

S13 Additional IMEI Check

The Cisco MME supports the 3GPP-standard S13 interface towards an Equipment Identity Register (EIR) server. This document describes an MME enhancement to send additional mobile equipment identity checking requests to the EIR server over the S13 interface.

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Feature Description

The 'S13 Additional IMEI Check' feature is an MME enhancement to send additional International Mobile Equipment Identity (IMEI) check requests - Mobile Identity check Request (MICR) towards the EIR server over the S13 interface. The additional MICR will include additional information, non-standard AVPs: the Mobile Station International Subscriber Directory Number (MSISDN) and the e-UTRAN Cell Global Identifier (e-CGI). As well, the sending of the additional information will be triggered by various UE procedures (Attach, TAU, and Handover).

Use of the 'S13 Additional IMEI Check' feature is CLI controlled. By default, the Cisco MME supports the 3GPP-standard S13 interface towards an EIR server, which includes sending IMEI check requests containing the two AVPs, IMEI and IMSI, as defined in 3GPP TS 29.272 section 6.2.1.1.

For additional information about the two additional AVPs, please refer to:

- MSISN, the standard Diameter AVP, is defined in section 6.3.2 of 3GPP TS 29.329.
- eCGI is defined in section 7.3.117 of 3GPP TS 29.272.

No feature-specific license is required for this feature.

How It Works

Overview

This 'S13 Additional IMEI Check' feature uses the S13 interface between the MME and the EIR to send an addition al IMEI check request (MICR) containing not the two but four AVPs: IMEI, IMSI, MSISDN, and eCGI.

There is no change in the call flow for this additional MICR. Attach/TAU/HO procedures continue as defined by 3GPP TS 29.272. This means that if this feature is accidentally enabled in the configuration, there is no impact on subscriber call flows.

Existing Diameter statistics (as well as existing bulk statistics) for EIR messaging are still applicable and can be used for monitoring. New statistics have been added to help monitor and troubleshoot this feature (see *Monitoring and Troubleshooting* section).

Operational Criteria

The MME will

- support the S13 Additional IMEI Check functionality, in addition to the default functionality, if the feature is enabled via CLI.
- continue to support the standard IMEI Check Request procedure with the EIR to ensure the MME continues the UE procedure even if the additional MICR procedure with the EIR fails due to error response or timeout.
- send the additional IMEI check request with the additional AVPs only if **all four AVPs** mentioned are available.
- send the additional IMEI check request with the additional AVPs to EIR during any one of the following procedures:
  - Initial Attach
  - GUTI Attach (normal)
  - Inter TAU
  - Periodic TAU
  - Handover (S1, X2)

Operational Requirements

1. The MME must be configured to enable the S13 Additional IMEI Check feature (refer to *Configuration* section).
2. The MME service must be configured to fetch IMEI numbers in advance to use during additional MICR (refer to *Configuration* section).
3. The custom2 dictionary must be selected for the EIR-endpoint under the HSS Peer Service to enable sending of the MSISDN and eCGI values (refer to *Configuration* section).
4. This feature reuses the Mobile Identity check Request (MICR) towards the EIR and adds two AVPs in addition to those defined by the 3GPP standards. So, the receiving EIR needs to be capable of handling and understanding the additional AVPs.



Note Not every EIR is capable of handling the additional AVPs. Hence, it is likely that this feature will not be useful to all operators.

Configuration

All configurations listed below must be completed to enable S13 Additional IMEI Checking functionality.

Enabling S13 Additional IMEI Check Request

A command has been added to the MME Service configuration mode to enable the MME to send additional Mobile Identity check Requests (MICR) towards the EIR over the S13 interface. You must choose at least one triggering UE procedure.

```
configure
   context context_name
      mme-service service_name
         [ no ] s13 additional-id-check { attach | handover | tau }
         end
```

Notes:

- *service_name* - Service names for all services should be unique per chassis.
- **no** - This command filter instructs the MME to remove the specified feature configuration from the MME Service configuration.
- **attach** - This keyword instructs the MME to send additional MICR in response to an Attach procedure.
- **handover** - This keyword instructs the MME to send additional MICR in response to a Handover procedure.
- **tau** - This keyword instructs the MME to send additional MICR in response to a Tracking Area Update procedure.
- The command can be repeated to configure multiple triggering procedures.
- For additional command information, refer to the *Command Line Interface Reference*.

Enabling Fetching of IMEI Number

This feature uses the existing syntax that configures the MME service to query the UE to fetch the IMEI during Attach and Tracking Area Update (TAU) procedures. The fetched IMEI is used in the additional MICR during the Attach and/or TAU procedures.

```
config
  context context_name
    mme-service service_name
      policy attach imei-query-type { imei | imei-sv | none }
      policy tau imei-query-type { imei | imei-sv | none }
      default policy [ attach | tau ] imei-query-type
      end
```

Notes:

- *service_name* - Service names for all services should be unique per chassis.

- **policy attach imei-query-type** - This command string configures the IMEI query type during UE Attach:
  - **imei :** Specifies that the MME is required to fetch the UE's International Mobile Equipment Identity (IMEI).
  - **imei-sv:** Specifies that the MME is required to fetch the UE's International Mobile Equipment Identity - Software Version (IMEI-SV).
  - **none:** Specifies that the MME does not need to query the UE to fetch either the IMEI or IMEI-SV. This is the default setting.
- **default** - Including this command filter returns the command to its default setting of 'none' for **imei-query-type**.
- For additional command information, refer to the *Command Line Interface Reference*.

Enabling custom2 Dictionary as EIR End-point

Use the following syntax to select the 'custom2' dictionary for the EIR end-point, under the HSS-Peer service configuration, to send MSISDN and eCGI values in the additional MICR.

```
config
   context context_name
      hss-peer-service service_name
         diameter hss-dictionary dictionary eir-dictionary custom2
         default diameter hss-dictionary eir-dictionary
     end
```

Notes:

- *context_name* - It is not required to configure the MME and HSS-Peer services to be in the same context.
- *service_name* - Service names for all services should be unique per chassis.
- **hss-dictionary** *dictionary* - This keyword identifies the dictionary to be used for the HSS Peer Service. Enter the name of the dictionary to be used as the HSS Diameter dictionary.
- **eir-dictionary** - This keyword specifies that an Equipment Identity Register (EIR) dictionary is to be used in conjunction with the HSS Diameter dictionary.
- **custom2** - This keyword selects the **custom2** dictionary, created for the MME's S13 Additional IMEI Check feature, to be used as the EIR dictionary.
- **default** - This command filter instructs the MME to reset the HSS Diameter dictionary and the EIR dictionary to the **standard** dictionary.
- For additional command information, refer to the *Command Line Interface Reference*.

Monitoring and Troubleshooting

Verifying Configuration

Use the following show command, from the Exec mode, to verify the configuration for this feature. The output generated by this command will look similar to the following to indicate the features configuration:

show mme-service name *service_name*

```
s13-additional-id-check :
  Attach: Enabled/Disabled
  TAU: Enabled/Disabled
  Handover: Enabled/Disabled
```

Monitoring Additional IMEI Check Request-related Statistics

Use the following show command, from the Exec mode, to use the monitoring statistics created for this feature. The output generated by this command will look similar to the following:

show mme-service statistics mme-service *service_name*

```
S13 statistics:
 Additional ME Identity Check Procedures (Attach):
  Requests: 0    Answer : 0
  Success : 0   Failure : 0
  Timeout : 0

 Additional ME Identity Check Procedures (TAU):
  Requests: 0    Answer : 0
  Success : 0   Failure : 0
  Timeout : 0

 Additional ME Identity Check Procedures (Handover):
  Requests: 0    Answer : 0
  Success : 0   Failure : 0
  Timeout : 0
```

Monitoring Additional IMEI Check Request-related Bulk Statistics

The following bulk statistics have been created in the MME schema to monitor additional IMEI check functions:

- msg-addtnl-mic-req
- msg-addtnl-mic-ans
- msg-addtnl-mica-success
- msg-addtnl-mica-failure
- msg-addtnl-mica-timeout

Monitoring Default IMEI Check Request Functionality

The default functionality is not new. You can use the existing bulk statistics in the HSS schema for tracking the MICR messaging for the default MICR functionality:

- msg-mic-req

- msg-mic-ans
- msg-micr-retries
- msg-mica-timeout
- msg-mica-drop