

عيطبلا هيچوتلا ةداعا ةمزح راسم نم ققحتلا لاصتالا رابتخا مادختساب NCS6k

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ةمدقمل

اهالصل او لاصتالا ءاطخا فاشكتسالا مادختسالا ءئاش لاصتالا رابتخا ةمزح رابتخا ةداعا ةمزح نم ققحتلل لاصتالا رابتخا مادختسالا امظتنم اجهن دنتسملا اذه حضوي س 6000 (NCS6K) زارط تاكبشلا براق ت ماطنل ءئيطبلا هيچوتلا.

ةيساسألا تابلطتملا

تابلطتملا

ةيلاتلا عيضاوملاب ءفرعم دنتسملا اذه ءارق ىدل نوكي نأ بجي:

- يساسألا IP ل هيچوت.
- XR ل ءغشت ماطن.

ةمدختسملا تانوكملا

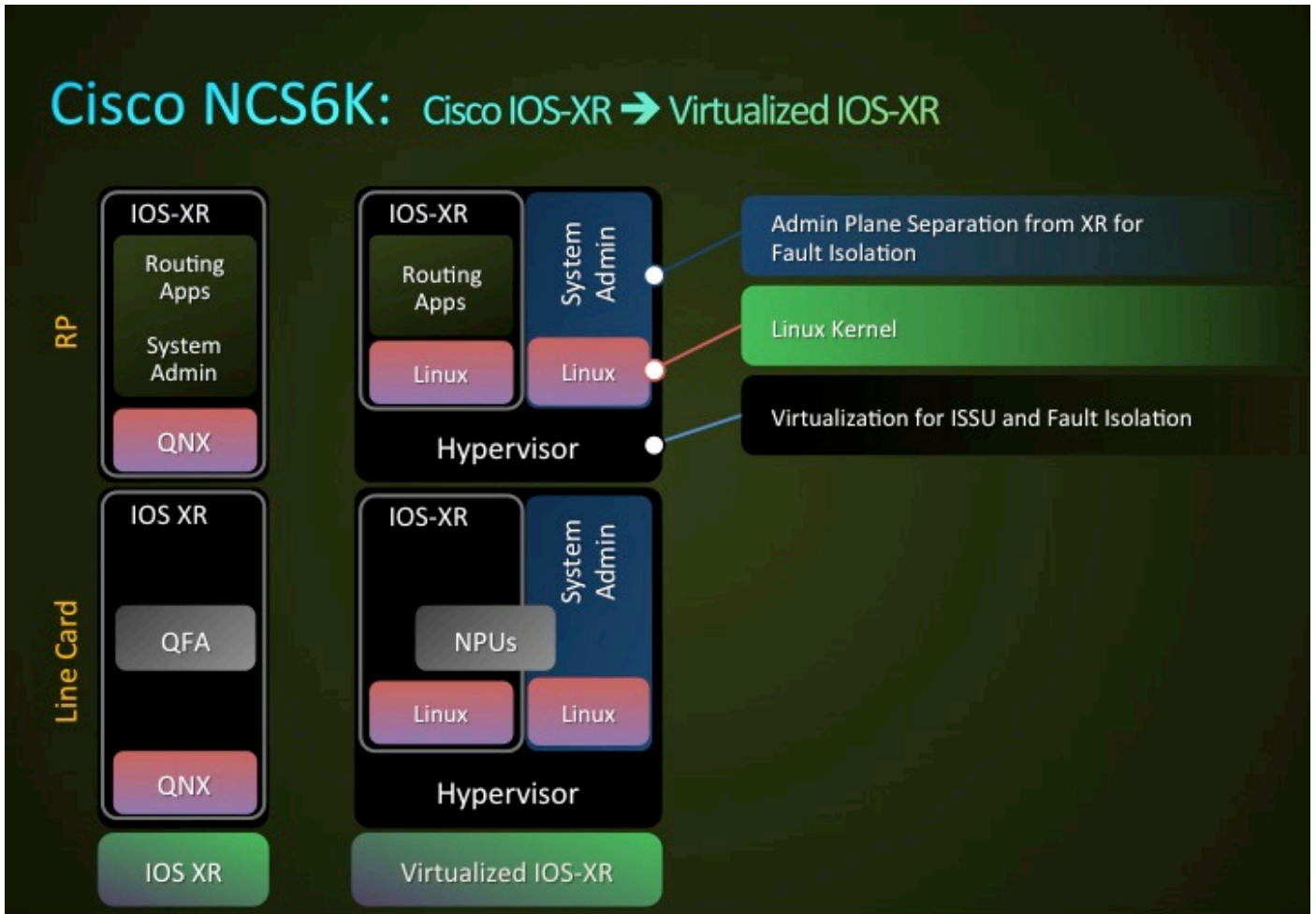
ةصنم NCS6K ل ءقيثو اذه تقلال.

ةصاخ ءئلعم ءئيب ي ءدوچوملا ءزهجالا نم دنتسملا اذه ي ءدراول تامولعمل ءاشن ا مت تناك اذا. (يضا رتفا) حوسمم نيوكتب دنتسملا اذه ي ءمدختسملا ءزهجالا عيمج تادب رما يال لم تحملا ريثا تلل كمهف نم دكأتف ، ءرشابم ك تكبش.

ةيساسأ تامولعم

NCS6K م دختست IOS-XR ي ديلقتلا يساسألا ماطنلا او NCS6K نيبي سيئر قرف دچوي وأ (RP) هيچوتلا لءاعم ، ءدقع لك موقت دق . ماطنلا ءنابل ءيضا رتفالا ءكاحملا ءينقت IOS-XR و VM ماطنلا ري دم لثم (VM) ءيويحل ءزهجالا نم ديدعل لءغشتب ، (LC) طخلل ءقابط ءئاطولا ءلماك XR ءدقع ءاشن اءم اءم دمتي يتلاو ، كلذل اءم و IOS-XR VM2 و VM1 دءاو IOS-XR VM زاھج لءغشتب LC و RP موقبي شيح الاثم يلاتلا لكشلل حضوي

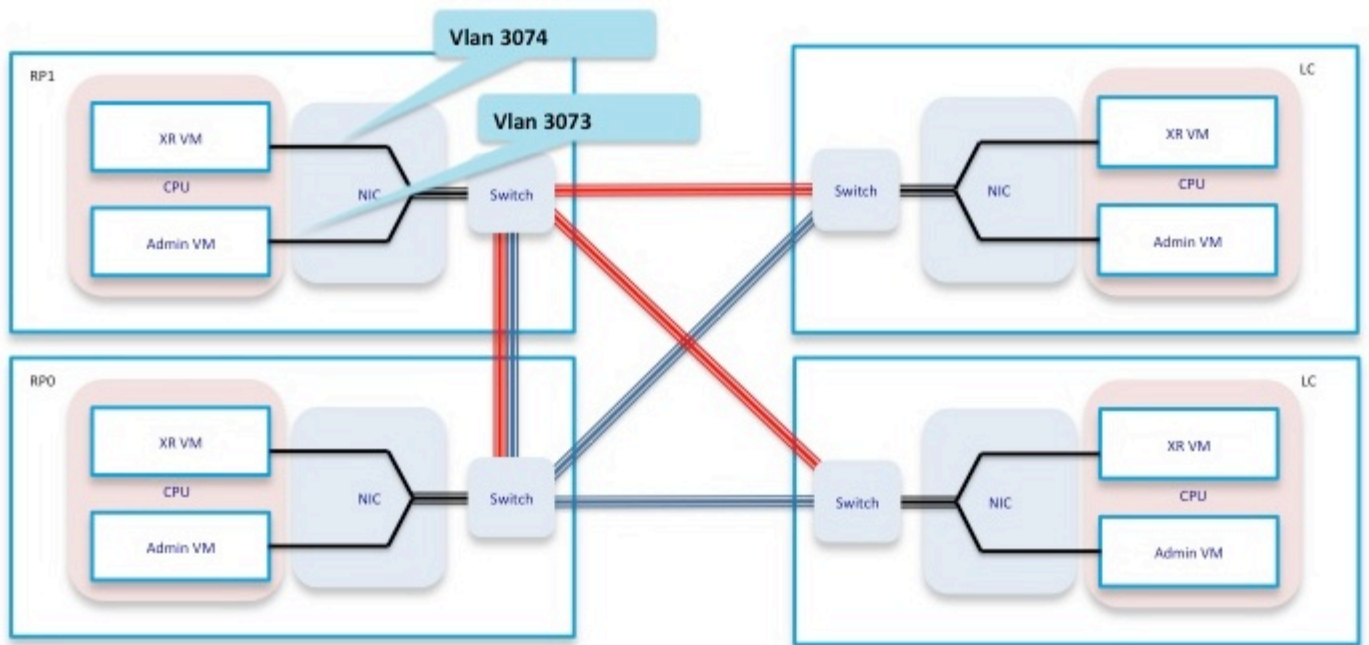
1 لكش



مكحتللا يوتسم تانايب رورم ةكرح رمت فوس. RPs و LCs طبرل مكحتللا تنرثي ةكبش كانه نإف، ةضارتفالا ةكاحملا ةئيب هذه نأ امب. هذه مكحتللا تنرثي ةكبش ربع RPs و LCs نيپ Nicantic (NIC) نأ فيكو ددحم (VM) ةضارتفا زاغ ىلإ ةمزحللا هذه ميلس ةئيب فيك لثم ةلئسأ؟ اهليل ةهجوم ةمزحللا نأ فرعت LC و RP في

ةزهجالاب ةصاخلا تانايب رورم ةكرح زيي متل VLAN تاكلبش مادختسا متي، راصتخاب (NIC) ةكبشلا ةهجاو ةقاطب ةطساوب ةئيب مةل هذه ءارجا متيو ةفلتخملا (VM) ةضارتفالا رورم ةكرحو، IOS-XR VM ىلإ VLAN 3074 رورم ةكرح ميلس تب NIC موقت فيك 2 لكشللا حصوي VLAN 3073 ىلإ Admin VM.

2 لكش

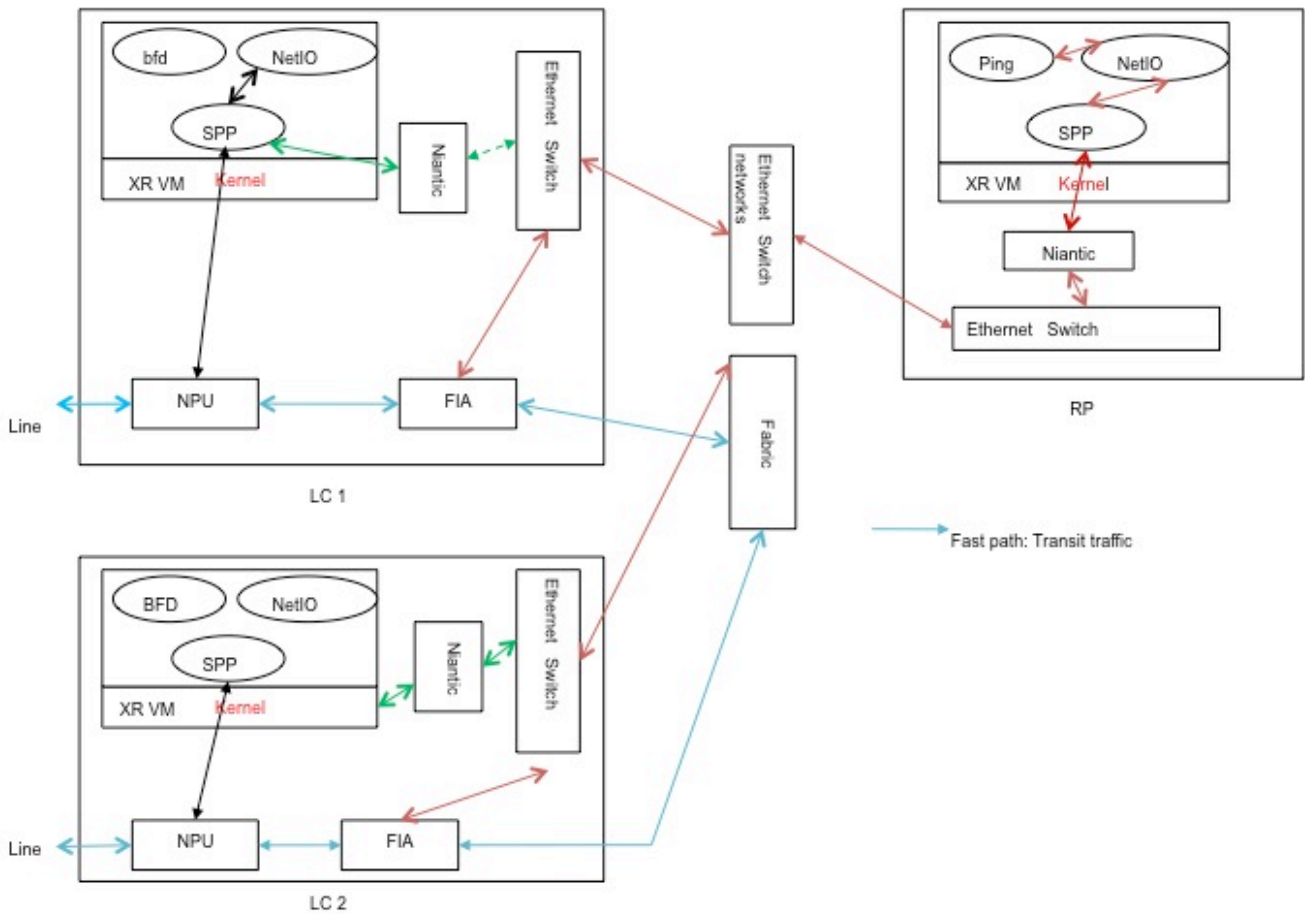


ويرانيسل طسبم هيچوت ةداع راسم ىلع لوصحلا كنكمي، اعم اذه هيچوتلا ةداع نوكم عضوب
3. لكشلا يف حضوم وه امك لاصتالا رابتخا

عبرملا لخاد يلاتلا هيچوتلا ةداع راسم مزحلا ذأت، RP نم لاصتا رابتخا ءارج دنع

RP_PING ↔ RP_NETIO ↔ RP_SPP ↔ RP_LINUX_KERNEL_SOCKET ↔ LC_FIA
↔ LC_NPU (نمضتي PSE، PLIM_ASIC) ↔ طخ

3 لكش



تحصلنا من قحتنا

من لاصت ال رابتخ| ادب هي ف متي وي راني س لاثم ك ذخؤيس ،دنتس م لي قابل ة بس نلاب رهظتس Te0/0/2/0. لى لع ةرشابم لصتم في ضمب ل لاصت ال رابتخ| ادب متي س. rp. لوك وتورب هذه لاصت ال رابتخ| ةم زح راسم من قحتلل ةوطخب ةوطخ جهن ةي لاتل تاوطلال

```
RP/0/RP0/CPU0:NCS6k-Deploy#show ip interface brief
```

Interface	IP-Address	Status	Protocol
Bundle-Ether671	10.67.2.2	Up	Up
Bundle-Ether672	10.67.3.2	Down	Down
Loopback0	10.17.17.17	Up	Up
MgmtEth0/RP0/CPU0/0	10.7.54.11	Up	Up
TenGigE0/0/0/2/0	10.67.1.2	Up	Up
TenGigE0/0/0/2/1	unassigned	Up	Up
TenGigE0/0/0/2/2	unassigned	Up	Up
TenGigE0/0/0/2/3	unassigned	Up	Up
TenGigE0/0/0/2/4	unassigned	Up	Up
TenGigE0/0/0/2/5	unassigned	Down	Down

[snip]

```
RP/0/RP0/CPU0:NCS6k-Deploy#show run interface Ten 0/0/0/2/0
interface TenGigE0/0/0/2/0
  ipv4 address 10.67.1.2 255.255.255.252
  load-interval 30
```

```
RP/0/RP0/CPU0:NCS6k-Deploy#ping 10.67.1.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.67.1.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 5/6/7 ms
```

1. "show ipv4 traffic" في مكحتل لئاسر لوكوتورب عادصأ دد رهظيس RP، دقع ىلع (ICMP) تترنتلإا. اهاعاچر مت يتل ICMP دور ددعو اهالاسر مت يتل (ICMP) تترنتلإا.

```
RP/0/RP0/CPU0:NCS6k-Deploy#show ipv4 traffic

IP statistics:
  Rcvd: 1495334 total, 80112 local destination
        0 format errors, 0 bad hop count
        23 unknown protocol, 0 not a gateway
        0 security failures, 0 bad source, 0 bad header
        133207 with options, 0 bad, 0 unknown
  Opts: 0 end, 0 nop, 0 basic security, 0 extended security
        0 strict source rt, 0 loose source rt, 0 record rt
        0 stream ID, 0 timestamp, 133207 alert, 0 cipso
  Frags: 0 reassembled, 0 timeouts, 0 couldn't reassemble, 0 fragments received
        0 fragmented, 0 fragment count, 0 fragment max drop
  Bcast: 0 sent, 0 received
  Mcast: 1361652 sent, 1376283 received
        Drop: 0 encapsulation failed, 237 no route, 0 too big
  Sent: 1437435 total
```

```
ICMP statistics:
  Sent: 0 admin unreachable, 63 network unreachable
        8 host unreachable, 0 protocol unreachable
        16 port unreachable, 0 fragment unreachable
        0 time to live exceeded, 0 reassembly ttl exceeded
        24 echo request, 30024 echo reply
        0 mask request, 0 mask reply
        0 parameter error, 0 redirects
        30131 total
  Rcvd: 0 admin unreachable, 21 network unreachable
        0 host unreachable, 0 protocol unreachable
        0 port unreachable, 0 fragment unreachable
        0 time to live exceeded, 0 reassembly ttl exceeded
        30024 echo request, 15 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
        30063 total, 0 checksum errors, 0 unknown
```

2. دادع صرحف في ةيالاتلا ةوطخال لثمتت (NETIO). ةكبشلا لاخدا جارخا نوكم نم ققحت netio. ةلسلس في IPv4 دقع صاخلا "جورخلا" دادع ىرت نأ بجي RP Fint Netio. ةلسلس NETIO. نوكم نم اهالاسر متي و NETIO نوكم ىلإ تلصو مزحل نأ ينعي اذه، اذإ **Check initial NETIO counter value.**

```
RP/0/RP0/CPU0:NCS6k-Deploy#sh netio chains FINT loc 0/rp0/cpu0 | in Stats
<Protocol number> (name) Stats
<6> (fint_n2n) Stats IN: 0 pkts, 0 bytes; OUT: 0 pkts, 0 bytes
<10> (clns) Stats IN: 0 pkts, 0 bytes; OUT: 0 pkts, 0 bytes
<12> (ipv4) Stats IN: 2788 pkts, 115373 bytes; OUT: 2816 pkts, 117933 bytes
<13> (mpls) Stats IN: 16482 pkts, 2467508 bytes; OUT: 0 pkts, 0 bytes
<18> (lpts) Stats IN: 47234 pkts, 10381065 bytes; OUT: 0 pkts, 0 bytes
<19> (ipv6) Stats IN: 0 pkts, 0 bytes; OUT: 0 pkts, 0 bytes
```

```
<30> (ipv4_preroute)   Stats IN: 0 pkts, 0 bytes; OUT: 0 pkts, 0 bytes
<32> (ipv6_preroute)   Stats IN: 0 pkts, 0 bytes; OUT: 0 pkts, 0 bytes
<34> (fint_proto_tp)   Stats IN: 0 pkts, 0 bytes; OUT: 0 pkts, 0 bytes
<36> (l2transport)    Stats IN: 0 pkts, 0 bytes; OUT: 0 pkts, 0 bytes
```

Initiate 10 ping packets.

```
RP/0/RP0/CPU0:NCS6k-Deploy#ping 10.67.1.1 coun 10
```

Type escape sequence to abort.

Sending 10, 100-byte ICMP Echos to 10.67.1.1, timeout is 2 seconds:

!!!!!!!!!!!!

Success rate is 100 percent (10/10), round-trip min/avg/max = 4/7/8 ms

Check NETIO counter again. You would see increment of 10 packets.

```
RP/0/RP0/CPU0:NCS6k-Deploy#sh netio chains FINT loc 0/rp0/cpu0 | in Stats
```

<Protocol number> (name) Stats

```
<6> (fint_n2n)   Stats IN: 0 pkts, 0 bytes; OUT: 0 pkts, 0 bytes
<10> (clns)     Stats IN: 0 pkts, 0 bytes; OUT: 0 pkts, 0 bytes
<12> (ipv4)     Stats IN: 2788 pkts, 115373 bytes; OUT: 2826 pkts, 118933 bytes
<13> (mpls)     Stats IN: 16482 pkts, 2467508 bytes; OUT: 0 pkts, 0 bytes
<18> (lpts)     Stats IN: 47234 pkts, 10381065 bytes; OUT: 0 pkts, 0 bytes
<19> (ipv6)     Stats IN: 0 pkts, 0 bytes; OUT: 0 pkts, 0 bytes
<30> (ipv4_preroute) Stats IN: 0 pkts, 0 bytes; OUT: 0 pkts, 0 bytes
<32> (ipv6_preroute) Stats IN: 0 pkts, 0 bytes; OUT: 0 pkts, 0 bytes
<34> (fint_proto_tp) Stats IN: 0 pkts, 0 bytes; OUT: 0 pkts, 0 bytes
<36> (l2transport) Stats IN: 0 pkts, 0 bytes; OUT: 0 pkts, 0 bytes
```

إذا امم ققحت لل "show_netio_fwder_stats -g" KornShell (ksh) رمأل مادختس ااضيأ كنكمي
ةكرح كانه نوكت دق، جاتنإل ةئيب يف :ةظحالم .ال م اديزتي جارخإل/الاخإل دادع ناك
لاصتال رابتخا مزح تناك إذا امم ققحتل بعصلال نم لعجت ةيفللخا يف ىرخأ رورم
ةلهملا تاذا مزحلال نم ري بك ددع مادختس اكنكمي ،لېدب لحك .ال م ا نوكملا اذه ىلإ تلصو
ىلع يوتحي وأ ةأجف ديازتي دادعلال ناك إذا امم ققحتل او "0 ةرم ping x.x.x.x 10000 ددع":
ةزفق.

Check initial counter value.

```
RP/0/RP0/CPU0:NCS6k-Deploy#run show_netio_fwder_stats -g
```

RECEIVE STATISTICS SUMMARY:

rx_pkts: 2224455

punt_pkts: 2224447

ingress_total_drops: 8

TRANSMIT STATISTICS SUMMARY:

inject_pkts: 2077319

tx_pkts: 2058041

egress_total_drops: 2

RECEIVE STATISTICS DETAILS:

Rx Pkt type stats:

lpts_pkts: 2220753

Rx Listener tag stats:

ipv4: 1116092

ipv6: 658627

clns: 112549

ipv4_l1: 286252

raw4: 23

raw6: 43984

ospf_mc4: 45

ospf_mc6: 2

udp4: 7

tcp4: 405

isis: 2767

Rx Punt reason stats:

IFIB: 2220753

```
Rx Drop stats:
  null_fint_ifh_drops: 8
  ingress_total_drops: 8
TRANSMIT STATISTICS DETAILS:
Tx Pkt type stats:
  ipv4: 2852
  mpls: 42647
  osi: 78760
  ipv4_preroute: 1339401
  ipv6_preroute: 613659
Tx Protocol Id stats:
  clns: 78760
  ipv4: 2852
  mpls: 42647
  ipv4_preroute: 1339401
  ipv6_preroute: 613659
Tx Drop stats:
  invalid_queue_drops: 2
  hdr_init_drops: 2
  egress_total_drops: 2
```

Initiate 10 ping packets.

```
RP/0/RP0/CPU0:NCS6k-Deploy#ping 10.67.1.1 coun 10
Type escape sequence to abort.
Sending 10, 100-byte ICMP Echos to 10.67.1.1, timeout is 2 seconds:
!!!!!!!!!!
Success rate is 100 percent (10/10), round-trip min/avg/max = 3/4/7 ms
```

Check counter again to check to se increment of 10 packets.

```
RP/0/RP0/CPU0:NCS6k-Deploy#run show_netio_fwder_stats -g
RECEIVE STATISTICS SUMMARY:
rx_pkts: 2224465
punt_pkts: 2224457
ingress_total_drops: 8
TRANSMIT STATISTICS SUMMARY:
inject_pkts: 2077332
tx_pkts: 2058051
egress_total_drops: 2
RECEIVE STATISTICS DETAILS:
Rx Pkt type stats:
  lpts_pkts: 2220763
Rx Listener tag stats:
  ipv4: 1116102
  ipv6: 658627
  clns: 112549
  ipv4_l: 286252
  raw4: 23
  raw6: 43984
  ospf_mc4: 45
  ospf_mc6: 2
  udp4: 7
  tcp4: 405
  isis: 2767
Rx Punt reason stats:
  IFIB: 2220763
Rx Drop stats:
  null_fint_ifh_drops: 8
  ingress_total_drops: 8
TRANSMIT STATISTICS DETAILS:
Tx Pkt type stats:
  ipv4: 2865
  mpls: 42647
  osi: 78760
```

```

    ipv4_preroute: 1339401
    ipv6_preroute: 613659
Tx Protocol Id stats:
  clns: 78760
  ipv4: 2865
  mpls: 42647
  ipv4_preroute: 1339401
  ipv6_preroute: 613659
Tx Drop stats:
  invalid_queue_drops: 2
  hdr_init_drops: 2
  egress_total_drops: 2
RP/0/RP0/CPU0:NCS6k-Deploy#

```

3. إلى تلصو ةم زحلا تناك اذا ام ة فر عمل SPP رم اوأ رطس ة هجاو مدختس أ. SPP نوكم نم ققحت .

Check initial counter value.

```

RP/0/RP0/CPU0:NCS6k-Deploy#sh spp node-counters
0/0/CPU0:
pdma/rx
      slicel high pkts:          10
-----
pdma/tx
      slicel low pkts:           10
-----
panini/classify
      forwarded to spp clients:  10
-----
client/inject
      pkts injected into spp:    10
-----
client/punt
      punted to client:          10
-----

0/RP0/CPU0:
panini/classify
      forwarded to spp clients:  22070
-----
client/inject  pkts injected into spp: 4640
-----
socket/rx
      ce low pkts:               45
      mgmt interface pkts:       22025
-----
socket/tx
      ce pkts:                   45
      mgmt interface pkts:       4595
-----
client/punt  punted to client: 22070
-----

```

Initiate 100 ping packets.

```
RP/0/RP0/CPU0:NCS6k-Deploy#ping 10.67.1.1 count 100
```

Type escape sequence to abort.

Sending 100, 100-byte ICMP Echos to 10.67.1.1, timeout is 2 seconds:

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
```

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!! Success rate is 100 percent (100/100), round-trip
```

```
min/avg/max = 3/3/8 ms
```

Check counter again to see increment of 100 packets.

```
RP/0/RP0/CPU0:NCS6k-Deploy#sh spp node-counters
```



```

0/0/CPU0:
pdma/rx
    slicel high pkts:                10
-----
pdma/tx
    slicel low pkts:                 10
-----
panini/classify
    forwarded to spp clients:         10
-----
client/inject
    pkts injected into spp:           10
-----
client/punt
    punted to client:                 10
-----

0/RP0/CPU0:
panini/classify
    forwarded to spp clients:         22172
-----
client/inject  pkts injected into spp: 4740
-----
socket/rx
    ce low pkts:                      145
    mgmt interface pkts:               22027
-----
socket/tx
    ce pkts:                           145
    mgmt interface pkts:               4595
-----
client/punt  punted to client: 22172
-----

```

4. تحت، هاندا جارخإلإ نم .سكونيل ةاون نوكم نم ةمزحلأ غيرفتل tcpdump تاودأ مدختسأ . ةيغرفل تاهجاولا نم ديعلال ةدهاشم كنكمي ،NCS6K XR VM KSH:

```

RP/0/RP0/CPU0:NCS6008-SJ#
RP/0/RP0/CPU0:NCS6008-SJ#run
Tue Jun 24 10:51:51.972 UTC
[xr-vm_node0_RP0_CPU0:/]$
[xr-vm_node0_RP0_CPU0:/]$ ifconfig -a
eth-vf1  Link encap:Ethernet  HWaddr 46:91:EE:A5:48:A8
         inet6 addr: fe80::4491:eeff:fea5:48a8/64 Scope:Link
         UP BROADCAST RUNNING MULTICAST  MTU:9700  Metric:1
         RX packets:518403076C3 errors:0 dropped:0 overruns:0 frame:0 TX packets:969599306
errors:0 dropped:0 overruns:0 carrier:0 collisions:0 txqueuelen:1000 RX bytes:138405352234
(128.9 GiB) TX bytes:242828863250 (226.1 GiB) eth-vf1.514 Link encap:Ethernet HWaddr
4C:4E:35:B6:63:68 inet6 addr: fe80::4e4e:35ff:feb6:6368/64 Scope:Link UP BROADCAST RUNNING
MULTICAST MTU:9700 Metric:1 RX packets:13547000 errors:0 dropped:0 overruns:0 frame:0 TX
packets:116957 errors:0 dropped:10 overruns:0 carrier:0 collisions:0 txqueuelen:0 RX
bytes:623478135C3 (594.5 MiB) TX bytes:26876899 (25.6 MiB) eth-vf1.3073 Link encap:Ethernet
HWaddr 4C:4E:35:B6:63:69 inet addr:192.0.0.4 Bcast:192.255.255.255 Mask:255.0.0.0 inet6
addr: fe80::4e4e:35ff:feb6:6369/64 Scope:Link UP BROADCAST RUNNING MULTICAST MTU:9700
Metric:1 RX packets:102364757 errors:0 dropped:0 overruns:0 frame:0 TX packets:100689507
errors:0 dropped:3 overruns:0 carrier:0 collisions:0 txqueuelen:0 RX bytes:29925046692
(27.8 GiB) TX bytes:7562528012 (7.0 GiB) eth-vf1.3074 Link encap:Ethernet HWaddr
4E:41:50:00:10:01 inet addr:172.0.16.1 Bcast:172.255.255.255 Mask:255.0.0.0 inet6 addr:
fe80::4c41:50ff:fe00:1001/64 Scope:Link UP BROADCAST RUNNING MULTICAST MTU:9700 Metric:1 RX
packets:402491385 errors:0 dropped:0 overruns:0 frame:0 TX packets:350389778 errors:0
dropped:6 overruns:0 carrier:0 collisions:0 txqueuelen:0 RX bytes:100599198478 (93.6 GiB)
TX bytes:96834116492 (90.1 GiB) lo Link encap:Local Loopback inet addr:127.0.0.1
Mask:255.0.0.0 inet6 addr: ::1/128 Scope:Host UP LOOPBACK RUNNING MTU:16436 Metric:1 RX
packets:1029861486 errors:0 dropped:0 overruns:0 frame:0 TX packets:1029861486 errors:0

```

dropped:0 overruns:0 carrier:0 collisions:0 txqueuelen:0 RX bytes:201624257033 (187.7 GiB)
TX bytes:201624257033 (187.7 GiB)

IPv4. ناونع ةيؤر كننكمي ال نكلو Mgmter ةهجاوب لاصلتال ال ETH-VF1.514 مادختسا متي
IP سذك نم ال دب IOS-XR ب صاخ ال IP سذك ملىع XR VM في Mgmtether ةهجاو دمتعت
eher-vf1.3074 مادختسا متي. Admin VM عم لاصلتال ال Ether-vf1.3073 تلمعتسا. Linux في
ال الخ نم لاصلتال رابتخا ةمزح ررمتس XR VM ب ةقلعتم ال مكحتل اىوتسم رورم ةكرحل
Tcpdump ن (سكونيل ةكبش لوكوتورب سذك م مادختسا ب) ةيعرف ال ةهجاو ال هذه
ةكرح نم صلخت ال ةيفي ك لوح ةريثك تاراخي اهل Linux ليغشت ال ماظن ب ةطبترم ال
مسقي نأ ةادأ tcpdump تلمعتسا عيظتسي تنأ. in addition، مامت ال ةريثم ال رورم ال
ةكرح رخآ مشي وأ (VLAN 3074) رورم ةكرح اىوتسم مكحت (SDR) دي دختس اىوتسم لاجم نامي
VLAN 3073 في (IPC) لاصلتال ةيولممع كرتشم لثم رورم

```
xr-vm_node0_RP0_CPU0:/]$ tcpdump -i eth-vf1.3074 -XX -vv
```

```
tcpdump: listening on eth-vf1.3074, link-type EN10MB (Ethernet), capture size 65535 bytes  
01:49:21.798386 IP (tos 0x6,ECT(0), ttl 1, id 0, offset 0, flags [DF], proto UDP (17),  
length 340)
```

```
172.0.16.1.10150 > 239.255.0.4.10150: [bad udp cksum ab2a!] UDP, length 312
```

```
0x0000: 0100 5e7f 0004 4e41 5000 1001 0800 4506 ..^...NAP.....E.  
0x0010: 0154 0000 4000 0111 cc8e ac00 1001 efff .T..@.....  
0x0020: 0004 27a6 27a6 0140 ad56 abcd abcd 0000 ..'..'..@.V.....  
0x0030: 0000 0280 f502 0000 0000 0000 0000 0000 .....  
0x0040: 0000 0000 0000 7856 3412 0128 0204 0000 .....xV4..(....  
0x0050: 0000 5508 0100 0100 0000 3c25 2600 0000 ..U.....<%&...  
0x0060: 0000 d007 0000 0000 0000 ffff 0000 0000 .....  
0x0070: 0000 0000 0000 0000 0000 0000 0000 0000 .....  
0x0080: 0000 0000 0000 4800 0000 0200 0000 0000 .....H.....  
0x0090: 0000 8800 0000 0000 0000 0000 0000 0000 .....  
0x00a0: 0000 0100 0000 0000 0000 0000 0000 0000 .....  
0x00b0: 0000 0000 0000 c2ca 0031 0000 0000 0000 .....1.....  
0x00c0: 0000 0000 0000 0000 0000 5508 0000 6510 .....U...e.  
0x00d0: 0000 ed53 4c00 0000 0000 0000 0000 0000 ...SL.....  
0x00e0: 0000 0000 0000 0000 0000 0000 0000 6264 .....bd  
0x00f0: 7863 0000 0000 0000 0000 0000 0000 0000 xc.....  
0x0100: 0000 0000 0000 0000 0000 0000 0000 0000 .....  
0x0110: 0000 0100 0000 0000 0000 0000 0000 30ff .....0.  
0x0120: 0002 0000 0000 0000 0000 0000 0000 0000 .....  
0x0130: 0000 0000 0000 0000 0000 0000 0000 0000 .....  
0x0140: 0000 0000 0000 0000 0000 0c00 0000 0000 .....  
0x0150: 0000 0000 0000 0000 0000 0000 0000 0000 .....  
0x0160: 0000 ..
```

```
01:49:21.799167 IP (tos 0x6,ECT(0), ttl 64, id 0, offset 0, flags [DF], proto UDP (17),  
length 380)
```

```
172.0.0.1.8197 > 172.0.16.1.8197: [udp sum ok] UDP, length 352
```

```
0x0000: 4e41 5000 1001 4e41 5000 0001 0800 4506 NAP...NAP.....E.  
0x0010: 017c 0000 4000 4011 d168 ac00 0001 ac00 .|.@.  
0x0040: 0000 0000 0000 7856 3412 0128 0204 0000 .....xV4..(....  
0x0050: 0000 5508 0100 0100 0000 3d25 2600 0000 ..U.....=%&...  
0x0060: 0000 d007 0000 0000 0000 ffff 0000 0000 .....  
0x0070: 0000 0000 0000 0000 0000 0000 0000 0000 .....  
0x0080: 0000 0000 0000 4800 0000 0200 0000 0000 .....H.....  
0x0090: 0000 8800 0000 0000 0000 0000 0000 0000 .....  
0x00a0: 0000 0100 0000 0000 0000 0000 0000 0000 .....  
0x00b0: 0000 0000 0000 c2ca 0031 0000 0000 0000 .....1.....  
0x00c0: 0000 0000 0000 0000 0000 5508 0000 6510 .....U...e.  
0x00d0: 0000 ee53 4c00 0000 0000 0000 0000 0000 ...SL.....  
0x00e0: 0000 0000 0000 0000 0000 0000 0000 6264 .....bd  
0x00f0: 7863 0000 0000 0000 0000 0000 0000 0000 xc.....  
0x0100: 0000 0000 0000 0000 0000 0000 0000 0000 .....  
0x0110: 0000 0100 0000 0000 0000 0000 0000 30ff .....0.  
0x0120: 0002 0000 0000 0000 0000 0000 0000 0000 .....  
0x0130: 0000 0000 0000 0000 0000 0000 0000 0000 .....  
0x0140: 0000 0000 0000 0000 0000 0c04 0000 0000 .....
```

```

0x0150: 0000 0000 0000 0000 0000 0000 0000 0000 .....
0x0160: 0000 ..
01:49:21.802982 IP (tos 0x6,ECT(0), ttl 64, id 0, offset 0, flags [DF], proto UDP (17),
length 380)
172.0.0.1.8197 > 172.0.16.1.8197: [udp sum ok] UDP, length 352
0x0000: 4e41 5000 1001 4e41 5000 0001 0800 4506 NAP...NAP.....E.
0x0010: 017c 0000 4000 4011 d168 ac00 0001 ac00 .|..@. .h.....
0x0020: 1001 2005 2005 0168 672f abcd abcd 0000 .....hg/.....
0x0030: 0000 3c80 f502 0000 0000 0000 0000 0000 ..<.....
0x0040: 0000 0000 0000 7856 3412 0411 0008 0000 .....xV4.....
0x0050: 0000 5508 0000 0100 0000 3d25 2600 0000 ..U.....=%&...
0x0060: 0000 d007 0100 0000 0000 ffff 0000 0000

```

[snip]

م تي يتل تانايبلا رورم ةكرح ني مضمضت متي دق ف VM، ويرانيس اذه نأ امب : **ةطخال**
رورم ةكرحل نكمي يتح يجرخال سألرا يي VM ةهجاو ناونع مادختساب VM لىل اهلاسر
VM ةهجاو لىل لوصولا هذه تانايبلا.

ةهجول/ردصم لبا UDP ةمزح س أرم ع قاولا يي هالعأ مزحلا غيرفت ني مضمضت مت
172.0.16.1، وهو ETH-VF1.3074 IP يي IOS-XR VM. **ةطخال** م
لائسر لوكوتوربل رورم ةكرح دوجو مدعوج ه نلا حيصوت وه اهب مايقلل مت يتل طاقتل
ل (ICMP) تنرتن لال يي ف مكحتلل.

5. طخ ةقاطب لىل ع FIA نوكم صحف.

Check initial counter value.

```
RP/0/RP0/CPU0:NCS6k-Deploy#sh controllers fia statistics instance 1 loc 0/0/cpu0
```

```
FIA Statistics Rack: 0, Slot: 0, Asic instance: 1
```

```
FIA Rx (To Fabric) Statistics.
```

```
----- Input Pkt counters
Pkts Bytes Rx pkts from pse : 250 53000 Rx pkts from switch : 993278 349564509 bcast pkts
from switch : 0 mcast pkts from switch : 993278 ucast pkts from switch :
```

250

```

Rx pkts enqueued(IQM)           :                500           86500
Rx pkts dequeued(IQM)           :                500           86500
Rx pkts sent to fabric           :                500

```

```
Cell counters:
```

```

Data cells sent to fabric        :                500           86500
Control cells sent to fabric     :           183039783411

```

```
Drop counters:
```

```

Rx burst error drops(NBI)       :                0
Rx error drops(Switch)          :                0
Rx error drops(pse)             :                0
Rx pkt discard drops(IQM)       :           993277           334570329
Pkt crc error drops(FDT)        :                0
Unreachable dest cell drops     :                0
Internal Error Count            :           41984110
Internal Drop Count             :                0

```

```
FIA Tx (From Fabric) Statistics
```

```
----- Cell counters:
Pkts Bytes Data cells : 500 Control cells : 179368087015 Reassembled packet counters: Pkts
received from fabric : 500 Tx Ucast pkts : 500 86500 Tx Mcast pkts : 0 0 Tx pkts (EPNI) :
500 81000 Tx pkts sent to switch : 250 53000 Bcast pkts sent to switch : 0 Mcast pkts sent
to switch : 0 Ucast pkts sent to switch : 250 Tx segments sent to pse :
```

250

29000

```

Tx pkts sent to pse (NBI)       :                500           49000

```

```
Drop counters:
```

```

Tx pkts dropped EPNI           :                0

```


Check counter again to see increment of 1000 packets.

RP/0/RP0/CPU0:NCS6k-Deploy#sh control pse statistics summ instance 1 loc 0/0/cpu0

STATISTICS SUMMARY:

INGRESS

From L2 [LSIM]:

Packets: 2261

Bytes: 293336

To Fabric:

Packets: 2250

Bytes: 477000

EGRESS

From Fabric:

Packets: 2250

Bytes: 261000

To TM:

Packets: 2272

To L2 [LSIM]:

Packets: 2261

Bytes: 256962

TO/FROM CPU

To CPU:

Packets: 11

From CPU:

Packets: 11

7. (PLIM) ةي دامل ا قو ب ط ل ا ة ه ج ا و ل ة ي ط م ن ل ا ة د ح و ل ل ASIC ا د ا د ع ن م ق ق ح ت ل ا .

Check initial counter value.

RP/0/RP0/CPU0:NCS6k-Deploy#sh controllers plim asic statistics interface Te0/0/0/2/0

Node: 0/0/CPU0

TenGigE0/0/0/2/0 Tx Statistics ----- Total Packets

: 2256 Total Bytes : 265884 Total Good Packets : 2256 Total Good Bytes : 265884 **Unicast**

Packets : 2256

Multicast Packets : 0

Broadcast Packets : 0

64 Byte Packets : 6

65to127 Byte Packets : 2250

128to255 Byte Packets : 0

256to511 Byte Packets : 0

512to1023 Byte Packets : 0

1024to1518 Byte Packets : 0

1519to1522 Byte Packets : 0

1523to1548 Byte Packets : 0

1549to2000 Byte Packets : 0

2001to_MRU Byte Packets : 0

Non Pause BPDU Packets : 0

Classic Pause Packets : 0

Class Based Pause Pkts 0 : 0

Class Based Pause Pkts 1 : 0

Class Based Pause Pkts 2 : 0

Class Based Pause Pkts 3 : 0

Class Based Pause Pkts 4 : 0

Class Based Pause Pkts 5 : 0

Class Based Pause Pkts 6 : 0

Class Based Pause Pkts 7 : 0

Dropped Packets

=====

Drained Packets : 0

Abort : 0

Length Error : 0

Giant : 0

Tail Drop: HP Queue : 0

Tail Drop: LP Queue : 0

TenGigE0/0/0/2/0 Rx Statistics

Total Packets : 2256 Total Bytes : 265884 Total Good Packets : 2256 Total Good Bytes :

265884 **Unicast Packets : 2256**

Multicast Packets : 0

Broadcast Packets : 0

64 Byte Packets : 6

Check counter again to see increment of 1000 packets.

RP/0/RP0/CPU0:NCS6k-Deploy#sh controllers plim asic statistics interface Ten0/0/0/2/0

Node: 0/0/CPU0

TenGigE0/0/0/2/0 Tx Statistics ----- Total Packets

: 3256 Total Bytes : 383884 Total Good Packets : 3256 Total Good Bytes : 383884 Unicast

Packets : 3256 Multicast Packets : 0
Broadcast Packets : 0 64 Byte Packets : 6
65to127 Byte Packets : 3250 128to255 Byte Packets : 0
256to511 Byte Packets : 0 512to1023 Byte Packets : 0
1024to1518 Byte Packets : 0 1519to1522 Byte Packets : 0
1523to1548 Byte Packets : 0 1549to2000 Byte Packets : 0
2001to_MRU Byte Packets : 0 Non Pause BPDUs Packets : 0
Classic Pause Packets : 0
Class Based Pause Pkts 0 : 0 Class Based Pause Pkts 1 : 0
Class Based Pause Pkts 2 : 0 Class Based Pause Pkts 3 : 0
Class Based Pause Pkts 4 : 0 Class Based Pause Pkts 5 : 0
Class Based Pause Pkts 6 : 0 Class Based Pause Pkts 7 : 0

Dropped Packets

=====

Drained Packets : 0 Abort : 0
Length Error : 0 Giant : 0
Tail Drop: HP Queue : 0 Tail Drop: LP Queue : 0

TenGigE0/0/0/2/0 Rx Statistics

Total Packets : 3256 Total Bytes : 383884 Total Good Packets : 3256 Total Good Bytes :

383884 Unicast Packets : 3256 Multicast Packets : 0

Broadcast Packets : 0 64 Byte Packets : 6
65to127 Byte Packets : 3250 128to255 Byte Packets : 0
256to511 Byte Packets : 0 512to1023 Byte Packets : 0
1024to1518 Byte Packets : 0 1519to1522 Byte Packets : 0
1523to1548 Byte Packets : 0 1549to2000 Byte Packets : 0
2001to_MRU Byte Packets : 0 Non Pause BPDUs Packets : 0
Classic Pause Packets : 0
Class Based Pause Pkts 0 : 0 Class Based Pause Pkts 1 : 0
Class Based Pause Pkts 2 : 0 Class Based Pause Pkts 3 : 0
Class Based Pause Pkts 4 : 0 Class Based Pause Pkts 5 : 0
Class Based Pause Pkts 6 : 0 Class Based Pause Pkts 7 : 0

Dropped Packets

=====

Runts : 0 Fragments : 0
Jumbo : 0 Jabber : 0
CRC : 0 Code Error : 0
Code Violation : 0 Bad Preamble : 0
IPG Violation : 0
Packet HPQ QoS Ctl Drop : 0 Bytes HPQ QoS Ctl Drop : 0
Packet HPQ QoS HP Drop : 0 Bytes HPQ QoS HP Drop : 0
Packet HPQ Ctl Tail Drop : 0 Bytes HPQ Ctl Tail Drop : 0
Packet HPQ HP Tail Drop : 0 Bytes HPQ HP Tail Drop : 0
Packet LPQ LP1 Tail Drop : 0 Bytes LPQ LP1 Tail Drop : 0
Packet LPQ LP2 Tail Drop : 0 Bytes LPQ LP2 Tail Drop : 0
Packet TCAM Miss : 0 Bytes TCAM Miss : 0
Packet EOP Abort Drop : 0 Bytes EOP Abort Drop : 0
Packet Policy Deny : 0 Bytes Policy Deny : 0

Rx Packet Drop Details

=====

Unknown Dest MAC Pkts : 0
Unknown E-Type Pkts : 0
Unknown Encap Pkts : 0 Unknown Encap Bytes : 0
Unknown VLAN Pkts : 0 Unknown VLAN Bytes : 0

!!
!!
!!
!!

Success rate is 100 percent (1000/1000), round-trip min/avg/max = 3/4/8 ms

Check counter again to see increment of 1000 packets.

RP/0/RP0/CPU0:NCS6k-Deploy#show inter ten 0/0/0/2/0

TenGigE0/0/0/2/0 is up, line protocol is up

Interface state transitions: 1
Hardware is TenGigE, address is e051.2a0f.8c29 (bia e051.2a0f.8c29)
Description: Connected to 0/7/0/1 - CRS-F
Internet address is 10.67.1.2/30
MTU 1514 bytes, BW 10000000 Kbit (Max: 10000000 Kbit)
 reliability 255/255, txload 0/255, rxload 0/255
Encapsulation ARPA,
Full-duplex, 10000Mb/s, SR, link type is force-up
output flow control is off, input flow control is off
loopback not set,
ARP type ARPA, ARP timeout 04:00:00
Last input 00:00:00, output 00:00:00
Last clearing of "show interface" counters 22:09:38
30 second input rate 1000 bits/sec, 2 packets/sec
30 second output rate 1000 bits/sec, 2 packets/sec
4256 packets input, 484860 bytes, 0 total input drops
 0 drops for unrecognized upper-level protocol
Received 0 broadcast packets, 0 multicast packets
 0 runts, 0 giants, 0 throttles, 0 parity
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
4256 packets output, 484860 bytes, 0 total output drops
Output 0 broadcast packets, 0 multicast packets
0 output errors, 0 underruns, 0 applique, 0 resets
0 output buffer failures, 0 output buffers swapped out
0 carrier transitions

ةمچرتل هذه ل و ح

ةلأل تاي نقتل ن م ة و مچ م ادخت ساب دن تسم ل ا ذه Cisco ت مچرت
م ل ا ل اء ان ا ع مچ ي ف ن م دخت س م ل ل م عد و ت م م م دقت ل ة يرش ب ل و
امك ة ق ي ق د ن و ك ت ن ل ة ل ا ة مچرت ل ض ف ا ن ا ة ظ ح ال م ي ج ر ي . ة ص ا خ ل ا م ه ت غ ل ب
Cisco ي ل خ ت . ف ر ت م م مچرت م ا م د ق ي ي ت ل ا ة ي ف ا ر ت ح ال ا ة مچرت ل ا م ل ا ح ل ا و ه
ل ا ا م ا د ع و ج ر ل ا ب ي ص و ت و ت ا مچرت ل ا هذه ة ق د ن ع ا ه ت ي ل و ئ س م Cisco
Systems (ر ف و ت م ط ب ا ر ل ا) ي ل ص ا ل ا ي ز ي ل ج ن ا ل ا دن ت س م ل ا