

# Catalyst 4908G-L3 VLAN 路由与桥接示例配置

## 目录

[简介](#)

[先决条件](#)

[要求](#)

[使用的组件](#)

[规则](#)

[配置](#)

[Catalyst 4908G-L3 VLAN 路由和桥接示例](#)

[网络图](#)

[配置](#)

[一般配置任务](#)

[为管理配置交换机](#)

[配置 VLAN](#)

[配置以太网信道](#)

[配置桥接和路由](#)

[配置交换机间 ISL 中继线](#)

[配置终端站端口](#)

[保存交换机配置](#)

[完整的设备配置](#)

[验证](#)

[故障排除](#)

[相关信息](#)

## 简介

本文论述 Catalyst 4908G-L3 交换机的配置示例，以支持 VLAN 间路由和若干第二层(L2)交换机间的 VLAN 桥接。

## 先决条件

### 要求

本文档的读者必须了解Catalyst 4908G-L3交换机：

- 从配置角度看，Catalyst 4908G-L3 是一个路由器。它使用Cisco IOS®配置接口，默认情况下，所有接口都是路由接口。
- Catalyst 4908G-L3不支持多种面向第2层的协议，如VLAN中继协议(VTP)、动态中继协议(DTP)或其他Catalyst交换机上的端口聚合协议(PAgP)。
- 在版本12.0(7)WX5(15d)中，Catalyst 4908G-L3不支持以下功能：数据平面（安全）访问控制

列表(ACL):换句话说,不能通过路由器接口上的输入或输出访问列表限制用户数据流量。  
12.0(10)W5(18e)版本现在支持数据平面ACL。在802.1q子接口上桥接,即同时应用 encapsulation dot1q和bridge-group n命令的子接口:支持在交换机间链路(ISL)子接口上桥接。  
版本12.0(10)W5(18e)现在支持802.1q子接口上的桥接。AppleTalk 路由端口监听,也称为 SPAN、端口镜像、混杂模式

## 使用的组件

本文档中的信息基于以下软件和硬件版本:

- 运行Cisco IOS 12.0(7)W5(15d)的Catalyst 4908G-L3交换机路由器
- 运行Cisco IOS 12.0(5.2)XU的三台Catalyst 3512XL交换机

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

有关文档约定的更多信息,请参考 [Cisco 技术提示约定](#)。

## 配置

### [Catalyst 4908G-L3 VLAN 路由和桥接示例](#)

本部分提供有关如何配置本文档所述功能的信息。

**注意:** 使用[命令查找工具](#)(仅限注册客户)可获取有关本节中使用的命令的详细信息。

在本示例配置中,部署 Catalyst 4908G-L3 交换机有两个目的:

- 将五个VLAN ( VLAN 1、10、20、30和40 ) 扩展到多台第2层交换机:在本例中,三个Catalyst 3512XL
- 为IP和网际分组交换(IPX)执行VLAN间路由,以便不同VLAN中的设备之间能够通信

为了在交换机上扩展VLAN,3512XL通过中继链路和流量连接到4908G-L3,这些流量从一台3512XL交换机(桥接在该VLAN上)到达给定VLAN,该交换机采用符合正常桥接规则的桥接配置连接到其它交换机。两台3512XL 交换机使用千兆 EtherChannel 连接到 4908G-L3 交换机。另一台3512XL 交换机使用单条千兆以太网链路。

为了支持VLAN间路由、集成路由和桥接(IRB)和网桥虚拟接口(BVI),这些接口配置为在不同VLAN之间路由IP和IPX。

终端站和服务器挂接到 Catalyst 3512XL 交换机。如果一个VLAN中的设备需要连接到另一个VLAN中的设备,则流量将发送到Catalyst 4908G-L3,并且它在BVI接口上路由流量。

如果部署是大型网络的一部分,则通过与核心交换机或路由器的连接将发往核心的流量路由到另一个子网(此处不考虑此配置)。

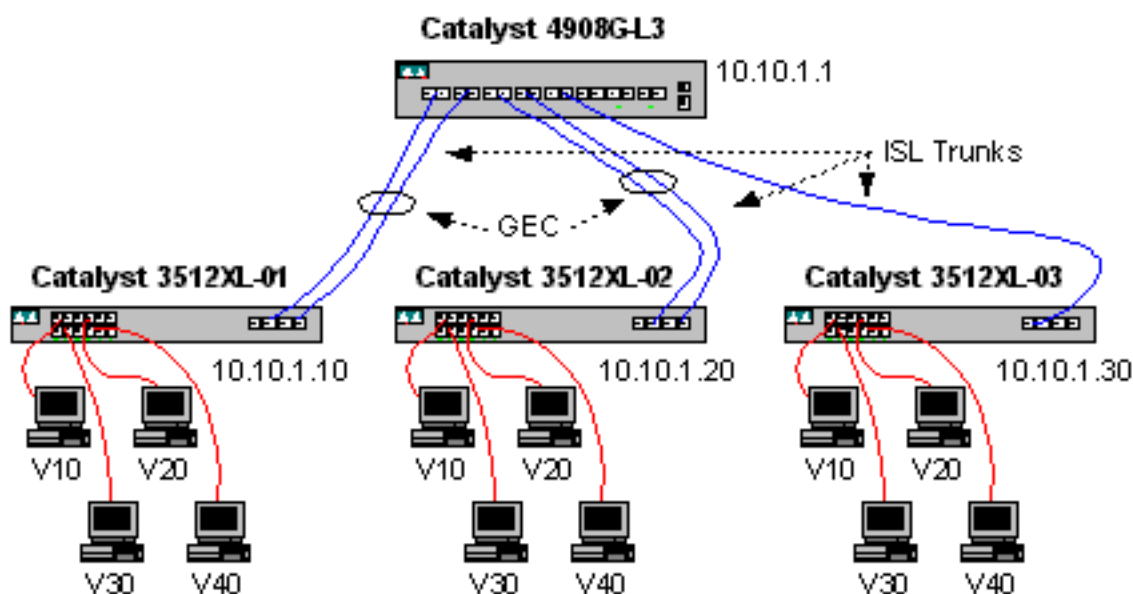
交换机采用以下配置:

- 应用基本的初始配置.

- 为便于管理而为交换机分配 IP 地址和默认网关。
- VTP模式设置为透明模式，并且VLAN在Catalyst 3512XL交换机上配置。
- 在Catalyst 4908G-L3和3512xl-01和3512xl-02交换机之间配置千兆EtherChannel链路。
- 桥接、BVI接口以及IP和IPX路由在Catalyst 4908G-L3上配置。
- ISL中继在Catalyst 4908G-L3和三台Catalyst 3512XL交换机之间配置，桥接在中继子接口上配置。
- 以下是IP和IPX网络到VLAN的映射：
- 分配了接入VLAN，并且在Catalyst 3512XL交换机的所有快速以太网接口上启用了生成树 portfast。

## 网络图

本文档使用以下网络设置：



## 配置

本文档使用以下配置：

- [一般配置任务](#)
- [为管理配置交换机](#)
- [配置 VLAN](#)
- [配置以太网信道](#)
- [配置桥接和路由](#)
- [配置交换机间 ISL 中继线](#)
- [配置终端站端口](#)
- [保存交换机配置](#)
- [完整的设备配置](#)

## 一般配置任务

在基于Cisco IOS的交换机（如Catalyst 4908G-L3和Catalyst 3512XL交换机）上，必须将此基本配置应用于每台交换机：

*!-- The calendar set command does not apply to the Catalyst 3500XL switches.*

```
Router#calendar set 18:00:00 Jan 8 2003
Router#clock set 18:00:00 Jan 8 2003
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname 4908G-L3
4908G-L3(config)#clock timezone PST -8
4908G-L3(config)#clock calendar-valid
4908G-L3(config)#service timestamps log datetime localtime msec
4908G-L3(config)#service timestamps debug datetime localtime msec
4908G-L3(config)#enable password verysecret
4908G-L3(config)#line vty 0 4
4908G-L3(config-line)#password secret
4908G-L3(config-line)#exit
4908G-L3(config)#no logging console
4908G-L3(config)#^Z
4908G-L3#
```

注意：

- **calendar set**命令在交换机的内部日历芯片上设置时间和日期。此命令不适用于Catalyst Catalyst 3512XL交换机。
- **clock set**命令用于设置交换机时钟的时间和日期。
- **hostname** 命令可设置交换机的主机名称。
- **clock calendar-valid** 命令告诉交换机在下次重新加载时使用存储在日历芯片中的日期和时间设置时钟日期和时间。此命令不适用于Catalyst 3548XL交换机。
- **service timestamps log datetime localtime msec**和**service timestamps debug datetime localtime msec**命令通过用当前日期和时间(精确到毫秒)的时间戳系统日志和调试输出，帮助进行管理和故障排除。
- **enable password**命令定义进入交换机特权模式的口令。
- **line vty 0 4**命令进入线路配置模式，因此我们可以在虚拟终端(vty)线路上为入站Telnet会话定义密码。在Catalyst 3512XL交换机上，使用**line vty 0 15**。
- **password**命令定义了一个口令，通过vty线路上的Telnet会话在交换机上进入正常模式。
- **no logging console**命令不允许系统日志消息出现在终端控制台上；这些示例中使用命令来简化屏幕截图。

## 为管理配置交换机

在Catalyst 3512XL 交换机上，在VLAN 1中配置IP地址和默认网关以支持交换机管理。默认网关是Catalyst 4908G-L3上BVI 1接口的IP地址；BVI接口稍后配置。

**注意：**在为接口分配IP地址之前，您无法Telnet至Catalyst 4908G-L3。

Catalyst 3512XL-01:

```
3512XL-01#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
3512XL-01(config)#interface vlan 1
3512XL-01(config-if)#ip address 10.10.1.10 255.255.255.0
3512XL-01(config-if)#management
3512XL-01(config-if)#exit
3512XL-01(config)#ip default-gateway 10.10.1.1
```

```
3512XL-01(config)#^Z
3512XL-01#
```

注意：

- ip default-gateway 命令定义下一跳路由器接口的默认网关IP地址。由于交换机不参与IP路由，并且不了解网络的第3层(L3)拓扑，因此需要执行此操作。
- 用于默认网关的IP地址是10.10.1.1，是Catalyst 4908G-L3交换机上BVI 1接口（本示例中后面配置）的IP地址。

Catalyst 3512XL-02:

```
3512XL-02#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
3512XL-02(config)#interface vlan 1
3512XL-02(config-if)#ip address 10.10.1.20 255.255.255.0
3512XL-02(config-if)#management
3512XL-02(config-if)#exit
3512XL-02(config)#ip default-gateway 10.10.1.1
3512XL-02(config)#^Z
3512XL-02#
```

Catalyst 3512XL-03:

```
3512XL-03#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
3512XL-03(config)#interface vlan 1
3512XL-03(config-if)#ip address 10.10.1.30 255.255.255.0
3512XL-03(config-if)#management
3512XL-03(config-if)#exit
3512XL-03(config)#ip default-gateway 10.10.1.1
3512XL-03(config)#^Z
3512XL-03#
```

## 配置 VLAN

Catalyst 4908G-L3 交换机不支持 VTP。在本示例中，Catalyst 3512XL 交换机配置为 VTP 透明模式，因为 VTP 域不能跨 Catalyst 4908G-L3 扩展。

在 Catalyst 3512XL-01, 3512XL-02, 和 3512XL-03 交换机上的配置完全相同：

```
3512XL-01#vlan database
3512XL-01(vlan)#vtp transparent
Setting device to VTP TRANSPARENT mode.
3512XL-01(vlan)#vlan 10 name Vlan10
VLAN 10 added:
    Name: Vlan10
3512XL-01(vlan)#vlan 20 name Vlan20
VLAN 20 added:
    Name: Vlan20
3512XL-01(vlan)#vlan 30 name Vlan30
VLAN 30 added:
    Name: Vlan30
3512XL-01(vlan)#vlan 40 name Vlan40
VLAN 40 added:
    Name: Vlan40
3512XL-01(vlan)#exit
APPLY completed.
```

```
Exiting...
3512XL-01#
```

您可以使用show vtp status和show vlan命令检验VLAN配置：

```
3512XL-01#show vtp status
VTP Version                : 2
Configuration Revision     : 0
Maximum VLANs supported locally : 254
Number of existing VLANs   : 9
VTP Operating Mode        : Transparent
VTP Domain Name           :
VTP Pruning Mode          : Disabled
VTP V2 Mode                : Disabled
VTP Traps Generation       : Disabled
MD5 digest                 : 0xF0 0xEA 0x28 0x34 0xA1 0xC6 0x2A 0xDE
Configuration last modified by 10.10.1.10 at 9-18-00 18:04:06
3512XL-01#show vlan
VLAN Name                Status    Ports
-----
1    default                active    Fa0/1, Fa0/2, Fa0/3, Fa0/4,
                                Fa0/5, Fa0/6, Fa0/7, Fa0/8,
                                Fa0/9, Fa0/10, Fa0/11, Fa0/12,
                                Gi0/1, Gi0/2
10   Vlan10                   active
20   Vlan20                   active
30   Vlan30                   active
40   Vlan40                   active
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   -     -     -        -   -        1002  1003
10   enet    100010   1500   -     -     -        -   -         0     0
20   enet    100020   1500   -     -     -        -   -         0     0
30   enet    100030   1500   -     -     -        -   -         0     0
40   enet    100040   1500   -     -     -        -   -         0     0
1002 fddi    101002   1500   -     -     -        -   -         1    1003
1003 tr     101003   1500   1005   0     -        -   srb       1    1002
1004 fdnet  101004   1500   -     -     1        ibm  -         0     0
1005 trnet  101005   1500   -     -     1        IBM  -         0     0
3512XL-01#
```

## 配置以太网信道

此输出显示如何配置Catalyst 4908G-L3与Catalyst 3512XL-01和3512XL-02交换机之间的EtherChannel链路。3512XL-01上的接口gig0/1和gig0/2连接到Catalyst 4908G-L3上的接口gig1和gig2。3512XL-02上的接口gig0/1和gig0/2连接到Catalyst 4908G — 上的接口gig3和gig4L3。

要在Catalyst 4908G-L3上配置EtherChannel，必须使用channel-group命令将物理接口分配给逻辑（端口通道）接口。在Catalyst 3512XL交换机上，物理接口被分配到端口组。Catalyst 3512XL上没有逻辑端口通道接口。

Catalyst 4908G-L3:

```

4908G-L3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
4908G-L3(config)#interface port-channel 1
4908G-L3(config-if)#exit
4908G-L3(config)#interface gig1
4908G-L3(config-if)#no shutdown
4908G-L3(config-if)#channel-group 1

GigabitEthernet1 added as member-1 to port-channell
4908G-L3(config-if)#exit
4908G-L3(config)#interface gig2
4908G-L3(config-if)#no shutdown
4908G-L3(config-if)#channel-group 1

GigabitEthernet2 added as member-2 to port-channell
4908G-L3(config-if)#exit
4908G-L3(config)#interface port-channel 2
4908G-L3(config-if)#exit
4908G-L3(config)#interface gig3
4908G-L3(config-if)#no shutdown
4908G-L3(config-if)#channel-group 2

GigabitEthernet3 added as member-1 to port-channel2
4908G-L3(config-if)#exit
4908G-L3(config)#interface gig4
4908G-L3(config-if)#no shutdown
4908G-L3(config-if)#channel-group 2

GigabitEthernet4 added as member-2 to port-channel2
4908G-L3(config-if)#^Z
4908G-L3#

```

注意：

- **interface port-channel**命令可创建逻辑接口；在本例中，创建了两个逻辑端口通道接口。
- **channel-group**命令将物理接口添加到逻辑端口通道接口；channel-group编号与port-channel接口编号对应。

您可以使用**show interface port-channel**命令验证EtherChannel配置：

```

4908G-L3#show interface port-channel 1
Port-channell is up, line protocol is up
  Hardware is GEChannel, address is 0030.78fe.a007 (bia 0000.0000.0000)
  MTU 1500 bytes, BW 2000000 Kbit, DLY 10 usec, rely 255/255, load 1/255
  Encapsulation ARPA, loopback not set, keepalive set (10 sec)
  Half-duplex, Unknown Speed, Media type unknown, Force link-up
  ARP type: ARPA, ARP Timeout 04:00:00
    No. of active members in this channel: 2
      Member 0 : GigabitEthernet1
      Member 1 : GigabitEthernet2
  Last input 00:00:25, output never, output hang never
  Last clearing of "show interface" counters never
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/300, 0 drops
  5 minute input rate 0 bits/sec, 1 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    489 packets input, 41461 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 abort
    0 watchdog, 0 multicast

```

```
0 input packets with dribble condition detected
19 packets output, 8668 bytes, 0 underruns(0/0/0)
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
4908G-L3#
```

注意：

- 请注意，**show interface port-channel**命令显示活动成员的数量和属于EtherChannel的特定接口。

Catalyst 3512XL-01:

```
3512XL-01#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
3512XL-01(config)#interface gig0/1
3512XL-01(config-if)#port group 1
3512XL-01(config-if)#exit
3512XL-01(config)#interface gig0/2
3512XL-01(config-if)#port group 1
3512XL-01(config-if)#^Z
3512XL-01#
```

注意：

- **port group** 命令将物理端口添加到逻辑端口组(EtherChannel)。

您可以使用**show port group**命令验证EtherChannel配置：

```
3512XL-01#show port group
Group  Interface                Transmit Distribution
-----
1 GigabitEthernet0/1          source address
1 GigabitEthernet0/2          source address
3512XL-01#
```

Catalyst 3512XL-02:

```
3512XL-02#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
3512XL-02(config)#interface gig0/1
3512XL-02(config-if)#port group 1
3512XL-02(config-if)#exit
3512XL-02(config)#interface gig0/2
3512XL-02(config-if)#port group 1
3512XL-02(config-if)#^Z
3512XL-02#
```

您可以使用**show port group**命令检验EtherChannel配置。

## 配置桥接和路由

此输出显示如何配置Catalyst 4908G-L3以进行桥接和路由。对于每个VLAN，定义单独的网桥过程；接口在配置交换机之间的ISL中[继一节中](#)分配给网桥组，本示例稍后介绍。由于需要VLAN间路由，因此必须使用**bridge irb**命令启用集成路由和桥接(IRB)。



此外，为了在不同网桥组之间路由IP和IPX数据流，必须创建网桥虚拟接口(BVI)。

在[配置交换机之间的ISL中继](#)部分，ISL中继上的VLAN子接口将加入相应的网桥组，为每个VLAN创建单个第2层域，并且相应的BVI充当该VLAN中的路由器接口。

Catalyst 4908G-L3:

```
4908G-L3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
4908G-L3(config)#ipx routing
4908G-L3(config)#bridge irb
4908G-L3(config)#bridge 1 protocol ieee
4908G-L3(config)#bridge 1 route ip
4908G-L3(config)#bridge 10 protocol IEEE
4908G-L3(config)#bridge 10 route ip
4908G-L3(config)#bridge 10 route ipx
4908G-L3(config)#bridge 20 protocol IEEE
4908G-L3(config)#bridge 20 route ip
4908G-L3(config)#bridge 20 route ipx
4908G-L3(config)#bridge 30 protocol IEEE
4908G-L3(config)#bridge 30 route ip
4908G-L3(config)#bridge 30 route ipx
4908G-L3(config)#bridge 40 protocol IEEE
4908G-L3(config)#bridge 40 route ip
4908G-L3(config)#bridge 40 route ipx
4908G-L3(config)#interface bvi 1
4908G-L3(config-if)#ip address 10.10.1.1 255.255.255.0
4908G-L3(config-if)#exit
4908G-L3(config)#interface bvi 10
4908G-L3(config-if)#ip address 10.10.10.1 255.255.255.0
4908G-L3(config-if)#ipx network 1000
4908G-L3(config-if)#exit
4908G-L3(config)#interface bvi 20
4908G-L3(config-if)#ip address 10.10.20.1 255.255.255.0
4908G-L3(config-if)#ipx network 2000
4908G-L3(config-if)#exit
4908G-L3(config)#interface bvi 30
4908G-L3(config-if)#ip address 10.10.30.1 255.255.255.0
4908G-L3(config-if)#ipx network 3000
4908G-L3(config-if)#exit
4908G-L3(config)#interface bvi 40
4908G-L3(config-if)#ip address 10.10.40.1 255.255.255.0
4908G-L3(config-if)#ipx network 4000
4908G-L3(config-if)#^Z
4908G-L3#
```

注意：

- **ipx routing**命令在Catalyst 4908G-L3上启用IPX路由。
- **bridge irb**命令在路由器上启用集成路由和桥接，这允许您在网桥组内路由流量。
- **网桥编号协议IEEE**命令创建运行IEEE生成树的网桥进程。
- **bridge number route ip**命令允许在BVI编号接口和路由器上其他IP接口之间路由IP业务。
- **网桥编号route ipx**命令允许IPX流量在BVI编号接口和路由器上的其他IPX接口之间路由；请注意，网桥进程1 [管理VLAN]省略了此命令。
- **interface bvi number**命令会创建网桥虚拟接口(BVI)接口，以用作编号网桥组中的L3接口。
- **ip address**命令将IP地址分配给BVI接口。
- **ipx network**命令将IPX网络号分配给BVI接口；请注意，管理VLAN [BVI 1]中的BVI没有分配

IPX网络号。

在配置ISL中继链路并将中继子接口添加到适当的网桥组后，我们可以在本示例的后面部分验证桥接配置。

## 配置交换机间 ISL 中继线

此输出显示如何配置Catalyst 4908G-L3和Catalyst 3512XL交换机之间的中继链路。

为了在Catalyst 4908G-L3上配置中继，它要求在主接口下添加子接口，即在中继上传输的每个VLAN有一个子接口。在本例中，在逻辑端口信道接口上配置了两条中继线，同时在物理接口上配置第3条中继线。

此外，在子接口下配置**bridge-group**命令，以将每个VLAN子接口加入相应的网桥组，从而完成在本示例前面的“配置桥接和路由”部分中启动的桥接和路由配置。

Catalyst 4908G-L3:

```
4908G-L3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
4908G-L3(config)#interface port-channel 1.1
4908G-L3(config-subif)#encapsulation isl 1
4908G-L3(config-subif)#bridge-group 1
4908G-L3(config-subif)#exit
4908G-L3(config)#interface port-channel 1.10
4908G-L3(config-subif)#encapsulation isl 10
4908G-L3(config-subif)#bridge-group 10
4908G-L3(config-subif)#exit
4908G-L3(config)#interface port-channel 1.20
4908G-L3(config-subif)#encapsulation isl 20
4908G-L3(config-subif)#bridge-group 20
4908G-L3(config-subif)#exit
4908G-L3(config)#interface port-channel 1.30
4908G-L3(config-subif)#encapsulation isl 30
4908G-L3(config-subif)#bridge-group 30
4908G-L3(config-subif)#exit
4908G-L3(config)#interface port-channel 1.40
4908G-L3(config-subif)#encapsulation isl 40
4908G-L3(config-subif)#bridge-group 40
4908G-L3(config-subif)#exit
4908G-L3(config)#interface port-channel 2.1
4908G-L3(config-subif)#encapsulation isl 1
4908G-L3(config-subif)#bridge-group 1
4908G-L3(config-subif)#exit
4908G-L3(config)#interface port-channel 2.10
4908G-L3(config-subif)#encapsulation isl 10
4908G-L3(config-subif)#bridge-group 10
4908G-L3(config-subif)#exit
4908G-L3(config)#interface port-channel 2.20
4908G-L3(config-subif)#encapsulation isl 20
4908G-L3(config-subif)#bridge-group 20
4908G-L3(config-subif)#exit
4908G-L3(config)#interface port-channel 2.30
4908G-L3(config-subif)#encapsulation isl 30
4908G-L3(config-subif)#bridge-group 30
4908G-L3(config-subif)#exit
4908G-L3(config)#interface port-channel 2.40
4908G-L3(config-subif)#encapsulation isl 40
4908G-L3(config-subif)#bridge-group 40
```

```

4908G-L3(config-subif)#exit
4908G-L3(config)#interface gig 5
4908G-L3(config-if)#no shutdown
4908G-L3(config-if)#exit
4908G-L3(config)#interface gig 5.1
4908G-L3(config-subif)#encapsulation isl 1
4908G-L3(config-subif)#bridge-group 1
4908G-L3(config-subif)#exit
4908G-L3(config)#interface gig 5.10
4908G-L3(config-subif)#encapsulation isl 10
4908G-L3(config-subif)#bridge-group 10
4908G-L3(config-subif)#exit
4908G-L3(config)#interface gig 5.20
4908G-L3(config-subif)#encapsulation isl 20
4908G-L3(config-subif)#bridge-group 20
4908G-L3(config-subif)#exit
4908G-L3(config)#interface gig 5.30
4908G-L3(config-subif)#encapsulation isl 30
4908G-L3(config-subif)#bridge-group 30
4908G-L3(config-subif)#exit
4908G-L3(config)#interface gig 5.40
4908G-L3(config-subif)#encapsulation isl 40
4908G-L3(config-subif)#bridge-group 40
4908G-L3(config-subif)^Z
4908G-L3#

```

注意：

- 要在主接口上创建逻辑子接口，请指定主接口，例如，interface port-channel 1，后跟句点(.)和子接口编号，例如，interface port-channel 1.10。子接口编号/VLAN编号/网桥组编号不必相同，但这使管理更简单。
- encapsulation isl vlan命令可指定在子接口上接收的封装类型(ISL)和VLAN。
- 请注意，VLAN子接口未分配IP地址或IPX网络号，而是通过bridge-group number命令添加到网桥组，这允许每个VLAN跨越第2层的所有交换机。在“配置桥接和路由”部分配置的[BVI具有IP地址和IPX网络号](#)。

您可以使用show interface、show ip interface和show ipx interface命令验证配置。例如，使用以下命令验证EtherChannel链路上端口通道1.10(VLAN 10)子接口上的配置，该子接口通向Catalyst 3512XL-01和VLAN 10的对应BVI(BVI 10):

```

4908G-L3#show interface port-channel 1.10
Port-channel1.10 is up, line protocol is up
  Hardware is GEChannel, address is 0030.78fe.a007 (bia 0000.0000.0000)
  MTU 1500 bytes, BW 2000000 Kbit, DLY 10 usec, rely 255/255, load 1/255
  Encapsulation ISL Virtual LAN, Color 10.
  ARP type: ARPA, ARP Timeout 04:00:00
4908G-L3#show ip interface bvi 10
BVI10 is up, line protocol is up
  Internet address is 10.10.10.1/24
  Broadcast address is 255.255.255.255
  Address determined by setup command
  MTU is 1500 bytes
  Helper address is not set
  Directed broadcast forwarding is disabled
  Outgoing access list is not set
  Inbound access list is not set
  Proxy ARP is enabled
  Security level is default
  Split horizon is enabled

```

```

ICMP redirects are always sent
ICMP unreachable are always sent
ICMP mask replies are never sent
IP fast switching is enabled
IP fast switching on the same interface is disabled
IP Null turbo vector
IP multicast fast switching is enabled
IP multicast distributed fast switching is disabled
Router Discovery is disabled
IP output packet accounting is disabled
IP access violation accounting is disabled
TCP/IP header compression is disabled
RTP/IP header compression is disabled
Probe proxy name replies are disabled
Policy routing is disabled
Network address translation is disabled
Web Cache Redirect is disabled
BGP Policy Mapping is disabled
4908G-L3#show ipx interface bvi 10
BVI10 is up, line protocol is up
  IPX address is 1000.0030.78fe.a00b, NOVELL-ETHER [up]
  Delay of this IPX network, in ticks is 2 throughput 0 link delay 0
  IPXWAN processing not enabled on this interface.
  IPX SAP update interval is 60 seconds
  IPX type 20 propagation packet forwarding is disabled
  Incoming access list is not set
  Outgoing access list is not set
  IPX helper access list is not set
  SAP GNS processing enabled, delay 0 ms, output filter list is not set
  SAP Input filter list is not set
  SAP Output filter list is not set
  SAP Router filter list is not set
  Input filter list is not set
  Output filter list is not set
  Router filter list is not set
  Netbios Input host access list is not set
  Netbios Input bytes access list is not set
  Netbios Output host access list is not set
  Netbios Output bytes access list is not set
  Updates each 60 seconds aging multiples RIP: 3 SAP: 3
  SAP interpacket delay is 55 ms, maximum size is 480 bytes
  RIP interpacket delay is 55 ms, maximum size is 432 bytes
  RIP response delay is not set
  IPX accounting is disabled
  IPX fast switching is configured (disabled)
  RIP packets received 0, RIP packets sent 19, 0 Throttled
  RIP specific requests received 0, RIP specific replies sent 0
  RIP general requests received 0, 0 ignored, RIP general replies sent 0
  SAP packets received 0, SAP packets sent 5, 0 Throttled
  SAP GNS packets received 0, SAP GNS replies sent 0
  SAP GGS packets received 0, 0 ignored, SAP GGS replies sent 0
4908G-L3#

```

您可以使用show bridge group和show spanning-tree number命令验证桥接配置。此外，您还可以使用 show bridge 命令来查看网桥转发表。

在Catalyst 3512XL交换机上，Catalyst 3512XL-01、3512XL-02和3512XL-03上的配置相同。中继链路配置在适当的千兆以太网接口上。对于 EtherChannel 链路，中继配置只需应用于端口组中的一个接口。中继会自动应用到同一组中的其他接口，并显示在配置中：

```
3512XL-01#configure terminal
```

```
Enter configuration commands, one per line. End with CNTL/Z.
3512XL-01(config)#interface gig 0/1
3512XL-01(config-if)#switchport mode trunk
3512XL-01(config-if)#^Z
3512XL-01#
```

注意：

- 在3512XL-01和3512XL-02中，当配置应用于信道组中的单个接口时，相同的配置将自动应用于该组中的其他接口，并出现在每个接口的配置中。
- switchport mode trunk 命令将接口配置为中继线端口。
- 在启用中继时，3500XL交换机默认使用ISL封装，因此在这种情况下无需指定封装。

您可以通过 **show interface switchport** 命令验证配置：

```
3512XL-01#show interface gig0/1 switchport
Name: Gi0/1
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: 1,10,20,30,40
Pruning VLANs Enabled: 2-1001

Priority for untagged frames: 0
Override vlan tag priority: FALSE
Voice VLAN: none
Appliance trust: none
3512XL-01#
```

## [配置终端站端口](#)

现在，Catalyst 3512XL 交换机的端口被分配给了 VLAN 而且spanning-tree portfast已被激活。任何 3512XL 交换机上的任何端口都可以分配到任何已配置的 VLAN 上。

特定VLAN中的终端站必须分配与该VLAN关联的范围内的IP地址，并且必须将该VLAN的Catalyst 4908G-L3上BVI的IP地址用作其默认网关。

此输出显示如何在VLAN 10中配置接口fast0/1和fast 0/2，并在接口上启用portfast:

```
3512XL-01#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
3512XL-01(config)#interface fast0/1
3512XL-01(config-if)#switchport access vlan 10
3512XL-01(config-if)#spanning-tree portfast
3512XL-01(config-if)#exit
3512XL-01(config)#interface fast0/2
3512XL-01(config-if)#switchport access vlan 10
3512XL-01(config-if)#spanning-tree portfast
3512XL-01(config-if)#^Z
3512XL-01#
```

可以使用show interface switchport命令和show spanning-tree interface命令来验证配置:

```
3512XL-01#show interface fast0/1 switchport
Name: Fa0/1
Switchport: Enabled
Administrative mode: static access
Operational Mode: static access
Administrative Trunking Encapsulation: isl
Operational Trunking Encapsulation: isl
Negotiation of Trunking: Disabled
Access Mode VLAN: 10 (Vlan10)
Trunking Native Mode VLAN: 1 (default)
Trunking VLANs Enabled: NONE
Pruning VLANs Enabled: NONE

Priority for untagged frames: 0
Override vlan tag priority: FALSE
Voice VLAN: none
Appliance trust: none
3512XL-01#show spanning-tree interface fast 0/1
Interface Fa0/1 (port 13) in Spanning tree 10 is FORWARDING
  Port path cost 19, Port priority 128
  Designated root has priority 16384, address 0090.ab28.d000
  Designated bridge has priority 16384, address 0090.ab28.d000
  Designated port is 193, path cost 0
  Timers: message age 2, forward delay 0, hold 0
  BPDU: sent 1, received 73
  The port is in the portfast mode
```

3512XL-01#

注意：

show interface switchport命令显示接口的Operational Mode (静态访问) 和Access Mode VLAN(10)。

show spanning-tree interface命令显示端口的生成树状态，并指示“端口处于portfast模式”。

## [保存交换机配置](#)

确保将运行配置保存到所有交换机上的 NVRAM (启动配置)，以便在重新加载时保留该配置。

Catalyst 4908G-L3:

```
4908G-L3#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
4908G-L3#
```

Catalyst 3512XL交换机：

```
3512XL-01#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
```

3512XL-01#

## [完整的设备配置](#)

以下是本示例中使用的设备的完整配置：

- [Catalyst 4908G-L3](#)
- [Catalyst 3512XL-01](#)
- [Catalyst 3512XL-02](#)
- [Catalyst 3512XL-03](#)

### Catalyst 4908G-L3

```
4908G-L3#show running-config
Building configuration...

Current configuration:
!
! Last configuration change at 14:09:14 PST Tue Sep 19
2000
! NVRAM config last updated at 14:09:15 PST Tue Sep 19
2000
!
version 12.0
no service pad
service timestamps debug datetime msec localtime
service timestamps log datetime msec localtime
no service password-encryption
!
hostname 4908G-L3
!
no logging console
enable password verysecret
!
clock timezone PST -8
clock calendar-valid
ip subnet-zero
ipx routing 0030.78fe.a000
!-- Enables IRB to route between bridge groups. bridge
irb
!
!
!
!-- Creates a logical interface (1) to group physical
interfaces into a channel. interface Port-channel1
no ip address
no ip directed-broadcast
hold-queue 300 in
!
!-- A subinterface is added to allow VLAN 1 traffic to
be transmitted on the trunk. interface Port-channel1.1
!-- Specifies ISL encapsulation for VLAN 1.
encapsulation isl 1
no ip redirects
no ip directed-broadcast
!-- Assign the subinterface to the appropriate bridge-
group
for bridging and routing.
bridge-group 1
!
!-- A subinterface is added to allow VLAN 10 traffic to
be transmitted on the trunk. interface Port-channel1.10
!-- Specifies ISL encapsulation for VLAN 10.
encapsulation isl 10
no ip redirects
```

```
no ip directed-broadcast
!-- Assign the subinterface to the appropriate bridge-
group for bridging and routing.  bridge-group 10
!
!-- VLAN 20 configuration. interface Port-channel1.20
encapsulation isl 20
no ip redirects
no ip directed-broadcast
bridge-group 20
!
!-- VLAN 30 configuration. interface Port-channel1.30
encapsulation isl 30
no ip redirects
no ip directed-broadcast
bridge-group 30
!
!-- VLAN 40 configuration. interface Port-channel1.40
encapsulation isl 40
no ip redirects
no ip directed-broadcast
bridge-group 40
!
!-- Creates a logical interface (2) to group physical
interfaces into a channel. interface Port-channel2
No ip address
no ip directed-broadcast
hold-queue 300 in
!
!-- VLAN 1 configuration. interface Port-channel2.1
encapsulation isl 1
no ip redirects
no ip directed-broadcast
bridge-group 1
!
!-- VLAN 10 configuration. interface Port-channel2.10
encapsulation isl 10
no ip redirects
no ip directed-broadcast
bridge-group 10
!
!-- VLAN 20 configuration. interface Port-channel2.20
encapsulation isl 20
no ip redirects
no ip directed-broadcast
bridge-group 20
!
!-- VLAN 30 configuration. interface Port-channel2.30
encapsulation isl 30
no ip redirects
no ip directed-broadcast
bridge-group 30
!
!-- VLAN 40 configuration. interface Port-channel2.40
encapsulation isl 40
no ip redirects
no ip directed-broadcast
bridge-group 40
!
interface GigabitEthernet1
no ip address
no ip directed-broadcast
!-- Logically groups the physical interface to interface
port-channel 1. channel-group 1
!
```



```
interface GigabitEthernet2
  no ip address
  no ip directed-broadcast
  !-- Logically groups the physical interface to interface
  port-channel 1. channel-group 1
  !
interface GigabitEthernet3
  no ip address
  no ip directed-broadcast
  !-- Logically groups the physical interface to interface
  port-channel 2. channel-group 2
  !
interface GigabitEthernet4
  no ip address
  no ip directed-broadcast
  !-- Logically groups the physical interface to interface
  port-channel 2. channel-group 2
  !
interface GigabitEthernet5
  no ip address
  no ip directed-broadcast
  !
  !-- A subinterface is added to allow VLAN 1 traffic to
  be transmitted on the trunk. interface
GigabitEthernet5.1
  !-- Specifies ISL encapsulation for VLAN 1.
encapsulation isl 1
  no ip redirects
  no ip directed-broadcast
  !-- Assign the subinterface to the appropriate bridge-
  group for bridging and routing. bridge-group 1
  !
  !-- VLAN 10 configuration. Interface GigabitEthernet5.10
encapsulation isl 10
  no ip redirects
  no ip directed-broadcast
bridge-group 10
  !
  !-- VLAN 20 configuration. interface GigabitEthernet5.20
encapsulation isl 20
  no ip redirects
  no ip directed-broadcast
bridge-group 20
  !
  !-- VLAN 30 configuration. interface GigabitEthernet5.30
encapsulation isl 30
  no ip redirects
  no ip directed-broadcast
bridge-group 30
  !
  !-- VLAN 30 configuration. interface GigabitEthernet5.40
encapsulation isl 40
  no ip redirects
  no ip directed-broadcast
  bridge-group 40
  !
interface GigabitEthernet6
  no ip address
  no ip directed-broadcast
  shutdown
  !
interface GigabitEthernet7
  no ip address
  no ip directed-broadcast
```

```

shutdown
!
interface GigabitEthernet8
  no ip address
  no ip directed-broadcast
  shutdown
!
!-- BVI 1 is an L3 interface for bridge-group 1 (VLAN
1). interface BVI1
!-- The IP address assigned to bridge-group 1. ip
address 10.10.1.1 255.255.255.0
  no ip directed-broadcast
  no ip route-cache cef
!
!-- BVI 10 is an L3 interface for bridge-group 10 (VLAN
10). interface BVI10
!-- The IP address assigned to bridge-group 10. ip
address 10.10.10.1 255.255.255.0 no ip directed-
broadcast no ip route-cache cef !-- Assigns IPX network
1000 to BVI 10. ipx network 1000 ! !-- BVI 20 is a Layer
3 interface for bridge-group 20 (VLAN 20).
Interface BVI20
!-- IP address assigned to bridge-group 20. ip address
10.10.20.1 255.255.255.0
  no ip directed-broadcast
  no ip route-cache cef
!-- Assigns IPX network 1000 to BVI 20. ipx network
2000!
!-- BVI 30 configuration.interface BVI30 ip address
10.10.30.1 255.255.255.0
  no ip directed-broadcast
  no ip route-cache cef
  ipx network 3000
!
!-- BVI 40 configuration. interface BVI40
ip address 10.10.40.1 255.255.255.0
  no ip directed-broadcast
  no ip route-cache cef
ipx network 4000
!
ip classless
!
!
!
!
!-- Applies IEEE Ethernet Spanning-Tree Protocol (STP)
to bridge-group 1. bridge 1 protocol ieee
!-- Allows IP traffic to be routed between the BVI 1 and
other IP interfaces. bridge 1 route ip
bridge 10 protocol ieee
  bridge 10 route ip
!-- Allows IPX traffic to be routed between the BVI 10
and other IP interfaces. bridge 10 route ipx
bridge 20 protocol ieee
  bridge 20 route ip
  bridge 20 route ipx
bridge 30 protocol ieee
  bridge 30 route ip
  bridge 30 route ipx
bridge 40 protocol ieee
  bridge 40 route ip
  bridge 40 route ipx
!
line con 0

```

```
transport input none
line aux 0
line vty 0 4
  password secret
  login
!
end
```

```
4908G-L3#
```

## Catalyst 3512XL-01

```
3512XL-01#show running-config
```

```
Building configuration...
```

```
Current configuration:
```

```
!
! Last configuration change at 08:24:03 PST Tue Sep 19
2000
! NVRAM config last updated at 08:24:03 PST Tue Sep 19
2000
!
version 12.0
no service pad
service timestamps debug datetime msec localtime
service timestamps log datetime msec localtime
no service password-encryption
!
hostname 3512XL-01
!
no logging console
enable password verysecret
!
!
!
!
!
clock timezone PST -8
!
ip subnet-zero
!
!
!
interface FastEthernet0/1
  !-- The switchport access command configures the port to
be an L2 2 port. !-- Assigns the port to be a member of
VLAN 10.  switchport access vlan 10
  switchport access vlan 10
  !-- Enables spanning-tree portfast.  spanning-tree
portfast
  spanning-tree portfast
!
interface FastEthernet0/2
  switchport access vlan 10
  spanning-tree portfast
!
interface FastEthernet0/3
  switchport access vlan 10
  spanning-tree portfast
!
interface FastEthernet0/4
  !-- Assigns the port to be a member of VLAN 20.
  switchport access vlan 20
  spanning-tree portfast
!
```

```

interface FastEthernet0/5
  switchport access vlan 20
  spanning-tree portfast
!
interface FastEthernet0/6
  switchport access vlan 20 spanning-tree portfast !
interface FastEthernet0/7 !-- Assigns the port to be a
member of VLAN 30. switchport access vlan 30
  spanning-tree portfast
!
interface FastEthernet0/8
  switchport access vlan 30
  spanning-tree portfast
!
interface FastEthernet0/9
  switchport access vlan 30
  spanning-tree portfast
!
interface FastEthernet0/10
  !-- Assigns the port to be a member of VLAN 40.
switchport access vlan 40
  spanning-tree portfast
!
interface FastEthernet0/11
  switchport access vlan 40
  spanning-tree portfast
!
interface FastEthernet0/12
  switchport access vlan 40
  spanning-tree portfast
!
interface GigabitEthernet0/1
  !-- Assigns the port to logical port-group 1 to create
the EtherChannel. port group 1
  !-- Configures the port to be an ISL trunk. switchport
mode trunk ! Interface GigabitEthernet0/2 !-- Assigns
the port to logical port-group 1 to create the
EtherChannel. port group 1
  !-- Configures the port to be an ISL trunk. switchport
mode trunk ! Interface VLAN1 !-- The IP address of the
management interface. ip address 10.10.1.10
255.255.255.0
  no ip directed-broadcast
  no ip route-cache
!
!-- The default gateway is set to the BVI 1 interface on
the 4908G-L3. ip default-gateway 10.10.1.1
!
line con 0
  transport input none
  stopbits 1
line vty 0 4
  password secret
  login
line vty 5 15
  password secret
  login
!
end

3512XL-01#

```

**Catalyst 3512XL-02**

```
3512XL-02#show running-config
```

```
Building configuration...
```

```
Current configuration:
```

```
!  
! Last configuration change at 08:25:22 PST Tue Sep 19  
2000  
! NVRAM config last updated at 08:25:22 PST Tue Sep 19  
2000  
!  
version 12.0  
no service pad  
service timestamps debug datetime msec localtime  
service timestamps log datetime msec localtime  
no service password-encryption  
!  
hostname 3512XL-02  
!  
no logging console  
enable password verysecret  
!  
!  
!  
!  
clock timezone PST -8  
!  
ip subnet-zero  
!  
!  
!  
interface FastEthernet0/1  
!-- The switchport access command configures the port to  
be an L2 port. !-- Assigns the port to be a member of  
VLAN 10. switchport access vlan 10  
switchport access vlan 10  
!-- Enables spanning-tree portfast. spanning-tree  
portfast  
!  
Interface FastEthernet0/2  
switchport access vlan 10  
spanning-tree portfast  
!  
interface FastEthernet0/3  
!-- Assigns the port to be a member of VLAN 20.  
switchport access vlan 20  
spanning-tree portfast  
!  
interface FastEthernet0/4  
switchport access vlan 20  
spanning-tree portfast  
!  
interface FastEthernet0/5  
switchport access vlan 20  
spanning-tree portfast  
!  
interface FastEthernet0/6  
switchport access vlan 20  
spanning-tree portfast  
!  
interface FastEthernet0/7  
switchport access vlan 20  
spanning-tree portfast
```

```
!  
interface FastEthernet0/8  
  switchport access vlan 20  
  spanning-tree portfast  
!  
interface FastEthernet0/9  
  !-- Assigns the port to be a member of VLAN 30.  
  switchport access vlan 30  
  spanning-tree portfast  
!  
interface FastEthernet0/10  
  switchport access vlan 30  
  spanning-tree portfast  
!  
interface FastEthernet0/11  
  !-- Assigns the port to be a member of VLAN 40.  
  switchport access vlan 40  
  spanning-tree portfast  
!  
interface FastEthernet0/12  
  switchport access vlan 40  
  spanning-tree portfast  
!  
interface GigabitEthernet0/1  
  !-- Assigns the port to logical port-group 1 to create  
  the EtherChannel. port group 1  
  !-- Configures the port to be an ISL trunk. switchport  
  mode trunk  
!  
Interface GigabitEthernet0/2  
  !-- Assigns the port to logical port-group 1 to create  
  the EtherChannel. port group 1  
  !-- Configures the port to be an ISL trunk. switchport  
  mode trunk  
!  
Interface VLAN1  
  !-- The IP address of the management interface. ip  
  address 10.10.1.20 255.255.255.0  
  No ip directed-broadcast  
  no ip route-cache  
!  
  !-- The default gateway is set to the BVI 1 interface on  
  the 4908G-L. ip default-gateway 10.10.1.1  
!  
line con 0  
  transport input none  
  stopbits 1  
line vty 0 4  
  password secret  
  login  
line vty 5 15  
  password secret  
  login  
!  
end  
  
3512XL-02#
```

## Catalyst 3512XL-03

```
3512xl-03#show running-config  
Building configuration...
```

```
Current configuration:
!
! Last configuration change at 12:13:33 PST Tue Sep 19
2000
! NVRAM config last updated at 12:13:34 PST Tue Sep 19
2000
!
version 12.0
no service pad
service timestamps debug datetime msec localtime
service timestamps log datetime msec localtime
no service password-encryption
!
hostname 3512x1-03
!
no logging console
enable password verysecret
!
!
!
!
clock timezone PST -8
!
ip subnet-zero
!
!
!
interface FastEthernet0/1
!-- The switchport access command configures the port to
be an L2 port. !-- Assigns the port to be a member of
VLAN 10. switchport access vlan 10
!-- Enables spanning-tree portfast. spanning-tree
portfast
!
interface FastEthernet0/2
switchport access vlan 10
spanning-tree portfast
!
interface FastEthernet0/3
switchport access vlan 10
spanning-tree portfast
!
interface FastEthernet0/4
switchport access vlan 10
spanning-tree portfast
!
interface FastEthernet0/5
switchport access vlan 10
spanning-tree portfast
!
interface FastEthernet0/6
switchport access vlan 10
spanning-tree portfast
!
interface FastEthernet0/7
!-- Assigns the port to be a member of VLAN 20.
switchport access vlan 20
spanning-tree portfast
!
interface FastEthernet0/8
switchport access vlan 20
spanning-tree portfast
!
```

```
interface FastEthernet0/9
!-- Assigns the port to be a member of VLAN 30.
switchport access vlan 30
spanning-tree portfast
!
interface FastEthernet0/10
switchport access vlan 30
spanning-tree portfast
!
interface FastEthernet0/11
!-- Assigns the port to be a member of VLAN 40.
switchport access vlan 40
spanning-tree portfast
!
interface FastEthernet0/12
switchport access vlan 40
spanning-tree portfast
!
interface GigabitEthernet0/1
!-- Configures the port to be an ISL trunk. switchport
mode trunk
!
Interface GigabitEthernet0/2
!
interface VLAN1
!-- The IP address of the management interface. ip
address 10.10.1.30 255.255.255.0
no ip directed-broadcast
no ip route-cache
!
!-- The default gateway is set to the BVI 1 interface on
the 4908G-L3. ip default-gateway 10.10.1.1
!
Line con 0
transport input none
stopbits 1
line vty 0 4
password secret
login
line vty 5 15
password secret
login
!
end

3512x1-03#
```

## [验证](#)

当前没有可用于此配置的验证过程。

## [故障排除](#)

目前没有针对此配置的故障排除信息。

## [相关信息](#)



- [在 Catalyst 4908G-L3 交换机上配置 EtherChannel](#)
- [在 Catalyst 3500XL 交换机上配置 EtherChannel](#)
- [在 Catalyst 4908G-L3 交换机上配置桥接](#)
- [在 Catalyst 4908G-L3 交换机上配置 VLAN 中继线](#)
- [在 Catalyst 2900XL 和 3500XL 交换机上配置 VTP、VLANs 和 VLAN 中继线](#)
- [技术支持和文档 - Cisco Systems](#)