

# حالتفم 9000 ةزافح ةدام ىلع nat تققودو تلكش

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## ةمدملا

9000 ةزافح ةداملا ىلع (NAT) ةمجرت ناونوع ةكبش قداصيو لكشي نأ فيك ةقيثو اذه فصري ةصنم.

## ةيساسألا تابلطتملا

### تابلطتملا

ةيلاتلا عيضاوملاب ةفرعم كيديل نوكت نأ Cisco ىصوت:

- IP ةنونع
- لوصولا في مكحتلا مئاوق

## ةيساسأ تامولعم

نيوانع إلى إضافة IP كعنوان حاسم مخرج في مداخل ال NAT ل اعويش رثك أال إلحاح  
هيجوتلل إلباقو ايملاع ةديرف تنرتنا

ةيلخادلا كعنوان لىل ةهجاو كيدل نوكي نأ NAT ذيفنتب موقبي ذل زاهاج لبلطتي  
(ةملاع) ةيجراخلا كعنوان لىل ةهجاوو (ةيلحلم).

ادانتسا ةمخرجت بلطتي ناك اذا ام ديدحتل رصملا رورم ةكرح صحف نع الوؤسم nat زاهاج نوكي  
nat دعاوق نيوكت لىل

ه في اذ عبتتني وناونع ديرف يملع لىل ناونع يلحم رصملا مخرجتي ةأدال، ةمخرجت بلطتي ن  
nat ةلواط ةمخرجت

تنالك اذا ام ةفرعمل هب صاخلا NAT لودج نم زاهاج ل ققحتي، هجوم ناونع عم مزحلا دوت ام دنع  
ةبترم ىرخأ ةمخرجت كانه

يلحلم ناونع لىل ىرخأ ةرم يلخادلا ماعلا ناونعلا ةمخرجت ب هجوملا موقبي، كلذك رمال ناك اذا  
ةمزحلا هجويو بسانملا

## ةمدختسملا تانوكملا

في رايلخا اذ رفوتيو. كعنوان ةزيم صيخرت لىل رفوتبي نأل nat 16.12.1 XE © cisco ios عم  
(DNA) يوونلا ضمحلل ةزيم صيخرت لىل ةقباسلا تارادصلل اعيمج

ةصنملا	NAT ةزيم ميديقت
C9300	Cisco IOS® XE رادصلل 16.10.1
C9400	Cisco IOS® XE، رادصلل 17.1.1
C9500	Cisco IOS® XE رادصلل 16.5.1a
C9600	Cisco IOS® XE رادصلل 16.11.1

16.12.4 ةغصي XE © cisco IOS عم ةصنم 9300 ةزافح ةداملا لىل ةقبيثو اذ دنتسي

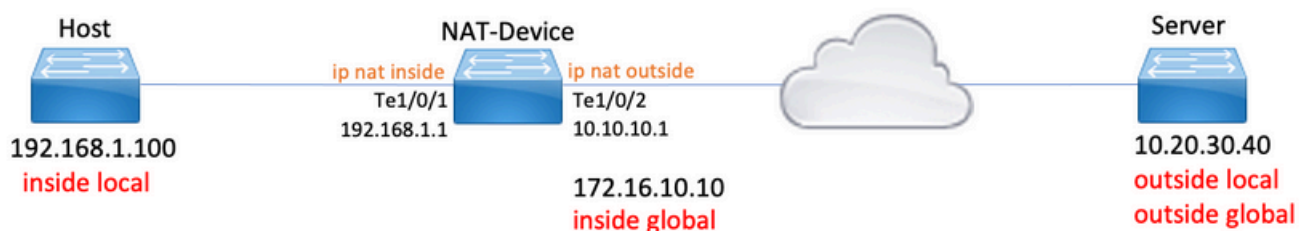
ةصاخ ةيلمعم ةئيبي في ةدوجوملا ةزهجال نم دنتسملا اذ في ةدراول تامولعملل ءاشنم  
تنالك اذا. (يضا رتفا) حوسمم نيوكتب دنتسملا اذ في ةمدختسملا ةزهجال اعيمج تادب  
رمايال لم تحملا ريثاتلل كمهف نم دكأتف، ليغشتلا ديقت كعنوان

## حلطصملا

NAT تباثلا	ي مومع ناونعل يلحم ناونعل 1 لىل 1 نم نيبيعتب حمسي
NAT يكي ماني دل	ةملاعلا نيوانعلا نم ةومجم لىل ةيلحلملا نيوانعلا نيبيعت
NAT ةلومحل ةدئازل	ةديرف L4 ذفانم مدختسي دحاو ي مومع ناونعل ةيلحلملا نيوانعلا نيبيعت
يلحلملا لخد	ةيلخادلا كعنوان لىل فيضملا هنيبيعت مت يذال IP ناونع

ةيملاعلا لخاد	كنكمي .ةجراخلا ةكبشلا لىل ودي امك يلخادلا فيضم لل IP ناوع وه اذه هيلل يلحملا لخادلا ةمجرت متت يذلا ناوعلا هنا لىل اذه في ريكفتلا
قاطنلا جراخ يلحملا	ةيلخادلا ةكبشلا لىل ودي امك يلجراخ فيضم لل IP ناوع
قاطنلا جراخ يملعلا	مطم في .ةجراخلا ةكبشلا لىل فيضم له نييعة متي يذلا IP ناوع اهسفن هةيمومعلا ةجراخلا او ةيلحملا ةجراخلا نيوانعلا نوكت تالاحلا
ب رآ نام فإ	ررمي يذلا Cisco IOS® XE ل مكحتلا يوتسم وه اذه RP تازيمل ريدم FMAN-FP لىل ةجرمل تامولعم
ف نام فإ	FMAN-RP ةكرش نم تامولعم FMAN-FP ةكرش يقلتتو .FP تازيمل ريدم يلا رديفلا يطايتحال كنب لىل اهررمتو
امت معطأ	ةجرمل FMAN-FP FED مدختسي .هوجوتلا ةداع كرحم ليغشت جمانرب قيبطت بةصاخلا ةجرمدملا ةرئادلا لىل مكحتلا يوتسم نم تامولعملا (UADP) دحوملا لوصول تانايب يوتسم

## ةكبشلا لىل يطيتختلا مسرلا



## نيوكتلا

### تانويوكتلا لىل لاثم

لخاد) 172.16.10.10 لىل (يلحم لخاد) 192.168.1.100 مجرتي نأ nat يكي تاتاسا نكاس ليكشت (لماش):

```
<#root>
```

```
NAT-Device#
```

```
show run interface te1/0/1
```

```
Building configuration...
```

```
Current configuration : 109 bytes
```

```
!
```

```
interface TenGigabitEthernet1/0/1
```

```
no switchport
```

```

ip address 192.168.1.1 255.255.255.0
ip nat inside                                <-- NAT inside interface

end

NAT-Device#
show run interface te1/0/2

Building configuration...

Current configuration : 109 bytes
!
interface TenGigabitEthernet1/0/2
no switchport
ip address 10.10.10.1 255.255.255.0
ip nat outside                                <-- NAT outside interface

end

ip nat inside source static 192.168.1.100 172.16.10.10          <-- static NAT rule

NAT-Device#
show ip nat translations

Pro Inside global      Inside local      Outside local      Outside global
icmp 172.16.10.10:4    192.168.1.100:4  10.20.30.40:4      10.20.30.40:4

<-- active NAT translation

--- 172.16.10.10      192.168.1.100      ---                ---
<-- static NAT translation added as a result of the configuration

```

192.168.1.0/24 إلى 172.16.10.1 - 172.16.10.30: nat يكرج لي كشت

<#root>

```

NAT-Device#
show run interface te1/0/1

```

Building configuration...

```

Current configuration : 109 bytes
!
interface TenGigabitEthernet1/0/1
no switchport

```

```
ip address 192.168.1.1 255.255.255.0
```

```
ip nat inside <-- NAT inside interface
```

```
end
```

```
NAT-Device#
```

```
show run interface te1/0/2
```

```
Building configuration...
```

```
Current configuration : 109 bytes
```

```
!  
interface TenGigabitEthernet1/0/2  
no switchport  
ip address 10.10.10.1 255.255.255.0  
  
ip nat outside
```

```
<-- NAT outside interface
```

```
end
```

```
!  
ip nat pool TAC-POOL 172.16.10.1 172.16.10.30 netmask 255.255.255.224 <-- NAT pool configuration
```

```
ip nat inside source list hosts pool TAC-POOL
```

```
<-- NAT rule configuration
```

```
!  
ip access-list standard hosts <-- ACL to match hosts to be
```

```
10 permit 192.168.1.0 0.0.0.255
```

```
NAT-Device#
```

```
show ip nat translations
```

```
Pro Inside global      Inside local      Outside local      Outside global  
icmp 172.16.10.10:6    192.168.1.100:6  10.20.30.40:6     10.20.30.40:6  
--- 172.16.10.10      192.168.1.100    ---                ---
```

يچراخ (ip nat) 10.10.10.1 سى | 192.168.1.0/24 مچرتي نأ (برض) nat ي كرح دئاز لئيمحت لئيشت  
(نراق):

```
<#root>
```

```
NAT-Device#
```

```
show run interface te1/0/1
```

```
Building configuration...
```

```
Current configuration : 109 bytes
```

```
!  
interface TenGigabitEthernet1/0/1  
no switchport  
ip address 192.168.1.1 255.255.255.0
```

```
ip nat inside <-- NAT inside interface
```

```
end
```

```
NAT-Device#
```

```
show run interface te1/0/2
```

```
Building configuration...
```

```
Current configuration : 109 bytes
```

```
!  
interface TenGigabitEthernet1/0/2  
no switchport  
ip address 10.10.10.1 255.255.255.0
```

```
ip nat outside <-- NAT outside interface
```

```
end
```

```
!  
ip nat inside source list hosts interface TenGigabitEthernet1/0/2 overload <-- NAT configuration
```

```
!  
ip access-list standard hosts <-- ACL to match hosts
```

```
10 permit 192.168.1.0 0.0.0.255
```

ةمحررت لكل 1 رادقمب يلخادال ماعال ناوعال ىلع ذفنملا تاداي ز طحال

```
<#root>
```

```
NAT-Device#
```

```
show ip nat translations
```

Pro	Inside global	Inside local	Outside local	Outside global
icmp	10.10.10.1:1024	192.168.1.100:1	10.20.30.40:1	10.20.30.40:1024

```
<-- Notice layer 4 port increments
```

```
icmp 10.10.10.1:1025 192.168.1.100:2 10.20.30.40:2 10.20.30.40:1025
```

```
<-- Notice layer 4 port increments
```

```
icmp 10.10.10.1:1026 192.168.1.100:3 10.20.30.40:3 10.20.30.40:1026
icmp 10.10.10.1:1027 192.168.1.100:4 10.20.30.40:4 10.20.30.40:1027
icmp 10.10.10.1:1028 192.168.1.100:5 10.20.30.40:5 10.20.30.40:1028
icmp 10.10.10.1:1029 192.168.1.100:6 10.20.30.40:6 10.20.30.40:1029
icmp 10.10.10.1:1030 192.168.1.100:7 10.20.30.40:7 10.20.30.40:1030
icmp 10.10.10.1:1031 192.168.1.100:8 10.20.30.40:8 10.20.30.40:1031
```

```
10.10.10.1:1024 = inside global
```

```
192.168.1.100:1 = inside local
```

## تباثلا NAT نم ققحتلا

### جماربالا نم ققحتلا

طشن قفدت نم ام كانه ام دنع nat يكي تاتسا نكاس عم ةم جرت نم فصن ىري نأ ع قوتي وه ةيكي ماني د ةم جرت عاشن امتي، اطشن قفدتلا حبصي ام دنع .م جرتي

```
<#root>
```

```
NAT-Device#
```

```
show ip nat translations
```

Pro	Inside global	Inside local	Outside local	Outside global
icmp	172.16.10.10:10	192.168.1.100:10	10.20.30.40:10	10.20.30.40:10

```
<-- dynamic translation
```

```
--- 172.16.10.10 192.168.1.100 --- ---
```

```
<-- static configuration from NAT rule configuration
```

قفدتلا عاشن اهي فمت يذلا تقولا ديدحت كنكمي، show ip nat translations، رمألا مادختساب ةم جرتلا ىلع يقبتملا تقولا رادقمو.

```
<#root>
```

NAT-Device#

```
show ip nat translations verbose
```

```
Pro Inside global Inside local Outside local Outside global  
icmp 172.16.10.10:10 192.168.1.100:10 10.20.30.40:10 10.20.30.40:10
```

```
create 00:00:13, use 00:00:13, left 00:00:46,
```

```
<-- NAT timers
```

```
flags:
```

```
extended, use_count: 0, entry-id: 10, lc_entries: 0
```

```
--- 172.16.10.10 192.168.1.100 --- ---
```

```
create 00:09:47, use 00:00:13,
```

```
flags:
```

```
static, use_count: 1, entry-id: 9, lc_entries: 0
```

NAT ددعاق قفدتلل قباطي امدنع NAT لى لوصول دادع ديازتي nat. تايئاصح نم ققحت  
هؤاشن متي و.

اني لرع رذعتي نكلو دع او قلل يدح عم تانا يبل رورم ة كرح قباطت امدنع NAT اءاطخ دادع ديازتي  
ءم جرتللا ءاشن.

<#root>

NAT-DEVICE#

```
show ip nat statistics
```

```
Total active translations: 1 (
```

```
1 static,
```

```
0 dynamic; 0 extended)
```

```
<-- 1 static translation
```

```
Outside interfaces:
```

```
TenGigabitEthernet1/0/1 <-- NAT outside interface
```

```
Inside interfaces:
```

```
TenGigabitEthernet1/0/2 <-- NAT inside interface
```

```
Hits: 0 Misses: 0 <-- NAT hit and miss counters.
```

```
CEF Translated packets: 0, CEF Punted packets: 0
```

```
Expired translations: 0
```

```
Dynamic mappings:
```

```
-- Inside Source
```



[Id: 1] access-list hosts interface TenGigabitEthernet1/0/1 refcount 0

فرعم طحال. قفدت nat ل نم ةيأغو رصم لى لإ رواجت نوكي نأ جاتحي كانه ةمچرت ل عقي نأ رواجت ل.

<#root>

NAT-Device#

show ip route 10.20.30.40

Routing entry for 10.20.30.40/32  
Known via "static", distance 1, metric 0  
Routing Descriptor Blocks:  
\* 10.10.10.2  
Route metric is 0, traffic share count is 1

NAT-Device#

show platform software adjacency switch active f0

Adjacency id:

0x29(41)

<-- adjacency ID

Interface: TenGigabitEthernet1/0/1, IF index: 52, Link Type: MCP\_LINK\_IP  
Encap: 0:ca:e5:27:3f:e4:70:1f:53:0:b8:e4:8:0  
Encap Length: 14, Encap Type: MCP\_ET\_ARPA, MTU: 1500  
Flags: no-l3-inject  
Incomplete behavior type: None  
Fixup: unknown  
Fixup\_Flags\_2: unknown  
Nexthop addr:  
192.168.1.100

<-- source adjacency

IP FRR MCP\_ADJ\_IPFRR\_NONE 0  
aom id: 464, HW handle: (nil) (created)

Adjacency id:

0x24 (36)

<-- adjacency ID

Interface: TenGigabitEthernet1/0/2, IF index: 53, Link Type: MCP\_LINK\_IP


```
Encap: 34:db:fd:ee:ce:e4:70:1f:53:0:b8:d6:8:0
Encap Length: 14, Encap Type: MCP_ET_ARPA, MTU: 1500
Flags: no-l3-inject
Incomplete behavior type: None
Fixup: unknown
Fixup_Flags_2: unknown
Nexthop addr:
10.10.10.2
```

```
<-- next hop to 10.20.30.40
```

```
IP FRR MCP_ADJ_IPFRR_NONE 0
aom id: 452, HW handle: (nil) (created)
```

ق ف د ت nat ق ل خ ي وه ا ذ و رورم ة ك ر ح م ل ت س ي ح ا ت ف م ل ا ق ق د ي ن ا debugs ت ن ك م ن ك م ي nat

---

 في ام ئ ا د ا ه ت ج ل ا ع م م ت ي NAT ل ة ع ض ا خ ن و ك ت ي ت ل ا ICMP رورم ة ك ر ح ن ا ظ ح ا ل : ة ظ ح ا ل م ICMP رورم ة ك ر ح ت ا ل ج س ي س ا س ا ل م ا ظ ن ل ا ع ا ط خ ا ح ي ح ص ت ر ه ط ت ا ل ك ل ذ ل ج م ا ن ر ب ل ا

---

```
<#root>
```

```
NAT-Device#
```

```
debug ip nat detailed
```

```
IP NAT detailed debugging is on
```

```
NAT-Device#
```

```
*Mar 8 23:48:25.672: NAT: Entry assigned id 11
```

```
<-- receive traffic and flow created
```

```
*Mar 8 23:48:25.672: NAT: i: icmp (192.168.1.100, 11) -> (10.20.30.40, 11) [55]
```

```
*Mar 8 23:48:25.672: NAT:
```

```
s=192.168.1.100->172.16.10.10
```

```
, d=10.20.30.40 [55]NAT: dyn flow info download suppressed for flow 11
```

```
<-- source is translated
```

```
*Mar 8 23:48:25.673: NAT: o: icmp (10.20.30.40, 11) -> (172.16.10.10, 11) [55]
```

```
*Mar 8 23:48:25.674: NAT: s=10.20.30.40,
```

```
d=172.16.10.10->192.168.1.100
```

```
[55]NAT: dyn flow info download suppressed for flow 11
```

```
<-- return source is translated
```

```
*Mar 8 23:48:25.675: NAT: i: icmp (192.168.1.100, 11) -> (10.20.30.40, 11) [56]
```

ءاطخأل احيحصت يف فذحلل اءارجل ىرتس ،هفدح متي وأ قفدتلا ةيخالص يهتنت امدنع

<#root>

\*Mar 31 17:58:31.344: FMANRP-NAT: Received flow data, action:

DELETE

<-- action is delete

\*Mar 31 17:58:31.344: id 2, flags 0x1, domain 0  
src\_local\_addr 192.168.1.100, src\_global\_addr 172.16.10.10, dst\_local\_addr 10.20.30.40,  
dst\_global\_addr 10.20.30.40, src\_local\_port 31783, src\_global\_port 31783,  
dst\_local\_port 23, dst\_global\_port 23,  
proto 6, table\_id 0 inside\_mapping\_id 0,  
outside\_mapping\_id 0, inside\_mapping\_type 0,  
outside\_mapping\_type 0

## ةزهأل نم ققحتل

ديكأت 5. ةقطنم nat تحت TCAM يف ةدعاق اذه تجمر رب زاوجل نوكي ةدعاق nat ل تللكش امدنع  
TCAM يف ةجمر رب ةدعاق ل نا

IP. ناونع ل ليوحتل مزلي كلذل ،ةيرشع ةيسادس ةغصب تاجرمل نوكت

<#root>

NAT-Device#

show platform hardware fed switch active fwd-asic resource tcam table pbr record 0 format 0 | begin NAT

Printing entries for region NAT\_1 (370) type 6 asic 3

Printing entries for region NAT\_2 (371) type 6 asic 3

Printing entries for region NAT\_3 (372) type 6 asic 3

Printing entries for region NAT\_4 (373) type 6 asic 3

Printing entries for region NAT\_5 (374) type 6 asic 3

<-- NAT Region 5

TAQ-2 Index-128 (A:1,C:1) Valid StartF-1 StartA-1 SkipF-0 SkipA-0

Mask1 3300f000:00000000:00000000:00000000:00000000:00000000:00000000:00000000:ffffffffff

Key1 21009000:00000000:00000000:00000000:00000000:00000000:00000000:00000000:

c0a80164

<--

inside local IP address 192.168.1.100 in hex (c0a80164)

AD 10087000:00000073

TAQ-2 Index-129 (A:1,C:1) Valid StartF-0 StartA-0 SkipF-0 SkipA-0  
Mask1 0300f000:00000000:00000000:00000000:00000000:00000000:ffffffff:00000000  
Key1 02009000:00000000:00000000:00000000:00000000:00000000:

ac100a0a

:00000000

<-- inside global IP address 172.16.10.10 in hex (ac100a0a)

AD 10087000:00000073

نم ققحتلا لالخ نم ةزهجالا ةجمرب نم دكأتلا نكمي ،اطشن قفدتلا حبصي ام دنع ،اريخأو  
TCAM ةقطنم نمض NAT 1.

<#root>

NAT-Device#

show platform hardware fed switch active fwd-asic resource tcam table pbr record 0 format 0 | begin NAT\_

Printing entries for region

NAT\_1

(370) type 6 asic 1

<-- NAT Region 1

=====  
TAQ-2 Index-32 (A:0,C:1) Valid StartF-1 StartA-1 SkipF-0 SkipA-0  
Mask1 0000f000:ff00ffff:00000000:0000ffff:00000000:00000000:ffffffff:ffffffff  
Key1 00009000:06005ac9:00000000:00000017:00000000:00000000:

0a141e28:c0a80164

AD 10087000:000000b0

TAQ-2 Index-33 (A:0,C:1) Valid StartF-0 StartA-0 SkipF-0 SkipA-0  
Mask1 0000f000:ff00ffff:00000000:0000ffff:00000000:00000000:ffffffff:ffffffff  
Key1 00009000:06000017:00000000:00005ac9:00000000:00000000:

ac100a0a:0a141e28

AD 10087000:000000b1

Starting at Index-32 Key1 from right to left:

c0a80164

= 192.168.1.100 (Inside Local)

0a141e28

= 10.20.30.40 (Outside Global)

00000017

= 23 (TCP destination port)

06005ac9

= 06 for TCP and 5ac9 is 23241 which is source port from "show ip nat translations" of the inside host

Repeat the same for Index-33 which is the reverse translation:

0a141e28

= 10.20.30.40 (Outside Global)

ac100a0a

= 172.16.10.10 (Inside Global)

00005ac9

= 23241 TCP Destination port

06000017

= 06 for TCP and 17 for TCP source port 23

## يكي ماني دل NAT نم ققحتلا

### جماربال نم ققحتلا

هه ل IP نيوانع لخاد هتمجرت متتس يذلا نيوانع ل عمجت نيوكت ديكأت.

172.16.10.1 ل 172.16.10.254 نيوانع ل 192.168.1.0/24 ةكبش ل عمجرت نيوكتلا اذه حيتي

```
<#root>
```

```
NAT-Device#
```

```
show run | i ip nat
```

```
ip nat inside
```

```
<-- ip nat inside on inside interface
```

```
ip nat outside
```

```
<-- ip nat outside on outside interface
```

```
ip nat pool MYPOOL 172.16.10.1 172.16.10.254 netmask 255.255.255.0 <-- Pool of addresses to translate
```

```
ip nat inside source list hosts pool MYPOOL <-- Enables hosts that match ACL "I
```

```
NAT-Device#
```

```
show ip access-list 10 <-- ACL to match hosts to be translated
```

```
Standard IP access list 10  
10 permit 192.168.1.0, wildcard bits 0.0.0.255  
NAT-Device#
```

لبق طشن قفدت عاشن بجي. ليكش التا طقف عم لخدم ي أوه قلخي ال nat ي كرح عم تظحال  
ةم جرتل لودج علم.

```
<#root>
```

```
NAT-Device#
```

```
show ip nat translations
```

```
<...empty...>
```

NAT ةدع اق قفدتل قباطي امدن NAT ل لوصول دادع دي ازتي. nat تا يئ اصح نم ققحت  
هؤاشن متي و.

اني لع رذعتي نكلو دع او قلا يدح عم تانا ي بل رورم ة كرح قباطت امدن NAT ا طخأ دادع دي ازتي  
ةم جرتل عاشن.

```
<#root>
```

```
NAT-DEVICE#
```

```
show ip nat statistics
```

```
Total active translations: 3794 (1 static,  
3793 dynamic  
; 3793 extended)
```

<-- dynamic translations

Outside interfaces:

TenGigabitEthernet1/0/1 <-- NAT outside interface

Inside interfaces:

TenGigabitEthernet1/0/2 <-- NAT inside interface

Hits: 3793

Misses: 0

<-- 3793 hits

CEF Translated packets: 0, CEF Punted packets: 0

Expired translations: 0

Dynamic mappings: <-- rule for dynamic mappings

-- Inside Source

[Id: 1]

access-list hosts interface TenGigabitEthernet1/0/1

refcount 3793

<-- NAT rule displayed

دوجوم ةهوجلواو ردصم لل رواجتلا دي كأت

<#root>

NAT-Device#

show platform software adjacency switch active f0

Number of adjacency objects: 4

Adjacency id:

0x24(36)

<-- adjacency ID

Interface: TenGigabitEthernet1/0/2, IF index: 53, Link Type: MCP\_LINK\_IP

Encap: 34:db:fd:ee:ce:e4:70:1f:53:0:b8:d6:8:0

Encap Length: 14, Encap Type: MCP\_ET\_ARPA, MTU: 1500

Flags: no-l3-inject

Incomplete behavior type: None

Fixup: unknown

Fixup\_Flags\_2: unknown

Nexthop addr:

10.10.10.2

<-- adjacency to destination

IP FRR MCP\_ADJ\_IPFRR\_NONE 0  
aom id: 449, HW handle: (nil) (created)

Adjacency id:

0x25 (37)

<-- adjacency ID

Interface: TenGigabitEthernet1/0/1, IF index: 52, Link Type: MCP\_LINK\_IP  
Encap: 0:ca:e5:27:3f:e4:70:1f:53:0:b8:e4:8:0  
Encap Length: 14, Encap Type: MCP\_ET\_ARPA, MTU: 1500  
Flags: no-l3-inject  
Incomplete behavior type: None  
Fixup: unknown  
Fixup\_Flags\_2: unknown  
Nexthop addr:  
192.168.1.100

<-- source adjacency

IP FRR MCP\_ADJ\_IPFRR\_NONE 0  
aom id: 451, HW handle: (nil) (created)

NAT اءاطخأ حىحصت عم ءءبل لى كنكمى ، رضاح NAT عم ةلكشم لى انه تناك اءا رواجتلا ءىكأء ءعب  
ىساسألا ماظنلانى لقتسم

<#root>

NAT-Device#

debug ip nat

IP NAT debugging is on  
NAT-Device#

debug ip nat detailed

IP NAT detailed debugging is on

NAT-Device#

show logging



```

*May 13 01:00:41.136: NAT: Entry assigned id 6
*May 13 01:00:41.136: NAT: Entry assigned id 7
*May 13 01:00:41.136: NAT: i:

tcp (192.168.1.100, 48308)
  -> (10.20.30.40, 23) [30067]
<-- first packet ingress without NAT

*May 13 01:00:41.136: NAT: TCP Check for Limited ALG Support
*May 13 01:00:41.136: NAT:
s=192.168.1.100->172.16.10.10
, d=10.20.30.40 [30067]NAT: dyn flow info download suppressed for flow 7
<-- confirms source address translation

*May 13 01:00:41.136: NAT: attempting to setup alias for 172.16.10.10 (redundancy_name , idb NULL, flag
*May 13 01:00:41.139: NAT: o:

tcp (10.20.30.40, 23)
  -> (172.16.10.10, 48308) [40691]
<-- return packet from destination to be translated

*May 13 01:00:41.139: NAT: TCP Check for Limited ALG Support
*May 13 01:00:41.139: NAT: s=10.20.30.40,
d=172.16.10.10->192.168.1.100
[40691]NAT: dyn flow info download suppressed for flow 7
<-- return packet is translated

*May 13 01:00:41.140: NAT: i: tcp (192.168.1.100, 48308) -> (10.20.30.40, 23) [30068]

```

ةؤلمع FMAN-RP nat تححص اضيأ عيطتسي تنأ

```
<#root>
```

```
NAT-Device#
```

```
debug platform software nat all
```

```
NAT platform all events debugging is on
```

```
Log Buffer (100000 bytes):
```

```
*May 13 01:04:16.098: FMANRP-NAT: Received flow data, action:
```

```
ADD
```

```
<-- first packet in flow so we ADD an entry
```



## ةزهألأ نم ققحتلأ

زاهج يف حيحص لكشب تمجرت نوكي نأ رورم ةكرح قباطي نأ ةدعاق تفضأ nat ل نإ تصحف  
ةقطنم nat تحت 5:

```
<#root>
```

```
NAT-Device#
```

```
show platform hardware fed switch active fwd-asic resource tcam table pbr record 0 format 0 | begin NAT_
```

```
Printing entries for region
```

```
NAT_1
```

```
(370) type 6 asic 1
```

```
<<<< empty due to no active flow
```

```
=====  
Printing entries for region NAT_2 (371) type 6 asic 1
```

```
=====  
Printing entries for region NAT_3 (372) type 6 asic 1
```

```
=====  
Printing entries for region NAT_4 (373) type 6 asic 1
```

```
=====  
Printing entries for region NAT_5 (374) type 6 asic 1
```

```
=====  
TAQ-2 Index-128 (A:0,C:1) Valid StartF-1 StartA-1 SkipF-0 SkipA-0  
Mask1 0300f000:00000000:00000000:00000000:00000000:00000000:ffffff8:00000000  
Key1 02009000:00000000:00000000:00000000:00000000:00000000:ac100a00:00000000  
AD 10087000:00000073
```

```
TAQ-2 Index-129 (A:0,C:1) Valid StartF-0 StartA-0 SkipF-0 SkipA-0  
Mask1 3300f000:00000000:00000000:00000000:00000000:00000000:00000000:00000000:
```

```
ffffff00
```

```
Key1 21009000:00000000:00000000:00000000:00000000:00000000:00000000:00000000:
```

```
c0a80100
```

```
AD 10087000:00000073
```

```
ffffff00 = 255.255.255.0 in hex
```

```
c0a80100 = 192.168.1.0 in hex which matches our network in the NAT ACL
```

ةقطنم nat tcam يف حيحص لكشب تجمرب ةطشنلأ ةمجرتلأ نأ دكؤي نأ جاتحت تنأ، اريخأ

<#root>

NAT-Device#

show ip nat translations

Pro	Inside global	Inside local	Outside local	Outside global
tcp	172.16.10.10:54854	192.168.1.100:54854	10.20.30.40:23	10.20.30.40:23
---	172.16.10.10	192.168.1.100	---	---

NAT-Device#

show platform hardware fed switch active fwd-asic resource tcam table pbr record 0 format 0 | begin NAT\_

Printing entries for region

NAT\_1

(370) type 6 asic 1

=====  
TAQ-2 Index-32 (A:0,C:1) Valid StartF-1 StartA-1 SkipF-0 SkipA-0  
Mask1 0000f000:ff00ffff:00000000:0000ffff:00000000:00000000:ffffffff:ffffffff  
Key1 00009000:0600d646:00000000:00000017:00000000:00000000:

0a141e28

:

c0a80164

AD 10087000:000000b0

TAQ-2 Index-33 (A:0,C:1) Valid StartF-0 StartA-0 SkipF-0 SkipA-0  
Mask1 0000f000:ff00ffff:00000000:0000ffff:00000000:00000000:ffffffff:ffffffff  
Key1 00009000:06000017:00000000:0000d646:00000000:00000000:

ac100a0a

:

0a141e28

AD 10087000:000000b1

Printing entries for region NAT\_2 (371) type 6 asic 1

=====  
Printing entries for region NAT\_3 (372) type 6 asic 1

=====  
Printing entries for region NAT\_4 (373) type 6 asic 1

=====  
Printing entries for region NAT\_5 (374) type 6 asic 1

Starting at Index-32 Key 1 from right to left:

c0a80164

- 192.168.1.100 (inside local)

0a141e28

- 10.20.30.40 (outside local/global)

00000017

- TCP port 23

0600d646

- 6 for TCP protocol and 54854 for TCP source port

Starting at Index-33 Key 1 from right to left

0a141e28

- 10.20.30.40 destination address

ac100a0a

- 172.16.10.10 (inside global source IP address)

0000d646

- TCP source port

06000017

- TCP protocol 6 and 23 for the TCP destination port

## NAT (PAT) ل كيمي اني دل ا دئال ل لمحل ل نم ق قحت ل

### جم ارب ل نم ق قحت ل

حصي ل ا دكؤي ن اجاتحت طقف تن ا nat. كرح ن ا ام ب س فن ل ا برض ق قدي ن ا ةي لمع log ل زا ه ج ي ف ح ي حص ل ك ش ب ت ج م ر ب نو كي ا ن ي م ل ن ا و ة م ج ر ت ر س ي ا

ة د ع ا ق nat ل ل ا ت ق ح ل ا ح ا ت ف م ل ا ة م ل ك ل ا "دئال ل لمحل ل" ب برض ق قحت ي

```
<#root>
```

```
NAT-Device#
```

```
show run | i ip nat
```

```
ip nat inside
```

```
<-- ip nat inside on NAT inside interface
```

```
ip nat outside
```

```
<-- ip nat outside on NAT outside interface
```

```
ip nat pool MYPOOL 172.16.10.1 172.16.10.254 netmask 255.255.255.0 <-- Address pool to translate to
```

```
ip nat inside source list hosts pool MYPOOL overload <-- Links ACL hosts to address pool
```

دوجوم ةه جولاو ردصم لل رواجتلا دي كأت

```
<#root>
```

```
NAT-Device#
```

```
show ip route 10.20.30.40
```

```
Routing entry for 10.20.30.40/32  
Known via "static", distance 1, metric 0  
Routing Descriptor Blocks:  
*
```

```
10.10.10.2
```

```
Route metric is 0, traffic share count is 1
```

```
NAT-Device#
```

```
show platform software adjacency switch active f0
```

```
Number of adjacency objects: 4
```

```
Adjacency id:
```

```
0x24
```

```
(36)
```

```
<-- adjacency ID
```

```
Interface: TenGigabitEthernet1/0/2, IF index: 53, Link Type: MCP_LINK_IP  
Encap: 34:db:fd:ee:ce:e4:70:1f:53:0:b8:d6:8:0  
Encap Length: 14, Encap Type: MCP_ET_ARPA, MTU: 1500  
Flags: no-l3-inject  
Incomplete behavior type: None  
Fixup: unknown  
Fixup_Flags_2: unknown  
Nexthop addr:
```

```
10.10.10.2 <-- adjacency to destination
```

```
IP FRR MCP_ADJ_IPFRR_NONE 0  
aom id: 449, HW handle: (nil) (created)
```

```
Adjacency id:
```

```
0x25
```

(37)

<-- adjacency ID

Interface: TenGigabitEthernet1/0/1, IF index: 52, Link Type: MCP\_LINK\_IP  
Encap: 0:ca:e5:27:3f:e4:70:1f:53:0:b8:e4:8:0  
Encap Length: 14, Encap Type: MCP\_ET\_ARPA, MTU: 1500  
Flags: no-l3-inject  
Incomplete behavior type: None  
Fixup: unknown  
Fixup\_Flags\_2: unknown  
Nexthop addr:  
192.168.1.100 <-- source adjacency

IP FRR MCP\_ADJ\_IPFRR\_NONE 0  
aom id: 451, HW handle: (nil) (created)

ال برض عم تظحال. اطشن قفدتال نوکي ام دن ع مچرتال لودج یل ةمچرتال ةفاضل نم دکأت nat. ی کرح عم وه نأ امب قلخي لخدم فصن کانه

ة. یلخالداو ةیلحمال ةیلخالدا ةماعال نیوانعال یلع ذفانمال ماقراً بقعت

<#root>

NAT-Device#

show ip nat translations

Pro	Inside global	Inside local	Outside local	Outside global
tcp	172.16.10.10:1024	192.168.1.100:52448	10.20.30.40:23	10.20.30.40:23

NAT ةدعاق قفدتال قباطي ام دن ع NAT یل لوصول دادع ديازتي. nat. تايئاصح نم ققحت هؤاشن متي و

انيلع رذعتي نكلو دعاوقال ی دح عم تانايبل رورم ةکرح قباطت ام دن ع NAT ءاطخأ دادع ديازتي ةمچرتال ءاشن

<#root>

NAT-DEVICE#

show ip nat statistics

Total active translations: 3794 (1 static,

3793 dynamic

```
; 3793 extended)
```

```
<-- dynamic translations
```

```
Outside interfaces:
```

```
TenGigabitEthernet1/0/1 <-- NAT outside interface
```

```
Inside interfaces:
```

```
TenGigabitEthernet1/0/2 <-- NAT inside interface
```

```
Hits: 3793
```

```
Misses: 0
```

```
<-- 3793 hits
```

```
CEF Translated packets: 0, CEF Punted packets: 0  
Expired translations: 0
```

```
Dynamic mappings:
```

```
<-- rule for dynamic mappings
```

```
-- Inside Source
```

```
[Id: 1]
```

```
access-list hosts interface TenGigabitEthernet1/0/1
```

```
refcount 3793
```

```
<-- NAT rule displayed
```

ثدحت يتال ذفنم لة مچرت يساسألماظنل نة ةلقوتسمال NAT ءاطخأ ححصت رهظت:

```
<#root>
```

```
NAT-Device#
```

```
debug ip nat detailed
```

```
IP NAT detailed debugging is on  
NAT-Device#
```

```
debug ip nat
```

```
IP NAT debugging is on
```

```
NAT-device#
```

```
show logging
```



Log Buffer (100000 bytes):

```
*May 18 23:52:20.296: NAT: address not stolen for 192.168.1.100, proto 6 port 52448
*May 18 23:52:20.296: NAT: Created portlist for proto tcp globaladdr 172.16.10.10
*May 18 23:52:20.296: NAT: Allocated Port for 192.168.1.100 -> 172.16.10.10:
```

wanted 52448 got 1024<-- confirms PAT is used

```
*May 18 23:52:20.296: NAT: Entry assigned id 5
*May 18 23:52:20.296: NAT: i: tcp (192.168.1.100, 52448) -> (10.20.30.40, 23) [63338]
*May 18 23:52:20.296: NAT: TCP Check for Limited ALG Support
*May 18 23:52:20.296: NAT: TCP
```

s=52448->1024

, d=23

<-- confirms NAT overload with PAT

```
*May 18 23:52:20.296: NAT:
```

s=192.168.1.100->172.16.10.10, d=10.20.30.40

[63338]NAT: dyn flow info download suppressed for flow 5

<-- shows inside translation

```
*May 18 23:52:20.297: NAT: attempting to setup alias for 172.16.10.10 (redundancy_name , idb NULL, flag
```

```
*May 18 23:52:20.299: NAT: o: tcp (10.20.30.40, 23) -> (172.16.10.10, 1024) [55748]
```

```
*May 18 23:52:20.299: NAT: TCP Check for Limited ALG Support
```

```
*May 18 23:52:20.299: NAT: TCP s=23,
```

d=1024->52448

<-- shows PAT on return traffic

```
*May 18 23:52:20.299: NAT: s=10.20.30.40, d=172.16.10.10->192.168.1.100 [55748]NAT: dyn flow info downl
```

<#root>

NAT-Device#

debug platform software nat all

NAT platform all events debugging is on

NAT-Device#

```
*May 18 23:52:20.301: FMANRP-NAT: Received flow data, action:
```

ADD <-- first packet in flow ADD operation

```
*May 18 23:52:20.301: id 5, flags 0x5, domain 0
```

src\_local\_addr 192.168.1.100, src\_global\_addr 172.16.10.10

, dst\_local\_addr 10.20.30.40,

```

<-- source translation

dst_global_addr 10.20.30.40,
src_local_port 52448, src_global_port 1024
,
<-- port translation

dst_local_port 23, dst_global_port 23,
proto 6, table_id 0 inside_mapping_id 1,
outside_mapping_id 0, inside_mapping_type 2,
outside_mapping_type 0
<snip>

```

## ةزهجالا نم ققحتلا

NAT 5 ةقطنم تحت زاهجالا عم ححص لكشب NAT ةدعاق تيبتت ديكأت

```
<#root>
```

```
NAT-Device#
```

```
show platform hardware fed switch active fwd-asic resource tcam table pbr record 0 format 0 | begin NAT_
```

```
Printing entries for region
```

```
NAT_1
```

```
(370) type 6 asic 1
```

```
<-- NAT_1 empty due to no active flow
```

```
=====  
Printing entries for region NAT_2 (371) type 6 asic 1
```

```
=====  
Printing entries for region NAT_3 (372) type 6 asic 1
```

```
=====  
Printing entries for region NAT_4 (373) type 6 asic 1
```

```
=====  
Printing entries for region NAT_5 (374) type 6 asic 1
```

```
=====  
TAQ-2 Index-128 (A:0,C:1) Valid StartF-1 StartA-1 SkipF-0 SkipA-0  
Mask1 0300f000:00000000:00000000:00000000:00000000:00000000:ffffffc:00000000  
Key1 02009000:00000000:00000000:00000000:00000000:00000000:ac100a00:00000000  
AD 10087000:00000073
```

```
TAQ-2 Index-129 (A:0,C:1) Valid StartF-0 StartA-0 SkipF-0 SkipA-0  
Mask1 3300f000:00000000:00000000:00000000:00000000:00000000:00000000:00000000:
```

```
ffffff00
```

```
Key1 21009000:00000000:00000000:00000000:00000000:00000000:00000000:
```

c0a80100

AD 10087000:00000073

ffffff00 = 255.255.255.0 in hex for our subnet mask in NAT ACL

c0a80100 = 192.168.1.0 in hex for our network address in NAT ACL

امدنع NAT\_Region 1 تحت TCAM زاھج لخاد قفدت تجمرب NAT ل تصحف عي طتسي تنأ اريخأ  
طشن نوکي قفدت ل

<#root>

NAT-Device#

show ip nat translations

```
Pro Inside global      Inside local      Outside local  Outside global
tcp 172.16.10.10:1024  192.168.1.100:20027  10.20.30.40:23  10.20.30.40:23
```

NAT-Device#

show platform hardware fed switch active fwd-asic resource tcam table pbr record 0 format 0 | begin NAT

Printing entries for region

NAT\_1

(370) type 6 asic 1

<-- NAT region 1

```
=====
TAQ-2 Index-32 (A:0,C:1) Valid StartF-1 StartA-1 SkipF-0 SkipA-0
Mask1 0000f000:ff00ffff:00000000:0000ffff:00000000:00000000:ffffffff:ffffffff
Key1 00009000:
```

06004e3b

:00000000:

00000017

:00000000:00000000:

0a141e28

:

c0a80164

AD 10087000:000000b0

TAQ-2 Index-33 (A:0,C:1) Valid StartF-0 StartA-0 SkipF-0 SkipA-0

Mask1 0000f000:ff00ffff:00000000:0000ffff:00000000:00000000:ffffffff:ffffffff  
Key1 00009000:

06000017  
:00000000:  
00000400  
:00000000:00000000:  
0a141e28  
:  
0a141e28

AD 10087000:000000b1

Starting at Index-32 Key1 from right to left:

c0a80164  
- 192.168.1.100 (inside local source address)

0a141e28  
- 10.20.30.40 (inside global address/outside local address)

00000017  
- 23 (TCP destination port)

06004e3b  
- TCP source port 20027 (4e3b) and TCP protocol 6

Starting at Index-33 Key1 from right to left:

0a141e28  
- 10.20.30.40 (outside global address/outside local address)

ac100a0a  
- 172.16.10.10 (inside global)

00000400  
- TCP inside global source port 1024

06000017  
- TCP protocol 6 and TCP source port 23

محلل يوتسم عاطخأ ححصت

عجل العمل ودحو لى ع زاهج لى فى NAT دءاق عم قفاوتى قفدت فى لىلوالا ءمزحلا ءبرجت بءى بءم راسمب ءطبءرمل اءاطءالاءى ءصءءءاءءم ضرءل. اءءءالءم ل زاهءاب ءصاءل ءىءرمل ءمزحلا هءءوء نامض ل اءاطءالاءى ءصءءءوءسم نم FED بءم راسمب ءبءء نىءمء ءنءمى لىل (CPU) ءىءرمل ءءالءم ءدءو ءراوم لىل ءاءءءىءل ءال NAT رورم ءءرء لءءنء. ءابرضل ل روءل ءاناء رورم ءءرءل (CPU) ءىءرمل ءءالءم ءدءو راءءنا ءمءاق.

مزحلا لىرء لءنل رورم ءءرءل (CPU) ءىءرمل ءءالءم ءدءو راءءنا ءمءاق ءنءا ءءا ءمء قءءء طشن لءش بءمءاقءنا مءى.

```
<#root>
```

```
NAT-DEVICE#
```

```
show platform software fed switch active punt cpuq clear <-- clear statistics
```

```
NAT-DEVICE#
```

```
show platform software fed switch active punt cpuq 18 <-- transit traffic queue
```

```
Punt CPU Q Statistics
```

```
=====
```

```
CPU Q Id :
```

```
18
```

```
CPU Q Name :
```

```
CPU_Q_TRANSIT_TRAFFIC
```

```
Packets received from ASIC : 0
```

```
<-- no punt traffic for NAT
```

```
Send to IOSd total attempts : 0
```

```
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 : 0
```

```
RX packets dq'd after intack : 0
```

```
Active RxQ event : 0
```

```
RX spurious interrupt : 0
```

```
RX phy_idb fetch failed: 0
```

```
RX table_id fetch failed: 0
```

```
RX invalid punt cause: 0
```

```
Replenish Stats for all rxq:
```

```
-----
```

```
Number of replenish : 0
```

```
Number of replenish suspend : 0
```

Number of replenish un-suspend : 0

NAT-DEVICE#

show platform software fed switch active punt cpuq 18 <-- after new translation

Punt CPU Q Statistics

CPU Q Id : 18

CPU Q Name : CPU\_Q\_TRANSIT\_TRAFFIC

Packets received from ASIC : 5

<-- confirms the UADP ASIC punts to

Send to IOSd total attempts : 5

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 : 5

RX packets dq'd after intack : 0

Active RxQ event : 5

RX spurious interrupt : 0

RX phy\_idb fetch failed: 0

RX table\_id fetch failed: 0

RX invalid punt cause: 0

Replenish Stats for all rxq:


Number of replenish : 18

Number of replenish suspend : 0

Number of replenish un-suspend : 0

## اهحال صاوا NAT ءاطخا فاشك تساً

لوجل ا يف حضوم وه امك NAT TCAM تال ا خدا نم يصق ال ا دحلل يل ا حل ا ءزه ال ا معد

 TCAM نل ا خدا ءطشن NAT ءم حرت لك بل طتت : ءط حالم

ءصنم ال	TCAM تال ا خدا دءل يصق ال ا دحلل
Catalyst 9300	5000
Catalyst 9400	14000
Catalyst 9500	14000
Catalyst 9500 يل ا حل ا ءا ال ا	15500
Catalyst 9600	15500

نأمة جرت TCP/UDP nat ومجملا نم مقرلا تدكأ عيطتسي تنأ، سايقم عم رادصإ تنأ كشني نإ  
دح ةصنم لباقم ققحتي.

<#root>

NAT-Device#

```
show ip nat translations | count tcp
```

Number of lines which match regexp =

```
621          <-- current number of TCP translations
```

NAT-Device#

```
show ip nat translations | count udp
```

Number of lines which match regexp =

```
4894         <-- current number of UDP translations
```

نأ زجعي زاخ حاتفملا يف ةيطمن ةدحو nat ل ك لذ دعب لاجم NAT TCAM ك تنأ ذفنتسي نإ  
ةم جرت لعضت يتلا تانايبلا رورم ةكرح عاضخإ متي، وييرانيسلا اذه يف. ةم جرت اذه جلاع  
اهتجالعم دارملا زاخلاب ةصاخلا ةيزكرملا ةجالعمل ةدحو ل NAT.

يف ةدايزلا هذه طاقسإ تاي لمع ربع هديكأت نكمي و، لوصو نمزي في ك لذ ببستي نأ نكمي  
nat. تانايب رورم ةكرح نع ةلوؤسم نوكت يتلا و، مكحتلا يوتسم سيسلوب راطتنا ةمئاق  
رورم ةكرح" هي NAT رورم ةكرح اهلا لقتنت يتلا (CPU) ةيزكرملا ةجالعمل ةدحو راطتنا ةمئاق  
للقنلا".

<#root>

NAT-Device#

```
show platform hardware fed switch active qos queue stats internal cpu policer
```

#### CPU Queue Statistics

```
=====
QId PlcIdx Queue Name           Enabled (default) (set) Queue Queue
                                Rate Rate Drop(Bytes) Drop(Frames)
-----
```

<snip>

14	13	Sw forwarding	Yes	1000	1000	0	0
15	8	Topology Control	Yes	13000	16000	0	0
16	12	Proto Snooping	Yes	2000	2000	0	0
17	6	DHCP Snooping	Yes	500	500	0	0
18	13	Transit Traffic	Yes	1000	1000	34387271	399507

```
<-- drops for NAT traffic headed towards the CPU
```

```

19 10 RPF Failed Yes 250 250 0 0
20 15 MCAST END STATION Yes 2000 2000 0 0
<snip>

```

لا عم 9300 نم جاتن اذه 17.x. ةي جمر بل تامي لع تل ي ف ةرفو تم ال NAT TCAM ةحاس م دي كأت  
ي صقأ ال ةحاس م ال ك لذل طشن بلاق nat

<#root>

NAT-DEVICE#

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

Codes: EM - Exact\_Match, I - Input, O - Output, IO - Input & Output, NA - Not Applicable

CAM Utilization for ASIC [0]

Table	Subtype	Dir	Max	Used	%Used	V4	V6	MPLS	Other
Mac Address Table	EM	I	32768	22	0.07%	0	0	0	22
Mac Address Table	TCAM	I	1024	21	2.05%	0	0	0	21
L3 Multicast	EM	I	8192	0	0.00%	0	0	0	0
L3 Multicast	TCAM	I	512	9	1.76%	3	6	0	0
L2 Multicast	EM	I	8192	0	0.00%	0	0	0	0
L2 Multicast	TCAM	I	512	11	2.15%	3	8	0	0
IP Route Table	EM	I	24576	16	0.07%	15	0	1	0
IP Route Table	TCAM	I	8192	25	0.31%	12	10	2	1
QOS ACL	TCAM	IO	1024	85	8.30%	28	38	0	19
Security ACL	TCAM	IO	5120	148	2.89%	27	76	0	45
Netflow ACL	TCAM	I	256	6	2.34%	2	2	0	2
<b>PBR ACL</b>	<b>TCAM</b>	<b>I</b>	<b>5120</b>	<b>24</b>	<b>0.47%</b>	<b>18</b>	<b>6</b>	<b>0</b>	<b>0</b>
Netflow ACL	TCAM	O	768	6	0.78%	2	2	0	2
Flow SPAN ACL	TCAM	IO	1024	13	1.27%	3	6	0	4
Control Plane	TCAM	I	512	281	54.88%	130	106	0	45
Tunnel Termination	TCAM	I	512	18	3.52%	8	10	0	0
Lisp Inst Mapping	TCAM	I	512	1	0.20%	0	0	0	1
Security Association	TCAM	I	256	4	1.56%	2	2	0	0
Security Association	TCAM	O	256	5	1.95%	0	0	0	5
CTS Cell Matrix/VPN Label	EM	O	8192	0	0.00%	0	0	0	0
CTS Cell Matrix/VPN Label	TCAM	O	512	1	0.20%	0	0	0	1
Client Table	EM	I	4096	0	0.00%	0	0	0	0
Client Table	TCAM	I	256	0	0.00%	0	0	0	0
Input Group LE	TCAM	I	1024	0	0.00%	0	0	0	0
Output Group LE	TCAM	O	1024	0	0.00%	0	0	0	0
Macsec SPD	TCAM	I	256	2	0.78%	0	0	0	2

عم 9300 نم جارخ ال اذه 16.x. ةي جمر بل تامي لع تل ي ف ةرفو تم ال NAT TCAM ةحاس م دي كأت  
ي صقأ ال دحل ال NAT TCAM تال اخل ةحاس م ال ةدايز متي ال ك لذل SDM لوصو بلاق



<#root>

NAT-DEVICE#

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

CAM Utilization for ASIC [0]

Table	Max Values	Used Values
Unicast MAC addresses	32768/1024	20/21
L3 Multicast entries	8192/512	0/9
L2 Multicast entries	8192/512	0/11
Directly or indirectly connected routes	24576/8192	5/23
QoS Access Control Entries	5120	85
Security Access Control Entries	5120	145
Ingress Netflow ACEs	256	8
<b>Policy Based Routing ACEs</b>	<b>1024</b>	<b>24 &lt;-- NAT usage in PRB TCAM</b>
Egress Netflow ACEs	768	8
Flow SPAN ACEs	1024	13
Control Plane Entries	512	255
Tunnels	512	17
Lisp Instance Mapping Entries	2048	3
Input Security Associations	256	4
SGT_DGT	8192/512	0/1
CLIENT_LE	4096/256	0/0
INPUT_GROUP_LE	1024	0
OUTPUT_GROUP_LE	1024	0
Macsec SPD	256	2

عدعاق ةرادإ بلق ىلإ لىرلغتلل لالء نم NAT TCAM ل ةرفوتمل ةزهجال ةءاسم ةءاز نكمى  
TCAM. تالءءل نم لىصقأال ءءلل ةزهجال معد ءءءل اءهو. NAT لىصفتل (SDM) لوءملا تاناىب

<#root>

NAT-Device#conf t

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

NAT-Device(config)#

sdm prefer nat

NAT، بلق ىلإ لىلءءلل ءءب لبلق (SDM) لوءملا تاناىب ءءءل ةرادإ ءنراقمب تمق اءل  
لوصولل فى مكءءلل تالءءل مءءءس الل ءلباقل TCAM ءءاسم لءءبءس لءكأء كنكمى فى  
ءسائسل لىل ءءءسمل (ACEs) لوصولل فى مكءءلل تاءءوو (QoS) ءمءءل ءءءل لىل

NAT. ءءمررب مءءءءءءل ءءءل حءءل TCAM PBR.

<#root>

NAT-Device#

show sdm prefer

## Showing SDM Template Info

This is the Access template.

Number of VLANs: 4094

Unicast MAC addresses: 32768

Overflow Unicast MAC addresses: 1024

L2 Multicast entries: 8192

Overflow L2 Multicast entries: 512

L3 Multicast entries: 8192

Overflow L3 Multicast entries: 512

Directly connected routes: 24576

Indirect routes: 8192

Security Access Control Entries: 5120

QoS Access Control Entries: 5120

Policy Based Routing ACEs: 1024 <-- NAT

<...snip...>

NAT-Device#

show sdm prefer

## Showing SDM Template Info

This is the NAT template.

Number of VLANs: 4094

Unicast MAC addresses: 32768

Overflow Unicast MAC addresses: 1024

L2 Multicast entries: 8192

Overflow L2 Multicast entries: 512

L3 Multicast entries: 8192

Overflow L3 Multicast entries: 512

Directly connected routes: 24576

Indirect routes: 8192

Security Access Control Entries: 5120

QoS Access Control Entries: 1024

Policy Based Routing ACEs: 5120 <-- NAT

<snip>

## طرق ناونع الة مخرجت (AOT)

الول لاجم ناونع الة مخرجت ن NAT ل بل طتم نو ك ي ام دن ع اهم ادختس ا ن ك مي ة ي ل آ ي ه AOT ل ك شب AOT دي زي ن ا ن ك مي ف ، ت ا ب ل ط ت م ل ا ب ي في ا ذه ن ا ك ا ذ ا . ق ف د ت ل ا ن م ا ن ي م 4 ة ق ب ط ل ا ة ز ه ا ل ا ي ف ا ه ه ي ج و ت ة د ا ع ا و ا ه ت م ج ر ت م ت ي س ي ت ل ا ت ا ق ف د ت ل ا د د ع ر ي ب ك .

- و ا ة د ح ا و ة ع و م ج م س ل ا ة ه ج و م NAT ت ا ق ف د ت م ط ع م نو ك ت ا م د ن ع ة ي ل ا ع ا ف ر ث ك ا AOT نو ك ت و ت ا ه ج و ل ا ن م ة ر ي غ ص .
- ة ي ل ا ل ا NAT ت ا م ج ر ت ح س م ب و ل ط م ، ا ه ن ي ك م ت د ع ب . ي ض ا ر ت ف ا ل ك ش ب AOT ل ي ط ع ت م ت ي .

 PAT. نمضتي ال يذلي كيمياني دل NAT و تباثل NAT عم طوقف AOT معد متي: ةظحال م

هه AOT ب حمست يتل ةنكمملا ةديحول NAT تانيوكت نا ينعني اذه

```
#ip nat inside source static <source> <destination>
#ip nat inside source list <list> pool <pool name>
```

رمأل اذه مادختساب AOT نيكمم ت كنكممي

<#root>

NAT-Device(config)#

```
no ip nat create flow-entries
```

ةمجرت nat كيمياني تاسا نكاس نم جاتنا اذه. حيحص لكشب NAT AOT ةدعاق ةجرمرب نم دكأت

<#root>

NAT-DEVICE#

```
show running-config | include ip nat
```

```
ip nat outside
```

```
ip nat inside
```

```
no ip nat create flow-entries
```

<-- AOT enabled

```
ip nat inside source static 10.10.10.100 172.16.10.10
```

<-- static NAT enabled

NAT-DEVICE#

```
show platform hardware fed switch active fwd-asic resource tcam table pbr record 0 format 0 | begin NAT_
```

```
Printing entries for region NAT_1 (376) type 6 asic 1
```

```
Printing entries for region NAT_2 (377) type 6 asic 1
```

```
Printing entries for region NAT_3 (378) type 6 asic 1
```

```
Printing entries for region NAT_4 (379) type 6 asic 1
```

```
Printing entries for region NAT_5 (380) type 6 asic 1
```

```
TAQ-1 Index-864 (A:0,C:1) Valid StartF-1 StartA-1 SkipF-0 SkipA-0
```

```
Mask1 3300f000:00000000:00000000:00000000:00000000:00000000:00000000:ffffff
```

```
Key1 21009000:00000000:00000000:00000000:00000000:00000000:00000000:
```

0a0a0a64

AD 10087000:00000073

TAQ-1 Index-865 (A:0,C:1) Valid StartF-0 StartA-0 SkipF-0 SkipA-0  
Mask1 0300f000:00000000:00000000:00000000:00000000:00000000:ffffff:00000000  
Key1 02009000:00000000:00000000:00000000:00000000:00000000:

ac100a0a

:00000000

AD 10087000:00000073

0a0a0a64 = 10.10.10.100 (inside local)  
ac100a0a = 172.16.10.10 (inside global)

ردصم لل IP ناو نع ةجمر رب متت هنا لىل ع ديكأت لل لال خ نم TCAM في AOT لال خ دم ققحت  
اطشن قفدت لل حبصي امدنع طقف ةهجول او

<#root>

NAT-DEVICE#

show platform hardware fed switch active fwd-asic resource tcam table pbr record 0 format 0 | begin NAT

Printing entries for region NAT\_1 (376) type 6 asic 1

Printing entries for region NAT\_2 (377) type 6 asic 1

TAQ-1 Index-224 (A:0,C:1) Valid StartF-1 StartA-1 SkipF-0 SkipA-0  
Mask1 0000f000:00000000:00000000:00000000:00000000:00000000:ffffff:ffffff  
Key1 00009000:00000000:00000000:00000000:00000000:00000000:

c0a80164:0a0a0a64 <-- no L4 ports, only source and destination IP is programmed

AD 10087000:000000b2

TAQ-1 Index-225 (A:0,C:1) Valid StartF-0 StartA-0 SkipF-0 SkipA-0  
Mask1 0000f000:00000000:00000000:00000000:00000000:00000000:ffffff:00000000  
Key1 00009000:00000000:00000000:00000000:00000000:00000000:

ac100a0a

:00000000

AD 10087000:000000b3

0a0a0a64 = 10.10.10.100 in hex (inside local IP address)

c0a80164 = 192.168.1.100 in hex (outside local/outside global)  
ac100a0a = 172.16.10.10 (inside global)

## ةلص تاذا تامولعم

- [Catalyst 9300 17.3.x nat نڤوكت لڤلد](#)
- [Catalyst 9400 17.3.x nat نڤوكت لڤلد](#)
- [Catalyst 9500 17.3.x nat نڤوكت لڤلد](#)
- [Catalyst 9600 17.3.x nat نڤوكت لڤلد](#)
- [Cisco Systems - تادنتس مللاو ڤنقتلا معدلا](#)

تامولعم Cisco نم ڤلخاد

لاخدا نوڪي ام دنع وا NAT TCAM دراوم دافنتسا دنع syslog ةفاضلا نڤسحت [CSCvz46804](#) حاجنب هتجمررب متت نا ىلع رداق ريغ NAT

ةمچرتل هذه ل و ح

ةلأل تاي نقتل ن مة و مچم مادختساب دن تسمل اذ ه Cisco ت مچرت  
ملاعلاء نأ عي مچي ف ني مدختسمل معد يوتحم مي دقتل ل ي رش بل او  
امك ة قيق د نوك ت نل ةلأل ة مچرت ل ضفأ نأ ة ظحال م ي جزي . ة صا حل م ه ت غ ل ب  
Cisco ي لخت . فرتحم مچرت م ا ه م د ق ي ي ت ل ا ة ي ف ارت حال ة مچرت ل ا عم ل ا حل او ه  
ى ل ا م اء اد ع و ج ر ل ا ب ي ص و ت و ت ا مچرت ل ا ه ذ ه ة ق د ن ع ا ه ت ي ل و ئ س م  
Systems (رفو تم ط بار ل ا) ي ل ص أ ل ا ي ز ي ل ج ن ا ل ا دن تسمل ا