

# Contents

[Introduction](#)

[Explanation](#)

[Related Cisco Support Community Discussions](#)

## Introduction

This article explains the difference in session counts between show sub and show session progress commands on an HSGW.

Call ID is the entity used on ASR5K platform to represent a call session. On Packet Data Network Gateway (PGW), there is a unique Call ID for each Application Point Name (APN) connection for a particular subscriber International Mobile Session Identifier (IMSI). Conversely, on an eHRPD Serving Gateway (HSGW), all the APNs share the same Call ID for an IMSI. Since show sub commands report on a sub-session basis, the counts from this command properly reflect the total number of APN connections. Conversely, show session progress reports on a Call ID basis, and so counts will be lower than compared with PGW and will not reflect the total number of APNs.

## Explanation

On a PGW, APN connections are counted separately from one another for the same IMSI for show subscriber commands and "show session progress". Here is an example of a single subscriber connected over three different APNs, and therefore assigned three separate Call IDs. Note the values for the Call IDs can be close in proximity for a given IMSI.

```
[local]PGW> show sub pgw-only imsi 311480131055555
Tuesday June 09 13:41:24 UTC 2015
+-----Access      (W) - pgw-gtp-ipv4           (Y) - pgw-gtp-ipv6
|      Type:        (Z) - pgw-gtp-ipv4-ipv6      (X) - pgw-pmip-ipv4
|                  (U) - pgw-pmip-ipv6      (V) - pgw-pmip-ipv4-ipv6
|                  (.) - Unknown
|
|+-----Access      (U) - UTRAN                 (G) - GERAN
||      Tech:       (W) - WLAN                 (N) - GAN
||                  (U) - HSPA Evolution      (E) - eUTRAN
||                  (H) - eHRPD              (.) - Unknown
||
||+-----Call       (C) - Connected          (c) - Connecting
|||      State:     (d) - Disconnecting      (u) - Unknown
|||
|||+-----PLMN:     (H) - Home                 (V) - Visiting
|||      (R) - Roaming          (u) - Unknown
|||
|||+-----Bearer:   (D) - Default            (E) - Dedicated
|||      Type
|||
|||+-----Emergency: (A) - Authentic IMSI          (U) - Un-Authentic IMSI
|||      Bearer          (O) - Only IMEI            (N) - Non-Emergency
```

```

||||||| Type
|||||||
||||||| Addr      (L) - Local pool
||||||| Type:    (S) - Static (Subscriber Supplied)
|||||||           (u) - Unknown
||||||| |
||||||| |
||||||| +-----+
|||||||      EBI-----+ |
|||||||           | |
vvvvvvv CALLID   IMSI/IMEI      v  v IP
APN          TIME-IDLE
-----
YECHDN 4d9c05f3 311480131055555  005 L
2600:5555:8007:71a5:0:4d:9c05:f301 APN1 00h16m27s
ZECHDN 4d9c0c9e 311480131055555  006 L
2600:5555:b02f:6bec:0:4d:9c0c:9e01, 100.123.165.246 APN2 00h00m43s
ZECHDN 4da040b5 311480131055555  007 L
2600:5555:9006:9f:0:4d:a040:b501, 10.150.22.115 APN3 00h00m45s

```

In the following output, Long Term Evolution (LTE) (gtp) and Evolved High Rate Packet Data (eHRPD) (pmip) counts are seen on a PGW. The values can be corroborated between show sub sum and show session progress:

```
[local]PGW> show subscriber summary
```

```

Total Subscribers:                3822449

Active:                            3822449
Dormant:                            0

pdsn-simple-ipv4:                  0          pdsn-simple-
ipv6:                               0

pdsn-mobile-ip:                    0          ha-mobile-
ipv6:                               0

hsgw-ipv6:                          0          hsgw-
ipv4:                               0

hsgw-ipv4-ipv6:                    0          pgw-pmip-
ipv6:                               258454

pgw-pmip-ipv4:                     209       pgw-pmip-ipv4-
ipv6:                               220120

pgw-gtp-ipv6:                      1793806    pgw-gtp-
ipv4:                               6701

pgw-gtp-ipv4-ipv6:                 1543679    sgw-gtp-
ipv6:                               0

```

```
[local]PGW> show session progress
```

3821347 In-progress calls

6909 In-progress calls @ PDN-TYPE-IPv4 CONNECTED state

2051456 In-progress calls @ PDN-TYPE-IPv6 CONNECTED state

1762878 In-progress calls @ PDN-TYPE-IPv4+IPv6 CONNECTED state

So:

1793806 + 258454 = 2052260

1543679 + 220120 = 1763799

As mentioned, on an HSGW, the same Call ID is shared for all APNs belonging to a given IMSI. The reason for this is that at the time the session is created, when the initial RRQ comes in and initiates the authentication to AAA (over STa), the HSGW only knows about the IMSI. The APN info comes later when PPP VSNCP phase starts. Hence all the APNs (i.e PDN) which belong to the same IMSI are treated as one session on the HSGW.

In this output there are two subscribers each connected via two APNs, and while the APN names are NOT tracked by the HSGW, their IP types (IPv4, IPv6, or IPv4+IPv6) are known and show sub commands properly reflect that:

```
[
+-----Access (S) - pdsn-simple-ip (M) - pdsn-mobile-ip (H) - ha-
mobile-ip
| Type: (P) - ggsn-pdp-type-ppp (h) - ha-ipsec (N) - lns-
l2tp
| (I) - ggsn-pdp-type-ipv4 (A) - asngw-simple-ip (G) - IPSP
| (V) - ggsn-pdp-type-ipv6 (B) - asngw-mobile-ip (C) - cscf-
sip
| (z) - ggsn-pdp-type-ipv4v6
| (R) - sgw-gtp-ipv4 (O) - sgw-gtp-ipv6 (Q) - sgw-
gtp-ipv4-ipv6
| (W) - pgw-gtp-ipv4 (Y) - pgw-gtp-ipv6 (Z) - pgw-
gtp-ipv4-ipv6
| (@) - saegw-gtp-ipv4 (#) - saegw-gtp-ipv6 ($) - saegw-
gtp-ipv4-ipv6
| (&) - cgw-gtp-ipv4 (^) - cgw-gtp-ipv6 (*) - cgw-
gtp-ipv4-ipv6
| (p) - sgsn-pdp-type-ppp (s) - sgsn (4) - sgsn-
pdp-type-ip
| (6) - sgsn-pdp-type-ipv6 (2) - sgsn-pdp-type-ipv4-ipv6
| (L) - pdif-simple-ip (K) - pdif-mobile-ip (o) -
femto-ip
| (F) - standalone-fa (J) - asngw-non-anchor
| (e) - ggsn-mbms-ue (i) - asnpc (U) - pdg-
ipsec-ipv4
| (E) - ha-mobile-ipv6 (T) - pdg-ssl (v) - pdg-
ipsec-ipv6
| (f) - hnbgw-hnb (g) - hnbgw-iu (x) - s1-
mme
```

```

|          (a) - phsgw-simple-ip      (b) - phsgw-mobile-ip (y) -
asngw-auth-only
|          (j) - phsgw-non-anchor      (c) - phspc             (k) - PCC
|          (X) - HSGW                  (n) - ePDG             (t) -
henbgw-ue
|          (m) - henbgw-henb          (q) - wsg-simple-ip    (r) -
samog-pmip
|          (D) - bng-simple-ip         (l) - pgw-pmip         (u) -
Unknown
|          (+) - samog-eogre
|
|+----Access (X) - CDMA 1xRTT          (E) - GPRS GERAN      (I) - IP
||   Tech:   (D) - CDMA EV-DO         (U) - WCDMA UTRAN     (W) -
Wireless LAN
||          (A) - CDMA EV-DO REVA     (G) - GPRS Other      (M) - WiMax
||          (C) - CDMA Other          (N) - GAN             (O) - Femto
IPSec
||          (P) - PDIF                 (S) - HSPA            (L) - eHRPD
||          (T) - eUTRAN              (B) - PPPoE           (F) - FEMTO
UTRAN
||          (H) - PHS                  (Q) - WSG             (.) -
Other/Unknown
||
||+---Call   (C) - Connected            (c) - Connecting
|||   State: (d) - Disconnecting        (u) - Unknown
|||          (r) - CSCF-Registering     (R) - CSCF-Registered
|||          (U) - CSCF-Unregistered
|||
|||+--Access (A) - Attached              (N) - Not Attached
||||   CSCF   (.) - Not Applicable
||||   Status:
||||
||||+--Link   (A) - Online/Active         (D) - Dormant/Idle
|||||   Status:
|||||
|||||+Network (I) - IP                    (M) - Mobile-IP      (L) -
L2TP
||||||Type:   (P) - Proxy-Mobile-IP      (i) - IP-in-IP       (G) - GRE
||||||        (V) - IPv6-in-IPv4        (S) - IPSEC          (C) - GTP
||||||        (A) - R4 (IP-GRE)         (T) - IPv6           (u) -
Unknown
||||||        (W) - PMIPv6 (IPv4)        (Y) - PMIPv6 (IPv4+IPv6) (R) -
IPv4+IPv6
||||||        (v) - PMIPv6 (IPv6)        (/) - GTPv1 (For SAMOG) (+) -
GTPv2 (For SAMOG)
||||||
||||||
vvvvvvv CALLID  MSID      USERNAME      IP
-----
XLCNDv 00004e76 311286039685555 6311480126445555@nai.epc.mnc480.mcc311.3gppnetwork.org
2600:5555:8020:334c:0:e:b6b5:aa01
XLCNDY 00004e76 311286039685555 6311480126445555@nai.epc.mnc480.mcc311.3gppnetwork.org
2600:5555:b027:6f8e:0:e:b6cd:1a01, 100.121.59.239

```

```

XLCNDv 0000501c 311289787584444 6311480085164444@nai.epc.mnc480.mcc311.3gppnetwork.org

```

Comparing output from "show sub summary" and "show session progress", the latter output reports much lower numbers for SIMPLE-IPv6 than for the analogous hsgw-ipv6 from show sub summary ...

Note that the count for hsgw-ipv4-ipv6 is essentially the same as SIMPLE-IPv4+IPv6, while hsgw-ipv6 is much larger than SIMPLE-IPv6. As it turns out, if a particular IMSI is connected as an IPv4/IPv6-based APN, then it gets counted under SIMPLE-IPv4+IPv6, while if it is ALSO connected as an IPv6-based APN (i.e. the IMS session), then it does NOT also get counted as SIMPLE-IPv6. It only gets counted as SIMPLE-IPv6 if there is no corresponding IPv4+IPv6 (or IPv4) connection. In other words, show session progress will only report one call per IMSI, regardless of the number of APN connections for that IMSI. This ultimately stems from the fact that there is one Call ID per IMSI on HSGW.

```
[HSGWin]HSGW> show sub summary
```

```
Total Subscribers:          460307

Active:                      39756          Dormant:
  420551

hsgw-ipv6:                   247972          hsgw-ipv4:
  1632

hsgw-ipv4-ipv6:             209968          pgw-pmip-
ipv6:                        0
```

```
[HSGWin]HSGW> show session progress
```

```
255045 In-progress calls
  20713 In-progress active calls
234332 In-progress dormant calls
  811 In-progress calls @ LCP-NEG state
  84 In-progress calls @ LCP-UP state
  276 In-progress calls @ AUTHENTICATING state
  0 In-progress calls @ BCMCS SERVICE AUTHENTICATING state
  270 In-progress calls @ AUTHENTICATED state
  72 In-progress calls @ SIMPLE-IPv4 CONNECTED state
  43944 In-progress calls @ SIMPLE-IPv6 CONNECTED state
  209555 In-progress calls @ SIMPLE-IPv4+IPv6 CONNECTED state
```

The above is made clearer when looking at the output from a combo HSGW-PGW LAB node with one only connected IMSI with three APNs. show sub summary reports ALL six sub-sessions, three for HSGW and three for PGW. The underlying difference is that the HSGW sessions all share the same Call ID, while for the PGW the Call IDs are unique.

Meanwhile for "show session progress", four calls are reported, three for the APNs on PGW, and one for the IPv4+IPv6 APN on the HSGW which effectively represents ALL three HSGW APNs, giving a total of four sessions instead of the actual six reported by show sub commands.

```
[local]ASR# show sub summary
```

```
Total Subscribers: 6
Active: 6 Dormant: 0
hsgw-ipv6: 1      hsgw-ipv4: 1
hsgw-ipv4-ipv6: 1  pgw-pmip-ipv6: 1
pgw-pmip-ipv4: 1   pgw-pmip-ipv4-ipv6: 1
```

```
[local]ASR# show session progress
```

```
4 In-progress calls
 4 In-progress active calls

1 In-progress calls @ SIMPLE-IPv4+IPv6 CONNECTED state << Accounts for
HSGW session

1 In-progress calls @ PDN-TYPE-IPv4 CONNECTED state
1 In-progress calls @ PDN-TYPE-IPv6 CONNECTED state
1 In-progress calls @ PDN-TYPE-IPv4+IPv6 CONNECTED state
```