连结7000对等体交换机配置(混合的设置)

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简介

本文描述如何配置在Cisco Nexus 7000系列交换机的对等体交换机为了允许非虚拟端口通道(非VPC)连接装载在VLAN之间的平衡。

当对等体交换机启用时，每连结7000交换机共享虚拟网桥ID，允许两交换机作为支持VLAN。对于不开辟信道有能力在的端口上有一连接的设备对在vpc domain的每连结7000交换机， Layer2 (L2)拓扑取决于生成树协议为了阻塞冗余链路。对等体交换机功能允许假STP配置允许非VPC连接装载在两连结之间的平衡STP状态7000交换机。本文详细讨论假STP配置的原因，并且他们如何影响非VPC和vPC链路。

vPC和非VPC链路的混合呼叫一个混合的设置。

用于在本文的配置示例的每交换机的MAC地址是：

- 连结7000 vPC Switch1 (N7K-1) ：00:24:98:6f:3b:41
- 连结7000 vPC Switch2 (N7K-2) ：00:24:98:6f:3b:42
- 非VPC Switch1 (SW-1) ：00:24:98:6f:3b:44
- 非VPC Switch2 (SW-2) ：00:24:98:6f:3b:43

先决条件

要求

Cisco 建议您了解以下主题：

- 生成树协议 (STP)
- 虚拟端口信道(vPC)

使用的组件

本文档中的信息根据Cisco Nexus 7000系列交换机用Supervisor 1模块。

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。

配置

> **Note**:使用命令查找工具（仅限注册用户）可获取有关本部分所使用命令的详细信息。

> **Note**:命令输出解释程序工具（仅限注册用户）支持某些 **show** 命令。请使用Output Interpreter Tool为了查看show命令输出分析。

混合的设置的正常vPC行为

这是一个混合的设置的网络图没有启用的对等体交换机。两连结7000交换机配置以优先级8192所有VLAN的。因为有更低网桥ID， N7K-1在网桥选择中获胜。所以，您在从N7K-2的链路盼望SW-1阻塞。SW-2连接对连结7000交换机通过vPC，并且在一种转发状态。 SW-2接收仅网桥协议数据单元(BPDU)从在vPC的主要的交换机，是在本例中的N7K-1。

```
SW-1# show span vlan 1VLAN0001
 Spanning tree enabled protocol rstp
 Root ID    Priority    8193
             Address     0024.986f.3b41
             Cost        4
            Port        295 (Ethernet2/39)
            Hello Time  2  sec  Max Age 20 sec  Forward Delay 15 sec

 Bridge ID  Priority    32769  (priority 32768 sys-id-ext 1)
            Address     0024.986f.3b44
            Hello Time  2  sec  Max Age 20 sec  Forward Delay 15 sec

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------------
Eth2/39          Root FWD 4         128.295  P2p
Eth2/40          Altn BLK 4         128.296  P2p

SW-1# show span vlan 1 detail

 VLAN0001 is executing the rstp compatible Spanning Tree protocol
```

```
 Bridge Identifier has priority 32768, sysid 1, address 0024.986f.3b44
 Configured hello time 2, max age 20, forward delay 15
 Current root has priority 8193, address 0024.986f.3b41
 Root port is 295 (Ethernet2/39), cost of root path is 4
 Topology change flag not set, detected flag not set
 Number of topology changes 4 last change occurred 0:29:13 ago
         from Ethernet2/39
 Times:  hold 1, topology change 35, notification 2
         hello 2, max age 20, forward delay 15
 Timers: hello 0, topology change 0, notification 0

 Port 295 (Ethernet2/39) of VLAN0001 is root forwarding
  Port path cost 4, Port priority 128, Port Identifier 128.295
  Designated root has priority 8193, address 0024.986f.3b41
   Designated bridge has priority 8193, address 0024.986f.3b41
   Designated port id is 128.260, designated path cost 0, Topology change is set
  Timers: message age 16, forward delay 0, hold 0
  Number of transitions to forwarding state: 1
  Link type is point-to-point by default
  BPDU: sent 4, received 898

 Port 296 (Ethernet2/40) of VLAN0001 is alternate blocking
  Port path cost 4, Port priority 128, Port Identifier 128.296
  Designated root has priority 8193, address 0024.986f.3b41
   Designated bridge has priority 8193, address 0024.986f.3b42 <-- Although same priority,
   Designated port id is 128.272, designated path cost 2          advertising Bridge ID is
higher
  Timers: message age 16, forward delay 0, hold 0         and therefore this link is BLK
   Number of transitions to forwarding state: 2
  Link type is point-to-point by default
  BPDU: sent 6, received 895
```

在两连结交换机的Enable (event)对等体交换机

这是网络图一个混合的设置用启用的对等体交换机。当对等体交换机启用时，每连结7000交换机共享允许两交换机作为支持VLAN的虚拟网桥ID。 vPC对等体林克总是在一种转发状态并且运行L2网关互连协议(L2GIP)为了防止桥接环路。

每连结7000个交换机发送BPDU用虚拟网桥ID识别的根网桥。在vPC链路，指定的网桥ID也使用虚拟网桥ID。对于非VPC链路，指定的网桥ID是对应的连结7000交换机的物理网桥ID。这允许非VPC交换机(SW-1)做出根决策根据BPDU广告而不是端口优先级。

Note:对于适当的行为，应该配置在两连结的VLAN优先级7000交换机同样。

非VPC连接

使用启用的对等体交换机，每连结7000交换机生成BPDU根网桥设置为虚拟网桥ID和指定的网桥设置为物理网桥ID。因为优先级是相同的，在链路的所有总是非VPC连接转发连接对连结7000在链路的交换机与更低网桥ID (在本例中的N7K-1)和块连接对连结7000有更高的网桥ID的(在本例中的N7K-2交换机)。

```
SW-1# show span vlan 1

VLAN0001
 Spanning tree enabled protocol rstp
```

```
 Root ID    Priority    8193
            Address     0023.04ee.be01
            Cost        4
            Port        295 (Ethernet2/39)
            Hello Time  2  sec  Max Age 20 sec  Forward Delay 15 sec

 Bridge ID  Priority    32769  (priority 32768 sys-id-ext 1)
            Address     0024.986f.3b44
            Hello Time  2  sec  Max Age 20 sec  Forward Delay 15 sec

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------------
Eth2/39          Root FWD 4         128.295  P2p
Eth2/40          Altn BLK 4         128.296  P2p
SW-1# show span vlan 1 detail
 VLAN0001 is executing the rstp compatible Spanning Tree protocol
 Bridge Identifier has priority 32768, sysid 1, address 0024.986f.3b44
 Configured hello time 2, max age 20, forward delay 15
 Current root has priority 8193, address 0023.04ee.be01
 Root port is 295 (Ethernet2/39), cost of root path is 4
 Topology change flag not set, detected flag not set
 Number of topology changes 6 last change occurred 0:25:38 ago
         from Ethernet2/39
 Times:  hold 1, topology change 35, notification 2
         hello 2, max age 20, forward delay 15
 Timers: hello 0, topology change 0, notification 0
 Port 295 (Ethernet2/39) of VLAN0001 is root forwarding
  Port path cost 4, Port priority 128, Port Identifier 128.295
  Designated root has priority 8193, address 0023.04ee.be01    <---Root Bridge = virtual ID
  Designated bridge has priority 8193, address 0024.986f.3b41  <---Designated Bridge ID = N7K-1
  Designated port id is 128.260, designated path cost 0, Topology change is set
  Timers: message age 16, forward delay 0, hold 0
  Number of transitions to forwarding state: 1
  Link type is point-to-point by default
  BPDU: sent 4, received 2280
 Port 296 (Ethernet2/40) of VLAN0001 is alternate blocking
  Port path cost 4, Port priority 128, Port Identifier 128.296
  Designated root has priority 8193, address 0023.04ee.be01    <---Root Bridge = virtual ID
  Designated bridge has priority 8193, address 0024.986f.3b42  <---Designated Bridge ID = N7K-2
  Designated port id is 128.272, designated path cost 0
  Timers: message age 15, forward delay 0, hold 0
  Number of transitions to forwarding state: 2
  Link type is point-to-point by default
  BPDU: sent 7, received 2278
```

vPC连接

使用启用的对等体交换机， vPC连接接收BPDU根网桥和指定的网桥设置为虚拟网桥ID。

```
SW-2# show span vlan 1

VLAN0001
 Spanning tree enabled protocol rstp
 Root ID    Priority    8193
            Address     0023.04ee.be01
             Cost        3
            Port        4105 (port-channel10)
            Hello Time  2  sec  Max Age 20 sec  Forward Delay 15 sec

 Bridge ID  Priority    32769  (priority 32768 sys-id-ext 1)
            Address     0024.986f.3b43
```

```
            Hello Time  2  sec  Max Age 20 sec  Forward Delay 15 sec

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------------
Po10             Root FWD 3         128.4105 P2p

SW-2# show span vlan 1 detail

 VLAN0001 is executing the rstp compatible Spanning Tree protocol
 Bridge Identifier has priority 32768, sysid 1, address 0024.986f.3b43
 Configured hello time 2, max age 20, forward delay 15
 Current root has priority 8193, address 0023.04ee.be01
 Root port is 4105 (port-channel10), cost of root path is 3
 Topology change flag not set, detected flag not set
 Number of topology changes 5 last change occurred 0:21:40 ago
         from port-channel10
 Times:  hold 1, topology change 35, notification 2
         hello 2, max age 20, forward delay 15
 Timers: hello 0, topology change 0, notification 0

 Port 4105 (port-channel10) of VLAN0001 is root forwarding
  Port path cost 3, Port priority 128, Port Identifier 128.4105
  Designated root has priority 8193, address 0023.04ee.be01          <--- Virtual Bridge ID
  Designated bridge has priority 8193, address 0023.04ee.be01       <--- Virtual Bridge ID
  Designated port id is 128.4105, designated path cost 0, Topology change is set
  Timers: message age 15, forward delay 0, hold 0
  Number of transitions to forwarding state: 2
  Link type is point-to-point by default
  BPDU: sent 96, received 2804
```

在VLAN之间的Enable (event)负载均衡在非VPC链路

在默认对等体交换机配置下，在非VPC交换机的所有VLAN在单条链路转发。为了装载在VLAN之间的平衡，通告的指定和根优先级可以利用生成树pseduo信息配置手工设置。思科建议在pseduo信息下的根优先级比最好的生成树优先级更低为了在故障切换状况下防止拓扑变化通知(TCN)。指定优先级可以是负载被均衡在两连结之间在vpc domain的7000交换机。

在本例中，在两连结的全局生成树优先权7000交换机设置到8192。在假信息下，根优先级配置作为4096，比最好的优先级更低8192。所以，用启用的对等体交换机参与的交换机变为VLAN的根。为了装载在两交换机之间的平衡，指定优先级为VLAN9和VLAN10交替。对于对SW-1的非VPC连接，VLAN9在对N7K-1的链路转发，并且VLAN10在对N7K-2的链路转发。

非VPC连接

对于VLAN9， SW-1看到假根网桥优先级和网桥ID作为从N7K-1和N7K-2的同一个值。 然而， N7K-1和N7K-2发送他们的已配置的假指定优先级。所以， SW-1看到指定的网桥优先级8201 (8192 + 9)从N7K-1和指定的网桥优先级12297 (12288 + 9)从N7K-2;SW-1选择链路往N7K-1作为在VLAN9的转发链路。

```
SW-1# show span vlan 9

VLAN0009
 Spanning tree enabled protocol rstp
 Root ID    Priority    4105
            Address     0023.04ee.be01
            Cost        4
```

```
            Port        295 (Ethernet2/39)
            Hello Time  2  sec  Max Age 20 sec  Forward Delay 15 sec

 Bridge ID  Priority    32777  (priority 32768 sys-id-ext 9)
            Address     0024.986f.3b44
            Hello Time  2  sec  Max Age 20 sec  Forward Delay 15 sec

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------------
Eth2/39          Root FWD 4         128.295  P2p
Eth2/40          Altn BLK 4         128.296  P2p

SW-1# show span vlan 9 detail

 VLAN0009 is executing the rstp compatible Spanning Tree protocol
 Bridge Identifier has priority 32768, sysid 9, address 0024.986f.3b44
 Configured hello time 2, max age 20, forward delay 15
 Current root has priority 4105, address 0023.04ee.be01
 Root port is 295 (Ethernet2/39), cost of root path is 4
 Topology change flag not set, detected flag not set
 Number of topology changes 16 last change occurred 0:06:56 ago
         from Ethernet2/39
 Times:  hold 1, topology change 35, notification 2
         hello 2, max age 20, forward delay 15
 Timers: hello 0, topology change 0, notification 0

 Port 295 (Ethernet2/39) of VLAN0009 is root forwarding
  Port path cost 4, Port priority 128, Port Identifier 128.295
  Designated root has priority 4105, address 0023.04ee.be01     <--- Root Virtual Bridge ID
  Designated bridge has priority 8201, address 0024.986f.3b41   <--- Designated N7K-1, 8201
  Designated port id is 128.260, designated path cost 0
  Timers: message age 15, forward delay 0, hold 0
  Number of transitions to forwarding state: 3
  Link type is point-to-point by default
  BPDU: sent 31, received 3486

 Port 296 (Ethernet2/40) of VLAN0009 is alternate blocking
  Port path cost 4, Port priority 128, Port Identifier 128.296
  Designated root has priority 4105, address 0023.04ee.be01    <--- Root Virtual Bridge ID
  Designated bridge has priority 12297, address 0024.986f.3b42 <--- Designated is N7K-2, 12297
  Designated port id is 128.272, designated path cost 0
  Timers: message age 15, forward delay 0, hold 0
  Number of transitions to forwarding state: 4
  Link type is point-to-point by default
  BPDU: sent 31, received 3496
```

同样对于VLAN10， SW-1看到假根网桥优先级和网桥ID作为从N7K-1和N7K-2的同一个值。 再次，N7K-1和N7K-2发送他们的已配置的假指定优先级。 对于VLAN10， SW-1看到指定的网桥优先级12298 (12288 + 10)从N7K-1和指定的网桥优先级8202 (8192 + 10)从N7K-2;SW-1这样选择链路往N7K-2作为VLAN的10.转发链路，非VPC连接的交换机能装载在N7K-1和N7K-2之间的平衡VLAN STP状态。

```
SW-1# show span vlan 10 detail

 VLAN0010 is executing the rstp compatible Spanning Tree protocol
 Bridge Identifier has priority 32768, sysid 10, address 0024.986f.3b44
 Configured hello time 2, max age 20, forward delay 15
 Current root has priority 4106, address 0023.04ee.be01
 Root port is 296 (Ethernet2/40), cost of root path is 4
 Topology change flag not set, detected flag not set
 Number of topology changes 7 last change occurred 0:07:13 ago
         from Ethernet2/40
```

```
 Times:  hold 1, topology change 35, notification 2
         hello 2, max age 20, forward delay 15
 Timers: hello 0, topology change 0, notification 0

 Port 295 (Ethernet2/39) of VLAN0010 is alternate blocking
  Port path cost 4, Port priority 128, Port Identifier 128.295
  Designated root has priority 4106, address 0023.04ee.be01     <--- Root Virtual Bridge ID
  Designated bridge has priority 12298, address 0024.986f.3b41  <--- Designated N7K-1, 12298
  Designated port id is 128.260, designated path cost 0, Topology change is set
  Timers: message age 16, forward delay 0, hold 0
  Number of transitions to forwarding state: 1
  Link type is point-to-point by default
  BPDU: sent 4, received 3497

 Port 296 (Ethernet2/40) of VLAN0010 is root forwarding
   Port path cost 4, Port priority 128, Port Identifier 128.296
  Designated root has priority 4106, address 0023.04ee.be01    <--- Root Virtual Bridge ID
  Designated bridge has priority 8202, address 0024.986f.3b42  <--- Designated N7K-2, 8202
  Designated port id is 128.272, designated path cost 0
  Timers: message age 16, forward delay 0, hold 0
  Number of transitions to forwarding state: 3
  Link type is point-to-point by default
  BPDU: sent 10, received 3492
```

vPC连接

为vPC链路、根和指定字段使用假根优先级和虚拟网桥ID，分别。

```
SW-2# show span vlan 9

VLAN0009
 Spanning tree enabled protocol rstp
 Root ID    Priority    4105
            Address     0023.04ee.be01
            Cost        3
            Port        4105 (port-channel10)
            Hello Time  2  sec  Max Age 20 sec  Forward Delay 15 sec

 Bridge ID  Priority    32777  (priority 32768 sys-id-ext 9)
            Address     0024.986f.3b43
            Hello Time  2  sec  Max Age 20 sec  Forward Delay 15 sec

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------------
Po10             Root FWD 3         128.4105 P2p

SW-2# show span vlan 10

VLAN0010
 Spanning tree enabled protocol rstp
 Root ID    Priority    4106
            Address     0023.04ee.be01
            Cost        3
            Port        4105 (port-channel10)
            Hello Time  2  sec  Max Age 20 sec  Forward Delay 15 sec

 Bridge ID  Priority    32778  (priority 32768 sys-id-ext 10)
            Address     0024.986f.3b43
            Hello Time  2  sec  Max Age 20 sec  Forward Delay 15 sec

Interface        Role Sts Cost      Prio.Nbr Type
```

```
---------------- ---- --- --------- -------- --------------------------------
Po10             Root FWD 3         128.4105 P2p

SW-2#show span vlan 9 detail

 VLAN0009 is executing the rstp compatible Spanning Tree protocol
 Bridge Identifier has priority 32768, sysid 9, address 0024.986f.3b43
 Configured hello time 2, max age 20, forward delay 15
 Current root has priority 4105, address 0023.04ee.be01
 Root port is 4105 (port-channel10), cost of root path is 3
 Topology change flag not set, detected flag not set
 Number of topology changes 12 last change occurred 0:04:29 ago
         from port-channel10
 Times:  hold 1, topology change 35, notification 2
         hello 2, max age 20, forward delay 15
 Timers: hello 0, topology change 0, notification 0

 Port 4105 (port-channel10) of VLAN0009 is root forwarding
  Port path cost 3, Port priority 128, Port Identifier 128.4105
  Designated root has priority 4105, address 0023.04ee.be01    <--- Root Virtual Bridge ID
  Designated bridge has priority 4105, address 0023.04ee.be01  <--- Root Virtual Bridge ID
  Designated port id is 128.4105, designated path cost 0, Topology change is set
  Timers: message age 15, forward delay 0, hold 0
  Number of transitions to forwarding state: 2
  Link type is point-to-point by default
  BPDU: sent 119, received 4867

SW-2# show span vlan 10 detail

 VLAN0010 is executing the rstp compatible Spanning Tree protocol
 Bridge Identifier has priority 32768, sysid 10, address 0024.986f.3b43
 Configured hello time 2, max age 20, forward delay 15
 Current root has priority 4106, address 0023.04ee.be01
 Root port is 4105 (port-channel10), cost of root path is 3
 Topology change flag not set, detected flag not set
 Number of topology changes 6 last change occurred 0:04:36 ago
         from port-channel10
 Times:  hold 1, topology change 35, notification 2
         hello 2, max age 20, forward delay 15
 Timers: hello 0, topology change 0, notification 0

 Port 4105 (port-channel10) of VLAN0010 is root forwarding
  Port path cost 3, Port priority 128, Port Identifier 128.4105
  Designated root has priority 4106, address 0023.04ee.be01    <--- Root Virtual Bridge ID
  Designated bridge has priority 4106, address 0023.04ee.be01  <--- Root Virtual Bridge ID
  Designated port id is 128.4105, designated path cost 0, Topology change is set
  Timers: message age 17, forward delay 0, hold 0
  Number of transitions to forwarding state: 2
  Link type is point-to-point by default
  BPDU: sent 96, received 5179
```

警告

请参阅Cisco Bug ID CSCub74914 ：假STP优先级在对等体交换机设置的vPC链路不正确设置

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

- Cisco连结7000系列NX-OS接口配置指南，版本5.x ：配置vPCs ：vPC对等体交换机
- 设计和配置指南：虚拟端口信道的(vPC)最佳实践在Cisco Nexus 7000系列交换机
- 技术支持和文档 - Cisco Systems