

Configuração do Par-interruptor do nexo 7000 (instalação híbrida)

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Introdução

Este documento descreve como configurar o par-interruptor no Switches Cisco Nexus série 7000 a fim permitir que as conexões NON-virtuais do Canal de porta (NON-VPC) carreguem o equilíbrio entre VLAN.

Quando o par-interruptor é permitido, cada 7000 Switch do nexo compartilha de um ID de bridge virtual, que permita que ambo o Switches atue como a raiz para o VLAN. Para os dispositivos com uma conexão a cada 7000 Switch do nexo no domínio do vPC que não são capazes da porta que canaliza, a topologia da camada 2 (L2) confia no Spanning Tree Protocol (STP) a fim obstruir os enlaces redundantes. A característica do par-interruptor permite as configurações pseudo--STP permitir que as conexões NON-VPC carreguem estados do equilíbrio STP entre os dois 7000 Switch do nexo. Este documento discute em detalhe a razão para as configurações pseudo--STP e como afetam o NON-VPC e os links do vPC.

Uma mistura de vPC e de links NON-VPC é chamada uma instalação híbrida.

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

- VPC Switch1 do nexo 7000 (N7K-1): 00:24:98:6f:3b:41
- VPC Switch2 do nexo 7000 (N7K-2): 00:24:98:6f:3b:42
- NON-VPC Switch1 (SW-1): 00:24:98:6f:3b:44
- NON-VPC Switch2 (SW-2): 00:24:98:6f:3b:43

Pré-requisitos

Requisitos

A Cisco recomenda que você tenha conhecimento destes tópicos:

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

Componentes Utilizados

A informação neste documento é baseada no Switches Cisco Nexus série 7000 com módulo do Supervisor 1.

As informações neste documento foram criadas a partir de dispositivos em um ambiente de laboratório específico. Todos os dispositivos utilizados neste documento foram iniciados com uma configuração (padrão) inicial. Se a sua rede estiver ativa, certifique-se de que entende o impacto potencial de qualquer comando.

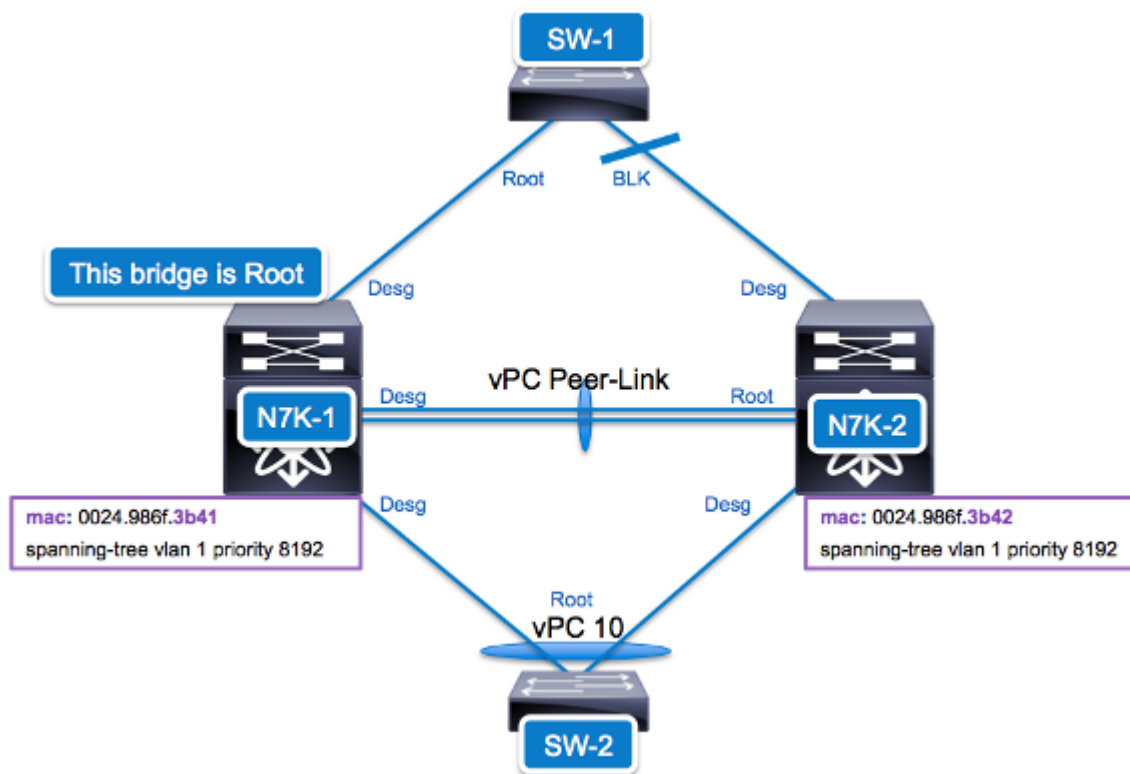
Configurar

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

Note: [A ferramenta Output Interpreter](#) ([clientes registrados somente](#)) apoia determinados comandos de exibição. Use a ferramenta Output Interpreter a fim ver uma análise do emissor de comando de execução.

Comportamento normal do vPC para a instalação híbrida

Este é um diagrama da rede de uma instalação híbrida sem par-interruptor permitido. Ambos os 7000 Switch do nexo são configurados com uma prioridade de 8192 para todos os VLAN. N7K-1 ganha a eleição da ponte porque tem o ID de bridge mais baixo. Consequentemente, você espera SW-1 obstruir no link de N7K-2. SW-2 é conectado aos 7000 Switch do nexo através de um vPC e estará em um estado da transmissão. SW-2 recebe o bridge protocol data units (BPDU) somente do interruptor preliminar 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 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

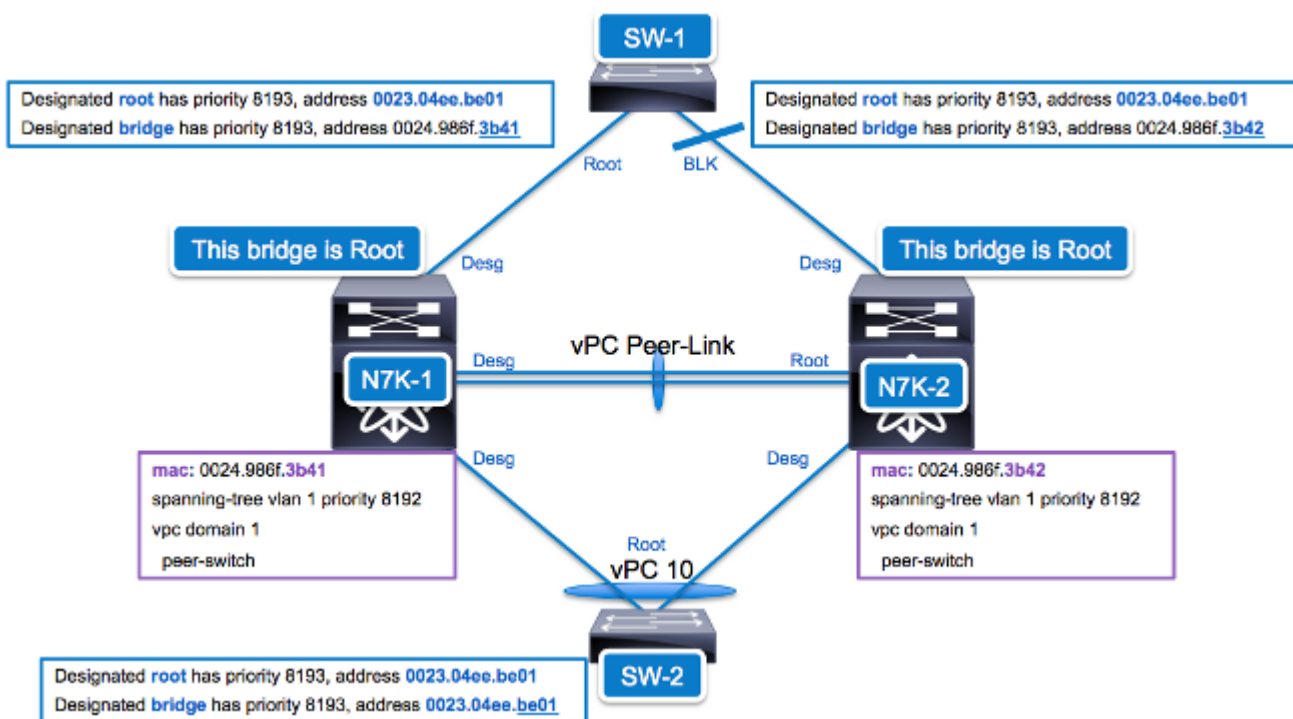
and therefore this link is BLK

Permita o Par-interruptor em ambo o Switches do nexa

Este é um diagrama da rede de uma instalação híbrida com o par-interruptor permitido. Quando o par-interruptor é permitido, cada 7000 Switch do nexa compartilha de um ID de bridge virtual que permita que ambo o Switches atue como a raiz para o VLAN. O par-link do vPC está sempre em um estado da transmissão e executa o protocolo da interconexão do gateway L2 (L2GIP) a fim impedir Loop de Bridging.

Cada 7000 Switch do nexa envia BPDUs com um bridge-raiz identificado pelo ID de bridge virtual. Nos links do vPC, o bridge designada ID igualmente usa o ID de bridge virtual. Para os links NON-VPC, o bridge designada ID é o ID de bridge físico do 7000 Switch correspondente do nexa. Isto permite que o interruptor NON-VPC (SW-1) faça uma decisão da raiz baseada em propagandas BPDUs em vez da prioridade de porta.

Note: Para o comportamento apropriado, as prioridades VLAN em ambos os 7000 Switch do nexa devem ser configuradas o mesmos.



conexão NON-VPC

Com o par-interruptor permitido, cada 7000 Switch do nexa gerencie BPDU com o grupo do bridge-raiz ao ID de bridge virtual e ao bridge designada ajustados ao ID de bridge físico. Desde que as prioridades são as mesmas, todas as conexões NON-VPC sempre dianteiras no link conectado ao 7000 Switch do nexa com o ID de bridge mais baixo (N7K-1 neste exemplo) e ao bloco nos links conectaram ao 7000 Switch do nexa com o ID de bridge mais alto (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
```

```
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
```

conexão do vPC

Com o par-interruptor permitido, as conexões do vPC recebem BPDU com o bridge-raiz e o

bridge designada ajustados ao ID de 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

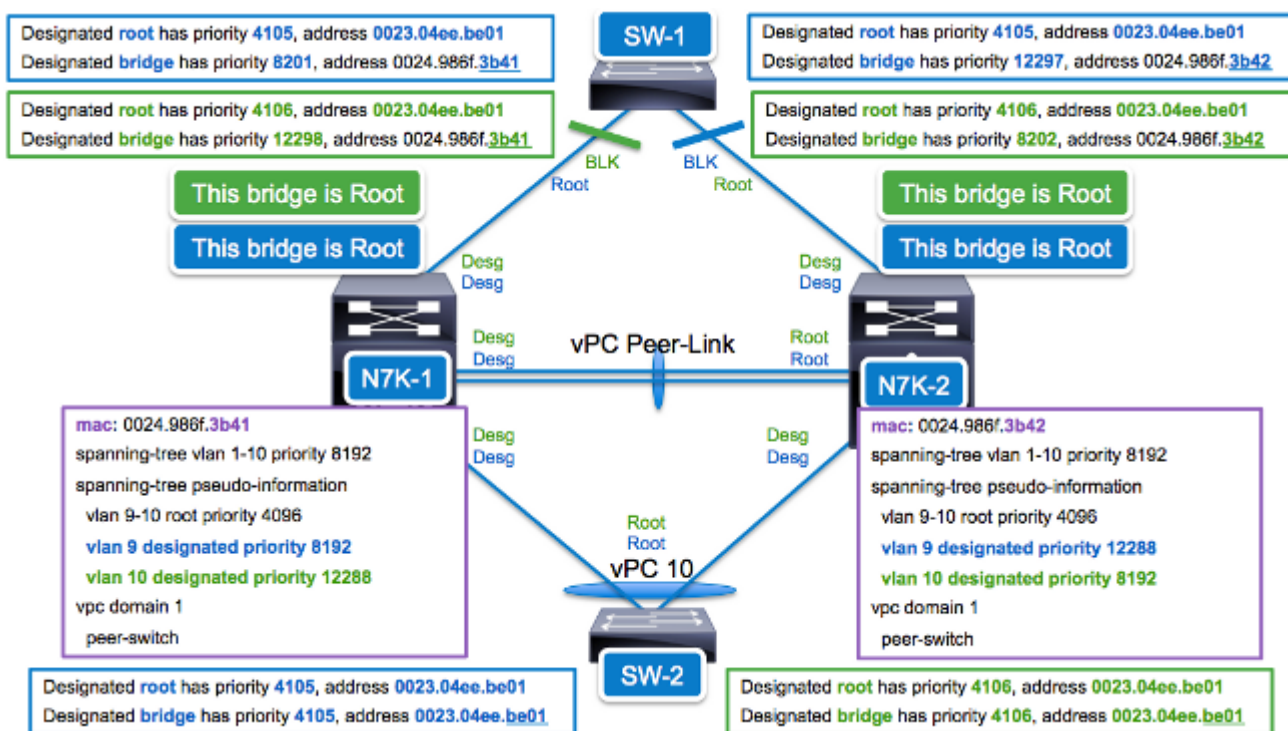
Port 4105 (port-channel10) of VLAN0001 is root forwarding
Port path cost 3, Port priority 128, Port Identifier 128.4105
Designated root has priority 8193, address 0023.04ee.be01 <--- Virtual Bridge ID
Designated bridge has priority 8193, address 0023.04ee.be01 <--- Virtual Bridge ID
Designated port id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

Permita o Balanceamento de carga entre VLAN nos links NON-VPC

Sob a configuração do par-interruptor do padrão, todos os VLAN no interruptor NON-VPC estão enviando em um link único. A fim carregar o equilíbrio entre os VLAN, designada e as prioridades de raiz anunciadas podem manualmente ser ajustadas por meio da medida - configurações da pseudo-informação da árvore. Cisco recomenda que a prioridade de raiz sob a pseudo-informação seja mais baixa do que o melhor que mede - prioridade da árvore a fim impedir as notificações da alteração de topologia (TCN) sob circunstâncias do Failover. As prioridades designadas podem ser carga equilibrada entre os dois 7000 Switch do nexa no domínio do vPC.

Neste exemplo, a medida global - as prioridades da árvore em ambos os 7000 Switch do nexa foram ajustadas a 8192. Sob a pseudo--informação, a prioridade de raiz foi configurada como 4096, que é mais baixa do que a melhor prioridade de 8192. Consequentemente, o interruptor que está participando com o par-interruptor permitido transforma-se a raiz para o VLAN. A fim

carregar o equilíbrio entre os dois Switches, as prioridades designadas são alternadas para VLAN 9 e VLAN10. Para as conexões NON-VPC a SW-1, o VLAN 9 é enviado no link a N7K-1, e o VLAN10 é enviado no link a N7K-2.



conexão NON-VPC

Para VLAN 9, SW-1 vê a prioridade de Root Bridge e o ID de bridge pseudo- como o mesmo valor de N7K-1 e de N7K-2. Contudo, N7K-1 e N7K-2 enviam suas prioridades designadas pseudo-configuradas. Consequentemente, SW-1 vê a prioridade do bridge designada de 8201 ($8192 + 9$) de N7K-1 e a prioridade do bridge designada de 12297 ($12288 + 9$) de N7K-2; SW-1 escolhe o link para N7K-1 como o link de transmissão em 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
```

Similarmente para o VLAN10, SW-1 vê a prioridade de Root Bridge e o ID de bridge pseudo- como o mesmo valor de N7K-1 e de N7K-2. Além disso, N7K-1 e N7K-2 enviam suas prioridades designadas pseudo- configuradas. Para o VLAN10, SW-1 vê a prioridade do bridge designada de 12298 (12288 + 10) de N7K-1 e a prioridade do bridge designada de 8202 (8192 + 10) de N7K-2; SW-1 escolhe o link para N7K-2 como o link de transmissão para VLAN 10. desta maneira, os switch conectados NON-VPC podem carregar o estado do equilíbrio VLAN STP 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 do vPC

Para os links do vPC, a raiz e o uso designado dos campos a prioridade de raiz pseudo- e o ID de 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

Veja a identificação de bug Cisco [CSCub74914](#): As prioridades do STP pseudo- ajustadas incorretamente no vPC ligam na instalação do par-interruptor

Verificar

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

Troubleshooting

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

Informações Relacionadas

- [Guia de configuração da interface do 7000 Series NX-OS do nexa de Cisco, liberação 5.x: Configurando vPCs: interruptor do par do vPC](#)
- [Projeto e manual de configuração: Melhores prática para os canais da porta virtual \(vPC\) no Switches Cisco Nexus série 7000](#)
- [Suporte Técnico e Documentação - Cisco Systems](#)