

MME-MEF Interface

- Feature Summary and Revision History, on page 1
- Feature Description, on page 2
- How It Works, on page 2
- Configuring MME MEF Interface, on page 6
- Monitoring and Troubleshooting, on page 7

Feature Summary and Revision History

Summary Data

Applicable Product(s) or Functional Area	MME
Applicable Platform(s)	• ASR 5500 • VPC-DI • VPC-SI
Default Setting	Enabled - Configuration Required
Related Changes in This Release	Not Applicable
Related Documentation	• *Command Line Interface Reference* • *MME Administration Guide* • *Statistics and Counters Reference*

Revision History

Revision Details	Release
First introduced.	21.14

Feature Description

A new service based on egtp-service supports MME's MEF functionality. This service handles a proprietary interface to deliver MEF events to MEF server based out of GTPv2 interface. This service creates a local end-point for the MEF interface which can be associated with the MME service. The maximum number of MEF services that can be created is limited to the maximum number of allowed egtp-service.

MME uses this interface to communicate with the peer MEF servers configured by the operator for each UP address. MME sends the MEF events to peer MEF server for only one PDN per UE, where it's created for MEC enabled APN along with UE-Usage-Type set to "PDN reconnection with MEF interworking". Following are list of messages defined for MEF interface:

- Subscriber-Activate-Request
- Subscriber-Modify-Request
- Subscriber-Delete-Request
- Subscriber-Audit-Request
- Subscriber-Audit-Response

Along with the list of above messages, ECHO-REQ and ECHO-RESPONSE are also supported for MEF interface path management.

How It Works

Architecture

Following messages are supported by MEF interface:

- Subscriber-Activate-Request
- Subscriber-Modify-Request
- Subscriber-Delete-Request
- Subscriber-Audit-Request
- Subscriber-Audit-Response

Subscriber-Activate-Request

MME sends a Subscriber-Activate-Request message to MEF server whenever the MEC PDN gets created for the UE either through Attach or PDN-Connect procedure. After Modify-Bearer-Request sent to SGW, MME sends this message to MEF with the following details:

Information Elements	Presence	Condition/Comment	IE Type	Ins
IMSI	M			

User Location Information (ULI)	M	Include ECGI and TAI.
PDN Address Allocation (PAA)	M	The PDN type field in the PAA must be set to IPv4, or IPv6 or IPv4v6.
Sender F-TEID for Control Plane	M	Sender F-TEID
Access Point Name (APN)	M	
UE Usage Type	M	This IE must be set to the subscribed UE Usage Type, if received from the HSS.

Subscriber-Modify-Request

MME sends Subscriber-Activate-Request message to the MEF server, whenever UE mobility occurs through Tracking-Area-Update (TAU), Service-Request, Handovers (S1/X2 Handover), and Location-Report with the ECGI change. MME does not send this event to MEF if any of the earlier procedures resulted only in the TAI change and no change in ECGI. Once the earlier mobility procedure compiled successfully with the ECGI change the MME sends the following details to MEF.

Information Elements	Presence	Condition/Comment	IE Type	Ins
IMSI	M		IMSI	0
User Location Information (ULI)	M	Include ECGI and TAI	ULI	0

Subscriber-Delete-Request

MME sends Subscriber-Delete-Request message to MEF server, whenever MEC PDN gets terminated for the UE either through Detach or PDN-Disconnect procedure. MME sends this message to MEF with the following details.

Information Elements	Presence	Condition/Comment	IE Type	Ins
IMSI	M		IMSI	0
User Location Information (ULI)	M	Include ECGI and TAI	ULI	0

PDN Address Allocation (PAA)	M	The PDN type field in the PAA must be set to IPv4, or IPv6 or IPv4v6.	PAA	0

MEF performs auditing for each UE periodically or when MEF receives MEC messages for unknown IMSI.

Subscriber-Audit-Request

MEF performs auditing for each UE periodically and when it receives MEC messages for unknown IMSI. It sends the Subscriber-Audit-Request message to MME with the IMSI of the subscriber for which it wants to perform an audit. In case of auditing for Unknown-IMSI, MEF sends the TEID as 0 in GTPv2 header, otherwise MEF fills the TEID information that is received in the Subscriber-Activate-Request from MME. MME responds with Subscriber-Audit-Response to MEF.

Information Elements	Presence	Condition/Comment	IE Type	Ins
IMSI	M		IMSI	0

Subscriber-Audit-Response

MME sends this message to MEF when it receives the Subscriber-Audit-Request for an IMSI. It responds with success or failure cause based on the availability of UE information. If MME does not have valid UE-Context for the IMSI received in Audit-Request, it responds with cause as “Context-Not-Found”, otherwise it sends the IMSI, PAA (IP address IPv4/v6), ECGI, TAI, APN-NI, UE-Usage-Type and so on.

Information Elements	Presence	Condition/Comment	IE Type	Ins
Cause	M		Cause	0
IMSI	M		IMSI	0
User Location Information (ULI)	CO	It includes ECGI and TAI.	ULI	0
PDN Address Allocation (PAA)	CO	The PDN type field in the PAA must be set to IPv4 or IPv6 or IPv4v6.	PAA	0
Access Point Name (APN)	CO		APN	0
UE Usage Type	CO	This IE must be set to the subscribed UE Usage Type, if received from the HSS.	Integer Number	0

REQ-ACCEPTED (Successful scenario where the MME can find the UE) and CONTEXT-NOT-FOUND (Failure cases where the MME is unable to find UE or invalid IMSI, and so on) are valid causes that are included in the Subscriber-Audit-Response's for different conditions.

Connection Auditing

MME/MEF performs the connection auditing by sending "ECHO-REQ" after the echo timer expiry which is configurable at MME under egtp-service.

ECHO Request: MME/MEF sends the ECHO-REQ whenever the configured echo-timer expires. MME initiates the ECHO-REQ when it has one valid session at-least towards the peer MEF server.

Information Elements	Presence	Condition/Comment	IE Type	Ins
Recovery	M		Recovery	0
Sending Node Features	CO	This IE sends towards a peer node on any GTPv2 interface if the sending node supports at least one feature on this interface or if the sending node supports at least one feature and does not know the interface type towards the peer node. This IE may be present otherwise.	Node Features	0
Private Extension	O	It includes ECGI and TAI.	Private Extension	VS

ECHO Response

MME/MEF responds with ECHO-RESPONSE whenever it receives ECHO-REQ from the peers.

Information Elements	Presence	Condition/Comment	IE Type	Ins
Recovery	M		Recovery	0
Sending Node Features	CO	This IE sends towards a peer node on any GTPv2 interface if the sending node supports at least one feature on this interface or if the sending node supports at least one feature and does not know the interface type towards the peer node. This IE may be present otherwise.	Node Features	0
Private Extension	O		Private Extension	VS

Limitations

- New MEF messages use the unused Message Type from GTPv2 specification. Any new message type defined by 3GPP for GTPv2 will impact the working of MEF interface.

- When MME requests PDN disconnection at GW-U area change, "Subscriber-Delete-Request" is sent and then re-selection of MEF is done at PDN connection establishment.
- MEF grouping and MEF redundancy (primary/secondary link) are not supported in this release.
- Run-time configuration change of MEF server address and disabling of MEF interworking will take effect only for the new subscribers.
- Run-time configuration change to remove association of MEF service under MME service and removal of MEF service will take effect immediately.

Configuring MME MEF Interface

This section provides information on the CLI commands to configure MME MEF Interface.

Configuring egtp-mef-service

Use the following configuration to associate the given egtp-service for MEF interface at the MME.

```
configure
  context context_name
    mme-service service_name
      associate egtp-mef-service  egtp_mef_service_name context context_name
      no associate egtp-mef-service
      end
```

NOTES:

- *no* Removes the association for MEF interface at the MME.
- **egtp-mef-service** *egtp_mef_service_name* : Associates the given egtp-service for MEF interface at the MME.

  egtp_mef_service_name must be a string from 1 to 63.
- **context** *context_name*: Specifies the context to which the service belongs.

  context_name must be a string from 1 to 79.

Configuring Peer MEF Address

Use the following configuration to configure peer MEF Address.

```
configure
  lte-policy
    tai-mgmt-db db_name
      tai-mgmt-obj obj_name
          [ no ] up-address ip_address mef-address ip_address
          end
```

NOTES:

- **no**: Disables the configuration of peer MEF address.

- **mef-address***ip_address*: Configures the peer MEF server address for MEF signalling. *ip_address* must be any IPV4 address of notation ##.##.##.## or IPV6 address of notation ####:####:####:####:####:####:####:#### . IPV6 also supports :: notation.

Monitoring and Troubleshooting

This section provides information regarding show commands and bulk statistics available to monitor and troubleshoot the MME MEF Interface.

Show Commands and Outputs

show mme-service all

The output of this command includes the following fields:

- EGTP MEF Context
- EGTP MEF Service

show mme-service name <service-name>

The output of this command includes the following fields:

- EGTP MEF Context
- EGTP MEF Service

Show lte-policy tai-mgmt-db name <db-name>

- MEF-ADDRESS

Show lte-policy tai-mgmt-db name <db-name> tai-mgmt-obj name <obj-name>

- MEF-ADDRESS

Show egtpc statistics

The output of this command includes the following fields:

MEF Messages:

- MEF Subscriber Activate Request:
  - Initial TX:
- MEF Subscriber Modify Request:
  - Initial TX:
- MEF Subscriber Delete Request:

- Initial TX:

- MEF Subscriber Audit Response:
  - Initial TX:

- MEF Subscriber Audit Request:
  - Initial RX:



Important MEF statistics block is displayed only when the values are non-zero.

Show egtpc statistics event-statistics

The output of this command includes the following fields:

Event Statistics at EGTPC:

- MEF Subscriber Audit Indication Evt

Request Events (from SAP to EGTPC):

- MEF Subscriber Activate Request Evt
- MEF Subscriber Modify Request Evt
- MEF Subscriber Delete Request Evt

Response Events (from SAP to EGTPC)

- MEF Subscriber Audit Response Evt

Show mme-service statistics debug

The output of this command includes the following fields:

Recovery:

- Failed MEF EGTPC Recovery
- Bad Peer MEF ctxt
- Failed MEF tunnel handles

Checkpoint:

- Bad MEF Ctxt