

MME SGs Service Configuration Mode Commands

The MME SGs Service Configuration Mode is used to create and manage the LTE Mobility Management Entity (MME) SGs services on this system. The SGs service creates an SGs interface between the MME and a Mobile Switching Center/Visitor Location Register (MSC/VLR).

Command Modes

Exec > Global Configuration > Context Configuration > MME SGs Service Configuration

configure > context *context_name* **> sgs-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-sgs-service)#
```

Important The commands or keywords/variables that are available are dependent on platform type, product version, and installed license(s).

Important For information on common commands available in this configuration mode, refer to the Common Commands chapter.

- associate, on page 2
- bind, on page 3
- ip, on page 4
- lai, on page 4
- non-pool-area, on page 5
- pool-area, on page 7
- sctp, on page 8
- tac-to-lac-mapping, on page 8
- timer, on page 9
- vlr, on page 11
- vlr-failure, on page 12

associate

Associates or disassociates a Stream Control Transmission Protocol (SCTP) parameter template with the SGs service.

Product

MME

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > MME SGs Service Configuration

configure > **context** *context_name* > **sgs-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-sgs-service)#
```

Syntax Description

associate sctp-param-template *template_name*
no associate sctp-param-template

no

Removes the SCTP parameter template association.

template_name

Associates an SCTP parameter template with the SGs service.

template_name specifies the name for a pre-configured SCTP parameter template to associate with this SGs service as an alphanumeric string of 1 through 63 characters. For more information on the SCTP parameter template, refer to the **sctp-param-template** command in the *Global Configuration Mode Commands* chapter and the *SCTP Parameter Template Configuration Mode Commands* chapter.

Usage Guidelines

Use this command to associate a pre-configured SCTP parameter template with the SGs service.

Caution This is a critical configuration. Any change to this configuration will cause the SGs service to restart, and the UEs is only supported with EPS Service. In such cases, the UE's are expected to send a COMBINED_IMSI_ATTACH message to the MME to resume the process.

Important If no SCTP parameter template is specified, all default settings for the configurable parameters in the SCTP Parameter Template Configuration Mode apply.

Example

The following command associates a pre-configured SCTP parameter template called *sctp-3* to the SGs service:

```
associate sctp-param-template sctp-3
```

bind

Binds the service to a logical IP interface serving as the SGs interface.

Product

MME

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > MME SGs Service Configuration

configure > context *context_name* **> sgs-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-sgs-service)#
```

Syntax Description

bind { ipv4-address *ipv4_address* **[ipv4-address** *ipv4_address* **] | ipv6-address** *ipv6_address* **[ipv6-address** *ipv6_address* **] }**
no bind

no

Removes the interface binding from this service.

ipv4-address *ipv4_address* [ipv4-address *ipv4_address*]

Specifies the IPv4 address of the SGs interface in IPv4 dotted-decimal notation.

A secondary IPv4 address can be configured to support SCTP multi-homing.

ipv6-address *ipv6_address* [ipv6-address *ipv6_address*]

Specifies the IPv6 address of the SGs interface in IPv6 colon-separated hexadecimal notation.

A secondary IPv6 address can be configured to support SCTP multi-homing.

Usage Guidelines

Associate the SGs service to a specific logical IP address. The logical IP address or interface takes on the characteristics of an SGs interface that provides the session connectivity for circuit switched fallback (CSFB) to/from a Mobile Switching Center/Visitor Location Register (MSC/VLR). Only one interface can be bound to a service. The interface must be configured prior to issuing this command.



Caution This is a critical configuration. Any change to this configuration will cause the SGs service to restart. Removing or disabling this configuration will stop the SGs service.

Example

The following command binds the logical IP interface with the IPv4 address of *209.165.200.246* to the SGs service:

```
bind ipv4-address 209.165.200.246
```

ip

This command configures the IP parameters on the SGs interface.

Product

MME

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > MME SGs Service Configuration

configure > context *context_name* **> sgs-service** *service_name*

Entering the above command sequence results in the following prompt:

`[context_name]host_name(config-sgs-service)#`

Syntax Description

[no] ip qos-dscp *dscp_value*

no

Removes IP parameter configuration from the SGs service/interface.

qos-dscp *dscp_value*

The **qos-dscp** keyword designates the Quality of Service - Differentiated Services Code Point value to the packet leaving through the SGs interface.

dscp_value is a value assigned to the packet for DSCP marking. The value can be a pre-defined DSCP value or an arbitrary value ranging from 0x01 to 0x3F.

Usage Guidelines

SGs interface allows Differentiated Services Code Point (DSCP) marking functionality. DSCP marking helps in packet traffic management. DSCP marking can be performed on both IPv4 and IPv6 packets leaving the SGs interface.

Either the pre-defined DSCP values can be used for marking, or any arbitrary value ranging from 0x01 to 0x3F can be assigned. The default DSCP value is 0x00 or be (Best Effort). The default DSCP value is automatically set when the configuration is disabled.

Example

The following command shows the IP configuration for DSCP marking on the SGs service.

```
ip qos-dscp ef
```

lai

This command allows you to configure the non-broadcast Location Area Identity (LAI).

Product

MME

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > Context Configuration > MME SGs Service Configuration

configure > context *context_name* **> sgs-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-sgs-service)#
```

Syntax Description

lai non-broadcastmcc *mcc_id* **mnc** *mnc_id* **lac** *lac_id*
no lai non-broadcast

no

Removes the non-broadcast LAI configuration.

mcc *mcc_id*

Configures the mobile country code (MCC). mcc_id is a 3-digit number between 000 to 999.

mnc *mnc_id*

Configures the mobile network code (MNC). mnc_id is a 2- or 3-digit number between 00 to 999.

lac *lac_id*

Configures the location area code (LAC). lac_id is an integer from 0 to 65535

Usage Guidelines

Use this command to configure the Location Area Identity (LAI) which is not assigned to any area.

Example

The following command configures non-broadcast LAI with MCC set to 123 , MNC set to 456 and LAC set to 1234 for this MME SGs service:

```
lai non-broadcast mcc 123 mnc 456 lac 1234
```

non-pool-area

Configures a non-pool area where a group of Location Area Code (LAC) values use a specific visitor Location Register (VLR).

Product

MME

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > MME SGs Service Configuration

configure > context *context_name* **> sgs-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-sgs-service)#
```

Syntax Description

```
non-pool-area name use-vlr vlr_name { lac value + | plmnid { any | mcc mcc_value
 mnc mnc_value } }
no non-pool-area name { lac value + }
```

no non-pool-area *name* { lac *value* }

Removes the configured non-pool-area from this service. Optionally, removes a specific LAC or LACs from this non-pool area. *name* is the name of an existing non-pool-area expressed as an alphanumeric string of 1 through 63 characters. *value* is an existing LAC integer value from 1 through 65535.

name

Specifies the name of the non-pool area as an alphanumeric string of 1 through 63 characters.

use-vlr *vlr_name*

Specifies the VLR to be used in this non-pool area configuration as an alphanumeric string of 1 through 63 characters.

lac *value*

Specifies the location area code or codes to be used with the configured VLR in this non-pool area configuration. *value(s)* is an integer from 1 through 65535.

A maximum of 96 areas can be added per non pool area (in a single line, or separately).

plmnid { any | mcc *mcc_value* mnc *mnc_value* }

Specifies the Public Land Mobile Network (PLMN) identifier to be used with the VLR in this non-pool area configuration.

any: Specifies that any PLMN ID can be used with the VLR in this configuration.

mcc *mcc_value* **mnc** *mnc_value*: Specifies the mobile country code (MCC) and mobile network code (MNC) of the PLMN identifier. *mcc_value* must be an integer from 101 through 998. *mnc_value* must be a 2- or 3-digit integer from 00 through 998.

+

Indicates that the LAC value in this command can be entered multiple times. A maximum of 96 areas can be added per non pool area (in a single line or separately).

Usage Guidelines

Use this command to configure a non-pool area where LAC values and/or PLMN IDs are associated with a specific VLR.

A maximum of 48 combined non pool areas and pool areas can be created.

Example

The following command creates a non-pool area named *svlr1* associated with a VLR named *vlr1* and containing LAC values of 1, 2, 3, 4, 5, 6, 7, and 8:

```
non-pool-area svlr1 use-vlr vlr1 lac 1 2 3 4 5 6 7 8
```

pool-area

Creates a location area code (LAC) pool area configuration or specifies an existing pool area and enters the LAC Pool Area Configuration Mode.

Product

MME

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > MME SGs Service Configuration

configure > context *context_name* **> sgs-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-sgs-service)#
```

Syntax Description

[no] pool-area *pool_name* **[-noconfirm]**

no

Removes the selected pool area configuration from the SGs service.

pool_name

Specifies the name of the LAC pool area configuration. If *pool_name* does not refer to an existing pool, a new pool is created. *pool_name* must be an alphanumeric string of 1 through 64 characters.

Usage Guidelines

Use this command to enter the LAC Pool Area Configuration Mode for an existing pool area configuration or for a newly defined pool area configuration. This command is also used to remove an existing pool area configuration.



Note The selection of the pool to use is based on matching PLMN (for Sv) or matching PLMN and LAC (for Sgs).The PLMN used is the one from the TAC/LAC and not from UE (IMSI).

In Release 12.2 and later, a maximum of 48 combined pool areas and non pool areas can be created. In older releases, a maximum of 8 combined pool areas and non pool areas can be created.

Entering this command results in the following prompt:

```
[context_name]hostname(config-sgs-pool-area)#
```

LAC Pool Area Configuration Mode commands are defined in the *MME LAC Pool Area Configuration Mode Commands* chapter.

Example

The following command enters the LAC Pool Area Configuration Mode for a new or existing pool area configuration named *pool1*:

```
pool-area pool1
```

sctp

Configures the Stream Control Transmission Protocol (SCTP) port number for this service.

Product

MME

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > MME SGs Service Configuration

configure > context *context_name* **> sgs-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-sgs-service)#
```

Syntax Description

sctp port *port_number*
no sctp

no

Removes the SCTP configuration for this service.

port *port_number*

Specifies the SCTP port number used to communicate with the MSC/VLR using the SGs interface as an integer from 1 through 65535.

Usage Guidelines

Use this command to assign the SCTP port with SCTP socket to communicate with the MSC/VLR through the SGs interface. A maximum of one SCTP port can be associated with one SGs service.

Example

The following command sets the SCTP port to *29118* for this service:

```
sctp port 29118
```

tac-to-lac-mapping

Maps any Tracking Area Code (TAC) value or a specific TAC value to a LAC value.

Product

MME

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > MME SGs Service Configuration

configure > context *context_name* **> sgs-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-sgs-service)#
```

Syntax Description

tac-to-lac-mapping { any-tac | tac *value* **} map-to lac** *value* **+**
no tac-to-lac-mapping { any-tac | { tac *value* **} + }**

any-tac | tac *value*

Specifies the TAC to map to the LAC.

any-tac: Specifies that any TAC value is to be mapped to the specified LAC.

tac *value*: Maps a specific TAC value to a LAC value expressed as an integer from 1 through 65535. For specific TAC values, multiple mappings can be entered on the same line (see Example).

map-to lac *value*

Specifies the LAC value that the selected TAC value, or any TAC value is mapped as an integer from 1 through 65535. For specific TAC values, multiple mappings can be entered on the same line (see Example).

For releases 19 and higher, the number of TAC to LAC mappings are increased from 512 to 1024 entries.

Usage Guidelines

Use this command to map TAC values to LAC values.

Enter up to 8 mappings per line.

In Release 12.2 and later, a maximum of 64 mapping lists can be created. In older releases, a maximum of 32 mapping lists can be created.

If no mapping is entered, the default behavior is TAC equals LAC.

Example

The following command maps a TAC value of 2 to a LAC value of 3, a TAC value of 4 to a LAC value of 5, and a TAC value of 6 to a LAC value of 7:

```
tac-to-lac-mapping tac 2 map-to lac 3 tac 4 map-to lac 5 tac 6 map-to lac
 7
```

timer

Configures the SGs-AP timer values.

Product

MME

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > MME SGs Service Configuration

configure > context *context_name* **> sgs-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-sgs-service)#
```

Syntax Description

timer { ts6-1 *value* **| ts10** *value* **| ts12-1** *value* **| ts12-2** *value* **| ts13** *value* **|**
ts8 *value* **| ts9** *value* **}**
default timer { ts10 | ts12-1 | ts12-2 | ts13 | ts6-1 | ts8 | ts9 }

default timer { ts10 | ts12-1 | ts12-2 | ts13 | ts6-1 | ts8 | ts9 }

Returns the timer to its default setting.

ts10 *value*

Specifies the Ts10 timer value (in seconds) as an integer from 1 through 30. This timer is used to guard the Implicit IMSI detach from non-EPS services procedure.

Default: 4

ts12-1 *value*

Specifies the Ts12-1 timer value (in seconds) as an integer from 8 through 23048. This timer is used to control the reset of the 'MME-Reset' variable. It is expected to take a value greater than the longest periodic tracking area update timer running on the MME, plus the transmission delay on the radio interface.

Default: 36000

ts12-2 *value*

Specifies the Ts12-2 timer value (in seconds) as an integer from 1 through 120. This timer is used to guard the MME reset procedure. There is one Ts12-2 timer per VLR for which the MME has an SGs association.

Default: 4

ts13 *value*

Specifies the Ts13 timer value (in seconds) as an integer from 1 through 30. This timer configures the retransmission interval for sending SGs message SGsAP-EPS-DETACH-INDICATION to MSC/VLR due to an Implicit IMSI detach from EPS services. If no SGsAP-EPS-DETACH-ACK is received, the MME will resend SGsAP-EPS-DETACH-INDICATION message upon expiry of this timer.

Default: 4

ts6-1 *value*

Specifies the Ts6-1 timer value (in seconds) as an integer from 10 through 90. This timer is used to guard the Location Update procedure. It is expected to take a value greater than 2 times the maximum transmission time in the SGs interface, plus the supervision timer of the Update Location procedure (as defined in 3GPP TS 29.002 [15]).

Default: 15

ts8 *value*

Specifies the Ts8 timer value (in seconds) as an integer from 1 through 30. This timer is used to guard the Explicit IMSI detach from EPS services procedure.

Default: 4

ts9 *value*

Specifies the Ts9 timer value (in seconds) as an integer from 1 through 30. This timer guards the Explicit IMSI detach from non-EPS services procedure.

Default: 4

Usage Guidelines Use this command to configure the SGs-AP timers.

Example

The following command sets the SGs-AP Ts6-1 timer to *20* seconds:

```
timer ts6-1 20
```

vlr

Configures the Visitor Location Register (VLR) to be used by this service.

Product MME

Privilege Administrator

Command Modes Exec > Global Configuration > Context Configuration > MME SGs Service Configuration

configure > context *context_name* **> sgs-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-sgs-service)#
```

Syntax Description **vlr** *vlr_name* **{ ipv4-address** *ipv4_address* **[ipv4-address** *ipv4_address* **] | ipv6-address** *ipv6_address* **[ipv6-address** *ipv6_address* **] } port** *port_number*
no vlr *vlr_name*

no

Removes the configured VLR from this service.

vlr_name

Specifies the name of the VLR as an alphanumeric string of 1 through 63 characters.

ipv4-address *ipv4_address* [ipv4-address *ipv4_address*]

Specifies the IPv4 address of the VLR. *ipv6_address* must be entered in dotted-decimal notation.

A secondary IPv4 address can be configured to support SCTP multi-homing.

ipv6-address *ipv6_address* [ipv6-address *ipv6_address*]

Specifies the IPv6 address of the VLR. *ipv6_address* must be entered in colon-separated hexadecimal notation.

A secondary IPv6 address can be configured to support SCTP multi-homing.

port *port_number*

Specifies the SCTP port number as an integer from 1 to 65535.

Usage Guidelines Use this command to configure the VLR used by this SGs service.

In Release 12.2 and later, a maximum of 48 separate VLRs can be created. In older releases, a maximum of 32 separate VLRs can be created.

Each individual VLR can be defined with up to 10 separate associations to a single MSS pool. Each of these associations support SCTP multi-homing by defining a primary/secondary IP address. Application layer messages are transmitted to the first available association for a particular VLR. If a complete failure of the underlying SCTP layer for a given association (for example, both SCTP paths in a multi-homed configuration) occurs, the VLR association is removed as a candidate for application message transmission until it recovers. A given MMS (VLR) will remain available as long as at least one related association remains available.

When the VLR configuration includes the same pair of peer VLR addresses with different destination port, this results in paging drops. The configuration to support the same IP address and different port is not supported by MME.

Example

The following command configures a VLR to be used by this service with a name of *vlr1*, with an SCTP multi-homed primary IPv4 address of *209.165.200.228*, a secondary IPv4 address of *209.165.200.225* and a port number of *29118*:

```
vlr vlr1 ipv4-address 209.165.200.228 ipv4-address 209.165.200.225 port
29118
```

vlr-failure

Configures automatic VLR failure handling for the SGs service.

Product

MME

Privilege

Administrator

Command Modes

Exec > Global Configuration > Context Configuration > MME SGs Service Configuration

configure > context *context_name* **> sgs-service** *service_name*

Entering the above command sequence results in the following prompt:

```
[context_name]host_name(config-sgs-service)#
```

Syntax Description

[no] vlr-failure duration *minutes* **backoff-timer** *seconds* **detach-rate** *number* **[-noconfirm]**

no

Removes the configuration from this service, which disables automatic detection and offload of VLRs when an SGs association failure occurs.

duration *minutes*

Specifies the amount of time in minutes during which all qualifying UEs will be detached.

The MME splits this duration into *n* intervals, 5 seconds apart. For example, a setting of 2 minutes with 100 subscribers would result in the MME processing all subscribers in the first 2 intervals (10) seconds. Any subscribers remaining at the expiry of the duration will not be processed.

If no detach rate is defined using the **detach-rate** keyword, a maximum of 50 subscribers are processed per interval. Any remaining UEs will remain attached until detached by other means (UE/network detach, etc).

minutes must be an integer from 1 to 3000.

backoff-timer *seconds*

Specifies the period of time that the MME will wait following the detection of a VLR condition before starting the controlled release of affected UEs. The MME begins offloading UEs following the expiry of this backoff timer. If the VLR has recovered before the backoff timer expires, no offloading is performed.

seconds must be an integer from 1 to 3000.

detach-rate *number*

This optional keyword specifies a maximum number of detaches to perform per 5 second cycle.

For example, if 12,000 subscribers are to be detached during a 5 minute window (duration = 5 minutes), the MME calculates 60 cycles (5 minutes / 5-second cycles) which results in 200 UEs to detach per cycle.

If the detach-rate is configured to 100, the MME will only detach 100 per 5 second cycle, resulting in a total of 6000 detaches. Any remaining UEs will remain attached until detached by other means (UE/network detach, etc).

number must be an integer from 1 to 2000.

-noconfirm

Executes the command without additional prompting for command confirmation.

Usage Guidelines

This command requires that a valid MME Resiliency license key be installed. Contact your Cisco account or support representative for information on how to obtain a license.

This command configures the MME to automatically initiate the VLR offload feature when a SGs association failure is detected.

This command provides equivalent functionality to the **sgs vlr-failure** command in the Exec Mode. The differences are that the Exec Mode command must be applied manually, while the command in this mode is applied automatically when a failure condition is detected.

Both commands cannot be enabled simultaneously. An error message is reported to the operator if this is attempted.

Example

The following command enables automatic SGs failure handling functionality. After detecting an SGs association failure, the MME will wait 180 seconds before starting to detach UEs over a 60 minute window, without exceeding a detachment rate of 100 UEs per 5-second cycle:

```
vlr-failure duration 60 backoff-timer 180 detach-rate 100
```