默认网关是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#
```

相关信息

- LAN 产品支持页
- LAN 交换技术支持页
- 技术支持和文档 - Cisco Systems