Configure VTP on Catalyst Switches

Contents

Introduction

Prerequisites

- Requirements
- Components Used

Background Information

Configure

- VTP Configuration Guidelines
- VTP Configuration on Catalyst Switches
- Practical Examples

Related Information

Introduction

This document describes the configuration of the VLAN Trunking Protocol (VTP) on Catalyst switches.

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

This document covers various Catalyst switch models and is not restricted to specific software versions.

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, ensure that you understand the potential impact of any command.

Background Information

VTP reduces administration in a switched network. When you configure a new VLAN on one VTP server, the VLAN is distributed through all switches in the domain. This reduces the need to configure the same VLAN everywhere. VTP is a Cisco-proprietary protocol that is available on most of the Cisco Catalyst series products.

Refer to Understand VLAN Trunk Protocol (VTP) for more information on VTP.

Configure

VTP Configuration Guidelines

This section provides some guidelines for the configuration of VTP in the network.

- All switches must share the same VTP domain name, unless the network design requires different VTP domains

> **Note**: Trunk negotiation does not work across VTP domains. Refer to the Data Traffic Blocked between VTP Domains section of Configure VLAN Trunk Protocol (VTP) for more information.

- All switches in a VTP domain must run the same VTP version.
- All switches in a VTP domain have the same VTP password, if there are any.
- For VTP versions 1 and 2, verify the configuration revision before you connect a switch to an existing VTP domain. A switch in VTP server or client mode that has a higher configuration revision and matching VTP domain name and password, when configured, can cause other switches to replace their VLAN database. Reset the configuration revision to 0 with a platform supported procedure before you connect the switch.
- When you make a change to the VLAN configuration on a VTP server, the change is propagated to all switches in the VTP domain.
- If you configure a switch for VTP transparent mode, you can create and modify VLANs, but the changes are not sent to other switches in the domain, and they affect only the individual switch.

> **Note**: For new deployments that require VTP, use VTP version 3 on supported platforms and software releases. Validate platform compatibility and deployment requirements before a migration from VTP version 1 or 2.

VTP Configuration on Catalyst Switches

This section provides some basic commands in order to configure VTP on the most commonly used Catalyst switches.

This section describes two methods in order to configure VTP. Method availability depends on the Catalyst platform and Cisco IOS Software release. Use VLAN database mode only on releases that support this legacy method. Use global configuration mode on supported current releases.

1. Method 1. VLAN database mode (legacy)

   In supported legacy Cisco IOS Software releases, you can configure the VTP domain name, VTP mode, and VLANs in VLAN database mode.

   1. In EXEC mode, run this command in order to enter VLAN database mode:

      <#root>

      Switch#

      vlan database

      ```
      !--- Issue this command in privileged EXEC mode,
      !--- not in global configuration mode.

      Switch(vlan)#

      !--- This is VLAN configuration mode.
      ```

   2. Issue this command in order to set the VTP domain name:

      <#root>

      Switch(vlan)#

      vtp domain example

   3. Issue this command in order to set the VTP mode:

      <#root>

      Switch(vlan)#

      vtp {client | server | transparent}

   4. Issue the **exit** command in order to exit VLAN configuration mode.

      Note: The **end** and the **Ctrl-Z** commands are not supported in this mode.

```
<#root>

Switch(vlan)#

end


Switch(vlan)#

^Z


% Invalid input detected at '^' marker.

Switch(vlan)#

Swtch(vlan)#

exit


APPLY completed.
Exiting....
Switch#
```

2. Method 2. Global Configuration mode

In Cisco IOS and Cisco IOS XE global configuration mode, you can configure all VTP parameters by running the next commands:

```
<#root>

Switch#

configure terminal

Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#

vtp ?


domain     Set the name of the VTP administrative domain.
file       Configure IFS filesystem file where VTP configuration is stored.
interface  Configure interface as the preferred source for the VTP IP updater
           address.
mode       Configure VTP device mode
password   Set the password for the VTP administrative domain
pruning    Set the administrative domain to permit pruning
version    Set the administrative domain to VTP version


Switch(config)#

vtp domain ?

  WORD  The ascii name for the VTP administrative domain.

Switch(config)#

vtp domain example
```

```
Changing VTP domain name from example to example
Switch(config)#
vtp mode server
Switch(config)#
end
```

3. Run these commands in order to verify VTP operation and status:

```
<#root>
Switch#
show vtp status


VTP Version capable             : 1 to 3
VTP version running             : 2
VTP Domain Name                 : example
VTP Pruning Mode                : Disabled
VTP Traps Generation            : Disabled
Device ID                       : 6400.f13e.dc40
Configuration last modified by 10.122.190.226 at 0-0-00 00:00:00
Local updater ID is 10.122.190.226 on interface Fa1 (first layer3 interface found)

Feature VLAN:
--------------
VTP Operating Mode                : Server
Maximum VLANs supported locally   : 1005
Number of existing VLANs          : 16
Configuration Revision            : 0
MD5 digest                        : 0x0A 0xF4 0xFD 0xE9 0x99 0xD7 0xAB 0x3F
                                    0x0A 0x64 0x04 0x7C 0x42 0x98 0xD8 0xE5
Switch#

Switch#
show vtp counters


VTP statistics:
Summary advertisements received    : 0
Subset advertisements received     : 0
Request advertisements received    : 0
Summary advertisements transmitted : 0
Subset advertisements transmitted  : 0
Request advertisements transmitted : 0
Number of config revision errors   : 0
Number of config digest errors     : 0
Number of V1 summary errors        : 0


VTP pruning statistics:

Trunk            Join Transmitted Join Received    Summary advts received from
                                                   non-pruning-capable device
---------------- ---------------- ---------------- ---------------------------
Switch#
```

Practical Examples

Example 1. This example involves two Catalyst 4500 switches that are connected by a TenGigabitEthernet link:

Step 1. Switch-A is a new switch that has no VTP domain name and no user-configured VLANs. Switch-C is a switch that currently exists and runs with 16 VLANs in the VTP domain test.

Step 2. In this sample output from the **show vtp status** command, you can see that the VTP version is defaulted to 1. And Switch-A is VTP V2-capable. However, the switch does not run VTP V2 in this case. The switch only runs VTP V2 if the V2 version is configured with the **vtp version 2** command. In this example, Switch-A is configured as VTP Client. Before you connect the switch to the VTP domain,ensure that its VTP mode, version, domain name, password, and configuration revision are correct. For VTP versions 1 and 2, reset the configuration revision with a platform supported procedure and verify the revision is 0 or has a lower value than current VTP Server before connection.

<#root>

Switch-A#

show vtp status

VTP Version capable : 1 to 3

VTP version running : 1

VTP Domain Name :

VTP Pruning Mode : Disabled VTP Traps Generation : Disabled Device ID : 6400.f13e.dc40 Configurat

VTP Operating Mode : Server

Maximum VLANs supported locally : 1005 Number of existing VLANs : 5

Configuration Revision : 0

MD5 digest : 0x57 0xCD 0x40 0x65 0x63 0x59 0x47 0xBD 0x56 0x9D 0x4A 0x3E 0xA5 0x69 0x35 0xBC Swit

show vlan brief

VLAN Name Status Ports ---- --------------------------------- --------- -------------------------

Switch-C#

show vtp status

VTP Version capable : 1 to 3

VTP version running : 2

VTP Domain Name : test

```
 VTP Pruning Mode : Disabled VTP Traps Generation : Disabled Device ID : 503d.e583.3b40 Configurat
VTP Operating Mode : Server
 Maximum VLANs supported locally : 1005 Number of existing VLANs : 16
Configuration Revision : 4
 MD5 digest : 0xCB 0x67 0x2A 0xF1 0x9A 0x8D 0xD3 0x1B 0xA8 0xB3 0x89 0xB2 0x32 0x63 0xA6 0xD0 Swit
show vlan brief
 VLAN Name Status Ports ---- -------------------------------- --------- -------------------------
2 VLAN0002 active 3 VLAN0003 active 4 VLAN0004 active 5 VLAN0005 active 6 VLAN0006 active 7 VLAN00
 VLAN Name Status Ports ---- -------------------------------- --------- -------------------------
8 VLAN0008 active 9 VLAN0009 active 10 VLAN0010 active 11 VLAN0011 active 12 VLAN0012 active
 1002 fddi-default act/unsup 1003 trcrf-default act/unsup 1004 fddinet-default act/unsup 1005 trbr

Switch-A# Switch-A#
configure terminal
 Switch-A(config)#
vtp version 2
 Switch-A(config)#
vtp mode client
 Setting device to VTP Client mode for VLANS. Switch-A(config)#
end
 Switch-A#
Switch-A#
show vtp status
 VTP Version capable : 1 to 3
VTP version running : 2
 VTP Domain Name : VTP Pruning Mode : Disabled VTP Traps Generation : Disabled Device ID : 6400.f1
VTP Operating Mode : Client
 Maximum VLANs supported locally : 1005
Number of existing VLANs : 5
 Configuration Revision : 1 MD5 digest : 0xD2 0x3F 0x31 0x25 0x6D 0xD1 0x3E 0x27 0x62 0x77 0x7C 0x
```

Step 3. At this stage, a trunk was manually created between the two switches. Notice how they synchronize and watch the VTP packet exchange:



Note: Debug output increases processor and logging activity. You must run these commands in a

---

controlled environment.

<#root>

Switch-A#

debug sw-vlan vtp events

vtp events debugging is on
Switch-A#

debug sw-vlan vtp packets

vtp packets debugging is on
Switch-A#
Switch-A#

configure terminal

Enter configuration commands, one per line. End with CNTL/Z.
Switch-A(config)#

interface tenGigabitEthernet3/2

Switch-A(config-if)#

no shut

Switch-A(config-if)#

end

Switch-A#

Step 4. Switch-C sends a summary advertisement to Switch-A. Switch-A then learns the VTP domain name from it, as shown in this sample output:

<#root>

!--- On Switch-A:

*Nov 25 02:45:46.580: VTP LOG RUNTIME: switchport trunk mode on Te3/2 has changed

*Nov 25 02:45:46.580: VTP LOG RUNTIME: delaying first flood on new trunk

*Nov 25 02:45:51.100: VTP LOG RUNTIME: Summary packet received in NULL domain state

*Nov 25 02:45:51.100: VTP LOG RUNTIME:

Summary packet received, domain = test, rev = 4, followers = 0, length 80, trunk Te3/2

!--- This indicates that Switch-A has received its first summary advertisement.

*Nov 25 02:45:51.100: VTP LOG RUNTIME: Validate TLVs : #tlvs 1, max blk size 4
*Nov 25 02:45:51.100: VTP LOG RUNTIME: Validate TLVs : #00, val 6, len 4
*Nov 25 02:45:51.100:
*Nov 25 02:45:51.100: summary: 02 01 00 04 74 65 73 74 00 00 00 00 00 00 00 00 ....test........
*Nov 25 02:45:51.100: summary: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ....
*Nov 25 02:45:51.100: summary: 00 00 00 00 00 00 00 04 0A 7A BE E3 32 32 31 31 ....z>c2211
*Nov 25 02:45:51.100: summary: 32 34 31 34 30 31 31 35 8D 07 FE 82 E5 FE 49 AD 24140115..~.e~I-
*Nov 25 02:45:51.100: summary: 1A 6E A5 AB D0 35 C2 CA 00 00 00 01 06 01 00 02 .n%+P5BJ........
*Nov 25 02:45:51.100:
*Nov 25 02:45:51.108: VTP LOG RUNTIME:

Transitioning from NULL to test domain

!--- Switch-A learns the VTP domain at this stage.

Step 5. With the debug enabled, you can see that Switch-A receives a summary advertisement with no followers. Therefore, Switch-A updates its domain name and sends advertisement requests to obtain the VLAN information, as shown in this sample output:

<#root>

!--- On Switch-A

*Nov 25 02:45:51.108: VTP LOG RUNTIME: Summary packet rev 4 greater than domain test rev 0

*Nov 25 02:45:51.108: VTP LOG RUNTIME: Domain test currently not in updating state

*Nov 25 02:45:51.108: VTP LOG RUNTIME:

Summary packet with followers field zero

*Nov 25 02:45:51.108: VTP LOG RUNTIME:

Transmit vtp request, domain test, start value 0

!--- This is where the advertisement request is sent.

Step 6. Switch-C sends another summary advertisement with the followers field set to 1, which indicates that one subset advertisement follows. The subset advertisement that contains all VLANs is shown in this output. Then Switch-A configures all the VLANs:

<#root>

!--- On Switch-A:

*Nov 25 02:45:51.595: VTP LOG RUNTIME:

Summary packet received, domain = test, rev = 4, followers = 1, length 80, trunk Te3/2

!--- Switch-A has received its second summary advertisement.

!--- This configuration revision is higher than that on Switch-A.

*Nov 25 02:45:51.595: VTP LOG RUNTIME: Validate TLVs : #tlvs 1, max blk size 4 *Nov 25 02:45:51.595: VTP LOG RUNTIME: Validate TL

Subset packet received, domain = test, rev = 4, seq = 1, length = 420

!--- Switch-A has received its subset advertisement.

*Nov 25 02:45:51.596: subset: 02 02 01 04 74 65 73 74 00 00 00 00 00 00 00 00 ....test..... *Nov 25 02:45:51.596: subset: 00 00 00 00 00 00 00 0

Step 7. At this point, both switches are synchronized:

<#root>

Switch-A#

show vtp status

```
VTP Version capable             : 1 to 3
```

VTP version running : 2

VTP Domain Name : test

```
VTP Pruning Mode                : Disabled
VTP Traps Generation            : Disabled
Device ID                       : 6400.f13e.dc40
Configuration last modified by 10.122.190.227 at 11-24-22 14:01:15

Feature VLAN:
--------------
```

VTP Operating Mode : Client

```
Maximum VLANs supported locally   : 1005
```

Number of existing VLANs : 16

Configuration Revision : 4

```
MD5 digest                        : 0x8D 0x07 0xFE 0x82 0xE5 0xFE 0x49 0xAD
                                    0x1A 0x6E 0xA5 0xAB 0xD0 0x35 0xC2 0xCA
Switch-A#
```

show vlan brief

```
VLAN Name                              Status    Ports
```

```
---- -------------------------------- --------- -------------------------------
1    default                          active    Gi1/1, Gi1/2, Gi1/4, Gi1/5
                                                Gi1/6, Gi1/7, Gi1/8, Gi1/9
                                                Gi1/10, Gi1/11, Gi1/12, Gi1/13
                                                Gi1/14, Gi1/15, Gi1/16, Gi1/17
                                                Gi1/18, Gi1/19, Gi1/20, Gi1/21
                                                Gi1/22, Gi1/23, Gi1/24, Gi1/25
                                                Gi1/26, Gi1/27, Gi1/28, Gi1/29
                                                Gi1/30, Gi1/31, Gi1/32, Gi1/33
                                                Gi1/34, Gi1/35, Gi1/36, Gi1/37
                                                Gi1/38, Gi1/39, Gi1/40, Gi1/41
                                                Gi1/42, Gi1/43, Gi1/44, Gi1/45
                                                Gi1/46, Gi1/47, Gi1/48, Te3/3
                                                Te3/4, Te3/5, Te3/6, Te3/7
                                                Te3/8

2 VLAN0002 active 3 VLAN0003 active 4 VLAN0004 active 5 VLAN0005 active 6 VLAN0006 active 7 VLAN00


VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------

8 VLAN0008 active 9 VLAN0009 active 10 VLAN0010 active 11 VLAN0011 active 12 VLAN0012 active


1002 fddi-default                     act/unsup
1003 trcrf-default                    act/unsup
1004 fddinet-default                  act/unsup
1005 trbrf-default                    act/unsup
```

Note: Disable the VTP debug conditions with the **undebug all** command after you collect the required output, and verify that debugging is no longer active.

Example 2. This example shows how to verify the VTP version running and Configuration Revision number:

<#root>

Switch#

show vtp status

```
VTP Version capable             : 1 to 3

VTP version running : 2

VTP Domain Name                 : Lab_Network
VTP Pruning Mode                : Disabled (Operationally Disabled)
VTP Traps Generation            : Disabled
Device ID                       : f87a.41a8.ca00
Configuration last modified by 10.10.10.2 at 8-17-26 20:47:55
Local updater ID is 10.10.10.2 on interface Vl10 (lowest numbered VLAN interface found)
```

```
Feature VLAN:
--------------
VTP Operating Mode                : Server
Maximum VLANs supported locally   : 1005
Number of existing VLANs          : 6

Configuration Revision : 1

MD5 digest                        : 0xFD 0x47 0xA0 0x3D 0x02 0x88 0x96 0x04
                                    0x52 0xDE 0x4D 0x51 0x6A 0x5E 0xEC 0x49
```

Example 3. This example shows how to display VTP statistics:

<#root>

Swtich#

show vtp counters

```
VTP statistics:
Summary advertisements received    : 0
Subset advertisements received     : 0
Request advertisements received    : 0
Summary advertisements transmitted : 2
Subset advertisements transmitted  : 2

Request advertisements transmitted : 10

Number of config revision errors   : 0
Number of config digest errors     : 0
Number of V1 summary errors        : 0

VTP pruning statistics:

Trunk            Join Transmitted Join Received    Summary advts received from
                                                   non-pruning-capable device
---------------- ---------------- ---------------- ---------------------------
Te1/1/6             0                0                0
```

Related Information

- Virtual LANs/VLAN Trunking Protocol (VLANs/VTP)
- IP Routing
- Cisco IOS Configuration Fundamentals Command Reference
- Cisco Technical Support & Downloads
- Configure VLAN Trunk Protocol (VTP)