验证Catalyst 9000系列交换机上的第2层硬件

目录

简介

本文档介绍如何验证Catalyst 9400系列交换机上的第2层硬件编程和转发。

先决条件

要求

本文档没有任何特定的要求。

使用的组件

本文档中的信息基于Catalyst 9400 (UADP 2.0)系列交换机。

注意：本文档中使用的软件版本是16.6.1，但此版本仍适用于Cisco IOS®的更高版本。

注意：您可以将此文档用于其他类型的Catalyst 9000交换机，但忽略任何引用板卡的命令。

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您的网络处于活动状态，请确保您了解所有命令的潜在影响。

背景信息

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

每个UADP 2.0转发ASIC具有：

- 双核(0、1) -在以前的UADP 2.0 ASIC中不存在此配置。
- SIF（堆栈接口）-用于通过内部堆栈环连接到其他2个UADP 2.0 ASIC。
- NIF（网络接口）-用于通过背板连接一个或多个线卡。

- 线卡和管理引擎上行链路接口的所有数据包转发决策由主用Supervisor上的3个UADP 2.0转发ASIC制定。
- 本示例中使用的板卡有1个不参与数据包转发决策的板卡单核心末节ASIC。
- 线卡上的线卡末节ASIC通过背板连接到Supervisor上的3个UADP 2.0转发ASIC中的1个或多个。
- Supervisor上的3个UADP 2.0转发ASIC会做出所有数据包转发决策。

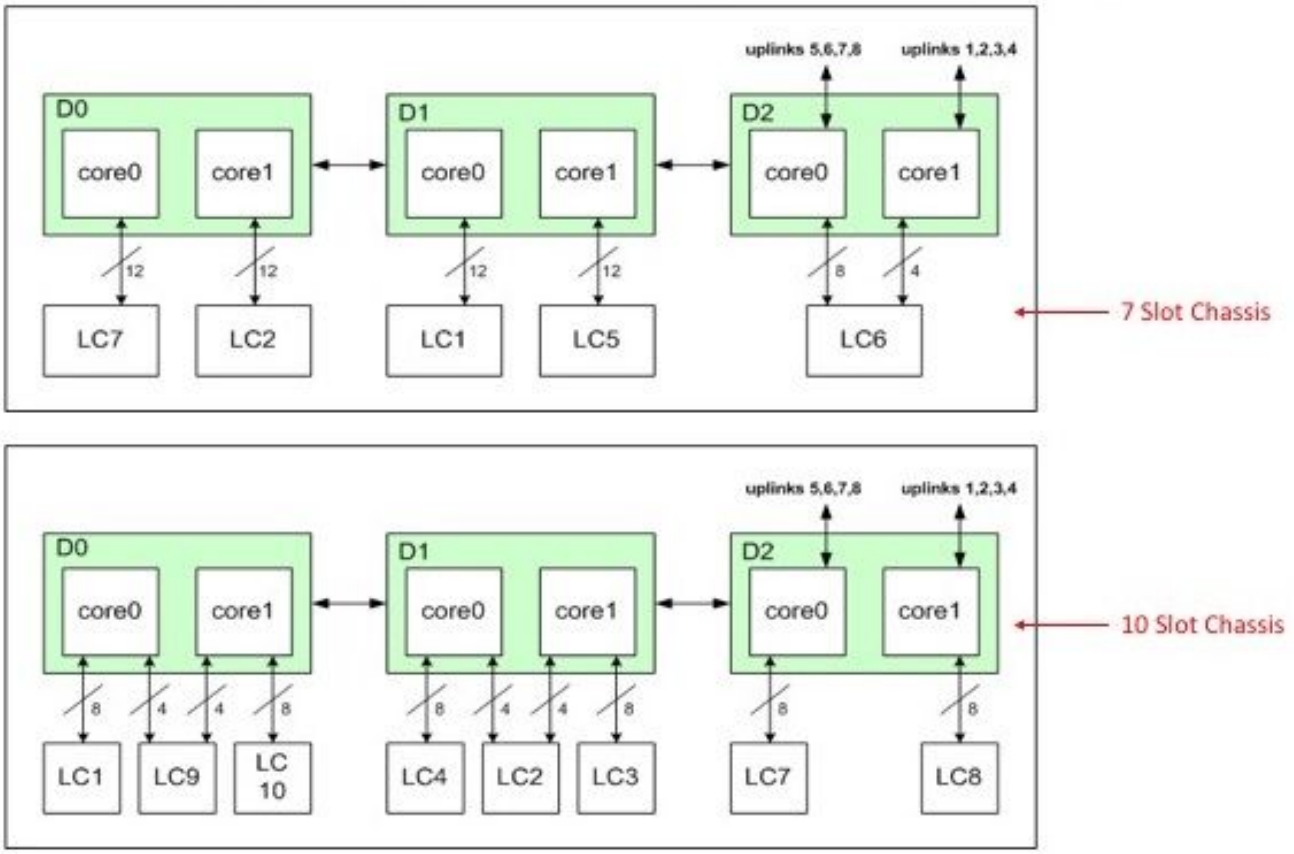
术语

缩写	定义
RP	路由处理器
FP	转发处理器
FED	转发引擎驱动程序。对Supervisor转发ASIC进行编程的软件进程。

对象管理器	作为异步对象存储在对象数据库中的FP软件MAC条目。
LSMPI	Linux共享内存传送接口。数据平面（硬件-UADP 2.0）和控制平面（软件-CPU）之间的传输。
IFM	接口管理器软件进程。
IF_ID	接口IDentifier是表示特定接口的唯一值。它用于交换机的内部编程。
Inst	实例。指示接口所连接的UADP 2.0 Asic/Core：0=Asic0/Core0、1=Asic0/Core1、2=Asic1/Core0、3=Asic1/Core1、4=Asic2/Core0、5=Asic2/Core1。
Asic	指定接口与哪个UADP 2.0关联：0=UADP 2.0 #0，1=UADP 2.0 #1，2= UADP 2.0 #2。
核心	指定UADP 2.0接口上的哪个核心与关联：0=core0,1=core1。
端口	插槽中端口的序号实例。在同一插槽内，所有端口号都是唯一的。
子端口	标识端口组(Cntx)内作为子端口的前面板端口的端口（Cntx和SubPort一起标识作为子端口的唯一端口）。
MAC	接口运行MACsec（安全身份验证和加密）时使用的接口标识符。
Cntx	情景。前面板接口为子端口时端口所属的组编号（Cntx和SubPort一起标识为子端口的唯一端口）。
LPN	与接口关联的逻辑端口号。
GPN	与接口关联的全局端口号。
键入NIF	网络接口；NRU =网络冗余上行链路
IF_IS	接口标识符.这是表示特定接口的唯一值。它用于交换机内部的各种编程。
Port_LE	端口逻辑实体。这是接口配置。

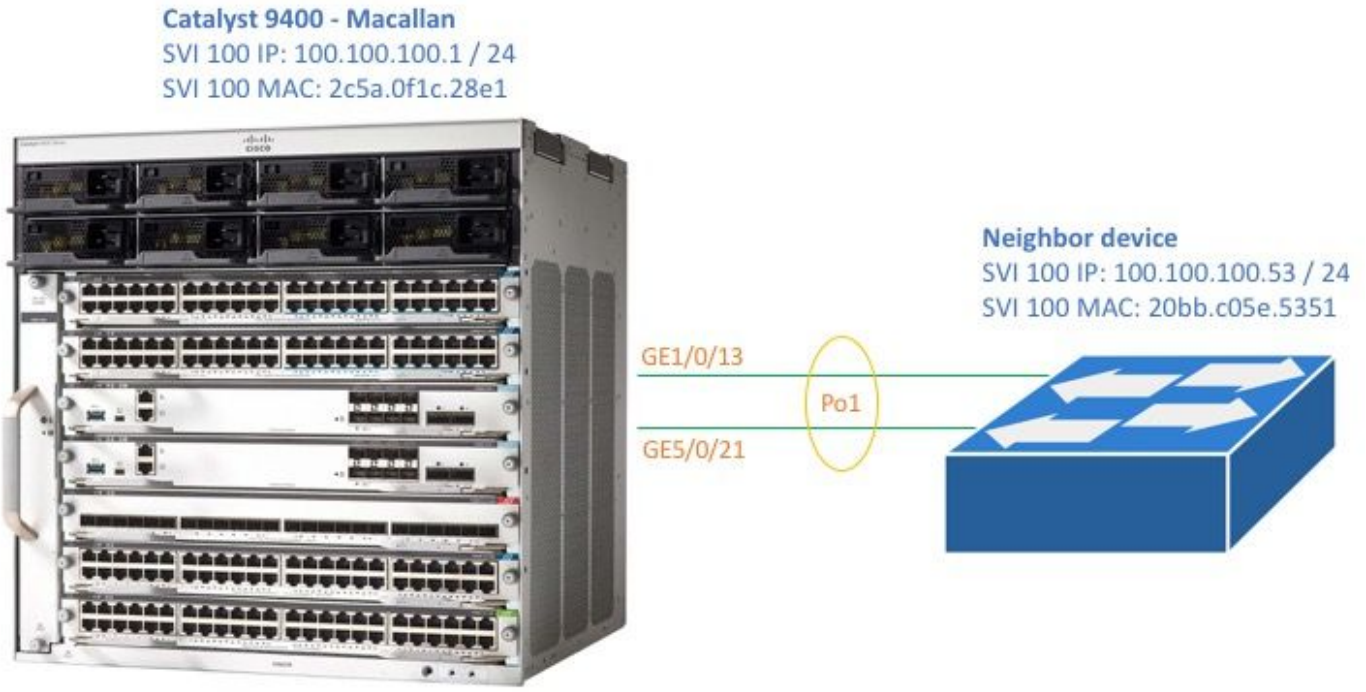
AOM	异步对象管理器。FP将信息作为对象编程到对象数据库中。
副总裁	虚拟端口
MATM	MAC地址表管理器
RP	路由处理器
OM_PTR	对象管理器指针
Tbl_ID	表标识符= vlan
CMAN	机箱管理器
FP	转发处理器
fp_port	前面板端口。
Sif	堆栈接口（指向管理引擎上转发ASIC的其他2个UADP 2.0）。
Nif	网络接口（朝向前面板接口）
IGR/EGR	入口/出口
IQS	入口队列调度程序
SQS	堆叠队列调度程序
PBC	数据包缓冲区综合体
AQM	活动队列管理。这将执行拥塞管理检查。
AQMRed	主动队列管理随机早期检测。
EQC	出口队列控制器

ESM	出口计划程序管理
RWE	重写引擎。在数据包中添加或删除报头信息。
IOMD	输入输出模块驱动程序
fp_port	前面板端口。
Nif	网络接口（朝向前面板接口）
SLI	系统链路接口（指向管理引擎）
IGR/EGR =	入口/出口
AQMRed	主动队列管理随机早期检测。
OCI	带外控制接口=线卡与主用管理引擎之间的内部通信信道
MATM	MAC地址表管理器
MAC移动计数	这是在新接口上移动（获知）MAC地址时的计数。当终端主机从一个接口物理移动到另一个接口、无线主机从一个接入点(AP)漫游到另一个连接在不同接口上的AP，或者生成树路径更改或环路时，可能会发生移动计数。


Line Card (LC) to UADP 2.0 Mapping
uplinks 5,6,7,8
uplinks 1,2,3,4
D0
D1
D2
core0
core1
12
8
4
LC7
LC2
LC1
LC5
LC6
7 Slot Chassis
LC9
LC 10
LC4
LC3
LC8
10 Slot Chassis

线卡到UADP

拓扑



<#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 SOFTWA
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命令可能要求语句中包含service internal全局配置命令。

接口编程

接口到UADP 2.0实例映射

接口编程命令显示所有板卡的前面板接口映射到主用Supervisor上3个UADP 2.0转发ASIC之一。

输出示例

该示例显示：

- 接口Gig1/0/3连接到Supervisor上的UADP 2.0实例2（UADP 2.0 Asic 1，核心0）。
- 接口Gig5/0/21连接到Supervisor上的UADP 2.0实例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--
```

物理接口编程

show platform命令基于上一个命令示例中的IF_ID值显示Gig1/0/3的软件配置详细信息。

<#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
```

此命令根据上一个命令的PORT_LE值显示Gig1/0/3的硬件配置详细信息。

价值	定义
值0	未设置值。
值1	在大多数情况下设置的值。

<#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/l3u_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编程

在以下Etherchannel编程示例输出中，RP对FP进行编程，FP对FED进行编程，FED随后对Supervisor转发ASIC硬件进行编程。 RP软件条目作为对象存储在对象数据库中，而FP软件条目作为异步对象存储在对象数据库中。

<#root>

C9400#

show etherchannel summary

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

在此输出中，组掩码为非零。在散列过程中使用它来确定任何流量流流出的EtherChannel中的链路。

<#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
```

此命令显示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] : 00000000000000
```

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

```
Index[3] : 00000000000000
```

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

```
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]
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
```

此命令显示映射接口的配置。

缩写/实例	定义
IFM	接口管理器
实例	Gig1/0/13位于接口ID为0x13的ASIC实例2（UADP 2.0 ASIC 1，核心0）上
实例	Gig5/0/21位于接口ID为0x8f的ASIC实例3（UADP 2.0 ASIC 1，核心1）上

<#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 acknowlegement 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
```

VLAN编程

<#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          L
------------------------------------------------------------------------------------------------------
100     0x0000000000420011 0x00007fe5c4616ef8 0x00007fe5c4617778 0x00007fe5c50dac28 0x00000000000002ea 1
```

此命令显示VLAN 100的硬件配置设置详细信息。

价值	定义
值0	未设置值。
值1	在大多数情况下设置的值。

<#root>

```
C9400#

show platform hardware fed active fwd-asic abstraction print-resource-handle 0x00007fe5c4616ef8 1

Handle:0x7fe5c4616ef8 Res-Type:ASIC_RSC_VLAN_LE Res-Switch-Num:255 Asic-Num:255 Feature-ID:AL_FID_L2 Lk
priv_ri/priv_si Handle: (nil)Hardware Indices/Handles: index0:0xa mtu_index/l3u_ri_index0:0x0 sm handle
Cookie length: 56
00 00 00 00 00 00 00 00 64 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0

Detailed Resource Information (ASIC#0)

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

--snip--
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

----------------------------------------

LEAD_VLAN_ALLOW_SNOOPING_IGMP_OR_MLD_IPV4 value 0 Pass
LEAD_VLAN_ALLOW_SNOOPING_IGMP_OR_MLD_IPV6 value 0 Pass
LEAD_VLAN_ARP_OR_ND_SNOOPING_ENABLED_IPV4 value 0 Pass
LEAD_VLAN_ARP_OR_ND_SNOOPING_ENABLED_IPV6 value 0 Pass
```

```
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--
```

生成树编程

<#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)
```

这些命令显示Port-channel 1的生成树转发状态。

<#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
```

接下来的命令显示了VLAN 100的生成树硬件转发状态。

<#root>

C9400#

show platform software fed active vp summary vlan 100

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

<#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)
```

检查生成树稳定性。确保不经常看到拓扑更改通知(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转发编程

<#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
```

软件编程

在下面的输出示例中，RP对FP进行编程，FP对FED进行编程，FED最终对Supervisor转发ASIC硬件进行编程。 RP软件MAC条目作为对象存储在对象数据库中，而FP软件MAC条目作为异步对象存储在对象数据库中。

<#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
```

硬件编程-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_MSRP_ADDR        0x400000  MAT_LISP_LOCAL_ADDR   0x800000
MAT_LISP_REMOTE_ADDR 0x1000000 MAT_VPLS_ADDR         0x2000000
```

macHandle编程

缩写/术语	定义
vlan：10	MVID 10。VLAN 100在交换机内部使用映射VLAN ID (MVID) 10。
gpn：1104	Port-channel 1的全局端口号。
mac：0x20bbc05e5351	MAC地址20bb.c05e.5351

这是macHandle编程输出示例：

<#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          I
-------------------------------------------------------------------------------------------------------
100     0x0000000000420011 0x00007fe5c4616ef8 0x00007fe5c4617778 0x00007fe5c50dac28 0x00000000000002ea 1
```

<#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：获知mac的接口是单个接口而不是端口通道，此命令用于确定GPN到接口的映射

<#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编程

<table>
<tr><td>缩写/术语</td><td colspan="2">定义</td></tr>
<tr><td>siHandle</td><td colspan="2">station index句柄。数据包重写信息（RI =重写索引）和传出接口信息（DI =目标索引）。</td></tr>
<tr><td colspan="3">单Supervisor ASIC上双核的复制位图：</td></tr>
<tr><td rowspan="4"></td><td>缩写/术语</td><td>定义</td></tr>
<tr><td>本地ASIC（LD =本地数据）</td><td>位于同一ASIC上的目的地，与源位于同一核心。</td></tr>
<tr><td>核心拷贝(CD =核心数据</td><td>位于同一ASIC（另一个核心）上的目标。</td></tr>
<tr><td>远程ASIC（RD =远程数据）</td><td>另一ASIC上的目标。</td></tr>
</table>

<#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/l3u_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 00 07 00 20 bb c0 5e 53 51 00 00 00 00 00 00 0

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)
```

没有预期的MAC重写信息，因为这是第2层MAC转发条目。

<#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编程

缩写	定义
diHandle	目标索引句柄。这是传出接口信息。

<#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/l3u_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)
```

硬件编程-方法2

缩写/术语	定义
vlan：10	MVID 10。VLAN 100在交换机内部使用映射VLAN ID (MVID) 10。
gpn：1104	Port-channel 1的全局端口号。
mac：0x20bbc05e5351	MAC地址20bb.c05e.5351

硬件编程方法2示例输出：

<#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_flo
MASK: vlan 0, mac 0x0, l3_if 0, gpn 0, epoch 0, static 0, flood_en 0, vlan_lead_wless_flood_en 0, clien
SRC_AD: need_to_learn 0, lrn_v 0, catchall 0, static_mac 0, chain_ptr_v 0, chain_ptr 0, static_entry_v
DST_AD: si 0xc7, bridge 0, replicate 0, blk_fwd_o 0, v4_mac 0, v6_mac 0, catchall 0, ign_src_lrn 0, por
--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          I
-------------------------------------------------------------------------------------------------------
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获知的接口是单个接口而不是端口通道，则使用下一命令确定gpn到接口的映射：

<#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

检查每个Supervisor ASIC实例上的MAC地址条目的TCAM利用率，以确保交换机不会耗尽TCAM空间来在硬件中存储条目。

<#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--
```

成功的硬件编程

所有功能（无论是mac地址、接口、vlan等等）都存储在对象数据库中，并作为对象编程到硬件中。

RP对FP进行编程，FP对FED进行编程，FED最终对转发ASIC硬件的管理引擎进行编程。RP软件条目作为对象存储在对象数据库中，而FP软件条目作为异步对象存储在对象数据库中。

当FP对FED编程（FED进而对Supervisor转发ASIC编程）时，FED会向FP发送确认消息。然后，FP将其转发到RP，以表明硬件编程已成功完成。如果FED硬件编程缺失或不正确，您可以使用此下一命令检查问题和/或确认。

<#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
```

如果之前的命令显示非零对象处于挂起发出状态，请使用此命令查找所涉及的对象编号：

<#root>

C9400#

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

然后使用此命令确定与对象编号关联的停滞进程：

<#root>

C9400#

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

在RP端，使用此命令检查FP未确认的对象的删除挂起（删除挂起）。

<#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_dpidb                   164           0          10
CHANNEL_DPIDB         channel_dpidb                  0           0          12
VIRTUAL_DPIDB         virtual_dpidb                503           0          13
SW_DPIDB              sw_dpidb                       0           0          17
VLAN                  vlan                           0           0          19
--snip--
```

运行状况检查

控制平面流量和策略

检查硬件UADP 2.0中流向软件CPU的流量的CoPP（控制平面策略）丢弃。这可能会影响MAC学习和生成树稳定性。

<#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
```

与上一个示例相同的CoPP输出在此以更加精细和易于读取（压缩）的格式显示。

<#root>

C9400#

show platform hardware fed active qos queue stats internal cpu policer

```
                          CPU Queue Statistics
============================================================================================
                                                 (default) (set)     Queue         Queue
QId PlcIdx  Queue Name                 Enabled    Rate     Rate      Drop(Bytes)   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/
```

从软件(CPU)的角度检查CPU传送路径（硬件-UADP 2.0到软件-CPU）统计信息。

<#root>

C9400#

show platform software infrastructure lsmpi

```
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 protcol 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          Total          Length         Dot1q encap    Other
```

```
                                consumed       forwarded      error          exceeded       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--
```

从软件(CPU)的角度检查CPU注入路径（软件-CPU到硬件-管理引擎）统计信息。

<#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
```

从FED (UADP 2.0)角度检查CPU传送/注入路径统计信息。

<#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

-----------------------------------------
```

从FED (Supervisor)的角度检查CPU传送路径（硬件-Supervisor到软件-CPU）统计信息。

<#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
-------------------------------------------------------------------------------
```

从FED (Supervisor)角度检查31个单独的CPU传送队列的运行状况。

<#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–

从FED (Supervisor)角度检查CPU注入路径（软件-CPU到硬件-Supervisor）统计信息。

<#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
-------------------------------------------------------------------------------------
```

从FED (UADP 2.0)的角度检查两个单独的CPU注入队列的运行状况。

<#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表事件统计信息

<#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异常丢弃

此命令详细介绍UADP 2.0转发ASIC丢弃数据包的任何原因：

<#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统计信息- Supervisor到线卡的数据路径

检查与特定前面板接口相关联的活动Supervisor UADP 2.0转发ASIC统计信息。在本例中，使用接口Gig1/0/13。

输出示例：

- 检查线卡上的哪些接口属于同一端口组。
- 每个端口组共享从线卡末节ASIC到Supervisor转发ASIC的8 Gbps带宽。
- 每个端口组与板卡末节ASIC上指向管理引擎转发ASIC的一个SLI（系统链路接口）关联。

<#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

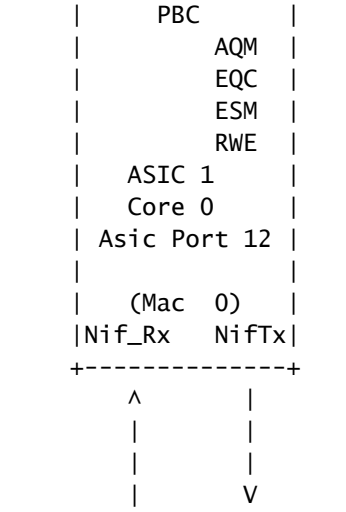
id 13 asic 1 core 0 port 12 mac 0 subport 4 contextid 0 maxspeed DEV_PORT_SPEED_1G gpn 113 active 1

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:                          NifTxByteGroupStats:
 rxBytes                     4495494           txBytes                     6499427
NifRxByteDestinationGroupStats:               NifTxByteDestinationGroupStats:
 rxUnicastBytes              1174628           txUnicastBytes              1175536
 rxMulticastBytes            3320866           txMulticastBytes            5298482
 rxBroadcastBytes            0                 txBroadcastBytes            25409
NifRxPortStatusGroupStats:                    NifTxFrameDestinationGroupStats:
 rxUnicastFrames             18326             txUnicastFrames             18330
 rxMulticastFrames           21387             txMulticastFrames           24834
 rxBroadcastFrames           0                 txBroadcastFrames           51
 rxPauseFrames               0                 txPauseFrames               0
 rxCos0PauseFrames           0                 txCos0PauseFrames           0
 rxCos1PauseFrames           0                 txCos1PauseFrames           0
 rxCos2PauseFrames           0                 txCos2PauseFrames           0
 rxCos3PauseFrames           0                 txCos3PauseFrames           0
 rxCos4PauseFrames           0                 txCos4PauseFrames           0
 rxCos5PauseFrames           0                 txCos5PauseFrames           0
 rxCos6PauseFrames           0                 txCos6PauseFrames           0
 rxCos7PauseFrames           0                 txCos7PauseFrames           0
 rxOamProcessedFrames        0                 txOamFrames                 0
NifRxPortStatusGroupStats:                    NifTxPortStatusGroupStats:
 rxCollisionFragments        0                 txLateCollisionFrames       0
 rxFcsErrorFrames            0                 txsystemFcsErrorFrames      0
 rxInvalidOversizeFrames     0                 txOversizeFrames            0
 rxMacOverrunFrames          0                 txMacUnderrunFrames         0
 rxIpgViolationFrames        0                 txDeferredFrames            0
 rxOamDroppedFrames          0                 txExcessiveDeferralFrames   0
 rxSymbolErrorFrames         0                 txOkMultipleCollisionFrames  0
 rxValidOversizeFrames       0                 txOkSingleCollisionFrames   0
 rxValidUndersizeFrames      0                 goldFramesTruncated         0
NifRxSizeGroupStats:                          NifTxSizeGroupStats:
 rx32768toMtuFrames          0                 tx32768toMtuFrames          0
 rx16384to32767ByteFrames    0                 tx16384to32767ByteFrames    0
 rx8192to16383ByteFrames     0                 tx8192to16383ByteFrames     0
 rx4096to8191ByteFrames      0                 tx4096to8191ByteFrames      0
 rx2048to4095ByteFrames      0                 tx2048to4095ByteFrames      0
 rx1519to2047ByteFrames      51                tx1519to2047ByteFrames      0
 rx1024to1518ByteFrames      15                tx1024to1518ByteFrames      0
 rx512to1023ByteFrames       17                tx512to1023ByteFrames       187
 rx256to511ByteFrames        3406              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
                                                  totalEnqStat              173449513
                                                  totalDeqStat              173449513
```

```
                                                totalDropStat              0
==============================================
For local/core 1 Switching:
                                               SqsCumulativeStatistics
                                                totalEnqStat               890114
                                                totalDeqStat               890114
                                                totalDropStat              0
                                               SqsCumulativeStatisticsB
                                                totalEnqStat               105061923
                                                totalDeqStat               105061923
                                                totalDropStat              0
==============================================
For Sif 0 Switching:
                                               SifSifPbcCnt0:
                                                Count                      81302675
                                               SifSifPbcCnt1:
                                                Count                      58187651
SifRacInsertedCnt:                             SifRacCopiedCnt:
 SifRacInsertedCnt[0]       2295051             SifRacCopiedCnt[0]         35850468
 SifRacInsertedCnt[1]       1738892             SifRacCopiedCnt[1]         19265491
 SifRacInsertedCnt[2]       1666479             SifRacCopiedCnt[2]         23814855
 SifRacInsertedCnt[3]       2773364             SifRacCopiedCnt[3]         32727259
 SifRacInsertedCnt[4]       3126116             SifRacCopiedCnt[4]         38376676
 SifRacInsertedCnt[5]       2066567             SifRacCopiedCnt[5]         22176467
==============================================
For Sif 1 Switching:
                                               SifSifPbcCnt0:
                                                Count                      40956521
                                               SifSifPbcCnt1:
                                                Count                      40956521
SifRacInsertedCnt:                             SifRacCopiedCnt:
 SifRacInsertedCnt[0]       11713808            SifRacCopiedCnt[0]         8615615
 SifRacInsertedCnt[1]       8319576             SifRacCopiedCnt[1]         7489596
 SifRacInsertedCnt[2]       8816344             SifRacCopiedCnt[2]         7608895
 SifRacInsertedCnt[3]       15404080            SifRacCopiedCnt[3]         8717898
 SifRacInsertedCnt[4]       16161715            SifRacCopiedCnt[4]         9685735
 SifRacInsertedCnt[5]       9745420             SifRacCopiedCnt[5]         7866174
```

从管理引擎的角度检查前面板接口的流量控制状态。这有助于确定接口上是否存在拥塞。

<#root>

C9400#

show platform hardware cman fp active flowcontrol status

```
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
          EsmF  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
          IqsC  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
          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
          EsmF  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
          IqsC  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

slot  2:  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
          EsmF  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
          IqsC  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
          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
          EsmF  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
```

```
          IqsC  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

slot  3:  Port 01 02 03 04 05 06 07 08 09 10
          EsmF  -  -  -  -  -  -  -  -  -  -
          IqsC 01  -  -  -  -  -  -  -  -  -

slot  4:  Port 01 02 03 04 05 06 07 08 09 10
          EsmF  -  -  -  -  -  -  -  -  -  -
          IqsC  -  -  -  -  -  -  -  -  -  -

slot  5:  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
          EsmF  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
          IqsC  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  - 01  -  -  -
          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
          EsmF  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
          IqsC  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -

slot  6:  Possibly linecard is not inserted

slot  7:  Possibly linecard is not inserted
```

检查控制流量是否通过OCI接口在活动Supervisor上的Supervisor转发ASIC和线卡上的Line card stub ASIC之间从Supervisor转发ASIC角度流动。

<#root>

C9400#

show platform hardware cman fp active oci status

```
processing oci information:
 chassis_type:       1
 sup slot:           4
 sup num oci ports:  8

slot_id 1 : oci_enable Enabled    Link Status 0 (UP)
            asic_id 1 core_id 0 oci_port 3 mac_id 0
            NruRxByteGroupStats:  rxBytes 417829462717812        NruTxByteGroupStats:  txBytes 58891128

slot_id 2 : oci_enable Enabled    Link Status 0 (UP)
            asic_id 0 core_id 0 oci_port 1 mac_id 1
            NruRxByteGroupStats:  rxBytes 417938235716344        NruTxByteGroupStats:  txBytes 58891760

slot_id 5 : oci_enable Enabled    Link Status 0 (UP)
            asic_id 1 core_id 0 oci_port 4 mac_id 1
            NruRxByteGroupStats:  rxBytes 53195855717244         NruTxByteGroupStats:  txBytes 58891542

slot_id 6 : oci_enable Enabled    Link Status 1 (DOWN)
            asic_id 2 core_id 0 oci_port 6 mac_id 0
            NruRxByteGroupStats:  rxBytes 0                      NruTxByteGroupStats:  txBytes 0

slot_id 7 : oci_enable Enabled    Link Status 1 (DOWN)
            asic_id 0 core_id 0 oci_port 2 mac_id 2
            NruRxByteGroupStats:  rxBytes 0                      NruTxByteGroupStats:  txBytes 0
```

线卡统计信息-管理引擎到线卡数据路径

检查与特定前面板接口关联的线卡线卡末节ASIC统计信息。在本例中，重点介绍接口Gig1/0/13。

输出示例：

- 从Gig 1/0/13接收的数据包进入网络接口接收端口，然后通过IQS进入堆栈接口。
- 数据包从那里通过堆栈接口传到另一个Supervisor ASIC ，或者通过SQS、AQM、EQC、ESM、RWE返回，然后通过Gig 1/0/13的网络接口传输。
- 从Gig 1/0/13传出的其他Supervisor ASIC接口发送的数据包进入Sif，然后通过SQS、AQM、EQC、ESM和RWE，然后通过Gig 1/0/13的NifTx。
- AQM有8个Tx队列。如果看到来自这些队列的丢包，可以使用此命令确定哪个队列发生丢包：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_

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:                          NifTxByteGroupStats:
 rxBytes                    4457854            txBytes                    6440428
NifRxByteDestinationGroupStats:               NifTxByteDestinationGroupStats:
 rxUnicastBytes             1163684            txUnicastBytes             1164528
 rxMulticastBytes           3294170            txMulticastBytes           5250491
 rxBroadcastBytes           0                  txBroadcastBytes           25409
NifRxPortStatusGroupStats:                    NifTxFrameDestinationGroupStats:
 rxUnicastFrames            18155              txUnicastFrames            18158
 rxMulticastFrames          21235              txMulticastFrames          24625
 rxBroadcastFrames          0                  txBroadcastFrames          51
 rxPauseFrames              0                  txPauseFrames              0
 rxCos0PauseFrames          0                  txCos0PauseFrames          0
 rxCos1PauseFrames          0                  txCos1PauseFrames          0
 rxCos2PauseFrames          0                  txCos2PauseFrames          0
 rxCos3PauseFrames          0                  txCos3PauseFrames          0
 rxCos4PauseFrames          0                  txCos4PauseFrames          0
 rxCos5PauseFrames          0                  txCos5PauseFrames          0
 rxCos6PauseFrames          0                  txCos6PauseFrames          0
 rxCos7PauseFrames          0                  txCos7PauseFrames          0
 rxOamProcessedFrames       0                  txOamFrames                0
NifRxPortStatusGroupStats:                    NifTxPortStatusGroupStats:
 rxCollisionFragments       0                  txLateCollisionFrames      0
 rxFcsErrorFrames           0                  txsystemFcsErrorFrames     0
 rxInvalidOversizeFrames    0                  txOversizeFrames           0
 rxMacOverrunFrames         0                  txMacUnderrunFrames        0
 rxIpgViolationFrames       0                  txDeferredFrames           0
 rxOamDroppedFrames         0                  txExcessiveDeferralFrames  0
 rxSymbolErrorFrames        0                  txOkMultipleCollisionFrames  0
 rxValidOversizeFrames      0                  txOkSingleCollisionFrames  0
 rxValidUndersizeFrames     0                  goldFramesTruncated        0
NifRxSizeGroupStats:                          NifTxSizeGroupStats:
 rx32768toMtuFrames         0                  tx32768toMtuFrames         0
 rx16384to32767ByteFrames   0                  tx16384to32767ByteFrames   0
 rx8192to16383ByteFrames    0                  tx8192to16383ByteFrames    0
 rx4096to8191ByteFrames     0                  tx4096to8191ByteFrames     0
 rx2048to4095ByteFrames     0                  tx2048to4095ByteFrames     0
 rx1519to2047ByteFrames     51                 tx1519to2047ByteFrames     0
 rx1024to1518ByteFrames     15                 tx1024to1518ByteFrames     0
 rx512to1023ByteFrames      17                 tx512to1023ByteFrames      186
 rx256to511ByteFrames       3374               tx256to511ByteFrames       9318
 rx128to255ByteFrames       6505               tx128to255ByteFrames       6518
 rx65to127ByteFrames        11237              tx65to127ByteFrames        8526
 rx64ByteFrames             18191              tx64ByteFrames             18286
=============================================
```

--> Input queue (Igr = Ingress)

```
IgrPacketCounters:                            EgrPacketCounters:
```

```
 packetsIn                  97078                  packetsIn                  576307
 packetsOut                 97078                  packetsEnqueueFcd_val      0
 packetsDropped             0                      packetsMarkedForDrop       0
 fpsSourcedPadErrorCount    0                      padErrorPacketsIn          0
 igrSourcedPadErrorCount    0                      padErrorPacketsOut         0
=============================================
For aqmRedQueueStats for asic port 12:
```

AqmRedQueueStats: (sum of all queues) ---> Output queue (Agm = 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:                           SliRxByteGroupStats:
 txBytes                    4457854             rxBytes                    6440428

SLI MAC 1 - SUP 1:
SliTxByteGroupStats:                           SliRxByteGroupStats:
 txBytes                    0                   rxBytes                    0
```

从线卡角度检查前面板接口的流量控制状态。这有助于识别接口上的任何拥塞。

- 如果没有流量控制，则值为“-”，否则表示经历流量控制（拥塞）的队列编号。
- 接口接收的流控制从线卡上的线卡ASIC传递到Supervisor上的Supervisor ASIC，其中AQM丢弃通常在Supervisor Supervisor ASIC上可见。OCI（带外控制接口）是线卡和主用管理引擎之间的内部通信通道，用于将流量控制从线卡发送到管理引擎。

<#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  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -  -
```

检查控制流量是否通过OCI接口从线路卡末节ASIC角度在线路卡上的线路卡末节ASIC与活动和备用Supervisor上的Supervisor转发ASIC之间流动。

- OCI =带外控制接口=线卡与主用和备用管理引擎之间的内部通信通道

<#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
```

检查线卡上的哪些接口属于同一个端口组，该端口组共享从线卡上的线卡末节ASIC到活动Supervisor上的Supervisor转发ASIC的8 Gbps带宽。每个端口组与线路卡末节ASIC上指向管理引擎的一个SLI（系统链路接口）关联。

<#root>

C9400#

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

```
Port  Interface                       Status    Interface
```

Group Max <-- aggregate bandwidth for 8 ports

```
Group                                           Bandwith
```

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	

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