



コンフィギュレーション例

この付録の各例では、設定に関連する部分のみを示しています。レイヤ 2 およびレイヤ 3 Catalyst スイッチの設定の一部が含まれる場合もあります。コメント行は # で始まります。 **configuration terminal** コマンドを入力して、コンフィギュレーションモードが開始されると、コメント行を設定にペーストすることができます。

vlan コマンドを使用して、スイッチ上の Content Switching Module (CSM; コンテントスイッチングモジュール) の設定で使用されるすべての VLAN (仮想 LAN) が作成されていることを確認します。

MSFC によるクライアント側のルータ モードの設定

ここでは、ルータ モードを設定する設定パラメータの例を示します。

```
module ContentSwitchingModule 5
vlan 220 server
  ip address 10.20.220.2 255.255.255.0
  alias 10.20.220.1 255.255.255.0

# The servers' default gateway is the alias IP address
# Alias IP addresses are needed any time that you are
# configuring a redundant system.
# However, it is a good practice to always use a
# alias IP address so that a standby CSM can easily
# be added without changes to the IP addressing scheme

!
vlan 221 client
  ip address 10.20.221.5 255.255.255.0
  gateway 10.20.221.1

# The CSM default gateway in this config is the
# MSFC IP address on that VLAN

!
serverfarm WEBFARM
  nat server
  no nat client
  real 10.20.220.10
  inservice
  real 10.20.220.20
  inservice
  real 10.20.220.30
  no inservice

!
vserver WEB
  virtual 10.20.221.100 tcp www
  serverfarm WEBFARM
  persistent rebalance
  inservice

# "persistence rebalance" is effective ONLY when performing
# L7 load balancing (parsing of URLs, cookies, header, ...)
# and only for HTTP 1.1 connections.
# It tells the CSM to parse and eventually make a new
# load balancing decision for each GET within the same
# TCP connection.

interface FastEthernet2/2
  no ip address
  switchport
  switchport access vlan 220

# The above is the port that connects to the real servers

interface FastEthernet2/24
  ip address 10.20.1.1 255.255.255.0

# The above is the interface that connects to the client side network

interface Vlan221
  ip address 10.20.221.1 255.255.255.0

# The above is the MSFC interface for the internal VLAN used
# for MSFC-CSM communication
```

show コマンドの出力

```
Cat6k-2# show module csm 5 arp
```

Internet Address	Physical Interface	VLAN	Type	Status
10.20.220.1	00-02-FC-E1-68-EB	220	-ALIAS-	local
10.20.220.2	00-02-FC-E1-68-EC	220	--SLB--	local
10.20.220.10	00-D0-B7-A0-81-D8	220	REAL	up(0 misses)
10.20.221.1	00-02-FC-CB-70-0A	221	GATEWAY	up(0 misses)
10.20.221.5	00-02-FC-E1-68-EC	221	--SLB--	local
10.20.220.20	00-D0-B7-A0-81-D8	220	REAL	up(0 misses)
10.20.220.30	00-D0-B7-A0-81-D8	220	REAL	up(0 misses)
10.20.221.100	00-02-FC-E1-68-EB	0	VSERVER	local

```
Cat6k-2# show module csm 5 vlan detail
```

vlan	IP address	IP mask	type
220	10.20.220.2	255.255.255.0	SERVER
ALIASES			
	IP address	IP mask	
	10.20.220.1	255.255.255.0	
221	10.20.221.5	255.255.255.0	CLIENT
GATEWAYS			
	10.20.221.1		

```
Cat6k-2#
```

```
Cat6k-2# show module csm 5 real
```

real	server farm	weight	state	conns/hits
10.20.220.10	WEBFARM	8	OPERATIONAL	0
10.20.220.20	WEBFARM	8	OPERATIONAL	0
10.20.220.30	WEBFARM	8	OUTOFSERVICE	0

```
Cat6k-2#
```

```
Cat6k-2# show module csm 5 real detail
```

```
10.20.220.10, WEBFARM, state = OPERATIONAL
  conns = 0, maxconns = 4294967295, minconns = 0
  weight = 8, weight(admin) = 8, metric = 0, remainder = 0
  total conns established = 5, total conn failures = 0
10.20.220.20, WEBFARM, state = OPERATIONAL
  conns = 0, maxconns = 4294967295, minconns = 0
  weight = 8, weight(admin) = 8, metric = 0, remainder = 0
  total conns established = 5, total conn failures = 0
10.20.220.30, WEBFARM, state = OUTOFSERVICE
  conns = 0, maxconns = 4294967295, minconns = 0
  weight = 8, weight(admin) = 8, metric = 0, remainder = 0
  total conns established = 0, total conn failures = 0
```

```
Cat6k-2#
```

```
Cat6k-2# show module csm 5 vsrver detail
```

```
WEB, type = SLB, state = OPERATIONAL, v_index = 17
  virtual = 10.20.221.100/32:80 bidir, TCP, service = NONE, advertise = FALSE
  idle = 3600, replicate csrp = none, vlan = ALL, pending = 30, layer 4
  max parse len = 2000, persist rebalance = TRUE
  ssl sticky offset = 0, length = 32
  conns = 0, total conns = 10
Default policy:
  server farm = WEBFARM, backup = <not assigned>
  sticky: timer = 0, subnet = 0.0.0.0, group id = 0
Policy          Tot matches  Client pkts  Server pkts
-----
(default)       10           50           50
```

```
Cat6k-2#
Cat6k-2# show module csm 5 stats
Connections Created:      28
Connections Destroyed:   28
Connections Current:     0
Connections Timed-Out:   0
Connections Failed:      0
Server initiated Connections:
    Created: 0, Current: 0, Failed: 0
L4 Load-Balanced Decisions: 27
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: 1, No policy match 0,
    No real: 0, 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: 345, Multicast: 5, Broadcast: 25844,
    Underflow Errors: 0
    Rx: Unicast: 1841, Multicast: 448118, Broadcast: 17,
    Overflow Errors: 0, CRC Errors: 0
```

MSFC によるクライアント側のブリッジ モードの設定

ここでは、ブリッジモードを設定する設定パラメータの例を示します。

```

module ContentSwitchingModule 5
  vlan 221 client
    ip address 10.20.220.2 255.255.255.0
    gateway 10.20.220.1
  !
  vlan 220 server
    ip address 10.20.220.2 255.255.255.0

# Two VLANs with the same IP address are bridged together.

!
serverfarm WEBFARM
  nat server
  no nat client
  real 10.20.220.10
  inservice
  real 10.20.220.20
  inservice
  real 10.20.220.30
  no inservice
!
vserver WEB
  virtual 10.20.220.100 tcp www
  serverfarm WEBFARM
  persistent rebalance
  inservice

interface FastEthernet2/2
  no ip address
  switchport
  switchport access vlan 220

# The above is the port that connects to the real servers

interface FastEthernet2/24
  ip address 10.20.1.1 255.255.255.0

# The above is the MSFC interface that connects to the client side network

interface Vlan221
  ip address 10.20.220.1 255.255.255.0

# The above is the MSFC interface for the internal VLAN used
# for MSFC-CSM communication.
# The servers use this IP address as their default gateway
# since the CSM is bridging between the client and server VLANs

```

show コマンドの出力

```
Cat6k-2# show module csm 5 arp
```

Internet Address	Physical Interface	VLAN	Type	Status
10.20.220.1	00-02-FC-CB-70-0A	221	GATEWAY	up(0 misses)
10.20.220.2	00-02-FC-E1-68-EC	221/220	--SLB--	local
10.20.220.10	00-D0-B7-A0-81-D8	220	REAL	up(0 misses)
10.20.220.20	00-D0-B7-A0-81-D8	220	REAL	up(0 misses)
10.20.220.30	00-D0-B7-A0-81-D8	220	REAL	up(0 misses)
10.20.220.100	00-02-FC-E1-68-EB	0	VSERVER	local

プローブの設定

ここでは、プローブを設定する設定パラメータの例を示します。

```

module ContentSwitchingModule 5
  vlan 220 server
    ip address 10.20.220.2 255.255.255.0
    alias 10.20.220.1 255.255.255.0
  !
  vlan 221 client
    ip address 10.20.221.5 255.255.255.0
    gateway 10.20.221.1
  !
  probe PING icmp
    interval 5
    failed 10
    receive 4

# Interval between the probes is 5 seconds for healthy servers
# while it is 10 seconds for failed servers.
# The servers need to reply within 4 seconds.

!
  probe TCP tcp
    interval 5
    failed 10
    open 4

# The servers need to open the TCP connection within 4 seconds.

!
  probe HTTP http
    request method head url /probe/http_probe.html
    expect status 200 299
    interval 20
    port 80

# The port for the probe is inherited from the vservers.
# The port is necessary in this case, since the same farm
# is serving a vserver on port 80 and one on port 23.
# If the "port 80" parameter is removed, the HTTP probe
# will be sent out on both ports 80 and 23, thus failing
# on port 23 which does not serve HTTP requests.

  probe PING-SERVER-30 icmp
    interval 5
    failed 10
  !
  serverfarm WEBFARM
    nat server
    no nat client
    real 10.20.220.10
    inservice
    real 10.20.220.20
    inservice
    real 10.20.220.30
    health probe PING-SERVER-30
    inservice
    probe PING
    probe TCP
    probe HTTP
  !
  vserver TELNET
    virtual 10.20.221.100 tcp telnet
    serverfarm WEBFARM
    persistent rebalance
    inservice
  !

```

```

vserver WEB
  virtual 10.20.221.100 tcp www
  serverfarm WEBFARM
  persistent rebalance
  inservice
!

```

show コマンドの出力

Cat6k-2# **show module csm 5 probe**

probe	type	port	interval	retries	failed	open	receive
PING	icmp		5	3	10		4
TCP	tcp		5	3	10	4	
HTTP	http	80	20	3	300	10	10
PING-SERVER-30	icmp		5	3	10		10

Cat6k-2# **show module csm 5 probe detail**

probe	type	port	interval	retries	failed	open	receive
PING	icmp		5	3	10		4
real		vserver		serverfarm		policy	status
10.20.220.30:80	WEB	WEBFARM	(default)	OPERABLE			
10.20.220.20:80	WEB	WEBFARM	(default)	OPERABLE			
10.20.220.10:80	WEB	WEBFARM	(default)	OPERABLE			
10.20.220.30:23	TELNET	WEBFARM	(default)	OPERABLE			
10.20.220.20:23	TELNET	WEBFARM	(default)	OPERABLE			
10.20.220.10:23	TELNET	WEBFARM	(default)	OPERABLE			
TCP	tcp		5	3	10	4	
real		vserver		serverfarm		policy	status
10.20.220.30:80	WEB	WEBFARM	(default)	OPERABLE			
10.20.220.20:80	WEB	WEBFARM	(default)	OPERABLE			
10.20.220.10:80	WEB	WEBFARM	(default)	OPERABLE			
10.20.220.30:23	TELNET	WEBFARM	(default)	OPERABLE			
10.20.220.20:23	TELNET	WEBFARM	(default)	OPERABLE			
10.20.220.10:23	TELNET	WEBFARM	(default)	OPERABLE			
HTTP	http	80	20	3	300	10	10
Probe Request: HEAD /probe/http_probe.html							
Expected Status Codes:							
200 to 299							
real		vserver		serverfarm		policy	status
10.20.220.30:80	WEB	WEBFARM	(default)	OPERABLE			
10.20.220.20:80	WEB	WEBFARM	(default)	FAILED			
10.20.220.10:80	WEB	WEBFARM	(default)	OPERABLE			
10.20.220.30:80	TELNET	WEBFARM	(default)	OPERABLE			
10.20.220.20:80	TELNET	WEBFARM	(default)	FAILED			
10.20.220.10:80	TELNET	WEBFARM	(default)	OPERABLE			
PING-SERVER-30	icmp		5	3	10		10
real		vserver		serverfarm		policy	status
10.20.220.30:80	WEB	WEBFARM	(default)	OPERABLE			
10.20.220.30:23	TELNET	WEBFARM	(default)	OPERABLE			

Cat6k-2# **show module csm 5 real**

real	server farm	weight	state	conns/hits
10.20.220.10	WEBFARM	8	OPERATIONAL	0
10.20.220.20	WEBFARM	8	PROBE_FAILED	0
10.20.220.30	WEBFARM	8	OPERATIONAL	0

サーバを送信元とする VIP への接続用の送信元 NAT の設定

この例では、サーバが、クライアントのアクセス先と同じ VIP アドレスへのオープン接続を持つ状況を示します。サーバが、サーバどうしでバランスを保つために、送信元 Network Address Translation (NAT; ネットワークアドレス変換) が必要となります。送信元 NAT を設定するには、仮想サーバコンフィギュレーションで **vlan** パラメータを使用して、接続が開始される VLAN を識別します。次に、異なるサーバファームを使用して、サーバを送信元とする接続を処理します。このサーバファーム用に、送信元 NAT が設定されます。送信元 NAT は、クライアントを送信元とする接続には使用されないため、サーバは実クライアントの IP アドレスを記録することができます。



(注) 同じ VLAN 内に位置する送信元および宛先サーバが、サーバ間でロードバランスされた接続をサポートする必要がある場合は、同様の設定を使用する必要があります。

```

module ContentSwitchingModule 5
  vlan 220 server
    ip address 10.20.220.2 255.255.255.0
    alias 10.20.220.1 255.255.255.0
  !
  vlan 221 client
    ip address 10.20.221.5 255.255.255.0
    gateway 10.20.221.1
  !
  natpool POOL-1 10.20.220.99 10.20.220.99 netmask 255.255.255.0
  !
  serverfarm FARM
    nat server
    no nat client
    real 10.20.220.10
      inservice
    real 10.20.220.20
      inservice
    real 10.20.220.30
      inservice
  !
  serverfarm FARM2
    nat server
    nat client POOL-1
    real 10.20.220.10
      inservice
    real 10.20.220.20
      inservice
    real 10.20.220.30
      inservice
  !
  vserver FROM-CLIENTS
    virtual 10.20.221.100 tcp telnet
    vlan 221
    serverfarm FARM
    persistent rebalance
    inservice
  !
  vserver FROM-SERVERS
    virtual 10.20.221.100 tcp telnet
    vlan 220
    serverfarm FARM2
    persistent rebalance
    inservice

```


show コマンドの出力

```
Cat6k-2# show module csm 5 vser
vserver          type  prot virtual          vlan state      conns
-----
FROM-CLIENTS    SLB   TCP  10.20.221.100/32:23  221 OPERATIONAL  1
FROM-SERVERS    SLB   TCP  10.20.221.100/32:23  220 OPERATIONAL  1
```

```
Cat6k-2# show module csm 5 conn detail
```

```

      prot vlan source          destination          state
-----
In  TCP  220  10.20.220.10:32858  10.20.221.100:23    ESTAB
Out TCP  220  10.20.220.20:23     10.20.220.99:8193   ESTAB
    vs = FROM-SERVERS, ftp = No, csrp = False

In  TCP  221  10.20.1.100:42443   10.20.221.100:23    ESTAB
Out TCP  220  10.20.220.10:23     10.20.1.100:42443   ESTAB
    vs = FROM-CLIENTS, ftp = No, csrp = False
```

```
# The command shows the open connections and how they are translated.
#
# For each connection, both halves of the connection are shown.
# The output for the second half of each connection
# swaps the source and destination IP:port.
#
# The connection originated by server 10.20.220.10 is source-NAT'ed
# and source-PAT'ed (also its L4 source port needs to be translated)
# Its source IP changes from 10.20.220.10 to 10.20.220.99
# Its source L4 port changes from 32858 to 8193
```

```
Cat6k-2# show module csm 5 real
```

```

real          server farm  weight  state      conns/hits
-----
10.20.220.10  FARM        8       OPERATIONAL  1
10.20.220.20  FARM        8       OPERATIONAL  0
10.20.220.30  FARM        8       OPERATIONAL  0
10.20.220.10  FARM2       8       OPERATIONAL  0
10.20.220.20  FARM2       8       OPERATIONAL  1
10.20.220.30  FARM2       8       OPERATIONAL  0
```

```
Cat6k-2# show module csm 5 natpool
nat client POOL-1 10.20.220.99 10.20.220.99 netmask 255.255.255.0
```

```
Cat6k-2# show module csm 5 serverfarm
```

```

server farm    type  predictor  nat  reals  redirect  bind id
-----
FARM           SLB   RoundRobin S    3      0        0
FARM2          SLB   RoundRobin S,C  3      0        0
```

セッションの持続性（スティッキ性）の設定

ここでは、セッションの持続性またはスティッキ性を設定する設定パラメータの例を示します。

```

module ContentSwitchingModule 5
  vlan 220 server
    ip address 10.20.220.2 255.255.255.0
    alias 10.20.220.1 255.255.255.0
  !
  vlan 221 client
    ip address 10.20.221.5 255.255.255.0
    gateway 10.20.221.1
  !
  serverfarm WEBFARM
    nat server
    no nat client
    real 10.20.220.10
      inservice
    real 10.20.220.20
      inservice
    real 10.20.220.30
      inservice
  !
  sticky 10 netmask 255.255.255.255 timeout 20
  !
  sticky 20 cookie yourname timeout 30
  !
  vserver TELNET
    virtual 10.20.221.100 tcp telnet
    serverfarm WEBFARM
    persistent rebalance
    inservice
  !
  vserver WEB1
    virtual 10.20.221.101 tcp www
    serverfarm WEBFARM
    sticky 20 group 10
    persistent rebalance
    inservice
  !
  vserver WEB2
    virtual 10.20.221.102 tcp www
    serverfarm WEBFARM
    sticky 30 group 20
    persistent rebalance
    inservice
  !

```

show コマンドの出力

```
Cat6k-2# show module csm 5 sticky group 10
```

group	sticky-data	real	timeout
10	ip 10.20.1.100	10.20.220.10	793

```
Cat6k-2# show module csm 5 sticky group 20
```

group	sticky-data	real	timeout
20	cookie 4C656B72:861F0395	10.20.220.20	1597

```
Cat6k-2# show module csm 5 sticky
```

group	sticky-data	real	timeout
20	cookie 4C656B72:861F0395	10.20.220.20	1584
10	ip 10.20.1.100	10.20.220.10	778

ルータ モードでのサーバへのダイレクト アクセスの設定

ここでは、ルータ モードを使用して、バックエンドサーバにダイレクト アクセスを行う仮想サーバの設定例を示します。



(注) ルータ モードでは、仮想サーバがヒットしない接続はいずれも廃棄されます。

```
module ContentSwitchingModule 5
  vlan 220 server
    ip address 10.20.220.2 255.255.255.0
    alias 10.20.220.1 255.255.255.0
  !
  vlan 221 client
    ip address 10.20.221.5 255.255.255.0
    gateway 10.20.221.1
    alias 10.20.221.2 255.255.255.0

  # The alias IP is only required in redundant configurations
  # This is the IP address that the upstream router (the MSFC
  # in this case) will use as next-hop to reach the
  # backend servers
  # See below for the static route added for this purpose.
  #
  !
  serverfarm ROUTE
    no nat server
    no nat client
    predictor forward

  #
  # This serverfarm is not load balancing, but is simply
  # routing the traffic according to the CSM routing tables
  # The CSM routing table in this example is very simple,
  # there is just a default gateway and 2 directly attached
  # subnets.
  #
  # The "no nat server" is very important, since you do not
  # want to rewrite the destination IP address when
  # forwarding the traffic.

  !
  serverfarm WEBFARM
    nat server
    no nat client
    real 10.20.220.10
    inservice
    real 10.20.220.20
    inservice
  !
  vserver DIRECT-ACCESS
    virtual 10.20.220.0 255.255.255.0 tcp 0
    serverfarm ROUTE
    persistent rebalance
    inservice

  # This vserver is listening to all TCP connections destined to the
  # serverfarm IP subnet.
  # Note: ping to the backend servers will not work with this example

  !
```

```

vserver WEB
  virtual 10.20.221.100 tcp www
  serverfarm WEBFARM
  persistent rebalance
  inservice

interface Vlan221
  ip address 10.20.221.1 255.255.255.0

# vlan221 is the L3 interface on the MSFC that connects to the CSM
# Client requests are being routed by the MSFC, from its other
# interfaces (not shown in this example) to vlan221.

!
ip classless
ip route 10.20.220.0 255.255.255.0 10.20.221.2

# This static route is necessary to allow the MSFC to reach
# the backend servers.

```

show コマンドの出力

```
Cat6k-2# show module csm 5 conn detail
```

```

      prot vlan source                destination                state
-----
In  TCP   221   10.20.1.100:44268                10.20.220.10:23          ESTAB
Out TCP   220   10.20.220.10:23                10.20.1.100:44268      ESTAB
      vs = DIRECT-ACCESS, ftp = No, csrp = False

```

```

# The information displayed shows that the CSM is not rewriting any IP addresses while
# forwarding the connection from VLAN 221 (client) to VLAN 220 (server) This connection
has
# been created because it was destined to the virtual server DIRECT-ACCESS.

```

```
Cat6k-2# show module csm 5 vsserver detail
```

```

WEB, type = SLB, state = OPERATIONAL, v_index = 14
  virtual = 10.20.221.100/32:80 bidir, TCP, service = NONE, advertise = FALSE
  idle = 3600, replicate csrp = none, vlan = ALL, pending = 30, layer 4
  max parse len = 2000, persist rebalance = TRUE
  ssl sticky offset = 0, length = 32
  conns = 0, total conns = 0
Default policy:
  server farm = WEBFARM, backup = <not assigned>
  sticky: timer = 0, subnet = 0.0.0.0, group id = 0
Policy          Tot matches Client pkts  Server pkts
-----
(default)       0             0           0

```

```

DIRECT-ACCESS, type = SLB, state = OPERATIONAL, v_index = 15
  virtual = 10.20.220.0/24:0 bidir, TCP, service = NONE, advertise = FALSE
  idle = 3600, replicate csrp = none, vlan = ALL, pending = 30, layer 4
  max parse len = 2000, persist rebalance = TRUE
  ssl sticky offset = 0, length = 32
  conns = 1, total conns = 1
Default policy:
  server farm = ROUTE, backup = <not assigned>
  sticky: timer = 0, subnet = 0.0.0.0, group id = 0
Policy          Tot matches Client pkts  Server pkts
-----
(default)       1             48          35

```

サーバ間のロードバランシングされた接続の設定

ここでは、3つの VLAN（1つのクライアント VLAN および2つのサーバ VLAN）による CSM の設定例を示します。この設定では、サーバ間でロードバランシングされた接続が許可されます。送信元および宛先サーバは、異なる VLAN 内にあるため、送信元 NAT は必要ありません。

```
module ContentSwitchingModule 5
  vlan 220 server
    ip address 10.20.220.2 255.255.255.0
    alias 10.20.220.1 255.255.255.0
  !
  vlan 221 client
    ip address 10.20.221.5 255.255.255.0
    gateway 10.20.221.1
  !
  vlan 210 server
    ip address 10.20.210.2 255.255.255.0
    alias 10.20.210.1 255.255.255.0
  !
  serverfarm TIER-1
    nat server
    no nat client
    real 10.20.210.10
    inservice
    real 10.20.210.20
    inservice
  !
  serverfarm TIER-2
    nat server
    no nat client
    real 10.20.220.10
    inservice
    real 10.20.220.20
    inservice
  !
  vserver VIP1
    virtual 10.20.221.100 tcp telnet
    vlan 221
    serverfarm TIER-1
    persistent rebalance
    inservice
  !
  vserver VIP2
    virtual 10.20.210.100 tcp telnet
    vlan 210
    serverfarm TIER-2
    persistent rebalance
    inservice
  !
```

show コマンドの出力

Cat6k-2# show module csm 5 arp

Internet Address	Physical Interface	VLAN	Type	Status
10.20.210.1	00-02-FC-E1-68-EB	210	-ALIAS-	local
10.20.210.2	00-02-FC-E1-68-EC	210	--SLB--	local
10.20.210.10	00-D0-B7-A0-68-5D	210	REAL	up(0 misses)
10.20.210.20	00-D0-B7-A0-68-5D	210	REAL	up(0 misses)
10.20.220.1	00-02-FC-E1-68-EB	220	-ALIAS-	local
10.20.220.2	00-02-FC-E1-68-EC	220	--SLB--	local
10.20.210.100	00-02-FC-E1-68-EB	0	VSERVER	local
10.20.220.10	00-D0-B7-A0-81-D8	220	REAL	up(0 misses)
10.20.221.1	00-02-FC-CB-70-0A	221	GATEWAY	up(0 misses)
10.20.221.5	00-02-FC-E1-68-EC	221	--SLB--	local
10.20.220.20	00-D0-B7-A0-81-D8	220	REAL	up(0 misses)
10.20.221.100	00-02-FC-E1-68-EB	0	VSERVER	local

Cat6k-2# show module csm 5 vser

vserver	type	prot	virtual	vlan	state	conns
VIP1	SLB	TCP	10.20.221.100/32:23	221	OPERATIONAL	1
VIP2	SLB	TCP	10.20.210.100/32:23	210	OPERATIONAL	1

Cat6k-2# show module csm 5 conn detail

prot	vlan	source	destination	state
In	TCP	221 10.20.1.100:44240	10.20.221.100:23	ESTAB
Out	TCP	210 10.20.210.10:23	10.20.1.100:44240	ESTAB
vs = VIP1, ftp = No, csrp = False				
In	TCP	210 10.20.210.10:45885	10.20.210.100:23	ESTAB
Out	TCP	220 10.20.220.10:23	10.20.210.10:45885	ESTAB
vs = VIP2, ftp = No, csrp = False				

The previous command shows a connection opened from a client coming in from VLAN 221
 # (client is 10.20.1.100). That connection goes to virtual IP address 1 (VIP1) and is
 # balanced to 10.20.210.10. Another connection is opened from server 10.20.210.10,
 # goes to
 # VIP2 and is balanced to 10.20.220.10

RHI の設定

CSM はいずれの IP サブネットにおいても、仮想サーバをサポートします。仮想サーバが、Multilayer Switch Feature Card (MSFC; マルチレイヤ スイッチ フィーチャ カード) と直接接続していないサブネット内で設定される場合は、この仮想サーバを処理するサーバファームの状態に応じて、スタティック ルートを MSFC ルーティング テーブルに注入するよう CSM を設定できます。

また、このメカニズムを障害の回復または Global Server Load Balancing (GSLB; グローバル サーバ ロード バランシング) ソリューションにも使用することができます。この場合、2 つの異なる CSM が同じ VIP のスタティック ルートを注入します。スタティック ルートは、結果的に異なるコストで、特定の位置に再配分できます。

```
module ContentSwitchingModule 5
  vlan 220 server
    ip address 10.20.220.2 255.255.255.0
    alias 10.20.220.1 255.255.255.0
  !
  vlan 221 client
    ip address 10.20.221.5 255.255.255.0
    gateway 10.20.221.1
    alias 10.20.221.2 255.255.255.0
```

エリアス IP は、CSM がアドバタイズされた仮想サーバに到達するために、ネクストホップとして使用するよう MSFC に指示する IP のため、非常に重要です。

```
!
probe PING icmp
  interval 2
  retries 2
  failed 10
  receive 2
!
serverfarm WEBFARM
  nat server
  no nat client
  real 10.20.220.10
  inservice
  real 10.20.220.20
  inservice
  probe PING
!
vserver WEB
  virtual 10.20.250.100 tcp www
  vlan 221

# By default, a virtual server listens to traffic coming in on any VLAN. You can
# restrict
# access to a virtual server by defining a specific VLAN. When using Route Health
# Injection, it is required to specify the VLAN for the virtual server. This tells the
# CSM
# which next-hop it needs to program in the static route that it will inject in the
# MSFC
# routing tables.

serverfarm WEBFARM
  advertise active

# This is the command that tells the CSM to inject the route for this virtual server.
# The
# option "active" tells the CSM to remove the route if the backend serverfarm fails.

persistent rebalance
  inservice
```

show コマンドの出力

```

Cat6k-2# show module csm 5 probe detail
probe          type    port interval retries failed open  receive
-----
PING           icmp      2      2      10      2
real          vserver  serverfarm  policy  status
-----
10.20.220.20:80  WEB      WEBFARM  (default)  OPERABLE
10.20.220.10:80  WEB      WEBFARM  (default)  OPERABLE

Cat6k-2# show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 10.20.1.100 to network 0.0.0.0

      10.0.0.0/8 is variably subnetted, 8 subnets, 3 masks
C       10.21.1.0/24 is directly connected, Vlan21
S       10.20.250.100/32 [1/0] via 10.20.221.2, Vlan221

# The static route to 10.20.250.100 has been automatically created by the CSM, since
both
# servers were healthy.

C       10.20.221.0/24 is directly connected, Vlan221
S*    0.0.0.0/0 [1/0] via 10.30.1.100

Cat6k-2# show module csm 5 vser detail
WEB, type = SLB, state = OPERATIONAL, v_index = 14
virtual = 10.20.250.100/32:80 bidir, TCP, service = NONE, advertise = TRUE
idle = 3600, replicate csrp = none, vlan = 221, pending = 30, layer 4
max parse len = 2000, persist rebalance = TRUE
ssl sticky offset = 0, length = 32
conns = 0, total conns = 6
Default policy:
  server farm = WEBFARM, backup = <not assigned>
  sticky: timer = 0, subnet = 0.0.0.0, group id = 0
Policy          Tot matches  Client pkts  Server pkts
-----
(default)        6           36           30

# Failing the servers causes the route to be removed This behaviour is configured with
the
# advertise active command.

Cat6k-2# show module csm 5 probe detail
1d20h: %SYS-5-CONFIG_I: Configured from console by vty0 (probe detail
probe          type    port interval retries failed open  receive
-----
PING           icmp      2      2      10      2
real          vserver  serverfarm  policy  status
-----
10.20.220.20:80  WEB      WEBFARM  (default)  TESTING
10.20.220.10:80  WEB      WEBFARM  (default)  TESTING

Cat6k-2#
1d20h: %CSM_SLB-6-RSERVERSTATE: Module 5 server state changed: SLB-NETMGT: ICMP health
probe failed for server 10.20.220.20:80 in serverfarm 'WEBFARM'
1d20h: %CSM_SLB-6-RSERVERSTATE: Module 5 server state changed: SLB-NETMGT: ICMP health
probe failed for server 10.20.220.10:80 in serverfarm 'WEBFARM'

```



```
\Cat6k-2#
Cat6k-2# show module csm 5 probe detail
probe          type      port  interval  retries  failed  open  receive
-----
PING           icmp          2      2         10         2         2
  real          vserver      serverfarm  policy      status
-----
10.20.220.20:80  WEB          WEBFARM  (default)  FAILED
10.20.220.10:80  WEB          WEBFARM  (default)  FAILED
Cat6k-2#

Cat6k-2# show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 10.20.1.100 to network 0.0.0.0
 10.0.0.0/8 is variably subnetted, 8 subnets, 3 masks
C       10.21.1.0/24 is directly connected, Vlan21
C       10.20.221.0/24 is directly connected, Vlan221
S*    0.0.0.0/0 [1/0] via 10.30.1.100
```

サーバ名の設定

ここでは、サーバ名を使用してサーバとサーバファームを関連付ける別の方法を示します。この方法は、複数のサーバファームに同一のサーバを関連付ける場合に適しています。ユーザが、1つのコマンドだけでサーバをすべてのサーバファームのローテーションから外すことができるからです。

```
module ContentSwitchingModule 5
vlan 220 server
  ip address 10.20.220.2 255.255.255.0
  alias 10.20.220.1 255.255.255.0
!
vlan 221 client
  ip address 10.20.221.5 255.255.255.0
  gateway 10.20.221.1
  alias 10.20.221.2 255.255.255.0
!
probe PING icmp
  interval 2
  retries 2
  failed 10
  receive 2
!
probe FTP ftp
  interval 5
  retries 2
  failed 20
  open 3
  receive 3
!
probe HTTP http
  request method head
  expect status 200 299
  interval 5
  retries 2
  failed 10
  open 2
  receive 2
!
real SERVER1
  address 10.20.220.10
  inservice
real SERVER2
  address 10.20.220.20
  inservice
!
serverfarm FTPFARM
  nat server
  no nat client
  real name SERVER1
  inservice
  real name SERVER2
  inservice
  probe PING
  probe FTP
!
serverfarm WEBFARM
  nat server
  no nat client
  real name SERVER1
  inservice
  real name SERVER2
  inservice
  probe PING
  probe HTTP
!
```

```

vserver FTP
  virtual 10.20.221.100 tcp ftp service ftp
  serverfarm FTPFARM
  persistent rebalance
  inservice
!
vserver WEB
  virtual 10.20.221.100 tcp www
  serverfarm WEBFARM
  persistent rebalance
  inservice
!

```

show コマンドの出力

```
Cat6k-2# show module csm 5 probe detail
```

probe	type	port	interval	retries	failed	open	receive
PING	icmp		2	2	10		2
real		vserver		serverfarm		policy	status
10.20.220.20:21	FTP			FTPFARM		(default)	OPERABLE
10.20.220.10:21	FTP			FTPFARM		(default)	OPERABLE
10.20.220.20:80	WEB			WEBFARM		(default)	OPERABLE
10.20.220.10:80	WEB			WEBFARM		(default)	OPERABLE
FTP	ftp		5	2	20	3	3
Expected Status Codes:							
0 to 999							
real		vserver		serverfarm		policy	status
10.20.220.20:21	FTP			FTPFARM		(default)	OPERABLE
10.20.220.10:21	FTP			FTPFARM		(default)	OPERABLE
HTTP	http		5	2	10	2	2
Probe Request: HEAD /							
Expected Status Codes:							
200 to 299							
real		vserver		serverfarm		policy	status
10.20.220.20:80	WEB			WEBFARM		(default)	OPERABLE
10.20.220.10:80	WEB			WEBFARM		(default)	OPERABLE

```
Cat6k-2# show module csm 5 real
```

real	server farm	weight	state	conns/hits
SERVER1	FTPFARM	8	OPERATIONAL	0
SERVER2	FTPFARM	8	OPERATIONAL	0
SERVER1	WEBFARM	8	OPERATIONAL	0
SERVER2	WEBFARM	8	OPERATIONAL	0

```

# Taking a server out of service at the server farm level will only take the server
out of
# service for that specific farm

```

```
Cat6k-2# configure terminal
```

```
Enter configuration commands, one per line. End with CNTL/Z.
```

```
Cat6k-2(config)# module csm 5
```

```
Cat6k-2(config-module-csm)# server webfarm
```

```
Cat6k-2(config-slb-sfarm)# real name server1
```

```
Cat6k-2(config-slb-real)# no inservice
```

```
Cat6k-2(config-slb-real)# end
```

```
1d20h: %CSM_SLB-6-RSERVERSTATE: Module 5 server state changed: SLB-NETMGT: Configured
server 10.20.220.10:0 to OUT-OF-SERVICE in serverfarm 'WEBFARM'
```

```
Cat6k-2#
```

```
1d20h: %SYS-5-CONFIG_I: Configured from console by vty0 (10.20.1.100)
```

```
Cat6k-2#
```

```
Cat6k-2# show module csm 5 real
```

```

real                server farm      weight  state          conns/hits
-----
SERVER1             FTPFARM        8       OPERATIONAL    0
SERVER2             FTPFARM        8       OPERATIONAL    0
SERVER1             WEBFARM        8       OUTFSERVICE   0
SERVER2             WEBFARM        8       OPERATIONAL    0
Cat6k-2#

# Taking the server out of service at the real server level will take the server out
of
# service for all the server farms

Cat6k-2# confure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Cat6k-2 (config)# module csm 5
Cat6k-2 (config-module-csm)# real server1
Cat6k (config-slb-module-real)# no inservice
Cat6k (config-slb-module-real)# end
Cat6k-2#
1d20h: %SYS-5-CONFIG_I: Configured from console by vty0 (10.20.1.100)
Cat6k-2# show module csm 5 real

real                server farm      weight  state          conns/hits
-----
SERVER1             FTPFARM        8       OUTFSERVICE   0
SERVER2             FTPFARM        8       OPERATIONAL    0
SERVER1             WEBFARM        8       OUTFSERVICE   0
SERVER2             WEBFARM        8       OPERATIONAL    0
Cat6k-2#

```

バックアップ サーバ ファームの設定

ここでは、仮想サーバにバックアップ サーバ ファームを設定する例を示します。プライマリ サーバ ファームのすべてのサーバで障害が発生した場合、CSM がバックアップ サーバ ファームに要求を送り始めます。仮想サーバにスティッキ性が設定されている場合は、sticky オプションによりバックアップ動作を制御できます。

```
module ContentSwitchingModule 5
vlan 220 server
  ip address 10.20.220.2 255.255.255.0
  alias 10.20.220.1 255.255.255.0
!
vlan 221 client
  ip address 10.20.221.5 255.255.255.0
  gateway 10.20.221.1
  alias 10.20.221.2 255.255.255.0
!
vlan 210 server
  ip address 10.20.210.2 255.255.255.0
  alias 10.20.210.1 255.255.255.0
!
probe PING icmp
  interval 2
  retries 2
  failed 10
  receive 2
!
real SERVER1
  address 10.20.220.10
  inservice
real SERVER2
  address 10.20.220.20
  inservice
real SERVER3
  address 10.20.210.30
  inservice
real SERVER4
  address 10.20.210.40
  inservice
!
serverfarm WEBFARM
  nat server
  no nat client
  real name SERVER1
  inservice
  real name SERVER2
  inservice
  probe PING
!
serverfarm WEBFARM2
  nat server
  no nat client
  real name SERVER3
  inservice
  real name SERVER4
  inservice
  probe PING
!
vserver WEB
  virtual 10.20.221.100 tcp www
  serverfarm WEBFARM backup WEBFARM2
  persistent rebalance
  inservice
!
```

show コマンドの出力

```

Cat6k-2# show module csm 5 real

real                server farm      weight  state          conns/hits
-----
SERVER1            WEBFARM          8       OPERATIONAL    0
SERVER2            WEBFARM          8       OPERATIONAL    0
SERVER3            WEBFARM2         8       OPERATIONAL    0
SERVER4            WEBFARM2         8       OPERATIONAL    0

# All the servers are shown as operational.

Cat6k-2# show module csm 5 serverfarm detail
WEBFARM, type = SLB, predictor = RoundRobin
  nat = SERVER
  virtuals inservice = 1, reals = 2, bind id = 0, fail action = none
  inband health config: <none>
  retcode map = <none>
  Probes:
    PING, type = icmp
  Real servers:
    SERVER1, weight = 8, OPERATIONAL, conns = 0
    SERVER2, weight = 8, OPERATIONAL, conns = 0
  Total connections = 0

WEBFARM2, type = SLB, predictor = RoundRobin
  nat = SERVER
  virtuals inservice = 1, reals = 2, bind id = 0, fail action = none
  inband health config: <none>
  retcode map = <none>
  Probes:
    PING, type = icmp
  Real servers:
    SERVER3, weight = 8, OPERATIONAL, conns = 0
    SERVER4, weight = 8, OPERATIONAL, conns = 0
  Total connections = 0

Cat6k-2# show module csm 5 vsver detail
WEB, type = SLB, state = OPERATIONAL, v_index = 18
  virtual = 10.20.221.100/32:80 bidir, TCP, service = NONE, advertise = FALSE
  idle = 3600, replicate csrp = none, vlan = ALL, pending = 30, layer 4
  max parse len = 2000, persist rebalance = TRUE
  ssl sticky offset = 0, length = 32
  conns = 0, total conns = 0
  Default policy:
    server farm = WEBFARM, backup = WEBFARM2 (no sticky)
    sticky: timer = 0, subnet = 0.0.0.0, group id = 0
  Policy          Tot matches  Client pkts  Server pkts
  -----
  (default)      0            0            0

# No connections have been sent to the virtual server yet.

Cat6k-2# show module csm 5 vsver detail
WEB, type = SLB, state = OPERATIONAL, v_index = 18
  virtual = 10.20.221.100/32:80 bidir, TCP, service = NONE, advertise = FALSE
  idle = 3600, replicate csrp = none, vlan = ALL, pending = 30, layer 4
  max parse len = 2000, persist rebalance = TRUE
  ssl sticky offset = 0, length = 32
  conns = 0, total conns = 14
  Default policy:
    server farm = WEBFARM, backup = WEBFARM2 (no sticky)
    sticky: timer = 0, subnet = 0.0.0.0, group id = 0
  Policy          Tot matches  Client pkts  Server pkts
  -----
  (default)      14           84           70

```

```

# A total of 14 connections have been sent to the virtual server and have been
balanced to # the primary server farm. For each connection, the client has sent 6
packets and the # server has sent 5 packets. Two servers are taken out of service

Cat6k-2#
1d21h: %CSM_SLB-6-RSERVERSTATE: Module 5 server state changed: SLB-NETMGT: ICMP health
probe failed for server 10.20.220.10:80 in serverfarm 'WEBFARM'
1d21h: %CSM_SLB-6-RSERVERSTATE: Module 5 server state changed: SLB-NETMGT: ICMP health
probe failed for server 10.20.220.20:80 in serverfarm 'WEBFARM'

Cat6k-2# show module csm 5 serverfarm detail
WEBFARM, type = SLB, predictor = RoundRobin
  nat = SERVER
  virtuals inservice = 1, reals = 2, bind id = 0, fail action = none
  inband health config: <none>
  retcode map = <none>
  Probes:
    PING, type = icmp
  Real servers:
    SERVER1, weight = 8, PROBE_FAILED, conns = 0
    SERVER2, weight = 8, PROBE_FAILED, conns = 0
  Total connections = 0

# The two servers have failed the probe but the CSM has not yet refreshed the ARP
table
# for them, so the servers are not yet shown in the failed state

WEBFARM2, type = SLB, predictor = RoundRobin
  nat = SERVER
  virtuals inservice = 1, reals = 2, bind id = 0, fail action = none
  inband health config: <none>
  retcode map = <none>
  Probes:
    PING, type = icmp
  Real servers:
    SERVER3, weight = 8, OPERATIONAL, conns = 0
    SERVER4, weight = 8, OPERATIONAL, conns = 0
  Total connections = 0

Cat6k-2# show module csm 5 vsrver detail
WEB, type = SLB, state = OUTOFSERVICE, v_index = 18
virtual = 10.20.221.100/32:80 bidir, TCP, service = NONE, advertise = FALSE
idle = 3600, replicate csrpf = none, vln = ALL, pending = 30, layer 4
max parse len = 2000, persist rebalance = TRUE
ssl sticky offset = 0, length = 32
conns = 0, total conns = 14
Default policy:
  server farm = WEBFARM, backup = WEBFARM2 (no sticky)
  sticky: timer = 0, subnet = 0.0.0.0, group id = 0
Policy          Tot matches  Client pkts  Server pkts
-----
(default)       14           83           70

# The virtual server is displayed as out of service, even if it is configured with a
# backup server farm, which is healthy. This behaviour is useful if the backup server
farm
# is configured as an HTTP redirect server farm to a different site and you are using
some
# DNS-based GSLB method, where some connections are still being directed to the failed
# virtual server.

# If you want the CSM to consider the virtual server healthy and operational if the
backup
# server farm is healthy, you just need to change an environmental variable.

Cat6k-2# show module csm 5 variable

```

```

variable                               value
-----
ARP_INTERVAL                           300
ARP_LEARNED_INTERVAL                   14400
ARP_GRATUITOUS_INTERVAL                15
ARP_RATE                               10
ARP_RETRIES                            3
ARP_LEARN_MODE                         1
ARP_REPLY_FOR_NO_INSERVICE_VIP       0
ADVERTISE_RHI_FREQ                    10
AGGREGATE_BACKUP_SF_STATE_TO_VS       0
DEST_UNREACHABLE_MASK                  0xffff
FT_FLOW_REFRESH_INT                    15
GSLB_LICENSE_KEY                       (no valid license)
HTTP_CASE_SENSITIVE_MATCHING           1
MAX_PARSE_LEN_MULTIPLIER               1
NAT_CLIENT_HASH_SOURCE_PORT            0
ROUTE_UNKNOWN_FLOW_PKTS                 0
NO_RESET_UNIDIRECTIONAL_FLOWS         0
SYN_COOKIE_INTERVAL                    3
SYN_COOKIE_THRESHOLD                   5000
TCP_MSS_OPTION                         1460
TCP_WND_SIZE_OPTION                    8192
VSERVER_ICMP_ALWAYS_RESPOND            false
XML_CONFIG_AUTH_TYPE                   Basic

```

The variable that you want to change is AGGREGATE_BACKUP_SF_STATE_TO_VS

Cat6k-2#

```
1d21h: %CSM_SLB-6-RSERVERSTATE: Module 5 server state changed: SLB-NETMGT: Server
10.20.220.20 failed ARP request
```

Cat6k-2#

The CSM has refreshed the ARP entry for 10.20.220.20 which is now reported in the failed state.

Cat6k-2# **configure terminal**

Enter configuration commands, one per line. End with CNTL/Z.

Cat6k-2 (config)# **module csm 5**

Cat6k-2 (config-module-csm)# **variable AGGREGATE_BACKUP_SF_STATE_TO_VS 1**

Cat6k-2 (config-module-csm)# **end**

```
1d21h: %SYS-5-CONFIG_I: Configured from console by vty0 (10.20.1.100)
```

Cat6k-2# **show module csm 5 variable**

```

variable                               value
-----
ARP_INTERVAL                           300
ARP_LEARNED_INTERVAL                   14400
ARP_GRATUITOUS_INTERVAL                15
ARP_RATE                               10
ARP_RETRIES                            3
ARP_LEARN_MODE                         1
ARP_REPLY_FOR_NO_INSERVICE_VIP       0
ADVERTISE_RHI_FREQ                    10
AGGREGATE_BACKUP_SF_STATE_TO_VS       1
DEST_UNREACHABLE_MASK                  0xffff
FT_FLOW_REFRESH_INT                    15
GSLB_LICENSE_KEY                       (no valid license)
HTTP_CASE_SENSITIVE_MATCHING           1
MAX_PARSE_LEN_MULTIPLIER               1
NAT_CLIENT_HASH_SOURCE_PORT            0
ROUTE_UNKNOWN_FLOW_PKTS                 0
NO_RESET_UNIDIRECTIONAL_FLOWS         0
SYN_COOKIE_INTERVAL                    3
SYN_COOKIE_THRESHOLD                   5000
TCP_MSS_OPTION                         1460

```



```
TCP_WND_SIZE_OPTION          8192
VSERVER_ICMP_ALWAYS_RESPOND  false
XML_CONFIG_AUTH_TYPE        Basic
```

Cat6k-2# **show module csm 5 vserver detail**

```
WEB, type = SLB, state = OPERATIONAL, v_index = 18
  virtual = 10.20.221.100/32:80 bidir, TCP, service = NONE, advertise = FALSE
  idle = 3600, replicate csrp = none, vlan = ALL, pending = 30, layer 4
  max parse len = 2000, persist rebalance = TRUE
  ssl sticky offset = 0, length = 32
  conns = 0, total conns = 14
Default policy:
  server farm = WEBFARM, backup = WEBFARM2 (no sticky)
  sticky: timer = 0, subnet = 0.0.0.0, group id = 0
Policy          Tot matches  Client pkts  Server pkts
-----
(default)       14           83           70
```

The virtual server is now shown as operational.

Cat6k-2# **show module csm 5 real detail**

```
SERVER1, WEBFARM, state = PROBE_FAILED
  address = 10.20.220.10, location = <NA>
  conns = 0, maxconns = 4294967295, minconns = 0
  weight = 8, weight(admin) = 8, metric = 0, remainder = 0
  total conns established = 7, total conn failures = 0
SERVER2, WEBFARM, state = FAILED
  address = 10.20.220.20, location = <NA>
  conns = 0, maxconns = 4294967295, minconns = 0
  weight = 8, weight(admin) = 8, metric = 0, remainder = 0
  total conns established = 7, total conn failures = 0
SERVER3, WEBFARM2, state = OPERATIONAL
  address = 10.20.210.30, location = <NA>
  conns = 0, maxconns = 4294967295, minconns = 0
  weight = 8, weight(admin) = 8, metric = 0, remainder = 0
  total conns established = 0, total conn failures = 0
SERVER4, WEBFARM2, state = OPERATIONAL
  address = 10.20.210.40, location = <NA>
  conns = 0, maxconns = 4294967295, minconns = 0
  weight = 8, weight(admin) = 8, metric = 0, remainder = 0
  total conns established = 0, total conn failures = 0
```

Cat6k-2#

```
1d21h: %CSM_SLB-6-RSERVERSTATE: Module 5 server state changed: SLB-NETMGT: Server
10.20.220.10 failed ARP request
```

The ARP entry for the other server has been refreshed.

Cat6k-2# **show module csm 5 real detail**

```
SERVER1, WEBFARM, state = FAILED
  address = 10.20.220.10, location = <NA>
  conns = 0, maxconns = 4294967295, minconns = 0
  weight = 8, weight(admin) = 8, metric = 0, remainder = 0
  total conns established = 7, total conn failures = 0
SERVER2, WEBFARM, state = FAILED
  address = 10.20.220.20, location = <NA>
  conns = 0, maxconns = 4294967295, minconns = 0
  weight = 8, weight(admin) = 8, metric = 0, remainder = 0
  total conns established = 7, total conn failures = 0
SERVER3, WEBFARM2, state = OPERATIONAL
  address = 10.20.210.30, location = <NA>
  conns = 0, maxconns = 4294967295, minconns = 0
  weight = 8, weight(admin) = 8, metric = 0, remainder = 0
  total conns established = 0, total conn failures = 0
SERVER4, WEBFARM2, state = OPERATIONAL
  address = 10.20.210.40, location = <NA>
  conns = 0, maxconns = 4294967295, minconns = 0
  weight = 8, weight(admin) = 8, metric = 0, remainder = 0
  total conns established = 0, total conn failures = 0
```

```
# So far, each of the servers in the primary server farm have received 7 connections.
New
# connections are now sent only to the backup server farm.

Cat6k-2# show module csm 5 real detail
SERVER1, WEBFARM, state = FAILED
  address = 10.20.220.10, location = <NA>
  conns = 0, maxconns = 4294967295, minconns = 0
  weight = 8, weight(admin) = 8, metric = 0, remainder = 0
  total conns established = 7, total conn failures = 0
SERVER2, WEBFARM, state = FAILED
  address = 10.20.220.20, location = <NA>
  conns = 0, maxconns = 4294967295, minconns = 0
  weight = 8, weight(admin) = 8, metric = 0, remainder = 0
  total conns established = 7, total conn failures = 0
SERVER3, WEBFARM2, state = OPERATIONAL
  address = 10.20.210.30, location = <NA>
  conns = 0, maxconns = 4294967295, minconns = 0
  weight = 8, weight(admin) = 8, metric = 0, remainder = 0
  total conns established = 6, total conn failures = 0
SERVER4, WEBFARM2, state = OPERATIONAL
  address = 10.20.210.40, location = <NA>
  conns = 0, maxconns = 4294967295, minconns = 0
  weight = 8, weight(admin) = 8, metric = 0, remainder = 0
  total conns established = 6, total conn failures = 0
Cat6k-2#
```

送信元 IP アドレスに基づいたロードバランシングの決定の設定

ここでは、クライアントの送信元 IP アドレスに基づいてロードバランシングを決定する例を示します。この設定では、slb ポリシーを使用する必要があります。

```
module ContentSwitchingModule 5
vlan 220 server
  ip address 10.20.220.2 255.255.255.0
  alias 10.20.220.1 255.255.255.0
!
vlan 221 client
  ip address 10.20.221.5 255.255.255.0
  gateway 10.20.221.1
  alias 10.20.221.2 255.255.255.0
!
probe PING icmp
  interval 2
  retries 2
  failed 10
  receive 2
!
real SERVER1
  address 10.20.220.10
  inservice
real SERVER2
  address 10.20.220.20
  inservice
real SERVER3
  address 10.20.220.30
  inservice
real SERVER4
  address 10.20.220.40
  inservice
!
serverfarm WEBFARM
  nat server
  no nat client
  real name SERVER1
  inservice
  real name SERVER2
  inservice
  probe PING
!
serverfarm WEBFARM2
  nat server
  no nat client
  real name SERVER3
  inservice
  real name SERVER4
  inservice
!
policy SOURCE-IP-50
  client-group 50
  serverfarm WEBFARM2

# A policy consists of a series of conditions, plus the actions to take if those
# conditions are matched. In this case, the only condition is client-group 50 which
# requires the incoming connection to match the standard access-list 50. The only
# action
# to take is to use server farm WEBFARM2 to serve those requests.

!
vserver WEB
  virtual 10.20.221.100 tcp www
  serverfarm WEBFARM
  persistent rebalance
  slb-policy SOURCE-IP-50
```

```
# Slb-policies associated to a virtual server are always examined in the order in
which
# they are configured. The definition of the server farm under the virtual server
# configuration is the default policy and is always used as a last resort if no policy
# matches, or if there are no policies configured.

# In this case, incoming requests are processed to see if they match the conditions of
the
# slb-policy SOURCE-IP-50. If they do, then the server farm WEBFARM2 is used,
otherwise
# the default policy is selected (for example, WEBFARM is used).

# If a default server farm is not configured, then connections that do not match any
# policy are dropped.

# This example shows how to configure the IOS standard access list. You can configure
any
# of the 1-99 standard access lists, or you can configure named access lists

inservice
!
access-list 50 permit 10.20.1.100
```

show コマンドの出力

```
Cat6k-2# show module csm 5 vser detail
WEB, type = SLB, state = OPERATIONAL, v_index = 18
virtual = 10.20.221.100/32:80 bidir, TCP, service = NONE, advertise = FALSE
idle = 3600, replicate csrp = none, vlan = ALL, pending = 30, layer 4
max parse len = 2000, persist rebalance = TRUE
ssl sticky offset = 0, length = 32
conns = 0, total conns = 0
Default policy:
  server farm = WEBFARM, backup = <not assigned>
  sticky: timer = 0, subnet = 0.0.0.0, group id = 0
Policy          Tot matches  Client pkts  Server pkts
-----
SOURCE-IP-50   0             0             0
(default)      0             0             0

# This example shows that six connections have matched the slb-policy SOURCE-IP-50.
```

```
Cat6k-2# show module csm 5 vser detail
WEB, type = SLB, state = OPERATIONAL, v_index = 18
virtual = 10.20.221.100/32:80 bidir, TCP, service = NONE, advertise = FALSE
idle = 3600, replicate csrp = none, vlan = ALL, pending = 30, layer 4
max parse len = 2000, persist rebalance = TRUE
ssl sticky offset = 0, length = 32
conns = 0, total conns = 6
Default policy:
  server farm = WEBFARM, backup = <not assigned>
  sticky: timer = 0, subnet = 0.0.0.0, group id = 0
Policy          Tot matches  Client pkts  Server pkts
-----
SOURCE-IP-50   6            36            30
(default)      0             0             0

# This example shows that SERVER3 and SERVER4 have received 3 connections each.
```

```
Cat6k-2# show module csm 5 real detail
SERVER1, WEBFARM, state = OPERATIONAL
address = 10.20.220.10, location = <NA>
conns = 0, maxconns = 4294967295, minconns = 0
weight = 8, weight(admin) = 8, metric = 0, remainder = 0
total conns established = 0, total conn failures = 0
SERVER2, WEBFARM, state = OPERATIONAL
address = 10.20.220.20, location = <NA>
conns = 0, maxconns = 4294967295, minconns = 0
weight = 8, weight(admin) = 8, metric = 0, remainder = 0
total conns established = 0, total conn failures = 0
SERVER3, WEBFARM2, state = OPERATIONAL
address = 10.20.220.30, location = <NA>
conns = 0, maxconns = 4294967295, minconns = 0
weight = 8, weight(admin) = 8, metric = 0, remainder = 0
total conns established = 3, total conn failures = 0
SERVER4, WEBFARM2, state = OPERATIONAL
address = 10.20.220.40, location = <NA>
conns = 0, maxconns = 4294967295, minconns = 0
weight = 8, weight(admin) = 8, metric = 0, remainder = 0
total conns established = 3, total conn failures = 0
Cat6k-2#
```

レイヤ7ロードバランシングの設定

ここでは、レイヤ7の情報に基づいてロードバランシングを決定する例を示します。この場合、CSMではTCP接続を終了し、要求をバッファに格納して、要求がポリシー条件に一致するか解析します。ロードバランスが決定されると、CSMは選択されたサーバとの接続を開始して、2つのフローを1つに結合します。

この例の設定では、マップおよびポリシーを使用する必要があります。ポリシーは条件および動作のリストで、すべての条件が真の場合に有効となります。

```
Cat6k-2 (config-module-csm)# policy test
Cat6k-2 (config-slb-policy)# ?
SLB policy config
  client-group      define policy client group
  cookie-map        define policy cookie map
  default           Set a command to its defaults
  exit              exit slb policy submode
  header-map        define policy header map
  no                Negate a command or set its defaults
  reverse-sticky    define sticky group for reverse traffic
  serverfarm        define policy serverfarm
  set               set policy parameters
  sticky-group      define policy sticky group
  url-map           define policy URL map

# The conditions are:
# -client-group (source IP matches a certain ACL)
# -cookie-map (match based on cookies)
# -header-map (match based on HTTP headers)
# -url-map (match based on URLs)

# The actions are:
# -serverfarm (the most common: use this serverfarm)
# -sticky-group (use sticky)
# -reverse-sticky (use reverse sticky)
# -set (set ip dscp)

\module ContentSwitchingModule 5
vlan 220 server
  ip address 10.20.220.2 255.255.255.0
  alias 10.20.220.1 255.255.255.0
!
vlan 221 client
  ip address 10.20.221.5 255.255.255.0
  gateway 10.20.221.1
  alias 10.20.221.2 255.255.255.0
!
probe PING icmp
  interval 2
  retries 2
  failed 10
  receive 2
!
map TEST header
  match protocol http header Host header-value www.test.com
!
map SPORTS url
  match protocol http url /sports/*

# The definition of maps is based on the header and the URL. The URL starts right
after
# the host. For example, in the URL http://www.test.com/sports/basketball/ the URL
portion
# that the URL map applies to is /sports/basketball/.
```

```
real SERVER1
  address 10.20.220.10
  inservice
real SERVER2
  address 10.20.220.20
  inservice
real SERVER3
  address 10.20.220.30
  inservice
real SERVER4
  address 10.20.220.40
  inservice
!
serverfarm WEBFARM
  nat server
  no nat client
  real name SERVER1
  inservice
  real name SERVER2
  inservice
  probe PING
!
serverfarm WEBFARM2
  nat server
  no nat client
  real name SERVER3
  inservice
  real name SERVER4
  inservice
!
policy TEST-SPORTS-50
  url-map SPORTS
  header-map TEST
  client-group 50
  serverfarm WEBFARM2

# Three conditions need to match for this policy to have a match.

!
vserver WEB
  virtual 10.20.221.100 tcp www
  serverfarm WEBFARM
  persistent rebalance
  slb-policy TEST-SPORTS-50
  inservice
!
# If the three conditions defined in the policy are true then WEBFARM2 is used
otherwise
# WEBFARM is.
```

show コマンドの出力

```
# In this example, 17 requests have matched the policy Of those, 12 requests have not
# matched the policy
```

```
Cat6k-2# show module csm 5 vserver detail
```

```
WEB, type = SLB, state = OPERATIONAL, v_index = 18
virtual = 10.20.221.100/32:80 bidir, TCP, service = NONE, advertise = FALSE
idle = 3600, replicate csrp = none, vlan = ALL, pending = 30, layer 4
max parse len = 2000, persist rebalance = TRUE
ssl sticky offset = 0, length = 32
conns = 0, total conns = 29
```

```
Default policy:
```

```
server farm = WEBFARM, backup = <not assigned>
sticky: timer = 0, subnet = 0.0.0.0, group id = 0
```

```
Policy          Tot matches  Client pkts  Server pkts
```

```
-----
TEST-SPORTS-50  17           112          95
(default)        12           82           72
```

```
# This example shows that the 29 connections that were load balanced have been load
# balanced at Layer 7. For example, the CSM has to terminate TCP and parse Layer 5
through
# Layer 7 information.
```

```
Cat6k-2# show module csm 5 stats
```

```
Connections Created:      29
Connections Destroyed:   29
Connections Current:      0
Connections Timed-Out:    0
Connections Failed:       0
Server initiated Connections:
  Created: 0, Current: 0, Failed: 0
L4 Load-Balanced Decisions: 0
L4 Rejected Connections:  0
L7 Load-Balanced Decisions: 29
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: 0, 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: 359, Multicast: 0, Broadcast: 8,
  Underflow Errors: 0
  Rx: Unicast: 387, Multicast: 221, Broadcast: 1,
  Overflow Errors: 0, CRC Errors: 0
```


HTTP リダイレクトの設定

ここでは、CSM による HTTP リダイレクト メッセージの送信の設定例を示します。

```
# This configuration represents the configuration of site A

module ContentSwitchingModule 6
  vlan 211 client
  ip address 10.20.211.2 255.255.255.0
  gateway 10.20.211.1
  !
  vlan 210 server
  ip address 10.20.210.1 255.255.255.0
  !
  map SPORTMAP url
  match protocol http url /sports*
  !
  serverfarm REDIRECTFARM
  nat server
  no nat client
  redirect-vserver WWW2
  webhost relocation www2.test.com 301
  inservice
  !
  serverfarm WWW1FARM
  nat server
  no nat client
  real 10.20.210.10
  inservice
  real 10.20.210.20
  inservice
  !
  policy SPORTPOLICY
  url-map SPORTMAP
  serverfarm REDIRECTFARM
  !
  vserver WWW1VIP
  virtual 10.20.211.100 tcp www
  serverfarm WWW1FARM
  persistent rebalance
  slb-policy SPORTPOLICY
  inservice

# This configuration represents the configuration of site B

module ContentSwitchingModule 7
  vlan 221 client
  ip address 10.20.221.2 255.255.255.0
  gateway 10.20.221.1
  !
  vlan 220 server
  ip address 10.20.220.1 255.255.255.0
  !
  serverfarm WWW2FARM
  nat server
  no nat client
  real 10.20.220.10
  inservice
  real 10.20.220.20
  inservice
  !
  vserver WWW2VIP
  virtual 10.20.221.100 tcp www
  serverfarm WWW2FARM
  persistent rebalance
  inservice
```

show コマンドの出力

```
# To test the configuration, the first nine requests are sent to www1.test.com
requesting
# the home page "/." The 10th request is sent to http://www1.test.com/sports/.
```

```
Cat6k-2# show module csm 6 vser deta
```

```
WWW1VIP, type = SLB, state = OPERATIONAL, v_index = 11
  virtual = 10.20.211.100/32:80 bidir, TCP, service = NONE, advertise = FALSE
  idle = 3600, replicate csrp = none, vlan = ALL, pending = 30
  max parse len = 2000, persist rebalance = TRUE
  ssl sticky offset = 0, length = 32
  conns = 0, total conns = 10
Default policy:
  server farm = WWW1FARM, backup = <not assigned>
  sticky: timer = 0, subnet = 0.0.0.0, group id = 0
Policy          Tot Conn    Client pkts  Server pkts
-----
SPORTPOLICY     1             3             1
(default)       9             45            45
```

```
Cat6k-2# show module csm 7 vser detail
```

```
WWW2VIP, type = SLB, state = OPERATIONAL, v_index = 26
  virtual = 10.20.221.100/32:80 bidir, TCP, service = NONE, advertise = FALSE
  idle = 3600, replicate csrp = none, vlan = ALL, pending = 30
  max parse len = 2000, persist rebalance = TRUE
  ssl sticky offset = 0, length = 32
  conns = 0, total conns = 1
Default policy:
  server farm = WWW2FARM, backup = <not assigned>
  sticky: timer = 0, subnet = 0.0.0.0, group id = 0
Policy          Tot Conn    Client pkts  Server pkts
-----
(default)       1             5             5
```

```
# Nine requests have matched the default policy for www1.test.com so they have been
served
# by WWW1FARM. One request has matched the policy SPORTPOLICY and has been redirected
to
# the second site that has then served the request.
```

```
# The following is an example of the request that was sent to www1.cisco.com asking
for
# /sports/.
```

```
10.20.1.100.34589 > 10.20.211.100.80: P 1:287(286) ack 1 win 5840 (DF)
0x0000  4500 0146 763c 4000 4006 da85 0a14 0164      E..Fv<@.@.....d
0x0010  0a14 d364 871d 0050 ec1d 69e6 7b57 aead      ...d...P..i.{W..
0x0020  5018 16d0 96b2 0000 4745 5420 2f73 706f      P.....GET./spo
0x0030  7274 732f 2048 5454 502f 312e 310d 0a43      rts/.HTTP/1.1..C
0x0040  6f6e 6e65 6374 696f 6e3a 204b 6565 702d      onnection:.Keep-
0x0050  416c 6976 650d 0a55 7365 722d 4167 656e      Alive..User-Agen
0x0060  743a 204d 6f7a 696c 6c61 2f35 2e30 2028      t:.Mozilla/5.0.(
0x0070  636f 6d70 6174 6962 6c65 3b20 4b6f 6e71      compatible;.Konq
0x0080  7565 726f 722f 322e 322d 3131 3b20 4c69      ueror/2.2-11;.Li
0x0090  6e75 7829 0d0a 4163 6365 7074 3a20 7465      nux)..Accept:.te
0x00a0  7874 2f2a 2c20 696d 6167 652f 6a70 6567      xt/*,.image/jpeg
0x00b0  2c20 696d 6167 652f 706e 672c 2069 6d61      ,.image/png,.ima
0x00c0  6765 2f2a 2c20 2a2f 2a0d 0a41 6363 6570      ge/*,*/*..Accep
0x00d0  742d 456e 636f 6469 6e67 3a20 782d 677a      t-Encoding:.x-gz
0x00e0  6970 2c20 677a 6970 2c20 6964 656e 7469      ip,.gzip,.identi
0x00f0  7479 0d0a 4163 6365 7074 2d43 6861 7273      ty..Accept-Chars
0x0100  6574 3a20 416e 792c 2075 7466 2d38 2c20      et:.Any,.utf-8,.
0x0110  2a0d 0a41 6363 6570 742d 4c61 6e67 7561      *..Accept-Langua
0x0120  6765 3a20 656e 5f55 532c 2065 6e0d 0a48      ge:.en_US,.en..H
0x0130  6f73 743a 2077 7777 312e 7465 7374 2e63      ost:.www1.test.c
0x0140  6f6d 0d0a 0d0a                                om....
```

```

# The following example is the message that the client has received back from
# www1.cisco.com. This message is the HTTP redirect message generated by the CSM

10.20.211.100.80 > 10.20.1.100.34589: FP 1:56(55) ack 287 win 2048 (DF)
0x0000 4500 005f 763c 4000 3e06 dd6c 0a14 d364 E..v<@.>..l...d
0x0010 0a14 0164 0050 871d 7b57 aead ec1d 6b04 ...d.P..{W....k.
0x0020 5019 0800 8b1a 0000 4854 5450 2f31 2e30 P.....HTTP/1.0
0x0030 2033 3031 2046 6f75 6e64 200d 0a4c 6f63 .301.Found...Loc
0x0040 6174 696f 6e3a 2068 7474 703a 2f2f 7777 ation:.http://ww
0x0050 7732 2e74 6573 742e 636f 6d0d 0a0d 0a w2.test.com....

# The redirect location sent back to the client matches exactly the string configured
with
# the webhost relocation www2.test.com 301 command because the client was browsing
# www1.test.com/sports/ and is redirected to www2.test.com/.

# In some cases this might not be the desired behaviour and there might be the need to
# preserve the original URL that the browser requested.

# To preserve the URL that the browser requested, you can use the %p parameter as
part of
# the redirect string.

# The configuration would then appear as:

# serverfarm REDIRECTFARM
# nat server
# no nat client
# redirect-vserver WWW2
# webhost relocation www2.test.com/%p
# inservice

# The following example shows the resulting redirect message which is sent back to the
# client:

10.20.211.100.80 > 10.20.1.100.34893: FP 1:64(63) ack 329 win 2048 (DF)
0x0000 4500 0067 7d95 4000 3e06 d60b 0a14 d364 E..g}.@.>.....d
0x0010 0a14 0164 0050 884d 7093 b53b 4e0b e8a8 ...d.P.Mp.;N...
0x0020 5019 0800 2800 0000 4854 5450 2f31 2e30 P...(...HTTP/1.0
0x0030 2033 3032 2046 6f75 6e64 200d 0a4c 6f63 .302.Found...Loc
0x0040 6174 696f 6e3a 2068 7474 703a 2f2f 7777 ation:.http://ww
0x0050 7732 2e74 6573 742e 636f 6d2f 7370 6f72 w2.test.com/spor
0x0060 7473 2f0d 0a0d 0a ts/....

# In other cases, you may need to redirect an HTTP request to an HTTPS VIP, on the
same or
# on a remote CSM. In that case, the URL request must change from http:// to https://
# You can do this by using the parameter ssl 443

# The configuration would then be as follows:

# serverfarm REDIRECTFARM
# nat server
# no nat client
# redirect-vserver WWW2
# webhost relocation www2.test.com/%p
# ssl 443
# inservice

# The following is the resulting redirect message sent back to the client.

10.20.211.100.80 > 10.20.1.100.34888: FP 1:65(64) ack 329 win 2048 (DF)
0x0000 4500 0068 2cda 4000 3e06 26c6 0a14 d364 E..h,.@.>.&....d
0x0010 0a14 0164 0050 8848 7088 b087 21e5 a627 ...d.P.Hp...!...'
0x0020 5019 0800 f39e 0000 4854 5450 2f31 2e30 P.....HTTP/1.0
0x0030 2033 3032 2046 6f75 6e64 200d 0a4c 6f63 .302.Found...Loc
0x0040 6174 696f 6e3a 2068 7474 7073 3a2f 2f77 ation:.https://w
0x0050 7777 322e 7465 7374 2e63 6f6d 2f73 706f ww2.test.com/spo
0x0060 7274 732f 0d0a 0d0a rts/....

```

■ HTTP リダイレクトの設定