在GGSN應用「新呼叫策略拒絕」時DNS服務引數的最佳實踐

目錄

[簡介](#)
[問題：在GGSN應用新呼叫策略拒絕時的DNS服務引數配置](#)
[解決方案](#)
[新呼叫策略拒絕如何工作？](#)
[SGSN如何選擇GGSN?](#)
[組態範例](#)

簡介

本檔案介紹在充當閘道通用封包無線服務(GPRS)支援節點(GGSN)的思科聚合服務路由器(ASR)5x00系列上遇到的情況（新呼叫原則拒絕失敗），以及設計網域名稱系統(DNS)網路以避免服務中斷時需要記住的一些預防措施。

作者：Parthasarathy M和Anthony Fajri，思科TAC工程師。

問題：在GGSN應用新呼叫策略拒絕時的DNS服務引數配置

在GGSN軟體升級期間，為了避免服務對使用者的影響，**在GGSN上應用新呼叫策**略拒絕。預期服務GPRS支援節點(SGSN)應根據新的呼叫策略將流量傳送到下一個可用GGSN。

但是，某些情況下並非如此。**newcall policy reject**沒有按預期工作，升級過程時會看到服務降級。

解決方案

新呼叫策略拒絕如何工作？

在GGSN上**應用新呼**叫策略拒絕後；

```
[local]ASR5K_LAB# newcall policy ggsn-service all reject
```

GGSN拒絕新的傳入的建立資料包資料協定(PDP)上下文請求(CPC-R)，而**且CPC-R沒有可用資**源，因此SGSN可以選擇下一個可用的GGSN，從而在升級維護視窗時將服務干擾降至最低。

新呼叫策略拒絕的實驗結果：

SGSN配置：

在本例中，**newcall policy reject**應用於GGSN1。當呼叫到達時，SGSN將CPC請求傳送到GGSN1,GGSN1又拒絕呼叫，然後SGSN將請求傳送到GGSN2。

監控訂戶跟蹤輸出：

```
===>GPRS Mobility/Session Management Message (2 Bytes)
Protocol Discriminator : GMM message
Message : Attach Complete


INBOUND>>>>>  05:34:35:320 Eventid:88112(0)
===>GPRS Mobility/Session Management Message (34 Bytes)
Protocol Discriminator : SM message
Message : Activate PDP Context Request
  Requested NSAPI
  Requested LLC SAPI
  Requested Qos
    Length of Qos: 14
  Requested PDP address
    Length : 2
  Access Point Name
    Length: 10


<<<<OUTBOUND  05:34:35:323 Eventid:116004(3)
GTPC Tx PDU, from 192.168.2.2:19002 to 192.168.2.1:2123 (110)
TEID: 0x00000000, Message type: GTP_CREATE_PDP_CONTEXT_REQ_MSG (0x10) >>>>>>>>>> to GGSN1
Sequence Number:: 0x00CC (204)
GTP HEADER FOLLOWS:
             Version number: 1
              Protocol type: 1 (GTP C/U)
       Extended header flag: Not present
       Sequence number flag: Present
           NPDU number flag: Not present
               Message Type: 0x10 (GTP_CREATE_PDP_CONTEXT_REQ_MSG)
             Message Length: 0x0066 (102)
                  Tunnel ID: 0x00000000
            Sequence Number: 0x00CC (204)
GTP HEADER ENDS.
INFORMATION ELEMENTS FOLLOW:
                       IMSI: 123450040000000
                   Recovery: 0x09 (9)
             Selection Mode: 0x0 (MS or network provided APN, subscribed verified (Subscribed))
           Tunnel ID Data I: 0x8000C002
        Tunnel ID Control I: 0x8000C002
                      NSAPI: 0x05 (5)
END USER ADDRESS FOLLOWS:
      PDP Type Organisation: IETF
            PDP Type Number: IPv4
                    Address: Empty
END USER ADDRESS ENDS.
           Access Point Name: sitt1.com
              GSN Address I: 0xC0A80202 (192.168.2.2)
             GSN Address II: 0xC0A80203 (192.168.2.3)
                    MSISDN: 128612345678901
                QOS Profile: 0x0223421F72967373440DFFFF00
COMMON FLAGS FOLLOW:
Prohibit Payload Compression: no
            MBMS Service Type: Multicast Service
         RAN Procedures Ready: no
    MBMS Counting Information: no
           No QoS negotiation: no
                         NRSN: yes
        Upgrade QoS Supported: no
     Dual Address Bearer Flag: no
```

```
COMMON FLAGS END.
    Radio Access Technology: GERAN
               MS Time Zone: -4:00
       Daylight Saving Time: +1 hour
INFORMATION ELEMENTS END.


INBOUND>>>>>  05:34:35:326 Eventid:116003(3)
GTPC Rx PDU, from 192.168.2.1:2123 to 192.168.2.2:19002 (14)
TEID: 0x8000C002, Message type: GTP_CREATE_PDP_CONTEXT_RES_MSG (0x11)
Sequence Number:: 0x00CC (204)
GTP HEADER FOLLOWS:
             Version number: 1
              Protocol type: 1 (GTP C/U)
       Extended header flag: Not present
       Sequence number flag: Present
           NPDU number flag: Not present
               Message Type: 0x11 (GTP_CREATE_PDP_CONTEXT_RES_MSG)
             Message Length: 0x0006 (6)
                  Tunnel ID: 0x8000C002
            Sequence Number: 0x00CC (204)
GTP HEADER ENDS.
INFORMATION ELEMENTS FOLLOW:
                      Cause: 0xC7 (GTP_NO_RESOURCES_AVAILABLE)
INFORMATION ELEMENTS END.


<<<<OUTBOUND  05:34:35:327 Eventid:116004(3)
GTPC Tx PDU, from 192.168.2.2:19002 to 192.168.2.128:2123 (110)
TEID: 0x00000000, Message type: GTP_CREATE_PDP_CONTEXT_REQ_MSG (0x10)>>>>>>>>>> GGSN2
Sequence Number:: 0x00CD (205)
GTP HEADER FOLLOWS:
             Version number: 1
              Protocol type: 1 (GTP C/U)
       Extended header flag: Not present
       Sequence number flag: Present
           NPDU number flag: Not present
               Message Type: 0x10 (GTP_CREATE_PDP_CONTEXT_REQ_MSG)
             Message Length: 0x0066 (102)
                  Tunnel ID: 0x00000000
            Sequence Number: 0x00CD (205)
GTP HEADER ENDS.
INFORMATION ELEMENTS FOLLOW:
                       IMSI: 123450040000000
                   Recovery: 0x09 (9)
             Selection Mode: 0x0 (MS or network provided APN, subscribed verified (Subscribed))
          Tunnel ID Data I: 0x8000C002
        Tunnel ID Control I: 0x8000C002
                      NSAPI: 0x05 (5)
END USER ADDRESS FOLLOWS:
      PDP Type Organisation: IETF
            PDP Type Number: IPv4
                    Address: Empty
END USER ADDRESS ENDS.
           Access Point Name: sitt1.com
              GSN Address I: 0xC0A80202 (192.168.2.2)
             GSN Address II: 0xC0A80203 (192.168.2.3)
                    MSISDN: 128612345678901
                QOS Profile: 0x0223421F72967373440DFFFF00
COMMON FLAGS FOLLOW:
Prohibit Payload Compression: no
            MBMS Service Type: Multicast Service
         RAN Procedures Ready: no
    MBMS Counting Information: no
```

```
          No QoS negotiation: no
                       NRSN: yes
        Upgrade QoS Supported: no
     Dual Address Bearer Flag: no
COMMON FLAGS END.
    Radio Access Technology: GERAN
               MS Time Zone: -4:00
       Daylight Saving Time: +1 hour
INFORMATION ELEMENTS END.


INBOUND>>>>>  05:34:35:337 Eventid:116003(3)
GTPC Rx PDU, from 192.168.2.128:2123 to 192.168.2.2:19002 (72)
TEID: 0x8000C002, Message type: GTP_CREATE_PDP_CONTEXT_RES_MSG (0x11)
Sequence Number:: 0x00CD (205)
GTP HEADER FOLLOWS:
             Version number: 1
              Protocol type: 1 (GTP C/U)
       Extended header flag: Not present
       Sequence number flag: Present
           NPDU number flag: Not present
               Message Type: 0x11 (GTP_CREATE_PDP_CONTEXT_RES_MSG)
             Message Length: 0x0040 (64)
                  Tunnel ID: 0x8000C002
            Sequence Number: 0x00CD (205)
GTP HEADER ENDS.
INFORMATION ELEMENTS FOLLOW:
                      Cause: 0x80 (GTP_REQUEST_ACCEPTED)
           Reorder Required: 0x0 (Not present)
           Tunnel ID Data I: 0x0FFFFFF8
        Tunnel ID Control I: 0x0FFFFFF8
                Charging ID: 0x00000007
END USER ADDRESS FOLLOWS:
      PDP Type Organisation: IETF
             PDP Type Number: IPv4
                IPv4 Address: 12.0.0.6
END USER ADDRESS ENDS.
               GSN Address I: 0xC0A80280 (192.168.2.128)
              GSN Address II: 0xC0A80280 (192.168.2.128)
                 QOS Profile: 0x0222421F7296D1FE460D03FE004A4A
INFORMATION ELEMENTS END.
```

SGSN如何選擇GGSN?

在apn-profile配置下，有一個命令**apn-resolve-dns-query snaptr**。

apn-resolve-dns-query snaptr [epc-ue |非epc-ue]

SNAPTR過濾器基於使用者裝置(UE)的EPC能力。 使用此命令為具有EPC訂閱的3G使用者啟用SNAPTR型別DNS查詢，以進行APN解析。此模式中的配置可提升每個APN對此功能的控制。
如果這兩個關鍵字都不包含在配置中，則S-NAPTR查詢適用於所有UE，包括支援EPC的UE和不支援EPC的UE。預設情況下，此功能未啟用。

這表示SGSN會以Name Authority Pointer(NAPTR)格式(sitt1.com.apn.epc.mnc090.mcc262.3gppnetwork.org)傳送DNS查詢以選擇GGSN。

如果NAPTR查詢失敗，則SGSN回退到查詢型別A(sitt1.mnc045.mcc123.gprs)以獲取GGSN IP地址。

實驗結果：

SGSN配置：

```
apn-profile default

    apn-resolve-dns-query snaptr
```

監控通訊協定追蹤：

```
*** Verbosity Level (  2) ***
*** Verbosity Level (  3) ***
<<<<OUTBOUND  05:42:24:667 Eventid:5957(3)
DNS PDU Tx
       from : 192.168.2.1 : 49351
       to   : 192.168.1.254 : 53
       bytes : 76
Query ID              : 6366
Type                  : Query
Question              : NAPTR ? sitt1.com.apn.epc.mnc045.mcc123.3gppnetwork.org.
Additional            :
  Name                : .
  Ext-RCODE           : 0
  Type                : OPT
  UDPsize             : 4096


INBOUND>>>>>  05:42:24:750 Eventid:5956(3)
DNS PDU Rx
       from : 192.168.1.254 : 53
       to   : 192.168.2.1 : 49351
       bytes : 76
Query ID              : 6366
Type                  : Response
Authoritative Answer  : No
Response code         : ServFail
Question              : NAPTR ? sitt1.com.apn.epc.mnc045.mcc123.3gppnetwork.org.
Additional            :
  Name                : .
  Ext-RCODE           : 0
  Type                : OPT
  UDPsize             : 4096



<<<<OUTBOUND  05:42:24:752 Eventid:5957(3)
DNS PDU Tx
       from : 192.168.2.1 : 51619
       to   : 192.168.1.254 : 53
       bytes : 57
Query ID              : 16777
Type                  : Query
Question              : A? sitt1.com.MNC045.MCC123.GPRS.
Additional            :
  Name                : .
  Ext-RCODE           : 0
  Type                : OPT
  UDPsize             : 4096
```

```
INBOUND>>>>>  05:42:24:781 Eventid:5956(3)
DNS PDU Rx
       from : 192.168.1.254 : 53
       to   : 192.168.2.1 : 51619
       bytes : 57
Query ID              : 16777
Type                  : Response
Authoritative Answer  : No
Response code         : Success
Question              : A? sitt1.com.MNC045.MCC123.GPRS.
Additional            :
  Name                : .
  Ext-RCODE           : 0
  Type                : OPT
  UDPsize             : 4096
```

組態範例

如果使用以下服務引數配置DNS:

```
Flags: A              Service: x-3gpp-pgw:x-s5-gtp:x-s8-gtp:x-gn:x-gp
```

當支援非演化分組核心(EPC)的UE嘗試連線時，根據DNS應答服務型別，SGSN決定回退到A查詢。

例如：

SGSN檢查DNS應答服務型別，如果找不到關鍵字x-3gpp-ggsn:x-gn和x-3gpp-ggsn:x-gp，則SGSN回退到A查詢型別。

```
Query Name: sitt1.com.apn.epc.mnc045.mcc123.3gppnetwork.org
Answer:
  Order: 10             Preference: 10
  Flags: A              Service: x-3gpp-pgw:x-s5-gtp:x-s8-gtp:x-gn:x-gp
  Regular Expression:
  Replacement: TOPON.S5.GGSN1.NODES.EPC.MNC090.MCC262.3GPPNETWORK.ORG

Query Name: sitt1.mnc045.mcc123.gprs
Query Type: A          TTL: 48993 seconds
Answer:
  IP Address: 192.168.2.1
```

假設，如果您在DNS中只為A記錄配置一個GGSN IP地址，則SGSN無法重定向到下一個可用GGSN，因此會降低服務。

根據SGSN管理指南：

Gn SGSN支援並幫助為支援Evolved Packet Core(EPC)的UE選擇共置資料包資料網路(PDN)網關(P-GW)/GGSN節點，並對服務引數**x-3gpp-pgw:x-gn / x-3gpp-pgw:x-gp**的APN完全限定域名(FQDN)執行DNS直接NAPTR(SNAPTR)查詢。服務引數**x-3gpp-ggsn:x-gn**和**x-3gpp-ggsn:x-gp** 中的介面也用於選擇獨立GGSN。

因此，在設計DNS記錄時，可以包含服務引數，例如：

```
Flags: A     Service: x-3gpp-pgw:x-s5-gtp:x-s8-gtp:x-gn:x-gp:x-3gpp-ggsn:x-gn:x-gp
```

之後，DNS開始為不支援EPC的UE返回多個網關(GW)地址。

```
Query Name: sitt1.com.apn.epc.mnc045.mcc123.3gppnetwork.org
Query Type: NAPTR      TTL: 42755 seconds
Answer:
 Order: 40             Preference: 40
 Flags: A              Service: x-3gpp-pgw:x-s5-gtp:x-s8-gtp:x-gn:x-gp:x-3gpp-ggsn:x-gn:x-gp
 Regular Expression:
 Replacement: TOPON.S5.GGSN03.NODES.EPC.mnc045.mcc123.3GPPNETWORK.ORG

Query Name: sitt1.com.apn.epc.mnc045.mcc123.3gppnetwork.org
Query Type: NAPTR      TTL: 42755 seconds
Answer:
 Order: 10             Preference: 10
 Flags: A              Service: x-3gpp-pgw:x-s5-gtp:x-s8-gtp:x-gn:x-gp:x-3gpp-ggsn:x-gn:x-gp
 Regular Expression:
 Replacement: TOPON.S5.GGSN02.NODES.EPC.mnc045.mcc123.3GPPNETWORK.ORG

Query Name: sitt1.com.apn.epc.mnc045.mcc123.3gppnetwork.org
Query Type: NAPTR      TTL: 42755 seconds
Answer:
 Order: 20             Preference: 20
 Flags: A              Service: x-3gpp-pgw:x-s5-gtp:x-s8-gtp:x-gn:x-gp:x-3gpp-ggsn:x-gn:x-gp
 Regular Expression:
 Replacement: TOPON.S5.GGSN05.NODES.EPC.mnc045.mcc123.3GPPNETWORK.ORG

Query Name: sitt1.com.apn.epc.mnc045.mcc123.3gppnetwork.org
Query Type: NAPTR      TTL: 42755 seconds
Answer:
 Order: 30             Preference: 30
 Flags: A              Service: x-3gpp-pgw:x-s5-gtp:x-s8-gtp:x-gn:x-gp:x-3gpp-ggsn:x-gn:x-gp
 Regular Expression:
 Replacement: TOPON.S5.GGSN04.NODES.EPC.mnc045.mcc123.3GPPNETWORK.ORG

Query Name: TOPON.S5.GGSN04.NODES.EPC.mnc045.mcc123.3GPPNETWORK.ORG
Query Type: NAPTR TTL: 48993 seconds
Answer:
IP Address: 192.168.2.22

Query Name: TOPON.S5.GGSN03.NODES.EPC.mnc045.mcc123.3GPPNETWORK.ORG
Query Type: NAPTR TTL: 48993 seconds
Answer:
IP Address: 192.168.2.18

Query Name: TOPON.S5.GGSN05.NODES.EPC.mnc045.mcc123.3GPPNETWORK.ORG
Query Type: NAPTR TTL: 48993 seconds
Answer:
IP Address: 192.168.2.23

Query Name: TOPON.S5.GGSN02.NODES.EPC.mnc045.mcc123.3GPPNETWORK.ORG
Query Type: NAPTR TTL: 48993 seconds
Answer:
IP Address: 192.168.2.21
```

總而言之，請確保您的DNS配置如x-3gpp-pgw:x-s5-gtp:x-s8-gtp:x-gn:x-gp:x-3gpp-ggsn:x-gn:x-gp，以避免當您擁有多個GGSN來支援地域冗餘時，出現服務干擾。