NCS5500 : Durée de vie d'un paquet (transit, Punt/Inject, chemin Ping)

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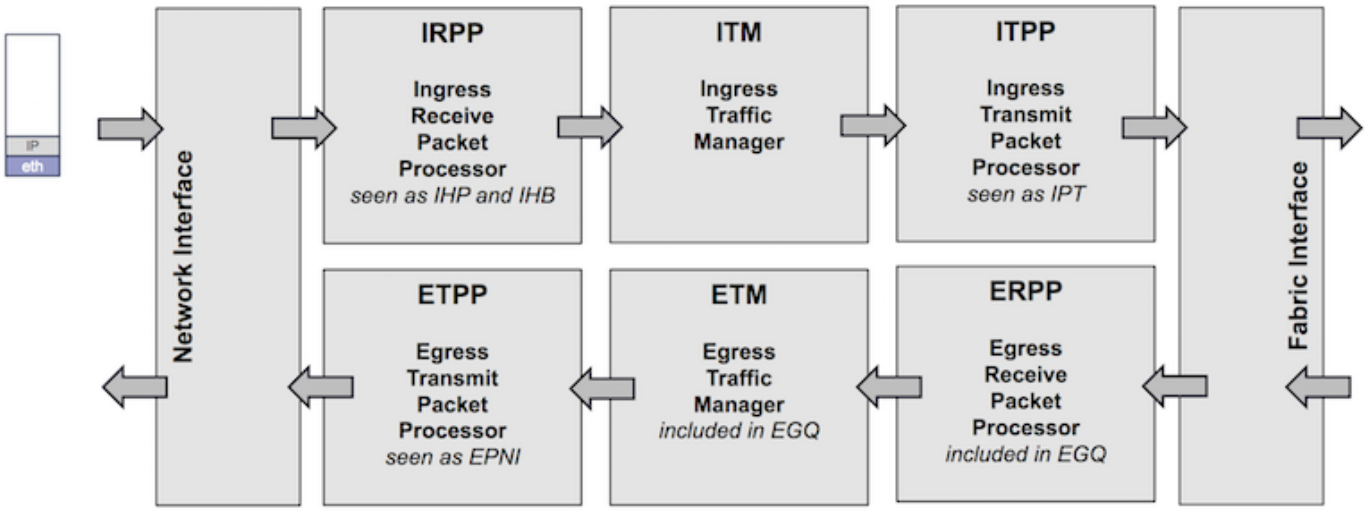
- Demande d'écho : RP local : TX
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- Réponse d'écho : Noeud local (LC) : RX

Ping local

Introduction

Ce document décrit le chemin emprunté par les paquets de requête d'écho/réponse d'écho ICMP dans la zone NCS55xx(Fretta).

Durée de vie d'un paquet dans ASIC de transfert



IRPP

Un paquet est reçu sur une interface et transmis à l'IRPP, où les 128 premiers octets seront extraits et traités. Par conséquent, l'en-tête système interne est ajouté en préfixe.

ITM

Le paquet est stocké dans la mémoire DRAM/OCB

TIPP

Si nécessaire, réécrivez l'en-tête du système (réplication multidiffusion, mise en miroir des ports, etc.)

Les paquets sont fractionnés en cellules et leur charge est répartie sur le fabric

ERPP

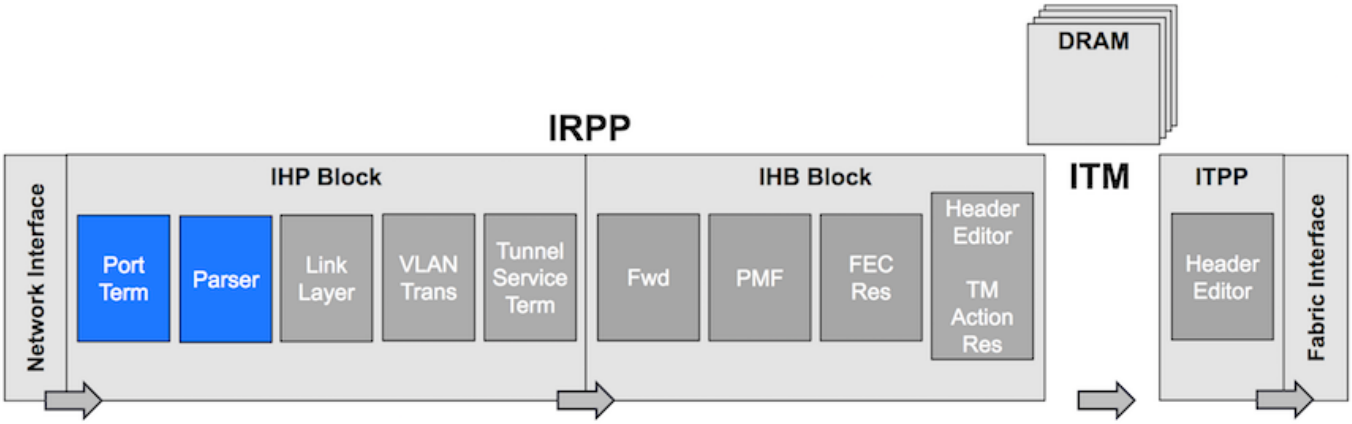
Les cellules sont reçues et réassemblées. Les 128 premiers octets sont extraits et appliquent tous les filtres de couche liaison, ACL de sortie, Réplication de sortie (multidiffusion)

ETPP/ETM

Le paquet entier est stocké dans une mémoire tampon jusqu'à ce que le paquet sortant soit planifié. Les en-têtes système sont supprimés.

ASIC de transfert

IRPP (Port Term, Parser)

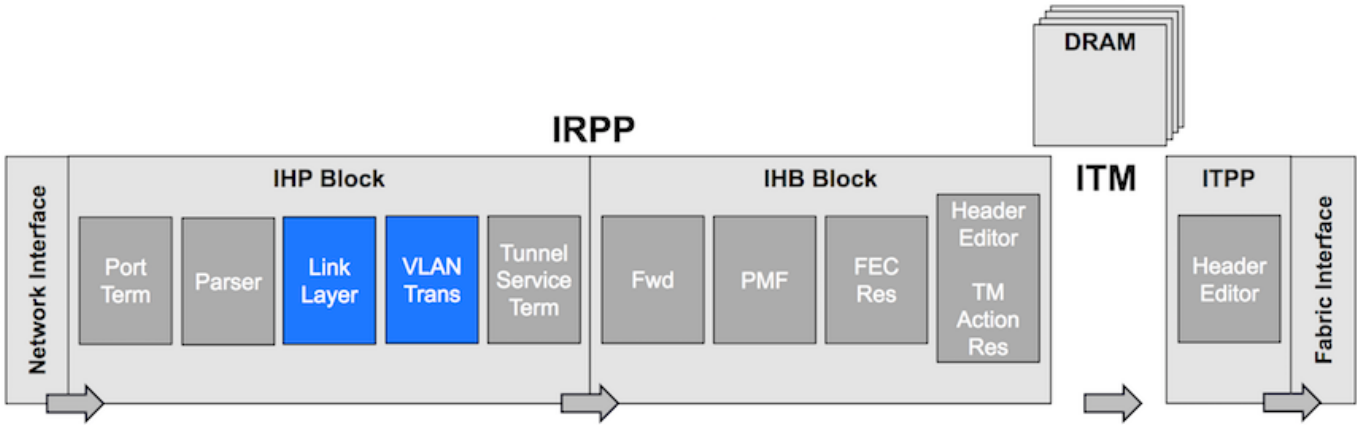


Terminaison de port : Paquets reçus de l'interface réseau/CPU/Recirculation

- Déterminez le port source et marquez le paquet avec.
- Choisissez le programme initial à utiliser dans l'analyseur.
- Identifiez le point de départ de l’en-tête réseau.

Analyseur : Extrayez l'Ethertype, les adresses MAC et déterminez le décalage pour les étapes suivantes du pipeline.

IRPP(Couche ligne, VLAN Trans)



Couche liaison : Filtrage sur L2 et authentification de l'adresse source.

Traduction VLAN : Nous mappons l'interface logique du paquet.

Chemin De Pointe

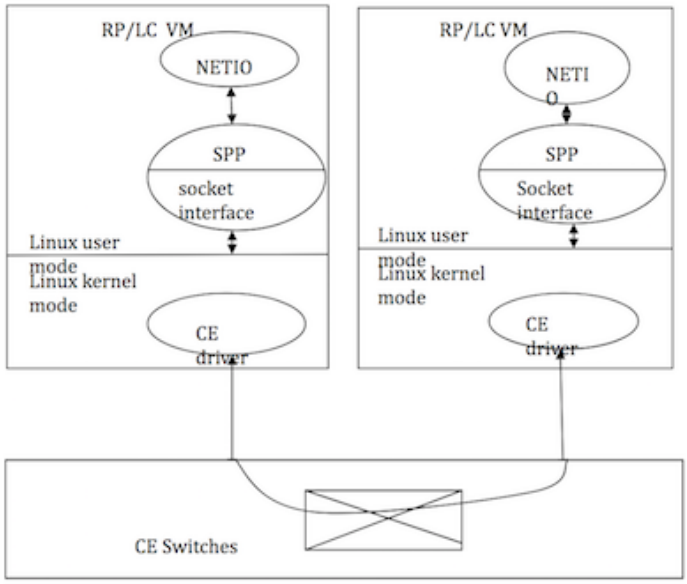
- Seules quelques entrées TCAM LPTS sont disponibles sur le NPU en raison d'un manque de ressources TCAM.
- La recherche LPTS majeure est effectuée dans le logiciel LPTS Pre-IFIB sur LC Netio
- Paquet de punt LPTS de NPU à RP directement via la recherche TCAM PMF :
  - Les paquets OSPF, OSPFv3 mcast et ISIS sont dirigés vers le RP actif et le RP de secours directement
- Paquet de punt LPTS du NPU au CPU local via la recherche TCAM PMF :

    - Tout protocole qui utilise TCP, UDP ; ICMP, ND
- Les paquets de protocole L2 sont envoyés à LC via un piège CPU BRCM :
    - ARP, RARP, CDP, LACP, LLDP, Ether-link OAM, MACSec
- Les paquets d'exception sont dirigés vers LC via un déroutement CPU BRCM.
    - TTL0, TTL1, MTU supérieur, Paquets d'option

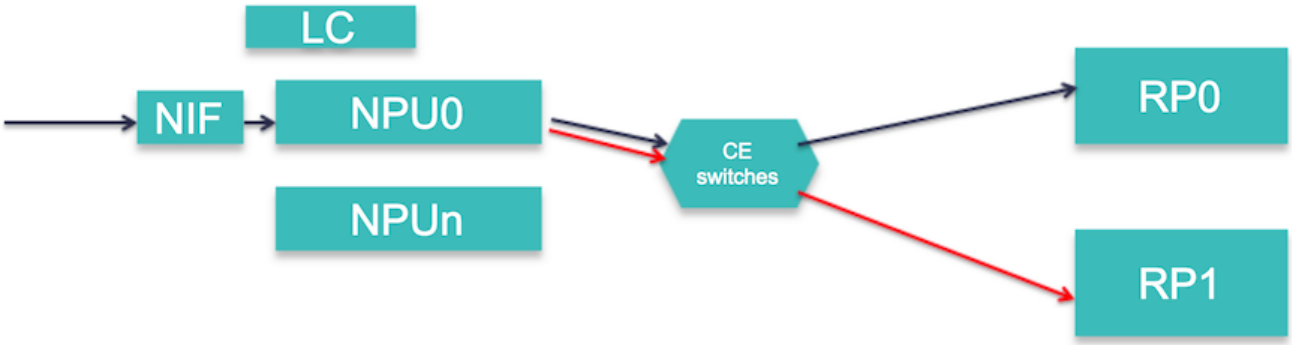
Chemin ponctuel entre deux noeuds du processeur

NetIO→SPP→CE switches→SPP→NETIO

CE switches: SC, FC, LC switches

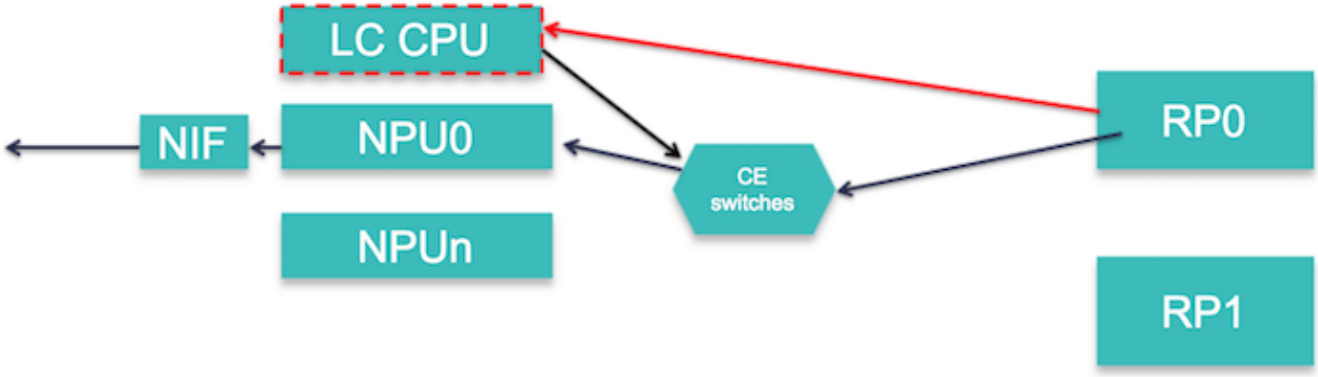


Chemin de pointes du processeur NPU au processeur RP



Les paquets RX Forus sont répliqués sur NPU. L'un est envoyé au RP actif et l'autre au RP de secours

Injection du processeur RP vers le processeur NPU ou LC

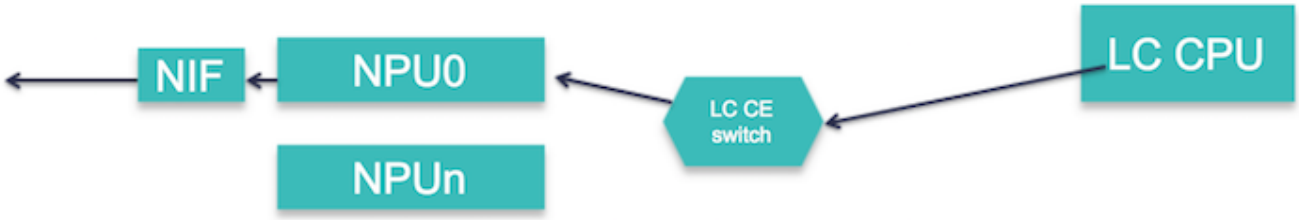


Les paquets de couche 3 sont injectés directement dans la NPU si la contiguïté de préfixe est terminée ou s'il s'agit d'un paquet de pré-routage

Les paquets L3 sont injectés au CPU LC dans le cas où :

- La contiguïté de préfixe est GLEAN.
- Paquet de pré-routage MPLS
- La taille du paquet dépasse MTU.

Injecter le chemin du processeur LC au NPU



Ces paquets sont injectés du CPU LC au NPU :

- ARP, ND, réponse d'écho ICMP, paquets fragmentés
- Paquets CDP, LACP, LLDP, EtherLink OAM

CLI pour le débogage Punt/Inject

<#root>

```
Show SPP node counters location <>
```

```
show netio chain <interface> location <>
```

```
show netio drop location <>
```

show ipv4/ipv6 traffic location <>

show fwd statistics location <>

show lpts pifib entry brief statistics location <>

show controllers fia diagshell <npu> "diag counters g cdsp" location <>

show interface <> location <>

Requête ping distante

Chemin du paquet : Demande d'écho

```
Local Node[ICMP(RP) -> IP I/O(RP) -> NetIO/Forwarder(RP) -> SPP(RP) -> NPU] -> wire -> Remote[NPU -> LP
```

Chemin du paquet : Réponse d'écho

```
Remote Node[IPv4/ICMP (LC) -> FWD/NetIO (LC) -> SPP (LC) -> NPU] -> wire -> Local Node[LPTS(HW) -> SPP(
```

Ping local

Chemin du paquet : Demande d'écho

```
RP(ICMP/IPv4 IO -> netio -> SPP -> CE) -> LC(SPP -> netio -> ICMP/ipv4 IO)
```

Chemin du paquet : Réponse d'écho

```
LC(IPv4 IO/ICMP -> Netio -> SPP -> CE) -> RP(SPP -> net -> ipv4 io/ICMP)
```

Débogages utiles:

```
debug icmp ipv4 location 0/0/CPU0

debug ipv4 packet location 0/0/CPU0

debug ipv4 ping events location 0/0/CPU0
```

Topologie

```
Fretta_1(GigabitEthernet0/0/0/16 ) <---->(GigabitEthernet0/0/0/16 ) Fretta_2
```

```
RP/0/RP0/CPU0:fretta_1#  ping 1.1.16.2 count 10000
```

Commandes pour vérifier la commande Remote Ping

Demande d'écho : RP local : TX

```
Path: ICMP(RP) -> IP I/O(RP) -> NetIO/Forwarder(RP) -> SPP(RP) -> NPU
```

1. E/S IP : Vérifiez si la requête d'écho est générée :

<#root>

```
show ipv4 traffic brief

ICMP statistics:

  Sent:

 0 admin unreachable, 0 network unreachable
        0 host unreachable, 0 protocol unreachable
        0 port unreachable, 0 fragment unreachable
        0 time to live exceeded, 0 reassembly ttl exceeded
```

10000 echo request

```
, 0 echo reply
        0 mask request, 0 mask reply
        0 parameter error, 0 redirects
        10000 total
```

2. NetIO

<#root>

```
RP/0/RP0/CPU0:fretta_1#show netio clients location 0/rP0/CPU0

Counters                  Errors/Total
----------------------------------------
Output                          0/10019


Input                           0/11804
Puntback                        0/0
Jump                            0/0
Driver Output                   0/10002

Mutex Bypass Counters        Total
----------------------------------------
Egress handled               0
Egress chainwalked           10006
Egress dropped               0
Ingress handled              10000
Ingress chainwalked          0
Ingress dropped              0



ClientID         Drop/Total        Drop/Total      Cur/High/Max    Cur/High/Max
-------------------------------------------------------------------------------
ipv6_icmp           0/0               0/0             0/0/1000        0/0/1000

icmp                0/10000

          0/0             0/1/1000        0/0/1000



If ping is failing then check if it is getting dropped in Netio:

RP/0/RP0/CPU0:fretta_1#show netio drops location 0/rP0/CPU0
Thu Apr 20 20:28:09.577 UTC

Drops for interfaces on node 0/RP0/CPU0


No drops
```

3. PSP

<#root>

```
RP/0/RP0/CPU0:fretta_1#show spp node-counters
Thu Apr 20 20:29:05.785 UTC
0/0/CPU0:
fretta/classify
      forwarded to spp clients:           10006
 forwarded NPU packet to NetIO:           10006
      dropped in classify node:              24
         Fwded to CoPP sampler:               1
                      PUNT ARP:               1
                     PUNT IFIB:           10006
                IFIB RAWIP4_FM:           10000
                IFIB RAWIP6_FM:               6
-------------------------------
client/inject
        pkts injected into spp:           10002
  NetIO->NPU injected into spp:               2
  NetIO->CPU injected into spp:           10000
          NetIO->NPU PROTO ARP:               2
           NetIO->CPU PKT LPTS:           10000
-------------------------------
socket/rx
               ether raw pkts:           10031
-------------------------------

socket/tx



 ce pkts:           10002


-------------------------------
client/punt
              punted to client:           10007
-------------------------------

0/RP0/CPU0:
socket/rx
                ether raw pkts:           10002
           mgmt interface pkts:            3204
-------------------------------
socket/tx
                      ce pkts:           10000
           mgmt interface pkts:               5
-------------------------------
fretta/classify
      forwarded to spp clients:           13204
 forwarded CPU packet to NetIO:           10000
forwarded Mgmt packet to NetIO:            3204
      dropped in classify node:               2
-------------------------------
client/inject
        pkts injected into spp:           10005
  NetIO->NPU injected into spp:           10000
     MGMT_IF injected into spp:               5
NetIO->NPU PROTO IPV4_PREROUTE:           10000
-------------------------------
client/punt
              punted to client:           13204
-------------------------------
```

4. Vérifiez si la requête d'écho est envoyée au câble :

```
 RP/0/RP0/CPU0:fretta_1#show controllers gigabitEthernet 0/0/0/16 stats | be Egress
Thu Apr 20 21:17:28.176 UTC

Egress:
    Output total bytes          = 1140270
        Output good bytes           = 1140270

    Output total packets        = 10004
    Output 802.1Q frames        = 0
    Output pause frames         = 0
    Output pkts 64 bytes        = 1
    Output pkts 65-127 bytes    = 10003
    Output pkts 128-255 bytes   = 0
    Output pkts 256-511 bytes   = 0
    Output pkts 512-1023 bytes  = 0
    Output pkts 1024-1518 bytes = 0
    Output pkts 1519-Max bytes  = 0

    Output good pkts            = 10004
    Output unicast pkts         = 10000
    Output multicast pkts       = 3
    Output broadcast pkts       = 1

    Output drop underrun        = 0
    Output drop abort           = 0
    Output drop other           = 0

    Output error other          = 0
```

Demande d'écho : LC distant : RX

```
Path: NPU -> LPTS(HW) -> SPP(LC) -> NetIO/Forwarder(LC) -> LPTS(SW)(LC) -> IP I/O (LC) -> ICMP (LC)
```

1. Vérifiez si le paquet est reçu du câble :

<#root>

```
RP/0/RP0/CPU0:fretta_2#show controllers gigabitEthernet 0/0/0/16 stats
Thu Apr 20 20:44:22.115 UTC
Statistics for interface GigabitEthernet0/0/0/16 (cached values):

Ingress:
    Input total bytes           = 1140270
    Input good bytes            = 1140270

    Input total packets         = 10004
    Input 802.1Q frames         = 0
```

```
    Input pause frames          = 0
    Input pkts 64 bytes         = 1

Input pkts 65-127 bytes     = 10003
```

2. Vérifiez le compteur LPTS.

```
RP/0/RP0/CPU0:fretta_2#show lpts pifib hardware entry brief location 0/0/CPU0 | i ICMP
Thu Apr 20 20:45:54.687 UTC
```

<#root>

```
DestIP               SrcIP               vrf   L4   LPort/Type   RPort  npu  Flowtype           DestNo
0.0.0.0              0.0.0.0             0     1    ECHO         0      0

ICMP-local

        Local LC     MEDIUM

10000

  0
```

3. PSP

```
RP/0/RP0/CPU0:fretta_2#show spp node-counters location 0/0/CPU0
```

<#root>

```
fretta/classify
      forwarded to spp clients:           10006
 forwarded NPU packet to NetIO:           10006
      dropped in classify node:              22
         Fwded to CoPP sampler:               2
                      PUNT ARP:               2
                     PUNT IFIB:           10006
                IFIB IPv4_STACK:           10000
                 IFIB RAWIP6_FM:               6
-------------------------------
client/inject
        pkts injected into spp:           10002
  NetIO->NPU injected into spp:           10002
           NetIO->NPU PROTO ARP:               2
          NetIO->NPU PROTO IPV4:           10000
-------------------------------

socket/rx
```

```
                ether raw pkts:           10030

------------------------------
socket/tx
                       ce pkts:           10002
------------------------------
client/punt
               punted to client:           10008
------------------------------
```

4. Netio

```
show netio chains gigabitEthernet 0/0/0/16 location 0/0/cpu0
```

<#root>

```
<12> (ipv4)   Stats IN: 10000 pkts, 1140000 bytes; OUT: 10000 pkts, 1140000 bytes
```

<#root>

```
       Protocol        SAFI       Pkts In    Bytes In    Pkts Out   Bytes Out
---------------  ----------    ----------  ----------  ----------  ----------

     ipv4     Unicast         10000

     1140000       10000     1000000
           ipv4   Multicast             0           0           0           0
           ipv4   Broadcast             0           0           0           0
           ipv6     Unicast             0           0           0           0
           ipv6   Multicast             0           0           0           0
```

<#root>

```
RP/0/RP0/CPU0:fretta_2#show netio clients location 0/0/CPU0
Thu Apr 20 20:52:26.802 UTC

Counters                  Errors/Total
---------------------------------------
Output                        0/10002
Input                         0/10008
Puntback                      0/0
Jump                          0/0
Driver Output                 0/10002

XIPC queues              Dropped/Queued    Cur/High/Max
------------------------------------------------------------
OutputL                       0/10000         0/1/6000
OutputH                       0/2             0/1/3000
```

```
Puntback                        0/0             0/0/6000

                    Input               Punt          XIPC InputQ      XIPC PuntQ
ClientID          Drop/Total          Drop/Total      Cur/High/Max    Cur/High/Max
-------------------------------------------------------------------------------
ipv6_icmp             0/0                 0/0             0/0/1000        0/0/1000

icmp                  0/10000             0/0             0/1/1000        0/0/1000


clns                L 0/0                 0/0           L 0/0/1000        0/0/0
                    H 0/0                               H 0/0/1000
ipv6_io               0/0                 0/0             0/0/1000        0/0/1000
ipv6_nd               0/0                 0/0             0/0/1500        0/0/1000
l2snoop               0/0                 0/0             0/0/1000        0/0/0
ether_sock            0/0                 0/0
tp_oam                0/0                 0/0             0/0/1000        0/0/1000
icmpv6_unreach_jump         0/0                 0/0
arp                   0/2                 0/0             0/1/1000        0/0/1000
mpls_io               0/0                 0/0             0/0/1000        0/0/1000
ipv4                  0/0                 0/0             0/0/1000        0/0/1000
ipv6                  0/0                 0/0             0/0/1000        0/0/1000

Key:
  L = queue for lower priority packets
  H = queue for higher priority packets
```

5. Statistiques FWD

<#root>

```
RP/0/RP0/CPU0:fretta_2#show fwd statistics all location 0/0/cpu0
Thu Apr 20 20:51:50.347 UTC
RECEIVE STATISTICS SUMMARY:

rx_pkts: 10008


punt_pkts: 10008


ingress_total_drops: 0
TRANSMIT STATISTICS SUMMARY:
inject_pkts: 10002
tx_pkts: 10002
egress_total_drops: 0
RP/0/RP0/CPU0:fretta_2#
```

6. IP IOS

```
show ipv4 traffic brief location 0/0/CPU0
```

<#root>

Rcvd:

```
 0 admin unreachable, 0 network unreachable
        0 host unreachable, 0 protocol unreachable
        0 port unreachable, 0 fragment unreachable
        0 time to live exceeded, 0 reassembly ttl exceeded
```

10000 echo request

```
, 0 echo reply
        0 mask request, 0 mask reply
        0 redirect, 0 parameter error
        0 source quench, 0 timestamp, 0 timestamp reply
        0 router advertisement, 0 router solicitation
        10000 total, 0 checksum errors, 0 unknown
```

Réponse d'écho : Noeud distant (LC) : TX

```
Path: IPv4/ICMP (LC) -> FWD/NetIO (LC) -> SPP (LC) -> NPU
```

1. E/S IP

```
RP/0/RP0/CPU0:fretta_2#show ipv4 traffic brief location 0/0/CPU0
```

<#root>

```
ICMP statistics:
```

Sent:

```
 0 admin unreachable, 0 network unreachable
        0 host unreachable, 0 protocol unreachable
        0 port unreachable, 0 fragment unreachable
        0 time to live exceeded, 0 reassembly ttl exceeded
        0 echo request,
```

10000 echo reply

```
        0 mask request, 0 mask reply
        0 parameter error, 0 redirects
        10000 total
```

2. Netio

```
show netio chains gigabitEthernet 0/0/0/16 location 0/0/cpu0
```

<#root>

```
<12> (ipv4)   Stats IN: 10000 pkts, 1140000 bytes; OUT: 10000 pkts, 1140000 bytes
```

<#root>

```
       Protocol        SAFI       Pkts In    Bytes In    Pkts Out   Bytes Out
---------------  ----------    ----------  ----------  ----------  ----------
           ipv4     Unicast         10000     1140000

 10000

     1000000
           ipv4   Multicast             0           0           0           0
           ipv4   Broadcast             0           0           0           0
           ipv6     Unicast             0           0           0           0
           ipv6   Multicast             0           0           0           0
```

<#root>

```
RP/0/RP0/CPU0:fretta_2#show netio clients location 0/0/CPU0
Thu Apr 20 20:52:26.802 UTC

Counters                   Errors/Total
---------------------------------------

Output                          0/10002


Input                           0/10008
Puntback                        0/0
Jump                            0/0
Driver Output                   0/10002

XIPC queues               Dropped/Queued    Cur/High/Max
------------------------------------------------------------
OutputL                         0/10000         0/1/6000
OutputH                         0/2             0/1/3000
Puntback                        0/0             0/0/6000
```

3. Statistiques FWD

<#root>

```
 RP/0/RP0/CPU0:fretta_2#show fwd statistics all location 0/0/cpu0
Thu Apr 20 20:51:50.347 UTC
RECEIVE STATISTICS SUMMARY:
rx_pkts: 10008
punt_pkts: 10008
ingress_total_drops: 0
```

```
TRANSMIT STATISTICS SUMMARY:

inject_pkts: 10002


tx_pkts: 10002


egress_total_drops: 0
```

4. PSP

```
 show spp node-counters location 0/0/CPU0
```

<#root>

```
fretta/classify
      forwarded to spp clients:           10006
 forwarded NPU packet to NetIO:           10006
      dropped in classify node:              22
         Fwded to CoPP sampler:               2
                     PUNT ARP:                2
                   PUNT IFIB:             10006
                IFIB IPv4_STACK:           10000
                 IFIB RAWIP6_FM:               6
------------------------------
client/inject
        pkts injected into spp:           10002
  NetIO->NPU injected into spp:           10002
          NetIO->NPU PROTO ARP:               2
         NetIO->NPU PROTO IPV4:           10000
------------------------------
socket/rx
                ether raw pkts:           10030
------------------------------

socket/tx


                       ce pkts:           10002


------------------------------
client/punt
              punted to client:           10008
------------------------------
```

5. Vérifiez si le paquet est envoyé au câble.

<#root>

```
RP/0/RP0/CPU0:fretta_2#show controllers gigabitEthernet 0/0/0/16 stats
Thu Apr 20 21:20:22.593 UTC
Statistics for interface GigabitEthernet0/0/0/16 (cached values):
Egress:
    Output total bytes          = 1140270
    Output good bytes           = 1140270

    Output total packets        = 10004
    Output 802.1Q frames        = 0
    Output pause frames         = 0
    Output pkts 64 bytes        = 1


 Output pkts 65-127 bytes    = 10003


    Output pkts 128-255 bytes   = 0
    Output pkts 256-511 bytes   = 0
    Output pkts 512-1023 bytes  = 0
    Output pkts 1024-1518 bytes = 0
    Output pkts 1519-Max bytes  = 0

    Output good pkts            = 10004
    Output unicast pkts         = 10000
    Output multicast pkts       = 3
    Output broadcast pkts       = 1

    Output drop underrun        = 0
    Output drop abort           = 0
    Output drop other           = 0

    Output error other          = 0
```

6. Statistiques d’interface

<#root>

```
RP/0/RP0/CPU0:fretta_2#show int gigabitEthernet 0/0/0/16
Thu Apr 20 21:21:37.942 UTC
GigabitEthernet0/0/0/16 is up, line protocol is up
  Interface state transitions: 1
  Hardware is GigabitEthernet, address is 008a.964a.7040 (bia 008a.964a.7040)
  Internet address is 1.1.16.2/24
  MTU 1514 bytes, BW 1000000 Kbit (Max: 1000000 Kbit)
     reliability 255/255, txload 0/255, rxload 0/255
  Encapsulation ARPA,
  Full-duplex, 1000Mb/s, link type is force-up
  output flow control is off, input flow control is off
  Carrier delay (up) is 10 msec
  loopback not set,
  Last link flapped 01:00:13
  ARP type ARPA, ARP timeout 04:00:00
  Last input 00:56:58, output 00:56:58
  Last clearing of "show interface" counters never
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     10004 packets input, 1140270 bytes, 0 total input drops
     3 drops for unrecognized upper-level protocol
```

```
     Received 1 broadcast packets, 3 multicast packets
              0 runts, 0 giants, 0 throttles, 0 parity
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort


 10004 packets output

, 1140270 bytes, 0 total output drops
     Output 1 broadcast packets, 3 multicast packets
     0 output errors, 0 underruns, 0 applique, 0 resets
     0 output buffer failures, 0 output buffers swapped out
     0 carrier transitions
```

Réponse d'écho : Noeud local (LC) : RX

```
LPTS(HW) -> SPP(LC) -> NetIO/Forwarder(LC) -> LPTS PreIFIB Lookup -> SPP(LC) -> CE(LC) -> SPP(RP) -> Ne
```

1. Vérifiez si les paquets arrivent du câble.

<#root>

```
RP/0/RP0/CPU0:fretta_1#show controllers gigabitEthernet 0/0/0/16 stats
Thu Apr 20 21:17:28.176 UTC
Statistics for interface GigabitEthernet0/0/0/16 (cached values):

Ingress:
    Input total bytes           = 1140270
    Input good bytes            = 1140270

    Input total packets         = 10004
    Input 802.1Q frames         = 0
    Input pause frames          = 0
    Input pkts 64 bytes         = 1

   Input pkts 65-127 bytes     = 10003


    Input pkts 128-255 bytes    = 0
    Input pkts 256-511 bytes    = 0
    Input pkts 512-1023 bytes   = 0
    Input pkts 1024-1518 bytes  = 0
    Input pkts 1519-Max bytes   = 0

    Input good pkts             = 10004
    Input unicast pkts          = 10000
    Input multicast pkts        = 3
    Input broadcast pkts        = 1

    Input drop overrun          = 0
    Input drop abort            = 0
    Input drop invalid VLAN     = 0
    Input drop invalid DMAC     = 0
    Input drop invalid encap    = 0
    Input drop other            = 0
```

```
    Input error giant           = 0
    Input error runt            = 0
    Input error jabbers         = 0
    Input error fragments       = 0
    Input error CRC             = 0
    Input error collisions      = 0
    Input error symbol          = 0
    Input error other           = 0

    Input MIB giant             = 0
    Input MIB jabber            = 0
    Input MIB CRC               = 0
```

2. Compteurs LPTS

```
RP/0/RP0/CPU0:fretta_1#show lpts pifib hardware entry brief locatio 0/0/CPU0
```

<#root>

```
0.0.0.0              0.0.0.0              0     1
```

ECHOREPLY

```
    0      0    ICMP-app-default   Local LC     LOW
```

10000

```
  0
```

3. SPP sur LC

<#root>

```
RP/0/RP0/CPU0:fretta_1#show spp node-counters location 0/0/CPU0
Thu Apr 20 21:01:31.974 UTC
fretta/classify
      forwarded to spp clients:           10006
 forwarded NPU packet to NetIO:           10006
      dropped in classify node:              24
         Fwded to CoPP sampler:               1
                     PUNT ARP:                1
                    PUNT IFIB:           10006
                IFIB RAWIP4_FM:           10000
                IFIB RAWIP6_FM:               6
------------------------------
client/inject
        pkts injected into spp:           10002
  NetIO->NPU injected into spp:               2
  NetIO->CPU injected into spp:           10000
          NetIO->NPU PROTO ARP:               2
```

```
           NetIO->CPU PKT LPTS:           10000
------------------------------

socket/rx


                ether raw pkts:           10031


------------------------------
socket/tx
                       ce pkts:           10002
------------------------------
client/punt
              punted to client:           10007
------------------------------
```

4. Netio sur LC

```
RP/0/RP0/CPU0:fretta_1# show netio chains gigabitEthernet 0/0/0/16 location 0/0/cpu0
```

<#root>

```
<12> (ipv4)   Stats IN: 10000 pkts, 1140000 bytes; OUT: 0 pkts, 0 bytes
```

<#root>

```
Protocol SAFI counts:
--------------------

       Protocol        SAFI       Pkts In    Bytes In    Pkts Out   Bytes Out
---------------  ----------    ----------  ----------  ----------  ----------

 ipv4     Unicast         10000     1140000

        0           0
           ipv4   Multicast             0           0           0           0
           ipv4   Broadcast             0           0           0           0
           ipv6     Unicast             0           0           0           0
           ipv6   Multicast             0           0           0           0
```

5. Statistiques FWD sur LC.

<#root>

```
RP/0/RP0/CPU0:fretta_1#show fwd statistics all location 0/0/CPU0
Thu Apr 20 21:04:27.767 UTC
```

```
RECEIVE STATISTICS SUMMARY:
rx_pkts: 10007

punt_pkts: 10007

ingress_total_drops: 0
TRANSMIT STATISTICS SUMMARY:
inject_pkts: 10002
tx_pkts: 10002
egress_total_drops: 0
RP/0/RP0/CPU0:fretta_1#
```

5. SPP sur LC à envoyer au SPP sur RP.

<#root>

```
RP/0/RP0/CPU0:fretta_1#show spp node-counters location 0/0/CPU0
Thu Apr 20 21:01:31.974 UTC
fretta/classify
      forwarded to spp clients:           10006
 forwarded NPU packet to NetIO:           10006
      dropped in classify node:              24
         Fwded to CoPP sampler:               1
                     PUNT ARP:               1
                    PUNT IFIB:           10006
                IFIB RAWIP4_FM:           10000
                IFIB RAWIP6_FM:               6
-------------------------------
client/inject
        pkts injected into spp:           10002
  NetIO->NPU injected into spp:               2
  NetIO->CPU injected into spp:           10000
           NetIO->NPU PROTO ARP:               2
            NetIO->CPU PKT LPTS:           10000
-------------------------------
socket/rx
               ether raw pkts:           10031
-------------------------------
socket/tx

                      ce pkts:           10002

-------------------------------
client/punt
              punted to client:           10007
-------------------------------
```

6. SPP sur RP

<#root>

```
RP/0/RP0/CPU0:fretta_1#show spp node-counters location 0/rP0/CPU0
Thu Apr 20 21:06:33.045 UTC

socket/rx


               ether raw pkts:           10002


           mgmt interface pkts:           16651
------------------------------
socket/tx
                       ce pkts:           10000
           mgmt interface pkts:              14
------------------------------
fretta/classify
      forwarded to spp clients:           26651
 forwarded CPU packet to NetIO:           10000
forwarded Mgmt packet to NetIO:           16651
      dropped in classify node:               2
------------------------------
client/inject
        pkts injected into spp:           10014
  NetIO->NPU injected into spp:           10000
     MGMT_IF injected into spp:              14
NetIO->NPU PROTO IPV4_PREROUTE:           10000
------------------------------
client/punt
              punted to client:           26651
------------------------------
```

7. Netio sur RP.

<#root>

```
RP/0/RP0/CPU0:fretta_1#show netio clients location 0/RP0/CPU0
Thu Apr 20 21:05:05.977 UTC

Counters                  Errors/Total
---------------------------------------
Output                        0/10031
Input                         0/25872
Puntback                      0/0
Jump                          0/0
Driver Output                 0/10014

Mutex Bypass Counters        Total
---------------------------------------
Egress handled               0
Egress chainwalked           10018
Egress dropped               0
Ingress handled              10000
Ingress chainwalked          0
Ingress dropped              0

XIPC queues              Dropped/Queued    Cur/High/Max
```

```
------------------------------------------------------------
OutputL                         0/10004         0/1/6000
OutputH                         0/14            0/1/3000
Puntback                        0/0             0/0/6000
PMutex_egressL                  0/10004         0/1/6000
PMutex_egressH                  0/14            0/1/1500
PMutex_ingressL                 0/0             0/0/6000
PMutex_ingressH                 0/0             0/0/1500

                    Input             Punt          XIPC InputQ      XIPC PuntQ
ClientID          Drop/Total        Drop/Total      Cur/High/Max    Cur/High/Max
--------------------------------------------------------------------------------
ipv6_icmp             0/0               0/0             0/0/1000        0/0/1000

icmp                  0/10000           0/0             0/1/1000        0/0/1000


clns                L 0/0               0/0           L 0/0/1000        0/0/0
                    H 0/0                             H 0/0/1000
eth_mgmt              0/0               0/0
ipv6_io               0/0               0/4             0/0/1000        0/1/1000
ipv6_nd               0/4               0/0             0/1/1500        0/0/1000
l2snoop               0/0               0/0             0/0/1000        0/0/0
ether_sock            0/0               0/0
icmpv6_unreach_jump         0/0                 0/0
raw                 L 0/0               0/0           L 0/0/1600        0/0/0
                    H 0/0                             H 0/0/1600
tcp                 L 0/0               0/0           L 0/0/1600        0/0/0
                    H 0/0                             H 0/0/1600
udp                 L 0/307             0/0           L 0/1/1600        0/0/0
                    H 0/0                             H 0/0/1600
arp                   0/15565           0/0             0/4/1000        0/0/1000
mpls_io               0/0               0/0             0/0/1000        0/0/1000
lspv_server           0/0               0/0
ipv4                  0/0               0/0             0/0/1000        0/0/1000
ipv6                  0/0               0/0             0/0/1000        0/0/1000

Key:
  L = queue for lower priority packets
  H = queue for higher priority packets
```

8. E/S IP

```
RP/0/RP0/CPU0:fretta_1#



RP/0/RP0/CPU0:fretta_1#show ipv4 traffic brief
```

<#root>

Rcvd

```
: 0 admin unreachable, 0 network unreachable
        0 host unreachable, 0 protocol unreachable
        0 port unreachable, 0 fragment unreachable
        0 time to live exceeded, 0 reassembly ttl exceeded
        0 echo request,
```

10000 echo reply

```
        0 mask request, 0 mask reply
        0 redirect, 0 parameter error
        0 source quench, 0 timestamp, 0 timestamp reply
        0 router advertisement, 0 router solicitation
        10000 total, 0 checksum errors, 0 unknown
```

9. Statistiques d'interface :

<#root>

```
RP/0/RP0/CPU0:fretta_1# show int gigabitEthernet 0/0/0/16
Thu Apr 20 21:22:12.822 UTC
GigabitEthernet0/0/0/16 is up, line protocol is up
  Interface state transitions: 1
  Hardware is GigabitEthernet, address is 008a.964b.7040 (bia 008a.964b.7040)
  Internet address is 1.1.16.1/24
  MTU 1514 bytes, BW 1000000 Kbit (Max: 1000000 Kbit)
     reliability 255/255, txload 0/255, rxload 0/255
  Encapsulation ARPA,
  Full-duplex, 1000Mb/s, link type is force-up
  output flow control is off, input flow control is off
  Carrier delay (up) is 10 msec
  loopback not set,
  Last link flapped 01:01:11
  ARP type ARPA, ARP timeout 04:00:00
  Last input 00:58:03, output 00:58:03
  Last clearing of "show interface" counters never
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
```

10004 packets input

```
, 1140270 bytes, 0 total input drops
     3 drops for unrecognized upper-level protocol
     Received 1 broadcast packets, 3 multicast packets
              0 runts, 0 giants, 0 throttles, 0 parity
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     10004 packets output, 1140270 bytes, 0 total output drops
     Output 1 broadcast packets, 3 multicast packets
     0 output errors, 0 underruns, 0 applique, 0 resets
     0 output buffer failures, 0 output buffers swapped out
     0 carrier transitions


RP/0/RP0/CPU0:fretta_1#
```

Ping local

<À déterminer>

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