

Configuração de peer-switch do Nexus 7000 (configuração híbrida)

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Introduction

Este documento descreve como configurar o peer-switch nos switches Cisco Nexus 7000 Series para permitir conexões de canal de porta não virtual (não-vPC) para balanceamento de carga entre VLANs.

Quando o peer-switch está ativado, cada switch Nexus 7000 compartilha um ID de bridge virtual, que permite que ambos os switches atuem como raiz para a VLAN. Para dispositivos com uma conexão a cada switch Nexus 7000 no domínio vPC que não são capazes de canalização de porta, a topologia da Camada 2 (L2) depende do Spanning Tree Protocol (STP) para bloquear os links redundantes. O recurso peer-switch permite configurações pseudo-STP para permitir conexões não-vPC para balancear a carga de estados STP entre os dois switches Nexus 7000. Este documento discute em detalhes o motivo das configurações pseudo-STP e como elas afetam links não-vPC e vPC.

Uma combinação de links vPC e não-vPC é chamada de configuração híbrida.

Os endereços MAC para cada switch usado no exemplo de configuração neste documento são:

- Switch 1 vPC Nexus 7000 (N7K-1): 00:24:98:6f:3b:41

- Switch 2 vPC Nexus 7000 (N7K-2): 00:24:98:6f:3b:42
- Switch 1 não-vPC (SW-1): 00:24:98:6f:3b:44
- Switch 2 não-vPC (SW-2): 00:24:98:6f:3b:43

Prerequisites

Requirements

A Cisco recomenda que você tenha conhecimento destes tópicos:

- STP (Spanning Tree Protocol)
- Canal de porta virtual (vPC)

Componentes Utilizados

As informações neste documento são baseadas nos Cisco Nexus 7000 Series Switches com Supervisor 1 Module.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

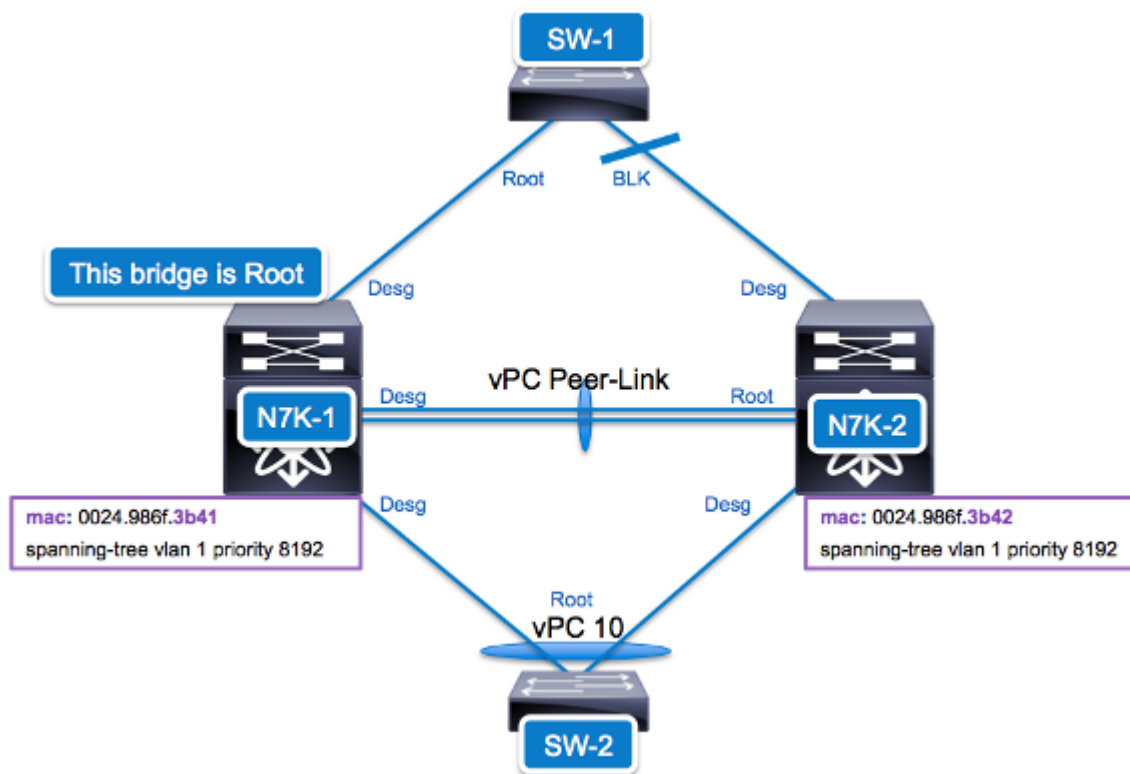
Configurar

Note: Use a [Command Lookup Tool \(somente clientes registrados\)](#) para obter mais informações sobre os comandos usados nesta seção.

Note: A [ferramenta Output Interpreter \(exclusiva para clientes registrados\)](#) é compatível com alguns comandos de exibição.. Use a ferramenta Output Interpreter para visualizar uma análise do resultado gerado pelo comando show..

Comportamento normal do vPC para configuração híbrida

Este é um diagrama de rede de uma configuração híbrida sem comutador par ativado. Ambos os switches Nexus 7000 são configurados com uma prioridade de 8192 para todas as VLANs. O N7K-1 vence a eleição da bridge porque tem o ID da bridge mais baixo. Portanto, você espera que o SW-1 bloqueie o link de N7K-2. O SW-2 está conectado aos switches Nexus 7000 por meio de um vPC e terá um status de encaminhamento. O SW-2 recebe BPDUs (Bridge Protocol Data Units, Unidades de Dados de Protocolo de Bridge) somente do switch principal no vPC, que é N7K-1 neste exemplo.



```
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, advertising Bridge ID is
Designated port id is 128.272, designated path cost 2

higher

Timers: message age 16, forward delay 0, hold 0
Number of transitions to forwarding state: 2
Link type is point-to-point by default
BPDU: sent 6, received 895

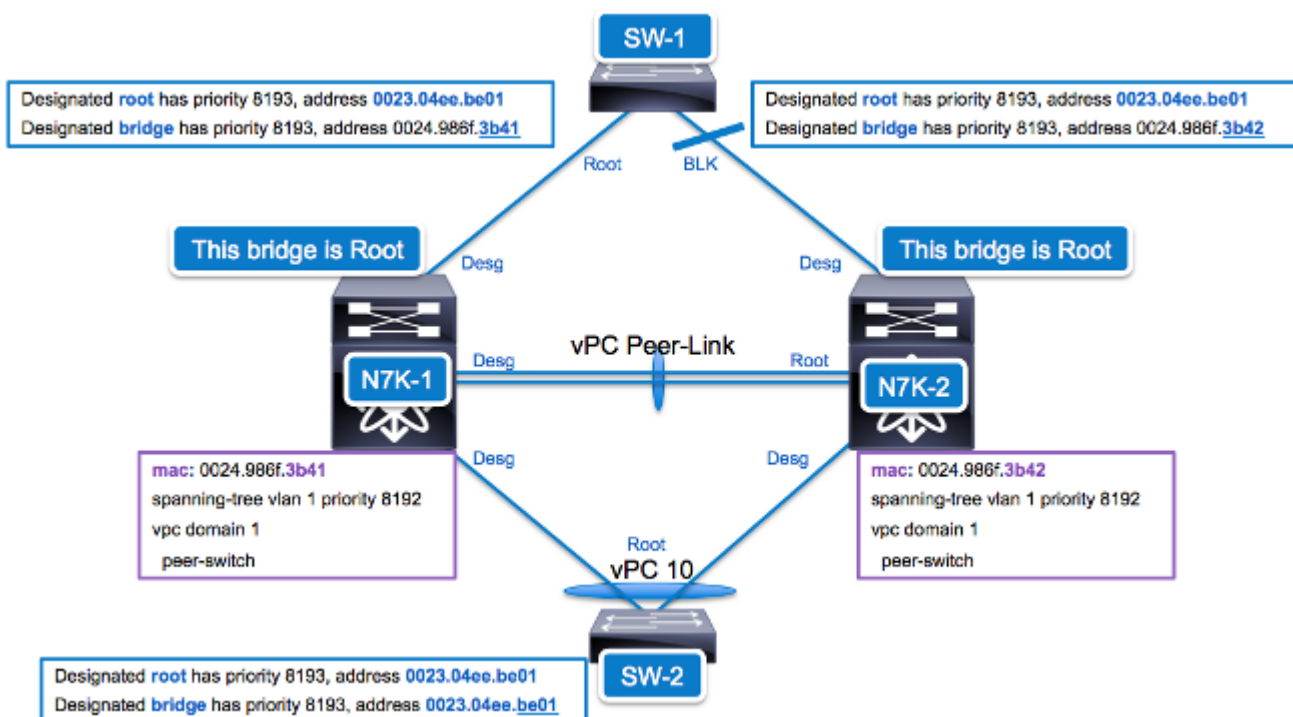
and therefore this link is BLK

Habilitar peer-switch em ambos os switches Nexus

Este é um diagrama de rede de uma configuração híbrida com peer-switch habilitado. Quando o peer-switch está ativado, cada switch Nexus 7000 compartilha um ID de bridge virtual que permite que ambos os switches atuem como raiz para a VLAN. O link peer do vPC está sempre em um status de encaminhamento e executa o L2 Gateway Interconnection Protocol (L2GIP) para evitar loops de bridging.

Cada switch Nexus 7000 envia BPDUs com uma bridge raiz identificada pelo ID da bridge virtual. Em links vPC, o ID de bridge designado também usa o ID de bridge virtual. Para enlaces que não são vPC, o ID da bridge designada é o ID da bridge física do switch Nexus 7000 correspondente. Isso permite que o switch não-vPC (SW-1) tome uma decisão raiz com base nos anúncios de BPDU em vez de prioridade de porta.

Note: Para o comportamento correto, as prioridades de VLAN em ambos os switches Nexus 7000 devem ser configuradas da mesma forma.



Conexão não-vPC

Com peer-switch ativado, cada switch Nexus 7000 gera BPDUs com a bridge raiz definida para o ID da bridge virtual e a bridge designada definida para o ID da bridge física. Como as prioridades são as mesmas, todas as conexões não-vPC sempre encaminham no link conectado ao switch Nexus 7000 com o ID da bridge mais baixa (N7K-1 neste exemplo) e bloqueiam os links conectados ao switch Nexus 7000 com o ID da bridge mais alta (N7K-2 neste exemplo).

```
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
    BPDUs: 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
    BPDUs: sent 7, received 2278
```

Conexão vPC

Com o peer-switch ativado, as conexões vPC recebem BPDUs com a bridge raiz e a bridge designada definidas para o ID da bridge virtual.

```
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

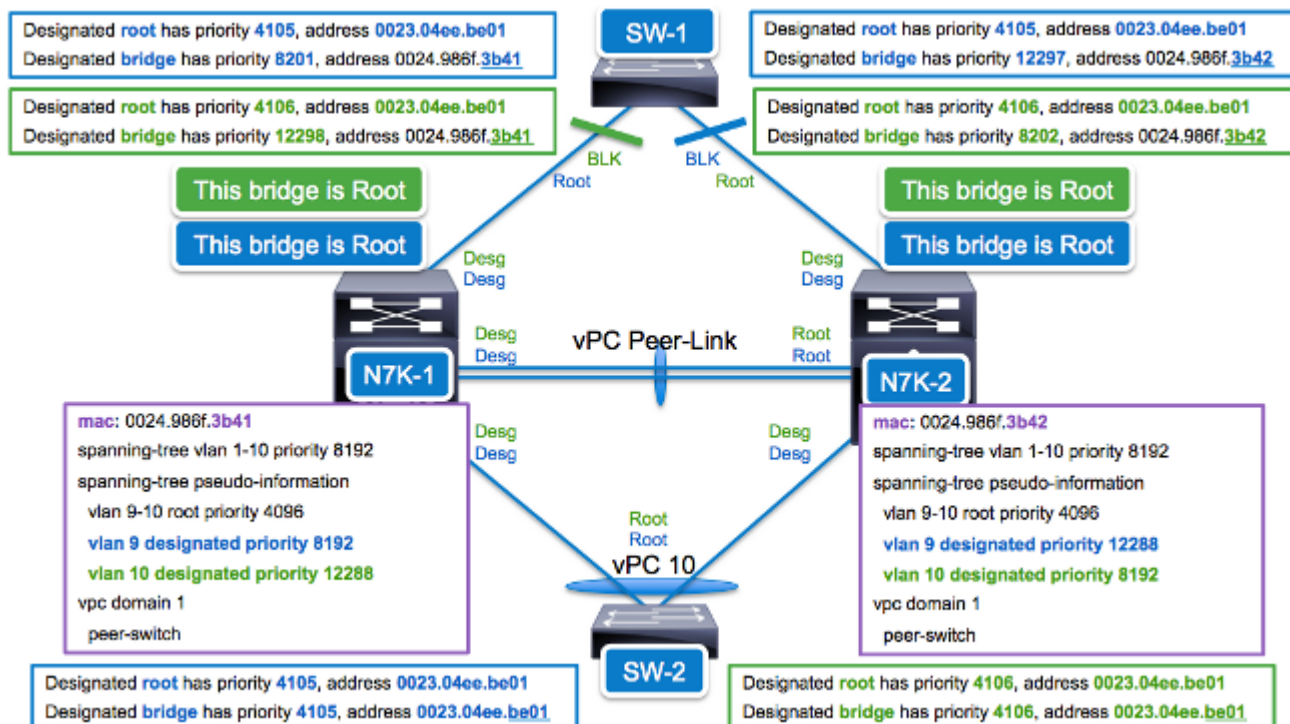
Port 4105 (port-channel10) of VLAN0001 is root forwarding
Port path cost 3, Port priority 128, Port Identifier 128.4105
Designated root has priority 8193, address 0023.04ee.be01          <--- Virtual Bridge ID
Designated bridge has priority 8193, address 0023.04ee.be01      <--- Virtual Bridge ID
Designated 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
```

Ativar balanceamento de carga entre VLANs em links não-vPC

Na configuração padrão do peer-switch, todas as VLANs no switch não-vPC estão encaminhando em um único link. Para fazer o balanceamento de carga entre as VLANs, as prioridades designadas e raiz anunciadas podem ser definidas manualmente pelo uso de configurações de pseudo-information do spanning tree. A Cisco recomenda que a prioridade raiz sob pseudo-information seja inferior à melhor prioridade de spanning tree para evitar TCNs (Topology Change Notification, notificações de alteração de topologia) em condições de failover. As prioridades designadas podem ser balanceadas de carga entre os dois switches Nexus 7000 no domínio vPC.

Neste exemplo, as prioridades globais de spanning tree em ambos os switches Nexus 7000 foram definidas como 8192. Sob as pseudo-informações, a prioridade raiz foi configurada como 4096, que é inferior à melhor prioridade de 8192. Portanto, o switch que está participando com peer-switch ativado torna-se a raiz da VLAN. Para fazer o balanceamento de carga entre os dois switches, as prioridades designadas são alternadas para a VLAN 9 e a VLAN 10. Para conexões

não-vPC com SW-1, a VLAN 9 é encaminhada no link para N7K-1, e a VLAN 10 é encaminhada no link para N7K-2.



Conexão não-vPC

Para a VLAN 9, o SW-1 vê a prioridade da bridge pseudo raiz e o ID da bridge como o mesmo valor de N7K-1 e N7K-2. No entanto, tanto o N7K-1 como o N7K-2 enviam suas pseudo-prioridades designadas configuradas. Portanto, o SW-1 vê a prioridade de bridge designada de 8201 ($8192 + 9$) do N7K-1 e a prioridade de bridge designada de 12297 ($12288 + 9$) do N7K-2; O SW-1 escolhe o link em direção a N7K-1 como o link de encaminhamento na VLAN 9.

```
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
```

Da mesma forma, para a VLAN 10, o SW-1 vê a prioridade da bridge pseudo raiz e o ID da bridge como o mesmo valor de N7K-1 e N7K-2. Novamente, tanto N7K-1 quanto N7K-2 enviam suas pseudo prioridades designadas configuradas. Para a VLAN 10, o SW-1 vê a prioridade de bridge designada de 12298 (12288 + 10) de N7K-1 e a prioridade de bridge designada de 8202 (8192 + 10) de N7K-2; O SW-1 escolhe o link em direção a N7K-2 como o link de encaminhamento para a VLAN 10. Dessa forma, os switches conectados não-vPC podem balancear a carga do estado de STP da VLAN entre N7K-1 e N7K-2.

```
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

```

Conexão vPC

Para links vPC, os campos raiz e designado usam a pseudo-prioridade raiz e o ID da bridge virtual, respectivamente.

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
```

Caveats

Consulte o bug da Cisco ID [CSCub74914](#): Prioridades do Pseudo STP definidas incorretamente em links do vPC na configuração do comutador de mesmo nível

Verificar

No momento, não há procedimento de verificação disponível para esta configuração.

Troubleshoot

Atualmente, não existem informações disponíveis específicas sobre Troubleshooting para esta configuração.

Informações Relacionadas

- [Guia de configuração da interface NX-OS do Cisco Nexus 7000 Series, versão 5.x: Configuração de vPCs: Switch peer vPC](#)
- [Guia de projeto e configuração: Práticas recomendadas para canais de porta virtuais \(vPC\) nos switches Cisco Nexus 7000 Series](#)
- [Suporte Técnico e Documentação - Cisco Systems](#)