

S-GW Blacklisting on the MME

This chapter describes how MME blacklists unaccessible and unresponsive S-GWs in the following sections:

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Feature Description

The SGW Blacklisting is a proprietary feature of StarOS. In this feature, the MME blacklists un-accessible or un-responsive SGWs for a configured time. The MME does not select these blacklisted SGWs during any procedures that requires SGW selection so that there is minimal latency during the procedures. SGW Blacklisting is supported for both Static and Dynamic IP addresses.

To support SGW blacklisting, a new CLI sgw-blacklist is added under the MME Service Configuration mode. When this feature is enabled, SGW blacklisting takes place using the following methods in the MME:

- Node Level Blacklisting
- Session Manager Level Blacklisting

A valid license key is required to enable SGW Blacklisting on the MME. Contact your Cisco Account or Support Representative for information on how to obtain a license.

How It Works

On identifying an unreachable SGW, the SGW is blacklisted for a configured amount of time. The show CLI discussed in the Monitoring and Troubleshooting section displays the expiry timestamp of this SGW, indicating the blacklisting duration. This feature is based on a per mme-service configuration, therefore a separate list to store blacklisted SGWs is created for every mme-service.

During the ATTACH, TAU and Handover procedures, the MME selects an SGW that is not blacklisted. If all SGWs are blacklisted, then the MME attempts to use one of the blacklisted SGWs instead of directly rejecting the call. If the Create Session Response time expires, the call is rejected.

The blacklisted SGWs are completely removed from the MME based on the following configuration changes/execution:

- If the sgw-blacklist configuration is removed – SGW blacklisting feature is disabled.
- If the sgw-blacklist configuration is reconfigured, that is, if the timeout or the msg-timeouts-per-min values are changed.
- If mme-service is stopped; a critical parameter is removed from its configuration.
- If the clear CLI is executed, refer to Monitoring and Troubleshooting section.



Note The MME does not remove the blacklisted SGWs based on any SGW initiated request/response message.

The following functionalities are also included for SGW blacklisting:

- Weight based load distribution with the available SGWs when some of the SGWs are blacklisted.
- Session manager recovery is added to recover node-level blacklisted SGWs.

SGW blacklisting takes place using the following methods in the MME:

Node Level Blacklisting

When no echo response is received from the SGW, a node-level path failure indication is sent to all SESSMGRs.

Based on the node-level path failure indication, the MME blacklists the SGW for the configured time and stores it as a node-level blacklisted type.

Session Manager Level Blacklisting

Along with node-level blacklisting, MME supports blacklisting of SGW based on Create Session Response timeout per SESSMGR instance. The Session Manager Level blacklisting is local to a specific SESSMGR instance and its particular mme-service where the Create Session Response times out.

To avoid broadcasting among SESSMGRs, session manager level blacklisting is not shared among SESSMGRs.

Along with “sgw-blacklist timeout” configuration, "msg-timeouts-per-min” configuration is configured, which is only required for sgmr-level blacklisting. Instead of blacklisting an SGW in the first Create Session Response timeout, the MME blacklists an SGW if the number of Create Session Response timeouts within a minute reaches the configured msg-timeouts-per-minute value. For more information, refer to Configuring SGW Blacklisting on the MME section.

Configuring SGW Blacklisting on the MME

The following CLI configures SGW blacklist timeout value, and the number of Create Session Response timeouts per minute to blacklist an SGW locally in a SESSMGR instance.

The configuration is provided under the MME Service Configuration mode.

```
config
   context context_name
      mme-service service_name
         [ no ] sgw-blacklist timeout timer_value msg-timeouts-per-min
number_of_timeouts
         end
```

- **no** disables the SGW Blacklisting configuration.
- **sgw-blacklist** specifies the configurable parameters required for SGW blacklisting.
- **timeout** specifies the period of time the blacklisted SGW cannot be used for call procedures. The timeout value is an integer ranging from 5 to 86400 seconds.
- **msg-timeouts-per-min** configures the number of message timeouts to wait, before blacklisting a SGW locally in a session manager instance. Only Create Session Response timeout is considered. The number of message is an integer ranging from 1 to 5000.
- By default, this configuration is not enabled.

Verifying SGW Blacklisting on the MME

The below given command displays the following new fields that are added to support the SGW Blacklisting feature:

show mme-service sgw-blacklist [mme-service-name *name* **] [smgr-instance** *number* **]**

```
MME service name: mmesvc
    Node-level: 0     Instance-level: 1
    SGW IP              : 192.168.20.2
    Blacklist type      : Sessmgr-level
    Expiry timestamp    : Monday June 13 02:27:57 EDT 2016
    Blacklist time left : 777 seconds
```

Notes:

- **sgw-blacklist** displays information on blacklisted SGWs.
- **mme-service-name** displays node level blacklisted SGWs for a specified mme-service
- **smgr-instance** displays node-level and session manager level blacklisted SGWs for a specific SESSMGR instance.
- Blacklist Type can either be Node level or Sessmgr-level.
- If smgr-instance option is selected, both Node-level and Sessmgr-level blacklisted SGWs are displayed, otherwise only Node-Level blacklisted SGWs are displayed.

Monitoring and Troubleshooting SGW Blacklisting on the MME

SGW Blacklisting Show Command(s) and /or Outputs

This section provides information regarding show commands and their outputs for the SGW blacklisting feature.

show mme-service name *name*

Executing the above command displays the following fields for this feature:

- SGW Blacklist Parameters

- Timeout
  - msg-timeouts-per-min

show mme-service statistics emm-only

Executing the above command displays the following fields for this feature:

```
SGW Selection:
    Blacklisted SGW chosen:  0
```

Notes:

- The SGW Selection specifies the number of times a blacklisted SGW is selected when all SGWs are blacklisted.

clear mme-service sgw-blacklist [mme-service-name *name*] [sgw-ip]

Executing the above command clears the selected SGW or all blacklisted SGWs from the system.

Notes:

- sgw-blacklist clears the blacklisted SGWs.
- mme-service-name clears the blacklisted SGWs that belong to a particular mme-service.
- sgw-ip clears the specified blacklisted SGW based on the IP address.

A trace level event ID: 147153 has been added for this feature to log when any SGW address is blacklisted.