

Dynamic TAI List

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Feature Summary and Revision History

Summary Data

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

Revision History

Revision Details	Release
This release supports Dynamic TAI lists as enahncement to Tracking Area list management.	21.20

Feature Description

To reduce the signaling message during the location update procedure and to manage the border areas more efficiently, MME maintains the historic TAI list for each UE. If the Dynamic Tracking Area List (DTAL) feature is enabled:

- When UE sends for the first time the Attach/TAU request message, MME saves this TAI in Historic TAI list and sends the TAL with configured values of TAI-mgmt-objs.
- Whenever MME detects TAI change, MME updates the historic list with new TAI details.
- When MME sends the Attach/TAU Accept, the new Dynamic TAL gets filled. This new DTAL will be a combination of Configured TAI-mgmt-objs and historic TAI list. MME saves the TAI to a maximum number of 16. MME uses the same TAL list as sent in ATTACH/TAU Accept message for paging.



Important MME uses the same DTAL as part of paging. Based on the DTAL depth configuration, the number of TAI in the historic list will be more and TAL list will have more TAC, resulting in more than normal level of paging. Based on paging load there will be impact in CPU usage.

How it works:

- When MME builds the DTAL, TAI entries from the tai-mgmt-obj takes precedence. If the tai-mgmt-obj already has 16 entries, the Dynamic TAL gets filled with those entries and the TAI entries from historic list is not considered.
- If the number of TAI in tai-mgmt-obj is less than 16, the remaining entries are filled from historic TAI list based on the depth configuration or the remaining empty entries in the TAL List, whichever is the least.
- Historic TAI list contains list of the TAI visited by UE. The entries are sorted by time. When the list reaches the maximum number of entries, the oldest TAI gets removed.
- Each User Equipment (UE) in the same tracking area can have its TAL list because of the difference in dynamic TAI.



Note The Historic TAI List is not recovered as part of Session manager recovery. After the Session manager recovery, MME will build the Historic TAI List for UE from beginning.

Limitation

As UE does not perform TAU procedure when moving to dynamically learnt TAL, S-GW will not be reassigned/reallocated as per TAI-mgmt-obj configuration.

Configuring dynamic-tal in mme-service and call-control-profile

Use the following CLIs to enable or disable and to configure depth of the TAL maintained for each UE.

Configuring CLI dynamic-tal in mme-service

```
configure
   context context_name
      mme-service service_name
        dynamic-tal depth depth-value
        [ no ] dynamic-tal
        end
```

NOTES:

- **mme-service** *service_name*: Specifies the name of the MME service and and must be a string of 1-63 characters.
- **dynamic-tal** *depth-value*: Configures the dynamic-tal for MME service users. MME maintains historic TAI list per UE up to the configured depth value.
- **depth** *depth-value*: Number of unique historic entries in TAL up to a maximum of 16.
- **no**: Removes the depth value in an MME Service.

Configuring CLI dynamic-tal in call-control-profile

```
configure
   context context_name
   call-control-profile  profile_name
       dynamic-tal depth depth-value
       [ no ] dynamic-tal
       end
```

NOTES:

- **call-control-profile** *profile_name*: Creates an instance of a call control profile.

  profile_name specifies the name of the call control profile and must be a string of 1-64 characters.
- **dynamic-tal** : Configures the dynamic-tal. MME maintains historic TAI list for each UE up to the configured depth value.
- **depth** *depth-value*: Number of unique historic entries in TAL up to a maximum of 16.
- **no** : Removes the depth value.

show call-control-profile all

The output of the above command is modified to display the Dynamic TAL List for each UE. Last Dynamic TAI History displays up to a maximum of 16 reported TAIs and is not controlled based on the configured depth value in mme-service.

```
UE Tracking Information: Last Dynamic TAI History
       |                Last Reported TAI |           Last Update
  ------------------------------------------------------------------------------
   (1)    (123,456)                0x1a7c             Fri Jun 12 09:09:11 2020
   (2)    (123,456)                 0x92e              Fri Jun 12 09:09:11 2020
   (3)    (123,456)                0x22c4             Fri Jun 12 09:09:10 2020
```

Monitoring and Troubleshooting

Show Commands and Output

show mme-service all

The output of the above command is modified to display the configured dynamic-tal depth value and not configured dynamic-tal depth value in mme-service and call-control-profiles.

For example, when dynamic-tal depth value is configured the following output is displayed:

```
Service name              : mme1
          Context                   : ingress
          Status                    : STARTED
          Bind                      : Done
..
          Dynamic TAL Depth         : 5
```

When dynamic-tal depth value is not configured the following output is displayed.

```
Service name              : mme1
          Context                   : ingress
          Status                    : STARTED
          Bind                      : Done
..
          Dynamic TAL Depth         : Not defined
```

show mme-service statistics tai

The output of this command includes the following Intra MME TAU Requests:

- Dynamic TAI List Periodic TAU—Displays the number of attempts, successes, and failures of Dynamic TAI list periodic tracking area update (TAU).
- Dynamic TAI List TA Updating—Displays the number of Dynamic TAI List TA updates, attempts, successes, or failures associated with all MME services.

show mme-service statistics

When the dynamic TAL list feature is enabled, new TAL statistics and existing TAU statics gets updated for MME service level EMM and TAI Statistics. The output of this command includes the following TAU sub-group:

Field	Description
Dynamic TAI List Periodic TAU	Displays the number of attempts, successes, and failures of Dynamic TAI list periodic tracking area update (TAU).

Field	Description
Dynamic TAI List Normal TAU without SGW Relocation	Displays the number of Dynamic TAI List Norma TAU, without S-GW relocation, attempts, successes, or failures associated with all MME services.
Dynamic TAI List TAU with Bearer Activation	Displays the number of Dynamic TAI list TAU, with bearer actvation, attempts, successes, or failures associated with all MME services.
Dynamic TAI List TAU with SGW Relocation	Displays the number of Dynamic TAI List TAU, with S-GW relocation, attempts, successes, or failures associated with all MME services.

Bulk Statistics

This section provides information on the bulk statistics for the Dynamic TAL feature.

MME-Schema

The following existing TAU bulk statistics are included in the MME Schema.

Counters	Description
dtal-tau-periodic-attempted	The total number of Dynamic TAI List Periodic TAU requests attempted.
dtal-tau-periodic-success	The total number of Dynamic TAI List Periodic TAU requests succeeded.
dtal-tau-periodic-failures	The total number of Dynamic TAI List Periodic TAU requests failed.
dtal-tau-normal-attempted	The total number of EMM Dynamic TAI List TAU request attempts where the EPS update type is set to TA updating (without S-GW relocation).
dtal-tau-normal-success	The total number of EMM Dynamic TAI List TAU request succeeded.
dtal-tau-normal-failures	The total number of EMM Dynamic TAI List TAU request failed.
dtal-tau-active-attempted	The total number of EMM Dynamic TAI List TAU with bearer activation attempts.
dtal-tau-active-success	The total number of EMM Dynamic TAI List TAU with successful bearer activation.
dtal-tau-active-failures	The total number of EMM Dynamic TAI List TAU with failed bearer activation.
dtal-tau-sgw-change-attempted	The total number of EMM Dynamic TAI List TAU with S-GW relocation attempts.
dtal-tau-sgw-change-success	The total number of EMM Dynamic TAI List TAU with S-GW relocation success.

Counters	Description
dtal-tau-sgw-change-failures	The total number of EMM Dynamic TAI List TAU with S-GW relocation failures.

TAI Schema

The following existing TAI bulk statistics are included in the MME Schema.

Counters	Description
tai-dtal-intra-tau-attempted	The total number of Dynamic TAI List Intra-MME normal TAU attempted with or without S-GW change.
tai-dtal-intra-tau-success	The total number of Dynamic TAI List Intra-MME normal TAU succeeded with or without S-GW change.
tai-dtal-intra-tau-failures	The total number of Dynamic TAI List Intra-MME normal TAU failed with or without S-GW change.
tai-dtal-tau-periodic-attempted	The total number of Intra-MME Dynamic TAI List Periodic TAU attempted.
tai-dtal-tau-periodic-success	The total number of Intra-MME Dynamic TAI List Periodic TAU succeeded.
tai-dtal-tau-periodic-failures	The total number of Intra-MME Dynamic TAI List Periodic TAU failed.