

Limiting the Number of SGWs Tried

This feature enables the operator to configure the number of pooled SGWs to be tried.

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Feature Description

With Releases 18.6, 19.4, 20.0 and higher, the operator can configure the MME to enable limiting the number of SGWs tried when the MME is attempting to find an available SGW during Attach or Handover procedures. If the feature-specific **sgw-retry-max** command is configured, as described in the *Configuring a Limit to the Number of SGWs Tried* section (see below), then:

- the MME's default retry behavior is ignored, and
- the MME limits the retries with different SGWs from the DNS pool to only retry a maximum of the configured number of times.

Default Behavior

If this feature is not enabled or is disabled, the MME uses or falls back to the default behavior which is in compliance with 3GPP TS 29.274, Section 7.6. The MME sends Create-Session-Request message to one SGW in the pool. If the SGW node is not available, the MME picks the next SGW from the pool and again sends a Create-Session-Request message. The MME repeats this process. For an Attach procedure, the MME tries up to five (1 + 4 retries) different SGWs from the pool. In the case of a HO procedure, the MME will try every SGW in the entire pool of SGWs sent by the DNS. If there are no further SGW nodes available in the DNS pool or if the guard timer expires, then MME stops trying and sends a Reject with cause "Network-Failure" towards the UE and the UE must restart the Attach/Handover procedure.

For statically configured SGW nodes (i.e. when no DNS is used) SGW selection takes place only once. If Create-Session-Request times out or SGW responds with a reject Cause value in Create-Session-Response, no subsequent SGW selection is attempted by MME.

Benefits

The amount of signaling at Attach or Handover can be reduced.

The amount of time to find an available SGW can be reduced.

How It Works

The operator has access to a feature-specific CLI command **sgw-retry-max** tto enable this feature and override the default behavior. **sgw-retry-max** sgw-retry-max configures the maximum number of SGWs to be *retried* from the DNS pool list during either Attach or Handover procedures. So the limit to the number of tries will be 1 + limit set. The command is only applicable to scenarios, where SGW is selected from the DNS pool (i.e. not taken from static configuration of MME).

For either Attach or Handover procedures, the MME sends Create-Session-Request message to one SGW in the pool. If the SGW node is not available, the MME picks the next SGW from the pool and retries. It again sends a Create-Session-Request message. At most, the MME retries only as many times as the number of retries configured with the **sgw-retry-max** command. If no SGW responds or only responds negatively and the MME reaches the configured limit for retries, then MME stops trying and sends the UE a Reject with cause "Network-Failure". At this point, the UE must restart the Attach/Handover procedure.

This feature-specific command is available for provisioning in both the MME service configuration and the Call-Control Profile configuration. To enable the feature, the feature-specific command must be configured under MME service configuration. We recommend provisioning under both modes. If **sgw-retry-max sgw-retry-max** command is configured under both MME service and Call-Control Profile, then the configuration under Call-Control Profile takes precedence.

The configuration under the Call-Control Profile provides the operator with additional control over "roamers" and "homers". For example, if **sgw-retry-max** under Call-Control Profile is set to 2 and if **sgw-retry-max** under MME service is set to 4, then if a "homer" subscriber Attaches, the MME retries 2 times but for all the subscribers other than "homers" the MME retries 4 times.

The feature is disabled with the entry of **no sgw-retry-max no sgw-retry-max** in the configuration. The MME reverts to the use of the default behavior.

Important To change the Reject cause code sent by the MME, use the **local-cause-code-mapping gw-unreachable** command in the Call-Control Profile configuration mode. Refer to the *Call-Control Profile Configuration Mode Commands* section in the *Command Line Interface Reference* for details.

Configuring a Limit to the Number of SGWs Tried

Enabling the Feature in the MME Service

Using the following configuration enables this feature in the MME service configuration. This feature sets the maximum number of SGW selection *retries* to be attempted during Attach/HO/TAU. This means, the total number of tries would be 1 (the initial try) + the **sgw-retry-max** value (the maximum number of retries).

```
configure
  context ctxt_name
    mme-service service_name
      sgw-retry-max max_number
      end
```

Notes:

- *ctxt_name* - Identifies the context in which the MME service configuration resides. Enter a string of 1 through 79 alphanumeric characters
- *service_name* - Identifies the previously configured MME service. Enter a string of 1 through 79 alphanumeric characters.
- *max_number* - Sets the maximum number of retries possible. Enter an integer from 0 to 5. If 0 (zero) is configured, then the MME sends Create-Session-Request to the 1st SGW and if that SGW does not reply, the MME does not select any further SGW to retry. The MME then rejects the ongoing procedure (Attach/HO/TAU) and sends a Reject message.
- Entering this command enables the feature which overrides the default behavior.
- To disable this feature, enter **no sgw-retry-max** . The MME falls back to the default behavior.

Enabling the Feature for Call-Control Profile

Using the following configuration enables this feature in the Call-Control Profile configuration. This feature sets the maximum number of SGW selection *retries* to be attempted during Attach/HO/TAU. This means, the total number of tries would be 1 (the initial try) + the **sgw-retry-max** value (the maximum number of retries).

```
configure
  call-control-profile profile_name
    sgw-retry-max max_number
    end
```

Notes:

- *profile_name* - Identifies the previously configured Call-Control Profile. Enter a string of 1 through 64 alphanumeric characters.
- *max_number* - Sets the maximum number of retries possible. Enter an integer from 0 to 5. If 0 (zero) is configured, then the MME sends Create-Session-Request to the 1st SGW and if that SGW does not reply, the MME does not select any further SGW to retry. The MME then rejects the ongoing procedure (Attach/HO/TAU) and sends a Reject message.
- Entering this command provides the operator with greater control over "roamers" and "homers". For example, if **sgw-retry-max** under Call-Control Profile is set to 2 and if **sgw-retry-max** under MME service is set to 4, then if a “homer” subscriber Attaches, the MME retries 2 times but for all the subscribers other than “homers” the MME retries 4 times.
- If the **sgw-retry-max** command is configured under both MME service and Call-Control Profile, then the configuration under Call-Control Profile takes precedence.
- To remove this configuration from the Call-Control Profile, enter **no sgw-retry-max** .

Verifying the Feature Configuration

Use the **show configuration** command to generate output that displays the values configured with **sgw-retry-max** . The following illustrates the sections of the output that will indicate the sgw-retry-max configuration for either or both MME service and Call-Control Profile:

(please note that variables shown are for clarification and are not suggested or real)

```
[local]hostname# show configuration
... ...
 mme-service mmesvc
... ...
   bind s1-mme ipv4-address 209.165.200.224
   msc default ip-address 209.165.201.0
   sgw-retry-max 2
  exit
... ...
... ...
 call-control-profile ccp
... ...
   s1-reset detach-ue
   sgw-retry-max 3
  exit
```