

Content Switching Module for Server Load Balancing and Direct Access to Real Servers Configuration Example

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Introduction

The Content Switching Module (CSM) can be added to a Catalyst 6500 with a Multilayer Switch Feature Card (MSFC) that runs Native IOS. This module allows ultimate performance when load balancing traffic to multiple servers or firewalls.

Typically, direct access to the servers is not available when you use a CSM. However, this configuration uses individual IP addresses in order to directly reach the servers. This configuration also shows load-balance connections to servers via the virtual address.

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

The information in this document is based on these software and hardware versions:

- Cisco IOS[®] Software Version 12.1(11b)E1
- Catalyst 6000
- ROM: System Bootstrap, Version 12.0(3)XE, Release Software
- BOOTLDR: MSFC Software (C6MSFC-BOOT-M), Version 12.1(3a)E4, Early Deployment Release Software (fc1)

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.

Conventions

Refer to the Cisco Technical Tips Conventions for more information on document conventions.

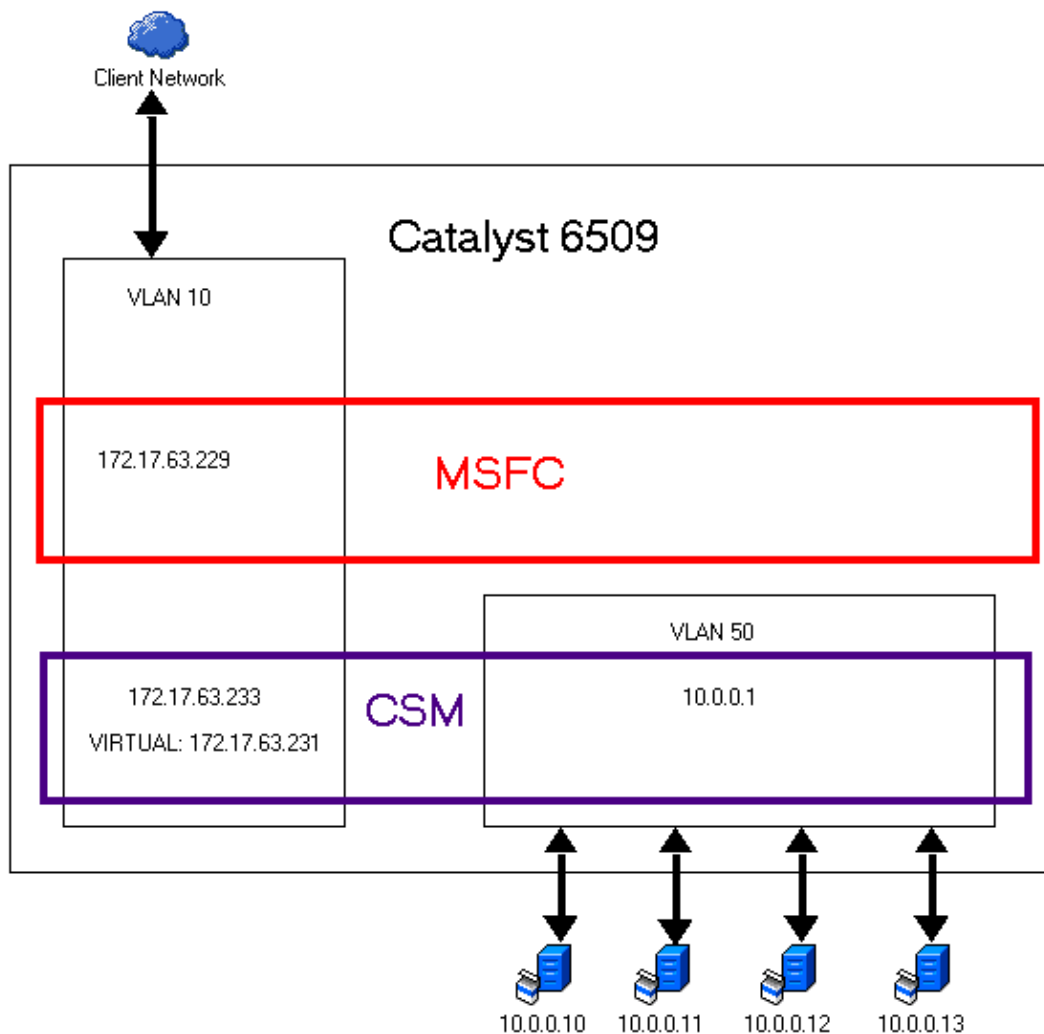
Configure

In this section, you are presented with the information to configure the features described in this document.

Use the Command Lookup Tool (registered customers only) to obtain more information on the commands used in this section.

Network Diagram

This document uses this network setup:



Configuration

In order to complete this configuration, follow these steps:

1. Configure VLANs on the switch.

```
Router#vlan database
```

```

Router(vlan)#vlan 10
VLAN 10 added:
    Name: VLAN0010
Router(vlan)#vlan 50
VLAN 50 added:
    Name: VLAN0050
Router(vlan)#exit
APPLY completed.
Exiting...

```

2. Configure ports on the switch.

```

Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int fa 4/1
Router(config-if)#switchport
Router(config-if)#switchport access vlan 10
Router(config-if)#no shut
Router(config-if)#int fa 4/46
Router(config-if)#switchport
Router(config-if)#switchport access vlan 50
Router(config-if)#no shut
Router(config-if)#int fa 4/47
Router(config-if)#switchport
Router(config-if)#switchport access vlan 50
Router(config-if)#no shut
Router(config-if)#int fa 4/48
Router(config-if)#switchport
Router(config-if)#switchport access vlan 50
Router(config-if)#no shut
Router(config-if)#int fa 4/45
Router(config-if)#switchport
Router(config-if)#switchport access vlan 50
Router(config-if)#no shut
Router(config-if)#exit

```

3. Configure interface VLAN on MSFC for the client VLAN.

```

Router(config-if)#interface vlan 10
Router(config-if)#ip address 172.17.63.229 255.255.255.192
Router(config-if)#no shut
Router(config-if)#exit

```

4. Configure routing on the MSFC.

```

Router(config)#ip route 10.0.0.0 255.255.255.0 172.17.63.233
Router(config)#ip route 0.0.0.0 0.0.0.0 172.17.63.193
Router(config)#

```

5. Configure the CSM server VLAN.

```

Router(config)#module csm 3
Router(config-module-csm)#vlan 50 server
Route(config-slb-vlan-server)#ip address 10.0.0.1 255.255.255.0
Route(config-slb-vlan-server)#gateway 172.17.63.229

```

6. Configure the CSM client VLAN by configuring the IP address and gateway.

```

Route(config-slb-vlan-server)#vlan 10 client
Route(config-slb-vlan-client)#ip address 172.17.63.233 255.255.255.192
Route(config-slb-vlan-client)#gateway 172.17.63.229
Route(config-slb-vlan-client)#exit
Router(config-slb-sfarm)#

```

7. Configure serverfarm for direct-access.

```

Router(config-module-csm)#serverfarm SERVER-SUBNETS
Router(config-slb-sfarm)#predictor forward
Router(config-slb-sfarm)#exit

```

8. Configure vserver for direct-access.

```
Router(config-module-csm)#vserver DIRECT-ACCESS
Router(config-slb-vserver)#virtual 10.0.0.0 255.255.255.0 any
Router(config-slb-vserver)#serverfarm SERVER-SUBNETS
Router(config-slb-vserver)#inservice
Router(config-slb-vserver)#exit
Router(config-module-csm)#exit
```

9. Configure serverfarm for servers.

```
Router(config-module-csm)#serverfarm SERVERS
Router(config-slb-sfarm)#nat server
Router(config-slb-sfarm)#no nat client
Router(config-slb-sfarm)#real 10.0.0.10
Router(config-slb-real)#inservice
Router(config-slb-real)#real 10.0.0.11
Router(config-slb-real)#inservice
Router(config-slb-real)#real 10.0.0.12
Router(config-slb-real)#inservice
Router(config-slb-real)#real 10.0.0.13
Router(config-slb-real)#inservice
Router(config-slb-real)#exit
```

10. Configure vserver for load-balanced traffic.

```
Router(config-slb-sfarm)#vserver MYSITE
Router(config-slb-vserver)#virtual 172.17.63.231 any
Router(config-slb-vserver)#serverfarm SERVERS
Router(config-slb-vserver)#inservice
Router(config-slb-vserver)#exit
Router(config-module-csm)#serverfarm SERVER-SUBNETS
Router(config-slb-sfarm)#predictor forward
Router(config-slb-sfarm)#exit
Router(config-module-csm)#exit
Router(config)#exit
Router#wr mem
Building configuration...

01:44:58: %SYS-5-CONFIG_I: Configured from console by console[OK]
```

Verify

Use this section to confirm that your configuration works properly.

1. View the configuration.

```
Router#show run
Building configuration...

Current configuration : 4071 bytes
!
version 12.1
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Router
!
boot bootldr bootflash:c6msfc-boot-mz.121-3a.E4
!
redundancy
  main-cpu
  auto-sync standard
ip subnet-zero
```

```
!  
!  
!  
mls qos statistics-export interval 300  
mls qos statistics-export delimiter |  
module ContentSwitchingModule 3  
  vlan 50 server  
    ip address 10.0.0.1 255.255.255.0  
!  
  vlan 10 client  
    ip address 172.17.63.233 255.255.255.192  
    gateway 172.17.63.229  
!  
  serverfarm SERVER-SUBNETS  
    nat server  
    no nat client  
    predictor forward  
!  
  serverfarm SERVERS  
nat server  
  no nat client  
  real 10.0.0.10  
  inservice  
  real 10.0.0.11  
  inservice  
  real 10.0.0.12  
  inservice  
  real 10.0.0.13  
  inservice  
!  
vserver DIRECT-ACCESS  
  virtual 10.0.0.0 255.255.255.0 any  
  serverfarm SERVER-SUBNETS  
  persistent rebalance  
  inservice  
!  
vserver MYSITE  
  virtual 172.17.63.231 any  
  serverfarm SERVERS  
  persistent rebalance  
  inservice  
!  
!  
!  
!  
interface GigabitEthernet1/1  
  no ip address  
  shutdown  
!  
interface GigabitEthernet1/2  
  no ip address  
  shutdown  
!  
interface FastEthernet4/1  
  no ip address  
  switchport  
  switchport access vlan 10  
!  
interface FastEthernet4/2  
  no ip address  
  shutdown  
!  
interface FastEthernet4/3  
  no ip address  
  shutdown  
!
```

```

!
--- output suppressed ---
!
!
interface FastEthernet4/43
 no ip address
 shutdown
!
interface FastEthernet4/44
 no ip address
 shutdown
!
interface FastEthernet4/45
 no ip address
 switchport
 switchport access vlan 50
!
interface FastEthernet4/46
 no ip address
 switchport
 switchport access vlan 50
!
interface FastEthernet4/47
 no ip address
 switchport
 switchport access vlan 50
!
interface FastEthernet4/48
 no ip address
 switchport
 switchport access vlan 50
!
interface Vlan1
 no ip address
 shutdown
!
interface Vlan10
 ip address 172.17.63.229 255.255.255.192
!
ip classless
ip route 0.0.0.0 0.0.0.0 172.17.63.193
ip route 10.0.0.0 255.255.255.0 172.17.63.233
no ip http server
!
!
!
line con 0
line vty 0 4
!
end

```

2. Verify that the VLANs are configured on the switch processor.

```

Router#show vlan

```

VLAN	Name	Status	Ports
1	default	active	
1002	fddi-default	active	
1003	token-ring-default	active	
1004	fddinet-default	active	
1005	trnet-default	active	

VLAN	Type	SAID	MTU	Parent	RingNo	BridgeNo	Stp	BrdgMode	Trans1	Trans2
1	enet	100001	1500	-	-	-	-	-	0	0

```

1002 fddi 101002 1500 - - - - - 0 0
1003 tr 101003 1500 - - - - - 0 0
1004 fdnet 101004 1500 - - - - ieee - 0 0
1005 trnet 101005 1500 - - - - ibm - 0 0

```

```

Primary Secondary Type Ports
-----

```

Router#

3. Verify that modules are in their proper slots.

Router# **show module**

```

Mod Ports Card Type Model Serial No.
-----
1 2 Cat 6k sup 1 Enhanced QoS (Active) WS-X6K-SUP1A-2GE SAD05020E10
3 0 SLB Application Processor Complex WS-X6066-SLB-APC SAD051102E1
4 48 48 port 10/100 mb RJ45 WS-X6348-RJ-45 SAL05073TGR

```

```

Mod MAC addresses Hw Fw Sw Status
-----
1 0001.c9b0.3b6c to 0001.c9b0.3b6d 7.0 5.4(2) 7.2(0.35) Ok
3 0030.f271.5d28 to 0030.f271.5d2f 1.2 2.2(2a) Ok
4 0004.de83.4530 to 0004.de83.455f 2.0 5.4(2) 7.2(0.35) Ok

```

```

Mod Sub-Module Model Serial Hw Status
-----
1 Policy Feature Card WS-F6K-PFC SAD05020NYT 1.1 Ok
1 MSFC Cat6k daughterboard WS-F6K-MSFC SAD05020B9A 1.4 Ok

```

4. Check your REALs.

Router#**show modu csm 3 reals**

```

real server farm weight state conns
-----
10.0.0.10 SERVERS 8 OPERATIONAL 0
10.0.0.11 SERVERS 8 OPERATIONAL 0
10.0.0.12 SERVERS 8 OPERATIONAL 0
10.0.0.13 SERVERS 8 FAILED 0

```

Router#

5. Check your vservers.

Router#**show module csm 3 vservers**

```

slb vserver prot virtual vlan state conns
-----
DIRECT-ACCESS any 10.0.0.0/24:0 ALL OPERATIONAL 0
MYSITE any 172.17.63.231/32:0 ALL OPERATIONAL 1

```

Router#**show module csm 3 ?**

```

arp SLB arp cache listing
capp SLB Content Application Peering Protocol information
conns SLB connection information
dfp SLB DFP manager information
ft SLB ft information
map SLB map information
memory SLB memory information
natpools SLB client nat pool information
policy SLB policy information
probe SLB probe information
reals SLB real server information
serverfarms SLB server farm information
static SLB static server NAT information
stats SLB Statistics
status SLB status information
sticky SLB sticky database
tech-support SLB tech debug information

```

vlan SLB vlan information
vservers SLB virtual server information

6. Check for connections on the CSM.

```
Router#show module csm 3 conns
```

	prot	vlan	source	destination	state
In	TCP	10	171.71.78.140:53141	172.17.63.231:23	ESTAB
Out	TCP	50	10.0.0.11:23	171.71.78.140:53141	ESTAB
In	UDP	50	10.0.0.11:1130	192.168.1.1:161	ESTAB
Out	UDP	10	192.168.1.1:161	10.0.0.11:1130	ESTAB

7. Check the statistics on the module.

```
Router#show module csm 3 stats
```

```
Connections Created:      6
Connections Destroyed:   5
Connections Current:     1
Connections Timed-Out:   0
Connections Failed:      0
Server initiated Connections:
    Created: 13, Current: 0, Failed: 13
L4 Load-Balanced Decisions: 18
L4 Rejected Connections:  1
L7 Load-Balanced Decisions: 0
L7 Rejected Connections:
    Total: 0, Parser: 0,
    Reached max parse len: 0, Cookie out of mem: 0,
    Cfg version mismatch: 0, Bad SSL2 format: 0
L4/L7 Rejected Connections:
    No policy: 0, No policy match 0,
    No real: 1, ACL denied 0,
    Server initiated: 0
Checksum Failures: IP: 0, TCP: 0
Redirect Connections: 0, Redirect Dropped: 0
FTP Connections:      0
MAC Frames:
    Tx: Unicast: 709, Multicast: 0, Broadcast: 155,
    Underflow Errors: 0
    Rx: Unicast: 723, Multicast: 1433, Broadcast: 83,
    Overflow Errors: 0, CRC Errors: 0
```

8. Check for additional details on serverfarms.

```
Router#show module csm 3 serverfarms detail
```

```
SERVER-SUBNETS, predictor = Forward, nat = SERVER
    virtuals inservice: 1, reals = 0, bind id = 0, fail action = none
    inband health config: <none>
    retcode map = <none>
    Total connections = 0
```

```
SERVERS, predictor = RoundRobin, nat = SERVER
    virtuals inservice: 1, reals = 4, bind id = 0, fail action = none
    inband health config: <none>
    retcode map = <none>
    Real servers:
        10.0.0.10, weight = 8, OPERATIONAL, conns = 0
        10.0.0.11, weight = 8, OPERATIONAL, conns = 0
        10.0.0.12, weight = 8, OPERATIONAL, conns = 0
        10.0.0.13, weight = 8, FAILED, conns = 0
    Total connections = 0
```

```
Router#
```

```
Router#show module csm 3 conns ?
```

```
client conns associated with a specific client IP address
```



```
detail    Detailed output
vserver  conns associated with a specific vserver
|        Output modifiers
<cr>
```

9. Check for additional details on vservers.

```
Router#show module csm 3 vservers detail
DIRECT-ACCESS, state = OPERATIONAL, v_index = 10
virtual = 10.0.0.0/24:0, any, service = NONE, advertise = FALSE
idle = 3600, replicate csrp = none, vlan = ALL, pending = 30
max parse len = 600, persist rebalance = TRUE
conns = 1, total conns = 1
Default policy:
  server farm = SERVER-SUBNETS
  sticky: timer = 0, subnet = 0.0.0.0, group id = 0
Policy          Tot Conn      Client pkts  Server pkts
-----
(default)       1             27           19

MYSITE, state = OPERATIONAL, v_index = 11
virtual = 172.17.63.231/32:0, any, service = NONE, advertise = FALSE
idle = 3600, replicate csrp = none, vlan = ALL, pending = 30
max parse len = 600, persist rebalance = TRUE
conns = 0, total conns = 8
Default policy:
  server farm = SERVERS
  sticky: timer = 0, subnet = 0.0.0.0, group id = 0
Policy          Tot Conn      Client pkts  Server pkts
-----
(default)       8             539          405
```

Troubleshoot

There is currently no specific troubleshooting information available for this configuration.

Related Information

- [Content Switching Module Products & Services](#)
- [Cisco CSS 11000 Series Content Services Switches](#)
- [Cisco CSS 11500 Series Content Services Switches](#)
- [Technical Support & Documentation – Cisco Systems](#)

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