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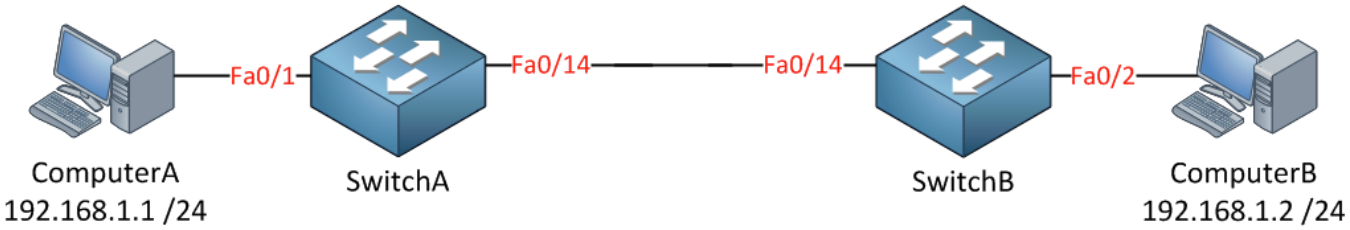
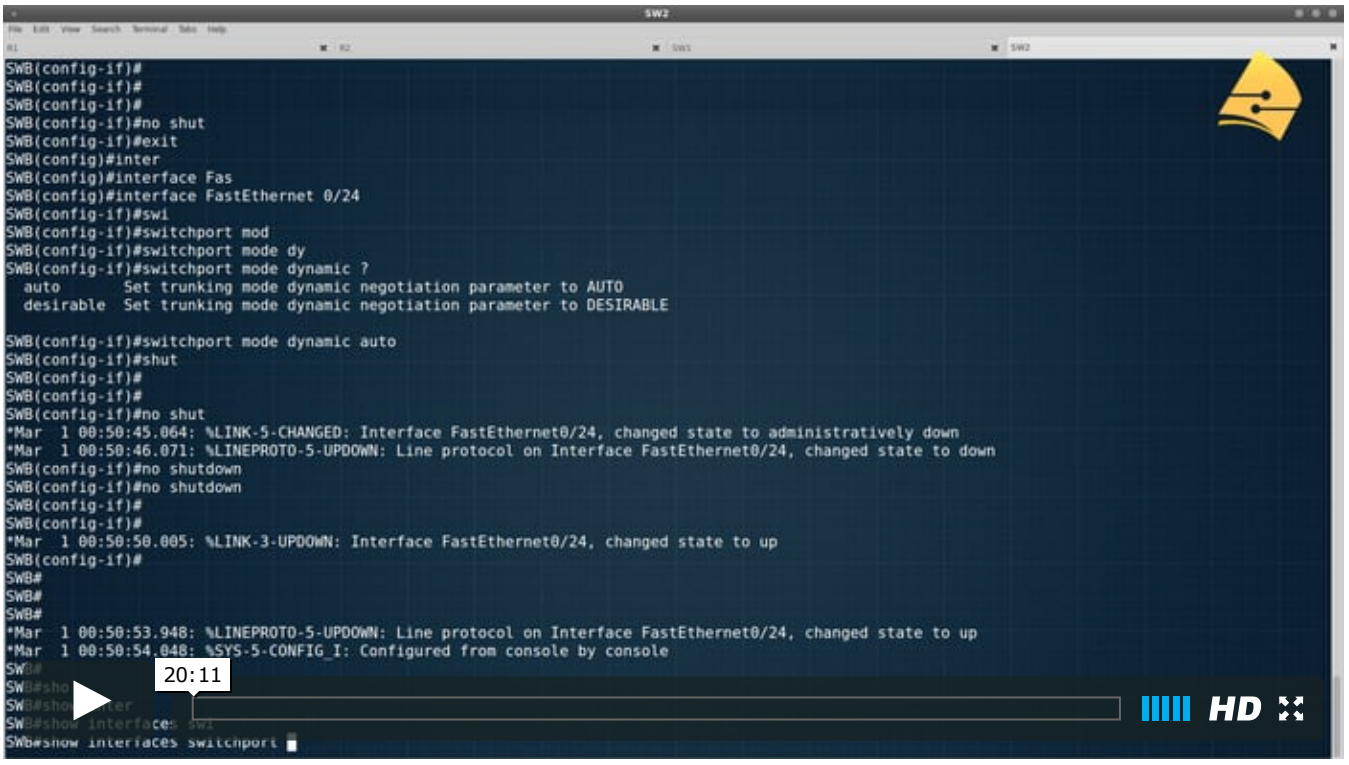
How to configure trunk on Cisco Catalyst Switch

19 votes

Trunks are required to carry VLAN traffic from one switch to another. In this article I will demonstrate how to configure a trunk between Cisco Catalyst switches. Let me show you the topology that we'll use:



Above you see a topology with a computer connected to each switch. We'll put the computers in the same VLAN and create a trunk between the two switches.



Let's start by creating a VLAN:

```
SwitchA(config)#vlan 50
SwitchA(config-vlan)#name Computers
SwitchA(config-vlan)#exit
```

```
SwitchB(config)#vlan 50
SwitchB(config-vlan)#name Computers
SwitchB(config-vlan)#exit
```

And let's put the interfaces connected to the computers in the correct VLAN:

```
SwitchA(config)#interface fa0/1
SwitchA(config-if)#switchport access vlan 50
```

```
SwitchB(config)#interface fa0/2
SwitchB(config-if)#switchport access vlan 50
```

The next step is to create a trunk between the two switches. Technically the interfaces between the two switches can also be in access mode right now because I only have a single VLAN.

```
SwitchA(config)#interface fa0/14
SwitchA(config-if)#switchport mode trunk
Command rejected: An interface whose trunk encapsulation is "Auto" can not be
configured to "trunk" mode.
```

```
SwitchB(config)#interface fa0/14
SwitchB(config-if)#switchport mode trunk
Command rejected: An interface whose trunk encapsulation is "Auto" can not be
configured to "trunk" mode.
```

I try to change the interface to trunk mode with the **switchport mode trunk** command. Depending on the switch model you might see the same error as me. If we want to change the interface to trunk mode we need to change the trunk encapsulation type. Let's see what options we have:

```
SwitchA(config-if)#switchport trunk encapsulation ?
  dot1q      Interface uses only 802.1q trunking encapsulation when trunking
  isl        Interface uses only ISL trunking encapsulation when trunking
  negotiate  Device will negotiate trunking encapsulation with peer on
interface
```

This is where you can choose between 802.1Q or ISL encapsulation. By default our switch will negotiate about the trunk encapsulation type.

```
SwitchA(config-if)#switchport trunk encapsulation dot1q
```

```
SwitchB(config-if)#switchport trunk encapsulation dot1q
```

Let"s change it to 802.1Q by using the **switchport trunk encapsulation** command.

```
SwitchA#show interfaces fa0/14 switchport
Name: Fa0/14
Switchport: Enabled
Administrative Mode: dynamic auto
Operational Mode: static access
Administrative Trunking Encapsulation: dot1q
```

```
SwitchB#show interfaces fa0/14 switchport
Name: Fa0/14
Switchport: Enabled
Administrative Mode: dynamic auto
Operational Mode: static access
Administrative Trunking Encapsulation: dot1q
```

As you can see the trunk encapsulation is now 802.1Q.

```
SwitchA(config)#interface fa0/14
SwitchA(config-if)#switchport mode trunk
```

```
SwitchB(config)#interface fa0/14
SwitchB(config-if)#switchport mode trunk
```

Now I can successfully change the switchport mode to trunk.

```
SwitchA#show interfaces fa0/14 switchport
Name: Fa0/14
Switchport: Enabled Administrative Mode: trunk Operational Mode: trunk
Administrative Trunking Encapsulation: dot1q
Operational Trunking Encapsulation: dot1q
```

```
SwitchB#show interfaces fa0/14 switchport
```

```
Name: Fa0/14
Switchport: Enabled Administrative Mode: trunk Operational Mode: trunk
Administrative Trunking Encapsulation: dot1q
Operational Trunking Encapsulation: dot1q
```

We can confirm we have a trunk because the operational mode is “dot1q”.

Let‟s try if ComputerA and ComputerB can reach each other:

```
C:\Documents and Settings\ComputerA>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Excellent! ComputerA and ComputerB can reach each other! Does this mean we are done? Not quite yet...there‟s more I want to show to you:

```
SwitchB#show vlan
VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
-
1    default                          active    Fa0/1, Fa0/3, Fa0/4, Fa0/5
                                                Fa0/6, Fa0/7, Fa0/8, Fa0/9
                                                Fa0/10, Fa0/11, Fa0/12, Fa0/13
                                                Fa0/15, Fa0/22, Fa0/23, Fa0/24
                                                Gi0/1, Gi0/2
50   Computers                        active    Fa0/2
```

First of all, if we use the show vlan command we don't see the Fa0/14 interface. This is completely normal because the show vlan command **only shows interfaces in access mode** and **no trunk interfaces**.

```
SwitchB#show interface fa0/14 trunk
Port        Mode             Encapsulation  Status        Native vlan
Fa0/14      on               802.1q         trunking      1
Port        Vlans allowed on trunk
Fa0/14      1-4094
Port        Vlans allowed and active in management domain
Fa0/14      1,50
Port        Vlans in spanning tree forwarding state and not pruned
Fa0/14      50
```

The **show interface trunk** command is very useful. You can see if an interface is in trunk mode, which trunk encapsulation protocol it is using (802.1Q or ISL) and what the native VLAN is. We can also see that VLAN 1 – 4094 are allowed on this trunk.

We can also see that currently only VLAN 1 (native VLAN) and VLAN 50 are active. Last but not least you can see something which VLANs are in the forwarding state for spanning-tree.

Before we continue with the configuration of VTP I want to show you one more thing about access and trunk interfaces:

```
SwitchB#show interface fa0/2 switchport
Name: Fa0/2
Switchport: Enabled
Administrative Mode: static access
Operational Mode: static access
```

An interface can be in access mode or in trunk mode. The interface above is connected to ComputerB and you can see that the operational mode is "static access" which means it's in access mode.

```
SwitchB#show interfaces fa0/14 switchport
Name: Fa0/14
Switchport: Enabled
Administrative Mode: trunk
```

```
Operational Mode: trunk
```

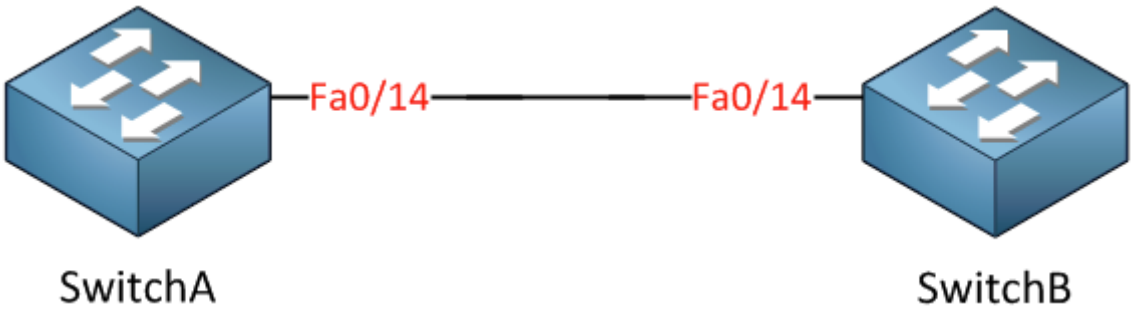
This is our trunk interface which is connected to SwitchA. You can see the operational mode is trunk mode.

```
SwitchB(config-if)#switchport mode ?
  access        Set trunking mode to ACCESS unconditionally
  dot1q-tunnel  set trunking mode to TUNNEL unconditionally
  dynamic       Set trunking mode to dynamically negotiate access or trunk
  private-vlan  Set private-vlan mode
  trunk         Set trunking mode to TRUNK unconditionally
```

If I go to the interface configuration to change the switchport mode you can see I have more options than access or trunk mode. There is also a **dynamic** method. Don't worry about the other options for now.

```
SwitchB(config-if)#switchport mode dynamic ?
  auto       Set trunking mode dynamic negotiation parameter to AUTO
  desirable  Set trunking mode dynamic negotiation parameter to DESIRABLE
```

We can choose between **dynamic auto** and **dynamic desirable.** Our switch will automatically find out if the interface should become an access or trunk port. So what's the difference between dynamic auto and dynamic desirable? Let's find out!



I'm going to play with the switchport mode on SwitchA and SwitchB and we'll see what the result will be.

```
SwitchA(config)#interface fa0/14
SwitchA(config-if)#switchport mode dynamic auto
```

```
SwitchA(config)#interface fa0/14
SwitchB(config-if)#switchport mode dynamic auto
```

First I'll change both interfaces to dynamic auto.

```
SwitchA(config-if)#do show interface f0/14 switchport
Name: Fa0/14
Switchport: Enabled
Administrative Mode: dynamic auto
Operational Mode: static access
```

```
SwitchB(config-if)#do show interface f0/14 switchport
Name: Fa0/14
Switchport: Enabled
Administrative Mode: dynamic auto
Operational Mode: static access
```

Our administrative mode is dynamic auto and as a result we now have an access port.

```
SwitchA(config)#interface fa0/14
SwitchA(config-if)#switchport mode dynamic desirable
```

```
SwitchB(config)#interface fa0/14
SwitchB(config-if)#switchport mode dynamic desirable
```

```
SwitchA#show interfaces fa0/14 switchport
Name: Fa0/14
Switchport: Enabled
Administrative Mode: dynamic desirable
Operational Mode: trunk
```

```
SwitchB#show interfaces fa0/14 switchport
Name: Fa0/14
Switchport: Enabled
Administrative Mode: dynamic desirable
```

```
Operational Mode: trunk
```

Once we change both interfaces to dynamic desirable we end up with a trunk link. What do you think will happen if we mix the switchport types? Maybe dynamic auto on one side and dynamic desirable on the other side? Let's find out!

```
SwitchA(config)#interface fa0/14
SwitchA(config-if)#switchport mode dynamic desirable
```

```
SwitchB(config)#interface fa0/14
SwitchB(config-if)#switchport mode dynamic auto
```

```
SwitchA#show interfaces f0/14 switchport
Name: Fa0/14
Switchport: Enabled
Administrative Mode: dynamic desirable
Operational Mode: trunk
```

```
SwitchB#show interfaces fa0/14 switchport
Name: Fa0/14
Switchport: Enabled
Administrative Mode: dynamic auto
Operational Mode: trunk
```

It seems our switch has a strong desire to become a trunk. Let's see what happens with other combinations!

```
SwitchA(config)#interface fa0/14
SwitchA(config-if)#switchport mode dynamic auto
```

```
SwitchB(config)#interface fa0/14
SwitchB(config-if)#switchport mode trunk
```

```
SwitchA#show interfaces f0/14 switchport
```

```
Name: Fa0/14
Switchport: Enabled
Administrative Mode: dynamic auto
Operational Mode: trunk
```

```
SwitchB#show interfaces fa0/14 switchport
Name: Fa0/14
Switchport: Enabled
Administrative Mode: trunk
Operational Mode: trunk
```

Dynamic auto will prefer to become an access port but if the other interface has been configured as trunk we will end up with a trunk.

```
SwitchA(config)#interface fa0/14
SwitchA(config-if)#switchport mode dynamic auto
```

```
SwitchB(config)#interface fa0/14
SwitchB(config-if)#switchport mode access
```

```
SwitchA#show interfaces f0/14 switchport
Name: Fa0/14
Switchport: Enabled
Administrative Mode: dynamic auto
Operational Mode: static access
```

```
SwitchB#show interfaces fa0/14 switchport
Name: Fa0/14
Switchport: Enabled
Administrative Mode: static access
Operational Mode: static access
```

Configuring one side as dynamic auto and the other one as access and the result will be an access port.

```
SwitchA(config)#interface fa0/14
SwitchA(config-if)#switchport mode dynamic desirable
```

```
SwitchB(config)#interface fa0/14
SwitchB(config-if)#switchport mode trunk
```

```
SwitchA#show interfaces f0/14 switchport
Name: Fa0/14
Switchport: Enabled
Administrative Mode: dynamic desirable
Operational Mode: trunk
```

```
SwitchB#show interfaces fa0/14 switchport
Name: Fa0/14
Switchport: Enabled
Administrative Mode: trunk
Operational Mode: trunk
```

Dynamic desirable and trunk mode offers us a working trunk.

What do you think will happen if I set one interface in access mode and the other one as trunk? Doesn't sound like a good idea but let's push our luck:

```
SwitchA(config)#interface fa0/14
SwitchA(config-if)#switchport mode access
```

```
SwitchB(config)#interface fa0/14
SwitchB(config-if)#switchport mode trunk
```

```
SwitchA#show interfaces f0/14 switchport
Name: Fa0/14
Switchport: Enabled
Administrative Mode: static access
Operational Mode: trunk
```

```
SwitchB#show interfaces fa0/14 switchport
Name: Fa0/14
Switchport: Enabled
Administrative Mode: trunk
Operational Mode: trunk
```

```
SwitchA#
%SPANTREE-7-RECV_1Q_NON_TRUNK: Received 802.1Q BPDU on non trunk
FastEthernet0/14 VLAN1.
%SPANTREE-7-BLOCK_PORT_TYPE: Blocking FastEthernet0/14 on VLAN0001.
Inconsistent port type.
%SPANTREE-2-UNBLOCK_CONSIST_PORT: Unblocking FastEthernet0/14 on VLAN0001.
Port consistency restored.
```

As soon as I change the switchport mode I see these spanning-tree error messages on SwitchA. Spanning-tree is a protocol that runs on switches that prevents loops in our network.

Let me give you an overview of the different switchport modes and the result:

	Trunk	Access	Dynamic Auto	Dynamic Desirable
Trunk	Trunk	Limited	Trunk	Trunk
Access	Limited	Access	Access	Access
Dynamic Auto	Trunk	Access	Access	Trunk
Dynamic Desirable	Trunk	Access	Trunk	Trunk

That's all I have for you now about trunking. I hope this was useful to you. It's best if you try some of these commands on your own switches so that you become familiar with the different commands. If you enjoyed this article, please leave a comment or share it with your friends!

Want to take a look for yourself? Here you will find the configuration of each device.

SwitchA

```
hostname SwitchA
!
vlan 50
 name Computers
!
interface FastEthernet0/1
 switchport access vlan 50
!
interface FastEthernet0/14
 switchport mode trunk
 switchport trunk encapsulation dot1q
!
end
```

SwitchB

```
hostname SwitchB
!
vlan 50
 name Computers
!
interface FastEthernet0/2
 switchport access vlan 50
!
interface FastEthernet0/14
 switchport mode trunk
 switchport trunk encapsulation dot1q
!
end
```

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- August 3, 2013 at 22:33 #15319 Reply

Aseel
You have a very unique way of explaining, Clear and direct to the point. I am very grateful.
Thank you

August 11, 2013 at 19:19 #15320 Reply

kareem mohamed
I really appreciate your efforts 🙂

August 25, 2014 at 09:59 #15321 Reply

Idris

Hi ,
Im following you LAB but i would like to know how to change the Operational Mode status .
Every times i would like to change it , it doesn't work .

#sh int Fa0/21 switchport
Name: Fa0/21
Switchport: Enabled
Administrative Mode: trunk
Operational Mode: down <—
Administrative Trunking Encapsulation: dot1q
Negotiation of Trunking: Off
Access Mode VLAN: 50 (TesteIMO(NOTOUCH))
Trunking Native Mode VLAN: 1 (default)
Voice VLAN: none

Thanks for your help .

February 18, 2015 at 11:29 #15322 Reply

bharathi n
Member
Can u check whether u made it no shut?

April 23, 2015 at 00:26 #15323 Reply

RAJAGOPAL K
Participant
Please clarify how to interpret the table you listed in the page below with different modes

April 28, 2015 at 14:40 #15324 Reply

Rene Molenaar
Keymaster
The horizontal values are for "switch 1" and the vertical values for "switch 2".

For example, if you use "dynamic auto" on switch 1 and 2 then the result will be access mode.

May 29, 2015 at 08:43 #15325 Reply

Srinivasan C
Participant
Hi Rene,
Network operators knows which ports are connected to switch and hosts. They can configure access mode or trunk mode accordingly.
Why do we need Dynamic access and Dynamic auto ? In what scenario we use it in production network?

Thanks,
SV

May 29, 2015 at 08:49 #15326 Reply

Rene Molenaar
Keymaster
Hi SV,

I can't think of any good reason to use dynamic auto or desirable. It's best always to use static access or trunk mode.

Rene

May 29, 2015 at 10:07 #15327 Reply

Srinivasan C
Participant
Hi Rene,
Thanks for your quick reply!

-SV

October 10, 2015 at 13:27 #17966 Reply

Frades

Participant
Rene, question, on your last compare example, its static access and static trunk, the result was trunk on both sides, so its a working trunk port? but on your table that you created, the Static Trunk and Static Access has a “Limited” value. care to explain why its Limited? and what does it do on the switch?

October 11, 2015 at 10:08 #17976 Reply

Rene Molenaar
Keymaster
Hi John,

When you mix access and trunk mode, we get to see this message:

```
SwitchA#
%SPANTREE-7-RECV_1Q_NON_TRUNK: Received 802.1Q BPDU on non trunk FastEthernet0/14
VLAN1.
%SPANTREE-7-BLOCK_PORT_TYPE: Blocking FastEthernet0/14 on VLAN0001. Inconsistent
port type.
%SPANTREE-2-UNBLOCK_CONSIST_PORT: Unblocking FastEthernet0/14 on VLAN0001. Port
consistency restored.
```

The trunk will send BPDUs for each VLAN, our access mode interface only sends one BPDU so that’s why CDP reports this error. This won’t be a working trunk but I think the access mode VLAN (VLAN1) will work.

I’d have to give this a try to see if it works.

Rene

November 22, 2015 at 05:50 #19850 Reply

Faisal A
Participant
Thanks .

It’s awesome.

November 23, 2015 at 03:20 #19855 Reply

Donald S
Participant
Rene

how do you turn trunk negotiation back on?

November 23, 2015 at 11:52 #19858 Reply

Rene Molenaar
Keymaster
Hi Donald,

“switchport nonegotiate” disabled it and “no switchport nonegotiate” enables it again.

Rene

December 27, 2015 at 14:40 #20481 Reply

Inderpal K
Participant
Hi Rene

Please can you advise what I can do, I am trying to create vlan 50 on this switch and keep getting following

```
SW1(config)#vlan 50
VTP VLAN configuration not allowed when device is not the primary server for
vlan database.
```

```
SW1#sh vtp status
VTP Version : 3 (capable)
VTP version running : 3
VTP Domain Name : CCIE-domain
VTP Pruning Mode : Disabled (Operationally Disabled)
VTP Traps Generation : Disabled
Device ID : aabb.cc00.0700
```

```
Feature VLAN:
--------------
VTP Operating Mode : Server
Number of existing VLANs : 8
Number of existing extended VLANs : 0
Configuration Revision : 0
Primary ID : 0000.0000.0000
Primary Description :
MD5 digest : 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00
Feature MST:
--------------
VTP Operating Mode : Transparent
Feature UNKNOWN:
--------------
VTP Operating Mode : Transparent
```

I tried deleting vlan.dat but to no avail

Thanks

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