

GTPC Overload Control Profile Configuration Mode Commands

Overload control enables a GTP-C entity becoming or being overloaded to gracefully reduce its incoming signalling load by instructing its GTP-C peers to reduce sending traffic according to its available signalling capacity to successfully process the traffic. A GTP-C entity is in overload when it operates over its signalling capacity, which results in diminished performance (including impacts to handling of incoming and outgoing traffic).

Command Modes

This chapter describes the GTPC Overload Profile Configuration Mode Commands

Exec > Global Configuration > GTPC Overload Control Profile Configuration

configure > gtpc-overload-control-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-gtpc-overload-control-profile)#
```

Important Available commands or keywords/variables vary based on platform type, product version, and installed license(s).

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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.

cpu-utilization

This command allows the user to configure the inclusion of CPU utilization of Session Manager, Demux Manager, IMSI Manager and MME Manager under GTP-C overload control profile for overload factor calculation.

Product P-GW

MME

S-GW

Privilege Administrator, Security Administrator

Command Modes Exec > Global Configuration > GTPC Overload Control Profile Configuration

configure > gtpc-overload-control-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-gtpc-overload-control-profile)#
```

Syntax Description

```
cpu-utilization { sessmgr-card | demuxmgr-card | imsimgr | mmemgr }
no cpu-utilization
default cpu-utilization
```

no

Disables the configuration of CPU utilization of Sessmgr/Demuxmgr/IMSImgr/MMEmgr under GTP-C overload control profile for overload factor calculation.

default

The default behavior for the above CLI is to include the average CPU utilization of Sessmgr cards and Demuxmgr card in the overload factor calculation.

cpu-utilization

This command configures the inclusion of average CPU-utilization SessMgr Cards/DemuxMgr Card/MMEMgr/IMSIMgr for load factor calculation.

sessmgr-card

This keyword configures the inclusion of average cpu-utilization of SessMgr cards for overload factor calculation.

demuxmgr-card

This keyword configures the inclusion of average cpu-utilization of Demux Manager card for overload factor calculation.

imsimgr

This keyword configures the inclusion of cpu-utilization of IMSIMgr(s) proclet for overload factor calculation.

mmemgr

This keyword configures the inclusion of cpu-utilization of MMEMgr(s) proclet for overload factor calculation.

Example

The following example configures the inclusion of CPU utilization of Sessmgr,Demuxmgr, IMSImgr and MMEmgr:

```
cpu-utilization sessmgr-card demuxmgr-card imsimgr mmemgr
```

inclusion-frequency

Configure parameters to determine the inclusion frequency of the Overload Control Information IE.

Product



Important GTP-C Overload Control Profile is a license-controlled feature. For more information, contact your Cisco account or support representative.

P-GW

SAEGW

S-GW

Privilege

Administrator, Security Administrator

Command Modes

Exec > Global Configuration > GTPC Overload Control Profile Configuration

configure > gtpc-overload-control-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-gtpc-overload-control-profile)#
```

Syntax Description

```
inclusion-frequency { advertisement-interval interval_in_seconds |
change-factor change_factor  }
default inclusion-frequency  { advertisement-interval | change-factor }
```

inclusion-frequency

Specifies that parameters to determine the inclusion frequency of the Overload Control Information IE for a GTP-C Overload Control Profile configuration will be configured. The Overload Control Information IE is a 3GPP-specific IE that is sent to peers when a configured threshold is reached. This parameter specifies how often the operator wants to send overload information to the peers.

advertisement-interval *interval_in_seconds*

Configures the advertisement-interval for overload control in seconds. Specifies how often overload control information should be sent to the peers. If configured to 0, the node will send overload control information in each and every outgoing message to the peers.

interval_in_seconds must be an integer from 0 to 3600.

Default: 300

change-factor *change_factor*

P-GW only. Configures the change factor for overload control. If the overload control factor changes by a configured factor, whether by an increase or decrease, the overload control information should be sent to the peers. This information is only sent to the peers when the overload factor changes by the factor configured.

change_factor must be an integer from 1 to 20.

Default: 5%

Usage Guidelines

Use this command to configure parameters to decide inclusion frequency of Overload Control Information IE. How often the sender includes the overload control information is implementation specific. The network element ensures that new/updated overload control information is propagated to the target receivers within an acceptable delay so that the purpose of the information, effective load balancing, is achieved.

If no parameters are specified, the system will use the default settings.

The Overload Control Profile must be associated with a P-GW, S-GW, or SAEGW service using one of the following commands:

- P-GW: **associate** command in P-GW Service Configuration Mode
- S-GW: **associate** command in S-GW Service Configuration Mode
- SAEGW: **associate** commands in both P-GW and S-GW Service Configuration modes

Example

The following example configures the inclusion-frequency change factor to 10.

```
inclusion-frequency change-factor  10
```

message-prioritization

Configures the priority percentage to be given to the two specific message groups for the GTP-C Overload Control Profile feature.

Product



Important GTP-C Overload Control Profile is a license-controlled feature. Fore more information, contact your Cisco account or support representative.

ePDG

P-GW

SAEGW

S-GW

Privilege

Administrator, Security Administrator

Command Modes

Exec > Global Configuration > GTPC Overload Control Profile Configuration

configure > gtpc-overload-control-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-gtpc-overload-control-profile)#
```

Syntax Description

message-prioritization group1 *percentage* **group2** *percentage*
[no | default] message-prioritization

no

Disables message-prioritization for this node.

default

Returns the message-prioritization settings to there default value. The defaults are 50% for each message group.

message-prioritization

Configures the priority percentage to be given to the two message groups.

group1*percentage*

In the overload control it is possible to apply message throttling (when peer indicated it is overloaded) based on message priority. To apply message prioritization using the loss algorithm the node must know how many messages each node (PGW or ePDG) is expected to generate. This keyword allows the operator to define the expected number of messages in, as a percentage in each message group. **group1** messages are:

- Update Bearer Request message for default bearer generated from PGW ingress
- Update Bearer Request message for dedicated bearer generated from PGW ingress
- Handoff Create Session Request message generated from ePDG egress.

The entry must be an integer from 0 to 100.

The default setting is 50%.

group2*percentage*

In the overload control it is possible to apply message throttling (when peer indicated it is overloaded) based on message priority. To apply message prioritization using the loss algorithm the node must know how many messages each node (PGW or ePDG) is expected to generate. This keyword allows the operator to define the expected number of messages in, as a percentage in each message group. **group2** messages are:

- Create Bearer Request message for default bearer generated from PGW ingress
- PDN connection requested Create Session Request message from ePDG egress.

The entry must be an integer from 0 to 100.

The default setting is 50%.

Usage Guidelines

Use this command to configure priority the message prioritization percentage to be given to the two specific message groups.

The Overload Control Profile must be associated with a P-GW, S-GW, or SAEGW service using one of the following commands:

- P-GW: **associate** command in P-GW Service Configuration Mode
- S-GW: **associate** command in S-GW Service Configuration Mode
- SAEGW: **associate** commands in both P-GW and S-GW Service Configuration modes

Example

This command sets the message-prioritization for both message groups to 40%.

```
message prioritization group1 40 group2 60
```

overload-control-handling

Enables/disables the handling of GTP-C overload control information for the node.

Product



Important GTP-C Overload Control Profile is a license-controlled feature. For more information, contact your Cisco account or support representative.

P-GW

SAEGW

S-GW

Privilege

Administrator, Security Administrator

Command Modes

Exec > Global Configuration > GTPC Overload Control Profile Configuration

configure > gtpc-overload-control-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-gtpc-overload-control-profile)#`

Syntax Description

`[ no ] overload-control-handling { home | visited }`

no

Disables overload control information handling for this node.

overload-control-handling

Enables the handling of overload control information.

home

Specifies that the handling of overload control information will be enabled for the home PLMN.

visited

Specifies that the handling of overload control information will be enabled for the visited PLMN.

Usage Guidelines

Use this command to enable/disable the handling of overload control information for this node.

The Load Control Profile must be associated with a P-GW, S-GW, or SAEGW service using one of the following commands:

- P-GW: **associate** command in P-GW Service Configuration Mode
- S-GW: **associate** command in S-GW Service Configuration Mode
- SAEGW: **associate** commands in both P-GW and S-GW Service Configuration modes

Example

This command enables the handling of overload control information for the home PLMN.

`overload-control-handling home`

overload-control-publishing

Enables/disables the publishing of overload control information towards the home or visited PLMN.

Product



Important GTP-C Overload Control Profile is a license-controlled feature. For more information, contact your Cisco account or support representative.

P-GW

SAEGW

S-GW

Privilege

Administrator, Security Administrator

Command Modes

Exec > Global Configuration > GTPC Overload Control Profile Configuration

configure > gtpc-overload-control-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-gtpc-overload-control-profile)#`

Syntax Description

`[ no ] overload-control-publishing { home | visited }`
`default overload-control-publishing`

no

Disables overload control information publishing towards the home or visited PLMN.

default

Returns overload control publishing to the default setting.

overload-control-publishing

Enables the publishing of overload control information.

home

Enables the publishing of overload control information towards the home PLMN.

visited

Enables the publishing of overload control information towards the visited PLMN.

Usage Guidelines

Use this command to enable/disable the publishing of overload control information towards the home or visited PLMN.

The Load Control Profile must be associated with a P-GW, S-GW, or SAEGW service using one of the following commands:

- P-GW: **associate** command in P-GW Service Configuration Mode
- S-GW: **associate** command in S-GW Service Configuration Mode
- SAEGW: **associate** commands in both P-GW and S-GW Service Configuration modes

Example

This command enables overload control publishing towards the visited PLMN.

```
overload-control-publishing visited
```

self-protection-behavior

Configures self protection behavior for up to three APN names or eight EARP values for the GTP-C Overload Control Profile feature.

Product



Important GTP-C Overload Control Profile is a license-controlled feature. For more information, contact your Cisco account or support representative.

P-GW

SAEGW

S-GW

Privilege

Administrator, Security Administrator

Command Modes

Exec > Global Configuration > GTPC Overload Control Profile Configuration

configure > gtpc-overload-control-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-gtpc-overload-control-profile)#
```

Syntax Description

```
[ no ] self-protection-behavior { apn apn_name * exclude | earp { 1 | 2 |
3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 * } exclude } }
```

no

Disables self-protection-behavior for this node.

self-protection-behavior

Enables self protection behavior for this node

apn *apn_name* *

Specify up to three APN names to be allowed under self-protection behavior.

earp *{ 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 * }*

Configures up to eight EARP priority level values so that incoming request messages for the configured EARP priority values are not rejected even if the system is under self-protection mode.

exclude

Specifies that configured emergency pdn connections and/or EARP priority values are not rejected.

Usage Guidelines

Use this command to configure GTP-C overload control self-protection behavior. This functionality enables the operator to configure up to three APN names and up to eight EARP priority level values for self-protection mode so that incoming request messages for emergency packet data node (PDN) connections and/or configured EARP priority values are not rejected even if the system is under self-protection mode.

The Load Control Profile must be associated with a P-GW, S-GW, or SAEGW service using one of the following commands:

- P-GW: **associate** command in P-GW Service Configuration Mode
- S-GW: **associate** command in S-GW Service Configuration Mode
- SAEGW: **associate** commands in both P-GW and S-GW Service Configuration modes

Example

The following command configures self protection behavior for the APN named **APN1**.

```
self-protection-behavior apn APN1
```

tolerance

Configures GTP-C Overload Control Profile tolerance limits.

Product

Important GTP-C Overload Control Profile is a license-controlled feature. For more information, contact your Cisco account or support representative.

P-GW

SAEGW

S-GW

Privilege

Administrator, Security Administrator

Command Modes

Exec > Global Configuration > GTPC Overload Control Profile Configuration

configure > gtpc-overload-control-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-gtpc-overload-control-profile)#
```

Syntax Description

tolerance { initial-reduction-metric *percentage* **| threshold report-reduction-metric** *percentage* **self-protection-limit** *percentage* **}**
default tolerance [initial-reduction-metric | threshold]

tolerance

Specifies that GTP-C overload profile configuration tolerance parameters will be configured.

initial-reduction-metric *percentage*

Configures initial overload reduction metric value to be advertised upon reaching minimum overload tolerance limit. When reaching the configured minimum threshold, this parameter specifies how much the node wants the peers to reduce incoming traffic.

percentage must be an integer from 1 to 100.

Default: 10%

threshold report-reduction-metric *percentage*

Configures the minimum overload tolerance threshold for advertising overload reduction metric to the peer. When the minimum threshold is reached, the node will report this information to peers. When the maximum limit is reached, the node will go into self-protection mode.



Important The **threshold report-reduction-metric** should always be lower than the **self-protection-limit**.

percentage must be an integer from 1 to 100.

Default: 80%

self-protection-limit *percentage*

Configures the maximum overload tolerance threshold after which node will move to self protection mode. When the maximum limit is reached, the node will start rejecting all incoming messages, except for delete messages. The node will not initiate any new messages to the peers. This is to mitigate the overload condition.

percentage must be an integer from 1 to 100.

Default: 95%

Usage Guidelines

Use this command to configure GTP-C Overload Control Profile tolerance limits.

Default parameters are used if any parameters are not configured.

The Overload Control Profile must be associated with a P-GW, S-GW or SAEGW service using one of the following commands:

- P-GW: **associate** command in P-GW Service Configuration Mode
- S-GW: **associate** command in S-GW Service Configuration Mode
- SAEGW: **associate** commands in both P-GW and S-GW Service Configuration modes

Example

The following example configures the initial-reduction-metric to 20%.

```
tolerance initial-reduction-metric  20
```

throttling-behavior

Configures throttling behavior based on peer's overload reduction-metric by excluding some or all emergency events and/or EARP messages for the GTP-C Overload Control Profile feature.

Product

Important GTP-C Overload Control Profile is a license-controlled feature. For more information, contact your Cisco account or support representative.

P-GW

SAEGW

S-GW

Privilege

Administrator, Security Administrator

Command Modes

Exec > Global Configuration > GTPC Overload Control Profile Configuration

configure > gtpc-overload-control-profile *profile_name*

Entering the above command sequence results in the following prompt:

`[local]`*`host_name`*`(config-gtpc-overload-control-profile)#`

Syntax Description

```
throttling-behavior { earp [ 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9| 10 | 11
| 12 | 13 | 14 | 15 * ] exclude } | emergency-events exclude }
no throttling-behavior { earp [ 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9| 10 |
11 | 12 | 13 | 14 | 15 * ] exclude } | emergency-events exclude }
```

throttling-behavior

Configures throttling behavior based on peer's overload reduction-metric.

earp [1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 *] exclude

Excludes the specified messages with configured earp from throttling due to peer's overload-reduction metric. If a bearer with configured EARP is created or updated, it will be excluded from throttling. A maximum of eight EARP values can be configured.

*****: More than one of the previous keywords can be entered within a single command.

emergency events exclude

P-GW Only. Excludes all emergency events from throttling due to the peer's overload reduction-metric. While reducing messages towards the peer based on the overload information received from the peer, the P-GW will exclude events sent for emergency sessions.

Usage Guidelines

Use this command to configure throttling behavior based on peer's overload reduction-metric by excluding some or all emergency events and/or messages with configured EARP. Message throttling applies only to initial messages. Triggered request or response messages should not be throttled since that would result in the retransmission of the corresponding request message by the sender.

If throttling behavior is configured, the profile can be associated with an S-GW or P-GW service. If a P-GW specific keyword is configured, and the profile is associated with an S-GW service, the S-GW will ignore the P-GW specific configuration. Only the parameters specific to S-GW or P-GW will be utilized.

The Overload Control Profile must be associated with a P-GW, S-GW, or SAEGW service using one of the following commands:

- P-GW: **associate** command in P-GW Service Configuration Mode
- S-GW: **associate** command in S-GW Service Configuration Mode
- SAEGW: **associate** commands in both P-GW and S-GW Service Configuration modes

Example

The following example excludes emergency events.

```
throttling-behavior emergency-events exclude
```

validity-period

Configures the time, in seconds, that specifies how long the overload control information is valid.

Product



Important GTP-C Overload Control Profile is a license-controlled feature. For more information, contact your Cisco account or support representative.

P-GW

SAEGW

S-GW

Privilege

Security Administrator, Administrator

Command Modes

Exec > Global Configuration > GTPC Overload Control Profile Configuration

configure > gtpc-overload-control-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-gtpc-overload-control-profile)#
```

Syntax Description

validity-period *seconds*
default validity-period

validity-period *seconds*

Specifies the length of time during which the overload condition specified by the OCI IE is to be considered as valid, unless overridden by subsequent new overload control information.

seconds must be an integer from from 1 to 3600.

Default: 600

Usage Guidelines

Use this command to configure how long the overload control profile information is valid.

If no validity-period is configured, the system will use the default setting.

The Overload Control profile must be associated with a P-GW, S-GW, or SAEGW service using one of the following commands:

- P-GW: **associate** command in P-GW Service Configuration Mode
- S-GW: **associate** command in S-GW Service Configuration Mode
- SAEGW: **associate** commands in both P-GW and S-GW Service Configuration modes

Example

The following example configures the validity-period to 700 seconds:

```
validity-period 700
```

weightage

Configures weightage for various GTP-C Overload Control Profile parameters.

Product



Important GTP-C Overload Control Profile is a license-controlled feature. For more information, contact your Cisco account or support representative.

P-GW

SAEGW

S-GW

Privilege

Administrator, Security Administrator

Command Modes

Exec > Global Configuration > GTPC Overload Control Profile Configuration

configure > gtpc-overload-control-profile *profile_name*

Entering the above command sequence results in the following prompt:

```
[local]host_name(config-gtpc-overload-control-profile)#
```

Syntax Description

weightage system-cpu-utilization *percentage* **system-memory-utilization** *percentage* **license-session-utilization** *percentage*
default weightage

weightage

Specifies that system memory, CPU, and license session utilization parameters are to be configured.



Important All parameters must be specified. The total weightage for all parameters should be 100%. The total of all three parameters cannot exceed 100%.

system-cpu-utilization *percentage*

Specify the desired system CPU utilization weightage as a percentage of 100.

percentage must be an integer from 0 to 100.

Default: 40%

system-memory-utilization *percentage*

Specify the system memory utilization weightage as a percentage of 100.

percentage must be an integer from 0 to 100.

Default: 30%

license-session-utilization *percentage*

Specify the license session utilization weightage as a percentage of 100.

percentage must be an integer from 0 to 100.

Default: 30%

default weightage

Returns all settings to their default value.

Usage Guidelines

Use this command to specify weightage for various GTP-C Overload Control Profile parameters. These parameters constitute the basic settings for this GTP-C Overload Control Profile. Communication of these parameters indicate to peers when this network element is becoming or being overloaded. When this occurs, the NE will be able to instruct its peers to gracefully reduce its incoming signalling load by instructing the peers to reduce sending traffic according to its available signalling capacity to successfully process the traffic. A GTP-C entity is in overload when it operates over its signalling capacity, which results in diminished performance (including impacts to handling of incoming and outgoing traffic).

Use the **inclusion-frequency** command in GTP-C Overload Profile Configuration mode to to determine the inclusion frequency of the Overload-Load control information IE that is sent to the peers to keep them up to date on the overload condition on this network element.

If no parameters are specified, the system will use the default settings.

The Overload Control profile must be associated with a P-GW, S-GW, or SAEGW service using one of the following commands:

- P-GW: **associate** command in P-GW Service Configuration Mode
- S-GW: **associate** command in S-GW Service Configuration Mode
- SAEGW: **associate** commands in both P-GW and S-GW Service Configuration modes

Example

This example configures system-cpu-utilization to 30%, system-memory-utilization to 30%, and license-session-utilization to 40%.

```
weightage system-cpu-utilization  30  system-memory-utilization  30
license-session-utilization  40
```