

APN Override

Access Point Name (APN) Override is a set of features which enable the operator to override the APN requested by the UE. The functionality to provide configurable remapping provides the operator flexible options with APN handling locally rather than requiring changes in the external systems.

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Feature Description

In many situations the APN provided in the Activation Request is unacceptable. Either it does not match any of the subscribed APNs or could be misspelled, resulting in the SGSN/MME rejecting the Activation Request. The APN Override feature enables the operator to override an incoming APN specified by a subscriber or provided during the APN selection procedure.

There are three methods of performing apn-overriding.

- Network Identifier (NI) based overriding
- Operator Identifier (OI) based overriding
- Charging-characteristic based overriding

A valid license key is required to enable APN Override. Contact your Cisco Account or Support representative for information on how to obtain a license.

MME sends remapped APN to the UE in the ATTACH_ACCEPT or ACTIVATE_DEFAULT_BEARER_REQ messages when APN Remapping feature is enabled. The behavior is modified so that MME can control to send either the UE requested APN or remapped APN in these messages. This behavior is controlled through adding a new optional keyword **orig-apn** in the existing **apn-remap** CLI command in the APN Remap Table configuration mode.

Additional configuration control is provided at the MME service level to reject or accept UE sessions with APN containing non-3GPP standard characters. The following are considered as standard 3GPP characters:

- A - Z, a - z (alphabets)
- 0 – 9 (numeric)

- - (hyphen)
- * (asterisk)
- . (period)

All other characters are considered as non-3GPP standard.

New CLI configuration is also introduced in the APN Remap Table configuration mode to allow remapping of APNs with non-3GPP characters.

How it Works

The following sections describe the three methods for overriding a UE requested APN. These options enable the operator to overwrite incorrect APNs or apply an APN when not provisioned for the subscriber in the HLR.

Network Identifier (NI) Overriding

Network Identifier (NI) Overriding is done before validating the UE requested APN with HSS subscriber data.

Operator Identifier (OI) Overriding

Operator Identifier (OI) Overriding is done after Network Identifier is validated against HSS subscriber data. After the FQDN is constructed for DNS query, OI overriding is applied on the constructed FQDN to form a new FQDN based on OI remapping.

Charging Characteristics Overriding

Charging characteristics based overriding is performed if the apn-charging-characteristic/subscriber-charging-characteristic from the HSS matches the configured APN and charging-characteristic in the remap entry.

Configuring APN Override

Configuration for all of the functions of the APN Override feature is accomplished in the APN Remap Table configuration mode of the Operator Policy Feature. In order to enable apn-overriding, an apn-remap-table must be configured and associated to the mme-service through the operator-policy.

Before You Begin

APN Override is configured with the commands in the APN Remap Table configuration mode. This mode generates a table that is a key component of the Operator Policy feature and the table is not valid unless it is associated with an operator policy.

Before entering the APN Remap Table configuration mode to configure specific APN override settings, you must first create and associate the various related objects as follows:

Procedure

Step 1 Create an APN Remap Table instance from the Global configuration mode.

Step 2 Associate the APN Remap Table with an operator policy in the Operator Policy configuration mode.

Step 3 Define which subscribers should have this operator policy applied.

Refer to the following example to complete these steps.

Example

```
configure
   apn-remap-table table_name -noconfirm
      exit
   operator-policy name policy_name -noconfirm
      associate apn-remap-table table_name
      exit
   lte-policy
      subscriber-map map_name -noconfirm
         precedence 1 match-criteria all operator-policy-name policy_name
         exit
      exit
   context ingress -noconfirm
      mme-service srvc_name  -noconfirm
         associate subscriber-map map_name
         end
```

Configuring Network Identifier Override

Network Identifier (NI) Overriding is done before validating the UE requested APN with HSS subscriber data.

```
configure
   apn-remap-table table_name
      apn-remap network-identifier  company.com new-ni internet.com
      end
```

Notes:

- The **apn-remap** command above remaps the UE requested APN "company.com" to "internet.com".
- Wildcards characters (*) can be used in the existing network identifier.

Configuring Operator Identifier Override

Operator Identifier (OI) Overriding is done after Network Identifier is validated against HSS subscriber data. After the FQDN is constructed for the DNS query, Operator Identifier overriding is applied on the constructed FQDN to construct the new FQDN based on OI remapping.

```
configure
   apn-remap-table table_name
      apn-remap operator-identifier mnc456.mcc123.gprs new-oi mnc987.mcc654.gprs
       apn-remap operator-identifier mnc456.mcc123.gprs value-for-oi-mcc 543
value-for-oi-mnc 234
       end
```

Notes:

- The first **apn-remap** command above remaps "company.com.apn.epc.mnc456.mcc123.3gppnetwork.org" to "starent.com.apn.epc.mnc987.mcc654.3gppnetwork.org".
- The second **apn-remap** command above remaps "starent.com.apn.epc.mnc456.mcc123.3gppnetwork.org" to "starent.com.apn.epc.mnc234.mcc543.3gppnetwork.org".
- Wildcards characters (*) can be used in the existing operator identifier.

Configuring Charging Characteristics Override

If the UE-requested APN and apn-charging-characteristic or subscriber-charging-characteristic information returned from the HSS matches the locally configured APN and charging-characteristic details in the remap entry, then it is overridden with the configured target-ni.

```
configure
   apn-remap-table table_name
      cc behavior  0x785 profile 6 apn-remap network-identifier company.com
 new-ni internet.com
      end
```

Notes:

- The above command remaps "company.com" to "internet.com" if the configured charging-characteristic matches the apn-charging-characteristic or subscriber-charging-characteristic in the HSS. Also, the PDN-type must match.

Enabling MME to Send UE Requested APN

Use the following configuration commands to configure MME to send the UE requested APN in ATTACH_ACCEPT or ACTIVATE_DEFAULT_BEARER_REQ message.

```
configure
   apn-remap-table table_name
      apn-remap network-identifier company.com new-ni internet.com [ orig-apn
 ]
      cc behavior 0xff profile 10 apn-remap network-identifier company.com
new-ni internet.com [ orig-apn ]
      apn-selection-default lowest-context-id [ orig-apn ]
      apn-selection-default first-in-subscription [ orig-apn ]
      apn-selection-default network-identifier require-dns-fail-wildcard
 [ orig-apn ]
      end
```

Notes:

- **orig-apn**: This is an optional keyword newly added to the existing CLI commands to enable MME to send UE requested APN to the UE. If this optional keyword is not configured, then MME continues with its default behavior of sending the remapped APN to the UE.
- For more information on the existing CLI commands, see the *Command Line Interface Reference* guide.

Rejecting UE Requested APN with Non-standard Characters

Use the following configuration commands to configure MME to reject UE sessions containing non 3GPP standard characters in the APN.

```
configure
   context context_name
      mme-service service_name
         [ default ] policy attach reject-non3gpp-char-apn
         [ default ] policy pdn-connect reject-non3gpp-char-apn
         end
```

Notes:

- **policy attach reject-non3gpp-char-apn**: This command enables MME to immediately reject the attach procedure without any APN remapping, if the UE requested APN contains non 3GPP characters. The attach procedure is rejected with ESM cause-code #27 "missing or unknown APN" and T3396 value IE is included in the Attach reject message.
- **policy pdn-connect reject-non3gpp-char-apn**: This command enables MME to immediately reject the PDN connect procedure without any APN remapping, if the UE requested APN contains non 3GPP characters. The PDN connect procedure is rejected with ESM cause-code #27 "missing or unknown APN" and T3396 value IE is included in the PDN connect reject message.
- For more information on the existing CLI commands, see the *Command Line Interface Reference* guide.

Remapping UE Requested APN with Non-standard Characters

Use the following configuration commands to configure MME to remap UE requested non 3GPP character APN to an operator defined APN.

```
configure
   apn-remap-table table_name
      apn-remap non3gpp-char-apn new-ni new-ni-name [ orig-apn ]
      end
```

Notes:

- **apn-remap non3gpp-char-apn new-ni** *new-ni-name*: This command enables MME to remap all UE requested APNs containing non 3GPP characters to the configured new-ni APN. If the optional keyword “orig-apn” is configured, then MME sends the UE requested APN in ATTACH_ACCEPT or ACTIVATE_DEFAULT_BEARER_REQ message. If this keyword is not configured, then remapped APN is sent back to UE.
- This CLI is applied only if the UE sessions are not rejected by the new configuration options **policy attach reject-non3gpp-char-apn** and **policy pdn-connect reject-non3gpp-char-apn** under the mme-service.

- If the UE requested APN contains non-3GPP characters and the **apn-remap non3gpp-char-apn new-ni** *new-ni-name* CLI command is configured, then this CLI takes precedence over any other matching criterion for APN remapping.
- For more information on the existing CLI commands, see the *Command Line Interface Reference* guide.

Verifying the APN Override Configuration

The following command shows the override settings configured for the specified APN remap table.

show apn-remap-table full name *table_name*

```
show apn-remap-table full name           table1
Charging Characteristic APN Override Entry1
      Match Charging Characteristics Behavior           : 0x785
      Match Charging Characteristics Profile-Index      : 6
      Match Requested APN                               : company.com
      APN to use for Overriding                         : internet.com
APN remap Entry1 :
      Match Input OI wildcard             :mnc456.mcc123.gprs
      Remap Input OI to                   :mnc987.mcc654.gprs
APN remap Entry2 :
      Match Input NI wildcard             :company.com
      Remap Input NI to                   :internet1.com
```

Monitoring and Troubleshooting the APN Override Feature

This section provides information regarding show commands and/or their outputs in support of this feature.

The following operations should be performed for any failure related to this feature:

- Verify if the feature is enabled using **show configuration** and **show mme-service all** CLI commands. If not enabled, configure the CLI commands mentioned in the *Enabling MME to Send UE Requested APN* and *Rejecting UE Requested APN with Non-standard Characters* sections and check if it works.
- Collect the output of **show mme-service statistics debug** command and analyze the debug statistics "Rejected Attach due to non3gpp char APN" and "Rejected PDN Connect due to non3gpp char APN". For further analysis, contact your Cisco account representative.

show configuration

The output of this show command is enhanced to indicate whether MME sends back UE requested APN in ATTACH_ACCEPT or ACTIVATE_DEFAULT_BEARER_REQ message.

The following is a sample output of this show command indicating that this feature is enabled.

```
[local]asr5000# show configuration
config
... ... ...
no session trace network-element saegw
  apn-remap-table abc
     apn-remap non3gpp-char-apn new-ni mappedAPn orig-apn
     apn-remap network-identifier origApn new-ni mappedApn orig-apn
  #exit
  port bits 24/4
    snmp trap link-status
```

```
... ... ...
      no heuristic-paging
      no isr-capability
      policy attach set-ue-time disable
       policy attach reject-non3gpp-char-apn
       policy pdn-connect reject-non3gpp-char-apn
      policy tau set-ue-time disable
... ... ...
... ... ...
end
```

show mme-service all

The output of this show command is enhanced to indicate whether MME rejects APNs with non-standard characters in Attach Request or PDN Connect Request message. The following fields are added in support of this feature.

- Reject attach with non-3GPP char APN
- Reject pdn connect with non-3GPP char APN

The following is a sample output of this show command with the new field included.

```
show mme-service all
Policy for Idle Mode Detach          : Explicit
NAS Max Retransmissions Count        : 4
Set UE Time (attach processing)      : Disabled
Reject attach with non-3GPP char APN : Disabled
Reject pdn connect with non-3GPP char APN : Disabled
IMEI Query (attach processing)       : None
EIR Query (attach processing)        : Disabled
```

show mme-service session full { all | imsi | mme-service }

The output of this show command is enhanced to display the name of UE requested APN with non-standard character in hexadecimal format, and with all standard characters in normal string format. The following field is added in support of this feature.

- UE Requested APN

The following is a sample output of this show command with the new field included.

```
show mme-service session full all
PDN Information:
   APN Name: starent.com
   UE Requested APN: starent-ueside.com
APN Restriction: 1
PDN Type: IPv4
```



Important The UE requested APN information will not be available for UE after the session recovery as it will not be check pointed.

show mme-service session full { all | imsi | mme-service }