

# 排除ASR 5000/5500上的基礎設施客戶端DNS故障

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## 簡介

本文說明如何排解與網域名稱服務(DNS)基礎架構相關的問題。其中包括各種命令列介面(CLI)、DNS概念以及可能需要收集的其他資料。根據需要提供示例輸出，以便更好地解釋某些點。

思科聚合服務路由器(ASR)5000/5500上的基礎設施DNS負責在配置它的上下文中解析完全限定域名(FQDN)。這通常是為了在入口上下文中支援呼叫控制的各個方面。 例如：

- 任何採用FQDN格式而不是IP地址的Diameter端點對等體的解析度
- 使用者裝置(UE)需要的Diameter S6b響應中返回的代理呼叫會話控制功能(P-CSCF)FQDN的分解，以便向IP多媒體系統(IIMS)核心註冊
- 高速封包資料服務閘道(HSGW)需要進行DNS命名應用命名授權指標(NAPTR)查詢，以取得要連線到的封包資料網路閘道(PGW)清單（新增或交接），然後進行DNS AAAA查詢，以擷取PGW本機行動錨點(LMA)位址的IP位址以連線呼叫。
- 移動性管理實體(MME)需要進行DNS NAPTR查詢，以獲取要連線的服務網關(SGW)/PGW對清單。這包括建立DNS AAAA/A查詢以檢索這些節點的IP。

# 組態

DNS作為客戶端應用程式在需要它的環境中實施非常簡單。以下是此類實作的範例：

```
context ingress
ip name-servers 2001:5555:202:ffff:a0:e:0:3 2001:5555:203:ffff:c0:e:0:3
dns-client HSGW-DNS
bind address 2001:5555:200:1011:342:281::
resolver retransmission-interval 2
resolver number-of-retries 3
exit
exit
```

要配置的最小值是服務/繫結地址和主 ( 或輔助 ) DNS伺服器地址。

## UDP與TCP

讓DNS變得更為複雜的是傳輸層。雖然DNS查詢通常基於UDP，但基於請求的NAPTR查詢最終可能會基於TCP。原因在於UDP的回應大小有限制，這要求TCP透過多個封包傳輸回應。封包流程包含初始要求，然後是來自DNS伺服器的回應。這會導致透過0負載回應透過TCP重新要求，且已設定Truncated(TC)旗標。這表示根據RFC 5966，使用者端應以TCP/IP的身份重試。接著進行典型的TCP三向交換，然後是第二次請求。什麼時候大小足以要求此功能？例如，在HSGW的情況下，如果請求為切換，則UDP應該足夠多，因為只有一個或多個網關FQDN ( 如果返回多個服務 ) 才能HSGW連線。但對於新呼叫，可返回的所有網路範圍內可能的PGW清單可能足夠長，需要使用TCP方法。

以下是請求TCP的回應 ( 來自Wireshark ) 範例：

```
Frame 85: 143 bytes on wire (1144 bits), 143 bytes captured (1144 bits)
Ethernet II, Src: JuniperN_20:e7:f0 (64:87:88:20:e7:f0), Dst:
StarentN_02:b1:9d (00:05:47:02:b1:9d)
802.1Q Virtual LAN, PRI: 0, CFI: 0, ID: 2010
Internet Protocol Version 6, Src: 2001:5555:202:ffff:a0:e:0:3
(2001:5555:202:ffff:a0:e:0:3), Dst: 2001:5555:200:1011:304:281::
(2001:5555:200:1011:304:281::) User Datagram Protocol, Src Port: domain (53),
Dst Port: 35049 (35049)
Domain Name System (response)
[Request In: 81]
[Time: 0.088530870 seconds]
Transaction ID: 0x3b2b
Flags: 0x8780 Standard query response, No error
  1... .. = Response: Message is a response
  .000 0... .. = Opcode: Standard query (0)
  .... .1.. .. = Authoritative: Server is an authority for domain
  .... ..1. .... = Truncated: Message is truncated
  .... ..1 .. = Recursion desired: Do query recursively
  .... .... 1... .. = Recursion available: Server can do recursive queries
  .... .... .0.. .. = Z: reserved (0)
  .... .... ..0. .... = Answer authenticated: Answer/authority portion
was not authenticated by the server
  .... .... ..0 .... = Non-authenticated data; Unacceptable
  .... .... .... 0000 = Reply code: No error (0)
Questions: 1
```

```

Answer RRs: 0
Authority RRs: 0
Additional RRs: 1
Queries
  APN1.apn.epc.mnc420.mcc300.3gppnetwork.org: type NAPTR, class IN
    Name: APN1.apn.epc.mnc420.mcc300.3gppnetwork.org
    Type: NAPTR (Naming authority pointer)
    Class: IN (0x0001)
Additional records

```

## 疑難排解指令

### show dns-client statistics client <DNS Client Name>

這是用於排除DNS問題的主要命令。以下為運行此命令的一些亮點：

- 它必須在定義客戶端的上下文中運行。
- 多次運行它並記錄相關統計資訊（如超時）中的增加情況。
- 使用情況統計資訊統計實際呼叫成功/失敗的數量，這些成功或失敗是由於能夠/不能解析DNS造成的。
- DNS解析程式統計故障計數超時次數，以及連線被拒絕等其它故障。超時可能是由於TCP連線建立問題。
- 根據這些統計資訊，使用SNMP陷阱（和警報）`ThreshDNSLookupFailure`捕獲DNS故障配置閾值。示例: `threshold dns-lookup-failure 5 clear 5`。
- 如果主裝置失敗，輔助裝置將在約2秒後嘗試運行（不可配置）。
- 方案CONTEXTSch1和CONTEXTSch2中的bulkstat變數包含與此命令相關的所有相關DNS基礎結構變數。NAPTR查詢型別的示例包括這些型別，它們也適用於AAAA和A型別查詢：`dns-primary-ns-naptr-atmptsdns-primary-ns-naptr-failsdns-primary-ns-naptr-sucpsdns-secondary-ns-naptr-atmptsdns-secondary-ns-naptr-failsdns-secondary-ns-query-timeouts`

在此示例輸出中，請注意主伺服器 and 輔助伺服器的使用量和解析程式統計資訊中反映的NAPTR故障增加情況（完全中斷）：

```

[Ingress]HSGW> show dns-client statistics client HSGW-DNS
Monday June 02 00:26:29 UTC 2014
DNS Usage Statistics:
-----
Query Type           Attempts      Successes      Failures
A                    21802         0              21802
SRV                   0             0              0
AAAA                 3934082666   3934060659    21831
NAPTR                1393765619   1387607858    6156730
PTR                   0             0              0
Total                1032902791   1026701221    6200363

DNS Cache Statistics:
-----
Total   Cache Hits   Cache Hits   Not Found   Hit Ratio

```

|                | Lookups    | (Positive Response) | (Negative Response) | in Cache  | (Percentage) |
|----------------|------------|---------------------|---------------------|-----------|--------------|
| Central Cache: | 94085256   | 89157603            | 6114                | 4921539   | 94.77%       |
| Local Cache:   | 1032902770 | 926126458           | 20175               | 106756137 | 89.66%       |

DNS Resolver Statistics:

-----  
Primary Name Server : 2001:5555:202:fffe:a0:e:0:3

| Query Type | Attempts | Successes | Failures |
|------------|----------|-----------|----------|
| A          | 0        | 0         | 0        |
| SRV        | 0        | 0         | 0        |
| AAAA       | 66       | 64        | 2        |
| NAPTR      | 746      | 37        | 709      |
| PTR        | 0        | 0         | 0        |

Total Resolver Queries: 812

Successful Queries: 101

Query Timeouts: 705

Domain Not Found: 1

Connection Refused: 0

Other Failures: 5

Secondary Name Server : 2001:5555:203:fffe:c0:e:0:3

| Query Type   | Attempts   | Successes | Failures   |
|--------------|------------|-----------|------------|
| A            | 0          | 0         | 0          |
| SRV          | 0          | 0         | 0          |
| AAAA         | 0          | 0         | 0          |
| <b>NAPTR</b> | <b>705</b> | <b>0</b>  | <b>703</b> |
| PTR          | 0          | 0         | 0          |

Total Resolver Queries: 705

Successful Queries: 0

Query Timeouts: 703

Domain Not Found: 0

Connection Refused: 0

Other Failures: 0

-----  
[Ingress]HSGW> show dns-client statistics client HSGW-DNS

Monday June 02 00:32:00 UTC 2014

DNS Usage Statistics:

| Query Type   | Attempts          | Successes         | Failures       |
|--------------|-------------------|-------------------|----------------|
| A            | 21802             | 0                 | 21802          |
| SRV          | 0                 | 0                 | 0              |
| AAAA         | 3934232613        | 3934210617        | 21831          |
| <b>NAPTR</b> | <b>1393923407</b> | <b>1387654707</b> | <b>6267989</b> |
| PTR          | 0                 | 0                 | 0              |
| Total        | 1033210526        | 1026898028        | 6320622        |

DNS Cache Statistics:

|                | Total Lookups | Cache Hits (Positive Response) | Cache Hits (Negative Response) | Not Found in Cache | Hit Ratio (Percentage) |
|----------------|---------------|--------------------------------|--------------------------------|--------------------|------------------------|
| Central Cache: | 94120194      | 89157771                       | 6114                           | 4956309            | 94.73%                 |
| Local Cache:   | 1033210498    | 926323077                      | 20175                          | 106867246          | 89.66%                 |

DNS Resolver Statistics:

-----  
Primary Name Server : 2001:5555:202:fffe:a0:e:0:3

| Query Type | Attempts | Successes | Failures |
|------------|----------|-----------|----------|
| A          | 0        | 0         | 0        |

```

SRV                0                0                0
AAAA               66               64               2
NAPTR           913            38             873
PTR                0                0                0
Total Resolver Queries: 979
Successful Queries:   102
Query Timeouts:      869
Domain Not Found:    1
Connection Refused:  0
Other Failures:      5

```

Secondary Name Server : 2001:5555:203:fffe:c0:e:0:3

| Query Type   | Attempts   | Successes | Failures   |
|--------------|------------|-----------|------------|
| A            | 0          | 0         | 0          |
| SRV          | 0          | 0         | 0          |
| AAAA         | 0          | 0         | 0          |
| <b>NAPTR</b> | <b>869</b> | <b>0</b>  | <b>869</b> |
| PTR          | 0          | 0         | 0          |

**Total Resolver Queries: 869**

```

Successful Queries: 0
Query Timeouts: 869
Domain Not Found: 0
Connection Refused: 0
Other Failures: 0

```

## show dns-client cache client <client name> [query-name <query-name> [query-type <NAPTR | AAAA | A>] | [query-type <NAPTR | AAAA | A>]]

此命令報告快取中針對各種查詢型別的所有已儲存響應（尚未過期），包括A、AAAA和NAPTR。這給出了快取記憶體的當前狀態，從中可以得出關於是否會出現基於缺少條目的呼叫失敗的結論：

如果沒有任何限定符，則顯示整個快取記憶體，其數量可能超出您打算進行故障排除所需的數量。快取條目具有生存時間(TTL)，因此，所返回的條目僅在各個TTL也保留的情況下才適用。當您比較所有條目時，TTL可能不同，因此條目會在不同的時間過期。這是意料之中的。

選擇特定查詢型別（如NAPTR），並查詢應用點名稱(APN)結果或特定FQDN（切換）結果。需要查詢的內容包括缺少的特定APN、缺少所有APN或缺少切換結果。

### 範例：

此輸出顯示APN1和APN2的快取中一些條目，這些條目對於這些APN的新呼叫可能需要。實際清單包括每個可能的APN的每個可能的PGW的條目，在整個服務提供商的網路中，LTE(x-S5-gtp)和eHRPD(x-s2a-pmip)都包括在內。此處僅與x-s2a-pmip相關，因為這是需要通過S2a連線連線到PGW的HSGW。請注意同時從DNS伺服器返回的具有相同APN/PGW位置的條目的相同TTL(1307、631)，而應用於不同APN/PGW位置的條目的不同TTL（1307與631）則不同。

```
[Ingress]HSGW> show dns-client cache client HSGW-DNS
```

Monday June 02 00:26:59 UTC 2014

```

Query Name: so01.APN1.apn.epc.mnc485.mcc320.3gppnetwork.org
Query Type: NAPTR          TTL: 1307 seconds
Answer:
Order: 100                 Preference: 50000
Flags: a                   Service: x-3gpp-pgw:x-s5-gtp
Regular Expression:
Replacement: topon.lb1.pgw01.NYNY.sa008.so.node.epc.mnc485.mcc320.3gppnetwork.org

```

Query Name: so01.APN1.apn.epc.mnc485.mcc320.3gppnetwork.org  
Query Type: NAPTR           TTL: 1307 seconds  
Answer:  
Order: 100                   Preference: 50000  
Flags: a                    Service: x-3gpp-pgw:x-s2a-pmip  
Regular Expression:  
Replacement: topon.lb2.pgw01.NYNY.sa008.so.node.epc.mnc485.mcc320.3gppnetwork.org

Query Name: APN2.apn.epc.mnc485.mcc320.3gppnetwork.org  
Query Type: NAPTR           TTL: 631 seconds  
Answer:  
Order: 100                   Preference: 50000  
Flags: a                    Service: x-3gpp-pgw:x-s2a-pmip  
Regular Expression:  
Replacement: topon.lb2.pgw01.BOMA.sa001.mw.node.epc.mnc485.mcc320.3gppnetwork.org

Query Name: APN2.apn.epc.mnc485.mcc320.3gppnetwork.org  
Query Type: NAPTR           TTL: 631 seconds  
Answer:  
Order: 100                   Preference: 50000  
Flags: a                    Service: x-3gpp-pgw:x-s5-gtp  
Regular Expression:  
Replacement: topon.lb1.pgw01.BOMA.sa001.mw.node.epc.mnc485.mcc320.3gppnetwork.org

在此第二個輸出範例中，是從長期演化(LTE)切換到eHRPD所需的NAPTR專案，如特定PGW FQDN位置專案(pgw01.PHLA.xxxxxx)所示。與先前的輸出類似，使用的相關條目是服務= x-s2a-pmip的條目。請為同時返回的所有這些條目注意相同的TTL(515)。唯一的區別是服務。AAAA條目解析表示PGW LMA服務地址的s2a條目，以便後續的代理MIPv6請求可以傳送到PGW以繼續呼叫建立。

Query Name: pgw01.PHLA.sa004.mw.node.epc.mnc485.mcc320.3gppnetwork.org  
Query Type: NAPTR           TTL: 515 seconds  
Answer:  
Order: 100                   Preference: 50000  
Flags: a                    Service: x-3gpp-pgw:x-s2b-gtp  
Regular Expression:  
Replacement: topon.lb4.pgw01.PHLA.sa004.mw.node.epc.mnc485.mcc320.3gppnetwork.org

Query Name: pgw01.PHLA.sa004.mw.node.epc.mnc485.mcc320.3gppnetwork.org  
**Query Type: NAPTR**           TTL: 515 seconds  
Answer:  
Order: 100                   Preference: 50000  
Flags: a                    **Service: x-3gpp-pgw:x-s2a-pmip**  
Regular Expression:  
Replacement: **topon.lb2.pgw01.PHLA.sa004.mw.node.epc.mnc485.mcc320.3gppnetwork.org**

Query Name: pgw01.PHLA.sa004.mw.node.epc.mnc485.mcc320.3gppnetwork.org  
Query Type: NAPTR           TTL: 515 seconds  
Answer:  
Order: 100                   Preference: 50000  
Flags: a                    Service: x-3gpp-pgw:x-s5-gtp  
Regular Expression:  
Replacement: topon.lb1.pgw01.PHLA.sa004.mw.node.epc.mnc485.mcc320.3gppnetwork.org

Query Name: **topon.lb2.pgw01.PHLA.sa004.mw.node.epc.mnc485.mcc320.3gppnetwork.org**  
**Query Type: AAAA**           TTL: 646 seconds  
Answer:  
IPv6 Address: 2001:5555:200:1000:304:200::

## dns-client query client-name <client name> query-type <NAPTR | AAAA> [query-name <query name>]

這是一個手動測試命令，用於啟動DNS客戶端，以便立即檢查快取並在存在快取時報告答案。否則，它會嘗試查詢並報告結果。如果查詢字串非常複雜，請確保其拼寫正確：

- 預設情況下，如果僅指定query-name，則客戶端假定查詢型別= A，因此NAPTR和AAAA請求需要查詢型別。
- 此處的結果與使用**show dns-client cache**查詢快取時返回的結果相同。例外情況是，如果查詢的內容不在快取中，則結果具有全新TTL。但是，如果已經存在於快取中，則TTL在新查詢中返回的值與0之間具有一些值。

示例 ( 與上一輸出中的查詢相同 ) :

```
[Ingress]HSGW> dns-client query client-name HSGW-DNS query-type NAPTR  
query-name pgw01.PHLA.sa004.mw.node.epc.mnc420.mcc300.3gppnetwork.org
```

```
Query Name: pgw01.PHLA.sa004.mw.node.epc.mnc420.mcc300.3gppnetwork.org  
Query Type: NAPTR      TTL: 188 seconds  
Answer:  
Order: 100             Preference: 50000  
Flags: a               Service: x-3gpp-pgw:x-s5-gtp  
Regular Expression:  
Replacement: topon.lb1.pgw01.PHLA.sa004.mw.node.epc.mnc420.mcc300.3gppnetwork.org
```

```
Query Name: pgw01.PHLA.sa004.mw.node.epc.mnc420.mcc300.3gppnetwork.org  
Query Type: NAPTR      TTL: 188 seconds  
Answer:  
Order: 100             Preference: 50000  
Flags: a               Service: x-3gpp-pgw:x-s2b-gtp  
Regular Expression:  
Replacement: topon.lb4.pgw01.PHLA.sa004.mw.node.epc.mnc420.mcc300.3gppnetwork.org
```

```
Query Name: pgw01.PHLA.sa004.mw.node.epc.mnc420.mcc300.3gppnetwork.org  
Query Type: NAPTR      TTL: 188 seconds  
Answer:  
Order: 100             Preference: 50000  
Flags: a               Service: x-3gpp-pgw:x-s2a-pmip  
Regular Expression:  
Replacement: topon.lb2.pgw01.PHLA.sa004.mw.node.epc.mnc420.mcc300.3gppnetwork.org
```

```
[Ingress]HSGW> dns-client query client-name HSGW-DNS query-type AAAA  
query-name topon.lb2.pgw01.PHLA.sa004.mw.node.epc.mnc420.mcc300.3gppnetwork.org
```

```
Query Name: topon.lb2.pgw01.PHLA.sa004.mw.node.epc.mnc420.mcc300.3gppnetwork.org  
Query Type: AAAA      TTL: 117 seconds  
Answer:  
IPv6 Address: 2001:5555:200:1000:304:200::
```

此輸出顯示了基於TCP的查詢失敗的示例。您只能從查詢本身得知這是基於TCP的，但是您知道基於APN的NAPTR查詢響應對於UDP而言過大。

```
[Ingress]HSGW> dns-client query client-name HSGW-DNS query-type NAPTR  
query-name APN1.apn.epc.mnc420.mcc300.3gppnetwork.org  
Query Name: APN1.apn.epc.mnc420.mcc300.3gppnetwork.org  
Query Type: NAPTR      TTL: 0 seconds  
Answer: -Negative Reply-  
Failure Reason: DNS query timed out
```

...

```
[Ingress]HSGW> dns-client query client-name HSGW-DNS query-type NAPTR
query-name APN2.apn.epc.mnc420.mcc300.3gppnetwork.org
Query Name: APN2.apn.epc.mnc420.mcc300.3gppnetwork.org
Query Type: NAPTR      TTL: 60 seconds
Answer: -Negative Reply-
Failure Reason: Connection Refused
```

## 監控通訊協定 ( DNS選項 )

監控協定報告所有DNS基礎設施資料包交換。監控使用者 ( 稍後介紹 ) 不會捕獲DNS資料包，即使發起了DNS交換的是使用者活動。

- 為了將請求與響應相匹配，查詢ID很有用。

但是：

- 在交換器到TCP的情況下，輸出不會指出此情況 ( 輸出所示 )。
- 輸出中的埠號不一定準確，例如埠= 0。
- 系統可能會將多個資料包 ( 如APN查詢 ) 組合成線路上的單個資料包，該資料包不會在此輸出級別上反映出來。這將繼續顯示每個APN的單獨資料包。
- 必須注意使用監控協定，以免系統過載。執行此操作前，請諮詢技術支援。

```
<<<<OUTBOUND 00:58:57:284 Eventid:5957(3)
DNS PDU Tx
  from : 2001:5555:200:1011:304:281:: : 52816
  to   : 2001:5555:202:fffe:a0:e:0:3 : 0
  bytes : 73
Query ID      : 17034
Type         : Query
Question     : NAPTR ? APN2.apn.epc.mnc420.mcc300.3gppnetwork.org.
Additional   :
  Name       : .
  Ext-RCODE  : 0
  Type      : OPT
  UDPsize   : 4096
```

```
INBOUND>>>> 00:58:57:469 Eventid:5956(3)
DNS PDU Rx
  from : 2001:5555:202:fffe:a0:e:0:3 : 0
  to   : 2001:5555:200:1011:304:281:: : 0
  bytes : 16738
Query ID      : 17034
Type         : Response
Authoritative Answer : Yes
Response code  : Success
Question     : NAPTR ? APN2.apn.epc.mnc420.mcc300.3gppnetwork.org.
Answer       :
  Name       : APN2.apn.epc.mnc420.mcc300.3gppnetwork.org.
  TTL       : 1800
  Type     : NAPTR
  Order    : 100
  Preference : 50000
  Flags    : a
Service   : x-3gpp-pgw:x-s2a-pmip
```



```
Regexp          :
Replacement     : topon.lb2.pgw01.PHLA.sa001.we.node.epc.mnc420.
mcc300.3gppnetwork.org.
```

```
Name           : APN2.apn.epc.mnc420.mcc300.3gppnetwork.org.
TTL            : 1800
Type           : NAPTR
Order          : 100
Preference     : 50000
Flags          : a
Service        : x-3gpp-pgw:x-s5-gtp
Regexp         :
Replacement     : topon.lb1.pgw01.PHLA.sa001.we.node.epc.
mnc420.mcc300.3gppnetwork.org
```

此範例顯示三個APN，它們最終封裝到一個封包中，交換到TCP，每個APN超時兩秒，最後重試到同樣發生故障的輔助伺服器。

**主伺服器:** 2001:555:202:ffff:a0:e:0:3  
**輔助服務器 :** 2001:555:203:ffff:c0:e:0:3

```
<<<<OUTBOUND 13:03:08:056 Eventid:5957(3)
DNS PDU Tx
  from : 2001:5555:200:1011:106:281:: : 35428
  to   : 2001:5555:202:ffff:a0:e:0:3 : 53
  bytes : 78

Query ID      : 23363
Type          : Query
Opcode        : Standard Query
Message Truncated : No
Recursion Desired : Yes
Authentication reqd. : No
Question count : 1
Additional count : 1
Question      : NAPTR ? APN1.apn.epc.mnc420.mcc300.3gppnetwork.org.
Additional    :
  Name        : .
  Ext-RCODE   : 0
  EDNS Version : 0
  Class       : 4096
  Data Length : 0
  Type        : OPT
  UDPsize     : 4096
```

```
Monday October 13 2014
<<<<OUTBOUND 13:03:08:057 Eventid:5957(3)
DNS PDU Tx
  from : 2001:5555:200:1011:106:281:: : 60489
  to   : 2001:5555:202:ffff:a0:e:0:3 : 53
  bytes : 73

Query ID      : 48443
Type          : Query
Opcode        : Standard Query
Message Truncated : No
Recursion Desired : Yes
Authentication reqd. : No
Question count : 1
Additional count : 1
Question      : NAPTR ? APN3.apn.epc.mnc420.mcc300.3gppnetwork.org.
Additional    :
  Name        : .
```

Ext-RCODE : 0  
EDNS Version : 0  
Class : 4096  
Data Length : 0  
Type : OPT  
UDPsize : 4096

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<<<<OUTBOUND 13:03:08:057 Eventid:5957(3)

DNS PDU Tx

from : 2001:5555:200:1011:106:281:: : 34309  
to : 2001:5555:202:ffff:a0:e:0:3 : 53  
bytes : 73

Query ID : 51787  
Type : Query  
Opcode : Standard Query  
Message Truncated : No  
Recursion Desired : Yes  
Authentication reqd. : No  
Question count : 1  
Additional count : 1  
Question : NAPTR ? APN2.apn.epc.mnc420.mcc300.3gppnetwork.org.  
Additional :  
Name : .  
Ext-RCODE : 0  
EDNS Version : 0  
Class : 4096  
Data Length : 0  
Type : OPT  
UDPsize : 4096

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INBOUND>>>> 13:03:08:064 Eventid:5956(3)

DNS PDU Rx

from : 2001:5555:202:ffff:a0:e:0:3 : 53  
to : 2001:5555:200:1011:106:281:: : 35428  
bytes : 78

Query ID : 23363  
Type : Response  
Opcode : Standard Query  
Message Truncated : Yes  
Recursion Desired : Yes  
Recursion Available : Yes  
Authenticated Answer : No  
Authoritative Answer : Yes  
Response code : Success  
Question count : 1  
Answer count : 0  
Authoritative count : 0  
Additional count : 1  
Question : NAPTR ? APN1.apn.epc.mnc420.mcc300.3gppnetwork.org.  
Additional :  
Name : .  
Ext-RCODE : 0  
EDNS Version : 0  
Class : 4096  
Data Length : 0  
Type : OPT  
UDPsize : 4096

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INBOUND>>>> 13:03:08:064 Eventid:5956(3)

DNS PDU Rx

from : 2001:5555:202:ffff:a0:e:0:3 : 53

to : 2001:5555:200:1011:106:281:: : 60489  
bytes : 73

Query ID : 48443  
Type : Response  
Opcode : Standard Query  
Message Truncated : Yes  
Recursion Desired : Yes  
Recursion Available : Yes  
Authenticated Answer : No  
Authoritative Answer : Yes  
Response code : Success  
Question count : 1  
Answer count : 0  
Authoritative count : 0  
Additional count : 1  
Question : NAPTR ? APN3.apn.epc.mnc420.mcc300.3gppnetwork.org.  
Additional :  
Name : .  
Ext-RCODE : 0  
EDNS Version : 0  
Class : 4096  
Data Length : 0  
Type : OPT  
UDPsize : 4096

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INBOUND>>>> 13:03:08:069 Eventid:5956(3)

DNS PDU Rx

from : 2001:5555:202:ffff:a0:e:0:3 : 53  
to : 2001:5555:200:1011:106:281:: : 34309  
bytes : 73

Query ID : 51787  
Type : Response  
Opcode : Standard Query  
Message Truncated : Yes  
Recursion Desired : Yes  
Recursion Available : Yes  
Authenticated Answer : No  
Authoritative Answer : Yes  
Response code : Success  
Question count : 1  
Answer count : 0  
Authoritative count : 0  
Additional count : 1  
Question : NAPTR ? APN2.apn.epc.mnc420.mcc300.3gppnetwork.org.  
Additional :  
Name : .  
Ext-RCODE : 0  
EDNS Version : 0  
Class : 4096  
Data Length : 0  
Type : OPT  
UDPsize : 4096

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<<<<OUTBOUND 13:03:08:147 Eventid:5957(3)

DNS PDU Tx

from : 2001:5555:200:1011:106:281:: : 36524  
to : 2001:5555:202:ffff:a0:e:0:3 : 0  
bytes : 78

Query ID : 23363  
Type : Query  
Opcode : Standard Query  
Message Truncated : No

Recursion Desired : Yes  
Authentication reqd. : No  
Question count : 1  
Additional count : 1  
Question : NAPTR ? APN1.apn.epc.mnc420.mcc300.3gppnetwork.org.  
Additional :  
Name : .  
Ext-RCODE : 0  
EDNS Version : 0  
Class : 4096  
Data Length : 0  
Type : OPT  
UDPsize : 4096

Monday October 13 2014

<<<<OUTBOUND 13:03:08:147 Eventid:5957(3)

DNS PDU Tx

from : 2001:5555:200:1011:106:281:: : 36524

to : 2001:5555:202:ffff:a0:e:0:3 : 0

bytes : 73

Query ID : 48443  
Type : Query  
Opcode : Standard Query  
Message Truncated : No  
Recursion Desired : Yes  
Authentication reqd. : No  
Question count : 1  
Additional count : 1  
Question : NAPTR ? APN3.apn.epc.mnc420.mcc300.3gppnetwork.org.  
Additional :  
Name : .  
Ext-RCODE : 0  
EDNS Version : 0  
Class : 4096  
Data Length : 0  
Type : OPT  
UDPsize : 4096

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<<<<OUTBOUND 13:03:08:147 Eventid:5957(3)

DNS PDU Tx

from : 2001:5555:200:1011:106:281:: : 36524

to : 2001:5555:202:ffff:a0:e:0:3 : 0

bytes : 73

Query ID : 51787  
Type : Query  
Opcode : Standard Query  
Message Truncated : No  
Recursion Desired : Yes  
Authentication reqd. : No  
Question count : 1  
Additional count : 1  
Question : NAPTR ? APN2.apn.epc.mnc420.mcc300.3gppnetwork.org.  
Additional :  
Name : .  
Ext-RCODE : 0  
EDNS Version : 0  
Class : 4096  
Data Length : 0  
Type : OPT  
UDPsize : 4096

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<<<<OUTBOUND 13:03:10:157 Eventid:5957(3)

DNS PDU Tx

from : 2001:5555:200:1011:106:281:: : 57041  
to : 2001:5555:203:ffff:c0:e:0:3 : 0  
bytes : 78

Query ID : 23363  
Type : Query  
Opcode : Standard Query  
Message Truncated : No  
Recursion Desired : Yes  
Authentication reqd. : No  
Question count : 1  
Additional count : 1  
Question : NAPTR ? APN1.apn.epc.mnc420.mcc300.3gppnetwork.org.  
Additional :  
Name : .  
Ext-RCODE : 0  
EDNS Version : 0  
Class : 4096  
Data Length : 0  
Type : OPT  
UDPsize : 4096

Monday October 13 2014

<<<<OUTBOUND 13:03:10:157 Eventid:5957(3)

DNS PDU Tx

from : 2001:5555:200:1011:106:281:: : 57041  
to : 2001:5555:203:ffff:c0:e:0:3 : 0  
bytes : 73

Query ID : 48443  
Type : Query  
Opcode : Standard Query  
Message Truncated : No  
Recursion Desired : Yes  
Authentication reqd. : No  
Question count : 1  
Additional count : 1  
Question : NAPTR ? APN3.apn.epc.mnc420.mcc300.3gppnetwork.org.  
Additional :  
Name : .  
Ext-RCODE : 0  
EDNS Version : 0  
Class : 4096  
Data Length : 0  
Type : OPT  
UDPsize : 4096

Monday October 13 2014

<<<<OUTBOUND 13:03:10:157 Eventid:5957(3)

DNS PDU Tx

from : 2001:5555:200:1011:106:281:: : 57041  
to : 2001:5555:203:ffff:c0:e:0:3 : 0  
bytes : 73

Query ID : 51787  
Type : Query  
Opcode : Standard Query  
Message Truncated : No  
Recursion Desired : Yes  
Authentication reqd. : No  
Question count : 1  
Additional count : 1  
Question : NAPTR ? APN2.apn.epc.mnc420.mcc300.3gppnetwork.org.  
Additional :  
Name : .  
Ext-RCODE : 0

```

EDNS Version      : 0
Class             : 4096
Data Length       : 0
Type              : OPT
UDPsize          : 4096

```

此圖顯示三個APN封裝在一個資料包#10中。1 - 3中的原始UDP請求在4、5和7中響應，而TCP握手由資料包6、8和9組成。在這種情況下，伺服器在最初通過資料包11確認基於TCP的查詢後，立即在資料包12中重置連線。以下是可能需要疑難排解的問題的型別：

| No. | Time     | Source     | Destination | Info   |
|-----|----------|------------|-------------|--|
| 1   | 09:03:08 | HSGW       | DNS_Server  | standard query 0x5b43 NAPTR APNinternet.apn  |
| 2   | 09:03:08 | HSGW       | DNS_Server  | standard query 0xbd3b NAPTR APNims.apn.epc.  |
| 3   | 09:03:08 | HSGW       | DNS_Server  | standard query 0xca4b NAPTR APNapp.apn.epc.  |
| 4   | 09:03:08 | DNS_Server | HSGW        | standard query response 0x5b43               |
| 5   | 09:03:08 | DNS_Server | HSGW        | standard query response 0xbd3b               |
| 6   | 09:03:08 | HSGW       | DNS_Server  | febooti-aw > domain [SYN] Seq=1097052319 win |
| 7   | 09:03:08 | DNS_Server | HSGW        | standard query response 0xca4b               |
| 8   | 09:03:08 | DNS_Server | HSGW        | domain > febooti-aw [SYN, ACK] Seq=172420703 |
| 9   | 09:03:08 | HSGW       | DNS_Server  | febooti-aw > domain [ACK] Seq=1097052320 Ack |
| 10  | 09:03:08 | HSGW       | DNS_Server  | standard query 0xca4b NAPTR APNapp.apn.epc.  |
| 11  | 09:03:08 | DNS_Server | HSGW        | domain > febooti-aw [ACK] Seq=1724207040 Ack |
| 12  | 09:03:08 | DNS_Server | HSGW        | domain > febooti-aw [RST, ACK] Seq=172420704 |

- ⊕ Frame 10: 318 bytes on wire (2544 bits), 318 bytes captured (2544 bits)
- ⊕ Linux cooked capture
- ⊕ Internet Protocol Version 6, Src: HSGW [REDACTED], Dst: DN [REDACTED]
- ⊕ Transmission Control Protocol, Src Port: febooti-aw (36524), Dst Port: domain [REDACTED]
- ⊖ Domain Name System (query)
  - Length: 78
  - Transaction ID: 0x5b43
  - ⊕ Flags: 0x0100 standard query
  - Questions: 1
  - Answer RRs: 0
  - Authority RRs: 0
  - Additional RRs: 1
  - ⊖ Queries
    - ⊕ APNinternet.apn.epc.mnc420.mcc300.3gppnetwork.org: type NAPTR, class IN
- ⊖ Domain Name System (query)
  - Length: 73
  - Transaction ID: 0xbd3b
  - ⊕ Flags: 0x0100 standard query
  - Questions: 1
  - Answer RRs: 0
  - Authority RRs: 0
  - Additional RRs: 1
  - ⊖ Queries
    - ⊕ APNims.apn.epc.mnc420.mcc300.3gppnetwork.org: type NAPTR, class IN
  - ⊕ Additional records
- ⊖ Domain Name System (query)
  - Length: 73
  - Transaction ID: 0xca4b
  - ⊕ Flags: 0x0100 standard query
  - Questions: 1
  - Answer RRs: 0
  - Authority RRs: 0
  - Additional RRs: 1
  - ⊖ Queries
    - ⊕ APNapp.apn.epc.mnc420.mcc300.3gppnetwork.org: type NAPTR, class IN
  - ⊕ Additional records

最後，來自同一捕獲，這是通過UDP成功查詢和響應NAPTR查詢，然後立即執行所需的AAAA查詢和響應，以解析NAPTR查詢返回的FQDN。此輸出與儲存為文本的Wireshark跟蹤相匹配：

```
Monday October 13 2014
<<<<OUTBOUND 13:03:11:535 Eventid:5957(3)
DNS PDU Tx
from : 2001:5555:200:1011:106:281:: : 38819
to : 2001:5555:202:fffe:a0:e:0:3 : 53
bytes : 87
Query ID : 55982
Type : Query
Opcode : Standard Query
Message Truncated : No
Recursion Desired : Yes
Authentication reqd. : No
Question count : 1
Additional count : 1
Question : NAPTR ? pgw02.PHLA.sa002.so.node.epc.mnc420.mcc300.3gppnetwork.org.
Additional :
Name : .
Ext-RCODE : 0
EDNS Version : 0
Class : 4096
Data Length : 0
Type : OPT
UDPsize : 4096
```

```
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INBOUND>>>> 13:03:11:543 Eventid:5956(3)
DNS PDU Rx
from : 2001:5555:202:fffe:a0:e:0:3 : 53
to : 2001:5555:200:1011:106:281:: : 38819
bytes : 307
Query ID : 55982
Type : Response
Opcode : Standard Query
Message Truncated : No
Recursion Desired : Yes
Recursion Available : Yes
Authenticated Answer : No
Authoritative Answer : Yes
Response code : Success
Question count : 1
Answer count : 2
Authoritative count : 0
Additional count : 1
Question : NAPTR ? pgw02.PHLA.sa002.so.node.epc.mnc420.
mcc300.3gppnetwork.org.
Answer :
Name : pgw02.PHLA.sa002.so.node.epc.mnc420.mcc300.3gppnetwork.org.
TTL : 1800
Class : IN
Data Length : 99
Type : NAPTR
Order : 100
Preference : 50000
Flags : a
Service : x-3gpp-pgw:x-s2a-pmip
Regexp :
Replacement : topon.lb2.pgw02.PHLA.sa002.so.node.epc.mnc420.
mcc300.3gppnetwork.org.
```

Name : pgw02.PHLA.sa002.so.node.epc.mnc420.mcc300.  
3gppnetwork.org.  
TTL : 1800  
Class : IN  
Data Length : 97  
Type : NAPTR  
Order : 100  
Preference : 50000  
Flags : a  
Service : x-3gpp-pgw:x-s5-gtp  
Regexp :  
Replacement : topon.lb1.pgw02.PHLA.sa002.so.node.epc.mnc420.  
mcc300.3gppnetwork.org.

Additional :

Name : .  
Ext-RCODE : 0  
EDNS Version : 0  
Class : 4096  
Data Length : 0  
Type : OPT  
UDPsize : 4096

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<<<<OUTBOUND 13:03:11:543 Eventid:5957(3)

DNS PDU Tx

from : 2001:5555:200:1011:106:281:: : 50002

to : 2001:5555:202:ffff:a0:e:0:3 : 53

bytes : 97

Query ID : 1974

Type : Query

Opcode : Standard Query

Message Truncated : No

Recursion Desired : Yes

Authentication reqd. : No

Question count : 1

Additional count : 1

Question : AAAA? topon.lb2.pgw02.PHLA.sa002.so.node.epc.  
mnc420.mcc300.3gppnetwork.org.

Additional :

Name : .  
Ext-RCODE : 0  
EDNS Version : 0  
Class : 4096  
Data Length : 0  
Type : OPT  
UDPsize : 4096

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INBOUND>>>> 13:03:11:551 Eventid:5956(3)

DNS PDU Rx

from : 2001:5555:202:ffff:a0:e:0:3 : 53

to : 2001:5555:200:1011:106:281:: : 50002

bytes : 125

Query ID : 1974

Type : Response

Opcode : Standard Query

Message Truncated : No

Recursion Desired : Yes

Recursion Available : Yes

Authenticated Answer : No

Authoritative Answer : Yes

Response code : Success

Question count : 1



Answer count : 1  
Authoritative count : 0  
Additional count : 1  
Question : AAAA? topon.lb2.pgw02.PHLA.sa002.so.node.epc.  
mnc420.mcc300.3gppnetwork.org.  
Answer :  
Name : topon.lb2.pgw02.PHLA.sa002.so.node.epc.mnc420.  
mcc300.3gppnetwork.org.  
TTL : 1800  
Class : IN  
Data Length : 16  
Type : AAAA  
Address : 2001:5555:200:1000:201:201::

Additional :  
Name : .  
Ext-RCODE : 0  
EDNS Version : 0  
Class : 4096  
Data Length : 0  
Type : OPT  
UDPsize : 4096

#### Corresponding Wireshark trace:

Frame 25: 151 bytes on wire (1208 bits), 151 bytes captured (1208 bits)  
Linux cooked capture  
Internet Protocol Version 6, Src: HSGW, Dst: DNS\_Server  
User Datagram Protocol, Src Port: 38819 (38819), Dst Port: domain (53)  
Domain Name System (query)

[Response In: 26]  
Transaction ID: 0xdaae  
Flags: 0x0100 Standard query  
Questions: 1  
Answer RRs: 0  
Authority RRs: 0  
Additional RRs: 1  
Queries

pgw02.PHLA.sa002.so.node.epc.mnc420.mcc300.3gppnetwork.org: **type NAPTR**, class IN  
Additional records

<Root>: type OPT  
Name: <Root>  
Type: OPT (EDNS0 option)  
UDP payload size: 4096  
Higher bits in extended RCODE: 0x0  
EDNS0 version: 0  
Z: 0x0  
Data length: 0

Frame 26: 371 bytes on wire (2968 bits), 371 bytes captured (2968 bits)  
Linux cooked capture  
Internet Protocol Version 6, Src: DNS\_Server, Dst: HSGW  
User Datagram Protocol, Src Port: domain (53), Dst Port: 38819 (38819)  
Domain Name System (response)

[Request In: 25]  
[Time: 0.008125000 seconds]  
Transaction ID: 0xdaae  
Flags: 0x8580 Standard query response, No error  
Questions: 1  
Answer RRs: 2  
Authority RRs: 0  
Additional RRs: 1  
Queries

pgw02.PHLA.sa002.so.node.epc.mnc420.mcc300.3gppnetwork.org: **type NAPTR**, class IN

Answers

pgw02.PHLA.sa002.so.node.epc.mnc420.mcc300.3gppnetwork.org:  
**type NAPTR**, class IN, order 100, preference 50000, flags a  
Name: pgw02.PHLA.sa002.so.node.epc.mnc420.mcc300.3gppnetwork.org  
Type: NAPTR (Naming authority pointer)  
Class: IN (0x0001)  
Time to live: 30 minutes  
Data length: 99  
Order: 100  
Preference: 50000  
Flags length: 1  
Flags: "a"  
Service length: 21  
**Service: "x-3gpp-pgw:x-s2a-pmip"**  
Regex length: 0  
Regex: ""  
Replacement length: 70  
Replacement: **topon.lb2.pgw02.PHLA.sa002.so.node.epc.mnc420.mcc300.3gppnetwork.org**

pgw02.PHLA.sa002.so.node.epc.mnc420.mcc300.3gppnetwork.org:  
**type NAPTR**, class IN, order 100, preference 50000, flags a  
Name: pgw02.PHLA.sa002.so.node.epc.mnc420.mcc300.3gppnetwork.org  
Type: NAPTR (Naming authority pointer)  
Class: IN (0x0001)  
Time to live: 30 minutes  
Data length: 97  
Order: 100  
Preference: 50000  
Flags length: 1  
Flags: "a"  
Service length: 19  
Service: "x-3gpp-pgw:x-s5-gtp"  
Regex length: 0  
Regex: ""  
Replacement length: 70  
Replacement: topon.lb1.pgw02.PHLA.sa002.so.node.epc.

mnc420.mcc300.3gppnetwork.org

Additional records

<Root>: type OPT  
Name: <Root>  
Type: OPT (EDNS0 option)  
UDP payload size: 4096  
Higher bits in extended RCODE: 0x0  
EDNS0 version: 0  
Z: 0x0  
Data length: 0

Frame 27: 161 bytes on wire (1288 bits), 161 bytes captured (1288 bits)

Linux cooked capture

Internet Protocol Version 6, Src: HSGW, Dst: DNS\_Server

User Datagram Protocol, Src Port: 50002 (50002), Dst Port: domain (53)

Domain Name System (query)

[Response In: 28]

Transaction ID: 0x07b6

Flags: 0x0100 Standard query

Questions: 1

Answer RRs: 0

Authority RRs: 0

Additional RRs: 1

Queries

**topon.lb2.pgw02.PHLA.sa002.so.node.epc.mnc420.mcc300.3gppnetwork.org:**

**type AAAA, class IN**

Additional records

```
<Root>: type OPT
  Name: <Root>
  Type: OPT (EDNS0 option)
  UDP payload size: 4096
  Higher bits in extended RCODE: 0x0
  EDNS0 version: 0
  Z: 0x0
  Data length: 0
```

Frame 28: 189 bytes on wire (1512 bits), 189 bytes captured (1512 bits)

Linux cooked capture

Internet Protocol Version 6, Src: DNS\_Server , Dst: HSGW

User Datagram Protocol, Src Port: domain (53), Dst Port: 50002 (50002)

Domain Name System (response)

[Request In: 27]

[Time: 0.007622000 seconds]

Transaction ID: 0x07b6

Flags: 0x8580 Standard query response, No error

Questions: 1

Answer RRs: 1

Authority RRs: 0

Additional RRs: 1

Queries

topon.lb2.pgw02.PHLA.sa002.so.node.epc.mnc420.mcc300.3gppnetwork.org:

**type AAAA, class IN**

Answers

topon.lb2.pgw02.PHLA.sa002.so.node.epc.mnc420.mcc300.3gppnetwork.org:

**type AAAA, class IN, addr 2001:5555:200:1000:201:201::**

Name: topon.lb2.pgw02.PHLA.sa002.so.node.epc.mnc420.mcc300.3gppnetwork.org

Type: AAAA (IPv6 address)

Class: IN (0x0001)

Time to live: 30 minutes

Data length: 16

**Addr: 2001:5555:200:1000:201:201::**

Additional records

```
<Root>: type OPT
```

```
  Name: <Root>
```

```
  Type: OPT (EDNS0 option)
```

```
  UDP payload size: 4096
```

```
  Higher bits in extended RCODE: 0x0
```

```
  EDNS0 version: 0
```

```
  Z: 0x0
```

```
  Data length: 0
```

## 記錄檔

12.2版新增了一項功能，即在兩分鐘時間內發生大量連線拒絕錯誤，導致中斷情況下重新繫結為DNS使用者端設定的IP位址。示例日誌條目為：

```
[vpn 5795 error] [1/0/30805 <vpnmgr:4> vpnmgr_msg.c:13773]
[context: Ingress, contextID: 4] [software internal system syslog]
Ingress: Rebinding DNS-CLIENT as connection refused errors
(<# of failures>) occuring continously
```

**範例：**

```
Jun  2 00:03:36 [10.142.250.226.171.216] evlogd: [local-60sec36.031]
[vpn 5450 error] [1/0/30805 <vpnmgr:4> vpnmgr_msg.c:13680] [context: Ingress,
contextID: 4] [software internal system syslog] Connection
refused for DNS query on QNAME:APN1.apn.epc.mnc420.mcc300.3gppnetwork.org
and QTYPE:NAPTR..... Many more of these logs

Jun  2 00:05:35 [10.142.250.226.171.216] evlogd: [local-60sec35.058]
[vpn 5450 error] [1/0/30805 <vpnmgr:4> vpnmgr_msg.c:13680]
[context: Ingress, contextID: 4] [software internal system syslog]
Connection refused for DNS query on QNAME:APN1.apn.epc.mnc420.mcc300.3gppnetwork.org
and QTYPE:NAPTR

Jun  2 00:05:35 [10.142.250.226.171.216] evlogd: [local-60sec35.058]
[vpn 5795 error] [1/0/30805 <vpnmgr:4> vpnmgr_msg.c:13773]
[context: Ingress, contextID: 4] [software internal system syslog]
Ingress: Rebinding DNS-CLIENT as connection refused errors (3132) occurring continuously
```

## 封包捕獲

發現了一些棘手的DNS問題，需要捕獲資料包以確定從DNS伺服器傳送和接收回的內容。統計資料和監控協定可能沒有提供足夠的資訊。

- 技術支援能夠使用TCP轉儲工具捕獲DNS資料包，並可能建議將此方法作為故障排除過程的一部分。
- 根據任何介入的防火牆和可以協商TCP/IP連線的防火牆，捕獲點非常重要。可能需要多個捕獲點才能找到問題的根本原因。
- 使用Wireshark中的**Follow TCP stream**選單選項過濾特定的TCP連線，以便更輕鬆地導航大型檔案中的多個TCP流。

## 排除DNS與呼叫控制相關的故障

如前所述，DNS本身不工作，但它是呼叫控制流的啟用程式或元件。例如，在eHRPD的情況下，需要確定PGW要連線到時，呼叫點需要DNS。如果在流的此點發生故障，則相應的呼叫控制統計資訊將反映這一點。

### show hsgw-service statistics

如果DNS發生故障，預計「No PGW Available」（無PGW可用）計數器會增加。由於在嘗試向PGW發出請求之前呼叫將失敗，因此「show mag statistics」不會捕獲此事件（這些事件不會統計傳送的繫結更新）

範例：

```
[Ingress]HSGW> show hsgw statistics all
Monday June 02 00:49:06 UTC 2014
```

Total PDNs Rejected Reason:  
No PGW Available: 9549866

[Ingress]HSGW> show hsgw statistics all  
Monday June 02 00:49:16 UTC 2014

No PGW Available: 9554113

## 監控訂戶

請注意，在監控訂閱伺服器中不會捕獲DNS資料包本身。儘管它們確實由單個使用者活動觸發，但它們的工作獨立於給定使用者，並且必須如前所述由監控協定捕獲。

出現DNS基礎設施控制消息，例如「No LMA address available for APN <APN Name> in subscriber profile, PDN connection failed」，並使用「Error-Code(6)=No-PDN-GW-Available(3)」將VSNCP Conf-Rej傳送到訂戶。

### 範例：

```
INBOUND>>>> 00:25:26:925 Eventid:25000(0)PPP Rx PDU (72)VSNCP 72:  
Conf-Req(2), OUI=cf0002(3GPP2), PDN-ID(1)=00, PDN-APN-Name(2)=\013APN1,  
PDN-Type(3)=IPv4,IPv6(3), PDN-Address(4)=(Null), PCO(5)  
{Protocol(0) = PPP(0),{IPCP
```

```
(1): Conf-Req(1), Pri-DNS=0.0.0.0, Sec-DNS=0.0.0.0},IPv6-DNS-Address(2)=Req,IP-Address-  
Allocation-via-NAS-Signaling(3),}, Attach-Type(7)=Initial(1),  
IPv4-Default-Router-Address(8)=0.0.0.0, Address-Allocation-Cause(9)=Null(0)
```

```
***CONTROL*** 00:25:27:054 Eventid:11813
```

**No LMA address available for APN**

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```
<<<<OUTBOUND 00:25:27:054 Eventid:25001(0)
```

```
PPP Tx PDU (14)
```

```
VSNCP 14: Conf-Req(1), OUI=cf0002(3GPP2), PDN-ID(1)=00
```

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```
<<<<OUTBOUND 00:25:27:054 Eventid:25001(0)
```

```
PPP Tx PDU (52)
```

```
VSNCP 52: Conf-Rej(2), OUI=cf0002(3GPP2), PDN-ID(1)=00, PDN-APN-Name(2)=\013APN1,  
PDN-Type(3)=IPv4,IPv6(3), PDN-Address(4)=(Null), PCO(5){Protocol(0)  
= PPP(0),}, Attach-Type(7)=Initial(1), IPv4-Default-Router-Address(8)=0.0.0.0,  
Address-Allocation-Cause(9)=Null(0), Error-Code(6)=No-PDN-GW-Available(3)
```

## 記錄檔

查詢與呼叫控制相關的任何錯誤日誌。

### 範例：

```
Jun  2 00:25:27 [10.142.250.226.171.216] evlogd: [local-60sec27.054]  
[sessmgr 11813 error] [15/0/5827 <sessmgr:71> sessmgr_mag.c:3595]  
[callid 14ec7ad1] [context: Ingress, contextID: 4] [software internal  
system protocol-log syslog] No LMA address available for APN
```

## 相關資訊

- [ASR5000系統管理指南 — Cisco Systems](#)
- [RFC 5966](#)
- [技術支援與文件 - Cisco Systems](#)

## 關於此翻譯

思科已使用電腦和人工技術翻譯本文件，讓全世界的使用者能夠以自己的語言理解支援內容。請注意，即使是最佳機器翻譯，也不如專業譯者翻譯的內容準確。Cisco Systems, Inc. 對這些翻譯的準確度概不負責，並建議一律查看原始英文文件（提供連結）。