ASR 5000系列用户级故障排除

目录

简介

本文重点介绍适用于排除特定用户问题的CLI。无论是已知的单个或一组用户遇到问题，还是未知（最初）的用户组，都有许多CLI可帮助查明问题。在故障排除过程中，将它们与（非用户特定的）统计CLI结合使用。显然，并非所有这些命令都适用于所有情况，因为其中一些命令是特定于协议的，而另一些命令是足够通用的，可以应用于所有用户。有些应用于用户平面（用户和网络之间来回传递数据），而有些应用于呼叫控制平面（设置呼叫），有些则可应用于两者。

在多个位置提供示例片段，以帮助阐明要点。所有IP地址和标识信息都已更改。

命令

监控用户（mon子）

这可能是平台上最广为人知的命令之一，而在此记录和解释其使用时花费的时间最多。根据所选设置，它可能显示特定用户的所有接口、服务、协议等的控制/信令和负载数据。运行命令和解释输出时的一些注意事项包括：

- 根据到某个时间点的调查，如果怀疑存在问题，但某个特定用户尚未知道存在问题，则尝试通过“下次呼叫”捕获（可能尝试多次）可能导致捕获故障（如果问题足够频繁）。如果问题很罕见，则此方法可能不可行。
- 对于已知呼叫类型(封闭RP、开放RP、演进数据优化(EVDO)、1X-EVDO、第2层隧道协议(L2TP)、家庭代理(HA)、长期演进(LTE)等)，尤其是那些占总容量百分比较低的呼叫类型，或那些对等分组控制功能(PCF)或对等L2TP接入集中器(LAC)是怀疑存在问题的地方，然后监控用户菜单选项允许根据此类标准对下一次呼叫进行限定，这将显着提高命中率。如果节点上的所有呼叫都属于同一类型，则此方法不会添加任何值（刚才提到的对等体地址版本除外），因为这样做不会降低可能性。
- 详细程度有不同的级别1到5。如果不需要，请不要打开较高级别的详细程度，因为这会使读取跟踪（快速）更加困难。通常，增加到第2版（默认值= 1）就足够了。
- 默认情况下，大多数（但并非全部）值得查看的协议会默认打开
- 除了实际数据包数据，有时还会显示特殊的CONTROL消息，可解释在封面下正在采取什么操作 — 此信息通常很有用。这包括在呼叫结束时显示的呼叫统计信息。以下是控制消息示例：

```
***CONTROL*** 00:25:27:054 Eventid:11813
No LMA address available for APN <apn2> in subscriber profile, PDN connection  failed
```

- 如果在网关节点上配置了增强型计费服务(ECS)，则打开选项34（CSS数据）允许查看发送到和从ECS模块发送的所有数据包，这有助于排除丢包和网络地址转换(NAT)故障。 例如，这是用户互联网控制消息协议(ICMP)数据包，它是ECS从私有IP 10.251.88.68到公有IP 209.165.201.1的NAT

```
<<<<OUTBOUND  23:57:08:943 Eventid:77000(9)
CSS Uplink Output PDU to ACS- slot:2 cpu:17 inst:4369
10.251.88.68 > 192.0.2.1: icmp: echo request (ttl 62, id 13840, len 84)

***CONTROL*** 23:57:08:943 Eventid:77202
Rule matched : icmp-pkts for uplink packet of subscriber MSID :

INBOUND>>>>>  23:57:08:943 Eventid:77001(9)
CSS Uplink Input PDU from ACS- slot:3 cpu:34 inst:8738
209.165.201.1 > 192.0.2.1: icmp: echo request (ttl 62, id 13840, len 84)
```

- 如果从跟踪中不能明显看出ASR为何表现出特定行为，则查看用户的内部处理可能具有值（解释包括状态机信息等的输出很困难，但可以通过工程实现），因此可以考虑日志记录监控或日志记录跟踪命令（稍后讨论）。
- 显示的时间戳相当准确，但是，由于各种设施都实时写入屏幕，因此无法权威地断定显示的数据包的顺序是数据包的实际处理顺序，但它将接近。
- 在分组数据交换网络(PDSN)或高速分组数据服务网关(HSGW)节点的入口端，为了查看所有A11消息（如果在故障排除场景中需要查看这一点，则可能不是），通过移动站标识(MSID)而非用户名进行监控，因为用户名尚不已知（有）尚未显示)，因此无法显示。如果MSID未知，则采取初始跟踪，以揭示它，然后再次开始由该MSID监控。

以下示例中，通过MSID进行监控可捕获更接近呼叫开始（A11响应）的情况，而通过用户名进行监控时移动IP(MIP)注册请求甚至Radius身份验证的情况。在用户名情况下，呼叫在FA服务点捕获，而在MSID监控器中，呼叫在PDSN服务点捕获较早。

```
[local]PDSN> mon sub msid 111119782577072
-------------------------------------------------------------------------
(Switching Trace) - New Incoming Call:
-------------------------------------------------------------------------
 MSID/IMSI   : 111119782577072            Callid      : 454a2432
 IMEI        : n/a                        MSISDN      : n/a
 Username    : n/a                        SessionType : unknown(0x00000000)
 Status      : Dormant                    Service Name: ORP-1x
 Src Context : source
-------------------------------------------------------------------------

Wednesday June 17 2015
<<<<OUTBOUND  16:47:57:310 Eventid:29001(3)
A11 Tx PDU, from 10.208.144.30:699 to 10.211.17.206:699 (75)
        Message Type: 0x03 (Registration Reply)
                Code: 0x00 (Accepted)
            Lifetime: 0x0708


[local]PDSN> mon sub user 9782577072@cisco.com

-------------------------------------------------------------------------
Incoming Call:
-------------------------------------------------------------------------
 MSID/IMSI   : 111119782577072            Callid      : 110b36ad
 IMEI        : n/a                        MSISDN      : n/a
 Username    : 9782577072@cisco.com       SessionType : unknown(0x00000010)
 Status      : Dormant                    Service Name: FA_service-1
 Src Context : destination
-------------------------------------------------------------------------

Wednesday June 17 2015
<<<<OUTBOUND  17:11:53:987 Eventid:23901(6)
RADIUS AUTHENTICATION Tx PDU, from 10.208.148.133:24912 to 198.51.100.1:1645 (401) PDU-
dict=custom9
 Code: 1 (Access-Request)
 Id: 81
 Length: 401
 Authenticator: CB 94 F3 4B 04 77 9F 4A 7A 44 FA 13 C9 7A 60 3C
      Calling-Station-Id = 111119782577072
```

- 在许多情况下打开用户L3(19)不会产生比其他情况下捕获的信息更多的信息，而是会产生许多数据包的重复。
- 启用某些协议将导致重复的数据包，例如，对于移动IP，MIP数据包显示两次，即点对点协议(PPP)和MIP。
- 输出使用非比例字体（如courier）的读取效果要好得多，因为列排列得非常整齐，所以使用这种字体进行分析也是如此。
- 通过特定接口的输出应与该接口上的数据包捕获保持一致，其区别在于监控用户输出将是一个子集，因为IP数据包中并非每个字段都会显示，因为在排除相关协议故障时不一定相关。例如，IP报头中的大多数字段都不显示。如果需要这些字段，请打开HEX/ASCII选项。
- 许多输出将根据标准进行解释，因此系统不显示实际的整数值，而是打印该值的文本表示。打开详细信息3和/或十六进制/ascii转储以查看原始数据。

以下是详细程度3与2的输出示例，后面是整个A11数据包的HEX/ASCII:

```
Application Sub Type: 0x01 (Radius)
         Radius Attr: Attribute Type: 26 (Vendor-Specific)
                      Length: 12
                      Vendor Id: 5535 (ThreeGPP2)
                      Vendor Type: 40 (3GPP2-Airlink-Record-Type)
                      Vendor Length: 6
                      Value: 00 00 00 02             ....
                             (Active-Start)

Application Sub Type: 0x01 (Radius)
         Radius Attr: 3GPP2-Airlink-Record-Type = Active-Start


0x0000   010a 0708 0000 0000 0ad0 901e 0ad0 9158        ...............X
0x0010   d92c 509a 0265 af7e 2715 8881 ecba aed8        .,P..e.~'.......
0x0020   0000 0001 0006 0811 1111 4290 4988 6126        ..........B.I.a&
0x0030   0000 d800 0015 9f01 011a 0c00 0015 9f28        ...............(
0x0040   0600 0000 021a 0c00 0015 9f29 06ec baae        ............)....
0x0050   d81a 0c00 0015 9f2a 0600 0000 011a 1600        .......*........
0x0060   0015 9f74 1041 3030 3030 3034 4444 3045        ...t.A000004DD0E
0x0070   4535 331a 1400 0015 9f0a 0e30 3031 3230        E53........00120
0x0080   3030 3330 3131 341a 0c00 0015 9f0b 0600        0030114.........
0x0090   0000 001a 0c00 0015 9f0c 0600 0000 001a        ................
0x00a0   0c00 0015 9f0d 0600 0000 001a 0c00 0015        ................
0x00b0   9f10 0600 0000 211a 0c00 0015 9f11 0600        ......!.........
0x00c0   0000 001a 0c00 0015 9f12 0600 0000 001a        ................
0x00d0   0c00 0015 9f13 0600 0000 001a 0c00 0015        ................
0x00e0   9f14 0600 0000 001a 0c00 0015 9f15 0600        ................
0x00f0   0000 001a 0c00 0015 9f32 0600 0000 001a        .........2......
0x0100   0c00 0015 9f27 0600 0000 0020 1400 0001        .....'..........
0x0110   00b3 c5f0 257e 8e93 c719 1b79 3ef9 30be        ....%~.....y>.0.
0x0120   07
```

- 并非所有分段的数据包都会显示，因为网络处理器单元(NPU)在将从线路接收的分段提供给处理呼叫的会话管理器进程以及监控用户输出其生成的位置之前，会将这些分段组合在一起。同样，对于出站方向，不显示NPU执行的分段。
- 在组合外部代理(FA)/HA机箱上，仅显示其中一个用户会话的输出。例如，如果在FA上看到RADIUS身份验证，则它不会显示在呼叫的HA部分。如果可能，在这些情况下使用监控协议捕获特定协议。
- 在排除节点（即FA和HA）之间的故障时，如果故障跨越两个机箱或这样做可能有助于消除某些可能性，请对两个机箱进行跟踪。

例如，以下是从FA发送到HA的相同数据包：

```
PDSN/FA:

<<<<OUTBOUND  23:57:08:941 Eventid:27001(0)
MIP-TUNNEL (IPv4-IPv4) Tx PDU
203.0.113.1 > 203.0.113.2: 10.251.88.68 > 192.0.2.1: icmp: echo request (ttl 62, id 13840, len
84) (ttl 255, id 0, len 104)

HA:

INBOUND>>>>>  23:57:08:943 Eventid:27000(0)
MIP-TUNNEL (IPv4-IPv4) Rx PDU
```

```
203.0.113.1 > 203.0.113.2: 10.251.88.68 > 192.0.2.1: icmp: echo request (ttl 62, id 13840, len
84) (ttl 251, id 0, len 104)
```

- 从数据包数据网络(PDN)的出口接口发送和接收的数据包（这不包括FA的出口，例如，因为出口是FA-HA IP隧道），不按未在未隧道接口上显示数据包的系统架构显示。如果数据包进入入口，然后从入口发送响应，则意味着数据包到达其目的地并返回（如果目的地是机箱本身）。但是，如果没有从入口发送响应，并且预期会收到响应，则需要确定它是否确实从出口发送以消除ASR作为问题，如果是，是否在出口上收到响应？这实际上适用于两个方向。数据包嗅探器位于传输网络中各个入口或出口接口和其他点上，包括记录在传输中包括终端点（用户设备或网络/互联网服务器）的各个点上，可能有助于查明未响应的原因。

这是FA和HA上的ICMP请求和响应，其中数据包仅显示在HA的入口（FA-HA隧道）端，而同时显示在FA的入口和出口端，因为两个接口都是隧道传输的。请注意，FA和HA之间更改的唯一字段是生存时间(TTL)值，该值在遍历网络节点时：

```
INBOUND>>>>>  23:57:08:941 Eventid:25000(0)
PPP Rx PDU (85)
IP 85: 10.251.88.68 > 192.0.2.1: icmp: echo request (ttl 63, id 13840, len 84)

<<<<OUTBOUND  23:57:08:941 Eventid:27001(0)
MIP-TUNNEL (IPv4-IPv4) Tx PDU
203.0.113.1 > 203.0.113.2: 10.251.88.68 > 192.0.2.1: icmp: echo request (ttl 62, id 13840, len
84) (ttl 255, id 0, len 104)


INBOUND>>>>>  23:57:08:943 Eventid:27000(0)
MIP-TUNNEL (IPv4-IPv4) Rx PDU
203.0.113.1 > 203.0.113.2: 10.251.88.68 > 192.0.2.1: icmp: echo request (ttl 62, id 13840, len
84) (ttl 251, id 0, len 104)

<<<<OUTBOUND  23:57:09:029 Eventid:27001(0)
MIP-TUNNEL (IPv4-IPv4) Tx PDU
203.0.113.2 > 203.0.113.1: 192.0.2.1 > 10.251.88.68: icmp: echo reply (ttl 42, id 27830, len 84)
(ttl 255, id 0, len 104)

Monday May 18 2015
INBOUND>>>>>  23:57:09:030 Eventid:27000(0)
MIP-TUNNEL (IPv4-IPv4) Rx PDU
203.0.113.2 > 203.0.113.1: 192.0.2.1 > 10.251.88.68: icmp: echo reply (ttl 42, id 27830, len 84)
(ttl 251, id 0, len 104)

Monday May 18 2015
<<<<OUTBOUND  23:57:09:030 Eventid:25001(0)
PPP Tx PDU (88)
IP 88: 192.0.2.1 > 10.251.88.68: icmp: echo reply (ttl 41, id 27830, len 84)
```

*客户可以访问的ASR接口上没有内置的数据包嗅探器，但TAC在此区域具有某些功能，具体取决于协议（用户数据无法根据什么捕获）

分析监控子输出时，请考虑以下事项：

- 是否缺少预期可见的数据包（例如来自机箱外部的响应或来自机箱的请求或来自机箱的转发数据包）
- 可以看到数据包沿相反的方向传输（以确认至少一个方向正在工作）
- 是按预期间隔实时和/或根据规格/配置的计时器值发送/接收的数据包

- 是按照协议的预期顺序发送/接收的数据包（请参阅前面有关排序的警告）
- 是数据包中包含正确/预期值（端口号、IP地址等）的各个字段。
- 对于TCP/IP，是连接的正确设置和断开。监控子使用的TCP标志的标识包括S(SYN)、。后跟Ack online(Acknowledgement)、S后跟Ack later online(SYN Ack)、P(Push)、R(Reset)、F(FIN)
- 问题是持续发生还是随机发生
- 用户呼叫控制类型、用户ID（用户名、msid、imsi等）、私有或NAT IP池或地址范围、UDP/TCP端口号、网络服务器（终端）地址、用户流量类型（HTTP、SMS、FTP、UDP等）、对等呼叫控制节点地址(例如：FA、HA、PCF、策略和计费规则功能(PCRF)、服务网关(SGW)、直径服务器等不要一刀切。
- 熟悉服务提供商已实施的规则和自定义协议行为，这些行为可能发布/披露，也可能不发布/披露— 提出问题！!!

日志监控

这实际上是全局配置命令，而不是用于监控特定用户的运行时执行命令。使用此命令有两个优点：

- 无需保持CLI会话打开，因为所有输出都保存到日志中
- 它自动为用户保存所有设施的调试级别日志，包括通常与监控用户一起显示的输出。虽然调试比可能需要的要多得多，但是没有遗漏任何信息，并且它不会干扰系统，因为打开日志记录或监控协议将针对各种设施（因为这样做会为使用受监控设施的所有用户获取信息）。

- 输出可能不像监控用户生成的输出那样容易/快速。 通常，TAC和/或工程部门需要解释输出。
- 要捕获监控器用户捕获的协议消息的详细信息（logging monitor只保存任何协议消息的前几行），请同时运行监控器用户会话，然后根据分析日志记录监控器输出时的需要引用输出；或者，打开日志记录的完整事件详细程度(global config command "logging display event-verbosity full")。 后一种方法不需要以后再做任何工作，因为所有输出都已连续且完整。

日志记录跟踪

与日志记录监控器相比，此方法使用执行模式级别访问，但同时也要求设备已连接。这对于排除用户数据故障（和/或运行命令后的进一步呼叫控制事件）与呼叫建立相反，因为呼叫需要已经设置才能正常工作（否则报告“没有呼叫与指定条件匹配”，而不实现任何目标）。 与日志记录监控器类似，“show logs”显示所有捕获的数据。

监控协议

此命令监控机箱上指定协议（呼叫控制、数据平面）的所有协议交换，并且输出与监控用户的类似样式

- 这只应是生产机箱上的最后选择，因为可能施加的负载取决于协议的协议和数据包量。
- 需要管理员CLI访问权限才能运行
- 要获取特定用户的输出，需要通过识别信息类型（如用户名/MSID、被叫方等）来过滤该输出。

活动或运行时日志记录

此命令捕获指定级别上指定设施的输出（从错误到调试）
— 这与监控协议在系统负载和过滤用户输出方面的问题相同
— 可能需要运行/配置系统日志服务器，具体取决于设备、调试级别和返回时间表的需要，否则数据可能会被尝试在机箱上检索到的时间覆盖。

用户命令

对于以下所有用户命令，不仅特定用户的信息可用，而且命中列表可以按任意数量的标准缩小到一组用户，例如他们所连接的呼叫控制服务(PDSN、FA、HA、LAC、L2TP网络服务器(LNS)、ECS、LTE等)或正在通信的实体（PCF、FA、HA、LAC、LNS、SGW等）、连接到分组交换卡(PSC)、连接或空闲时间或会话剩余时间（大于/小于）、接收或发送的数据量（大于/小于）、关联的IP池名称、休眠/活动参数等，甚至这些和许多其他参数的各种组合。使用在线帮助列出各种可能性，然后进行实验是学习的绝佳方式。

如前所述，不需要始终知道要跟踪的特定用户。相反，了解用户所属的类别，就能获得该类别中用户的列表，从中可以进一步缩小/分析范围，并选择特定用户进行分析。请参阅CLI自动完成帮助，了解“show subscribers”。

当确实需要选择特定用户时，需要使用用户名、国际移动用户身份(IMSI)、MSID、移动站ISDN(MSISDN)等关键字之一进行资格审批。

show subscribers full

这可能是存在的第一个用户命令，应针对每个用户问题捕获该命令。它包含指定用户的TON信息，对于排除用户问题非常有用。虽然讨论此处的每个字段并不可行，但有些字段显然比其他字段通常被检查和引用得更多，尽管每种场景因所排除的故障而不同。需要牢记的是：

- 某些字段与呼叫技术无关。例如：- HA上的域名服务器(DNS)地址不相关，因为DNS是从PDSN/FA发出的。
- 休眠仅在接入节点上有意义，并且始终在网关上设置为活动
- 某些字段可以多次列出
- 某些字段可能表示一个值，但实际上另一个值最终会被使用。例如，如果与主服务器存在连接问题，则使用的RADIUS服务器可能会更改
- 对于LTE和其他LTE，每个用户的每个连接承载都显示一个输出。例如，如果用户连接了三个应用点名称(APN)，其中一个APN有两个承载，则会有四个分别的输出。
- 各个字段应能与其他CLI的输出（包括必要的配置）相关联。

PDSN/FA（接入节点）和HA（HA是网关类型的节点）节点类型的相关字段，也主要适用于所有呼叫类型，包括：

- 状态 — 休眠或活动。
- 接入类型/技术 — 呼叫入口端的技术
- 网络类型 — 呼叫出口端的技术
- 用户名、MSID、IP地址、NAT IP地址 — 标识用户的方法。
  注意：msid并不总是msid。例如，在PGW上，它是IMSI。
- 被叫方 — 8个十六进制数字ID，用于跟踪每个会话的所有活动。数据包数据网络网关(PGW)或多媒体管理实体(MME)上的每个APN存在唯一的呼叫
- Sessmgr实例 — 处理会话的sessmgr实例（显示任务资源将列出会话）
- 卡/CPU — 会话管理器驻留的PSC或数据处理卡(DPC)
- PCF、HA、FA、DNS地址等 — 不言而喻
- 连接时间 — 呼叫连接时
- 呼叫持续时间 — 呼叫已连接的时间。
  注意：如果用户漫游，则FA和HA之间可能不同，因为新FA节点不知道原始呼叫的总寿命
- 空闲时间 — 未交换用户数据（控制数据包不计算）的时间
- 剩余会话时间 — 会话在终止之前可以持续多长时间（由硬编码配置控制、在身份验证中返回和/或在节点之间协商）
- MIP FA/MIP HA - MIP会话的各种值
- Input Pkts/Bytes — 从用户通过入口端接收的用户数据包数/字节数
- Output Pkts/Bytes — 通过入口端向用户发送的用户数据包数/字节数。
  注意：
  — 这些计数器适用于入口端。出口端没有计数器！！
  — 这些计数和发往/发自ECS的数据包之间应有密切的关联，但可能没有完全匹配
- 已丢弃的输入数据包/已丢弃的输出数据包 — 请注意，数据包实际上可能会在ECS之外被丢弃，或被情景中的访问控制列表(ACL)丢弃（因此，不要假设所有数据包丢弃都在ECS中）。

网关节点：

- ip pool name — 从中检索IP地址的IP池。仅在呼叫终端（网关）上相关，因为其他节点（即PDSN）无法知道池名称，只知道地址。
- ECS规则库 — 主用计费服务(ACS)中的规则库，包含要应用于用户数据包的规则
- NAT IP地址 — 可公开路由的IP地址，NAT是用户私有分配的IP地址
- NAT领域 — ECS服务中使用的关联NAT IP池的分组
- （按需）— NAT地址是永久分配还是临时分配给用户（按池配置）
- （NAT IP池名称）— NAT池名称
- 下一跳IP地址 — IP池的下一跳地址，应将数据包转发到该地址
- 已分配的NAT端口块 — 可用和使用的端口数，以及使用NAT IP进行NAT的端口范围
- 下行链路CSS信息/上行链路CSS信息 — ECS服务处理的数据包的上行链路（输入）和下行链路（输出）方向计数

以下是PDSN和HA上同一用户同时获取的“show sub full”的缩写输出（删除了某些“不太重要”字段），使得可以轻松地将两个输出（包括数据包计数）关联起来。

```
PDSN> show sub full username 9782577072@cisco.com
Monday May 18 23:56:20 UTC 2015
Username: 9782577072@cisco.com       Status: Dormant
  Access Type: pdsn-mobile-ip        Network Type: Mobile-IP
  Access Tech: CDMA 1xRTT           Access Network Peer ID: n/a
  callid: 3ee822d2                   msid: 111119782577072
```

```
  Card/Cpu: 15/0                    Sessmgr Instance: 212
  state: Connected                  PCF address: 10.211.17.207
connect time: Mon May 18 23:45:54 2015 call duration: 00h10m35s
  idle time: 00h02m30s              idle time left: 02h02m30s
  session time left: 23h44m25s      ip address: 10.251.88.68
  Primary DNS Address: 209.165.200.225
  Secondary DNS Address: 209.165.200.226
  home-agent:  203.0.113.2
  fa-service name: FA9  (context destination)
  source context: source       destination context: destination
  AAA context: source               AAA domain: cisco.com
  AAA start count: 1                AAA stop count: 0
  AAA interim count(RADIUS+GTPP): 0  Acct-session-id: 69A9CDEB
  AAA RADIUS group: aaa-cisco.com
RADIUS Auth Server IP: 198.51.100.1
RADIUS Acct Server IP: 198.51.100.1
  NAS IP Address: 10.208.148.133
MIPFA Session:                  Care-of-Address: 203.0.113.1
    Home-Address: 10.251.88.68     HA-Address: 203.0.113.2
    Lifetime: 02h00m00s             Remaining Life: 01h49m25s
    Revocation Negotiated: yes Revocation I Bit Negotiated: Yes
  input pkts: 254                      output pkts: 229
  input bytes: 24088                   output bytes: 129012
input pkts dropped: 0                 output pkts dropped: 0
   dormancy total: 11                 handoff total: 0
Num Auxiliary A10s:1
  PCF Address     SR_ID
10.211.17.207      1

[local]HA> show sub full username 9782577072@cisco.com
Monday May 18 23:56:14 UTC 2015
Username: 9782577072@cisco.com           Status: Online/Active
  Access Type: ha-mobile-ip              Network Type: IP
  Access Tech: Other                     Access Network Peer ID: n/a
  callid: 4a6ae475                       msid: n/a
  Card/Cpu: 2/0                          Sessmgr Instance: 329
  state: Connected                       FA address: 66.174.112.72
  connect time: Mon May 18 23:45:54 2015 call duration: 00h10m28s
  idle time: 00h02m23s                idle time left:  n/a
  session time left: 23h49m32s
  ip address: 10.251.88.68
  ip pool name: MIP_Private
  ha-service name: HA1
  source context: HA                     destination context: XGWout
  Acct-session-id: A414F3F6
  RADIUS Auth Server IP: 198.51.100.1    RADIUS Acct Server IP: n/a
  NAS IP Address: 10.208.148.135         Nexthop IP Address: 209.165.200.230
  active input acl: ECS_ACL              active output acl: ECS_ACL
  ECS Rulebase: 201                      Firewall-and-Nat Policy: MIP
   Nat Realm: MIP_NAT_Int       Nat ip address: 170.200.132.0   (on-demand) (MIP_NAT_Int04)
   Nexthop ip address: 209.165.200.230
  Nat port chunks allocated[start - end]: (1 chunk) [6464 - 6495]
  Max NAT port chunks used: 1
  HA binding care-of-addr(s): 203.0.113.1
  MIPHA binding 1:  Care-of-Address: 203.0.113.1
                    FA Address/Port: 203.0.113.1/434
    Home-Address: 10.251.88.68           HA-Address: 203.0.113.2
    Lifetime: 02h00m00s                  Remaining Life: 01h49m32s
    Revocation Negotiated: Yes           Revocation I Bit Negotiated: Yes
    MN-HA-Key-Present: TRUE              MN-HA-SPI:300
    FA-HA-Key-Present: TRUE              FA-HA-SPI:8832
  Proxy DNS Intercept List: ROAMINGDNS
  Downlink CSS Information
    Service/ACL Names: /ECS_ACL
```

```
      downlink pkts to svc: 229          downlink pkts from svc: 229
  Uplink CSS Information
    Service/ACL Names: /ECS_ACL
      uplink pkts to svc: 254            uplink pkts from svc: 252
  input pkts: 254                                 output pkts: 229
  input bytes: 24088                              output bytes: 129012
```

根据FA和HA节点之间的以下ICMP请求/响应数据包交换（实际上有4个ICMP交换，此处仅显示一个），将显示“show sub full”跟踪的随后数据包/字节计数：

```
[local]PDSN> show sub full username 9782577072@cisco.com
Monday May 18 23:56:20 UTC 2015

  input pkts: 254                       output pkts: 229
  input bytes: 24088                    output bytes: 129012
  input pkts dropped: 0                 output pkts dropped: 0

[local]PDSN> show sub full username 9782577072@cisco.com
Monday May 18 23:57:25 UTC 2015

  input pkts: 258                       output pkts: 233
  input bytes: 24424                    output bytes: 129348

INBOUND>>>>>  23:57:08:943 Eventid:27000(0)
MIP-TUNNEL (IPv4-IPv4) Rx PDU
203.0.113.1 > 203.0.113.2: 10.251.88.68 > 192.0.2.1: icmp: echo request (ttl 62, id 13840, len
84) (ttl 251, id 0, len 104)

<<<<OUTBOUND  23:57:09:029 Eventid:27001(0)
MIP-TUNNEL (IPv4-IPv4) Tx PDU
203.0.113.2 > 203.0.113.1: 192.0.2.1 > 10.251.88.68: icmp: echo reply (ttl 42, id 27830, len 84)
(ttl 255, id 0, len 104)

[local]HA> show sub full username 9782577072@cisco.com
Monday May 18 23:56:14 UTC 2015

Downlink CSS Information
  downlink pkts to svc: 229        downlink pkts from svc: 229
Uplink CSS Information
  uplink pkts to svc: 254          uplink pkts from svc: 252

  input pkts: 254                  output pkts: 229
  input bytes: 24088               output bytes: 129012

[local]HA> show sub full username 9782577072@cisco.com
Monday May 18 23:57:34 UTC 2015

Downlink CSS Information
   downlink pkts to svc: 233        downlink pkts from svc: 233
Uplink CSS Information
   uplink pkts to svc: 258          uplink pkts from svc: 256

  input pkts: 258                   output pkts: 233
  input bytes: 24424                output bytes: 129348
```

以下示例代码段用于LTE语音(VoLTE)呼叫。解释可能会很棘手，因为有两个用户被列出，而且他们之间的区别并不清晰。

- 所列的第一个是默认IP多媒体系统(IMS)承载，第二个是专用(VoLTE)承载，两者都属于同一APN
- Acct-session-id:是一个独特优势。
- 两个承载之间的输入/输出包/字节不同，并且由于专用承载将发送更多（语音）数据包，因此可以假设具有较高计数的用户将是专用承载，同时……对于两个承载（默认承载使用的数量），ECS的数据包计数相同
- 两者的连接时间显示显示默认承载连接时间，即使专用连接在以后。
- 获取PGW呼叫更有用、更准确、更简单信息的方法是使用“show pgw-only full”（稍后讨论）

```
[local]PGW> show sub full imsi 300420060496012
Monday September 16 21:50:07 UTC 2013

Username: 0300420060496012@nai.epc.mnc420.mcc300.3gppnetwork.org Status: Online/Active
  Access Type: gtp-pdn-type-ipv6         Network Type: IPv6
  Access Tech: eUTRAN                    Access Network Peer ID: n/a
  callid: 22075719                       msid: 300420060496012
  Card/Cpu: 7/1                          Sessmgr Instance: 115
  state: Connected                       SGW Address: 203.0.113.3
  connect time: Mon Sep 16 21:44:28 2013 call duration: 00h05m42s
  idle time: 00h00m00s                   idle time left: 02h05m00s
  session time left: 08759h54m
  long duration time left:  n/a          long duration action:  n/a
  always on: Disabled
  ip address: 2001:db8::1
  ip pool name: ims61-03
  source context: XGWin                  destination context: XGWout
...
  AAA context: XGWin                     AAA domain: XGWin
...
Acct-session-id: 42AE2B922619E10F
...
  active input acl: n/a                  active output acl: n/a
  active input ipv6 acl: ECS_ACL_V6      active output ipv6 acl: ECS_ACL_V6
  ECS Rulebase: PGW
...
  P-CSCF address :
    Primary:  2001:db8::fd
    Secondary:  2001:db8::fe
    Tertiary:   n/a
...
  Downlink CSS Information
    Service/ACL Names: /ECS_ACL_V6
    (Active Charging Optimized Mode)
      downlink pkts to svc: 658          downlink pkts from svc: 658
  Uplink CSS Information
    Service/ACL Names: /ECS_ACL_V6
    (Active Charging Optimized Mode)
      uplink pkts to svc: 675            uplink pkts from svc: 675
  Collapsed cscf subscribers: none
  input pkts: 29                             output pkts: 45
  input bytes: 10578                         output bytes: 10763
  input bytes dropped: 0                     output bytes dropped: 0
  input pkts dropped: 0                      output pkts dropped: 0
...
  pk rate from user(bps): 1375               pk rate to user(bps): 1699
  ave rate from user(bps): 458               ave rate to user(bps): 566
  sust rate from user(bps): 456              sust rate to user(bps): 564
  pk rate from user(pps): 0                  pk rate to user(pps): 1
...
```

```
CAE Server Address:
Username: 0300420060496012@nai.epc.mnc420.mcc300.3gppnetwork.org Status: Online/Active
  Access Type: gtp-pdn-type-ipv6         Network Type: IPv6
  Access Tech: eUTRAN                    Access Network Peer ID: n/a
  callid: 22075719                       msid: 300420060496012
  Card/Cpu: 7/1                          Sessmgr Instance: 115
  state: Connected                       SGW Address: 203.0.113.3
  connect time: Mon Sep 16 21:44:28 2013 call duration: 00h05m42s
  idle time: 00h00m00s                   idle time left: 02h05m00s
  session time left: 08759h54m
  long duration time left:  n/a          long duration action:  n/a
  always on: Disabled
  ip address: 2001:db8::1
  ip pool name: ims61-03
  source context: XGWin                  destination context: XGWout
...
  AAA context: XGWin                     AAA domain: XGWin
  AAA start count: 0                     AAA stop count: 0
  AAA interim count(RADIUS+GTPP): 0
Acct-session-id: 42AE2B922619E18D
...
  active input ipv6 acl: ECS_ACL_V6      active output ipv6 acl: ECS_ACL_V6
  ECS Rulebase: PGW
P-CSCF address : Primary: 2001:db8::fd Secondary: 2001:db8::fe Tertiary: n/a ... Downlink CSS
Information Service/ACL Names: /ECS_ACL_V6 (Active Charging Optimized Mode) downlink pkts to
svc: 658 downlink pkts from svc: 658 Uplink CSS Information Service/ACL Names: /ECS_ACL_V6
(Active Charging Optimized Mode) uplink pkts to svc: 675 uplink pkts from svc: 675 Collapsed
cscf subscribers: none input pkts: 643 output pkts: 617 input bytes: 58421 output bytes: 55925
... pk rate from user(bps): 1375 pk rate to user(bps): 1699 ave rate from user(bps): 458 ave
rate to user(bps): 566 sust rate from user(bps): 456 sust rate to user(bps): 564 pk rate from
user(pps): 0 pk rate to user(pps): 1
```

show subscribers（仅HSGW）|仅pgw | ggsn-only |仅MME |仅sgw |仅sgsn)full

其中一些具有非常有用的信息，这些信息是专门为呼叫类型量身定制的，而不仅仅是普通的show subscriber full（这更一般，许多字段适用于所有呼叫类型，但有些字段仍特定于某些呼叫类型）

- 在仅hsgw和ggsn-only的情况下，输出与普通的“show sub full”没有区别，只是限定符自动将命中列表限制为指定类型的调用。
- MSISDN有效列出设备电话号码
- 字段名称IMSI已明确且正确列出
- 请注意，来自同一APN的承载具有相同的呼叫
- 承载类型和承载ID — 区分不同承载
- QCI — 服务质量标识符（范围从1到9）。 在这种情况下，QCI 1用于语音，QCI 5用于IMS控制
- c-teid、u-teid — 用于控制和用户平面的终端终端标识符对于确定将数据包与哪个承载关联是必需的
- S5/S8/S2b-APN、SGi-APN — 承载的APN
- input pkts/output pkts — 数据包计数用于承载者本身
- MBR/GBR上行链路/下行链路 — 两个方向的最大和保证比特率。注意VoLTE的38000位/秒（与VoLTE编解码器的比特率有关）。

以下示例代码段用于与上面“show sub full”所示的相同LTE语音(VoLTE)呼叫，大约在同一时间（参见时间戳）进行，以便对输出进行有用的比较（如果有兴趣）。它还包括当时也连接的互联网APN:

```
[local]PGW> show sub pgw-only full imsi 300420060496012
Monday September 16 21:50:25 UTC 2013

Username: 0300420060496012@nai.epc.mnc420.mcc300.3gppnetwork.org
  Subscriber Type : Home
  Status          : Online/Active
  State           : Connected
  Connect Time    : Mon Sep 16 21:44:28 2013
  Idle time       : 00h00m00s
  MS TimeZone     : +5:00        Daylight Saving Time: +1 hour

  Access Type: gtp-pdn-type-ipv6         Network Type: IPv6
  Access Tech: eUTRAN                    pgw-service-name: PGW1
  Callid: 22075719                       IMSI: 300420060496012
  Protocol Username:                     MSISDN: 19126757869
  Interface Type: S5S8GTP
  Emergency Bearer Type: N/A
  S6b Auth Status: Enabled
  Acct-session-id (C1): 42AE2B922619E10F
  ThreeGPP2-correlation-id (C2): 3939BA30 / h0WKcCZS
  Card/Cpu: 7/1                          Sessmgr Instance: 115

  Bearer Type: Default Bearer-Id: 5 Bearer State: Active IP allocation type: N/A IPv6 allocation
type: local pool IP address: 2001:db8::1 Framed Routes: N/A Framed Routes Source: N/A ULI: TAI-
ID: MCC: 300 MNC: 420 TAC: 0x8504 ECGI-ID: MCC: 300 MNC: 420 ECI: 0x207b201 Accounting mode:
None APN Selection Mode: Subscribed MEI: 9900015028325700 Serving Nw: MCC=300, MNC=420 Charging
id: 639230223 Charging chars: normal Source context: XGWin Destination context: XGWout
S5/S8/S2b-APN: IMSAPN SGi-APN: IMSAPN APN-OI: mnc420.mcc300.gprs IMS Auth Service : IMS-GX
active input ipv4 acl: active output ipv4 acl: active input ipv6 acl: ECS_ACL_V6 active output
ipv6 acl: ECS_ACL_V6 ECS Rulebase: PGW Bearer QoS: QCI: 5 ARP: 0x069 PCI: 1 (Disabled) PL : 10
PVI: 1 (Disabled) MBR Uplink(bps): 0 MBR Downlink(bps): 0 GBR Uplink(bps): 0 GBR Downlink(bps):
0 P-CSCF address : 1: 2001:db8::fd 2: 2001:db8::fe 3: NA Access Point MAC Address: N/A pgw c-
teid: [0x8d11c073] 2366750835 pgw u-teid: [0xc20d0073] 3255631987 sgw c-teid: [0x00160880]
1443968 sgw u-teid: [0x00160885] 1443973 ePDG c-teid: N/A ePDG u-teid: N/A pgw c-addr:
203.0.113.4 pgw u-addr: 203.0.113.4
2001:db8::1f sgw c-addr: 203.0.113.3 sgw u-addr: 203.0.113.3 ePDG c-addr: N/A ePDG u-addr: N/A
Downlink APN AMBR: 600 Kbps Uplink APN AMBR: 600 Kbps input pkts: 29 output pkts: 45 input
bytes: 10578 output bytes: 10763 input bytes dropped: 0 output bytes dropped: 0 input pkts
dropped: 0 output pkts dropped: 0 ... pk rate from user(bps): 27699 pk rate to user(bps): 24879
ave rate from user(bps): 9691 ave rate to user(bps): 8859 sust rate from user(bps): 9720 sust
rate to user(bps): 8885 pk rate from user(pps): 37 pk rate to user(pps): 34 ave rate from
user(pps): 12 ave rate to user(pps): 11 sust rate from user(pps): 12 sust rate to user(pps): 11
link online/active percent: 100 ... CAE Server Address: Username:
0300420060496012@nai.epc.mnc420.mcc300.3gppnetwork.org Subscriber Type : Home Status :
Online/Active State : Connected Connect Time : Mon Sep 16 21:49:53 2013 Idle time : 00h00m00s MS
TimeZone : +5:00 Daylight Saving Time: +1 hour Access Type: gtp-pdn-type-ipv6 Network Type: IPv6
Access Tech: eUTRAN pgw-service-name: PGW1 Callid: 22075719 IMSI: 300420060496012 Protocol
Username: MSISDN: 19126757869 Interface Type: S5S8GTP Emergency Bearer Type: N/A S6b Auth
Status: Enabled Acct-session-id (C1): 42AE2B922619E18D ThreeGPP2-correlation-id (C2): 3939BA30 /
h0WKcCZS Card/Cpu: 7/1 Sessmgr Instance: 115 Bearer Type: Dedicated Bearer-Id: 7 Bearer State:
Active IP allocation type: N/A IPv6 allocation type: local pool IP address: 2001:db8::1 Framed
Routes: N/A Framed Routes Source: N/A ULI: TAI-ID: MCC: 300 MNC: 420 TAC: 0x8504 ECGI-ID: MCC:
300 MNC: 420 ECI: 0x207b201 Accounting mode: None APN Selection Mode: Subscribed MEI:
9900015028325700 Serving Nw: MCC=300, MNC=420 Charging id: 639230349 Charging chars: normal
Source context: XGWin Destination context: XGWout S5/S8/S2b-APN: IMSAPN SGi-APN: IMSAPN APN-OI:
mnc420.mcc300.gprs IMS Auth Service : IMS-GX active input ipv4 acl: active output ipv4 acl:
active input ipv6 acl: ECS_ACL_V6 active output ipv6 acl: ECS_ACL_V6 ECS Rulebase: PGW Bearer
QoS: QCI: 1 ARP: 0x06d PCI: 1 (Disabled) PL : 11 PVI: 1 (Disabled) MBR Uplink(bps): 38000 MBR
Downlink(bps): 38000 GBR Uplink(bps): 38000 GBR Downlink(bps): 38000 P-CSCF address : 1:
2001:db8::fd 2: 2001:db8::fe 3: NA Access Point MAC Address: N/A pgw c-teid: [0x8d11c073]
2366750835 pgw u-teid: [0xc1f20073] 3253862515 sgw c-teid: [0x00160880] 1443968 sgw u-teid:
[0x00160887] 1443975 ePDG c-teid: N/A ePDG u-teid: N/A pgw c-addr: 203.0.113.4 pgw u-addr:
203.0.113.4
2001:db8::1f sgw c-addr: 203.0.113.3 sgw u-addr: 203.0.113.3 ePDG c-addr: N/A ePDG u-addr: N/A
```

```
Downlink APN AMBR: 600 Kbps Uplink APN AMBR: 600 Kbps input pkts: 1640 output pkts: 1614 input
bytes: 149478 output bytes: 146930 input bytes dropped: 0 output bytes dropped: 0 input pkts
dropped: 0 output pkts dropped: 0 ... pk rate from user(bps): 27699 pk rate to user(bps): 24879
ave rate from user(bps): 9691 ave rate to user(bps): 8859 sust rate from user(bps): 9720 sust
rate to user(bps): 8885 pk rate from user(pps): 37 pk rate to user(pps): 34 ave rate from
user(pps): 12 ave rate to user(pps): 11 sust rate from user(pps): 12 sust rate to user(pps): 11

CAE Server Address:
Username: 0300420060496012@nai.epc.mnc420.mcc300.3gppnetwork.org
 Subscriber Type : Home
 Status          : Online/Active
 State           : Connected
 Connect Time    : Mon Sep 16 21:44:33 2013
 Idle time       : 00h02m04s
 MS TimeZone     : +5:00        Daylight Saving Time: +1 hour

 Access Type: gtp-pdn-type-ipv4-ipv6    Network Type: IPV4+IPv6
 Access Tech: eUTRAN                    pgw-service-name: PGW1
 Callid: 2207571f                       IMSI: 300420060496012
 Protocol Username:                     MSISDN: 19126757869
 Interface Type: S5S8GTP
 Emergency Bearer Type: N/A
 S6b Auth Status: Enabled
 Acct-session-id (C1): 42AE2B922619E115
 ThreeGPP2-correlation-id (C2): 3939BA36 / h0WKfBYt
 Card/Cpu: 7/1                          Sessmgr Instance: 115

  Bearer Type: Default                   Bearer-Id: 6
 Bearer State: Active
 IP allocation type: local pool
 IPv6 allocation type: local pool
 IP address: 2001:db8::2, 10.174.230.156
 Framed Routes: N/A                             Framed Routes Source: N/A
 ULI:
  TAI-ID:
   MCC: 300 MNC: 420
   TAC: 0x8504
  ECGI-ID:
   MCC: 300 MNC: 420
   ECI: 0x207b201
 Accounting mode: None                  APN Selection Mode: Subscribed
 MEI: 9900015028325700                  Serving Nw: MCC=300, MNC=420
 Charging id: 639230229                 Charging chars: normal
 Source context: XGWin                  Destination context: XGWout
 S5/S8/S2b-APN: INTERNET
 SGi-APN:   INTERNET
 APN-OI:    mnc420.mcc300.gprs
 IMS Auth Service : IMS-GX
 active input ipv4 acl: ECS_ACL_V4      active output ipv4 acl: ECS_ACL_V4
 active input ipv6 acl: ECS_ACL_V6      active output ipv6 acl: ECS_ACL_V6
 ECS Rulebase: OCS

 Bearer QoS:
  QCI: 9
  ARP: 0x069
   PCI: 1 (Disabled)
   PL : 10
   PVI: 1 (Disabled)
  MBR Uplink(bps): 0                    MBR Downlink(bps): 0
  GBR Uplink(bps): 0                    GBR Downlink(bps): 0

 P-CSCF address :
 1:   NA
 2:   NA
```

```
 3:   NA

 Access Point MAC Address:  N/A

 pgw c-teid: [0x8c298073] 2351530099    pgw u-teid: [0xc20b8073] 3255533683
 sgw c-teid: [0x31580880] 827852928     sgw u-teid: [0x31580886] 827852934
 ePDG c-teid: N/A                       ePDG u-teid: N/A
 pgw c-addr: 203.0.113.4 pgw u-addr: 203.0.113.4
2001:db8::1f
 sgw c-addr: 203.0.113.3             sgw u-addr: 203.0.113.3
 ePDG c-addr: N/A                       ePDG u-addr: N/A

 Downlink APN AMBR:      75000 Kbps    Uplink APN AMBR:      75000 Kbps
 input pkts: 21                                 output pkts: 23
 input bytes: 2687                              output bytes: 6457
 input bytes dropped: 0                         output bytes dropped: 0
input pkts dropped: 0                          output pkts dropped: 0
...

CAE Server Address:
Total subscribers matching specified criteria: 3
```

show active-charging sessions full

这可能是“show sub full”之后第二重要的用户命令，如果排除ECS相关问题(如丢包、在线计费、IMS(PCRF)授权)故障，则对网关更重要。

- 上行链路和下行链路数据包和字节应与“show sub pgw-only”中据报发往/来自ECS的数据包匹配
- 了解跟踪丢弃数据包的各个字段
- 动态规则名称条目是PCRF在初始和持续PCRF交互时通过Gx交互返回的规则。将列出与规则匹配的数据包计数及其定义
- 对于计费规则定义（在本例中为专用VoLTE承载），还列出了配额、使用和时间

为保持一致，以下示例代码段用于与上面“show sub full”和“show sub pgw-only full”所示的相同LTE语音(VoLTE)呼叫，大约在同一时间（参见时间戳）进行，以便在有兴趣时进行有用的输出比较。

- 此外，还显示了捕获在线计费数据的互联网APN
- rule 0_0用于语音(实时传输协议(RTP))数据，0_1用于实时控制协议(RCP) — 用于随时间推移传递链路和语音质量。运行此CLI时，没有数据包通过RCP承载。

```
[local]PGW> show active-charging sessions full imsi 300420060496012
Monday September 16 21:50:18 UTC 2013

  Session-ID:             115:12023212  Username:
0300420060496012@nai.epc.mnc420.mcc300.3gppnetwork.org
  Callid:                     22075719  IMSI/MSID:          300420060496012
  MSISDN:                                                    19126757869
  ACSMgr Instance:                 115  ACSMgr Card/Cpu:                7/1
  SessMgr Instance:                                                    115
  Client-IP:                                                    2001:db8::
  NAS-IP:                                                          0.0.0.0
  Access-NAS-IP(FA):
  NAS-PORT:                          0   NSAPI:                          5
```

```
Acct-Session-ID:                                          393A43B1
NAS-ID:                                                        n/a
Access-NAS-ID(FA):                                             n/a
3GPP2-BSID:                                                    n/a
Access-Correlation-ID(FA):                                     n/a
3GPP2-Correlation-ID:                                          n/a
MEID:                                                          n/a
Carrier-ID:                        n/a  ESN:                   n/a
Uplink Bytes:                    10778  Downlink Bytes:       10411
Uplink Packets:                     32  Downlink Packets:        41
Injected Uplink Bytes:               0  Injected Downlink Bytes:  0
Injected Uplink Packets:             0  Injected Downlink Packets: 0
Buffered Uplink Packets:             0  Buffered Downlink Packets: 0
Buffered Uplink Bytes:               0  Buffered Downlink Bytes:  0
Uplink Packets in Buffer:            0  Uplink Bytes in Buffer:   0
Downlink Packets in Buffer:          0  Downlink Bytes in Buffer: 0
Buff Over-limit Uplink Pkts:         0  Buff Over-limit Uplink Bytes:  0
Buff Over-limit Downlink Pkts:       0  Buff Over-limit Downlink Bytes: 0
Processed Uplink Packets:            0  Processed Downlink Packets: 0
Dropped Uplink Packets:              0  Dropped Downlink Packets:  0
Uplink Out of Order Packets:         0  Downlink Out of Order Packets:  0
Dyn FUI Redirected Flows:            0  Dyn FUI Discarded Pkts:    0
ITC Terminated Flows:                0  ITC Redirected Flows:      0
ITC Dropped Packets:                 0  ITC ToS Remarked Packets:  0
ITC Dropped Upl Pkts:                0  ITC Dropped Dnl Pkts:      0
ITC Dropped Upl Bytes:               0  ITC Dropped Dnl Bytes:     0
Flow action Terminated Flows:                                   0
PP Flow action Terminated Flows:                                0
CC Dropped Uplink Packets:           0  CC Dropped Uplink Bytes:   0
CC Dropped Downlink Packets:         0  CC Dropped Downlink Bytes: 0
NRUPC Req Made:                      1  NRUPC Req Success:         1
NRUPC Req Failed:                    0  NRUPC Req Time Out:        0
Dynamic Rule Limiting: Enabled
Bearer Bandwidth Limiting: Enabled
Uplink MBR (bps):                    0  Downlink MBR (bps):        0
Uplink GBR (bps):                    0  Downlink GBR (bps):        0
Uplink Burst (bytes):                0  Downlink Burst (bytes):    0
Dropped Uplink Pkts:                 0  Dropped Downlink Pkts:     0
Dropped Uplink Bytes:                0  Dropped Downlink Bytes:    0
Current Readdressed Sessions:                                   0
Total Readdressed Uplink Pkts:                                  0
Total Readdressed Uplink Bytes:                                 0
Total Readdressed Downlink Pkts:                                0
Total Readdressed Downlink Bytes:                               0
Total Readdressing Failure Packets:                             0
  Non Syn Flow:                      0  Duplicate Key:             0
  Dropped Pkts:                      0

Creation Time:                       Monday September 16 21:44:28 GMT 2013
Last Pkt Time:                       Monday September 16 21:50:20 GMT 2013
Duration:                                                 00h:05m:52s
Active Charging Service name:                                    LTE
Rule Base name:                                                  PGW
URL-Redir First-Request-Only:                                  n/a
Bandwidth Policy:                                              n/a
FW-and-NAT Policy:                                             n/a
NAT Policy NAT44:                                     Not-required
NAT Policy NAT64:                                     Not-required
TPO Policy:                                                    n/a
CF Policy ID:                                                  n/a
Old CF Policy ID:                                              n/a
Dynamic Charging:                                          Enabled
Dynamic Chrg Msg Received:           3  Rule Definitions Received:  3
Installs Received:                   3  Removes Received:          0
```

```
Installs Succeeded:                3  Installs Failed:                   0
Removes Succeeded:                 0  Removes Failed:                    0
Uplink Dynamic Rule Packets:      32  Uplink Dynamic Rule Bytes:     10778
Downlink Dynamic Rule Packets:    41  Downlink Dynamic Rule Bytes:   10411
Dynamic Charging Packet Drop statistics:
PCC Rule BW Limit Upl Pkts:        0  PCC Rule BW Limit Dnl Pkts:        0
PCC Rule BW Limit Upl Bytes:       0  PCC Rule BW Limit Dnl Bytes:       0
PCC Rule Gating Upl Pkts:          0  PCC Rule Gating Dnl Pkts:          0
PCC Rule Gating Upl Bytes:         0  PCC Rule Gating Dnl Bytes:         0
RuleMatch Fail Upl Pkts:           0  RuleMatch Fail Dnl Pkts:           0
RuleMatch Fail Upl Bytes:          0  RuleMatch Fail Dnl Bytes:          0
Credit-Control:                                                      Off
Event-Triggers:
QoS Renegotiate Up:                0  QoS Renegotiate Dn:                0
TCP Proxy Flows Requests:          0  TCP Proxy Flows Request Success:   0
Disable TCP Proxy Flows Requests:  0  Disable TCP Proxy Flows Success:   0
Current TCP Proxy Flows:           0  Total TCP Proxy Flows:             0
TCP-proxy reset for non-SYN flows:                                       0
Current IP Flows:                  0  Current ICMP Flows:                0
Current IPv6 Flows:                2  Current ICMPv6 Flows:              0
Current TCP Flows:                 1  Current UDP Flows:                 1
Current HTTP Flows:                0  Current HTTPS Flows:               0
Current FTP Flows:                 0  Current POP3 Flows:                0
Current SMTP Flows:                0  Current SIP Flows:                 1
Current RTSP Flows:                0  Current RTP Flows:                 0
Current RTCP Flows:                0  Current IMAP Flows:                0
Current WSP-CO Flows:              0  Current WSP-CL Flows:              0
Current MMS Flows:                 0  Current DNS Flows:                 0
Current PPTP-GRE Flows:            0  Current PPTP Flows:                0
Current P2P Flows:                 0  Current H323 Flows:                0
Current TFTP Flows:                0
Current UNKNOWN Flows:             1
Max (L3) Flows:                    6
Max Flows Timestamp:                Monday September 16 21:44:39 GMT 2013


CAE-Readdressing:
GET Requests redirected:                                                 0
POST Requests redirected:                                                0
Other Requests redirected:                                               0
HTTP Responses redirected:                                               0
Requests having xheader inserted:                                        0
Total Uplink Bytes:                                                      0
Total Uplink Packets:                                                    0
Total Downlink Bytes:                                                    0
Total Downlink Packets:                                                  0
Total request charging action hit:                                       0
Total response charging action hit:                                      0
Total Charging action hit - Req. Readdr.:                                0
Total Charging action hit - Resp. Readdr.:                               0
CAE Readdressing Err. Conditions:
Total connection failed to video server:                                 0
Skipped Req. Readdr. - pipelined req:                                    0
Skipped Req. Readdr. - persistent case:                                  0
Skipped Req. Readdr. - zero copied buf:                                  0
Skipped Req. Readdr. - buf limit exceed:                                 0
Req. Readdr. - Socket Mig. failed:                                       0
Skipped Flow. - pipelined req.:                                          0
Skipped Resp. Readdr. - pipelined req:                                   0
Skipped Resp. Readdr. - persistent case:                                 0
Skipped Resp. Readdr. - partial resp hdr:                                0
Skipped Resp. Readdr. - zero copied buf:                                 0
Skipped Resp. Readdr. - buf limit exceed:                                0
Resp. Readdr. - Socket Mig. failed:                                      0
```

```
  Total load balancer failed:                                          0
  Total MVG xheader insertion failed:                                  0
  Rulebase configuration missing:                                      0

  Transrating:
  Total Transrated Video Connections:                                  0
  Total GZIP'd Video Connections:                                      0
  Total MP4 Video Connections:                                         0
  Total FLV Video Connections:                                         0
  Transrated Sorenson H263 Connections:                                0
  Transrated H264 Connections:                                         0
  Failed Sorenson H263 Connections:                                    0
  Failed H264 Connections:                                             0
  Failed Video Codec not supported                                     0
  Total Input Video Data Bytes:                                        0
  SH263 Input Video Data Bytes:                                        0
  H264 Input Video Data Bytes:                                         0
  GZIP Input Video Data Bytes:                                         0
  Total Output Video Data Bytes:                                       0
  SH263 Output Video Data Bytes:                                       0
  H264 Output Video Data Bytes:                                        0
  GZIP Output Video Data Bytes:                                        0
  Average Input Video Bit Rate:                                        0
  SH263 Input Video Bit Rate:                                          0
  H264 Input Video Bit Rate:                                           0
  Average Output Video Bit Rate:                                       0
  SH263 Output Video Bit Rate:                                         0
  H264 Output Video Bit Rate:                                          0
  Average Bit Rate Reduction:                                          0
  SH263 Bit Rate Reduction:                                            0
  H264 Bit Rate Reduction:                                             0
  TCP-Proxy Session Stats:                                           n/a
  WiMAX Hotlining Status:                                            n/a
  Link Monitoring Average Throughput:                 0 kbps
  Link Monitoring Average RTT:                        0 ms

  Charging Updates:                                                  n/a

Dynamic Charging Rule Definition Statistics:
Dynamic-Rule-Name     Pkts-Down Bytes-Down    Pkts-Up   Bytes-Up       Hits
-------------------- ---------- ---------- ---------- ---------- ----------
IMSDefault                   41      10411         32      10778         73
Total Dynamic Rules:             1
Total Predefined Rules:          0
Total Firewall Predefined Rules: 0
Charging-Updates Statistics:         n/a

Dynamic Charging Rule Definition(s) Configured:
Name                 Prior Content-Id Chrg-Type Rule Parameters
-------------------- ----- ---------- --------- --------------------------
          IMSDefault   950        100   Offline Gate Status:      Allow All
                                                 QoS Class Identifier:     5
                                                 ARP Priority Level:      10
                                                 Reporting Level: Rating Grp
                                                 Metering Method:   Duration
                                                 Uplink MBR:        75000000
                                                 Downlink MBR:      75000000
                                                 Filter 1:
                                                 Direction:           Uplink
                                                 Dst Addr  ::/0
                                                 Filter 2:
                                                 Direction:         Downlink
                                                 Src Addr  ::/0
Predefined Rules Enabled List: n/a
```

```
Predefined Firewall Rules Enabled List: n/a


  Session-ID:             115:12023218  Username:
0300420060496012@nai.epc.mnc420.mcc300.3gppnetwork.org
  Callid:                     2207571f  IMSI/MSID:          300420060496012
  MSISDN:                                                      19126757869
  ACSMgr Instance:                 115  ACSMgr Card/Cpu:                7/1
  SessMgr Instance:                                                    115
  Client-IP:                                      2001:db8::,10.174.230.156
  NAS-IP:                                                        0.0.0.0
  Access-NAS-IP(FA):
  NAS-PORT:                          0   NSAPI:                           6
  Acct-Session-ID:                                                393A43B7
  NAS-ID:                                                              n/a
  Access-NAS-ID(FA):                                                   n/a
  3GPP2-BSID:                                                          n/a
  Access-Correlation-ID(FA):                                           n/a
  3GPP2-Correlation-ID:                                                n/a
  MEID:                                                                n/a
  Carrier-ID:                      n/a  ESN:                            n/a
  Uplink Bytes:                   2887  Downlink Bytes:                6105
  Uplink Packets:                   24  Downlink Packets:                19
  Injected Uplink Bytes:             0  Injected Downlink Bytes:          0
  Injected Uplink Packets:           0  Injected Downlink Packets:        0
  Buffered Uplink Packets:           0  Buffered Downlink Packets:        0
  Buffered Uplink Bytes:             0  Buffered Downlink Bytes:          0
  Uplink Packets in Buffer:          0  Uplink Bytes in Buffer:           0
  Downlink Packets in Buffer:        0  Downlink Bytes in Buffer:         0
  Buff Over-limit Uplink Pkts:       0  Buff Over-limit Uplink Bytes:     0
  Buff Over-limit Downlink Pkts:     0  Buff Over-limit Downlink Bytes:   0
  Processed Uplink Packets:          0  Processed Downlink Packets:       0
  Dropped Uplink Packets:            0  Dropped Downlink Packets:         0
  Uplink Out of Order Packets:       0  Downlink Out of Order Packets:    0
  Dyn FUI Redirected Flows:          0  Dyn FUI Discarded Pkts:           0
  ITC Terminated Flows:              0  ITC Redirected Flows:             0
  ITC Dropped Packets:               0  ITC ToS Remarked Packets:         0
  ITC Dropped Upl Pkts:              0  ITC Dropped Dnl Pkts:             0
  ITC Dropped Upl Bytes:             0  ITC Dropped Dnl Bytes:            0
  Flow action Terminated Flows:                                        0
  PP Flow action Terminated Flows:                                     0
  CC Dropped Uplink Packets:         0  CC Dropped Uplink Bytes:          0
  CC Dropped Downlink Packets:       0  CC Dropped Downlink Bytes:        0
  NRUPC Req Made:                    1  NRUPC Req Success:                1
  NRUPC Req Failed:                  0  NRUPC Req Time Out:               0
  Dynamic Rule Limiting: Enabled
  Bearer Bandwidth Limiting: Enabled
  Uplink MBR (bps):                  0  Downlink MBR (bps):              0
  Uplink GBR (bps):                  0  Downlink GBR (bps):              0
  Uplink Burst (bytes):              0  Downlink Burst (bytes):          0
  Dropped Uplink Pkts:               0  Dropped Downlink Pkts:            0
  Dropped Uplink Bytes:              0  Dropped Downlink Bytes:           0
  Current Readdressed Sessions:                                        0
  Total Readdressed Uplink Pkts:                                       0
  Total Readdressed Uplink Bytes:                                      0
  Total Readdressed Downlink Pkts:                                     0
  Total Readdressed Downlink Bytes:                                    0
  Total Readdressing Failure Packets:                                  0
    Non Syn Flow:                    0  Duplicate Key:                   0
    Dropped Pkts:                    0

  Creation Time:                      Monday September 16 21:44:33 GMT 2013
  Last Pkt Time:                      Monday September 16 21:48:33 GMT 2013
  Duration:                                                   00h:05m:47s
```

```
  Active Charging Service name:                                    LTE
  Rule Base name:                                                  OCS
  URL-Redir First-Request-Only:                                    n/a
  Bandwidth Policy:                                                n/a
  FW-and-NAT Policy:                                           NATPOLICY
  NAT Policy NAT44:                                             Required
  NAT Policy NAT64:                                         Not-required
  TPO Policy:                                                      n/a
  CF Policy ID:                                                    n/a
  Old CF Policy ID:                                                n/a
  Dynamic Charging:                                             Enabled
  Dynamic Chrg Msg Received:         1  Rule Definitions Received:        1
  Installs Received:                 3  Removes Received:                 0
  Installs Succeeded:                3  Installs Failed:                  0
  Removes Succeeded:                 0  Removes Failed:                   0
  Uplink Dynamic Rule Packets:      22  Uplink Dynamic Rule Bytes:     2763
  Downlink Dynamic Rule Packets:    17  Downlink Dynamic Rule Bytes:   5879
  Dynamic Charging Packet Drop statistics:
  PCC Rule BW Limit Upl Pkts:        0  PCC Rule BW Limit Dnl Pkts:       0
  PCC Rule BW Limit Upl Bytes:       0  PCC Rule BW Limit Dnl Bytes:      0
  PCC Rule Gating Upl Pkts:          0  PCC Rule Gating Dnl Pkts:         0
  PCC Rule Gating Upl Bytes:         0  PCC Rule Gating Dnl Bytes:        0
  RuleMatch Fail Upl Pkts:           0  RuleMatch Fail Dnl Pkts:          0
  RuleMatch Fail Upl Bytes:          0  RuleMatch Fail Dnl Bytes:         0
  Credit-Control:                                                     On
  CC Peer:                                                   PHLARTRMAS03
  CC Group:                                                       DCCA-GY
  CC Mode:                                                      DIAMETER
  CC Failure Handling:                                 Retry & Terminate
  CC Session Failover:                                          Enabled
  CCR-I Server Unreachable Handling:                           Continue
  CCR-U Server Unreachable Handling:                           Continue
  Total CCR-U                                                         0
  Current Server Unreachable State:                                 n/a
      Interim Volume in Bytes (used / allotted):                 na/   na
      Interim Time in Seconds (used / allotted):                 na/   na
      Server Retries (attempted / configured):                   na/   na
  QoS Renegotiate Up:                0  QoS Renegotiate Dn:               0
  TCP Proxy Flows Requests:          0  TCP Proxy Flows Request Success:  0
  Disable TCP Proxy Flows Requests:  0  Disable TCP Proxy Flows Success:  0
  Current TCP Proxy Flows:           0  Total TCP Proxy Flows:            0
  TCP-proxy reset for non-SYN flows:                                     0
  Current IP Flows:                  0  Current ICMP Flows:               0
  Current IPv6 Flows:                1  Current ICMPv6 Flows:             0
  Current TCP Flows:                 1  Current UDP Flows:               0
  Current HTTP Flows:                0  Current HTTPS Flows:              0
  Current FTP Flows:                 0  Current POP3 Flows:              0
  Current SMTP Flows:                0  Current SIP Flows:                0
  Current RTSP Flows:                0  Current RTP Flows:                0
  Current RTCP Flows:                0  Current IMAP Flows:               0
  Current WSP-CO Flows:              0  Current WSP-CL Flows:             0
  Current MMS Flows:                 0  Current DNS Flows:               0
  Current PPTP-GRE Flows:            0  Current PPTP Flows:               0
  Current P2P Flows:                 0  Current H323 Flows:              0
  Current TFTP Flows:                0
  Current UNKNOWN Flows:             1
  Max (L3) Flows:                    6
  Max Flows Timestamp:                Monday September 16 21:44:40 GMT 2013
...
  Charging Updates:                                                  n/a

    Rating-Group:                 3300
      Service-Identifier:            0
      State:                  Charging
```

```
      Checkpoint State:        Current
      Pending Update:               No
      Last Answer:             0h05m47s
      Validity-Time:              42853
      Volume Threshold:       255852544

                                 Quota         Usage   Total Usage
      ------------------ ------------- ------------- -------------
      CC-Time:                       -           347           347
      CC-Total-Octets:       524288000          8992          8992
      CC-Input-Octets:               -          2887          2887
      CC-Output-Octets:              -          6105          6105
      CC-Service-Specific-Units:     -            36            36
      Quota-Consumption-Time:        -             -
      Quota-Hold-Time:               -             -
      Quota-Validity-Time:       43200           347

Ruledef Name          Pkts-Down Bytes-Down    Pkts-Up   Bytes-Up       Hits
-------------------- ---------- ---------- ---------- ---------- ----------
HandleDNS3300                 2        226          2        124          4

Firewall-Ruledef Name Pkts-Down Bytes-Down    Pkts-Up   Bytes-Up       Hits
-------------------- ---------- ---------- ---------- ---------- ----------
int_apn_src                   2        226          2        124          4

Dynamic Charging Rule Definition Statistics:
Dynamic-Rule-Name     Pkts-Down Bytes-Down    Pkts-Up   Bytes-Up       Hits
-------------------- ---------- ---------- ---------- ---------- ----------
RTRRule3300                  17       5879         22       2763         36
Total Dynamic Rules:             1
Total Predefined Rules:          2
Total Firewall Predefined Rules: 0
Charging-Updates Statistics:         n/a

Dynamic Charging Rule Definition(s) Configured:
Name                  Prior Content-Id Chrg-Type Rule Parameters
-------------------- ----- ---------- --------- --------------------------
         RTRRule3300   950       3300      Both Gate Status:      Allow All
                                                QoS Class Identifier:     9
                                                ARP Priority Level:      10
                                                Reporting Level: Rating Grp
                                                Metering Method: Durn + Vol
                                                Uplink MBR:        75000000
                                                Downlink MBR:      75000000
                                                Filter 1:
                                                Direction:           Uplink
                                                Dst Addr  0.0.0.0/0
                                                Filter 2:
                                                Direction:         Downlink
                                                Src Addr  0.0.0.0/0
                                                Filter 3:
                                                Direction:           Uplink
                                                Dst Addr  ::/0
                                                Filter 4:
                                                Direction:         Downlink
                                                Src Addr  ::/0

Predefined Rules Enabled List:
       HandleTCP3300
       HandleDNS3300
Predefined Firewall Rules Enabled List: n/a

  Session-ID:             115:12023409  Username:
0300420060496012@nai.epc.mnc420.mcc300.3gppnetwork.org
```

```
  Callid:                      22075719  IMSI/MSID:          300420060496012
  MSISDN:                                                      19126757869
  ACSMgr Instance:               115     ACSMgr Card/Cpu:               7/1
  SessMgr Instance:                                                     115
  Client-IP:                                                   2001:db8::
  NAS-IP:                                                        0.0.0.0
  Access-NAS-IP(FA):
  NAS-PORT:                        0     NSAPI:                           7
  Acct-Session-ID:                                               393A43B1
  NAS-ID:                                                             n/a
  Access-NAS-ID(FA):                                                  n/a
  3GPP2-BSID:                                                         n/a
  Access-Correlation-ID(FA):                                          n/a
  3GPP2-Correlation-ID:                                               n/a
  MEID:                                                               n/a
  Carrier-ID:                    n/a     ESN:                         n/a
  Uplink Bytes:                94041     Downlink Bytes:            83406
  Uplink Packets:               1033     Downlink Packets:            922
...
  Dynamic Rule Limiting: Enabled
  Bearer Bandwidth Limiting: Enabled
  Uplink MBR (bps):            38000     Downlink MBR (bps):        38000
  Uplink GBR (bps):            38000     Downlink GBR (bps):        38000
  Uplink Burst (bytes):         9500     Downlink Burst (bytes):     9500
  Dropped Uplink Pkts:             0     Dropped Downlink Pkts:         0
  Dropped Uplink Bytes:            0     Dropped Downlink Bytes:        0
  Current Readdressed Sessions:                                         0
  Total Readdressed Uplink Pkts:                                        0
  Total Readdressed Uplink Bytes:                                       0
  Total Readdressed Downlink Pkts:                                      0
  Total Readdressed Downlink Bytes:                                     0
  Total Readdressing Failure Packets:                                   0
    Non Syn Flow:                  0     Duplicate Key:                 0
    Dropped Pkts:                  0

  Creation Time:                    Monday September 16 21:44:28 GMT 2013
  Last Pkt Time:                    Monday September 16 21:50:20 GMT 2013
  Duration:                                                   00h:05m:52s
  Active Charging Service name:                                       LTE
  Rule Base name:                                                     PGW
  URL-Redir First-Request-Only:                                       n/a
  Bandwidth Policy:                                                   n/a
  FW-and-NAT Policy:                                                  n/a
  NAT Policy NAT44:                                          Not-required
  NAT Policy NAT64:                                          Not-required
  TPO Policy:                                                         n/a
  CF Policy ID:                                                       n/a
  Old CF Policy ID:                                                   n/a
  Dynamic Charging:                                                Enabled
  Dynamic Chrg Msg Received:       0     Rule Definitions Received:     0
  Installs Received:               0     Removes Received:              0
  Installs Succeeded:              0     Installs Failed:               0
  Removes Succeeded:               0     Removes Failed:                0
  Uplink Dynamic Rule Packets:  1033     Uplink Dynamic Rule Bytes:  94041
  Downlink Dynamic Rule Packets: 922     Downlink Dynamic Rule Bytes: 83406
  Dynamic Charging Packet Drop statistics:
  PCC Rule BW Limit Upl Pkts:      0     PCC Rule BW Limit Dnl Pkts:    0
  PCC Rule BW Limit Upl Bytes:     0     PCC Rule BW Limit Dnl Bytes:   0
  PCC Rule Gating Upl Pkts:        0     PCC Rule Gating Dnl Pkts:      0
  PCC Rule Gating Upl Bytes:       0     PCC Rule Gating Dnl Bytes:     0
  RuleMatch Fail Upl Pkts:         0     RuleMatch Fail Dnl Pkts:       0
  RuleMatch Fail Upl Bytes:        0     RuleMatch Fail Dnl Bytes:      0
  Credit-Control:                                                   Off
  Event-Triggers:
```

```
  QoS Renegotiate Up:                0  QoS Renegotiate Dn:                0
  TCP Proxy Flows Requests:          0  TCP Proxy Flows Request Success:   0
  Disable TCP Proxy Flows Requests:  0  Disable TCP Proxy Flows Success:   0
  Current TCP Proxy Flows:           0  Total TCP Proxy Flows:             0
  TCP-proxy reset for non-SYN flows:                                       0
  Current IP Flows:                  0  Current ICMP Flows:                0
  Current IPv6 Flows:                1  Current ICMPv6 Flows:              0
  Current TCP Flows:                 0  Current UDP Flows:                 1
  Current HTTP Flows:                0  Current HTTPS Flows:               0
  Current FTP Flows:                 0  Current POP3 Flows:               0
  Current SMTP Flows:                0  Current SIP Flows:                 0
  Current RTSP Flows:                0  Current RTP Flows:                 0
  Current RTCP Flows:                0  Current IMAP Flows:               0
  Current WSP-CO Flows:              0  Current WSP-CL Flows:              0
  Current MMS Flows:                 0  Current DNS Flows:                 0
  Current PPTP-GRE Flows:            0  Current PPTP Flows:                0
  Current P2P Flows:                 0  Current H323 Flows:               0
  Current TFTP Flows:                0
  Current UNKNOWN Flows:             1
  Max (L3) Flows:                    0
  Max Flows Timestamp:                                                  n/a

...

  Charging Updates:                                                     n/a
No Charging ruledef(s) match the specified criteria
No Firewall ruledef(s) match the specified criteria

Dynamic Charging Rule Definition Statistics:
Dynamic-Rule-Name     Pkts-Down Bytes-Down    Pkts-Up   Bytes-Up       Hits
--------------------- ---------- ---------- ---------- ---------- ----------
0_0                          922      83406       1033      94041       1955
Total Dynamic Rules:             2
Total Predefined Rules:          0
Total Firewall Predefined Rules: 0
Charging-Updates Statistics:         n/a

Dynamic Charging Rule Definition(s) Configured:
Name                  Prior Content-Id Chrg-Type Rule Parameters
--------------------- ----- ---------- --------- ----------------------------
                  0_0   400        102   Offline Gate Status:      Allow All
                                                 QoS Class Identifier:     1
                                                 ARP Priority Level:      11
                                                 Reporting Level: Rating Grp
                                                 Metering Method:   Duration
                                                 Uplink MBR:           38000
                                                 Downlink MBR:         38000
                                                 Uplink GBR:           38000
                                                 Downlink GBR:         38000
                                                 Filter 1:
                                                 Direction:           Uplink
                                                 Protocol:               UDP
                                                 Src Addr  2001:db8::12/128
                                                 Dst Addr  2001:db8::13/128
                                                 Dst Port  59536
                                                 Filter 2:
                                                 Direction:         Downlink
                                                 Protocol:               UDP
                                                 Src Addr  2001:db8::13/128
                                                 Dst Addr  2001:db8::12/128
                                                 Dst Port  53626
                  0_1   401        102   Offline Gate Status:      Allow All
                                                 QoS Class Identifier:     1
                                                 ARP Priority Level:      11
```

```
                                        Reporting Level: Rating Grp
                                        Metering Method:   Duration
                                        Uplink MBR:                0
                                        Downlink MBR:              0
                                        Uplink GBR:                0
                                        Downlink GBR:              0
                                        Filter 1:
                                        Direction:           Uplink
                                        Protocol:               UDP
                                        Src Addr  2001:db8::12/128
                                        Dst Addr  2001:db8::13/128
                                        Dst Port  59537
                                        Filter 2:
                                        Direction:         Downlink
                                        Protocol:               UDP
                                        Src Addr  2001:db8::13/128
                                        Dst Addr  2001:db8::12/128
                                        Dst Port  53627
Predefined Rules Enabled List: n/a
Predefined Firewall Rules Enabled List: n/a

Total acs sessions matching specified criteria: 3
```

show active-charging firewall statistics

这是“show active-charging sessions full”的小姐妹，可提供有关丢包原因的详细信息。

```
[XGWout]PGW> show active-charging firewall statistics callid 0000513a
Thursday June 18 17:01:20 UTC 2015
Firewall Statistics for Callid 0000513a in Context: XGWout.
Data Stats:
Total Packets Received:                                                 8745
Total Bytes Received:                                                5296353
Total Packets Sent:                                                     8704
Total Bytes Sent:                                                    5291193
Total Packets (NAT64 Translation):                                         0
Total Bytes Reduced (NAT64 Translation):                                   0
Total Packets Injected:                                                    0
Total Bytes Injected:                                                      0
Uplink Packets Dropped:                                                   37
Uplink Bytes Dropped:                                                   5000
Downlink Packets Dropped:                                                  4
Downlink Bytes Dropped:                                                  160
Total Malformed Packets:                                                   0
Total DOS Attacks:                                                         0
Total Flows Processed by Firewall:                                         0
Total NAT Flows Processed by Firewall:                                   171
Total NAT44 Flows Processed by Firewall:                                 171
Total NAT64 Flows Processed by Firewall:                                   0
Total Bypass-NAT Flows Processed by Firewall:                              0
Total Bypass-NAT44 Flows Processed by Firewall:                            0
Total Bypass-NAT64 Flows Processed by Firewall:                            0
Current Flows Processed by Firewall:                                       0
Current NAT Flows Processed by Firewall:                                   1
Current NAT44 Flows Processed by Firewall:                                 1
Current NAT64 Flows Processed by Firewall:                                 0
Current Bypass-NAT Flows Processed by Firewall:                            0
Current Bypass-NAT44 Flows Processed by Firewall:                          0
Current Bypass-NAT64 Flows Processed by Firewall:                          0
```

show subscribers data-rate [high/low]

捕获用户或用户组的数据速率/吞吐量

- 当应用于与普通组或其他组相比，怀疑存在两个方向或两个方向的数据问题的一组用户时，这最有用，即特定IP池中存在问题的用户

以下输出适用于与之前的命令同时使用的相同VoLTE用户。

```
[local]PGW> show sub data-rate high callid 22075719
 Monday September 16 21:51:07 UTC 2013

Total Subscribers       : 1
Active                  : 1             Dormant                 : 0
peak rate from user(bps): 27699         peak rate to user(bps)  : 24879
ave rate from user(bps) : 16663         ave rate to user(bps)   : 16433
sust rate from user(bps): 16692         sust rate to user(bps)  : 16459
peak rate from user(pps): 37            peak rate to user(pps)  : 34
ave rate from user(pps) : 22            ave rate to user(pps)   : 22
sust rate from user(pps): 22            sust rate to user(pps)  : 22
```

show subscribers debug-info

此命令包含的大部分信息可能有助于TAC或工程部门为客户提供支持，但此处有一些信息让好奇的客户可能感兴趣。

此处使用相同的VoLTE示例：

```
[local]PGW> show sub debug-info msid 300420060496012
Monday September 16 21:50:51 UTC 2013

username: 0300420060496012@nai.epc.mnc420.mcc300.3gppnetwork.org
callid: 22075719 msid: 300420060496012 Card/Cpu: 7/1 Sessmgr Instance: 115 Primary callline:
Redundancy Status: Original Session Checkpoints Attempts Success Last-Attempt Last-Success Full:
8 6 63300ms 63300ms Micro: 661 661 0ms 0ms GR Checkpoints Sent 2 Full Checkpoints, last 63
seconds before 56 Micro Checkpoints, last 3 seconds before Invalidate-CRRs: 0 Call Statistics: 1
Current number of NAT flows checkpointed: 0 Current state: SMGR_STATE_CONNECTED FSM Event trace:
State Event Num Occurances Time SMGR_STATE_OPEN SMGR_EVT_NEWCALL (1) 2013-09-16:21:44:28
SMGR_STATE_NEWCALL_ARRIVED SMGR_EVT_IPV6ADDR_ALLOC_SUCCESS (1) 2013-09-16:21:44:29
SMGR_STATE_NEWCALL_ARRIVED SMGR_EVT_ANSWER_CALL (1) 2013-09-16:21:44:29
SMGR_STATE_NEWCALL_ANSWERED SMGR_EVT_LINE_CONNECTED (1) 2013-09-16:21:44:29
SMGR_STATE_LINE_CONNECTED SMGR_EVT_LOWER_LAYER_UP (1) 2013-09-16:21:44:29 CLP State Trace: State
EBI's Associated Time CLI_MAPPED_SGX_EVT_POLICY_STATUS_IND - - - - - - - - - - - 2013-09-
16:21:49:53 CLI_MAPPED_SGX_EVT_POLICY_CHANGE_REQ - - - - - - - - - - - 2013-09-16:21:49:53
CLI_MAPPED_SEF_EVT_POLICY_CHANGE_REQ - - - - - - - - - - - 2013-09-16:21:49:53
CLI_MAPPED_SEF_EVT_POLICY_CHANGE_RSP - - - - - - - - - - - 2013-09-16:21:49:53
CLI_MAPPED_SGX_EVT_POLICY_CHANGE_REQ - - - - - - - - - - - 2013-09-16:21:49:53
CLI_MAPPED_SGX_EVT_POLICY_STATUS_IND - - - - - - - - - - - 2013-09-16:21:49:53
CLI_MAPPED_SEF_EVT_SESS_SETUP_RSP - - - - - - - - - - - 2013-09-16:21:44:29
CLI_MAPPED_SGX_EVT_POLICY_STATUS_IND - - - - - - - - - - - 2013-09-16:21:44:29
```

```
SMGR_CLP_EVT_PGW_UPDATE_BEARER_REQ - - - - - - - - - - - 2013-09-16:21:44:29
CLI_MAPPED_SEF_EVT_BEARER_BINDING_RSP - - - - - - - - - - - 2013-09-16:21:44:29
SMGR_CLP_EVT_PGW_CREATE_SESSION_RSP 5 - - - - - - - - - - 2013-09-16:21:44:29
CLI_MAPPED_SGX_EVT_POLICY_CHANGE_REQ - - - - - - - - - - - 2013-09-16:21:49:52
CLI_MAPPED_SEF_EVT_POLICY_CHANGE_REQ - - - - - - - - - - - 2013-09-16:21:49:52
CLI_MAPPED_SEF_EVT_POLICY_CHANGE_RSP - - - - - - - - - - - 2013-09-16:21:49:52
CLI_MAPPED_SGX_EVT_POLICY_CHANGE_REQ - - - - - - - - - - - 2013-09-16:21:49:52
CLI_MAPPED_SGX_EVT_POLICY_STATUS_IND - - - - - - - - - - - 2013-09-16:21:49:52
SMGR_CLP_EVT_PGW_CREATE_BEARER_REQ - - - - - - - - - - - 2013-09-16:21:49:52
CLI_MAPPED_SEF_EVT_BEARER_BINDING_RSP - - - - - - - - - - - 2013-09-16:21:49:53
SMGR_CLP_EVT_PGW_CREATE_BEARER_RSP - - 7 - - - - - - - - 2013-09-16:21:49:53
CLI_MAPPED_SEF_EVT_POLICY_STATUS_IND - - - - - - - - - - - 2013-09-16:21:49:53 Sub Session State
Trace: EBI ID State TimeStamp 5 SMGR_STATE_NEWCALL_ARRIVED 2013-09-16:21:44:28 5
SMGR_STATE_CONNECTED 2013-09-16:21:44:29 7 SMGR_STATE_CONNECTED 2013-09-16:21:49:53 NAT Policy
NAT44: Not-required NAT Policy NAT64: Not-required Data Reorder statistics Total timer expiry: 0
Total flush (tmr expiry): 0 Total no buffers: 0 Total flush (no buffers): 0 Total flush (queue
full): 0 Total flush (out of range):0 Total flush (svc change): 0 Total out-of-seq pkt drop: 0
Total out-of-seq arrived: 0 IPv4 Reassembly Statistics: Success: 0 In Progress: 0 Failure
(timeout): 0 Failure (no buffers): 0 Failure (other reasons): 0 Re-addressed Session Entries:
Allowed: 2000 Current: 0 Added: 0 Deleted: 0 Revoked for use by different subscriber: 0 TCP
Proxy DNS Info entries 0 IPv4 ACL applied: active input acl: number of rules: 0 active output
acl: number of rules: 0 ACL caching statistics: input packets: 2206 input cache hits: 0 output
packets: 2183 output cache hits: 0 IPv6 ACL applied: active input ipv6 acl: ECS_ACL_V6 number of
rules: 8 active output ipv6 acl: ECS_ACL_V6 number of rules: 8 IPv6 ACL caching statistics:
input cache hits: 1787 output cache hits: 739 Total number of ACL reload: 0 Total number of ACS
session deleted on ACL reload: 0 NEMO Mode: N/A ; Peer bond: NO ; Peer Callid: 00000000 sessmgr
NPU Flow Details: Flow Id Flow Type Nat Realm VPN Id 8079786 IPV6_FLOW n/a 5 Private IP NPU flow
timeout (Seconds) : n/a ACS PCP Service: n/a
```

show subscribers aaa-configuration

这是用户的所有AAA和配置（甚至非AAA相关）相关信息的庞大列表，无论AAA是否被使用过。查看分配给用户的机箱时，不必分析AAA身份验证数据包交换、用户配置文件或对默认机箱设置做出假设，这非常有用。

show subscribers activity

此图形显示用户的活动级别

show active-charging flows ip-address

这是按流ID列出的所有流列表，这些流与给定的出口IP地址连接，以及两个方向发送的字节数。必须先使用监控用户查看用户尝试访问的地址，然后确认是否从该地址接收了任何数据包。

- 可以使用show active-charging flows full flow-id检索有关关注流ID的详细信息，通过MS IP字段（此时从监控子输出中已知的用户的IP地址）标识正确的流。

show subscribers policy

这将列出已分配用户的当前策略

show [mipfa | mipha] full

此列出有关用户的详细MIP相关信息

```
[local]PDSN-FA> show mipfa full username 9786045176@cisco.com
Tuesday May 12 16:08:05 UTC 2015
Username: 9786045176@cisco.com          Callid: 1120ff97
MSID:  311289786045176
Num Agent Advt Sent: 1     Num Agent Solicit Rcvd: 0

  Home Address #1: 10.235.121.62       NAI: 9786045176@cisco.com
    FA Address: 203.0.113.1            HA Address: 203.0.113.2
    Lifetime: 02h00m00s                Remaining Lifetime: 01h56m04s
    Reverse Tunneling: On              Encapsulation Type: IP-IP
    GRE Key: n/a                       IPSec Required: No
    IPSec Ctrl Tunnel Estab.: No       IPSec Data Tunnel Estab.: No
    MN-AAA Removal: No                 Proxy MIP: Disabled
    DMU Auth Failures: 0               Send Terminal Verification: Disabled
    Revocation Negotiated: YES         Revocation I Bit Negotiated: YES
    MN-HA-Key-Present: FALSE           MN-HA-SPI: n/a
    FA-HA-Key-Present: TRUE            FA-HA-SPI: 8832
    MN-FA-Key-Present: FALSE           MN-FA-SPI: n/a
    HA-RK-KEY-Present: FALSE           HA-RK-SPI: n/a
    HA-RK-Lifetime:    n/a             HA-RK-Remaining-Lifetime: n/a
    Send Host Config: Disabled
```

show [mipfa |mipha]计数器

此报告用户的各种MIP相关计数器：

```
[local]PFDN> show mipfa counters username 9786045176@cisco.com
Tuesday May 12 16:08:12 UTC 2015
MSID: 311289786045176
Username: 9786045176@cisco.com
Callid: 1120ff97
Num Agent Advt Sent: 1   Num Agent Solicit Rcvd: 0
 Home Address: 10.235.121.62          NAI: 9786045176@cisco.com
 FA Address: 203.0.113.1              HA Address: 203.0.113.2
Registration Request Received:
  Total Received Reg:          1            Accepted Reg:           1
  Rejected Reg:                0
    Denied Reg:                0              Discarded Reg:        0
  Relayed Reg:                 1            Auth Failed Reg:        0
  FA Denied Reg:               0            HA Denied Reg:          0
```

```
  Rcvd with MIP Key Data&colon;     0

  Init RRQ Received:          1           Init RRQ Accepted:      1
  Init RRQ Rejected:          0
    Init RRQ Denied:          0             Init RRQ Discarded:   0
  Init RRQ Relayed:           1           Init RRQ Auth Failed:   0
  Init PMIP RRQ Xmit:         0           Init PMIP RRQ Re-Xmit:  0
  Init RRQ Denied by FA:      0           Init RRQ Denied by HA:  0

  Renew RRQ Received:         0           Renew RRQ Accepted:     0
  Renew RRQ Rejected:         0
    Renew RRQ Denied:         0             Renew RRQ Discarded:  0
  Renew RRQ Relayed:          0           Renew RRQ Auth Failed:  0
  Renew PMIP RRQ Xmit:        0           Renew PMIP RRQ Re-Xmit: 0
  Renew RRQ Denied by FA:     0           Renew RRQ Denied by HA: 0

  Dereg RRQ Received:         0           Dereg RRQ Accepted:     0
  Dereg RRQ Rejected:         0
    Dereg RRQ Denied:         0             Dereg RRQ Discarded:  0
  Dereg RRQ Relayed:          0           Dereg RRQ Auth Failed:  0
  Dereg PMIP RRQ Xmit:        0           Dereg PMIP RRQ Re-Xmit: 0
  Dereg RRQ Denied by FA:     0           Dereg RRQ Denied by HA: 0

Denied by FA:
  Unspecified error:          0           Reg Timeout:            0
  Admin Prohibited:           0           No Resources:           0
  MN Auth Failure:            0           HA Auth Failure:        0
  Lifetime too long:          0           Poorly formed Request:  0
  Poorly formed Reply:        0           MN Too Distant:         0
  Invalid COA:                0           Missing NAI:            0
  Missing Home Agent:         0           Missing Home Addr:      0
  Unknown Challenge:          0           Missing Challenge:      0
  Stale Challenge:            0
  Encap Unavailable:          0           Rev Tunnel Unavailable: 0
  Rev Tunnel Mandatory:       0           HA Network Unreachable: 0
  Delivery Style Unavailable: 0           HA Host Unreachable:    0
  HA Port Unreachable:        0           HA Unreachable:         0
  Unknown CVSE Rcvd:          0           MIP Key Request:        0
  AAA Authenticator:          0           Public Key Invalid:     0

Discarded by FA:
  Invalid Extn:               0           Invalid UDP Checksum:   0

Denied by HA:
  FA Auth Failure:            0           Poorly formed Request:  0
  Mismatched ID:              0           Simul Bindings Exceeded:0
  Unknown HA:                 0           Rev Tunnel Unavailable: 0
  MN Auth Failure:            0           No Resources:           0
  Admin Prohibited:           0           Rev Tunnel Mandatory:   0
  Encap Unavailable:          0           Unspecified Reason:     0
  Unknown CVSE Rcvd:          0

Registration Reply Rcvd:
  Total:                      1           Relayed:                1
  Errors:                     0

  Init RRP Rcvd:              1           Init RRP Relayed:       1
  Renew RRP Rcvd:             0           Renew RRP Relayed:      0
  Dereg RRP Rcvd:             0           Dereg RRP Relayed:      0
  RRP with Dyn HA Rcvd:       0           RRP with Dyn HA Denied: 0

Registration Reply Sent:
  Total:                      1           Accepted Reg:           1
  Accepted DeReg:             0           Denied:                 0
```

```
  Send Error:                0

Tunnel Data Received:
  Total Packets :            3383
    IPIP:                    3383        GRE:                  0
  Total Bytes :              3850296
    IPIP:                    3850296     GRE:                  0
  Errors:
    Protocol Type Error:     0           GRE Key Absent:       0
    GRE Checksum Error :     0           Invalid Pkt Length:   0
    No Session Found   :     0

Tunnel Data Sent:
  Total Packets :            2905
    IPIP:                    2905        GRE:                  0
  Total Bytes :              346228
    IPIP:                    346228      GRE:                  0
```

show ppp [full]

此报告有关用户的详细PPP相关信息。
— 完整版本不是普通版本的超集。

```
[local]PDSN-HSGW> show ppp username 9786045176@cisco.com
Tuesday May 12 16:08:18 UTC 2015
PPP Summary:
         1 PPP Sessions In Progress

Layer Info:
         1 LCP Up             1 IPCP Up            0 IPv6CP Up     0  CCP Up

Compression:
         0 VJ Compressed Sessions (loc to rem)
         0 VJ Compressed Sessions (rem to loc)
         0 ROHC Compressed Sessions (loc to rem)
         0 ROHC Compressed Sessions (rem to loc)
         0 Normal PPP Compressed Sessions
         0 Stateless PPP Compressed Sessions
         1 NONE        0 STAC        0 MPPC        0 DEFLATE (loc to rem)
         1 NONE        0 STAC        0 MPPC        0 DEFLATE (rem to loc)

Errors:
         0 In errors              0 In discards             0 In unknown proto
         0 Out errors             0 Out discards            0 Pkt too long
         0 Bad address            0 Bad control             0 Bad FCS
         0 Bad Length
         0 Echo req rcvd          0 Echo rsp rcvd           0 Echo Req sent
         0 Echo rsp sent          0 Invalid magic-number rcvd
         0 LCP Vend Ext req sent          0 LCP Vend Ext req resent
         0 LCP Vend Ext rsp rcvd          0 LCP Vend Ext protocol rejected
         0 LCP Vend Ext req max-retried
         0 Decomp errors          0 Comp Reset sent
         0 Comp errors            0 Comp expansion          0 Comp Reset rcvd

Data Stats:
            294366 In octs(unframed)              2059 In pkts
               307 In ctrl octs                      8 In ctrl pkts
                 0 In comp octs                      0 In comp pkts
```

```
               0 In uncomp octs
          307522 In framed octs
         3798297 Out octs(unframed)             3400 Out pkts
             139 Out ctrl octs                     6 Out ctrl pkts
               0 Out comp octs                     0 Out comp pkts
               0 Out uncomp octs
         3840820 Out framed octs

[local]PDSN-HSGW> show ppp full username 9786045176@cisco.com
Tuesday May 12 16:08:23 UTC 2015
Username: 9786045176@cisco.com  Callid:1120ff97 Msid: 311289786045176

LCP State: Opened
  mtu (Negotiated/Enforced): 1500/1500   mru: 1500
  auth algorithm (loc to rem):     none  (rem to loc):     none
  PFC  (loc to rem): enabled [ignore]  (rem to loc):  enabled
  ACFC (loc to rem): enabled [ignore]  (rem to loc):  enabled
  async map (loc to rem): 0x00000000     (rem to loc): 0x00000000

IPCP State: Opened
  IP Header comp. (loc to rem): none
                  (rem to loc): none
  Local Address:   203.0.113.1            Remote Address:         0.0.0.0
  Primary DNS:  209.165.200.225           Secondary DNS:  209.165.200.226
  Primary NBNS:         0.0.0.0           Secondary NBNS:         0.0.0.0

IPV6CP State: Not Opened

CCP State: Not Opened

    294701 In octs(unframed)                2063 In pkts
   3798574 Out octs(unframed)               3404 Out pkts
       307 In ctrl octs                        8 In ctrl pkts
       139 Out ctrl octs                       6 Out ctrl pkts
    307883 In framed octs                3841113 Out framed octs
    291333 In data (unfr/data-cmp) octs  3784675 Out data (unfr/data-cmp) octs
    291471 In data (iphdr-cmp) octs      3784843 Out data (iphdr-cmp) octs
         0 In data (iphdr-cmp-fail) octs         0 In data (iphdr-cmp-fail) pkts
         0 In data (iphdr-rohc) octs             0 Out data (iphdr-rohc) octs
         0 In data (iphdr-rohc-fail) octs        0 In data(iphdr-rohc-fail) pkts
         0 In discards                           0 In errors
         0 Out discards                          0 Out errors
         0 Bad address                           0 Bad control
         0 Pkt too long                          0 Bad FCS
         0 Bad pkt length
         0 Echo req rcvd                         0 Echo rsp rcvd
         0 Echo req sent                         0 Echo rsp sent
         0 LCP Vend Ext req sent                 0 LCP Vend Ext req resent
         0 LCP Vend Ext rsp rcvd                 0 LCP Vend Ext protocol rejected
         0 LCP Vend Ext req max-retried
         0 Invalid magic-number rcvd

Total PPP sessions matching specified criteria: 1

show ppp counters

[local]PDSN-HSGW> show ppp counters username 9786045176@cisco.com
Tuesday May 12 16:08:52 UTC 2015
Username: 9786045176@cisco.com  Callid:1120ff97 Msid: 311289786045176
    296894 In octs(unframed)                2083 In pkts
   3800156 Out octs(unframed)               3412 Out pkts
       307 In ctrl octs                        8 In ctrl pkts
       139 Out ctrl octs                       6 Out ctrl pkts
    310124 In framed octs                3842736 Out framed octs
```

```
    293517 In data (unfr/data-cmp) octs    3786225 Out data (unfr/data-cmp) octs
    293655 In data (iphdr-cmp) octs        3786393 Out data (iphdr-cmp) octs
         0 In data (iphdr-cmp-fail) octs         0 In data (iphdr-cmp-fail) pkts
         0 In data (iphdr-rohc) octs             0 Out data (iphdr-rohc) octs
         0 In data (iphdr-rohc-fail) octs        0 In data(iphdr-rohc-fail) pkts
         0 In discards                           0 In errors
         0 Out discards                          0 Out errors
         0 Bad address                           0 Bad control
         0 Pkt too long                          0 Bad FCS
         0 Bad pkt length
         0 Echo req rcvd                         0 Echo rsp rcvd
         0 Echo req sent                         0 Echo rsp sent
         0 LCP Vend Ext req sent                 0 LCP Vend Ext req resent
         0 LCP Vend Ext rsp rcvd                 0 LCP Vend Ext protocol rejected
         0 LCP Vend Ext req max-retried
         0 Invalid magic-number rcvd

Total PPP sessions matching specified criteria: 1
```

show rp full

此报告有关用户的详细A11（RP接口）相关信息
— “show rp counters”是此命令的子集

```
[local]PDSN-HSGW> show rp full username 9786045176@cisco.com
Tuesday May 12 16:07:52 UTC 2015
Username: 9786045176@cisco.com  Callid: 1120ff97 Msid: 311289786045176
A10 Connection #1:(Main)
  PCF Address: 10.207.6.67               PDSN Address: 10.211.28.132
  MN Sess Ref ID: 1                      GRE Key: 1864769
  Service Option: 59
Flow Control State : XON
  Lifetime: 00h30m00s                    Remaining Lifetime: 00h28m59s
 GRE Receive:
  Total Packets Rcvd: 2017               Total Bytes Rcvd: 367426
 GRE Send:
  Total Packets Sent: 4722               Total Bytes Sent: 3988706
  Data Over Signaling Packets: 0         Data Over Signaling Bytes: 0
 IP Header compression:
    Forward: ROHC not negotiated
    Reverse: ROHC not negotiated
GRE Flow Control:
  Total Packets Received with XOFF:       0
  Total Packets Received with XON:        0
  Total XON->XOFF Transitions:            0
  Total Output Packets Dropped on XOFF:   0
  Total Output Bytes Dropped on XOFF:     0

  SPI: 257
  Prev System Id: 0                      Current System Id: 0
  Prev Network Id: 0                     Current Network Id: 0
  Prev Packet Zone Id: 0                 Current Packet Zone Id: 0
  BSID: 001C00030015                     GRE Segmentation : Disabled

Registration Request/Reply:
```

```
  Renew RRQ Accepted: 0                    Discarded: 0
  Intra PDSN Active H/O RRQ Accept: 0   Intra PDSN Dormant H/O RRQ Accept: 0
  Inter PDSN Handoff RRQ Accepted: 1
  Reply Send Error: 0

Registration Update/Ack:
  Initial Update Transmitted: 0          Update Retransmitted: 0
  Denied: 0                              Not Acknowledged: 0
  Reg Ack Received: 0                    Reg Ack Discarded: 0
  Update Send Error: 0

Registration Update Send Reason:
  Lifetime Expiry:  0                    Upper Layer Initiated: 0
  Other Reasons: 0                       Handoff Release: 0
  Session Manager Exited: 0

Registration Update Denied:
  Reason Unspecified: 0                  Admin Prohibited: 0
  PDSN Failed Authentication: 0          Identification Mismatch: 0
  Poorly Formed Update: 0

Session Update/Ack:
  Initial Update Transmitted: 1          Update Retransmitted: 0
  Denied: 0                              Not Acknowledged: 0
  Sess Update Ack Received: 1            Sess Update Ack Discarded: 0
  Update Send Error: 0

Session Update Send Reason:
  Always On:        0                    QoS Info:           1
  TFT violation:    0                    Traffic Violation:  0
  Traffic Policing: 0                    Operator Triggered: 0


Session Update Denied:
  Reason Unspecified: 0                  Insufficient Resources: 0
  Admin Prohibited: 0                    Parameter not updated: 0
  PDSN Failed Authentication: 0
  Identification Mismatch: 0
  Poorly Formed Update: 0
  Profile Id Not Supported: 0            Handoff In Progress :    0


GRE Receive:
  Total Packets Received:   2017         Protocol Type Error:     0
  Total Bytes Received:     367426       GRE Key Absent:          0
                                         GRE Checksum Error:      0
                                         Invalid Packet Length:   0

GRE Send:
  Total Packets Sent:       4722
  Total Bytes Sent:         3988706
  Total Packets Sent in SDB:0
  Total Bytes Sent in SDB:  0

GRE Segmentation:
  Total Packets Received with Segmentation Indication:     0
  Total Packets Sent with Segmentation Indication:         0
  Total Successful Reassembly:                             0
  Total packets processed without proper reassembly:       0

GRE Flow Control:
  Total Packets Received with XOFF:       0
  Total Packets Received with XON:        0
  Total XON->XOFF Transitions:            0
```

```
  Total Output Packets Dropped on XOFF:   0
  Total Output Bytes Dropped on XOFF:     0

Total RP sessions matching specified criteria: 1
```

show l2tp sessions full

此报告有关用户的详细l2tp相关信息
— 请注意，与呼叫的LNS端相比，呼叫LAC端(0s)的Rx和Tx数据包计数显示不正确

```
[local]PDSN-LAC> show l2tp sessions full user 0020000648@cisco.com
Wednesday June 17 23:34:13 UTC 2015

Username: 0020000648@cisco.com    Callid: 161df87f     Msid: 311280020000648
Peer IP Address: 203.0.113.11       Service Name:   LAC-Service1
Context Name:    destination        Service Type:   LAC

Session State: LAC_ESTABLISHED

  Local Tunnel ID:  7             Local Session ID:  2471
  Peer Tunnel ID:   88            Peer Session ID:   2471
  Call Type:        LAC-INCOMING  Call Serial Num:   371062911
  Rx Connect Speed: 57600         Tx Connect Speed:  64000
  PPP Proxy-Auth:   CHAP_MD5      Tunnel Key:        n/a
  Bearer Type:      DIGITAL       Framing Type:      ASYNC
  System ID:        0             Network ID:        0
  Cell Number:      0             Service Option:    0

  Data Rx Sequence Num Enabled:  DISABLED
  Data Tx Sequence Num Enabled:  DISABLED
  Data Rx Sequence Num:          0
  Data Tx Sequence Num:          0

  Rx Data Pkts:          0           Tx Data Pkts:  0
  Rx Data Octs:          0           Tx Data Octs:  0
  Rx Discard Data Pkts:  0

  Handoffs:              0


[local]HA-LNS> show l2tp sessions full username 0020009112@cisco.com
Wednesday June 17 23:33:01 UTC 2015

Username: 0020000648@cisco.com    Callid: 0a30f2ac     Msid: 311280020000648
Peer IP Address: 203.0.113.10       Service Name:   SIP-LNS
Context Name:    LNSINGRESS         Service Type:   LNS

Session State: LNS_ESTABLISHED

  Local Tunnel ID:  88            Local Session ID:  2471
  Peer Tunnel ID:   7             Peer Session ID:   2471
  Call Type:        LNS-INCOMING  Call Serial Num:   371062911
  Rx Connect Speed: 57600         Tx Connect Speed:  64000
  PPP Proxy-Auth:   CHAP_MD5      Tunnel Key:        n/a
  Bearer Type:      DIGITAL       Framing Type:      ASYNC

  Data Rx Sequence Num Enabled:  ENABLED
  Data Tx Sequence Num Enabled:  DISABLED
```

```
  Data Rx Sequence Num:          15
  Data Tx Sequence Num:          6

  Rx Data Pkts:          15          Tx Data Pkts:  6
  Rx Data Octs:          953         Tx Data Octs:  424
  Rx Discard Data Pkts:  0
```

show rsvp counters

此列出用户的详细rsvp计数器

show ims-authorization sessions full

此部分列出有关PCRF会话的详细信息

本示例显示两个APN（APN1和APN2）的PCRF信息

- 请注意，SGSN IP-Address实际上是SGW地址

```
[local]PGW> show ims-authorization sessions full imsi 300420160377232
Wednesday June 17 23:47:00 UTC 2015

CallId: 4d9f33cb            Service Name: IMS-GX
  IMSI:  300420160377232
  Session ID: 0007-diamproxy.PHLA.Gx.ims.com;1302279115;926061183;55810c5d-17f02
  Bearer Type: GTP
  SGSN IP-Addr: 203.0.113.3
  APN: APN1
  Bearer Control Mode: UE/NW
  State: Connected

  Negotiated Supported Features:
    3gpp-r10
  Bound PCRF Server: ohcis04mra01.cisco.com
  Primary PCRF Server: ohcis04mra01.cisco.com
  Secondary PCRF Server: njbbs04mra01.cisco.com
  Primary P-CSCF: NA
  Secondary P-CSCF: NA
  Outstanding CCR-U: 0
  UE IP Address:
    UE IP Session Type: IPv6
    IPv4 Address: NA
    IPv6 Prefix: 5555:1000:8010:a9a4::
  Auth Decision:
    Event Triggers:
      QoS-Change
      PLMN-Change
      RAT-Change
      IP_CAN-Change
      Usage-Report
      Successful-Resource-Alloc
      UE-Timezone-Change
```

```
      Resource-Modification-Request
      UE-IP-Address-Allocate
      UE-IP-Address-Release
      Default-EPS-Bearer-QOS-Change
      APN-AMBR-Modification-Failure
      Default-EPS-Bearer-QOS-Modification-Failure
    Event Report Indication: None

  Negotiated QoS:

    Default-Bearer-QoS:
      QCI: 5
      ARP:
        PL: 10        PCI: 1
        PVI: 1
      APN AMBR Uplink(in bps): 600000        APN AMBR Downlink(in bps): 600000

CallId: 4d9f5163            Service Name: IMS-GX
  IMSI:  300420160377232
  Session ID: 0007-diamproxy.PHLA.Gx.ims.com;1302286691;929479551;55814953-17f02
  Bearer Type: GTP
  SGSN IP-Addr: 203.0.113.3
  APN: APN2
  Bearer Control Mode: UE/NW
  State: Connected

  Negotiated Supported Features:
    3gpp-r10
  Bound PCRF Server: ohcis04mra01.cisco.com
  Primary PCRF Server: ohcis04mra01.cisco.com
  Secondary PCRF Server: njbbs04mra01.cisco.com
  Primary P-CSCF: NA
  Secondary P-CSCF: NA
  Outstanding CCR-U: 0
  UE IP Address:
    UE IP Session Type: IPv4_IPv6
    IPv4 Address: 100.107.226.26
    IPv6 Prefix: 5555:1000:b029:a82d::
  Auth Decision:
    Event Triggers:
      QoS-Change
      PLMN-Change
      RAT-Change
      IP_CAN-Change
      Out-Of-Credit
      Reallocation-Of-Credit
      Usage-Report
      Resource-Modification-Request
      UE-IP-Address-Allocate
      UE-IP-Address-Release
      Default-EPS-Bearer-QOS-Change
      APN-AMBR-Modification-Failure
      Default-EPS-Bearer-QOS-Modification-Failure
    Event Report Indication: None

  Negotiated QoS:

    Default-Bearer-QoS:
      QCI: 8
      ARP:
        PL: 10        PCI: 1
        PVI: 1
      APN AMBR Uplink(in bps): 150000000    APN AMBR Downlink(in bps): 150000000
```

非用户特定命令

虽然命令show port npu counters和show port datalink counters适用于整个接口，但如果试图查看系统是否正在从出口接口处理特定用户的数据（请参阅监控用户限制的上述内容），并且可以控制用户，则尝试通过网络发送非常大的数据包，并查看接口计数器是否在短窗口中发送的数据包数量增加
发送。要能对结果充满信心地执行此操作，需要确保在运行测试之前，所选数据包大小的计数器通常不会频繁递增。