Troubleshoot CGNAT

For supported software information, click here.

This article describes how to troubleshoot CGNAT issues.

View CGNAT Summary Information

To view CGNAT summary information, issue the **show orgs org-services cgnat summary** CLI command. For example:

```
admin@vcsn> show orgs org-services Customer1 cgnat summary
               TOTAL      TOTAL
          TOTAL    ENDPOINT   ENDPOINT   TOTAL
    VSN      ADDRESS   INDEPENDENT INDEPENDENT DSLITE    TOTAL 6RD   TOTAL MAPT
ID MAPPINGS MAPPINGS FILTERS    SOFTWIRES  SOFTWIRES  SUBSCRIBERS
------------------------------------------------------------------------------------
2  0      0      0      0      0      0
```

View CGNAT Per-Pool Statistics

To view CGNAT per-pool statistics, issue the **show orgs org-services cgnat pools statistics** CLI command. For example:

```
admin@vcsn> show orgs org-services Customer1 cgnat pools Customer1_NAPT_Pool statistics
statistics
id               2
bindings-allocated   33
bindings-freed       33
alloc-failures       0
free-failures        7
out-of-address-errors 0
out-of-ports-errors   0
```

Inspect the CGNAT State in the vsmd Daemon

This section describes the CLI commands to troubleshoot issues related to CGNAT state in the vsmd daemon.

View a Summary of Configured Tenants

To view summary information about configured tenants, issue the **show cgnat tenants** CLI command. For example:

```
vsm-vcsn> show cgnat tenants
TENANT (id: 1)
  Num of rules configured      : 0
  Num of pools configured      : 0
  Num of DSLite SC configured  : 0
  Num of 6RD SC configured     : 0
  Num of Static NAT entries    : 2
  Num of subscribers           : 0
  Num of EIM entries           : 0
  Num of EIF entries           : 0
  Num of DSLite softwires      : 0
  Num of 6RD softwires         : 0
TENANT (id: 200)
  Num of rules configured      : 3
  Num of pools configured      : 3
  Num of DSLite SC configured  : 0
  Num of 6RD SC configured     : 0
  Num of Static NAT entries    : 0
  Num of subscribers           : 0
  Num of EIM entries           : 0
  Num of EIF entries           : 0
  Num of DSLite softwires      : 0
  Num of 6RD softwires         : 0
TENANT (id: 100)
  Num of rules configured      : 3
  Num of pools configured      : 3
  Num of DSLite SC configured  : 0
  Num of 6RD SC configured     : 0
  Num of Static NAT entries    : 0
  Num of subscribers           : 0
  Num of EIM entries           : 0
  Num of EIF entries           : 0
  Num of DSLite softwires      : 0
  Num of 6RD softwires         : 0
```

View CGNAT Access Lists for Traffic Matching

To view CGNAT access lists for matching traffic, issue the **show cgnat acl info** CLI command. For example:

```
vsm-vcsn> show cgnat acl info 100
Legends
  C - Category (A: Allow, D: Deny)
  P - Rule precedence
+------------+--------+---+-----+-----------+-------------------+--------------+
|  ACL Hdl  | RuleId | C |  P  |   VRF    |   SOURCE-IP       | DEST-IP      |
+------------+--------+---+-----+-----------+-------------------+--------------+
| 0x00010003 |    3 | A |  1  |  14-14   | 192.168.130.0/24 | 99.88.77.0/28 |
```

```
| 0x00020001 |    1 | A |  1 |  14-14  |  192.168.130.0/24 | 88.77.66.0/28 |
| 0x00030002 |    2 | A |  1 |  14-14  |  192.168.130.0/24 | 77.66.55.0/28 |
+------------+--------+---+-----+----------+-------------------+--------------+
Tenant id   : 100
Total filters : 3
```

View CGNAT Access List Counters

To view CGNAT access list counters, issue the **show cgnat acl counters** CLI command. Counters are incremented when traffic matches. Use the value in the Rule ID column to correlate values with the output of the **show cgnat acl** command. For example:

```
vsm-vcsn> show cgnat acl counters 100
+------------+---------+------------+
|  ACL Hdl  | Rule ID |  COUNTER  |
+------------+---------+------------+
| 0x00010003 |    3 |    14 |
| 0x00020001 |    1 |     0 |
| 0x00030002 |    2 |    26 |
+------------+---------+------------+
Tenant id   : 100
Total filters : 3
```

View the CGNAT Access List History

To view CGNAT access list history of traffic pattern matches, issue the **show cgnat acl history** CLI command.

```
vsm-vcsn> show cgnat acl history [ipv4 | ipv6] [all | number]
```

For example:

```
vsm-vcsn> show cgnat acl history 100
+----------------+----------------+-------+-------+----+------+
|  SOURCE-IP   |   DEST-IP    | SPORT | DPORT | P  | RES |
+----------------+----------------+-------+-------+----+------+
| 192.168.130.50 |   77.66.55.1 | 46859 |   53 | 17 | Hit |
| 192.168.130.50 |   77.66.55.1 | 58285 |   53 | 17 | Hit |
| 192.168.130.50 |   77.66.55.1 | 54768 |   21 |  6 | Hit |
| 192.168.130.50 |   77.66.55.1 | 54772 |   21 |  6 | Hit |
| 192.168.130.50 |   77.66.55.1 | 54776 |   21 |  6 | Hit |
| 192.168.130.50 |   77.66.55.1 | 54779 |   21 |  6 | Hit |
+----------------+----------------+-------+-------+----+------+
```

View the CGNAT Pool Configuration

To display summary information about the CGNAT pool configuration for all tenants, issue the **show cgnat config pool**

brief CLI command. For example:

```
vsm-vcsn> show cgnat config pool brief
TNT-ID  POOL-NAME              ID
----------------------------------------------------------
200     Customer2_SNAT_Pool        3
200     Customer2_DYN_Pool         1
200     Customer2_NAPT_Pool        2
TNT-ID  POOL-NAME              ID
----------------------------------------------------------
100     Customer1_SNAT_Pool        3
100     Customer1_DYN_Pool         1
100     Customer1_NAPT_Pool        2
```

View the CGNAT Pool Configuration for a Tenant

To display detailed information about the CGNAT pool configuration for a tenant, issue the **show cgnat config pool detail** CLI command. You can determine the tenant's pool ID from the output of the **show cgnat config pool brief** command. For example:

```
vsm-vcsn> show cgnat config pool detail 200 3
TENANT          : [200]
NAT Pool name      : [Customer2_SNAT_Pool]
Object ID      : [3]
Pool Flags     : [0x00001941]
IPv4 Ranges
  102.84.68.0/24
Routing instance  : [ri_Global - 18]
Provider Tenant id : [1]
TCP idle timeout  : [7440]
TCP idle timeout  : [7440]
UDP idle timeout  : [300]
ICMP idle timeout : [60]
Addr allocation   : [round-robin]
```

In releases prior to Release 21.2.2, the command syntax is **show cgnat config pool detail** *pool-id tenant-id*.

View the CGNAT Rule Configuration

To display summary information about CGNAT rule configuration for all tenants, issue the **show cgnat config rule brief** CLI command. For example:

```
vsm-vcsn> show cgnat config rule brief
TNT-ID  RULE-NAME              ID
----------------------------------------------------------
200     Customer2_SNAT_Rule        3
200     Customer2_DYN_Rule         1
200     Customer2_NAPT_Rule        2
TNT-ID  RULE-NAME              ID
----------------------------------------------------------
```

```
    100   Customer1_SNAT_Rule        3
    100   Customer1_DYN_Rule         1
    100   Customer1_NAPT_Rule        2
```

View the CGNAT Rule Configuration for a Tenant

To display detailed information about CGNAT rule configuration in for a particular tenant, issue the **show cgnat config rule detail** CLI command. Use the output of the **show cgnat config rule brief** command to determine the rule ID for the tenant. For example:

```
vsm-vcsn> show cgnat config rule detail 1 200
 TENANT            : [200]
 NAT Rule name     : [Customer2_DYN_Rule]
 Object ID         : [1]
 Precedence        : [1]
 TERM
   Routing instance : [ri_Customer2 - 16]
   Source IPv4 Prefix
   192.168.131.0/24
   Dest IPv4 Prefix
   55.44.33.0/28
 ACTION
   NAT mode        : [dynamic-nat-44]
   Addr Pool Paired : [False]
   EIM enabled     : [False]
   EIF enabled     : [False]
   Source Pool     : [1]
```

View Active Counters

To display active counters, issue the **show cgnat counters active** CLI command. Use this command when data is flowing to verify whether CGNAT is NATing the packets.

```
vsm-vcsn> show cgnat counters active
CGNAT_CNTR_ACTIVE_BINDINGS        0
CGNAT_CNTR_ACTIVE_SUBS            0
CGNAT_CNTR_ACTIVE_MAPT_SUBS       0
CGNAT_CNTR_ACTIVE_EI_MAPPINGS     0
CGNAT_CNTR_ACTIVE_EI_FILTERS      0
```

View Internal Counters

To display internal counters, issue the **show cgnat counters** internal CLI command. For example:

```
vsm-vcsn> show cgnat counters internal
CGNAT_CNTR_BINDINGS_ALLOCD        77
CGNAT_CNTR_BINDINGS_FREED         103
CGNAT_CNTR_ALG_BINDINGS_ALLOCD    26
```

```
CGNAT_CNTR_FIRST_PACKET          104
CGNAT_CNTR_SESS_ACCEPT           103
CGNAT_CNTR_SESS_IGNORE           1
CGNAT_CNTR_SESS_CLOSE            103
CGNAT_CNTR_TENANT_LKUP_FAIL      1
CGNAT_CNTR_ST_NAT_FILTER_SUCCESS 28
CGNAT_CNTR_TENANT_SWITCHED       28
CGNAT_CNTR_VRF_SWITCHED          28
CGNAT_CNTR_LOG_EXPORTED          98
```

View the CGNAT Resource State

To display information about the CGNAT resources state, issue the **show cgnat resources state** CLI command. Each CGNAT pool is a resource managed by the resource and forwarding daemon. A resource must be in the Ready state before CGNAT can handle traffic for the pool. If it is not ready, the traffic has been dropped. Check the above CLI command for MISC_POOL_ERROR counters. For example:

```
vsm-vcsn> show cgnat resources state 100
Legends:
    A - Address present
    P - Ports present
    S - Static pool
    R - Preserve range
    Y - Preserve parity
+------+-------------------------------+-----------------+---------+
| ID |         Pool-name              |  State      | Flags  |
+------+-------------------------------+-----------------+---------+
|  3 | Customer1_SNAT_Pool            | READY       | A.S..  |
|  1 | Customer1_DYN_Pool             | READY       | A....  |
|  2 | Customer1_NAPT_Pool            | READY       | AP...  |
+------+-------------------------------+-----------------+---------+
```

View CGNAT Pool Counters

To display CGNAT pool counters, issue the **show cgnat resources counters** CLI command. The command output displays the number of bindings that are allocated and freed per pool. The output also shows resources assigned by Versa resource and forwarding process (vrfd) to each thread. For example:

```
vsm-vcsn> show cgnat resources counters Customer1_NAPT_Pool 100
Pool   : Customer1_NAPT_Pool
State  : READY
VRF    : ri_Global (18)
Thread 0 : IP [104.74.68.1 - 104.74.68.254]   Ports [4096 - 40959]
COUNTER          TCP        UDP        OTHER
-------------------------------------------------------------
Bindings allocated  25        4        4
Bindings freed      18        4        11
Alloc failures      0         0        0
    Out of addrs    0         0        0
```

```
        Out of ports    0        0        0
Free failures     0        0        7
```

View Static NAT Mappings

To view static NAT mappings used for debugging basic-nat-44 and dnat-44, issue the **show cgnat static-nat** CLI command. For example:

```
vsm-vcsn> show cgnat static-nat 100
Legends:
  ID = Rule ID
    T = Type (S - Static NAT)
         (D - Dest NAT)
         (2 - Twice NAT)
+------+---+----------------+----------------+----------------+----------------+-------+-------+
| ID  | T | Rule SPrefix  | Rule DPrefix  | Pool SPrefix  | Pool DPrefix  | RPort | Pport |
+------+---+----------------+----------------+----------------+----------------+-------+-------+
|  3 | S |  192.168.131.0 |          - |   102.84.68.0 |         - | 0   |    0 |
|  3 | S |  192.168.130.0 |          - |   102.74.68.0 |         - | 0   |    0 |
+------+---+----------------+----------------+----------------+----------------+-------+-------+
```

For debugging, use the following **clear** commands:

```
vsm-vcsn> clear cgnat counters internal
vsm-vcsn> clear cgnat acl history tenant-id
vsm-vcsn> clear cgnat acl counters tenant-id
```

View CGNAT Pools with the Source Port

To display per-thread resource allocation, issue the **show rfm table src-port allocated** CLI command. The CGNAT pool with the source port is the resource that is divided and then distributed to all worker threads by Versa RFD/RFM. For example:

```
vsm-vcsn> show rfm table src-port allocated
src-port: Table Alloc entries
Tenant 0:
StartPort EndPort  PoolId Client RmtID  LclID  Thread Application
===================================================================
4096   4096   0  2  0  1  1  App-RFM
4097   4097   0  2  0  2  1  App-RFM
4114   4114   0  2  0  4  1  App-RFM
4098   4113   0  2  0  3  1  App-LEF
Tenant 1:
StartPort EndPort  PoolId Client RmtID  LclID  Thread Application
===================================================================
Tenant 100:
StartPort EndPort  PoolId Client RmtID  LclID  Thread Application
===================================================================
4096   40959  2  2  0  1  1  App-CGNAT
```

```
Tenant 200:
StartPort EndPort  PoolId Client RmtID  LclID  Thread Application
==================================================================
4096   40959  2  2  0  1  1  App-CGNAT
```

View CGNAT Pools with the Source IP Address

To display per-thread resource allocation, issue the **show rfm table src-ip allocated** CLI command. In this command, the CGNAT pool with the source IP address is the only resource. The command output shows which thread received what quota from RFD/RFM. For example:

```
vsm-vcsn> show rfm table src-ip allocated
src-ip: Table Alloc entries
Tenant 0:
Start IP      End IP        Pool Client RmtId  LclId  Thread Application
================================================================================
Tenant 1:
Start IP      End IP        Pool Client RmtId  LclId  Thread Application
================================================================================
Tenant 100:
Start IP      End IP        Pool Client RmtId  LclId  Thread Application
================================================================================
103.74.0.0    103.74.119.255  1  2  0  1  1  App-CGNAT
Tenant 200:
Start IP      End IP        Pool Client RmtId  LclId  Thread Application
================================================================================
103.84.0.0    103.84.119.255  1  2  0  1  1  App-CGNAT
```

To display filters and access lists for each tenant, issue the **show filter info all table** and **show filter stats all** CLI commands. In a multi-VSN deployment, he command output shows the datapath filters used to steer reverse traffic to the correct VCSN/VSN. This datapath filter table is also used by CGNAT to install basic-nat-44 and dnat-44 filters. For example:

```
vsm-vcsn> show filter info all table 1
Legends
 C/Catg - Category
 L/Prio - Level (Predefined priority)
 P/Prot - Protocol
+----------------------------------------------------------------------------------------+
| Tenant Id  - 1                                                                          |
+------------+---+-----+----+----------+---------------+------------------+-----------+-------------+
| Rule Hdl | C | L | P | VRF     | SOURCE-IP  |   DEST-IP  | SPORT  | DPORT   |
+------------+---+-----+----+----------+---------------+------------------+-----------+-------------+
| 0x01830403 | A |  1 | 17 |  0-256  |  0.0.0.0/0 |    0.0.0.0/0 | 67-67  | 68-68   |
| 0x01840403 | A |  1 | 17 |  0-256  |  0.0.0.0/0 |    0.0.0.0/0 | 0-65535 | 3784-3784 |
| 0x01850404 | A |  1 | 17 |  0-256  |  0.0.0.0/0 |    0.0.0.0/0 | 0-65535 | 4784-4784 |
| 0x01860403 | A | 19 |  6 |  0-256  |  0.0.0.0/0 |    0.0.0.0/0 | 0-65535 | 179-179  |
| 0x01870403 | A | 19 |  6 |  0-256  |  0.0.0.0/0 |    0.0.0.0/0 | 179-179 | 0-65535  |
| 0x01885003 | A | 16 |  0 |  18-18  |  0.0.0.0/0 | 102.84.68.0/24 | 0-65535 | 0-65535  |
| 0x01895003 | A | 16 |  0 |  18-18  |  0.0.0.0/0 | 102.74.68.0/24 | 0-65535 | 0-65535  |
```

```
| 0x018a4003 | A |  19 |  0 |  18-18  |   0.0.0.0/0  |   103.74.0.0/18   |  0-65535 |  0-65535   |
| 0x018b4003 | A |  19 |  0 |  18-18  |   0.0.0.0/0  |   103.74.64.0/19  |  0-65535 |  0-65535   |
| 0x018c4003 | A |  19 |  0 |  18-18  |   0.0.0.0/0  |   103.74.96.0/20  |  0-65535 |  0-65535   |
| 0x018d4003 | A |  19 |  0 |  18-18  |   0.0.0.0/0  |   103.74.112.0/21 |  0-65535 |  0-65535   |
| 0x018e4003 | A |  19 |  0 |  18-18  |   0.0.0.0/0  |   104.74.68.0/24   |  0-65535 | 4096-40959 |
| 0x018f4003 | A |  19 |  0 |  18-18  |   0.0.0.0/0  |   103.84.0.0/18   |  0-65535 |  0-65535   |
| 0x01904003 | A |  19 |  0 |  18-18  |   0.0.0.0/0  |   103.84.64.0/19  |  0-65535 |  0-65535   |
| 0x01914003 | A |  19 |  0 |  18-18  |   0.0.0.0/0  |   103.84.96.0/20  |  0-65535 |  0-65535   |
| 0x01924003 | A |  19 |  0 |  18-18  |   0.0.0.0/0  |   103.84.112.0/21 |  0-65535 |  0-65535   |
| 0x01934003 | A |  19 |  0 |  18-18  |   0.0.0.0/0  |   104.84.68.0/24   |  0-65535 | 4096-40959 |
+------------+---+-----+----+----------+--------------+------------------+----------+------------+
| Total IPv4 Filters: 17                                                 |
+----------------------------------------------------------------------------+
```

Supported Software Information

Releases 20.2 and later support all content described in this article, except:

- In Releases 21.2.2 and later, syntax changed for **show cgnat config pool detail** and **show cgnat acl history** commands.

Additional Information

Configure CGNAT