# UDPC2 Support for MME/SGSN

This chapter includes the following topics:

# Feature Description

The MME and SGSN now support the UDPC2 hardware. The maximum number of MME managers supported per chassis on ASR 5500 with DPC is 24, to support UDPC2 on ASR 5500 the maximum number of MME managers have been increased to 36.

The CLI command **task facility mmemgr per-sesscard-density { high | normal }** under the Global configuration mode is used to configure the density (number of MME managers) of MME managers per session card. The disadvantage of this command is it does not allow configuration of specific number of MME managers per card, but allows the operator to configure only high or normal density. This CLI is deprecated and new CLI commands are introduced to provide the operator with more flexibility to configure number of MME managers per active session cards (or per active session VM in case of VPC) and the total number of MME managers. The MME managers are now moved to Non-Demux card, therefore the number of managers depends on the number of session cards per chassis. The new CLI command enables the operator to spawn the maximum or desired number of MME managers even when the chassis is not fully loaded in the case of ASR 5K and ASR 5500 platforms. For VPC DI the operator can restrict max number of MME managers per chassis, if operator desires to scale with more session VMs without requiring additional MME managers.

In UDPC2, the number of Session Managers in ASR5500 is increased from 336 to 1008.

**Note**  The StarOS does not support an ASR5500 deployment with mixed usage of DPC and DPC2 cards. All session cards in one ASR5500 have to be of the same type.

**Note**  All product specific limits, capacity and performance, will remain same as compared to ASR5500 with DPC.

### MME Scaling on DPC2 to 2xDPC

This feature enhancement provides improved CEPS (Call Events Per Second) and session capacity utilization for MME/SGSN on the ASR5500 DPC2 platform. It is observed that the current MME/SGSN deployments limit the maximum session/subscriber capacity utilization as the CPU reaches its maximum threshold for some proclets though sufficient memory is available in the system and in the proclet for additional sessions/subscribers. With this enhancement, the session utilization capacity is doubled (2X) on the ASR5500 DPC2 platform for a specific call model.

This feature has increased the limits for the following MME/SGSN specific proclets on ASR5500 DPC2 platform:

- The maximum number of MME managers per chassis has been increased to "48" on ASR5500 DPC2 platform.

- The maximum number of MME managers per Non-Demux card has been increased to "8" on ASR5500 DPC2 platform.

- The maximum number of IMSI managers per Demux card has been increased to "8" on ASR5500 DPC2 platform.

### MMEMGR Scaling on DPC

In this feature enhancement, the load on the MME managers are distributed widely with the increase in the number of MME managers. This enhancement is most likely seen in a standalone MME deployment, where the difference in the usage of MME manager CPU and Session Manager CPU is apparent.

This feature has increased the limits of the following MME/SGSN proclets on the ASR5500 DPC Platform:

- The maximum number of MME managers per chassis has been increased to "36" on the ASR5500 DPC platform.

# How It Works

In previous releases, the number of MME managers for a platform is pre-defined and not configurable. The operator can now configure the desired number of MME managers defined for each platform. A new CLI command **task facility mmemgrs max** *value* is introduced to configure the number of MME managers. If the operator does not configure the desired number of MME managers, a default number of pre-defined MME managers will be configured on the chassis. The table below depicts the default and maximum number of MME managers per chassis for each platform:

| Platform | Default max. number of MME Managers per chassis | Maximum number of MME Managers per chassis. |
|---|---|---|
| ASR 5000 | 12 | 12 |
| ASR 5500 with DPC | 24 | 36<br><br>**Note** Releases prior to 21.1, the maximum number of MME Managers per chassis supported was only "24". |

| Platform | Default max. number of MME Managers per chassis | Maximum number of MME Managers per chassis. |
|---|---|---|
| ASR 5500 with DPC2 | 48<br><br>**Note** Releases prior to 21.0, the default number of MME Managers per chassis supported was only "36". | 48<br><br>**Note** Releases prior to 21.0, the default number of MME Managers per chassis supported was only "36". |
| SSI MEDIUM/LARGE | 2 | 2 |
| SSI SMALL | 1 | 1 |
| SCALE MEDIUM/LARGE | 24 | 48<br><br>**Note** : Releases prior to 20.0, the maximum number of MME Managers per chassis supported was only "24". |

In previous releases the number of MME managers for a session card could be configured based only on the density per session card/VM. With the introduction of the CLI command **task facility mmemgr per-sesscard-count** *number* the operator can now configure the number of MME Managers per session card. If the operator does not configure the desired number of MME managers per session card, a default number of MME managers will be spawned on the session card. The table below depicts the default and maximum number of MME managers configurable per session card for different platforms/cards:

| Platform | Default number of MME Managers per session card | Maximum number of MME Managers per session card |
|---|---|---|
| ASR 5000 PSC/PSC2/PSC3 | 1 | 2 |
| ASR 5500 with DPC | 4 | 6 |
| ASR 5500 with DPC2 | 8<br><br>**Note** Releases prior to 21.0, the default number of MME managers per session card supported was only "6". | 8<br><br>**Note** Releases prior to 21.0, the default number of MME managers per session card supported was only "6". |
| SSI MEDIUM/LARGE | 2 | 2 |
| SSI SMALL | 1 | 1 |
| SCALE MEDIUM/LARGE | 1 | 2 |

Configuring the number of MME managers helps to scale the number of eNodeB connections.The maximum number of eNodeB connections supported by MME is 128K per ASR5500 chassis. Having more number of MME managers ensure better CPU utilization, load balancing across MME managers and improved message communication between Session managers and MME managers.

# Configuring MME/SGSN Support on UDPC2

The following CLI command is deprecated from release 19.2 onwards. It was introduced in release 18.0 and is valid till release 19.0. When an operator using this configuration command upgrades to release 19.2, this CLI is mapped to a new CLI command **task facility mmemgr per-sesscard-count** *count*.

**configure**
      **task facility mmemgr per-sesscard-density { high | normal }**
      **exit**

This CLI command is deprecated as it does not allow the operator to configure the required number of MME managers per session card. This command only allows two predefined modes of either "high" or "normal" density.

New commands are introduced to provide more flexibility to the operator to configure required number of MME managers per session card and to configure the desired number of MME managers per chassis.

The following CLI command is introduced to configure the desired number of MME managers per session card:

**configure**
      **task facility mmemgr per-sesscard-count** *count*
      **default task facility mmemgr per-sesscard-count**
      **exit**

Notes:

- The maximum number of MME managers that can be configured per session card varies based on the platform/VM and card type. However, the upper limit of MME managers that can be configured per session card is set to "6" for releases up to 20.0 and to "8" from release 21.0 onwards.

- This configuration change will be effective only after a chassis reload. The operator must save the configuration changes prior to a reload. The system issues appropriate warnings to the operator to indicate that configuration changes must be saved and the changes will be effective only after a chassis reload.

- This command is not specific to any platform or card type. It is applicable and available to all platforms and card types.

- The keyword **default** resets the number MME managers per session card to the default number of MME managers per session card/VM. By default this CLI is not configured. When this CLI is not configured default number of MME managers per session card will be selected based on platform and card type. Listed below are the default values:

| Platform/VM and card type | Default number of MME managers per session card |
|---|---|
| ASR5000 PSC/PSC2/PSC3 | 1 |
| ASR 5500 DPC | 4 |

| Platform/VM and card type | Default number of MME managers per session card |
|---|---|
| ASR 5500 DPC2 | 8<br><br>**Note**      Releases prior to 21.0, the default number of MME managers per session card supported was only "6". |
| SSI MEDIUM/LARGE | 2 |
| SSI SMALL | 1 |
| SCALE LARGE/MEDIUM | 1 |

• The keyword **per-sesscard-count** *count* is used to set the maximum number of MME managers per session card.

    ◦ The value of *count* is an integer with range "1" up to "6" for releases up to 20.0 and to "8" from release 21.0 onwards.

Listed below is the maximum number of MME managers allowed per session card based on the platform/VM and card type:

| Platform/VM and card type | Maximum number of MME managers per session card |
|---|---|
| ASR5000 PSC/PSC2/PSC3 | 2 |
| ASR 5500 DPC | 6 |
| ASR 5500 DPC2 | 8<br><br>**Note**      Releases prior to 21.0, the maximum number of MME managers per session card supported was only "6". |
| SSI MEDIUM/LARGE | 2 |
| SSI SMALL | 1 |
| SCALE LARGE/MEDIUM | 2 |

Usage example:

Listed below is an example where 3 MME managers are configured per session card on an ASR5500 platform with DPC2 card:

**task facility mmemgr per-sesscard-count 3**

Listed below is an example where default number of MME managers configured per session card on an ASR5500 platform with DPC card:

**default task facility mmemgr per-sesscard-count**

The following CLI command is introduced configure desired number of MME managers per chassis:

**configure**
    **task facility mmemgr max** *value*
    **default task facility mmemgr max**
    **exit**
Notes:

- This configuration change will be effective only after a chassis reload. The operator must save the configuration changes prior to a reload. The system issues appropriate warnings to the operator to indicate that configuration changes must be saved and the changes will be effective only after a chassis reload.

- The maximum number of MME managers that can be configured per chassis is varies based on the platform. However, the upper limit of MME managers per chassis is set to 48.

> **Note** Note: For releases prior to 20.0 the upper limit of MME managers per chassis was set to "36".

- This CLI is not configured by default. The keyword default resets the number of MME managers per chassis to the default values. Listed below are the default values:

| Platform/VM and card type | Default number of MME managers per chassis |
|---|---|
| ASR5000 | 12 |
| ASR 5500 DPC | 24 |
| ASR 5500 DPC2 | 48<br><br>**Note** For releases prior to 21.0 the default number of MME managers per chassis was "36". |
| SSI MEDIUM/LARGE | 1 |
| SSI SMALL | 1 |
| VPC-DI or SCALE LARGE/MEDIUM | 24 |

- The keyword **max value** is used to set the maximum number of MME managers per chassis.

  ◦ The maximum *value* is an integer with range 1 up to 48.

  > **Note** Note: For releases prior to 20.0 the upper limit of MME managers per chassis was set to "36".

Listed below is the maximum number of MME managers allowed per chassis based on the platform/VM and card type:

| Platform/VM and card type | Maximum number of MME managers per chassis | |
|---|---|---|
| ASR5000 | 12 | |
| ASR 5500 DPC | 36 | |
| | **Note** | For releases prior to 21.1 the maximum number of MME managers per chassis was "24". |
| ASR 5500 DPC2 | 48 | |
| | **Note** | For releases prior to 21.0 the default number of MME managers per chassis was "36". |
| SSI MEDIUM/LARGE | 2 | |
| SSI SMALL | 1 | |
| VPC-DI or SCALE LARGE/MEDIUM | 48 | |
| | **Note** | Releases prior to 20.0, the maximum number of MME Managers per chassis supported was only "24". |

Usage example:

Listed below is an example where 5 MME managers are configured per chassis on an ASR5500 platform with DPC2 card:

**task facility mmemgr max 5**

Listed below is an example where default number of MME managers configured per chassis on an ASR5500 platform with DPC card:

**default task facility mmemgr max**

# Verifying the Configuration

The **show configuration** command is used to verify the configuration of this feature. The output displays the configured values of number of MME managers per chassis or number of MME managers per session card.

If "5" MME managers are configured per chassis the following output is displayed on issuing the **show configuration** command:

**task facility mmemgr max 5**

If "2" MME managers are configured per session card the following output is displayed on issuing the show configuration command:

**task facility mmemgr per-sesscard-count 2**