

# 配置在Cat9500和ISR4K之间的VPLS

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## 简介

VPLS是多数客户使用用ISP's和在被借用的/租用的服务与第三方供应商的Layer2分机技术。VPLS使用情况延伸超出此配置指南的范围之外。这是在帮助客户的尝试的一个基本配置指南配置在现有ISR4K平台和新的Cat9500交换机之间的L2VPN。

## 先决条件

您应该知道基本L2VPN概念和配置的L2 VFI上下文配置pseudowire模板

## 要求

ISR4K作为CE设备和两个设备使用的路由器(任何ISR4400/ISR4300) , Cat9500交换机

## 使用的组件

ISR4451-X

C9500-40X-A

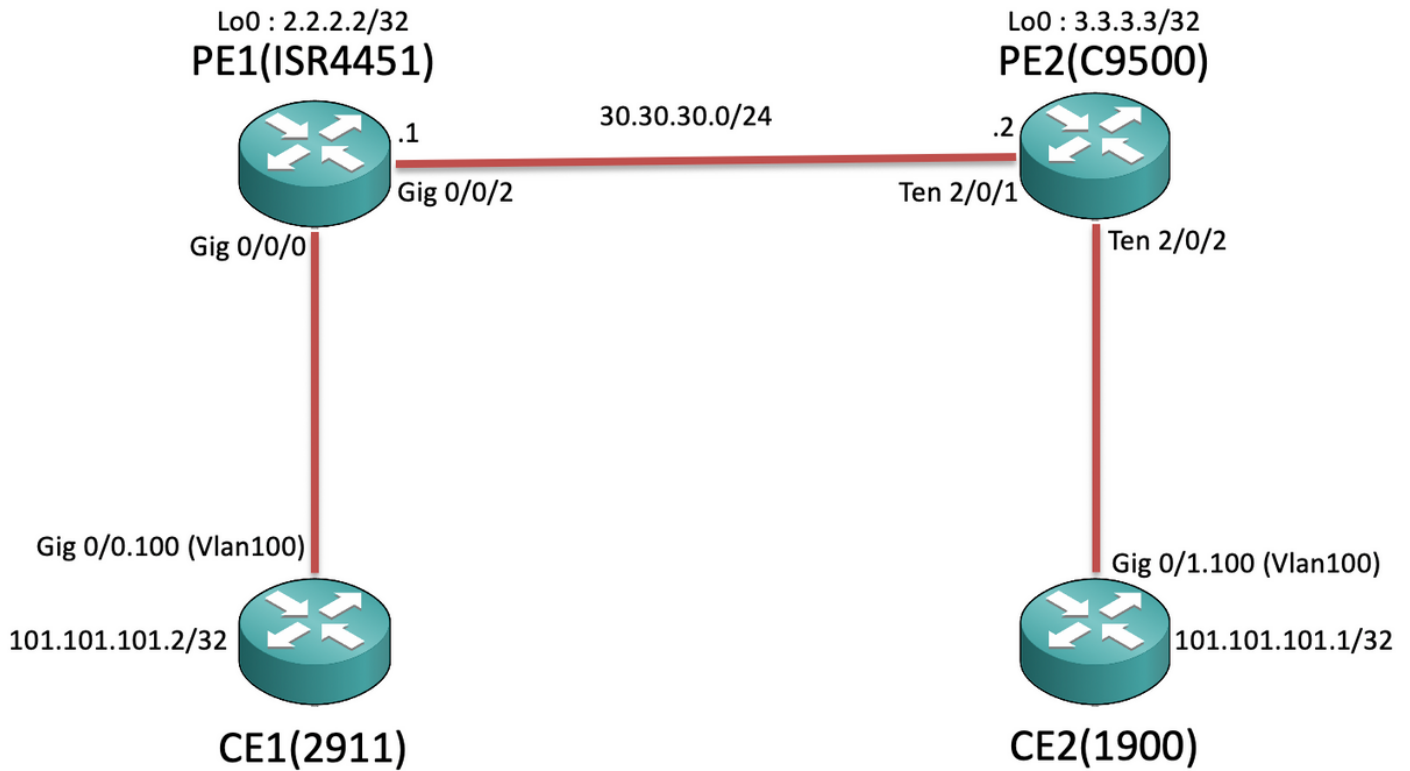
CISCO1921

CISCO2911

## 配置

配置告诉支持的VPLS上下文和VC类型/详细信息的使用情况

## 网络图



## 配置

在CE1与CE2：

```
CE1#sh run
Building configuration...

Current configuration : 105 bytes
!
interface GigabitEthernet0/0
no ip address
duplex auto
speed auto
!
interface GigabitEthernet0/0.100
encapsulation dot1Q 100
ip address 101.101.101.2 255.255.255.0
!
```

```
CE2#sh run
Building configuration...

Current configuration : 1718 bytes
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
!
interface GigabitEthernet0/1.100
encapsulation dot1Q 100
ip address 101.101.101.1 255.255.255.0
!
```

在PE1及PE2：

```
PE1#sh run
Building configuration...
Current configuration : 5049 bytes
!
pseudowire-class VPLS100
encapsulation mpls
no control-word
!
l2 vfi 100 manual
vpn id 100
bridge-domain 100
mtu 9180
neighbor 3.3.3.3 pw-class VPLS100
```

```
PE2#sh run
Building configuration...

Current configuration : 10722 bytes
!
ip routing
!
pseudowire-class VPLS100
encapsulation mpls
no control-word
!
l2 vfi 100 manual
vpn id 100
```

```

!
interface Loopback0
ip address 2.2.2.2 255.255.255.255
!
interface GigabitEthernet0/0/0
mtu 9180
no ip address
negotiation auto
service instance 100 ethernet
  encapsulation dot1q 100
  rewrite ingress tag pop 1 symmetric
  bridge-domain 100
!
!
interface GigabitEthernet0/0/2
ip address 30.30.30.1 255.255.255.0
negotiation auto
mpls ip
!
ip route 3.3.3.3 255.255.255.255 30.30.30.2
!
mpls ldp router-id Loopback0 force
!

neighbor 2.2.2.2 pw-class VPLS100
!
interface Loopback0
ip address 3.3.3.3 255.255.255.255
!
interface TenGigabitEthernet2/0/1
no switchport
ip address 30.30.30.2 255.255.255.0
mpls ip
!
interface TenGigabitEthernet2/0/2
switchport trunk allowed vlan 100
switchport mode trunk
!
interface Vlan100
no ip address
xconnect vfi 100
!
ip route 2.2.2.2 255.255.255.255 30.30.30.1
!
mpls ldp router-id Loopback0 force
!

```

---

**注意：**在EFP的ISR4K和ASR1000设备上(以太网流点)服务实例运行，请保证我们配置“rewrite ingress tag pop 1对称”命令在各自SI (服务实例)下我们要扩大子网/广播域的地方，因此ISR4K/ASR1k能收到从CE末端发送的标记为的(802.1Q VLAN标记)数据包。

---

## 验证

与“以太网的” Cat9500平台支持互连网络到目前为止在VPLS下。那么首先请检查VC类型是默认)的以太网(：

```

PE1#show mpls l2transport binding
Destination Address: 3.3.3.3,VC ID: 100
Local Label: 19
  Cbit: 0,    VC Type: Ethernet,    GroupID: n/a
  MTU: 9180,  Interface Desc: n/a
  VCCV: CC Type: RA [2], TTL [3]
    CV Type: LSPV [2]
Remote Label: 17
  Cbit: 0,    VC Type: Ethernet,    GroupID: 0
  MTU: 9180,  Interface Desc: n/a
  VCCV: CC Type: RA [2], TTL [3]
    CV Type: LSPV [2]

```

```

PE2#show mpls l2transport binding
Destination Address: 2.2.2.2,VC ID: 100
Local Label: 17
  Cbit: 0,    VC Type: Ethernet,    GroupID: n/a
  MTU: 9180,  Interface Desc: n/a
  VCCV: CC Type: RA [2], TTL [3]
    CV Type: LSPV [2]
Remote Label: 19
  Cbit: 0,    VC Type: Ethernet,    GroupID: 0
  MTU: 9180,  Interface Desc: n/a
  VCCV: CC Type: RA [2], TTL [3]

```

CV Type: LSPV [2]

现在命令的其余类似于您验证L2VPN VC的方式。但是请注意Cat9500有系统mtu，因此您不能修改面对LAN侧的单个接口MTU值。因此您会需要明确配置“mtu <>”在ISR4K平台的I2 vfi上下文下，以便MTU值得到协商基于在Cat9500交换机mtu配置的系统：

**PE2 :**

```
PE2#show system mtu
```

```
Global Ethernet MTU is 9180 bytes.
```

**PE1 :**

```
PE1#show mpls l2transport vc detail
```

```
Local interface: VFI 100 vfi up
```

```
Interworking type is Ethernet
```

```
Destination address: 3.3.3.3, VC ID: 100, VC status: up
```

```
Output interface: Gi0/0/2, imposed label stack {17}
```

```
Preferred path: not configured
```

```
Default path: active
```

```
Next hop: 30.30.30.2
```

```
Create time: 00:02:10, last status change time: 00:02:10
```

```
Last label FSM state change time: 00:02:10
```

```
Signaling protocol: LDP, peer 3.3.3.3:0 up
```

```
Targeted Hello: 2.2.2.2(LDP Id) -> 3.3.3.3, LDP is UP
```

```
Graceful restart: not configured and not enabled
```

```
Non stop routing: not configured and not enabled
```

```
Status TLV support (local/remote) : enabled/supported
```

```
LDP route watch : enabled
```

```
Label/status state machine : established, LruRru
```

```
Last local dataplane status rcvd: No fault
```

```
Last BFD dataplane status rcvd: Not sent
```

```
Last BFD peer monitor status rcvd: No fault
```

```
Last local AC circuit status rcvd: No fault
```

```
Last local AC circuit status sent: No fault
```

```
Last local PW i/f circ status rcvd: No fault
```

```
Last local LDP TLV status sent: No fault
```

```
Last remote LDP TLV status rcvd: No fault
```

```
Last remote LDP ADJ status rcvd: No fault
```

```
MPLS VC labels: local 19, remote 17
```

```
Group ID: local n/a, remote 0
```

```
MTU: local 9180, remote 9180
```

```
Remote interface description:
```

```
Sequencing: receive disabled, send disabled
```

```
Control Word: Off
```

```
SSO Descriptor: 3.3.3.3/100, local label: 19
```

```
Dataplane:
```

```
SSM segment/switch IDs: 8387/4289 (used), PWID: 4
```

```
VC statistics:
```

```
transit packet totals: receive 0, send 0
```

```
transit byte totals: receive 0, send 0
```

```
transit packet drops: receive 0, seq error 0, send 0
```

**PE2 :**

```
PE2#show mpls l2transport vc detail
```

```
Local interface: VFI 100 vfi up
```

```
Interworking type is Ethernet
```

```
Destination address: 2.2.2.2, VC ID: 100, VC status: up
```

```
Output interface: Te2/0/1, imposed label stack {19}
```

```
Preferred path: not configured
```

```
Default path: active
Next hop: 30.30.30.1
Create time: 01:02:03, last status change time: 00:03:09
Last label FSM state change time: 00:03:09
Signaling protocol: LDP, peer 2.2.2.2:0 up
Targeted Hello: 3.3.3.3(LDP Id) -> 2.2.2.2, LDP is UP
Graceful restart: not configured and not enabled
Non stop routing: not configured and not enabled
Status TLV support (local/remote) : enabled/supported
LDP route watch : enabled
Label/status state machine : established, LruRru
Last local dataplane status rcvd: No fault
Last BFD dataplane status rcvd: Not sent
Last BFD peer monitor status rcvd: No fault
Last local AC circuit status rcvd: No fault
Last local AC circuit status sent: No fault
Last local PW i/f circ status rcvd: No fault
Last local LDP TLV status sent: No fault
Last remote LDP TLV status rcvd: No fault
Last remote LDP ADJ status rcvd: No fault
MPLS VC labels: local 17, remote 19
Group ID: local n/a, remote 0
MTU: local 9180, remote 9180
Remote interface description:
Sequencing: receive disabled, send disabled
Control Word: Off
SSO Descriptor: 2.2.2.2/100, local label: 17
Dataplane:
SSM segment/switch IDs: 12297/8194 (used), PWID: 1
VC statistics:
transit packet totals: receive 0, send 0
transit byte totals: receive 0, send 0
transit packet drops: receive 0, seq error 0, send 0
```

现在，当我们设法启动ping从CE1到CE2时：

```
CE1#ping 101.101.101.1 source 101.101.101.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 101.101.101.1, timeout is 2 seconds:
Packet sent with a source address of 101.101.101.2
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/4 ms
```

然后，当我们检查VC统计信息保证时数据包通过VPLS去：

PE1：

```
PE1#show mpls l2transport vc detail | sec statistics
VC statistics:
transit packet totals: receive 5, send 5
transit byte totals: receive 660, send 660
transit packet drops: receive 0, seq error 0, send 0
```

PE2：

```
PE2#show mpls l2transport vc detail | sec statistics
VC statistics:
transit packet totals: receive 5, send 5
transit byte totals: receive 680, send 680
transit packet drops: receive 0, seq error 0, send 0
```

## 故障排除

本文被认为选定兼容性问题，当配置在那么目前作为PE节点的ISR/ASR路由器和Cat9500 switches之间的VPLS VC，没有故障排除步骤时。