

# 排除MME中的DNS超時問題

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## 簡介

本文說明在服務閘道(SGW)和封包資料網路閘道(PGW)選取的移動管理實體(MME)中針對DNS的查詢的網域名稱系統(DNS)逾時相關問題。

## 必要條件

### 需求

思科建議您瞭解以下主題：

- StarOS
- 與DNS相關的MME功能

### 採用元件

本文中的資訊係根據以下軟體和硬體版本：

- DNS
- MME

本文中的資訊是根據特定實驗室環境內的裝置所建立。文中使用到的所有裝置皆從已清除（預設）的組態來啟動。如果您的網路運作中，請確保您瞭解任何指令可能造成的影響。

## 背景資訊

### DNS

DNS將域名轉換為IP地址，瀏覽器可使用該地址載入ye mian頁面。連線到網路的每台裝置都有自己

的IP地址，其他裝置使用該地址查詢裝置。

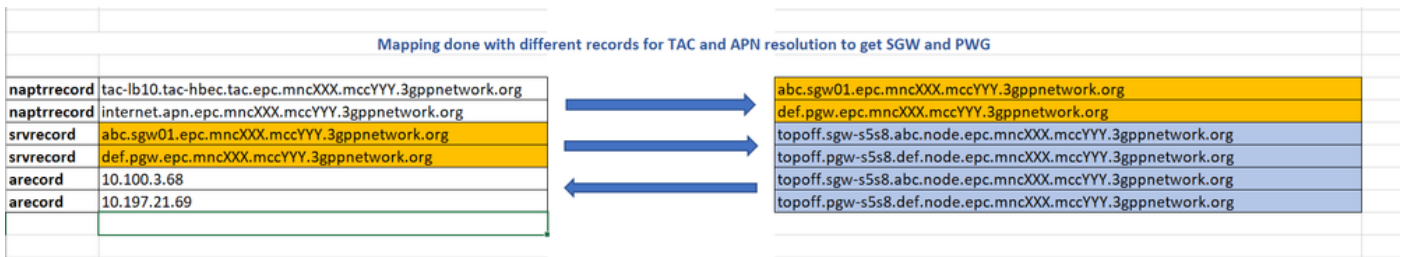
從移動性角度來看，DNS是用於接入點名稱(APN)的外部伺服器，並根據其與網路中節點的連線進行URL解析。

1. MME到DNS連線：用於SPGW選擇的APN解析
2. SPGW到DNS連線：用於URL解析，以聯絡網際網路服務提供商(ISP)

DNS中使用的記錄型別。

1. A/AAA記錄：用於定義對映到主機完全限定名稱的IPv4和IPv6主機地址，其中A記錄用於IPv4，身份驗證、授權和記帳(AAA)用於IPv6。
2. NAPTR記錄：用作查詢服務，指向4G APN和TAC解析的SPGW選擇流程的服務記錄(SRV)和A/AAA記錄。
3. SRV記錄：用作在名稱許可權指標(NAPTR)和A/AAA記錄之間進行對映的查詢。

範例：觀察A/SRV/NAPTR的對映方式。



## 與DNS相關的MME功能

- 與DNS相關的MME的基本功能是基于DNS查詢選擇SGW和PGW。
- Cisco MME擁有自己的DNS快取，這有助於避免頻繁查詢到外部伺服器，並將每個查詢儲存在MME DNS快取中，以減少將查詢傳送到外部DNS伺服器的需要。
- 當UE註冊到演化分組系統(EPS)網路時，必須為其分配適當的SGW和PGW。MME根據DNS選擇GW。
- NAPTR查詢用於進行GW地址解析。
- MME根據DNS查詢確定S-GW和P-GW之間的介面。

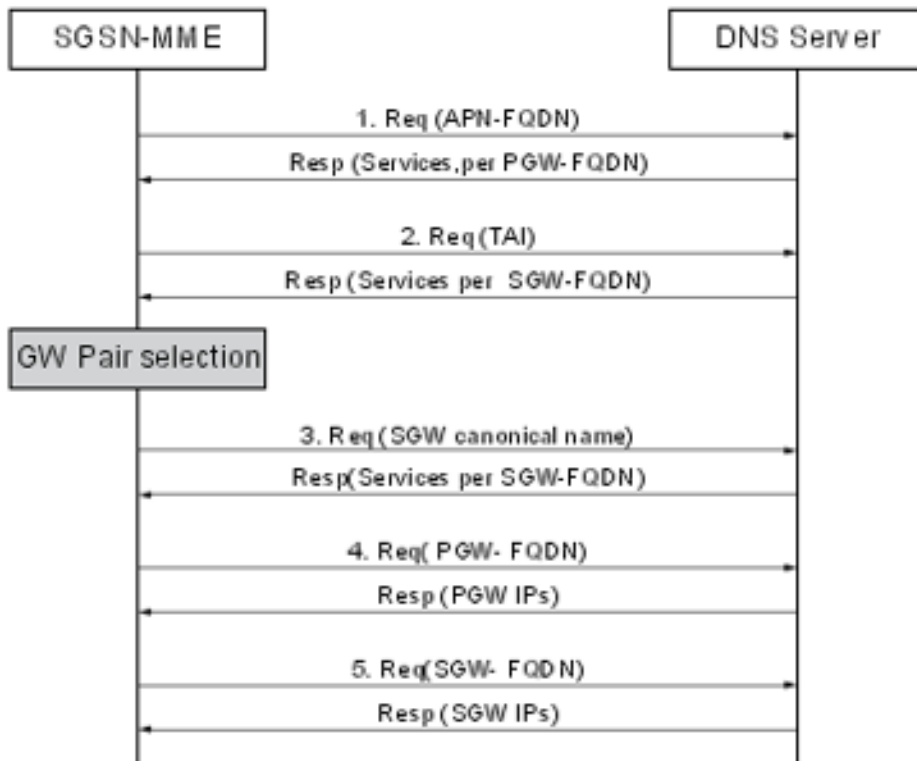
## SPGW的選擇過程

- MME執行初始DNS查詢以獲取GW標識和優先順序清單
- 基於跟蹤區域識別符號(TAI)的S-GW選擇
- 基於APN的P-GW選擇
- MME根據優先順序資訊或MME配置選擇GW
- 然後進行第二個DNS查詢，以獲取所需的GW的IP地址。

因此，按照此過程，MME總是進行2個DNS查詢來獲得GW IP地址，對此進行了說明。

查詢1:對於通過APN或TAI完成的第一個查詢，您會獲得與其對映的SRV配置檔案，或者直接對映為響應的A記錄輸出。

查詢2:此外，它向SRV配置檔案發出查詢，並將其作為替換字串傳送，以獲取GW IP。



例如：

```
Query Name: abcd.apn.epc.mncXXX.mccYYY.3gppnetwork.org
Query Type: NAPTR      TTL: 515 seconds
Answer:
Order: 100            Preference: 50000
Flags: a              Service: x-3gpp-pgw:x-s5-gtp:x-s8-gtp:x-gn:x-gp
Regular Expression:
Replacement: _nodes._pgw.epc.mncXXX.mccYYY.3gppnetwork.org

Query Name: _nodes._pgw.epc.mncXXX.mccYYY.3gppnetwork.org
Query Type: NAPTR      TTL: 515 seconds
Answer:
Order: 100            Preference: 50000
Flags: a              Service: x-3gpp-pgw:x-s5-gtp:x-s8-gtp:x-gn:x-gp
Regular Expression: toff.pgw- s5s8.node.epc.mncXXX.mccYYY.3gppnetwork.org

Query Name: toff.pgw- s5s8.node.epc.mncXXX.mccYYY.3gppnetwork.org
Query Type: A          TTL: 646 seconds
Answer:
IP Address: X.X.X.X
```

## 問題

1.從MME對APN abcd.apn.epc.mncXXX.mccYYY.3gppnetwork.org執行NAPTR查詢並在MME獲取DNS超時時。

**附註：**String +nc-nr是新增到5G服務的新字串，它針對每個NAPTR資源記錄(RR)新增以標識服務介面。

```
"x-3gpp-pgw:x-s5-gtp+nc-nr:x-s8-gtp:x-gn:x-gp"
```

**附註：**+nc-nr是基於5G服務的新字串，因此MME需要支援此服務才能工作，因為當MME進行DNS查詢並獲得響應以檢查特定服務是否在MME中啟用時。

```
[gn]SGSN-MME# dns-client query client-name dnsclient query-type NAPTR query-name  
abcd.apn.epc.mncXXX.mccYYY.3gppnetwork.org  
Wednesday October 27 17:06:20 ICT 2021  
Query Name: abcd.apn.epc.mncXXX.mccYYY.3gppnetwork.org  
Query Type: NAPTR      TTL: 0 seconds  
Answer: -Negative Reply-  
Failure Reason: DNS query timed out
```

2.在PCAP跟蹤中，發現DNS伺服器收到查詢，並在響應中針對每個APN傳送30到35個替換，因為資料包大小變為4186位元組並且MME會發起TCP連線。

3.您可以看到DNS已收到查詢請求並傳送響應，但沒有任何內容只有一個標誌，即「消息被截斷」。只有在響應消息被截斷，並且4G響應的其餘部分在消息未被截斷時工作正常的情況下，才會觀察到這種情況。

截斷消息的原因是，針對APN對映的替換數超過30，它增加消息的大小並傳送被截斷的消息標誌作為響應。響應消息的總大小是作為TCP負載的4181位元組（請參見圖）。

在MME收到此響應後，MME會發起與DNS的TCP連線。

No.	Time	Protocol	Length	Text Item	Info
38	2021-08-02 18:24:12.554886	DNS	4247	✓	Standard query response 0x7f65 NAPTR Internet.apn.epc.mnc000.mcc262.3gppnetwork.org NAPTR 28
39	2021-08-02 18:24:12.555426	TCP	66	✓	47684 → 53 [ACK] Seq=78 Ack=1448 Win=14352 Len=0 Tsv=0+2577277438 TSecr=384894879
40	2021-08-02 18:24:12.555436	TCP	66	✓	47684 → 53 [ACK] Seq=78 Ack=2897 Win=54784 Len=0 Tsv=0+2577277438 TSecr=384894879
41	2021-08-02 18:24:12.555441	TCP	66	✓	47684 → 53 [ACK] Seq=78 Ack=54832 Win=54832 Len=0 Tsv=0+2577277438 TSecr=384894879
42	2021-08-02 18:24:12.555446	TCP	66	✓	47684 → 53 [RST, ACK] Seq=78 Ack=1448 Win=14352 Len=0 Tsv=0+2577277438 TSecr=384894879
43	2021-08-02 18:24:12.628312	DNS	117	✓	Standard query 0x7f65 NAPTR 0mxyz.hs.apn.epc.mnc000.mcc468.3gppnetwork.org OPT
44	2021-08-02 18:24:12.927428	DNS	185	✓	Standard query 0x436 & rec0000.lac7f6a.mcc001.mcc258.gprs OPT
45	1871-08-02 18:18:17.877638	TCP	146	✓	Standard query 0x7f65 & rec0000.lac7f6a.mcc001.mcc258.gprs OPT

```
Acknowledgment number (raw): 3453854488  
1800 .... = Header Length: 32 bytes (8)  
> Flags: 0x0000 (PSH, ACK)  
Window: 227  
[Calculated window size: 20866]  
[Window size scaling factor: 128]  
Checksum: 0x7882 [unverified]  
[Checksum status: Unverified]  
Urgent pointer: 0  
> Options: (32 bytes), No-Operation (NOP), No-Operation (NOP), Timestamps  
  * [SQ/NCK analysis]  
    [SYT: 0.000028000 seconds]  
    [Bytes in flight: 4181]  
    [Bytes sent since last PSH flag: 4181]  
> [Timestamps]  
  * TCP payload (4181 bytes)  
    [PSH size: 4044]  
> Domain Name System (response)
```

## 從MME到DNS

- 第31幀 — MME向DNS傳送查詢
- 第32幀 — DNS傳送帶有標誌設定為「消息被截斷」的響應
- 第33/34/35幀 — MME和DNS之間建立的TCP連線，並交換各自的功能

在給定的快照中，可以看到MME傳送的最大段大小(MSS)為9060。

當MME查詢哪個DNS傳送的響應帶有「Message is trunked」（消息被截斷），並且它沒有其他資訊後，基於DNS響應的MME發起TCP連線。

31	2021-08-02 10:24:12.539211	DNS	117	✓	Standard query 0xffd5 NAPTR internet.apn.epc.mnc003.mcc262.3gppnetwork.org OPT
32	2021-08-02 10:24:12.539293	DNS	117	✓	Standard query response 0xffd5 NAPTR internet.apn.epc.mnc003.mcc262.3gppnetwork.org OPT
33	2021-08-02 10:24:12.539720	TCP	74	✓	47684 → 53 [SYN] Seq=0 Win=18120 Len=0 MSS=9060 SACK_PERM=1 TSval=2577277422 TSecr=0 WS=512
34	2021-08-02 10:24:12.539737	TCP	74	✓	53 → 47684 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MSS=1460 SACK_PERM=1 TSval=384894064 TSecr=2577
35	2021-08-02 10:24:12.540338	TCP	66	✓	47684 → 53 [ACK] Seq=1 Ack=1 Win=18432 Len=0 TSval=2577277423 TSecr=384894064
36	2021-08-02 10:24:12.554558	DNS	143	✓	Standard query 0xffd5 NAPTR internet.apn.epc.mnc003.mcc262.3gppnetwork.org OPT
37	2021-08-02 10:24:12.554570	DNS	66	✓	53 → 47684 [ACK] Seq=1 Ack=78 Win=29056 Len=0 TSval=384894079 TSecr=2577277437
38	2021-08-02 10:24:12.554686	DNS	4247	✓	Standard query response 0xffd5 NAPTR internet.apn.epc.mnc003.mcc262.3gppnetwork.org NAPTR 20 3276
39	2021-08-02 10:24:12.555626	TCP	66	✓	47684 → 53 [ACK] Seq=78 Ack=1449 Win=36352 Len=0 TSval=2577277438 TSecr=384894079

```

Domain Name System (response)
Transaction ID: 0xffd5
Flags: 0x8380 Standard query response, No error
 1... .. = Response: Message is a response
.000 0... .. = Opcode: Standard query (0)
... ..0... .. = Authoritative: Server is not 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

29 2021-08-02 10:24:12.419414 DNS 126 ✓ Standard query 0x3b46 NAPTR tac-lbc4.tac-hb1c.tac.epc.mnc099.mcc250.3gppnetwork.org OPT
30 2021-08-02 10:24:12.419480 DNS 183 ✓ Standard query response 0x3b46 No such name NAPTR tac-lbc4.tac-hb1c.tac.epc.mnc099.mcc250.3gppnet
31 2021-08-02 10:24:12.539211 DNS 117 ✓ Standard query 0xffd5 NAPTR internet.apn.epc.mnc003.mcc262.3gppnetwork.org OPT
32 2021-08-02 10:24:12.539293 DNS 117 ✓ Standard query response 0xffd5 NAPTR internet.apn.epc.mnc003.mcc262.3gppnetwork.org OPT

```

```

.000 0... .. = Opcode: Standard query (0)
... ..0... .. = Authoritative: Server is not 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
  internet.apn.epc.mnc003.mcc262.3gppnetwork.org: type NAPTR, class IN
    Name: internet.apn.epc.mnc003.mcc262.3gppnetwork.org
    [Name Length: 46]
    [Label Count: 7]
    Type: NAPTR (Naming Authority Pointer) (35)
    Class: IN (0x0001)

```

## 從DNS到MME

- MME在TCP連線後傳送查詢
- DNS會確認這一點。
- DNS傳送帶有標誌設定為「消息未截斷」的響應，因為與DNS共用的MSS設定為9060位元組，它一次傳送整個響應。
- MME使用無內容的ACK進行響應
- DNS將ACK傳送到消息38中的內容，其中負載為4181位元組
- MME傳送TCP，以在收到最後一個片段時立即重設和關閉連線。

36	2021-08-02 04:54:12.554558	DNS	543	Standard query 0xffd5 NAPTR internet.apn.epc.mnc003.mcc262.3gppnetwork.org OPT
37	2021-08-02 04:54:12.554570	TCP	66	53 → 47684 [ACK] Seq=0 Ack=78 Win=29056 Len=0 TSval=384894079 TSecr=2577277437
38	2021-08-02 04:54:12.554686	DNS	4247	Standard query response 0xffd5 NAPTR internet.apn.epc.mnc003.mcc262.3gppnetwork.org NAPTR 20 3276 A NAPTR
39	2021-08-02 04:54:12.554626	TCP	66	47684 → 53 [ACK] Seq=78 Ack=1449 Win=36352 Len=0 TSval=2577277438 TSecr=384894079
40	2021-08-02 04:54:12.554636	TCP	66	47684 → 53 [ACK] Seq=78 Ack=2897 Win=54784 Len=0 TSval=2577277438 TSecr=384894079
41	2021-08-02 04:54:12.554640	TCP	66	47684 → 53 [ACK] Seq=78 Ack=4182 Win=54832 Len=0 TSval=2577277438 TSecr=384894079
42	2021-08-02 04:54:12.554646	TCP	66	47684 → 53 [RST, ACK] Seq=0 Ack=4182 Win=0 Len=0 TSval=2577277438 TSecr=384894079
43	2021-08-02 04:54:12.426812	DNS	117	Standard query 0xf460 NAPTR smc2c.ha.apn.epc.mnc001.mcc262.3gppnetwork.org OPT
44	2021-08-02 04:54:12.927420	DNS	585	Standard query 0xc456 A rac0000.lac4209.rac.epc.mnc001.mcc250.3gppnet
45	2021-08-02 04:54:12.927530	DNS	585	Standard query 0x3f82 A rac0000.lac4209.rac.epc.mnc001.mcc250.3gppnet
46	2021-08-02 04:54:12.909817	ARP	60	Gratuitous ARP for 217.138.72.1 (Reply)
47	2021-08-02 04:54:13.405622	DNS	154	Standard query response 0xf460 No such name A rac0000.lac4209.rac.epc.mnc001.mcc250.gprs SOA dns1.mnc001.mcc250.gpr
48	2021-08-02 04:54:13.405696	DNS	154	Standard query response 0xc456 No such name A rac0000.lac4209.rac.epc.mnc001.mcc250.gprs SOA dns1.mnc001.mcc250.gpr
49	2021-08-02 04:54:13.407374	DNS	124	Standard query 0xf461 NAPTR rac0000.lac4209.rac.epc.mnc001.mcc250.3gppnetwork.org OPT

```

> TCP Option - No-Operation (NOP)
> TCP Option - Timestamps: Tsvl 384894079, TSecr 2577277437
[SO:ACK analysis]
 [RTT: 0.000618000 seconds]
 [Bytes in Flight: 4081]
 [Bytes sent since last PSN flag: 4081]
[Timestamps]
TCP payload (4181 bytes)
PDU Size: 4081
Domain Name System (response)
Length: 4179
Transaction ID: 0xffd5

```

當MME在2到3個區段中收到整個負載，或從DNS進行一次嘗試時，MME會傳送TCP重設訊息。

DNS commands to troubleshoot

```
show dns-client statistics
show dns-client statistics client <DNS Client Name>
show dns-client cache client <client name> [query-name <query-name>[query-type <NAPTR | AAAA | A>] | [query-type <NAPTR | AAAA | A>]]
dns-client query client-name <client name> query-type <NAPTR | AAAA> [query-name <query name>].show port datalink counters
```

Commands to check if there were any problem internal to the starOS system where request is not able to reach from demux vpmngr to DNS app in sessmgrs

```
show port npu counters
show cloud configuration
show iftask stats summary
show npu utilization table
show iftask port-stats card <card> ---- for all active SF cards
show iftask iomux-stats card <card> ---- for all active SF cards
```

MON SUB to be captured with options enabled (verbosity 5,Y,S,34,35,19,A,26)

PCAP traces to be captured

DNS cache flush commands

```
clear dns-client <client-name> cache
```

## 測試方案

- 1.使用專用測試捕獲所有所需的調試日誌/跟蹤，並在訂戶瀏覽存在問題的APN時同時啟用日誌
- 2.確保每次執行測試方案時，訂戶都需要執行新的附加來刷新訂戶。
- 3.為測試目的，指定一名測試人員，該測試人員需要對其內部管理介面執行專用測試，並需要訪問有問題的APN:abcd.apn.epc.mncXXX.mccYYY.3gppnetwork.org。

```
logging filter active facility vpn level debug ----- debug level logs
logging filter active facility tcpdemux level debug ----- debug level logs
logging monitor msid <MSID number> ----- (these logging command to be
executed in config mode)
```

## 疑難排解

- 1.檢查上述所有命令的輸出以確認系統內部是否存在任何丟包現象。
- 2.檢查統計資訊以確認節點中的DNS超時增加頻率。

```
[gn]SGSN-MME# show dns-client statistics client dnsclient
Friday August 20 13:31:48 ICT 2021
DNS Usage Statistics:
```

```
-----
Query Type           Attempts      Successes     Failures
A                    2430996860   2410410937   20546467
SRV                  1325520986   1325516557   4429
AAAA                 3939810089   0             3939810089
```

NAPTR	480586697	432853033	47732791
PTR	0	0	0
Total	3881947336	4168780527	4008093776

```

...
Total Resolver Queries: 4480708
Successful Queries:      670040
Query Timeouts:         409717
Domain Not Found:       2455918
Connection Refused:     0
Other Failures:         580612

```

運行這些命令以捕獲多次迭代的統計資訊並觀察到查詢超時逐漸增加，但Demux和sessmgr之間沒有丟包，因此內部系統不會出現問題

為了檢查DNS中的外部連線或配置問題，您可以直接手動從MME而非APN執行替換值查詢，如圖所示，在該查詢中，可以無延遲地正確解決替換值，並得出外部連線和配置也沒有問題的結論。

```

[gn]SGSN-MME# dns-client query client-name dnsclient query-name
TOPON.test.NODE.EPC.MNCXXX.MCCYYY.3GPPNETWORK.ORG
Monday August 02 18:51:29 ICT 2021
Query Name: TOPON.test.NODE.EPC.MNCXXX.MCCYYY.3GPPNETWORK.ORG
Query Type: A          TTL: 1038 seconds
Answer:

```

```
IP Address: X.X.X.X ----- resolve properly and gave IP
```

問題出在DNS和SGSN-MME之間，在此您可以看到DNS傳送響應（替換值為topon），並且MME必須再次查詢topon條目，但是如果我們手動執行查詢解析成功，則不會發生這種情況

根據命令輸出和跟蹤，很明顯，當您查詢APN時，會通過TCP連線以片段形式獲得具有30個替換的響應，而MME確認這些片段時，會向DNS傳送重置消息。

由於MME會傳送TCP以重設，因此我們在MME中可看到，其中DNS查詢將錯誤顯示為查詢逾時，而此時由於片段尚未完全確認且在此程式完成之前，我們看不到在MME指令輸出中的30個替代值。

Debug logs analysis

```
For abcd.apn.epc.mncXXX.mccYYY.3gppnetwork.org
```

```

2021-Oct-27+17:06:20.910 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpmngr_func.c:8011] [software
internal system syslog] query:14585, UDP, Sent time 1635329180, Timeout set 1635329183 ----
timer is set here
2021-Oct-27+17:06:20.910 [vpn 5919 info] [9/0/11730 <vpnmgr:6> dns_resolver.c:323] [software
internal system syslog] Sent out a DNS Query abcd.apn.epc.mncXXX.mccYYY.3gppnetwork.org to DNS
Server ----- DNS query is send for the first time
2021-Oct-27+17:06:20.911 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpmngr_func.c:8011] [software
internal system syslog] TCP Connection Init, While Sending Query
2021-Oct-27+17:06:20.911 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpmngr_func.c:8011] [software
internal system syslog] TCP Connection Open with DHost
2021-Oct-27+17:06:20.911 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpmngr_func.c:8011] [software
internal system syslog] query:14585, TCP, Sent time 1635329180, Timeout set 1635329183 -----
--- DNS query is send for the second time
2021-Oct-27+17:06:20.911 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpmngr_func.c:8011] [software
internal system syslog] TCP Connection Successful - DHost-Id = 6766924, Sock_fd = 21
2021-Oct-27+17:06:21.008 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpmngr_func.c:8011] [software
internal system syslog] TCP READ, Kernel Closed, EOF - DHost-Id = 6766924, Sock_fd = 21, errno =
115, req_read_len = 0
2021-Oct-27+17:06:21.008 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpmngr_func.c:8011] [software
internal system syslog] TCP Connection close - DHost-Id = 6766924, Sock_fd = 21

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2021-Oct-27+17:06:23.019 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpnmgr\_func.c:8011] [software internal system syslog] query:14585, TCP, Timeout detected: 1635329183 ----- Timeout detected here  
2021-Oct-27+17:06:23.019 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpnmgr\_func.c:8011] [software internal system syslog] TCP Connection Init, While Sending Query ----- Query is send again  
2021-Oct-27+17:06:23.019 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpnmgr\_func.c:8011] [software internal system syslog] TCP Connection Open with DHost  
2021-Oct-27+17:06:23.019 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpnmgr\_func.c:8011] [software internal system syslog] query:14585, TCP, Sent time 1635329183, Timeout set 1635329186 ----- Again send the query with new timer value set  
2021-Oct-27+17:06:23.019 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpnmgr\_func.c:8011] [software internal system syslog] TCP Connection Successful - DHost-Id = 6504921, Sock\_fd = 23  
2021-Oct-27+17:06:26.036 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpnmgr\_func.c:8011] [software internal system syslog] query:14585, TCP, Timeout detected: 1635329186 ----- Timeout detected here  
2021-Oct-27+17:06:26.036 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpnmgr\_func.c:8011] [software internal system syslog] query:35196, UDP, Timeout detected: 1635329186 ----- Timeout detected here

Another example abcd.apn.epc.mncXXX.mccYYY.3gppnetwork.org

2021-Oct-27+17:06:27.257 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpnmgr\_func.c:8011] [software internal system syslog] query:19140, UDP, Sent time 1635329187, Timeout set 1635329190 ---- timer is set here  
2021-Oct-27+17:06:27.257 [vpn 5919 info] [9/0/11730 <vpnmgr:6> dns\_resolver.c:323] [software internal system syslog] Sent out a DNS Query abcd.apn.epc.mncXXX.mccYYY.3gppnetwork.org to DNS Server ----- Query send for the first time  
2021-Oct-27+17:06:27.258 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpnmgr\_func.c:8011] [software internal system syslog] TCP Connection Init, While Sending Query  
2021-Oct-27+17:06:27.258 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpnmgr\_func.c:8011] [software internal system syslog] TCP Connection Open with DHost  
2021-Oct-27+17:06:27.258 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpnmgr\_func.c:8011] [software internal system syslog] query:19140, TCP, Sent time 1635329187, Timeout set 1635329190 ----- Same Query send for the second time  
2021-Oct-27+17:06:27.258 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpnmgr\_func.c:8011] [software internal system syslog] TCP Connection Successful - DHost-Id = 7201531, Sock\_fd = 22  
2021-Oct-27+17:06:27.309 [vpn 5921 debug] [7/0/12843 <sessmgr:79> dns\_snaptr.c:1466] [software internal system syslog] VPN DEBUG : snaptr\_match\_valid\_entries Initial ue\_usage\_type:0 nc\_nr:0  
---- snaptr match starts  
2021-Oct-27+17:06:27.309 [vpn 5921 debug] [7/0/12843 <sessmgr:79> dns\_snaptr.c:237] [software internal system syslog] VPN DEBUG : snaptr\_compare\_service\_protocol\_set rr\_service\_parameter x-3gpp-mme:x-gn, inp\_svc\_param x-3gpp-sgw:x-s5-gtp ue\_usage\_type\_enabled:0 nc\_nr\_enabled:0 ---- -- nc\_nr enabled which I mentioned earlier  
2021-Oct-27+17:06:27.309 [vpn 5921 debug] [7/0/12843 <sessmgr:79> dns\_snaptr.c:237] [software internal system syslog] VPN DEBUG : snaptr\_compare\_service\_protocol\_set rr\_service\_parameter x-3gpp-sgw:x-s5-gtp:x-s8-gtp, inp\_svc\_param x-3gpp-sgw:x-s5-gtp ue\_usage\_type\_enabled:0 nc\_nr\_enabled:0  
2021-Oct-27+17:06:27.309 [vpn 5921 debug] [7/0/12843 <sessmgr:79> dns\_snaptr.c:279] [software internal system syslog] VPN DEBUG : 0.rr\_prot\_token x-s5-gtp, input token x-s5-gtp  
2021-Oct-27+17:06:27.309 [vpn 5921 debug] [7/0/12843 <sessmgr:79> dns\_snaptr.c:323] [software internal system syslog] VPN DEBUG : 4.Success Selected Protocol(Normal):x-s5-gtp ----- snaptr protocol matched  
2021-Oct-27+17:06:30.057 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpnmgr\_func.c:8011] [software internal system syslog] query:19140, TCP, Timeout detected: 1635329190 ----- TCP timeout happens  
2021-Oct-27+17:06:30.057 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpnmgr\_func.c:8011] [software internal system syslog] TCP Connection Init, While Sending Query ----- Again TCP connection initiated  
2021-Oct-27+17:06:30.057 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpnmgr\_func.c:8011] [software internal system syslog] TCP Connection Open with DHost  
2021-Oct-27+17:06:30.057 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpnmgr\_func.c:8011] [software internal system syslog] query:19140, TCP, Sent time 1635329190, Timeout set 1635329193 ----- New timer value set with send query



```
2021-Oct-27+17:06:30.057 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpnmgr_func.c:8011] [software internal system syslog] TCP Connection Successful - DHost-Id = 7136007, Sock_fd = 21
2021-Oct-27+17:06:30.158 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpnmgr_func.c:8011] [software internal system syslog] TCP READ, Kernel Closed, EOF - DHost-Id = 7136007, Sock_fd = 21, errno = 115, req_read_len = 0 - Error because TCP connection is busy because previous connection is not closed
2021-Oct-27+17:06:30.158 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpnmgr_func.c:8011] [software internal system syslog] TCP Connection close - DHost-Id = 7136007, Sock_fd = 21 -----
Connection closed
2021-Oct-27+17:06:30.171 [vpn 5921 debug] [14/0/12709 <sessmgr:15> dns_snaptr.c:1466] [software internal system syslog] VPN DEBUG : snaptr_match_valid_entries Initial ue_usage_type:0 nc_nr:0 -- again snaptr match takes place
2021-Oct-27+17:06:30.171 [vpn 5921 debug] [14/0/12709 <sessmgr:15> dns_snaptr.c:237] [software internal system syslog] VPN DEBUG : snaptr_compare_service_protocol_set rr_service_parameter x-3gpp-mme:x-gn, inp_svc_param x-3gpp-sgw:x-s5-gtp ue_usage_type_enabled:0 nc_nr_enabled:0
2021-Oct-27+17:06:30.171 [vpn 5921 debug] [14/0/12709 <sessmgr:15> dns_snaptr.c:237] [software internal system syslog] VPN DEBUG : snaptr_compare_service_protocol_set rr_service_parameter x-3gpp-sgw:x-s5-gtp:x-s8-gtp, inp_svc_param x-3gpp-sgw:x-s5-gtp ue_usage_type_enabled:0 nc_nr_enabled:0
2021-Oct-27+17:06:30.171 [vpn 5921 debug] [14/0/12709 <sessmgr:15> dns_snaptr.c:279] [software internal system syslog] VPN DEBUG : 0.rr_prot_token x-s5-gtp, input token x-s5-gtp
2021-Oct-27+17:06:33.073 [vpn 5456 info] [9/0/11730 <vpnmgr:6> vpnmgr_func.c:8011] [software internal system syslog] query:19140, TCP, Timeout detected: 1635329193 -----TCP timeout detected
```

從日誌中，它表示在第一超時後，MME為下一次重試傳送錯誤115，因為第一個TCP連線仍然未在套接字上關閉。第一個TCP連線的超時已發生，而上一個連線未關閉。

啟動新連線，該連線位於先前連線已建立但未清除的同一套接字上。您會看到錯誤115（操作正在進行中），即使已形成新連線，但在第一個超時後，套接字並未關閉上一個連線。

## 解決方案

重新啟動DNS上下文的vpnmgr。軟體修復尚未提供。