Troubleshoot Scenarios of SPGW Selection via DNS Route Based on Configuration

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Introduction

This document describes the different scenarios of Domain Name Server (DNS) used for Serving and PDN-Gateway (SPGW) selection based on Mobility Management Entity (MME) configuration.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- DNS
- SPGW selection basics
- MME configuration basics (call control profile/IMSI configuration)

Components Used

The information in this document is based on these software and hardware versions:

- DNS
- MME

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Overview

1. SPGW is the node which is responsible to provide the desired services to the user and interconnects the user with the Internet Service Provider (ISP).

2. But, when at MME it needs to be decided subscriber requests to be forwarded to the correct SPGW and that is done via DNS which depends on the type of configuration you do in MME.

3. In MME, these are the mentioned formats of configuration:

- DNS client configuration is done in the context where there are required services. In this context, where there is a DNS configuration, its DNS profile name (sgw/pgw/mme/amf) is mapped wherever required, and where it needs sgw/pgw/mme/amf selection.

- Call-control profile: DNS profile is mapped with the call control profile so all the IMSI series which use this call control profile use this DNS profile mapped with it to get PGW IP.

Flow Structure of How Entities are Mapped


```
operator-policy name <operator-policy-name>
associate call-control-profile <profile name>
exit

call-control-profile RMN-CCP1
dns-pgw context CORE
exit

lte-policy
subscriber-map LTE
precedence 1 match-criteria imsi mcc <XXX> mnc <YYY> <operator-policy-name>
precedence 2 match-criteria imsi mcc <XXX> mnc <YYY> msin first <IMSI range start> last <IMSI
range end> operator-policy-name <operator-policy-name>
exi
```

There is a DNS profile in MME-SVC as well which is used by default in case any DNS profile is not mapped with call control profiles.

Types of SPGW Selection via DNS Route

There are two types of SPGW selections that depend on the type of entry you do, like static/dynamic.

1. Static SPGW Selection from MME

In this type of static selection, direct SPGW can be selected and defined in the configuration in different ways.

In APN Profiles

Here, against every APN profile, you can directly have the PGW address assigned with a proper collocated node name.

```
apn-profile <apn profile name>
 pgw-address <PGW IP> collocated-node <collocated name of PGW> smf-combined weight 100
exit
```

Now, further, this APN profile is mapped with operator policy which has a call control profile and an APN profile bound. In this way, the call control profile gets that particular APN profile for that operator's policy.

```
operator-policy name ABC
associate call-control-profile ABC
apn network-identifier abc operator-identifier 5g.mncXXX.mccXXX.gprs apn-profile <apn profile
name mentioned above>
exit
```

In MME-SVC

There is always a default configuration in MME-SVC for static entry which comes into the picture when the user is not able to find any static entry.

```
mme-service ABC
 pgw-address <PGW IP> collocated-node <collocated node name>
exit
```

2. Dynamic SPGW Selection from External DNS

In Call-control Profiles

This is the place which is the first point of contact when the user is latched to the network with the IMSI where the system checks if it has any dynamic entry in the call control profile.

```
  call-control-profile ABC
   dns-sgw context <context name where dns client is configured for SGW>
   dns-pgw context <context name where dns client is configured for PGW>
 exit
```

In MME-SVC

There is always a default configuration in MME-SVC for dynamic entry also, which comes into the picture when the user is not able to find any dynamic entry.

```
  mme-service ABC
   dns-sgw context <context name where dns client is configured for SGW>
```

```
     dns-pgw context <context name where dns client is configured for PGW>
   exit
```

Different Scenarios for the SPGW Selection Based on Configuration and Type of Entry

1. In call control profiles, the DNS profile is configured and it has a dynamic way of SPGW selection. If you have no dynamic DNS entry for SPGW selection, then it proceeds to check if any static route is defined or not.

> **Note**: Dynamic entry means that you send the request to external DNS/cache DNS to do the SPGW selection.

2. Now, again for static SPGW entry, you first have to accomplish if there are any APN profiles created. If any APN profile is created with a static SPGW entry, then it directly selects SPGW based on that static entry. In case no APN profile is mapped, then it picks the static entry from mme-svc which is the default.

> **Note**: Once you map an APN profile and there is no static entry then it would not check in mme-svc for static entry further. So if you want static SPGW selection and you already have an APN profile created then add the static entry in an APN profile itself. In case if APN profile is not created at all then it directly picks a static entry from mme-svc.

3. If there is no dynamic DNS entry in the call-control profile and no static entry via the APN profile, then by default it looks into mme-svc (mme service) where:

- Firstly, it checks if any dynamic entry is available and if it is, you can consider that as a dynamic entry.
- Secondly, if no dynamic entry is present, it looks if any static entry is available and considers it if it is.