

驗證Catalyst 9000系列交換機上的第2層硬體

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簡介

本檔案介紹如何驗證Catalyst 9400系列交換器上的第2層硬體程式設計和轉送。


必要條件

需求

本文件沒有特定需求。

採用元件

本檔案中的資訊是根據Catalyst 9400 (UADP 2.0)系列交換器。

 注意：本文檔中使用的軟體版本是16.6.1，但此版本仍然適用於Cisco IOS®的更高版本。

 注意：您可以將此文檔用於其他型別的Catalyst 9000交換機，但忽略任何引用板卡的命令。

本文中的資訊是根據特定實驗室環境內的裝置所建立。文中使用到的所有裝置皆從已清除（預設）的組態來啟動。如果您的網路運作中，請確保您瞭解任何指令可能造成的影響。

背景資訊

Catalyst 9400 Supervisor1 (C9400-SUP-1)有3個UADP 2.0轉發ASIC(0、1、2)。

每個UADP 2.0轉發ASIC具有：

- 雙核心(0，1) -在之前的UADP 2.0 ASIC中並不存在。
- SIF（堆疊介面）-用於透過內部堆疊環連線到其他2個UADP 2.0 ASIC。
- NIF（網路介面）-用於透過背板連線到1個或多個線卡。
- 線卡和Supervisor上行鏈路介面的所有資料包轉發決策都由活動Supervisor上的3個UADP 2.0轉發ASIC作出。
- 本示例中使用的板卡有1個不參與資料包轉發決策的板卡單核心末節ASIC。
- 線卡上的線卡末節ASIC透過背板連線到Supervisor上的3個UADP 2.0轉發ASIC中的1個或多個。
- Supervisor上的3個UADP 2.0轉發ASIC會做出所有資料包轉發決策。

技術

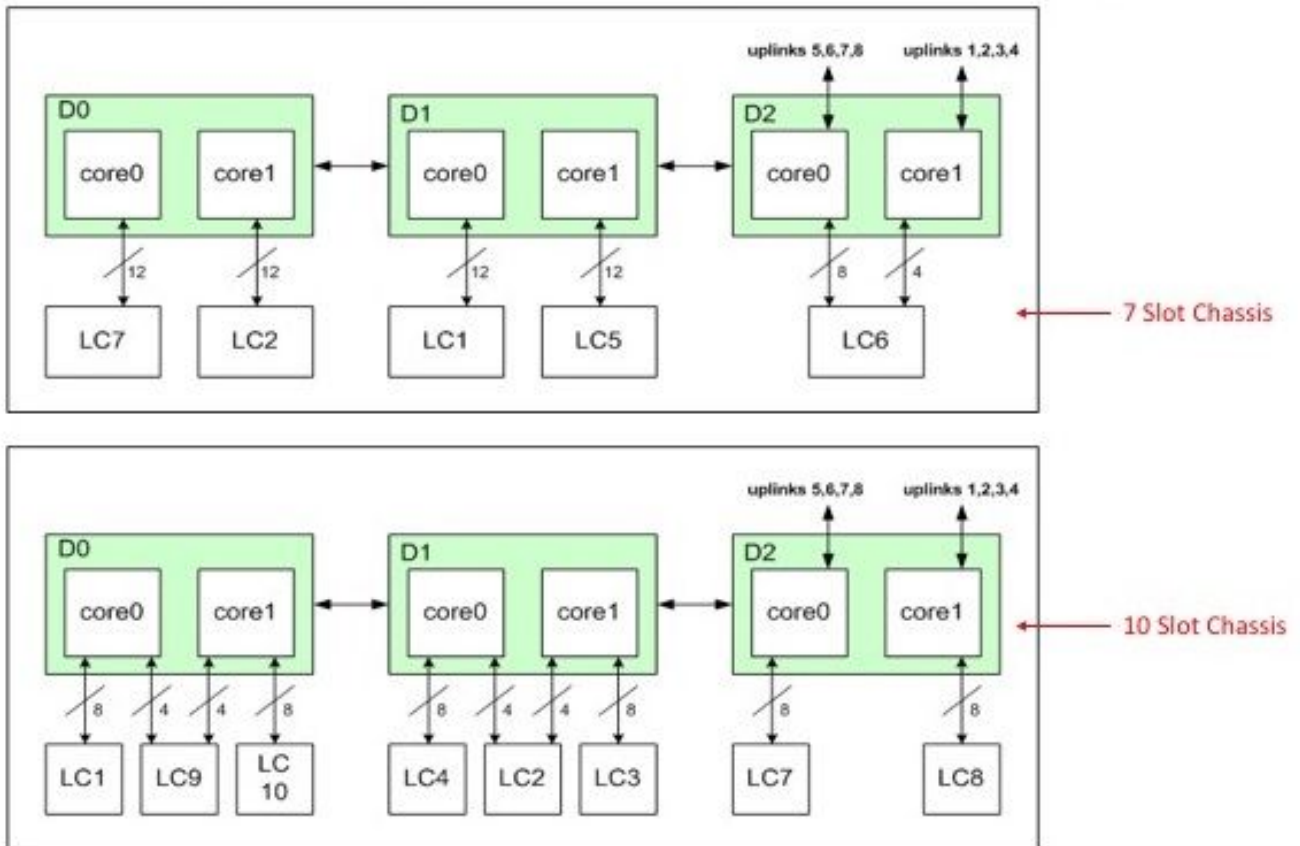
縮寫	定義
RP	路由處理器
FP	轉發處理器
FED	轉發引擎驅動程式。對Supervisor轉發ASIC進程式設計的軟體進程。

物件管理員	FP軟體MAC條目，在對象資料庫中儲存為非同步對象。
LSMPI	Linux共用記憶體傳送介面。資料層面（硬體-UADP 2.0）和控制層面（軟體-CPU）之間的傳輸。
IFM	Interface Manager軟體進程。
IF_ID	介面Identifier是表示特定介面的唯一值。它用於交換機內部程式設計期間。
例證	例項。指示UADP 2.0 Asic/Core介面連線到 ：0=Asic0/Core0,1=Asic0/Core1,2=Asic1/Core0,3=Asic1/Core1,4=Asic2/Core0,5=Asic2/Core1
Asic	指定與介面關聯的UADP 2.0:0=UADP 2.0 #0，1=UADP 2.0 #1，2= UADP 2.0 #2。
核心	指定UADP 2.0介面上與哪個核心關聯：0=core0,1=core1。
連接埠	插槽中埠的序號例項編號。在同一插槽中，所有埠號都是唯一的。
子連線埠	辨識前面板連線埠的連線埠群組(Cntx)中屬於子連線埠的連線埠（Cntx與SubPort一起辨識屬於子連線埠的唯一連線埠）。
Mac	介面運行MACsec（安全身份驗證和加密）時使用的介面識別符號。
Cntx	情景。當前面板介面為子埠時，埠所屬的組編號（Cntx和SubPort一起標識為子埠的唯一埠）。
流水標	與介面關聯的邏輯埠號。
GPN	與介面關聯的全局埠號。
鍵入NIF	網路介面；NRU =網路冗餘上行鏈路
IF_IS	介面辨識碼。這是代表特定介面的唯一值。它在交換機內部進行各種程式設計時使用。
Port_LE	連線埠邏輯實體。這是介面配置。
AOM	非同步對象管理器。FP將資訊作為對象程式設計到對象資料庫中。

副總裁	虛擬連線埠
MATM	MAC位址表管理員
RP	路由處理器
OM_PTR	物件管理員指標
Tbl_ID	表識別符號= vlan
CMAN	機箱管理器
FP	轉發處理器
fp_port	前面板埠。
Sif	堆疊介面 (指向Supervisor上的其他2個UADP 2.0轉發ASIC) 。
Nif	網路介面 (朝向前面板介面)
IGR/EGR	輸入/輸出
IQS	入口佇列排程器
SQS	堆疊佇列排程器
PBC	資料包緩衝區複雜性
AQM	主動佇列管理。這將執行擁塞管理檢查。
AQMRed	主動隊列管理隨機早期檢測。
EQC	出口隊列控制器
ESM	出口排程器管理

RWE	重寫引擎。從資料包中增加或刪除報頭資訊。
IOMD	輸入輸出模組驅動程式
fp_port	前面板埠。
Nif	網路介面 (朝向前面板介面)
SLI	系統鏈路介面 (指向Supervisor)
IGR/EGR =	輸入/輸出
AQMRed	主動隊列管理隨機早期檢測。
OCI	帶外控制介面=線卡和主用Supervisor之間的內部通訊通道
MATM	MAC位址表管理員
MAC移 動計數	這是在新介面上移動 (獲知) MAC地址時的計數。當終端主機從一個介面實際移動到另一個介面、無線主機從一個存取點(AP)漫遊到另一個連線到另一個介面的AP，或者生成樹路徑發生更改或環路時，就會發生移動計數。

Line Card (LC) to UADP 2.0 Mapping



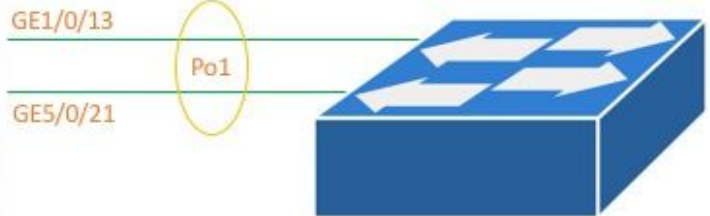
線卡到UADP

拓撲

Catalyst 9400 - Macallan
 SVI 100 IP: 100.100.100.1 / 24
 SVI 100 MAC: 2c5a.0f1c.28e1



Neighbor device
 SVI 100 IP: 100.100.100.53 / 24
 SVI 100 MAC: 20bb.c05e.5351



<#root>

C9400#

show version

```
Cisco IOS XE Software, Version 16.06.01
Cisco IOS Software [Everest], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 16.6.1, RELEASE SOFTWARE
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2017 by Cisco Systems, Inc.
Compiled Sat 22-Jul-17 05:51 by mcpre
--snip--
```

<#root>

C9400#

show module

Chassis Type: C9407R

Mod	Ports	Card Type	Model	Serial No.
1	48	48-Port 10/100/1000 (RJ-45)	C9400-LC-48T	JAE211703RC
2	48	48-Port UPOE 10/100/1000 (RJ-45)	C9400-LC-48U	JAE21150CGD
3	10	Supervisor 1 Module	C9400-SUP-1	JAE21240235
4	10	Supervisor 1 Module	C9400-SUP-1	JAE21240235
5	48	48-Port UPOE 10/100/1000 (RJ-45)	C9400-LC-48U	JAE21150CG9

Mod	MAC addresses	Hw	Fw	Sw	Status
1	E4AA.5D54.C84C to E4AA.5D54.C87B	0.6	16.6.1r [FC	16.06.01	ok
2	E4AA.5D54.B430 to E4AA.5D54.B45F	0.6	16.6.1r [FC	16.06.01	ok

```

3 2C5A.0F1C.28EC to 2C5A.0F1C.28F5 0.6 16.6.1r [FC 16.06.01 ok
4 2C5A.0F1C.28F6 to 2C5A.0F1C.28FF 0.6 16.6.1r [FC 16.06.01 ok
5 E4AA.5D54.B658 to E4AA.5D54.B687 0.6 16.6.1r [FC 16.06.01 ok

```

```

Mod Redundancy Role      Operating Redundancy Mode Configured Redundancy Mode
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
3  Active          sso                    sso
4  Standby         sso                    sso

```

<#root>

C9400#

show running-config interface port-channel 1

```

interface Port-channel1
switchport trunk allowed vlan 100
switchport mode trunk

```

<#root>

C9400#

show running-config interface gigabitEthernet 1/0/13

```

interface GigabitEthernet1/0/13
switchport trunk allowed vlan 100
switchport mode trunk
channel-group 1 mode active

```

<#root>

C9400#

show running-config interface gigabitEthernet 5/0/21

```

interface GigabitEthernet5/0/21
switchport trunk allowed vlan 100
switchport mode trunk
channel-group 1 mode active

```

<#root>

C9400#

show etherchannel summary

--snip--

```

Group Port-channel Protocol Ports
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
1      Po1(SU)         LACP   Gi1/0/13(P) Gi5/0/21(P)

```


 注意：show platform命令可能要求語句中包含service internal全局配置命令。

介面程式設計

介面到UADP 2.0例項對映

介面程式設計命令顯示所有板卡到活動Supervisor上3個UADP 2.0轉發ASIC之一的前面板介面對映。

輸出範例

此範例顯示：

- 介面Gig1/0/3連線到：Supervisor上的UADP 2.0例項2 (UADP 2.0 Asic 1，核心0)。
- 介面Gig5/0/21連線到Supervisor上的UADP 2.0例項3 (UADP 2.0 Asic 1，核心1)。

```
<#root>
```

```
C9400#
```

```
show platform software fed active ifm mappings
```

Interface	IF_ID	Inst	Asic	Core	Port	SubPort	Mac	Cntx	LPN	GPN	Type	Active
GigabitEthernet1/0/1	0x7	2	1	0	0	0	4	4	1	101	NIF	Y
GigabitEthernet1/0/2	0x8	2	1	0	1	1	4	4	2	102	NIF	Y
--snip--												
GigabitEthernet1/0/13	0x13	2	1	0	12	4	0	0	13	1105	NIF	Y
--snip--												
GigabitEthernet5/0/21	0x8f	3	1	1	20	4	5	5	21	1104	NIF	Y
--snip--												

物理介面程式設計

show platform命令基於上一個命令示例中的IF_ID值顯示Gig1/0/3的軟體配置詳細資訊。

```
<#root>
```

```
C9400#
```

```
show platform software fed active ifm if-id 0x13
```

```
Interface IF_ID : 0x0000000000000013
Interface Name : GigabitEthernet1/0/13
Interface Block Pointer : 0x7fe5c5aab7b8
Interface State : READY
Interface Status : ADD, UPD
Interface Ref-Cnt : 7
Interface Type : ETHER
      Port Type : SWITCH PORT
```

Port Location : LOCAL
Slot : 1
Unit : 0
Slot Unit : 13
SNMP IF Index : 14
GPN : 1105
EC Channel : 1
EC Index : 1
Port Handle : 0x72000285
LISP v4 Mobility : false
LISP v6 Mobility : false
QoS Trust Type : 0

Port Information

Handle [0x72000285]
Type [Layer2]
Identifier [0x13]
Slot [1]
Unit [13]
Port Physical Subblock
 Affinity [local]
 Asic Instance [2 (A:1,C:0)]
 AsicPort [12]
 AsicSubPort [4]
 MacNum [0]
 ContextId [0]
 LPN [13]
 GPN [113]
 Speed [1GB]
 type [NIF]
 PORT_LE [0x7fe5c5aabc28]
 L3IF_LE [0x0]
 EC GPN [1105]
 EC L3IF_LE [0x0]
 EC Port Mask [0xaaaaaaaaaaaaaaaa]
 DI [0x7fe5c5ab5c48]
Port L2 Subblock
 Enabled [Yes]

Allow dot1q [Yes] ---> interface Gig1/0/13 is configured as a trunk

 Allow native [Yes]
 Default VLAN [1]
 Allow priority tag ... [Yes]
 Allow unknown unicast [Yes]
 Allow unknown multicast [Yes]
 Allow unknown broadcast [Yes]
 Allow unknown multicast [Enabled]
 Allow unknown unicast [Enabled]
 IPv4 ARP snoop [No]
 IPv6 ARP snoop [No]
 Jumbo MTU [1500]
 Learning Mode [1]
Port QoS Subblock
 Trust Type [0x2]
 Default Value [0]
 Ingress Table Map [0x0]
 Egress Table Map [0x0]
 Queue Map [0x0]
Port Netflow Subblock
Port Policy Subblock
List of Ingress Policies attached to an interface

```

List of Egress Policies attached to an interface
Ref Count : 7 (feature Ref Counts + 1)
IFM Feature Ref Counts
  FID : 100, Ref Count : 1
  FID : 57, Ref Count : 1
  FID : 115, Ref Count : 1
  FID : 17, Ref Count : 1
  FID : 78, Ref Count : 1
  FID : 30, Ref Count : 1
IFM Feature Sub block information
  FID : 57, Private Data : 0x7fe5c685e748
  FID : 17, Private Data : 0x7fe5c5e85f38
  FID : 30, Private Data : 0x7fe5c5e85aa8

```

此命令根據上一個命令的PORT_LE值顯示Gig1/0/3的硬體配置詳細資訊。

價值	定義
值0	未設定值。
值1	在大多數情況下設定的值。

<#root>

C9400#

```
show platform hardware fed active fwd-asic abstraction print-resource-handle 0x7fe5c5aabc28 1
```

```
Handle:0x7fe5c5aabc28 Res-Type:ASIC_RSC_PORT_LE Res-Switch-Num:0 Asic-Num:2 Feature-ID:AL_FID_IFM Lkp-f
priv_ri/priv_si Handle: (nil)Hardware Indices/Handles: index2:0xc mtu_index/13u_ri_index2:0x4 sm handle
```

Detailed Resource Information (ASIC#2)

```

LEAD_PORT_ALLOW_BROADCAST value 1 Pass
LEAD_PORT_ALLOW_CAPWAP value 0 Pass
LEAD_PORT_ALLOW_CTS value 0 Pass
LEAD_PORT_ALLOW_DOT1Q_TAGGED value 1 Pass
LEAD_PORT_ALLOW_MULTICAST value 1 Pass
LEAD_PORT_ALLOW_NATIVE value 1 Pass
LEAD_PORT_ALLOW_NON_CTS value 0 Pass
LEAD_PORT_ALLOW_PRIORITY_TAGGED value 1 Pass
LEAD_PORT_ALLOW_UNICAST value 1 Pass
LEAD_PORT_ALLOW_UNKNOWN_ETHER_TYPE value 0 Pass
LEAD_PORT_ALLOW_UNKNOWN_UNICAST value 1 Pass
LEAD_PORT_ALLOW_VLAN_LOAD_BALANCE_GROUP value 15 Pass
LEAD_PORT_ALLOW_VRF value 0 Pass
LEAD_PORT_ARP_OR_ND_SNOOPING_ENABLED_IPV4 value 0 Pass
LEAD_PORT_ARP_OR_ND_SNOOPING_ENABLED_IPV6 value 0 Pass
LEAD_PORT_AUTH_MODE value 0 Pass
LEAD_PORT_CAPWAP_TUNNEL value 0 Pass
LEAD_PORT_CONTENT_MATCHING_ENABLED value 0 Pass
LEAD_PORT_CTS_ENABLED value 0 Pass
LEAD_PORT_CUSTOMER_PORT value 0 Pass

```

```
LEAD_PORT_DAI_OR_ND_TRUST_MODE_IPV4 value 0 Pass
LEAD_PORT_DAI_OR_ND_TRUST_MODE_IPV6 value 0 Pass
LEAD_PORT_DATA_GLEAN_LEARN_IPV4 value 0 Pass
--snip--
```

Etherchannel程式設計

在以下EtherChannel程式設計示例輸出中，RP對FP進行程式設計，FP對FED進行程式設計，然後FED對Supervisor轉發ASIC硬體進行程式設計。RP軟體條目作為對象資料庫中的對象儲存，FP軟體條目作為非同步對象儲存在對象資料庫中。

```
<#root>
```

```
C9400#
```

```
show etherchannel summary
```

```
--snip--
```

```
Group Port-channel Protocol Ports
-----+-----+-----+-----
1 Po1(SU) LACP Gi1/0/13(P) Gi5/0/21(P)
```

在此輸出中，「組掩碼」為非零。它用於雜湊過程中確定EtherChannel中任何流量流出處的鏈路。

```
<#root>
```

```
C9400#
```

```
show platform software interface rp active brief
```

```
Forwarding Manager Interfaces Information
```

Name	ID	QFP ID
Null0	1	0
GigabitEthernet1/0/1	7	0
GigabitEthernet1/0/2	8	0
GigabitEthernet1/0/3	9	0
--snip--		
GigabitEthernet1/0/13	19	0
--snip--		
GigabitEthernet5/0/21	143	0
--snip--		
Port-channel1	748	0
--snip--		

```
<#root>
```

```
C9400#
```

```
show platform software fed active etherchannel 1 group-mask
```

Group Mask Info

Aggport IIF Id: 00000000000002EC ---> hex 0x2EC = dec 748

Active Port: : 2 -----> 2 active interfaces in the etherchannel = the Member ports below

Member Ports

If Name	If Id	local	Group Mask
GigabitEthernet1/0/13	0000000000000013	true	5555555555555555 ---> hex 0x13 = dec 19
GigabitEthernet5/0/21	000000000000008f	true	aaaaaaaaaaaaaaaa ---> hex 0x8f = dec 143

此命令顯示Port-channel 1的配置：

```
<#root>
```

```
C9400#
```

```
show platform software fed active ifm if-id 0x000002ec
```

```
Interface IF_ID : 0x00000000000002ec
Interface Name : Port-channel1
Interface Block Pointer : 0x7fe5c685df98
Interface State : READY
Interface Status : ADD, UPD
Interface Ref-Cnt : 5
Interface Type : ETHERCHANNEL
Port Type : SWITCH PORT
Channel Number : 1
SNMP IF Index : 720
Port Handle : 0x50002f6
#Of Active Ports : 2
Base GPN : 1104
Index[2] : 0000000000000000
```

```
13 ---> Gig1/0/13 from previous command output
```

```
Index[3] : 0000000000000000
```

```
8f ---> Gig5/0/21 from previous command output
```

Port Information

```
Handle ..... [0x50002f6]
Type ..... [L2-Ethchannel1]
Identifier ..... [0x2ec]
Unit ..... [1]
Port Logical Subblock
L3IF_LE handle .... [0x0]
Num physical port . [2]
GPN Base ..... [1104]
Num physical port on asic [0] is [0]
DiBcam handle on asic [0].... [0x0]
Num physical port on asic [1] is [0]
DiBcam handle on asic [1].... [0x0]
```

```
Num physical port on asic [2] is [1] -----> Gig1/0/13 is on ASIC instance 2 (Supervisor ASIC 1, c
```

```
DiBcam handle on asic [2].... [0x7fe5c6ae3608]
```

```
Num physical port on asic [3] is [1] -----> Gig5/0/21 is on ASIC instance 3 (Supervisor ASIC 1, c
```

```
DiBcam handle on asic [3].... [0x7fe5c685d7e8]
Num physical port on asic [4] is [0]
DiBcam handle on asic [4].... [0x0]
Num physical port on asic [5] is [0]
DiBcam handle on asic [5].... [0x0]
Port L2 Subblock
Enabled ..... [No]
Allow dot1q ..... [No]
Allow native ..... [No]
Default VLAN ..... [0]
Allow priority tag ... [No]
Allow unknown unicast [No]
Allow unknown multicast[No]
Allow unknown broadcast[No]
Allow unknown multicast[Enabled]
Allow unknown unicast [Enabled]
IPv4 ARP snoop ..... [No]
IPv6 ARP snoop ..... [No]
Jumbo MTU ..... [0]
Learning Mode ..... [0]
Port QoS Subblock
Trust Type ..... [0x7]
Default Value ..... [0]
Ingress Table Map ..... [0x0]
Egress Table Map ..... [0x0]
Queue Map ..... [0x0]
Port Netflow Subblock
Port Policy Subblock
List of Ingress Policies attached to an interface
List of Egress Policies attached to an interface
Ref Count : 5 (feature Ref Counts + 1)
IFM Feature Ref Counts
FID : 115, Ref Count : 1
FID : 78, Ref Count : 1
No Sub Blocks Present
```

此命令顯示對映介面的配置。

縮寫/例項	定義
IFM	介面管理員
例項	Gig1/0/13位於ASIC例項2 (UADP 2.0 ASIC 1 , 核心0) 上 , 介面ID為0x13
例項	Gig5/0/21位於ASIC例項3 (UADP 2.0 ASIC 1 , 核心1) 上 , 介面ID為0x8f

<#root>

C9400#

show platform software fed active ifm mappings

Interface	IF_ID	Inst	Asic	Core	Port	SubPort	Mac	Cntx	LPN	GPN	Type	Active
GigabitEthernet1/0/1	0x7	2	1	0	0	0	4	4	1	101	NIF	Y
GigabitEthernet1/0/2	0x8	2	1	0	1	1	4	4	2	102	NIF	Y
--snip--												
GigabitEthernet1/0/13	0x13	2	1	0	12	4	0	0	13	1105	NIF	Y
--snip--												
GigabitEthernet5/0/21	0x8f	3	1	1	20	4	5	5	21	1104	NIF	Y
--snip--												

全局Etherchannel配置

<#root>

C9400#

show platform software ether-channel rp active global-config

Forwarding Manager EtherChannel Global Configuration Information

Frame Dist Method:

Dest-IP-Address ---> distribution (hash) method: a packet's destination IP address is used to determine

<#root>

C9400#

show platform software ether-channel fp active global-config

Forwarding Manager EtherChannel Global Configuration Information

Frame Dist Method: Dest-IP-Address

AOM ID: 27

Status:

Done -----> Programming in hardware is complete (FP received acknowledgement from FED)

<#root>

C9400#

show platform software object-manager fp active object 27

Object identifier: 27

Description: EtherChannel global configuration object

Status: Done, Epoch: 0, Client data: 0x792e6e28


```
LEAD_VLAN_BLOCK_L2_LEARN value 0 Pass
LEAD_VLAN_CONTENT_MATCHING_ENABLED value 0 Pass
LEAD_VLAN_DEST_MOD_INDEX_TVLAN_LE value 0 Pass
LEAD_VLAN_DHCP_SNOOPING_ENABLED_IPV4 value 0 Pass
LEAD_VLAN_DHCP_SNOOPING_ENABLED_IPV6 value 0 Pass
LEAD_VLAN_ENABLE_SECURE_VLAN_LEARNING_IPV4 value 0 Pass
LEAD_VLAN_ENABLE_SECURE_VLAN_LEARNING_IPV6 value 0 Pass
LEAD_VLAN_EPOCH value 0 Pass
LEAD_VLAN_L2_PROCESSING_STP_TCN value 0 Pass
LEAD_VLAN_L2FORWARD_IPV4_MULTICAST_PKT value 0 Pass
LEAD_VLAN_L2FORWARD_IPV6_MULTICAST_PKT value 0 Pass
LEAD_VLAN_L3_IF_LE_INDEX_PRIO value 1 Pass
LEAD_VLAN_L3IF_LE_INDEX value 111 Pass

LEAD_VLAN_LOOKUP_VLAN value 10 Pass -----> MVID 10 = vlan 100

LEAD_VLAN_MCAST_LOOKUP_VLAN value 10 Pass
LEAD_VLAN_RIET_OFFSET value 1 Pass
LEAD_VLAN_SNOOPING_FLOODING_ENABLED_IGMP_OR_MLD_IPV4 value 0 Pass
LEAD_VLAN_SNOOPING_FLOODING_ENABLED_IGMP_OR_MLD_IPV6 value 1 Pass
LEAD_VLAN_SNOOPING_PROCESSING_STP_TCN_IGMP_OR_MLD_IPV4 value 0 Pass
LEAD_VLAN_SNOOPING_PROCESSING_STP_TCN_IGMP_OR_MLD_IPV6 value 0 Pass
LEAD_VLAN_VLAN_CLIENT_LABEL value 0 Pass
LEAD_VLAN_VLAN_CONFIG value 0 Pass
LEAD_VLAN_VLAN_FLOOD_ENABLED value 0 Pass
LEAD_VLAN_VLAN_ID_VALID value 1 Pass
LEAD_VLAN_VLAN_LOAD_BALANCE_GROUP value 15 Pass
LEAD_VLAN_VLAN_ROLE value 0 Pass
LEAD_VLAN_VLAN_FLOOD_MODE_BITS value 3 Pass
LEAD_VLAN_LVX_VLAN value 0 Pass
LEAD_VLAN_EGRESS_DEJAVU_CANON value 0 Pass
LEAD_VLAN_EGRESS_INGRESS_VLAN_MODE value 0 Pass
LEAD_VLAN_EGRESS_LOOKUP_VLAN value 0 Pass
LEAD_VLAN_EGRESS_SGACL_DISABLED value 3 Pass
LEAD_VLAN_EGRESS_VLAN_CLIENT_LABEL value 0 Pass
LEAD_VLAN_EGRESS_VLAN_ID_VALID value 1 Pass
LEAD_VLAN_EGRESS_VLAN_LOAD_BALANCE_GROUP value 15 Pass
LEAD_VLAN_EGRESS_INTRA_POD_BCAST value 0 Pass
LEAD_VLAN_EGRESS_INTER_POD_BCAST value 0 Pass
LEAD_VLAN_MAX value 0 Pass
```

Detailed Resource Information (ASIC#3)

```
---> ASIC instance 3 = Supervisor ASIC 1, core 1
```

```
--snip--
```

Detailed Resource Information (ASIC#4)

```
---> ASIC instance 4 = Supervisor ASIC 2, core 0
```

```
--snip-
```

Detailed Resource Information (ASIC#5)

```
---> ASIC instance 5 = Supervisor ASIC 2, core 1
```

```
--snip--
```

生成樹程式設計

```
<#root>
```

C9400#

show spanning-tree vlan 100

VLAN0100

Spanning tree enabled protocol rstp
Root ID Priority 32868
Address 20bb.c05e.5300
Cost 4
Port 2473 (Port-channel1)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 32868 (priority 32768 sys-id-ext 100)
Address 2c5a.0f1c.28c0
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300 sec

Interface	Role	Sts	Cost	Prio.Nbr	Type
Gi1/0/1	Desg	FWD	19	128.1	Shr
Gi2/0/11	Desg	FWD	4	128.107	P2p
Po1	Root	FWD	3	128.2473	P2p Peer(STP)

<#root>

C9400#

show etherchannel summary

--snip--

Group	Port-channel	Protocol	Ports
1	Po1(SU)	LACP	Gi1/0/13(P) Gi5/0/21(P)

這些命令顯示Port-channel 1的生成樹轉發狀態。

<#root>

C9400#

show platform software interface rp active brief

Forwarding Manager Interfaces Information

Name	ID	QFP ID
Null0	1	0
GigabitEthernet1/0/1	7	0
GigabitEthernet1/0/2	8	0
GigabitEthernet1/0/3	9	0

-snip-

```
Port-channel1          748          0
--snip--
```

<#root>

C9400#

```
show platform software fed active vp summary interface if_id 748
```

if_id	vlan_id	pvlan_mode	pvlan_vlan	stp_state	vtp pruned	Untagged
748	100	trunk	1	forwarding	No	No

以下命令顯示VLAN 100的生成樹硬體轉發狀態。

<#root>

C9400#

```
show platform software fed active vp summary vlan 100
```

if_id	vlan_id	pvlan_mode	pvlan_vlan	stp_state	vtp pruned	Untagged
748	100	trunk	1	forwarding	No	No

<#root>

C9400#

```
show platform hardware fed active vlan 100 ingress
```

VLAN STP State in hardware

vlan id is:: 100

Interfaces in forwarding state: : Gi2/0/11(Tagged), Gi1/0/1(Tagged), Gi1/0/13(Tagged), Gi5/0/21(Tagged)

flood list: : Gi2/0/11, Gi1/0/1, Gi1/0/13, Gi5/0/21

<#root>

C9400#

```
show platform hardware fed active vlan 100 egress
```

VLAN STP State in hardware

vlan id is:: 100

Interfaces in forwarding state: : Gi2/0/11(Tagged), Gi1/0/1(Tagged), Gi1/0/13(Tagged), Gi5/0/21(Tagged)

檢查生成樹穩定性。確保不經常看到拓撲更改通知(TCN)。

```
<#root>
```

```
C9400#
```

```
show spanning-tree vlan 100 detail
```

```
VLAN0100 is executing the rstp compatible Spanning Tree protocol
Bridge Identifier has priority 32768, sysid 10, address 2c5a.0f1c.28c0
Configured hello time 2, max age 20, forward delay 15, transmit hold-count 6
Current root has priority 32868, address 2c5a.0f1c.5300
Root port is 2473 (Port-channel1), cost of root path is 4
Topology change flag not set, detected flag not set
Number of topology changes 1 last change occurred 2w6d ago
    from Port-channel1
Times: hold 1, topology change 35, notification 2
    hello 2, max age 20, forward delay 15
Timers: hello 0, topology change 0, notification 0, aging 300
```

```
--snip--
```

L2轉發程式設計

```
<#root>
```

```
C9400#
```

```
show etherchannel summary
```

```
--snip--
```

Group	Port-channel	Protocol	Ports
1	Po1(SU)	LACP	Gi1/0/13(P) Gi5/0/21(P)

```
<#root>
```

```
C9400#
```

```
ping 100.100.900.53
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 100.100.900.53, timeout is 2 seconds:
```

```
!!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 3/4/5 ms
```

```
<#root>
```

```
C9400#
```

```
show mac address-table dynamic vlan 100
```

```
Mac Address Table
```

```
-----  
Vlan Mac Address      Type      Ports  
----  -  
100  0000.0200.0800  DYNAMIC  Gi1/0/1  
100  20bb.c05e.5318  DYNAMIC  Po1  
100  20bb.c05e.5351  DYNAMIC  Po1  
Total Mac Addresses for this criterion: 3
```

軟體程式設計

在下面的輸出示例中，RP對FP程式設計，FP對FED程式設計，FED最後對Supervisor轉發ASIC硬體程式設計。RP軟體MAC條目作為對象儲存在對象資料庫中，而FP軟體MAC條目作為非同步對象儲存在對象資料庫中。

```
<#root>
```

```
C9400#
```

```
show platform software matm rp active mac 20bb.c05e.5351 1 100 ---> 100 = vlan
```

```
Tbl_Type  Tbl_ID  MAC_Address  Type  Ports  AOM_ID/OM_PTR  
MAT_VLAN  100  20bb.c05e.5351  1  1  OM: 0x3700860010  
List of Ports: 748
```

```
<#root>
```

```
C9400#
```

```
show platform software interface rp active brief
```

```
Forwarding Manager Interfaces Information
```

```
Name                                     ID          QFP ID  
-----  
Null0                                    1          0  
GigabitEthernet1/0/1                    7          0  
GigabitEthernet1/0/2                    8          0  
GigabitEthernet1/0/3                    9          0  
-snip-  
Port-channel1                            748       0  
-snip-
```

```
<#root>
```

C9400#

show platform software matm fp active mac 20bb.c05e.5351

```
Tbl_Type  Tbl_ID  MAC_Address  Type  Ports  AOM_ID/OM_PTR
MAT_VLAN  100  20bb.c05e.5351  1  1  6567  created
List of Ports: 748
```

<#root>

C9400#

show platform software object-manager fp active object 6567

```
Object identifier: 6567
Description: matm mac entry type VLAN, id 100, 20bb.c05e.5351
Status: Done, Epoch: 0, Client data: 0x799633f8
```

硬體程式設計-方法1

<#root>

C9400#

show platform softwarefed active matm macTable vlan 100

VLAN MAC

Type

Seq#	macHandle	siHandle	diHandle	*a_time	*e_time	ports		
100	2c5a.0f1c.28e1	0X8002 0	0x7fe5c5eaf1c8	0x7fe5c5924f38	0x0	0	0	Vlan100
100	20bb.c05e.5351							

0x1

589	0x7fe5c6b03d68	0x7fe5c6865f78	0x7fe51001b458	300	1	Port-channel1		
100	0000.0200.0800	0X1 610	0x7fe5c6b07888	0x7fe5c6b076e8	0x7fe5c5972ce8	300	1	GigabitE

Total Mac number of addresses:: 3
*a_time=aging_time(secs) *e_time=total_elapsed_time(secs)

Type:

MAT_DYNAMIC_ADDR 0x1

MAT_STATIC_ADDR

0x2 ---> Type = dynamically learned MAC address entry

MAT_CPU_ADDR	0x4	MAT_DISCARD_ADDR	0x8
MAT_ALL_VLANS	0x10	MAT_NO_FORWARD	0x20
MAT_IPMULT_ADDR	0x40	MAT_RESYNC	0x80
MAT_DO_NOT_AGE	0x100	MAT_SECURE_ADDR	0x200
MAT_NO_PORT	0x400	MAT_DROP_ADDR	0x800
MAT_DUP_ADDR	0x1000	MAT_NULL_DESTINATION	0x2000
MAT_DOT1X_ADDR	0x4000	MAT_ROUTER_ADDR	0x8000
MAT_WIRELESS_ADDR	0x10000	MAT_SECURE_CFG_ADDR	0x20000

```

MAT_OPQ_DATA_PRESENT 0x40000 MAT_WIRED_TUNNEL_ADDR 0x80000
MAT_DLR_ADDR          0x100000 MAT_MRP_ADDR          0x200000
MAT_MSRRP_ADDR        0x400000 MAT_LISP_LOCAL_ADDR   0x800000
MAT_LISP_REMOTE_ADDR  0x1000000 MAT_VPLS_ADDR         0x2000000

```

macHandle程式設計

縮寫/Term	定義
vlan : 10	MVID 10。VLAN 100在交換機內部使用對映VLAN ID (MVID) 10。
gpn : 1104	Port-channel 1的全局埠號。
mac : 0x20bbc05e5351	MAC address 20bb.c05e.5351

以下是macHandle程式設計輸出示例：

```
<#root>
```

```
C9400#
```

```
show platform hardware fed active fwd-asic abstraction print-resource-handle 0x7fe5c6b03d68 1
```

```

Handle:0x7fe5c6b03d68 Res-Type:ASIC_RSC_HASH_TCAM Res-Switch-Num:0 Asic-Num:255 Feature-ID:AL_FID_L2 Lk
priv_ri/priv_si Handle: (nil)Hardware Indices/Handles: handle [ASIC: 0]: 0x7fe5c6aed898 handle [ASIC: 1
Features sharing this resource:Cookie length: 12
5e c0 bb 20 51 53 0a 80 07 00 00 00

```

```
Detailed Resource Information (ASIC#0)
```

```
-----
Number of HTM Entries: 1
```

```
Entry 0: (handle 0x7fe5c6aed898)
```

```
Abs_hash_index: 294
```

```

KEY - vlan:10 mac:0x20bbc05e5351 l3_if:0 gpn:1104 epoch:0 static:0 flood_en: 0 vlan_lead_wless_flood_en
MASK - vlan:0 mac:0x0 l3_if:0 gpn:0 epoch:0 static:0 flood_en:0 vlan_lead_wless_flood_en: 0 client_home
SRC_AD - need_to_learn:0 lrn_v:0 catchall:0 static_mac:0 chain_ptr_v:0 chain_ptr: 0 static_entry_v:0 au
DST_AD - si:0xcd bridge:0 replicate:0 blk_fwd_o:0 v4_rmac:0 v6_rmac:0 catchall:0 ign_src_lrn:0 port_mas

```

```
Detailed Resource Information (ASIC#1)
```

```
--snip--
```

```
Detailed Resource Information (ASIC#2)
```

```
--snip--
```

```
<#root>
```

```
C9400#
```

```
show platform software fed active vlan 100
```

VLAN Fed Information

Vlan Id	IF Id	LE Handle	STP Handle	L3 IF Handle	SVI IF ID
100	0x000000000420011	0x00007fe5c4616ef8	0x00007fe5c4617778	0x00007fe5c50dac28	0x00000000000002ea

<#root>

C9400#

```
show platform software fed active ifm mappings etherchannel
```

Mappings Table

Chan	Interface	IF_ID
1	Port-channel1	0x000002ec

--snip--

<#root>


C9400#

```
show platform software fed active ifm if-id 0x000002ec <-- IF_ID from previous output
```

Interface IF_ID : 0x00000000000002ec
Interface Name : Port-channel1
Interface Block Pointer : 0x7fe5c685df98
Interface State : READY
Interface Status : ADD, UPD
Interface Ref-Cnt : 5
Interface Type : ETHERCHANNEL
Port Type : SWITCH PORT
Channel Number : 1
SNMP IF Index : 720
Port Handle : 0x50002f6
#Of Active Ports : 2
Base GPN : 1104
Index[2] : 0000000000000013
Index[3] : 000000000000008f

Port Information

Handle [0x50002f6]
Type [L2-Ethchannel]
Identifier [0x2ec]
Unit [1]
Port Logical Subblock
L3IF_LE handle [0x0]
Num physical port . [2]
GPN Base [1104]
--snip--

 注意：mac獲知的介面是單個介面而不是埠通道，此命令用於確定GPN到介面的對映

```
<#root>
```

```
C9400#
```

```
show platform software fed active ifm mappings gpn
```

```
Mappings Table
```

```
GPN   Interface                IF_ID
-----
101   GigabitEthernet1/0/1       0x00000007
102   GigabitEthernet1/0/2       0x00000008
103   GigabitEthernet1/0/3       0x00000009
--snip--
```

siHandle程式設計

縮寫/Term	定義
siHandle	站台索引控制代碼。資料包重寫資訊 (RI =重寫索引) 和傳出介面資訊 (DI =目標索引)。

單一Supervisor ASIC上雙核心的複製點陣圖：

	縮寫/術語	定義
	本地ASIC (LD =本地 資料)	位於同一ASIC、與來源相同核心上的目的地。
	核心複製(CD =核心資料)	位於同一個ASIC (另一個核心) 上的目標。
	遠端ASIC (RD =遠端 資料)	另一個ASIC上的目的地。

```
<#root>
```

```
C9400#
```

show platform hardware fed active fwd-asic abstraction print-resource-handle 0x7fe5c6865f78 1

Handle:0x7fe5c6865f78 Res-Type:ASIC_RSC_SI Res-Switch-Num:255 Asic-Num:255 Feature-ID:AL_FID_L3_UNICAST
priv_ri/priv_si Handle: 0x7fe5c6864938Hardware Indices/Handles: index0:0xcd mtu_index/13u_ri_index0:0x0
Features sharing this resource:64 (1)
55 (1)]
Cookie length: 56
00 00 00 00 00 00 00 00 64 00 00 00 00 00 00 00 00 00 00 07 00 20 bb c0 5e 53 51 00 00 00 00 00 00 00 00

Detailed Resource Information (ASIC#0)

---> ASIC instance 0 = Supervisor ASIC 0, core 0

Station Index (SI) [0xcd]

RI = 0x29 -----> Rewrite index (no MAC rewrite for L2 forwarding)

DI = 0x51c2 -----> Destination index = outgoing interface

stationTableGenericLabel = 0
stationFdConstructionLabel = 0
lookupSkipIdIndex = 0
rcpServiceId = 0
dejaVuPreCheckEn = 0x1
Replication Bitmap: LD RD CD

Detailed Resource Information (ASIC#1)

---> ASIC instance 1 = Supervisor ASIC 0, core 1

--snip--

Detailed Resource Information (ASIC#2)

---> ASIC instance 2 = Supervisor ASIC 1, core 0

--snip--

Detailed Resource Information (ASIC#3)

---> ASIC instance 3 = Supervisor ASIC 1, core 1

--snip--

Detailed Resource Information (ASIC#4)

---> ASIC instance 4 = Supervisor ASIC 2, core 0

--snip--

Detailed Resource Information (ASIC#5)

---> ASIC instance 5 = Supervisor ASIC 2, core 1

--snip--

<#root>

C9400#

show platform hardware fed active fwd-asic resource asic all destination-index range 0x51c2 0x51c2

ASIC#0:

--snip--

ASIC#1:
--snip--

ASIC#2: -----> ASIC Instance 2 = Supervisor ASIC 1, core 0

Destination Index (DI) [0x51c2]

portMap =

0x00000000 00001000 ---> binary 0001 0000 0000 0000 = Port 12 (see next command output)

cmi1 = 0

(read right to left, zero based)

rcpPortMap = 0

CPU Map Index (CMI) [0]

ctiLo0 = 0

ctiLo1 = 0

ctiLo2 = 0

cpuQNum0 = 0

cpuQNum1 = 0

cpuQNum2 = 0

npuIndex = 0

stripSeg = 0

copySeg = 0

ASIC#3: -----> ASIC instance 3 = Supervisor ASIC 1, core 1

Destination Index (DI) [0x51c2]

portMap =

0x00000000 00100000 ---> binary 0001 0000 0000 0000 0000 0000 = Port 20 (see next command output)

cmi1 = 0

(read right to left, zero based)

rcpPortMap = 0

CPU Map Index (CMI) [0]

ctiLo0 = 0

ctiLo1 = 0

ctiLo2 = 0

cpuQNum0 = 0

cpuQNum1 = 0

cpuQNum2 = 0

npuIndex = 0

stripSeg = 0

copySeg = 0

ASIC#4:
--snip--

ASIC#5:
--snip--

<#root>

C9400#

show platform software fed active ifm mappings

Interface	IF_ID	Inst	Asic	Core	Port	SubPort	Mac	Cntx	LPN	GPN	Type	Active
-----------	-------	------	------	------	------	---------	-----	------	-----	-----	------	--------

```
GigabitEthernet1/0/1 0x7 2 1 0 0 0 4 4 1 101 NIF Y
GigabitEthernet1/0/2 0x8 2 1 0 1 1 4 4 2 102 NIF Y
--snip--
GigabitEthernet1/0/13 0x13 2 1 0 12 4 0 0 13 1105 NIF Y
--snip--
GigabitEthernet5/0/21 0x8f 3 1 1 20 4 5 5 21 1104 NIF Y
--snip--
```

<#root>

C9400#

show etherchannel summary

--snip--

Group	Port-channel	Protocol	Ports
1	Po1(SU)	LACP	Gi1/0/13(P) Gi5/0/21(P)

沒有預期的MAC返回資訊，因為這是第2層MAC轉發條目。

<#root>

C9400#

show platform hardware fed active fwd-asic resource asic all rewrite-index range 0x29 0x29 1

ASIC#0:

Rewrite Data Table Entry,
ASIC#:0, rewrite_type:1,

RI:41 ----> dec 41 = hex 0x29

MAC Addr:

MAC Addr: 20:bb:c0:5e:53:51,
L3IF LE Index 111

ASIC#1:

Rewrite Data Table Entry,
ASIC#:1, rewrite_type:1, RI:41

MAC Addr:

MAC Addr: 20:bb:c0:5e:53:51,
L3IF LE Index 111

ASIC#2:

--snip--

ASIC#3:

--snip--

ASIC#4:

--snip--

ASIC#5:

--snip--

<#root>

C9400#

```
show mac address-table address 20bb.c05e.5351
```

Mac Address Table

```
-----  
Vlan    Mac Address      Type      Ports  
----    -  
100     20bb.c05e.5351  DYNAMIC   Po1  
Total Mac Addresses for this criterion: 1
```

diHandle程式設計

縮寫	定義
diHandle	目標索引控制代碼。這是傳出介面資訊。

<#root>

C9400#

```
show platform hardware fed active fwd-asic abstraction print-resource-handle 0x7fe51001b458 1
```

```
Handle:0x7fe51001b458 Res-Type:ASIC_RSC_DI Res-Switch-Num:0 Asic-Num:255 Feature-ID:AL_FID_INVALID Lkp-priv-ri/priv-si Handle: (nil)Hardware Indices/Handles: index0:0x51c2 mtu_index/13u-ri_index0:0x0 index1  
Features sharing this resource:Cookie length: 8  
01 00 00 00 c2 51 00 00
```

Detailed Resource Information (ASIC#0)

--snip--

Detailed Resource Information (ASIC#1)

--snip--

Detailed Resource Information (ASIC#2)

---> ASIC Instance 2 = Supervisor ASIC 1, core 0

Destination Index (DI) [0x51c2]

portMap =

0x00000000 00001000 -----> binary 0001 0000 0000 0000 = Port 12 (see next command output)

cmi1 = 0

(

read right to left, zero based)

rcpPortMap = 0

CPU Map Index (CMI) [0]

ctiLo0 = 0

ctiLo1 = 0

ctiLo2 = 0

cpuQNum0 = 0
cpuQNum1 = 0
cpuQNum2 = 0
npuIndex = 0
stripSeg = 0
copySeg = 0

Detailed Resource Information (ASIC#3)

---> ASIC Instance 3 = Supervisor ASIC 1, core 1

Destination Index (DI) [0x51c2]

portMap =

0x00000000 00100000 ---> binary 0001 0000 0000 0000 0000 0000 = Port 20 (see next command output)

cmi1 = 0

(read right to left, zero based)

rcpPortMap = 0

CPU Map Index (CMI) [0]

ctiLo0 = 0

ctiLo1 = 0

ctiLo2 = 0

cpuQNum0 = 0

cpuQNum1 = 0

cpuQNum2 = 0

npuIndex = 0

stripSeg = 0

copySeg = 0

Detailed Resource Information (ASIC#4)

--snip--

Detailed Resource Information (ASIC#5)

--snip--

<#root>

C9400#

show platform software fed active ifm mappings

Interface	IF_ID	Inst	Asic	Core	Port	SubPort	Mac	Cntx	LPN	GPN	Type	Active
GigabitEthernet1/0/1	0x7	2	1	0	0	0	4	4	1	101	NIF	Y
GigabitEthernet1/0/2	0x8	2	1	0	1	1	4	4	2	102	NIF	Y
--snip--												
GigabitEthernet1/0/13	0x13	2	1	0	12	4	0	0	13	1105	NIF	Y
--snip--												
GigabitEthernet5/0/21	0x8f	3	1	1	20	4	5	5	21	1104	NIF	Y
--snip--												

<#root>

C9400#

show etherchannel summary

--snip--

Group	Port-channel	Protocol	Ports
1	Po1(SU)	LACP	Gi1/0/13(P) Gi5/0/21(P)

硬體程式設計-方法2

縮寫/Term	定義
vlan : 10	MVID 10。VLAN 100在交換機內部使用對映VLAN ID (MVID) 10。
gpn : 1104	Port-channel 1的全局埠號。
mac : 0x20bbc05e5351	MAC address 20bb.c05e.5351

硬體程式設計方法2示例輸出：

<#root>

C9400#

```
show platform hardware fed active matm macTable vlan 100
```

--snip--

HEAD: MAC address 20bb.c05e.5351 in VLAN 100

KEY: vlan 10, mac 0x20bbc05e5351, l3_if 0, gpn 1104, epoch 0, static 0, flood_en 0, vlan_lead_wless_flood_en 0

MASK: vlan 0, mac 0x0, l3_if 0, gpn 0, epoch 0, static 0, flood_en 0, vlan_lead_wless_flood_en 0, client_learn 0

SRC_AD: need_to_learn 0, lrn_v 0, catchall 0, static_mac 0, chain_ptr_v 0, chain_ptr 0, static_entry_v 0, static_mac 0

DST_AD: si 0xc7, bridge 0, replicate 0, blk_fwd_o 0, v4_mac 0, v6_mac 0, catchall 0, ign_src_lrn 0, port_learn 0

--snip--

<#root>

C9400#

```
show platform software fed active vlan 100
```

VLAN Fed Information

Vlan Id	IF Id	LE Handle	STP Handle	L3 IF Handle	SVI IF ID
100	0x0000000000420011	0x00007fe5c4616ef8	0x00007fe5c4617778	0x00007fe5c50dac28	0x00000000000002ea

<#root>

C9400#

```
show platform software fed active ifm mappings etherchannel
```

Mappings Table

Chan	Interface	IF_ID
1	Port-channel1	0x000002ec

--snip--

<#root>


C9400#

```
show platform software fed active ifm if-id 0x000002ec
```

Interface IF_ID : 0x00000000000002ec
Interface Name : Port-channel1
Interface Block Pointer : 0x7fe5c685df98
Interface State : READY
Interface Status : ADD, UPD
Interface Ref-Cnt : 5
Interface Type : ETHERCHANNEL
Port Type : SWITCH PORT
Channel Number : 1
SNMP IF Index : 720
Port Handle : 0x50002f6
#Of Active Ports : 2
Base GPN : 1104
Index[2] : 0000000000000013
Index[3] : 000000000000008f

Port Information

Handle [0x50002f6]
Type [L2-Ethchannel]
Identifier [0x2ec]
Unit [1]
Port Logical Subblock
L3IF_LE handle [0x0]
Num physical port . [2]
GPN Base [1104]
--snip--

 注意：如果mac獲知的介面是單個介面而不是埠通道，則下一個命令用於確定gpn到介面的對映：

<#root>

C9400#

```
show platform software fed active ifm mappings gpn
```

Mappings Table


```

GPN   Interface           IF_ID
-----
101   GigabitEthernet1/0/1 0x00000007
102   GigabitEthernet1/0/2 0x00000008
103   GigabitEthernet1/0/3 0x00000009
--snip--

```

TCAM利用率

檢查每個Supervisor ASIC例項上MAC地址條目的TCAM利用率，以確保交換機不會耗盡TCAM空間來在硬體中儲存條目。

<#root>

C9400

```
show platform hardware fed active fwd-asic resource tcam utilization
```

```
CAM Utilization for ASIC Instance [0]
```

```
--snip--
```

```
CAM Utilization for ASIC Instance [1]
```

```
--snip--
```

```
CAM Utilization for ASIC Instance [2]
```

```
--snip--
```

```
CAM Utilization for ASIC Instance [3]---> ASIC instance 3 = Supervisor ASIC 1, Core 1
```

Table	Max Values	Used Values
Unicast MAC addresses	65536/1024	
13/1 -----> prefix/mask		
IGMP and Multicast groups	16384/1024	0/7
L2 Multicast groups	16384/1024	1/9
Directly or indirectly connected routes	49152/65536	0/0
NAT/PAT SA address and Port	0	0
QoS Access Control Entries	18432	34
Security Access Control Entries	18432	0
Ingress Netflow ACEs	1024	0
Policy Based Routing ACEs	2048	9
Egress Netflow ACEs	2048	8
Input Microflow policer ACEs	0	0
Output Microflow policer ACEs	0	0
Flow SPAN ACEs	1024	13
Control Plane Entries	1024	0
Tunnels	1024	0
Lisp Instance Mapping Entries	1024	0
Input Security Associations	512	3
Output Security Associations and Policies	512	0
SGT_DGT	8192/512	0/0
CLIENT_LE	4096/256	2/0
INPUT_GROUP_LE	1024	0
OUTPUT_GROUP_LE	1024	0
Macsec SPD	256	0
CAM Utilization for ASIC Instance [4]		

```
--snip--  
CAM Utilization for ASIC Instance [5]  
--snip--
```

成功的硬體程式設計

所有功能（無論是mac地址、介面、vlan等）都儲存在對象資料庫中，並作為對象程式設計到硬體中。

RP對FP程式設計，FP對FED程式設計，FED最後對Supervisor轉發ASIC硬體程式設計。RP軟體條目作為對象資料庫中的對象儲存，FP軟體條目作為非同步對象儲存在對象資料庫中。

當FP對FED程式設計（FED進而對Supervisor轉發ASIC程式設計）時，FED會向FP傳送確認。然後FP將其轉發給RP，以表明硬體程式設計已成功完成。如果FED硬體程式設計丟失或不正確，您可以使用此下一個命令來檢查問題和/或確認。

```
<#root>
```

```
C9400#
```

```
show platform software object-manager fp active statistics
```

```
Forwarding Manager Asynchronous Object Manager Statistics
```

```
Object update: Pending-issue: 0, Pending-acknowledgement: 0  
Batch begin:   Pending-issue: 0, Pending-acknowledgement: 0  
Batch end:     Pending-issue: 0, Pending-acknowledgement: 0  
Command:      Pending-acknowledgement: 0  
Total-objects: 3269  
Stale-objects: 0  
Resolve-objects: 0  
Error-objects: 0  
Paused-types: 0
```

如果之前的命令顯示非零對象處於待處理問題狀態，請使用此命令查詢所涉及的對象編號：

```
<#root>
```

```
C9400#
```

```
show platform software object-manager fp active pending-issue-update
```

然後使用此命令來確定與對象編號相關聯的停滯進程：

```
<#root>
```

```
C9400#
```

```
show platform software object-manager fp active object {object#}
```

在RP端，使用此命令檢查FP未確認的對象的刪除掛起（刪除Pend）。

```
<#root>
```

```
C9400#
```

```
show platform software object-manager rp active object-type-info
```

Object type	Name	Count	Del Pend	Layer
CC	cc	5	0	2
SPA	spa	0	0	4
PORT_DPIDB	port_dpodb	164	0	10
CHANNEL_DPIDB	channel_dpodb	0	0	12
VIRTUAL_DPIDB	virtual_dpodb	503	0	13
SW_DPIDB	sw_dpodb	0	0	17
VLAN	vlan	0	0	19

--snip--

狀況檢查

控制平面流量和策略

檢查硬體UADP 2.0中傳送到軟體CPU的資料流的CoPP（控制層面策略）丟棄。這可能會影響MAC學習和生成樹穩定性。

```
<#root>
```

```
C9400#
```

```
show policy-map control-plane
```

```
Control Plane
```

```
Service-policy input: system-cpp-policy
```

```
--snip--
```

```
Class-map: system-cpp-police-sw-forward (match-any)
  0 packets, 0 bytes
  5 minute offered rate 0000 bps, drop rate 0000 bps
  Match: none
  police:
    rate 1000 pps, burst 244 packets
    conformed 1298 bytes; actions:
      transmit
    exceeded 0 bytes; actions:
      drop
```

--snip--

```
Class-map: system-cpp-police-l2-control (match-any)
  0 packets, 0 bytes
  5 minute offered rate 0000 bps, drop rate 0000 bps
  Match: none
  police:
    rate 500 pps, burst 122 packets
    conformed 239197001 bytes; actions:
      transmit
    exceeded 0 bytes; actions:
      drop
```

--snip--

```
Class-map: system-cpp-default (match-any)
  0 packets, 0 bytes
  5 minute offered rate 0000 bps, drop rate 0000 bps
  Match: none
  police:
    rate 1000 pps, burst 244 packets
    conformed 0 bytes; actions:
      transmit
    exceeded 0 bytes; actions:
      drop
```

```
Class-map: class-default (match-any)
  0 packets, 0 bytes
  5 minute offered rate 0000 bps, drop rate 0000 bps
  Match: any
```

與上一個示例相同的CoPP輸出在此以更精細和更簡單的讀取 (壓縮) 格式顯示。

<#root>

C9400#

show platform hardware fed active qos queue stats internal cpu policer

CPU Queue Statistics

```
=====
```

QId	PlcIdx	Queue Name	Enabled	(default) Rate	(set) Rate	Queue Drop(Bytes)	Queue Drop(Frames)
0	11	DOT1X Auth	Yes	1000	1000	0	0
1	1	L2 Control	Yes	2000	400	0	0
2	14	Forus traffic	Yes	1000	1000	0	0
3	0	ICMP GEN	Yes	600	600	0	0
4	2	Routing Control	Yes	5400	1800	0	0
5	14	Forus Address resolution	Yes	1000	1000	0	0
6	0	ICMP Redirect	Yes	600	600	0	0
7	16	Unused	Yes	1000	1000	0	0
8	4	L2 LVX Cont Pack	Yes	1000	1000	0	0
9	16	EWLC Control	Yes	1000	1000	0	0
10	16	EWLC Data	Yes	1000	1000	0	0
11	13	L2 LVX Data Pack	Yes	1000	1000	0	0

12	0	BROADCAST	Yes	600	600	0	0
13	10	Learning cache ovfl	Yes	100	200	0	0
14	13	Sw forwarding	Yes	1000	1000	0	0
15	8	Topology Control	Yes	13000	13000	0	0
16	12	Proto Snooping	Yes	2000	2000	0	0
17	16	DHCP Snooping	Yes	1000	1000	0	0
18	9	Transit Traffic	Yes	500	400	0	0
19	10	RPF Failed	Yes	100	200	0	0
20	15	MCAST END STATION	Yes	2000	2000	0	0
21	13	LOGGING	Yes	1000	1000	0	0
22	7	Punt Webauth	Yes	1000	1000	0	0
23	10	Crypto Control	Yes	100	200	0	0
24	10	Exception	Yes	100	200	0	0
25	3	General Punt	Yes	200	200	0	0
26	10	NFL SAMPLED DATA	Yes	100	200	0	0
27	2	Low Latency	Yes	5400	1800	0	0
28	10	EGR Exception	Yes	100	200	0	0
29	5	Stackwise Virtual Control	No	8000	8000	0	0
30	9	MCAST Data	Yes	500	400	0	0
31	10	Gold Pkt	Yes	100	200	0	0

* NOTE: CPU queue policer rates are configured to the closest hardware supported value

CPU Queue Policer Statistics

Policer Index	Policer Accept Bytes	Policer Accept Frames	Policer Drop Bytes	Policer Drop Frames
0	3132	36	0	0
1	239197001	721952	0	0
2	123004776	978818	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	1024	16	0	0
9	0	0	0	0
10	13600	200	0	0
11	0	0	0	0
12	0	0	0	0
13	1298	3	0	0
14	80520	9158	0	0
15	2189268	23733	0	0
16	0	0	0	0
17	0	0	0	0

CPP Classes to queue map

PlcIdx	CPP Class	Queues
0	system-cpp-police-data	: ICMP GEN/BROADCAST/ICMP Redirect/
10	system-cpp-police-sys-data	: Learning cache ovfl/Crypto Control/Exception/EGR Exc
13	system-cpp-police-sw-forward	: Sw forwarding/LOGGING/L2 LVX Data Pack/
9	system-cpp-police-multicast	: Transit Traffic/MCAST Data/
15	system-cpp-police-multicast-end-station	: MCAST END STATION /
7	system-cpp-police-punt-webauth	: Punt Webauth/
1	system-cpp-police-l2-control	: L2 Control/
5	system-cpp-police-stackwise-virt-control	: Stackwise Virtual Control/
2	system-cpp-police-routing-control	: Routing Control/Low Latency/
3	system-cpp-police-control-low-priority	: General Punt/
4	system-cpp-police-l2lvx-control	: L2 LVX Cont Pack/

```
8      system-cpp-police-topology-control      : Topology Control/
11     system-cpp-police-dot1x-auth           : DOT1X Auth/
12     system-cpp-police-protocol-snooping    : Proto Snooping/
14     system-cpp-police-forus                : Forus Address resolution/Forus traffic/
5      system-cpp-police-stackwise-virt-control : Stackwise Virtual Control/
16     system-cpp-default                     : DHCP Snooping/Unused/EWLC Control/EWLC Data/
```

從軟體(CPU)的角度檢查CPU傳送路徑 (硬體-UADP 2.0到軟體-CPU) 統計資訊。

<#root>

C9400#

```
show platform software infrastructure lsmapi
```

```
LSMPI interface internal stats:
enabled=0, disabled=0, throttled=0, unthrottled=0, state is ready
Input Buffers = 8801257
Output Buffers = 5506129
rxdone count = 8801257
txdone count = 5506128
Rx no particletype count = 0
Tx no particletype count = 0
Txbuf from shadow count = 0
No start of packet = 0
No end of packet = 0
Punt drop stats:
Bad version 0
Bad type 0
Had feature header 0
Had platform header 0
Feature header missing 0
Common header mismatch 0
Bad total length 0
Bad packet length 0
Bad network offset 0
Not punt header 0
Unknown link type 0
No swidb 0
Bad ESS feature header 0
No ESS feature 0
No SSLVPN feature 0
No PPP bridge feature 0
Punt For PPP bridge type packets 0
Punt For Us type unknown 0
EPC CP RX Pkt cleansed 0
Punt cause out of range 0
IOSXE-RP Punt packet causes:
    42879 Layer2 control and legacy packets
    3644168 ARP request or response packets
        7584 For-us data packets
        1794 Mcast Directly Connected Source packets
        1573 Mcast PIM signaling packets
        750076 For-us control packets
38058 Layer2 bridge domain data packet packets
3823736 Layer2 control protocols packets
```

```

FOR_US Control IPv4 protocol stats:
  750076 [proto=0] packets
Packet histogram(500 bytes/bin), avg size in 125, out 126:
Pak-Size      In-Count      Out-Count
  0+:          8228322      5207592
  500+:        41355        1717
  1000+:       4331         2402
  1500+:       35860        20017

```

```
Lsmpi11/3 is up, line protocol is up
```

```
<-- CPU interface
```

```

Hardware is LSMPI
MTU 1500 bytes, BW 1000000 Kbit/sec, DLY 10 usec,
  reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive not set
Unknown, Unknown, media type is unknown media type
output flow-control is unsupported, input flow-control is unsupported
ARP type: ARPA, ARP Timeout 04:00:00
Last input never, output never, output hang never
Last clearing of "show interface" counters never
Input queue: 0/1500/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: fifo
Output queue: 0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
  8309868 packets input, 0 bytes, 0 no buffer
  Received 0 broadcasts (0 IP multicasts)
  0 runts, 0 giants, 0 throttles
  0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
  0 watchdog, 0 multicast, 0 pause input
  5231728 packets output, 659535525 bytes, 0 underruns
  0 output errors, 0 collisions, 0 interface resets
  0 unknown protocol drops
  0 output buffer failures, 0 output buffers swapped out

```

```
<#root>
```

```
C9400#
```

```
show platform software infrastructure lsmpi punt
```

```
LSMPI punt statistics
```

```

Total packets consumed:          876
Total packets forwarded:        8468766
First frag packets:              0
Total packets consumed & forwarded: 0

```

Cause	Total consumed	Total forwarded	Length error	Dot1q encap exceeded	Other linktype
MPLS ICMP Can't Fragment	0	0	0	0	0

IPv4 Options	0	0	0	0	0
Layer2 control and legacy	0	0	0	0	0
PPP Control	0	0	0	0	0
CLNS IS-IS Control	0	0	0	0	0
HDLC keepalives	0	0	0	0	0
--snip--					

從軟體(CPU)的角度檢查CPU注入路徑 (軟體-CPU到硬體-Supervisor) 統計資訊。

```
<#root>
```

```
C9400#
```

```
show platform software infrastructure inject
```

```
Statistics for L3 injected packets:
```

```
5233473 total inject pak, 3 failed
```

```
0 sent, 859329 prerouted
```

```
0 non-CEF capable, 855296 non-unicast
```

```
859826 IP, 0 IPv6
```

```
0 MPLS, 0 Non-IP Tunnel
```

```
0 UDLR tunnel, 0 P2MP replicated mcast
```

```
0 Non-IP Fastswitched over Tunnel, 4373497 legacy pak path
```

```
0 Other packet
```

```
0 IP fragmented
```

```
644 normal, 391 nexthop
```

```
858788 adjacency, 150 feature
```

```
0 undefined
```

```
3 pak find no adj, 0 no adj-id
```

```
137322 sb alloc, 856085 sb local
```

```
0 p2mcast failed count 0 p2mcast enqueue fail
```

```
0 unicast dhc
```

```
0 mobile ip
```

```
0 IPv6 NA
```

```
0 IPv6 NS
```

```
0 Transport failed cases
```

```
0 Grow packet buffer
```

```
per feature packet inject statistics
```

```
150 Feature multicast
```

```
0 Feature Edge Switching Service
```

```
0 Feature Session Border Controller
```

```
0 Feature interrupt level
```

```
0 Feature use outbound interface
```

```
0 Feature interrupt level with OCE
```

```
0 Feature ICMPv6 error message
```

```
0 Feature Session Border Controller media packet injection
```

```
0 Feature Tunnel Ethernet over GRE
```

```
0 Feature Secure Socket Layer Virtual Private Network
```

```
0 Feature EPC Wireshark injecting packets
```

```
Statistics for L2 injected packets:
```

```
0 total L2 inject pak, 0 failed
```

```
0 total BD inject pak, 0 failed
```

```
0 total EFP inject pak, 0 failed
```

```
0 total VLAN inject pak, 0 failed
```


從FED (UADP 2.0)角度檢查CPU傳送/插入路徑統計資訊。

<#root>

C9400#

show platform software fed active lsmpi stat

LSMPI Statistics

```
-----  
Transmit: -----> FED transmit = FED (Supervisor) punt to CPU  
  Packet Count      : 8469445  
  Bytes Count      : 1055390613  
  particle Count    : 8951009  
  particle with App : 7258  
  Ring Full Error   : 0  
  No Buff Error     : 0  
  TX Ring Free      : 2047  
  TX Ring Busy      : 0  
  TX Ring Size      : 2048  
  TXDone Ring Free  : 6816  
  TXDone Ring Busy  : 9567  
  TXDone Ring Size  : 16384  
Receive: -----> FED receive = CPU inject to FED (Supervisor)  
  Packet Count      : 5450099  
  Bytes Count      : 675084903  
  Particle Count    : 5695697  
  Particles with App : 4294966854  
  RX Done Count     : 5696139  
  No SOP            : 0  
  No EOP            : 0  
  Not Enough Buf    : 0  
  Max Not Enough Buf : 0  
  RX Ring Free      : 4095  
  RX Ring Busy      : 0  
  RX Ring Size      : 4096  
  RXDone Ring Free  : 8191  
  RXDone Ring Busy  : 0  
  RXDone Ring Size  : 8192  
-----
```

從FED (Supervisor)的角度檢查CPU傳送路徑 (硬體-Supervisor到軟體-CPU) 統計資訊。

<#root>

C9400#

show platform software fed active punt cause summary

Statistics for all causes

Cause	Cause Info	Rcvd	Dropped
-------	------------	------	---------

7	ARP request or response	3644168	0
11	For-us data	1524	0
12	Mcast Directly Connected Source	1794	0
25	Mcast PIM signaling	1573	0
55	For-us control	750461	0
58	Layer2 bridge domain data packet	38058	0
96	Layer2 control protocols	3825228	0

從FED (Supervisor)的角度檢查31個單個CPU傳送队列的運行狀況。

<#root>

C9400#

show platform software fed active cpu-interface

queue	retrieved	dropped	invalid	hol-block
Routing Protocol	790844	0	0	0
L2 Protocol	2774488	0	0	0
sw forwarding	0	0	0	0
broadcast	0	0	0	0
icmp	0	0	0	0
icmp redirect	0	0	0	0
logging	0	0	0	0
rpf-fail	1573	0	0	0
DOT1X authentication	0	0	0	0
Forus Traffic	1524	0	0	0
Forus Resolution	3644192	0	0	0
Wireless q5	0	0	0	0
Wireless q1	0	0	0	0
Wireless q2	0	0	0	0
Wireless q3	0	0	0	0
Wireless q4	0	0	0	0
Learning cache	0	0	0	0
Topology control	1198807	0	0	0
Proto snooping	0	0	0	0
BFD Low latency	0	0	0	0
Transit Traffic	0	0	0	0
Multi End station	38058	0	0	0
Health Check	0	0	0	0
Health Check	0	0	0	0
Crypto control	0	0	0	0
Exception	0	0	0	0
General Punt	0	0	0	0
NFL sampled data	0	0	0	0
STG cache	0	0	0	0
EGR exception	0	0	0	0
FSS	0	0	0	0
Multicast data	1794	0	0	0

<#root>

C9400#

show platform software fed active punt cpuq all

Punt CPU Q Statistics

=====

-snip-

```
CPU Q Id           : 1
CPU Q Name         : CPU_Q_L2_CONTROL

Packets received from ASIC      : 2669864 -----> Packets received by the FED process from the Super
Send to IOSd total attempts    : 2669864 -----> Packets sent from the FED process to IOSd

Send to IOSd failed count      : 0
RX suspend count               : 0
RX unsuspend count             : 0
RX unsuspend send count        : 0
RX unsuspend send failed count : 0
RX consumed count              : 0
RX dropped count                : 0
RX non-active dropped count     : 0
RX conversion failure dropped   : 0
RX INTACK count                : 2243784
RX packets dq'd after intack    : 5074
Active RxQ event                : 2243785
RX spurious interrupt          : 322266
```

```
CPU Q Id           : 2
CPU Q Name         : CPU_Q_FORUS_TRAFFIC
Packets received from ASIC      : 1524
Send to IOSd total attempts    : 1524
Send to IOSd failed count      : 0
RX suspend count               : 0
RX unsuspend count             : 0
RX unsuspend send count        : 0
RX unsuspend send failed count : 0
RX consumed count              : 0
RX dropped count                : 0
RX non-active dropped count     : 0
RX conversion failure dropped   : 0
RX INTACK count                : 1347
RX packets dq'd after intack    : 8
Active RxQ event                : 1347
RX spurious interrupt          : 38
```

-snip-

從FED (Supervisor)的角度檢查CPU注入路徑 (軟體-CPU到硬體-Supervisor) 統計資訊。

<#root>

C9400#

show platform software fed active inject cause summary

Statistics for all causes

Cause	Cause Info	Rcvd	Dropped
1	L2 control/legacy	4331682	0
2	QFP destination lookup	290	0
3	QFP IPv4/v6 nexthop lookup	391	0
7	QFP adjacency-id lookup	859393	265
8	Mcast specific inject packet	150	0
12	ARP request or response	601	0

從FED (UADP 2.0)的角度檢查兩個單個CPU注入队列的運行狀況。

<#root>

C9400#

show platform software fed active inject cpuq all

Inject CPU Q Statistics

=====

```

CPU Q Id          : 0
CPU Q Name        : TX_CPUQ_PRIO_LOW ----> low priority CPU inject queue
Packets received from IOSd      : 168342
Enq to pkt driver total attempts : 168277
Enq to pkt driver failed count  : 0
Count of TX CMPL received       : 168277
TX suspend count                 : 0
TX unsuspend count               : 0
TX dropped count                 : 265
TX punted count                  : 0
TX App enq failed                : 0

CPU Q Id          : 7
CPU Q Name        : TX_CPUQ_PRIO_HI ----> high priority CPU inject queue
Packets received from IOSd      : 5024664
Enq to pkt driver total attempts : 5024664
Enq to pkt driver failed count  : 0
Count of TX CMPL received       : 5024664
TX suspend count                 : 0
TX unsuspend count               : 0
TX dropped count                 : 0
TX punted count                  : 0
TX App enq failed                : 0

```

Stats for all txq:

```

-----
TX chunk malloc fail count      : 0
-----

```

MAC表事件統計資訊

<#root>

C9400#

show platform software fed active matm stats

MATM counters

```
Total non-cpu mac entries      : 10
Mac Learn SPI Msg Count        : 0
Mac Learn SPI Err Count        : 0
Mac Delete SPI Msg Count       : 0
Mac Delete SPI Err Count       : 0
Mac Learn Count                 : 967
Mac Add Count                   : 989
Mac AL add Count                : 971
Mac Del Count                   : 957
Mac AL Del Count                : 961

Mac Move Count                  : 2 ----> MAC moves between interfaces (see details above)

Mac AL Move Count               : 0
Mac Clear Count                 : 0
Mac Del all count               : 6
Mac table create Count         : 9
Mac VP event Count              : 5
Mac Update info Count           : 0
Mac Vlan age config Event Count : 0
Mac Vlan Link Event Count      : 6
Mac SVI linkEvent Count        : 3
Mac Bsync Event Count          : 0
Mac Isync Event Count           : 0
Mac Recon Start Count          : 0
Mac Recon Event Count          : 0
Mac IFM event Count             : 75
Mac FEC Event Count             : 0
Mac Aging Tick Count           : 0
Mac Retry event Count           : 0
Mac Hw Update Err Count        : 0
Mac In retryQ Count            : 0
```

<#root>

C9400#

configure terminal

C9400(config)#

mac address-table notification ?

```
change      Enable/Disable MAC Notification feature on the switch
mac-move    Enable Mac Move Notification
threshold   Configure L2 Table monitoring
```

```
C9400(config)#C9400(config)#
```

```
mac address-table notification mac-move ---> enabled by default, syslog generated for any MAC move (show)
```

```
C9400(config)#
```

```
mac address-table notification change ?
```

```
  history-size  Number of MAC notifications to be stored  
  interval      Interval between the MAC notifications  
<cr>          <cr>
```

```
C9400(config)#
```

```
mac address-table notification change ---> disabled by default
```

```
<#root>
```

```
C9400#
```

```
show mac address-table notification mac-move
```

```
MAC Move Notification:
```

```
enabled
```

```
<#root>
```

```
C9400#
```

```
show mac address-table notification change
```

```
MAC Notification Feature is Enabled on the switch  
Interval between Notification Traps : 1 secs  
Number of MAC Addresses Added : 0  
Number of MAC Addresses Removed : 0  
Number of Notifications sent to NMS : 0  
Maximum Number of entries configured in History Table : 1  
Current History Table Length : 0  
MAC Notification Traps are Disabled  
History Table contents  
-----
```

UADP 2.0異常丟棄

此命令詳細介紹UADP 2.0轉發ASIC丟棄資料包的所有原因：

<#root>

C9400#

show platform hardware fed active fwd-asic drops exceptions

****EXCEPTION STATS ASIC INSTANCE 0 (asic/core 0/0)****

Asic/core	NAME	prev	current	delta
0 0	NO_EXCEPTION	0	0	0
0 0	IPV4_CHECKSUM_ERROR	0	0	0
0 0	ROUTED_AND_IP_OPTIONS_EXCEPTION	0	0	0
0 0	CTS_FILTERED_EXCEPTION	0	0	0
0 0	SIA_TTL_ZERO	0	0	0
0 0	ALLOW_NATIVE_EXCEPTION_COUNT	0	0	0
0 0	ALLOW_DOT1Q_EXCEPTION_COUNT	0	0	0
0 0	ALLOW_PRIORITY_TAGGED_EXCEPTION_COUNT	0	0	0
0 0	ALLOW_UNKNOWN_ETHER_TYPE_EXCEPTION	0	0	0
0 0	IP_SOURCE_GUARD_VIOLATION	0	0	0
0 0	SECURE_L3IF_LEARNING_VIOLATION	0	0	0
0 0	AUTH_DRIVEN_DROP	0	0	0
0 0	VLAN_LOADBALANCE_GROUP_DENY	0	0	0
0 0	RPF_UNICAST_FAIL	0	0	0
0 0	RPF_UNICAST_FAIL_SUPPRESS	0	0	0
0 0	RPF_UNICAST_CHECK_INCOMPLETE	0	0	0
0 0	RPF_MULTICAST_FAIL	0	0	0
0 0	PKT_DROP_COUNT	0	0	0
0 0	SOURCE_ROUTE_EXCEPTION	0	0	0
0 0	IGR_MISC_FATAL_ERROR	0	0	0
0 0	BLOCK_FORWARD	0	0	0
0 0	POLICER_DROP	0	0	0
0 0	DENY_ROUTE	0	0	0
0 0	DENY_BRIDGE	0	0	0
0 0	STATIC_MAC_VIOLATION	0	0	0
0 0	STATIC_IP_VIOLATION	0	0	0
0 0	FPM_DROP_PACKET	0	0	0
0 0	IGR_EXCEPTION_L4_ERROR	0	0	0
0 0	IGR_EXCEPTION_L5_ERROR	0	0	0
0 0	IGR_EXCEPTION_HARDWARE_PARSE_EXCEPTION	0	0	0
0 0	IGR_EXCEPTION_INVALID_VLAN_DROP	0	0	0
0 0	IGR_EXCEPTION_31	0	0	0
0 0	FRAGMENTING_IPV4_WITH_OPTIONS	0	0	0
0 0	FRAGMENTING_IPV6_WITH_EXTENSIONS	0	0	0
0 0	ICMP_REDIRECT	0	0	0
0 0	MTU_FAIL_PUNT_TO_CPU_NO_IP_UNREACHABLE	0	0	0
0 0	LINK_LOCAL_CHECK_FAIL_NO_IP_UNREACHABLE	0	0	0
0 0	IP_UNICAST_TTL_REACHED_ZERO	0	0	0
0 0	MISC_FATAL_ERROR	0	0	0
0 0	STP_OR_FLEXLINK_DROP	0	0	0
0 0	PROTECTED_PORT_DROP	0	0	0
0 0	PVLAN_ISOLATED_CHECK_FAILED	0	0	0
0 0	PVLAN_COMMUNITY_CHECK_FAILED	0	0	0
0 0	DEJA_VU_CHECK_FAILED	0	0	0
0 0	NOT_VLAN_LOAD_BALANCE_GROUP_ALLOWED	0	0	0
0 0	RSPAN_DROP	0	0	0
0 0	SPLIT_HORIZON_DROP	0	0	0
0 0	SYSTEM_TTL_DROP	0	0	0
0 0	PRUNED	0	0	0
0 0	DENY_NO_IP_UNREACHABLE	0	0	0
0 0	IP_MULTICAST_TTL_REACHED_ZERO	0	0	0
0 0	MTU_FAIL_DROP_BRIDGED	0	0	0

```

0 0 MTU_FAIL_DROP_BRIDGED_IP_ROUTED          0          0          0
0 0 MTU_FAIL_ERSPAN                          0          0          0
0 0 LINK_LOCAL_CHECK_FAIL_L3M_VALID          0          0          0
0 0 DENY_NOT_NO_IP_UNREACHABLE              0          0          0
0 0 MTU_FAIL_PUNT_TO_CPU_NOT_NO_IP_UNREACHABLE 0          0          0
0 0 LINK_LOCAL_CHECK_FAIL_NOT_NO_IP_UNREACHABLE 0          0          0
0 0 COPY_TO_CPU                              0          0          0
0 0 EGR_L3_ERROR                             0          0          0
0 0 EGR_L4_ERROR                             0          0          0
0 0 EGR_L5_ERROR                             0          0          0
0 0 EGR_HARDWARE_PARSE_EXCEPTION            0          0          0
0 0 EGR_SHOW_FORWARD_DROP                   0          0          0

```

****EXCEPTION STATS ASIC INSTANCE 1 (asic/core 0/1)****

```

=====
Asic/core |          NAME          |  prev  |  current  |  delta
=====
0 1 NO_EXCEPTION          13168    16679     3511
0 1 IPV4_CHECKSUM_ERROR    0         0         0
0 1 ROUTED_AND_IP_OPTIONS_EXCEPTION        81       103       22
--snip--

```

Supervisor統計資訊- Supervisor到板卡資料路徑

檢查與特定前面板介面相關聯的活動Supervisor UADP 2.0轉發ASIC統計資訊。在本例中，使用介面Gig1/0/13。

輸出範例：

- 檢查線卡上的哪些介面屬於同一埠組。
- 每個埠組共用從線卡末節ASIC到Supervisor轉發ASIC的8 Gbps頻寬。
- 每個埠組都與線路卡末節ASIC上指向Supervisor轉發ASIC的一個SLI (系統鏈路介面) 相關聯。

<#root>

C9400#

```
show platform hardware cman fp active data-path 1 13 detail ---> Slot 1, interface 13
```

```
showing cman data-path for frontpanel 1/0/13
```

```
fp_portmap.xml: ---> Supervisor ASIC 1, core 0 is associated with front panel (fp) interface Gig1/0/13
```

```
id 13 asic 1 core 0 port 12 mac 0 subport 4 contextid 0 maxspeed DEV_PORT_SPEED_1G gpn 113 active 1
```

```
data path:
```

```
slot 3
```

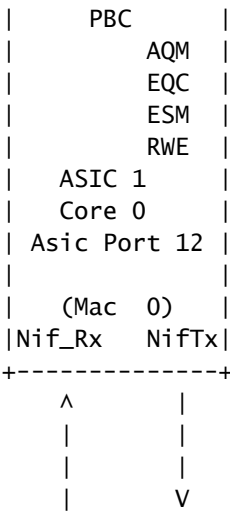
```

+- ACTIVE_SUP --+
|   Sif 0       |

```


| IQS SQS |

---> Supervisor ASIC 1, core 0 on the slot 3 active Supervisor associated with interface Gig1/0/13



=====

Nif MAC 0 Inforation:

NifRxByteGroupStats:

```
rxBytes          4495494
NifRxByteDestinationGroupStats:
rxUnicastBytes   1174628
rxMulticastBytes 3320866
rxBroadcastBytes 0
NifRxPortStatusGroupStats:
rxUnicastFrames  18326
rxMulticastFrames 21387
rxBroadcastFrames 0
rxPauseFrames    0
rxCos0PauseFrames 0
rxCos1PauseFrames 0
rxCos2PauseFrames 0
rxCos3PauseFrames 0
rxCos4PauseFrames 0
rxCos5PauseFrames 0
rxCos6PauseFrames 0
rxCos7PauseFrames 0
rxOamProcessedFrames 0
NifRxPortStatusGroupStats:
rxCollisionFragments 0
rxFcsErrorFrames      0
rxInvalidOversizeFrames 0
rxMacOverrunFrames    0
rxIpgViolationFrames  0
rxOamDroppedFrames    0
rxSymbolErrorFrames   0
rxValidOversizeFrames 0
rxValidUndersizeFrames 0
NifRxSizeGroupStats:
rx32768toMtuFrames    0
rx16384to32767ByteFrames 0
rx8192to16383ByteFrames 0
rx4096to8191ByteFrames 0
rx2048to4095ByteFrames 0
rx1519to2047ByteFrames 51
rx1024to1518ByteFrames 15
rx512to1023ByteFrames 17
rx256to511ByteFrames 3406
```

NifTxByteGroupStats:

```
txBytes          6499427
NifTxByteDestinationGroupStats:
txUnicastBytes   1175536
txMulticastBytes 5298482
txBroadcastBytes 25409
NifTxFrameDestinationGroupStats:
txUnicastFrames  18330
txMulticastFrames 24834
txBroadcastFrames 51
txPauseFrames    0
txCos0PauseFrames 0
txCos1PauseFrames 0
txCos2PauseFrames 0
txCos3PauseFrames 0
txCos4PauseFrames 0
txCos5PauseFrames 0
txCos6PauseFrames 0
txCos7PauseFrames 0
txOamFrames      0
NifTxPortStatusGroupStats:
txLateCollisionFrames 0
txsystemFcsErrorFrames 0
txOversizeFrames      0
txMacUnderrunFrames   0
txDeferredFrames      0
txExcessiveDeferralFrames 0
txOkMultipleCollisionFrames 0
txOkSingleCollisionFrames 0
goldFramesTruncated   0
NifTxSizeGroupStats:
tx32768toMtuFrames    0
tx16384to32767ByteFrames 0
tx8192to16383ByteFrames 0
tx4096to8191ByteFrames 0
tx2048to4095ByteFrames 0
tx1519to2047ByteFrames 0
tx1024to1518ByteFrames 0
tx512to1023ByteFrames 187
tx256to511ByteFrames 9407
```

rx128to255ByteFrames	6567	tx128to255ByteFrames	6580
rx65to127ByteFrames	11295	tx65to127ByteFrames	8583
rx64ByteFrames	18362	tx64ByteFrames	18458

=====

-----> Input queue (Igr = Ingress)

IgrPacketCounters:		EgrPacketCounters:	
packetsIn	97777	packetsIn	580324
packetsOut	97777	packetsEnqueueFcd_val	0
packetsDropped	3383	packetsMarkedForDrop	278
fpsSourcedPadErrorCount	0	padErrorPacketsIn	0
igrSourcedPadErrorCount	0	padErrorPacketsOut	0

=====

For RWE for core 0:

RweTotalEnqStats:	
packetCount	580324
RweTotalDeqStats:	
packetCount	580046
FragmentCount	580046

=====

For EQC for core 0:

EqcTotalEnqStats:	
Count	580704
EqcTotalDeqStats:	
Count	580324

=====

For aqmRedQueueStats for asic port 12:

AqmRedQueueStats: (sum of all queues) ----> Output queue (Aqm = Active queue management)

acceptByteCnt0	0
acceptFrameCnt0	0
acceptByteCnt1	6407742
acceptFrameCnt1	43070
acceptByteCnt2	39609
acceptFrameCnt2	395
dropByteCnt0	0
dropFrameCnt0	0
dropByteCnt1	0
dropFrameCnt1	0
dropByteCnt2	0
dropFrameCnt2	0
outOfSoftBufDropByteCnt	0
outOfSoftBufDropFrameCnt	0
maxQebDropByteCnt	0
maxQebDropFrameCnt	0

=====

For PBC for core 0:

PbcIngressErrorDropCount:		PbcEgressErrorDropCount:	
iCount	0	eS0Count	0
iCount	0	eS1Count	0
PbcCreditCount:		PbcEnqFcErrorDropCount:	
creditCount	64	fCount	0
rwePbcStall	0		

=====

For local/core 0 Switching:

SqsCumulativeStatistics	
totalEnqStat	1368200
totalDeqStat	1368200
totalDropStat	0
SqsCumulativeStatisticsB	

線卡統計資訊-管理引擎到線卡資料路徑

檢查與特定前面板介面相關聯的線卡線卡Stub ASIC統計資訊。在本例中，焦點是介面Gig1/0/13。

輸出範例：

- 從Gig 1/0/13接收的資料包進入網路介面接收埠並透過IQS進入堆疊介面。
- 資料包從堆疊介面傳出到另一個Supervisor ASIC，或者透過SQS、AQM、EQC、ESM、RWE返回，然後傳出Gig 1/0/13的網路介面傳輸。
- 從從Gig 1/0/13出發的其他Supervisor ASIC介面傳送的資料包進入Sif，然後透過SQS、AQM、EQC、ESM、RWE，最後從Gig 1/0/13的NifTx發出。
- 對於AQM，有8個Tx隊列。如果看到這些隊列中的丟棄，可以使用此命令確定哪個隊列發生丟棄：`show platform hardware fed active goes queue stats interface Gig 1/0/13`

```
<#root>
```

```
C9400#
```

```
show platform hardware iomd 1/0 data-path 13 detail ----> slot 1, interface 13
```

```
lcportmap.xml: ----> Line Card (lc) ASIC instance 0 is associated with interface Gig1/0/13
```

```
id 13 asic 0 asicport 12 mac 23 contextid 12 intl_port_sup0 9 intl_port_sup1 1 maxspeed DEV_PORT_SPEED_1G
```

```
fp_portmap.xml: ----> Supervisor ASIC 1, core 0 is associated with front panel (fp) interface Gig1/0/13
```

```
id 13 asic 1 core 0 port 12 mac 0 subport 4 contextid 0 maxspeed DEV_PORT_SPEED_1G gpn 113 active 1  
data path:  
slot 3
```

```
  +---ACTIVE SUP---+  
  |                   |
```

```
----> Supervisor ASIC 1, core 0 on the slot 3 active Supervisor associated with interface Gig1/0/13
```

```
  | ASIC 1           |  
  | Core 0           |  
  | Asic Port 12    |  
  |                 |  
  | (Mac 0)         |  
  |Nif_Rx  NifTx    |
```

```
  +-----+  
  |       |  
  |       |
```

```
SLI MAC 9  |       |
```

```
  +-----+  
  | SLI_Tx  SLI_Rx |
```

```
----> Line Card 1. The statistic output below is only for this Line card ASIC
```

```
  |                   |  
  | ASIC 0           |
```

```

| Asic Port 12 |
|              |
| (Mac 23)     |
| NIF_Rx  NIF_Tx|
+-----+

```

Front Port 1/0/13

```

^      |
|      |
|      |
|      V

```

=====
Nif MAC 23 Inforation:

NifRxByteGroupStats:

rxBytes 4457854

NifRxByteDestinationGroupStats:

rxUnicastBytes 1163684

rxMulticastBytes 3294170

rxBroadcastBytes 0

NifRxPortStatusGroupStats:

rxUnicastFrames 18155

rxMulticastFrames 21235

rxBroadcastFrames 0

rxPauseFrames 0

rxCos0PauseFrames 0

rxCos1PauseFrames 0

rxCos2PauseFrames 0

rxCos3PauseFrames 0

rxCos4PauseFrames 0

rxCos5PauseFrames 0

rxCos6PauseFrames 0

rxCos7PauseFrames 0

rxOamProcessedFrames 0

NifRxPortStatusGroupStats:

rxCollisionFragments 0

rxFcsErrorFrames 0

rxInvalidOversizeFrames 0

rxMacOverrunFrames 0

rxIpgViolationFrames 0

rxOamDroppedFrames 0

rxSymbolErrorFrames 0

rxValidOversizeFrames 0

rxValidUndersizeFrames 0

NifRxSizeGroupStats:

rx32768toMtuFrames 0

rx16384to32767ByteFrames 0

rx8192to16383ByteFrames 0

rx4096to8191ByteFrames 0

rx2048to4095ByteFrames 0

rx1519to2047ByteFrames 51

rx1024to1518ByteFrames 15

rx512to1023ByteFrames 17

rx256to511ByteFrames 3374

rx128to255ByteFrames 6505

rx65to127ByteFrames 11237

rx64ByteFrames 18191

NifTxByteGroupStats:

txBytes 6440428

NifTxByteDestinationGroupStats:

txUnicastBytes 1164528

txMulticastBytes 5250491

txBroadcastBytes 25409

NifTxFrameDestinationGroupStats:

txUnicastFrames 18158

txMulticastFrames 24625

txBroadcastFrames 51

txPauseFrames 0

txCos0PauseFrames 0

txCos1PauseFrames 0

txCos2PauseFrames 0

txCos3PauseFrames 0

txCos4PauseFrames 0

txCos5PauseFrames 0

txCos6PauseFrames 0

txCos7PauseFrames 0

txOamFrames 0

NifTxPortStatusGroupStats:

txLateCollisionFrames 0

txsystemFcsErrorFrames 0

txOversizeFrames 0

txMacUnderrunFrames 0

txDeferredFrames 0

txExcessiveDeferralFrames 0

txOkMultipleCollisionFrames 0

txOkSingleCollisionFrames 0

goldFramesTruncated 0

NifTxSizeGroupStats:

tx32768toMtuFrames 0

tx16384to32767ByteFrames 0

tx8192to16383ByteFrames 0

tx4096to8191ByteFrames 0

tx2048to4095ByteFrames 0

tx1519to2047ByteFrames 0

tx1024to1518ByteFrames 0

tx512to1023ByteFrames 186

tx256to511ByteFrames 9318

tx128to255ByteFrames 6518

tx65to127ByteFrames 8526

tx64ByteFrames 18286

-----> Input queue (Igr = Ingress)

```

IgrPacketCounters:
  packetsIn          97078
  packetsOut         97078
  packetsDropped     0
  fpsSourcedPadErrorCount 0
  igrSourcedPadErrorCount 0

EgrPacketCounters:
  packetsIn          576307
  packetsEnqueueFcd_val 0
  packetsMarkedForDrop 0
  padErrorPacketsIn 0
  padErrorPacketsOut 0

```

```

=====
For aqmRedQueueStats for asic port 12:

```

```

AqmRedQueueStats:          (sum of all queues) ---> Output queue (Aqm = Active queue management)
                                                                    acceptByteCnt0          0
                                                                    acceptFrameCnt0        0
                                                                    acceptByteCnt1         0
                                                                    acceptFrameCnt1        0
                                                                    acceptByteCnt2        6440428
                                                                    acceptFrameCnt2        42834
                                                                    dropByteCnt0           0
                                                                    dropFrameCnt0          0
                                                                    dropByteCnt1           0
                                                                    dropFrameCnt1          0
                                                                    dropByteCnt2           0
                                                                    dropFrameCnt2          0
                                                                    outOfSoftBufDropByteCnt 0
                                                                    outOfSoftBufDropFrameCnt 0
                                                                    maxQebDropByteCnt     0
                                                                    maxQebDropFrameCnt    0

```

```

=====
SLI MAC 9 - SUP 0: ( an ACTIVE sup in slot 3 )

```

```

SliTxByteGroupStats:          txBytes          4457854
SliRxByteGroupStats:          rxBytes          6440428

```

```

SLI MAC 1 - SUP 1:

```

```

SliTxByteGroupStats:          txBytes          0
SliRxByteGroupStats:          rxBytes          0

```

從線卡角度檢查前面板介面的流量控制狀態。這有助於辨識介面上的任何擁塞。

- 如果不存在流量控制，則值為「-」，否則將顯示出現流量控制（擁塞）的隊列編號。
- 介面接收的流量控制從線卡上的線卡ASIC傳遞到Supervisor上的Supervisor ASIC，其中 AQM丟棄通常在Supervisor Supervisor ASIC上可見。OCI（帶外控制介面）是線卡和主用 Supervisor之間的內部通訊通道，用於向線卡和Supervisor傳送流控制訊號。

```
<#root>
```

```
C9400#
```

```
show platform hardware iomd 1/0 flowcontrol status ---> slot 1
```

```
Slot 1 - number of ports 48
```

```

slot 1:  Port 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
        IsmF  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
        IqmC  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
        Port 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
        IsmF  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
        IqmC  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

```

檢查控制流量是否透過OCI介面從線卡末節ASIC角度線上卡上的線卡末節ASIC與活動和備用 Supervisor上的Supervisor轉發ASIC之間流動。

- OCI =帶外控制介面=線卡與主用和備用管理引擎之間的內部通訊通道

<#root>

C9400#

```
show platform hardware iomd 1/0 oci status ---> slot 1
```

```

Asic 0, Mac 10, Tx OCI Config 0, OCI Merge FALSE, OCI Enabled, Link Status 0 (UP)
Network Port Range 0---47, Local Port Range 0---47
NifRxByteGroupStats:  rxBytes 177402572782108          NifTxByteGroupStats:  txBytes 141925777717156

```

```

Asic 0, Mac 11, Tx OCI Config 0, OCI Merge FALSE, OCI Enabled, Link Status 0 (UP)
Network Port Range 0---47, Local Port Range 0---47
NifRxByteGroupStats:  rxBytes 963489284                NifTxByteGroupStats:  txBytes 770809988

```

檢查線卡上的哪些介面屬於同一個埠組，該埠組共用從線卡上的線卡末節ASIC到活動Supervisor上的Supervisor轉發ASIC的8 Gbps頻寬。每個埠組都與通向Supervisor的板卡末節ASIC上的SLI (系統鏈路介面) 之一相關聯。

<#root>

C9400#

```
show platform hardware iomd 1/0 portgroups ---> slot 1
```

```
Port  Interface                               Status  Interface
```

```
Group Max  <-- aggregate bandwidth for 8 ports
```

```
Group                                             Bandwidth
```

```
Bandwidth
```

```

1  TenGigabitEthernet1/0/1  up      1G
1  TenGigabitEthernet1/0/2  down    1G
1  TenGigabitEthernet1/0/3  admindown 1G

```


1	TenGigabitEthernet1/0/4	down	1G	
1	TenGigabitEthernet1/0/5	down	1G	8G
1	TenGigabitEthernet1/0/6	down	1G	
1	TenGigabitEthernet1/0/7	down	1G	
1	TenGigabitEthernet1/0/8	down	1G	
2	TenGigabitEthernet1/0/9	down	1G	
2	TenGigabitEthernet1/0/10	down	1G	
2	TenGigabitEthernet1/0/11	down	1G	
2	TenGigabitEthernet1/0/12	down	1G	
2	TenGigabitEthernet1/0/13	up	1G	8G
2	TenGigabitEthernet1/0/14	down	1G	
2	TenGigabitEthernet1/0/15	down	1G	
2	TenGigabitEthernet1/0/16	down	1G	
3	TenGigabitEthernet1/0/17	down	1G	
3	TenGigabitEthernet1/0/18	down	1G	
3	TenGigabitEthernet1/0/19	down	1G	
3	TenGigabitEthernet1/0/20	down	1G	
3	TenGigabitEthernet1/0/21	down	1G	8G
3	TenGigabitEthernet1/0/22	down	1G	
3	TenGigabitEthernet1/0/23	down	1G	
3	TenGigabitEthernet1/0/24	down	1G	
4	TenGigabitEthernet1/0/25	down	1G	
4	TenGigabitEthernet1/0/26	down	1G	
4	TenGigabitEthernet1/0/27	down	1G	
4	TenGigabitEthernet1/0/28	down	1G	
4	TenGigabitEthernet1/0/29	down	1G	8G
4	TenGigabitEthernet1/0/30	down	1G	
4	TenGigabitEthernet1/0/31	down	1G	
4	TenGigabitEthernet1/0/32	down	1G	
5	TenGigabitEthernet1/0/33	down	1G	
5	TenGigabitEthernet1/0/34	down	1G	
5	TenGigabitEthernet1/0/35	down	1G	
5	TenGigabitEthernet1/0/36	down	1G	
5	TenGigabitEthernet1/0/37	down	1G	8G
5	TenGigabitEthernet1/0/38	down	1G	
5	TenGigabitEthernet1/0/39	down	1G	
5	TenGigabitEthernet1/0/40	down	1G	
6	TenGigabitEthernet1/0/41	down	1G	
6	TenGigabitEthernet1/0/42	down	1G	
6	TenGigabitEthernet1/0/43	down	1G	
6	TenGigabitEthernet1/0/44	down	1G	
6	TenGigabitEthernet1/0/45	down	1G	8G
6	TenGigabitEthernet1/0/46	down	1G	
6	TenGigabitEthernet1/0/47	down	1G	
6	TenGigabitEthernet1/0/48	up	1G	

關於此翻譯

思科已使用電腦和人工技術翻譯本文件，讓全世界的使用者能夠以自己的語言理解支援內容。請注意，即使是最佳機器翻譯，也不如專業譯者翻譯的內容準確。Cisco Systems, Inc. 對這些翻譯的準確度概不負責，並建議一律查看原始英文文件（提供連結）。