

Bearer Control Profile Configuration Mode Commands

The Bearer Control Profile configuration mode provides the commands to define the MME's bearer-level QoS control parameters. Bearer-level parameters such as ARP, MBR, GBR, QCI remap value can be configured independently for either or both default/dedicated bearers along with the capping action, such as prefer-as-cap or pgw-upgrade, in bearer control profile. The bearer control profile can be applied for a specific QCI or a range of QCIs.

The bearer control profile becomes valid after it is associated with an MME QoS profile.

Command Modes

Exec > Global Configuration > Bearer Control Profile Configuration

configure > bearer-control-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(bearer-control-profile-`*`bc_profile_name`*`)#`

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

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dedicated-bearer

Use this command to define the operator-provided values for ARP-PL, ARP-PCI, ARP-PVI, MBR, GBR, and QCI, as well as pgw-upgrade capping.

Product

MME

Privilege

Administrator

Command Modes

Exec > Global Configuration > Bearer Control Profile Configuration

configure > bearer-control-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(bearer-control-profile-bc_profile_name)#
```

Syntax Description

dedicated-bearer { arp { preemption-capability | preemption-vulnerability | priority-level } pgw-upgrade { local | minimum | rej-if-exceed } | gbr gbr-up *gbr_up_value* **gbr-down** *gbr_down_value* **pgw-upgrade { local | minimum | rej-if-exceed } | mbr mbr-up** *mbr_up_value* **mbr-down** *mbr_down_value* **pgw-upgrade| qci { remap | pgw-upgrade { local | minimum | rej-if-exceed } } }**
remove dedicated-bearer { arp | gbr | mbr | qci }

remove

Including this command prefix causes the MME to delete the dedicated-bearer configuration for the named bearer control profile.

arp

This keyword configures the allocation and retention priority parameters:

- **preemption-capability** - Enter an integer, either **0** (may) to specify that this bearer may pre-empt other lower priority bearers if required, or **1** (shall-not) to specify that this bearer shall not pre-empt other lower priority bearers.
- **preemption-vulnerability** - Enter an integer, either **0** (pre-emptible) to specify that this bearer is preemptible by other high priority bearers, or **1** (not-pre-emptible) to specify that this bearer is not pre-emptible by other high priority bearers.
- **priority-level** - Enter an integer 1 through 15, with 1 as the highest priority, to specify the allocation/retention priority level.

gbr

The **gbr** keyword configures the Guaranteed Bit Rate values. This keyword is only used for the dedicated-bearer configuration.

- **gbr-up** - Enter an integer from 1 though 256000 to identify the desired uplink data rate in kbps.
- For 21.10 and later releases

  gbr-up *gbr_up*: Defines the guaranteed bit rate for uplink traffic. *gbr_up* must be an integer from 1 to 4000000000000 (4 Tbps).

- **gbr-down** - Enter an integer from 1 though 256000 to identify the desired downlink data rate in kbps.
- For 21.10 and later releases

  gbr-down *gbr_down*: Defines the guaranteed bit rate for downlink traffic. *gbr_down* must be an integer from 1 to 4000000000000 (4 Tbps).

mbr

The **mbr** keyword configures the Maximum Bit Rate values. This keyword is only used for the dedicated-bearer configuration.

- **mbr-up** - Enter an integer from 1 though 256000 to identify the desired uplink data rate in kbps.

- For 21.10 and later releases

  mbr-up *mbr_up*: Defines the maximum bit rate for uplink traffic. *mbr_up* must be an integer from 1 to 4000000000000 (4 Tbps).

- **mbr-down** - Enter an integer from 1 though 256000 to identify the desired downlink data rate in kbps.
- For 21.10 and later releases

  mbr-down *mbr_down*: Defines the maximum bit rate for downlink traffic. *mbr_down* must be an integer from 1 to 4000000000000 (4 Tbps).

qci remap

The **qci remap** keyword sets the locally configured QCI. Enter an integer from 1 through 9. You can enter the new standardized QCI values 65, 66, 67, 69 and 70. The QCI remap mechanism maps an incoming QCI or a range of QCI to the configured QCI or range of QCI. QCI remap is the first configuration that is applied, from the bearer control profile configuration, and it is applicable only during Create Session Request and Create Bearer Request procedures. The Bearer Control profile associated to the remapped QCI value is used for capping the remaining QoS parameters.

pgw-upgrade

The **pgw-upgrade** keyword can be included with any of the other keywords. It identifies the capping mechanism to be used when QoS parameters are received from the PGW and the options include:

- **local** - Instructs the MME to select locally configured values for QoS capping.
- **minimum** - Instructs the MME to select the lower value, of the two values locally configured or received value, to use as the QoS capping value.
- **rej-if-exceed** - Instructs the MME to reject the call if the received value exceeds the locally configured value.

Usage Guidelines

Repeat the **dedicated-bearer** command as needed to configure all parameters of interest.

QoS Computation - The following explains how the resultant QoS values are derived for the **minimum** and **reject-if-exceed** actions configured under **pgw-upgrade**.

- **QCI**
  - Every standard GBR/non-GBR QCI is associated with a priority level as per 3GPP TS 23.203 v12.10.0, Table 6.1.7.

QCI	Resource Type	Priority
1	GBR	2
2	GBR	4
3	GBR	3
4	GBR	5
5	non-GBR	1
6	non-GBR	6
7	non-GBR	7
8	non-GBR	8

QCI	Resource Type	Priority
9	non-GBR	9

- Priority Level 1 has the highest priority and in case of congestion lowest priority level traffic would be the first to be discarded.
- **minimum**: The QCI with lower priority level will be used.
- **rej-if-exceed**: If the received QCI has higher priority level than the configured local QCI, then the procedure will be rejected.

- **ARP Priority Level**
  - ARP Priority level decreases on increasing value (1 to 15). ARP Priority level 1 has the highest priority value.
  - **minimum**: The lower ARP Priority level (i.e. higher value) will be used.
  - **rej-if-exceed**: If the received ARP Priority level is higher (i.e. value is lesser) than the CLI configured local ARP Priority level, then the procedure will be rejected.
- **ARP-PCI**
  - Preemption capability indicator can have either of the following two values, where may (0) > shall-not (1)
    - *may* - specifies that this bearer may preempt other lower priority bearers, if required
    - *shall-not* - specifies that this bearer shall-not pre-empt other lower priority bearers.
  - Following table indicates the resultant pre-emption capability for the *minimum* pgw-upgrade

Received value	Configured local value	Resultant value to be used
may	may	may
may	shall-not	shall-not
shall-not	may	shall-not
shall-not	shall-not	shall-not

  - *rej-if-exceed*: If the received ARP-PCI value is *may* and the configured local value is *shall-not*, then the procedure will be rejected.
  - Default value set by MME if not provided by HSS/PGW : *shall-not*
- **ARP-PVI**
  - Preemption vulnerability indicator can have either of the following two values, where *not-pre-emptible* (1) > *pre-emptible* (0)
    - *pre-emptible* - specifies that this bearer is pre-emptible by other high priority bearers
    - *not-pre-emptible* - specifies that this bearer is NOT pre-emptible by other high priority bearers
  - Following table indicates the resultant pre-emption vulnerability for the *minimum* pgw-upgrade:

Received value	Configured local value	Resultant value to be used
pre-emptible	pre-emptible	pre-emptible

Received value	Configured local value	Resultant value to be used
pre-emptible	not-pre-emptible	pre-emptible
not-pre-emptible	pre-emptible	pre-emptible
not-pre-emptible	not-pre-emptible	not-pre-emptible

- *rej-if-exceed*: If the received ARP-PVI value is *not-pre-emptible* and the configured local value is *pre-emptible*, then the procedure will be rejected.
- Default value set by the MME if not provided by the HSS/PGW : *pre-emptible*

- **MBR / GBR**
  - *minimum*:
    - Uplink - The lower of the values, comparing the received values and the configured local value, will be used for APN-AMBR/MBR/GBR.
    - Downlink - The lower value of the received value and configured local value will be used for APN-AMBR/MBR/GBR.
  - *rej-if-exceed*: If the received Uplink value is greater than the configured local Uplink value or the received Downlink value is greater than the configured local Downlink value, then the procedure will be rejected.

Example

The following is a sample command to configure ARP capping for dedicated bearers:

```
dedicated-bearer arp priority 1 pgw-upgrade local
```

The following is a sample command to configure MBR capping for dedicated bearers:

```
dedicated-bearer mbr max-ul 20000 max-dl 20000  pgw-upgrade minimum
```

default-bearer

Use this command to configure the operator-provided values for the ARP and QCI QoS control parameters, as well as the prefer-as-cap and pgw-upgrade capping.

Product

MME

Privilege

Administrator

Command Modes

Exec > Global Configuration > Bearer Control Profile Configuration

configure > bearer-control-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(bearer-control-profile-bc_profile_name)#
```

Syntax Description

```
default-bearer { arp { { preemption-capability | preemption-vulnerability
 | priority-level } { pgw-upgrade | prefer-as-cap } { local | minimum |
rej-if-exceed } } | qci { remap | pgw-upgrade { local | minimum |
rej-if-exceed } } }
remove default-bearer { arp | qci }
```

remove

Including this command prefix instructs the MME to delete the default-bearer configuration.

arp

This keyword configures the allocation and retention priority parameters:

- **preemption-capability** - Enter an integer, either **0** (may) to specify that this bearer may pre-empt other lower priority bearers if required, or **1** (shall-not) to specify that this bearer shall not pre-empt other lower priority bearers.
- **preemption-vulnerability** - Enter an integer, either **0** (pre-emptible) to specify that this bearer is preemptible by other high priority bearers, or **1** (not-pre-emptible) to specify that this bearer is not pre-emptible by other high priority bearers.
- **priority-level** - Enter an integer 1 through 15, with 1 as the highest priority, to specify the allocation/retention priority level.

pgw-upgrade

The **pgw-upgrade** keyword can be included with any of the other keywords. It identifies the capping mechanism to be used when QoS parameters are received from the PGW and the options include:

- **local** - Instructs the MME to select locally configured values for QoS capping.
- **minimum** - Instructs the MME to select the lower value, of the two values locally configured or received value, to use as the QoS capping value.
- **rej-if-exceed** - Instructs the MME to reject the call if the received value exceeds the locally configured value.

prefer-as-cap

The **prefer-as-cap** keyword can be included with any of the other keywords. It identifies the capping mechanism to be used when QoS parameters are received from the HSS or from the peer-MME/S4-SGSN:

- **local** - The configured local value will be used.
- **minimum** - The minimum (lowest) value of the configured local value or the HSS-provided value will be used.
- **reject-if-exceed** - The request/procedure is rejected if the HSS-provided value exceeds the configured local value.

qci remap

The **qci remap** keyword sets the locally configured QCI. Enter an integer from 1 through 9. You can enter the new standardized QCI values 69 and 70. The QCI remap mechanism maps an incoming QCI or a range of QCI to the configured QCI or range of QCI. QCI remap is the first configuration that is applied, from the bearer control profile configuration, and it is applicable only during Create Session Request and Create Bearer Request procedures. The Bearer Control profile associated to the remapped QCI value is used for capping the remaining QoS parameters.

Usage Guidelines

Repeat the **default-bearer** command as needed to configure all parameters of interest.

QoS Computation - The following explains how the resultant QoS values are derived for the **minimum** and **reject-if-exceed** actions configured under **prefer-as-cap** or **pgw-upgrade**.

- **QCI**
  - Every standard GBR/non-GBR QCI is associated with a priority level as per 3GPP TS 23.203 v12.10.0, Table 6.1.7.

QCI	Resource Type	Priority
1	GBR	2
2	GBR	4
3	GBR	3
4	GBR	5
5	non-GBR	1
6	non-GBR	6
7	non-GBR	7
8	non-GBR	8
9	non-GBR	9
65	GBR	0.7
66	GBR	2
67	GBR	1.5
69	Non-GBR	0.5
70	Non-GBR	5.5

  - Priority Level 1 has the highest priority and in case of congestion lowest priority level traffic would be the first to be discarded.
  - **minimum**: The QCI with lower priority level will be used.
  - **rej-if-exceed**: If the received QCI has higher priority level than the configured local QCI, then the procedure will be rejected.
- **ARP Priority Level**
  - ARP Priority level decreases on increasing value (1 to 15). ARP Priority level 1 has the highest priority value.
  - **minimum**: The lower ARP Priority level (i.e. higher value) will be used.
  - **rej-if-exceed**: If the received ARP Priority level is higher (i.e. value is lesser) than the CLI configured local ARP Priority level, then the procedure will be rejected.
- **ARP-PCI**
  - Preemption capability indicator can have either of the following two values, where may (0) > shall-not (1)
    - *may* - specifies that this bearer may preempt other lower priority bearers, if required

- *shall-not* - specifies that this bearer shall-not pre-empt other lower priority bearers.

- Following table indicates the resultant pre-emption capability for the *minimum* prefer-as-cap or pgw-upgrade

Received value	Configured local value	Resultant value to be used
may	may	may
may	shall-not	shall-not
shall-not	may	shall-not
shall-not	shall-not	shall-not

- *rej-if-exceed*: If the received ARP-PCI value is *may* and the configured local value is *shall-not*, then the procedure will be rejected.
- Default value set by MME if not provided by HSS/PGW: *shall-not*

- **ARP-PVI**
  - Preemption vulnerability indicator can have either of the following two values, where *not-pre-emptible* (1) > *pre-emptible* (0)
    - *pre-emptible* - specifies that this bearer is pre-emptible by other high priority bearers
    - *not-pre-emptible* - specifies that this bearer is NOT pre-emptible by other high priority bearers
  - Following table indicates the resultant pre-emption vulnerability for the *minimum* prefer-as-cap or pgw-upgrade:

Received value	Configured local value	Resultant value to be used
pre-emptible	pre-emptible	pre-emptible
pre-emptible	not-pre-emptible	pre-emptible
not-pre-emptible	pre-emptible	pre-emptible
not-pre-emptible	not-pre-emptible	not-pre-emptible

  - *rej-if-exceed*: If the received ARP-PVI value is *not-pre-emptible* and the configured local value is *pre-emptible*, then the procedure will be rejected.
  - Default value set by the MME if not provided by the HSS/PGW : *pre-emptible*

Example

The following is an example of a command to configure QCI mapping for the default bearer:

```
default-bearer qci remap 6
```

description

Allows you to enter descriptive text for this configuration.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
description text
no description
```

no

Clears the description for this configuration.

text

Enter descriptive text as an alphanumeric string of 1 to 100 characters.

If you include spaces between words in the description, you must enclose the text within double quotation marks (" "), for example, "AAA BBBB".

Usage Guidelines The description should provide useful information about this configuration.

end

Exits the current configuration mode and returns to the Exec mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
end
```

Usage Guidelines Use this command to return to the Exec mode.

exit

Exits the current mode and returns to the parent configuration mode.

Product All

Privilege Security Administrator, Administrator

Syntax Description

```
exit
```

Usage Guidelines Use this command to return to the parent configuration mode.

pre-rel8-qos-mapping

This command defines mapping of EPC QOS (non-standard QCIs) to 3GPP PreRelease8 QoS parameters in the MME.

Product MME

Privilege Security Administrator, Administrator

Command Modes Exec > Global Configuration > Bearer Control Profile Configuration

configure > bearer-control-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(bearer-control-profile-bc_profile_name)#
```

Syntax Description

```
[ remove ] { pre-rel8-qos-mapping { { class { background | conversational
 | interactive | streaming } } { thp thp_value } { sig-ind indicator_value }
 { src-stat-desc value } { min-transfer-delay value } { sdu error-ratio value
 } } | qci value }
```

remove

Including this command prefix causes the MME to delete the PreRelease8QoS parameter configuration for the named bearer control profile.

qci

qci indicates the QoS class. Its value ranges from 1 to 9. When QCI is configured, the corresponding mapping takes place based on 3GPP TS 23.401.

class

Indicates the UMTS traffic classified into the following categories:

- **background**
- **conversational**
- **interactive**
- **streaming**

thp

Traffic handling priority specifies the relative importance of handling all SDUs that belong to the UMTS bearer compared to the SDUs of other bearers. The priority value ranges from 1 to 3, where the value 1 holds the highest priority.

sig-ind

The **sig-ind** keyword toggles the state of the signal. The values are either 0 or 1.

src-stat-desc

The **src-stat-desc** (Source Statistics Descriptor) keyword toggles the state of the signal. The values are either 0 or 1.

sdu error-ratio

The Service Data Unit (SDU) Error ratio indicates the fraction of SDUs lost or detected as error packets. SDU error ratio is defined only for conforming traffic.

min-transfer-delay

The **min-transfer-delay** defines the maximum delay for 95th percentile of the delay distributed for all delivered SDUs during the lifetime of a bearer service. The delay value ranges from 10 to 40,000 milliseconds.

Usage Guidelines

An operator specific QCI can be remapped to another QCI using the Bearer Control Profile Configuration mode. Bearer level parameters such as ARP, MBR, GBR values can be configured independently for default/dedicated bearer along with actions such as **prefer-as-cap** or **pgw-upgrade** in the Bearer Control Profile Configuration mode.

The operator specific QCIs from 128 to 254 has the lowest priority. These priority values are considered while deriving resultant QoS values for the **minimum** and **reject-if-exceed** actions configured under **prefer-as-cap** or **pgw-upgrade**.

Example

The following is a sample command to configure PreRelease8QoS parameter for the conversational class:

```
pre-rel8-qos-mapping class conversational thp 1 sig-ind 0 src-stat-desc
1 min-transfer-delay 100 sdu error-ratio 4
```

The following is a sample command to configure PreRelease8QoS parameter for the conversational class:

```
pre-rel8-qos-mapping class interactive thp 2 sig-ind 0 src-stat-desc 1
min-transfer-delay 300 sdu error-ratio 4
```