



## **Cisco Ultra Cloud Serving Gateway Control Plane Function Metrics Reference, Release 2026.01**

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## About this Guide



**Note** The documentation set for this product strives to use bias-free language. For purposes of this documentation set, bias-free is defined as language that does not imply discrimination based on age, disability, gender, racial identity, ethnic identity, sexual orientation, socioeconomic status, and intersectionality. While any existing biased terms are being substituted, exceptions may be present in the documentation due to language that is hardcoded in the user interfaces of the product software, language used based on RFP documentation, or language that is used by a referenced third-party product.

This preface describes the *Ultra Cloud Core Serving Gateway Control Plane Function - Metrics Reference*, the document conventions, and the customer support details.

- [Conventions Used, on page v](#)
- [Contacting Customer Support, on page vi](#)

## Conventions Used

The following tables describe the conventions used throughout this documentation.

| Notice Type      | Description                                                                                              |
|------------------|----------------------------------------------------------------------------------------------------------|
| Information Note | Provides information about important features or instructions.                                           |
| Caution          | Alerts you of potential damage to a program, device, or system.                                          |
| Warning          | Alerts you of potential personal injury or fatality. May also alert you of potential electrical hazards. |

| Typeface Conventions                 | Description                                                                                       |
|--------------------------------------|---------------------------------------------------------------------------------------------------|
| Text represented as a screen display | This typeface represents displays that appear on your terminal screen, for example:<br><br>Login: |

| Typeface Conventions                          | Description                                                                                                                                                                                                          |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Text represented as <b>commands</b>           | This typeface represents commands that you enter, for example:<br><br><b>show ip access-list</b><br><br>This document always gives the full form of a command in lowercase letters. Commands are not case sensitive. |
| Text represented as a <b>command variable</b> | This typeface represents a variable that is part of a command, for example:<br><br><b>show card slot_number</b><br><br><i>slot_number</i> is a variable representing the applicable chassis slot number.             |
| Text represented as menu or sub-menu names    | This typeface represents menus and sub-menus that you access within a software application, for example:<br><br>Click the <b>File</b> menu, then click <b>New</b>                                                    |

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Refer to the support area of <http://www.cisco.com> for up-to-date product documentation or to submit a service request. A valid username and password are required to access this site. Please contact your Cisco sales or service representative for additional information.



# CHAPTER 1

## Key Performance Indicators

- [Feature Summary and Revision History, on page 1](#)
- [Feature Description, on page 1](#)
- [KPI Categories, on page 2](#)
- [Bulkstats Categories, on page 13](#)
- [Alerts, on page 28](#)

## Feature Summary and Revision History

### Summary Data

**Table 1: Summary Data**

|                                          |                     |
|------------------------------------------|---------------------|
| Applicable Product(s) or Functional Area | cnSGW-C             |
| Applicable Platform(s)                   | SMI                 |
| Feature Default Setting                  | Enabled - Always-on |
| Related Documentation                    | Not Applicable      |

### Revision History

**Table 2: Revision History**

| Revision Details  | Release   |
|-------------------|-----------|
| First introduced. | 2021.02.0 |

## Feature Description

This chapter describes the Key Performance Indicators (KPIs/Bulkstats/Alerts) definitions for the Cloud Native Serving Gateway Control Plane Function (cnSGW-C).

# KPI Categories

cnSGW-C KPIs are divided into the following categories:

- Session
- Bearer Level
- PLMN Level
- Procedure KPIs
- Inter/Intra RAT Handover
- Failure (Rejection/Call Disconnect Reasons)
- Pod level

## Session and Bearer KPIs

The following table list the session and bearer KPIs.

**Table 3: Session and Bearer KPIs**

| KPI Name                     | Description                             | Expression                                                                                                               |
|------------------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| SGW Total Number of Sessions | The total number of active UE sessions. | <code>sum(sgw_ue_counters{rat_type=\\"EUTRAN\\",state=\\"connected\\"}) by (namespace)</code>                            |
| SGW Total Current PDN        | The total number of active PDNs.        | <code>sum(sgw_pdn_counters{rat_type=\\"EUTRAN\\"}) by (namespace)</code>                                                 |
| SGW Total Current Bearers    | The total number of active bearers.     | <code>sum(sgw_bearer_counters{qci!=\\'null\\',service_name=\\"sgw-service\\",status=\\"active\\"}) by (namespace)</code> |
| SGW Total EPS Bearer Setup   | The total number of bearer setups.      | <code>sum(sgw_bearer_stats{qci!=\\'null\\',service_name=\\"sgw-service\\",status=\\"setup\\"}) by (namespace)</code>     |

| KPI Name                              | Description                                                                  | Expression                                                                                                                                                        |
|---------------------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SGW Total Current Dedicated Bearers   | Total number of current active bearers – Total number of current active PDNs | sum(sgw_bearer_counters{qci!='null', service_name=\"sgw-service\", status=\"active\"}) by (namespace) - sum(sgw_pdn_counters{rat_type=\"EUTRAN\"}) by (namespace) |
| SGW Total EPS Bearers Released        | The total number of bearers released.                                        | sum(sgw_bearer_stats{qci!='null', service_name=\"sgw-service\", status=\"release\"}) by (qci,namespace)                                                           |
| SGW Number of PDN teardown            | The total number of PDN released.                                            | sum(sgw_service_stats{pdn_type!='null', status=\"release\"}) by (namespace)                                                                                       |
| SGW PDNs Rejected Reason Distribution | PDN disconnect reasons.                                                      | sum(sgw_pdn_disconnect_stats{reason!='null'}) by (reason,namespace)                                                                                               |

## PLMN KPIs

The following table list the PLMN KPIs.

**Table 4: PLMN KPIs**

| KPI Name                 | Description                              | Expression                                                                           |
|--------------------------|------------------------------------------|--------------------------------------------------------------------------------------|
| SGW Home PDNs active     | The total number of active homer PDNs.   | sum(sgw_pdn_counters{pdn_plmn_type=\"homer\", rat_type=\"EUTRAN\"}) by (namespace)   |
| SGW Roaming PDNs active  | The total number of active roamer PDNs.  | sum(sgw_pdn_counters{pdn_plmn_type=\"roamer\", rat_type=\"EUTRAN\"}) by (namespace)  |
| SGW Visiting PDNs active | The total number of active visitor PDNs. | sum(sgw_pdn_counters{pdn_plmn_type=\"visitor\", rat_type=\"EUTRAN\"}) by (namespace) |

## Procedure KPIs

The following table list the procedure KPIs.

**Table 5: Procedure KPIs**

| KPI Name                     | Description                                                  | Expression                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Attach Success Rate          | The total number of attach success/total attaches attempted. | $\frac{\text{sum}(\text{rate}(\text{sgw\_service\_stats} \{ \text{sgw\_procedure\_type} = \text{"initial\_attach"}, \text{status} = \text{"success"} \} [5\text{m}])) \text{ by (namespace)}}{\text{sum}(\text{rate}(\text{sgw\_service\_stats} \{ \text{sgw\_procedure\_type} = \text{"initial\_attach"}, \text{status} = \text{"attempted"} \} [5\text{m}])) \text{ by (namespace)}}$                                                                                                                             |
| Detach Success Rate          | The total number of detach success/total detaches attempted. | $\frac{\text{sum}(\text{rate}(\text{sgw\_service\_stats} \{ \text{interface} = \text{"interface\_sgw\_ingress"}, \text{sgw\_procedure\_type} = \text{"delete\_session\_request"}, \text{status} = \text{"success"} \} [5\text{m}])) \text{ by (namespace)}}{\text{sum}(\text{rate}(\text{sgw\_service\_stats} \{ \text{interface} = \text{"interface\_sgw\_ingress"}, \text{sgw\_procedure\_type} = \text{"delete\_session\_request"}, \text{status} = \text{"attempted"} \} [5\text{m}])) \text{ by (namespace)}}$ |
| Bearer Creation Success Rate | The total number of bearer success/total bearers attempted.  | $\frac{\text{sum}(\text{rate}(\text{sgw\_service\_stats} \{ \text{interface} = \text{"interface\_sgw\_ingress"}, \text{sgw\_procedure\_type} = \text{"create\_bearer"}, \text{status} = \text{"success"} \} [5\text{m}])) \text{ by (namespace)}}{\text{sum}(\text{rate}(\text{sgw\_service\_stats} \{ \text{interface} = \text{"interface\_sgw\_ingress"}, \text{sgw\_procedure\_type} = \text{"create\_bearer"}, \text{status} = \text{"attempted"} \} [5\text{m}])) \text{ by (namespace)}}$                     |

| KPI Name                         | Description                                                               | Expression                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bearer Modification Success Rate | The total number of bearer update success/total bearers update attempted. | $\frac{\text{sum}(\text{rate}(\text{sgw\_service\_stats} \{ \text{interface}=\text{"interface\_sgw\_ingress"}, \text{sgw\_procedure\_type}=\text{"update\_bearer"}, \text{status}=\text{"success"} \} [5\text{m}])) \text{ by (namespace) }}{\text{sum}(\text{rate}(\text{sgw\_service\_stats} \{ \text{interface}=\text{"interface\_sgw\_ingress"}, \text{sgw\_procedure\_type}=\text{"update\_bearer"}, \text{status}=\text{"attempted"} \} [5\text{m}])) \text{ by (namespace) }}$                                                           |
| Bearer Deletion Success Rate     | The total number of bearer delete success/total bearer delete attempted.  | $\frac{\text{sum}(\text{rate}(\text{sgw\_service\_stats} \{ \text{interface}=\text{"interface\_sgw\_ingress"}, \text{sgw\_procedure\_type}=\text{"pgw\_initiated\_dedicated\_bearer\_deletion"}, \text{status}=\text{"success"} \} [5\text{m}])) \text{ by (namespace) }}{\text{sum}(\text{rate}(\text{sgw\_service\_stats} \{ \text{interface}=\text{"interface\_sgw\_ingress"}, \text{sgw\_procedure\_type}=\text{"pgw\_initiated\_dedicated\_bearer\_deletion"}, \text{status}=\text{"attempted"} \} [5\text{m}])) \text{ by (namespace) }}$ |

| KPI Name                  | Description                                                         | Expression                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Handover Success Rate     | The total number of successful handovers/Total handovers attempted. | <pre> sum(rate(sgw_service_stats {sgw_procedure_type=~'s1_sgw_relocation_attach  x2_sgw_relocation_attach inter_mme_handover  intra_mme_handover  inter_system_handover_attach  x2_gnnp_to_lte_relocation_attach  s1_gnnp_to_lte_relocation_attach', status="success"}[5m])) by (sgw_procedure_type, namespace)/ sum(rate(sgw_service_stats {sgw_procedure_type=~ 's1_sgw_relocation_attach x2_sgw_relocation_attach  inter_mme_handover intra_mme_handover  inter_system_handover_attach  x2_gnnp_to_lte_relocation_attach  s1_gnnp_to_lte_relocation_ attach',status="attempted"} [5m])) by (sgw_procedure_type,namespace) </pre> |
| Association Setup Failure | Association Setup Failure                                           | <pre> sum(proto_udp_res_msg_total {message_name="association_ setup_res",status!= "accepted"}) by (namespace) </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Association Release       | Association Release                                                 | <pre> sum(sgw_ue_disconnect_stats {reason="sx_association_release", service_name="sgw-service"}) by (namespace) </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

| KPI Name                           | Description                                                                            | Expression                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Session Establishment Failure Rate | Session Establishment Response Rejected/Total number of Session Establishment Requests | $\frac{\text{sum(proto\_udp\_res\_msg\_total \{message\_name= \"session\_establishment\_res\", status!=\"accepted\" \})}}{\text{sum(proto\_udp\_res\_msg\_total \{message\_name= \"session\_establishment\_res\", status= \"accepted\" \})}} \text{ by (namespace) + } \frac{\text{sum(proto\_udp\_res\_msg\_total \{message\_name= \"session\_establishment\_res\", status!=\"accepted\" \})}}{\text{sum(proto\_udp\_res\_msg\_total \{message\_name= \"session\_establishment\_res\", status= \"accepted\" \})}} \text{ by (namespace)}$                                                                                                     |
| Session Modification Failure Rate  | Session Modification Response Rejected/Total number of Session Modification Requests   | $\frac{\text{sum(proto\_udp\_res\_msg\_total \{interface\_type= \"SXA\", message\_name= \"session\_modification\_res\", status!=\"accepted\" \})}}{\text{sum(proto\_udp\_res\_msg\_total \{interface\_type= \"SXA\", message\_name= \"session\_modification\_res\", status= \"accepted\" \})}} \text{ by (namespace) + } \frac{\text{sum(proto\_udp\_res\_msg\_total \{interface\_type= \"SXA\", message\_name= \"session\_modification\_res\", status!=\"accepted\" \})}}{\text{sum(proto\_udp\_res\_msg\_total \{interface\_type= \"SXA\", message\_name= \"session\_modification\_res\", status= \"accepted\" \})}} \text{ by (namespace)}$ |

| KPI Name                       | Description                                                     | Expression                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Association Setup Failure Rate | Association Failure/(Association Failure + Association Success) | <pre>sum(proto_udp_res_msg_total {message_name= \"association_setup_res\", status!=\"accepted\"}) by (namespace) / sum ((proto_udp_res_msg_total {message_name=\"association_ _setup_res\",status!= \"accepted\"} by (namespace) + proto_udp_res_msg_total {message_name=\"association_ _setup_res\",status!=\"accepted\"}) by (namespace))</pre> |

## Failure/Rejection/Retransmission KPIs

The following table lists Failure/Rejection/Retransmission KPIs.

**Table 6: Failure/Rejection/Retransmission KPIs**

| KPI Name              | Description               | Expression                                                                      |
|-----------------------|---------------------------|---------------------------------------------------------------------------------|
| UE Disconnect Reasons | UE disconnection reasons. | <pre>sum(sgw_ue_disconnect_stats {reason!='null'}) by (reason, namespace)</pre> |

| KPI Name              | Description                                                          | Expression                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PDN Failure Rate      | Total attach attempted – Total attach success/Total attach attempted | <pre>sum(sgw_service_stats{interface= \"interface_sgw_egress\", sgw_procedure_type= \"initial_attach\", status=\"attempted\"} by (namespace))-um(sgw_service_stats {interface=\"interface_sgw_egress\", sgw_procedure_type=\"initial_attach\", status=\"success\"} by (namespace))/sum(sgw_service_stats {interface=\"interface_sgw_egress\", sgw_procedure_type=\"initial_attach\", status=\"attempted\"} by (namespace))</pre> |
| PDN Disconnect Reason | PDN disconnection reason                                             | <pre>sum(sgw_pdn_disconnect_stats {reason!=\"null\"}) by (reason,namespace)</pre>                                                                                                                                                                                                                                                                                                                                                |
| GTPC Path Failure     | GTPC path failure                                                    | <pre>sum(rate(sgw_ue_disconnect_stats {reason=~'s11_path_failure  s5e_path-failure  s11_path_failure_local_purge  s5e_path_failure_local_purge  s5e_recovery s11_recovery  s5e_recovery_local_purge  s11_recovery_local_purge'} [5m])) by (namespace)</pre>                                                                                                                                                                      |

| KPI Name                           | Description                                                                                                                                                                                                                                     | Expression                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Intra EUTRAN Handover Failure Rate | (S1 HO SGW Relocation Success + TAU HO SGW Relocation + X2 HO SGW Relocation + Inter/Intra MME HO failure) / S1 HO SGW Relocation Attempted + TAU HO SGW Relocation Attempted + TAU HO SGW Relocation Attempted + Inter/Intra MME HO Attempted) | $\frac{\text{sum}(\text{rate}(\text{sgw\_service\_stats} \{ \text{sgw\_procedure\_type}=\sim \text{'s1\_sgw\_relocation\_attach' x2\_sgw\_relocation\_attach' inter\_mme\_handover' intra\_mme\_handover'} \}, \text{status}=\sim \text{'rejected'} \} [5\text{m}])) \text{ by } (\text{sgw\_procedure\_type}, \text{namespace})}{\text{sum}(\text{rate}(\text{sgw\_service\_stats} \{ \text{sgw\_procedure\_type}=\sim \text{'s1\_sgw\_relocation\_attach' x2\_sgw\_relocation\_attach' inter\_mme\_handover' intra\_mme\_handover'} \}, \text{status}=\sim \text{'attempted'} \} [5\text{m}])) \text{ by } (\text{sgw\_procedure\_type}, \text{namespace})}$                  |
| Inter System Handover Failure Rate | (WiFi HO Failure + GnGp HO Failure) / (WiFi HO Attempted + GnGp HO Attempted)                                                                                                                                                                   | $\frac{\text{sum}(\text{rate}(\text{sgw\_service\_stats} \{ \text{sgw\_procedure\_type}=\sim \text{'inter\_system\_handover\_attach' x2\_gngp\_to\_lte\_relocation\_attach' s1\_gngp\_to\_lte\_relocation\_attach'} \}, \text{status}=\sim \text{'success'} \} [5\text{m}])) \text{ by } (\text{sgw\_procedure\_type}, \text{namespace})}{\text{sum}(\text{rate}(\text{sgw\_service\_stats} \{ \text{sgw\_procedure\_type}=\sim \text{'inter\_system\_handover\_attach' x2\_gngp\_to\_lte\_relocation\_attach' s1\_gngp\_to\_lte\_relocation\_attach'} \}, \text{status}=\sim \text{'attempted'} \} [5\text{m}])) \text{ by } (\text{sgw\_procedure\_type}, \text{namespace})}$ |

## Handover KPIs

The following table lists the handover KPIs.

**Table 7: Handover KPIs**

| KPI Name                                                  | Description                                                                                   | Expression                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SGW Relocation Success Rate                               | Total SGW Relocation Success/Total Relocation Attempted                                       | $\frac{\text{sum}(\text{rate}(\text{sgw\_service\_stats} \{ \text{sgw\_procedure\_type} = \sim 's1\_sgw\_relocation\_attach  x2\_sgw\_relocation\_attach', \text{status} = \backslash \text{"success"} \} [5m])) \text{ by } (\text{sgw\_procedure\_type}, \text{namespace})}{\text{sum}(\text{rate}(\text{sgw\_service\_stats} \{ \text{sgw\_procedure\_type} = \sim 's1\_sgw\_relocation\_attach  x2\_sgw\_relocation\_attach', \text{status} = \backslash \text{"attempted"} \} [5m])) \text{ by } (\text{sgw\_procedure\_type}, \text{namespace})}$ |
| Intra EUTRAN Handover Success Rate without SGW Relocation | Total Handover Success without SGW Relocation/Total Handover Attempted without SGW Relocation | $\frac{\text{sum}(\text{rate}(\text{sgw\_service\_stats} \{ \text{sgw\_procedure\_type} = \sim 'inter\_mme\_handover  intra\_mme\_handover', \text{status} = \backslash \text{"success"} \} [5m])) \text{ by } (\text{sgw\_procedure\_type}, \text{namespace})}{\text{sum}(\text{rate}(\text{sgw\_service\_stats} \{ \text{sgw\_procedure\_type} = \sim 'inter\_mme\_handover  intra\_mme\_handover', \text{status} = \backslash \text{"attempted"} \} [5m])) \text{ by } (\text{sgw\_procedure\_type}, \text{namespace})}$                             |

| KPI Name                           | Description                                                                                      | Expression                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inter System Handover Success Rate | Wifi Handover Success + GnGp Handover Success)/Wifi Handover Attempted + GnGp Handover Attempted | sum(rate(sgw_service_stats {sgw_procedure_type=~ 'inter_system_handover_attach x2_gnnp_to_lte_relocation_attach s1_gnnp_to_lte_relocation_attach', status=~"success\[5m\]}) by (sgw_procedure_type, namespace)/sum(rate(sgw_service_stats {sgw_procedure_type=~ 'inter_system_handover_attach x2_gnnp_to_lte_relocation_attach s1_gnnp_to_lte_relocation_attach', status=~"attempted\[5m\]}) by (sgw_procedure_type,namespace) |
| SGW IDFT Creation Success Rate     | Total IDFT Success/Total IDFT Attempted                                                          | sum(rate(sgw_service_stats {sgw_procedure_type=\ "create_indirect_data_forwarding_tunnel", status=~"success\[5m\]}) by (namespace)/sum(rate (sgw_service_stats {sgw_procedure_type=\ "create_indirect_data_forwarding_tunnel", status=~"attempted\[5m\]}) by (namespace)                                                                                                                                                       |

## Pod Level KPIs

The following table lists pod level KPIs.

Table 8: Pod Level KPIs

| KPI Name             | Description                          | Expression                                                             |
|----------------------|--------------------------------------|------------------------------------------------------------------------|
| Average cpu_usage    | Average CPU percent usage for pods.  | sum(cpu_percent{<br>service_name=\"sgw-service\"})<br>by (namespace)   |
| Average Memory_usage | Average memory usage for pods in kb. | sum(mem_usage_kb<br>{service_name=\"sgw-service<br>\"}) by (namespace) |

## Bulkstats Categories

cnSGW-C bulkstats are divided into the following categories:

- Session/Bearer/UE
- Procedural
- Handover
- Collision
- Disconnect Reason/Failures/Retransmissions

## Session/Bearer/UE Bulkstats

The following table lists Session/Bearer/UE bulkstats.

Table 9: Session/Bearer/UE Bulkstats

| Bulkstats Query Name           | Type    | Expression                                                                                     | Label    |
|--------------------------------|---------|------------------------------------------------------------------------------------------------|----------|
| active_pdns_<br>per_pdn_type   | Gauge   | sum(sgw_pdn_counters<br>{pdn_type!='null'}) by<br>(pdn_type,namespace)                         | rat_type |
| pdns_released_<br>per_pdn_type | Counter | sum(sgw_service_stats<br>{pdn_type!='null',<br>status=\"release\"}) by<br>(pdn_type,namespace) | pdn_type |

| Bulkstats Query Name            | Type    | Expression                                                                                               | Label         |
|---------------------------------|---------|----------------------------------------------------------------------------------------------------------|---------------|
| pdns_setup_<br>per_pdn_type     | Counter | sum(sgw_service_stats<br>{pdn_type!='null',status=<br>\'setup\'}) by (pdn_type,<br>namespace)            | pdn_type      |
| ue_active                       | Gauge   | sum(sgw_ue_counters<br>{rat_type=\'EUTRAN\',<br>state=\'connected\'}) by<br>(namespace)                  | state         |
| ue_active_<br>per_svc_pod       | Gauge   | sum(sgw_ue_counters<br>{rat_type=\'EUTRAN\'}) by<br>(instance_id,namespace)                              | instance_id   |
| ue_idle                         | Gauge   | sum(sgw_ue_counters<br>{rat_type=\'EUTRAN\'<br>,state=\'idle\'}) by<br>(namespace)                       | state         |
| ue_released                     | Counter | sum(sgw_ue_counters<br>{rat_type=\'EUTRAN\',<br>state=\'release\'}) by<br>(namespace)                    | status        |
| ue_setup                        | Counter | sum(sgw_ue_counters<br>{rat_type=\'EUTRAN\',<br>state=\'setup\'}) by<br>(namespace)                      | status        |
| active_pdn_<br>per_plmn_type    | Gauge   | sum(sgw_pdn_counters<br>{rat_type=\'EUTRAN\',<br>pdn_plmn_type!='null'}) by<br>(pdn_plmn_type,namespace) | pdn_plmn_type |
| pdns_released_<br>per_plmn_type | Counter | sum(sgw_pdn_counters<br>{rat_type=\'EUTRAN\',<br>pdn_plmn_type!='null'}) by<br>(pdn_plmn_type,namespace) | pdn_plmn_type |

| Bulkstats Query Name         | Type    | Expression                                                                                                                   | Label         |
|------------------------------|---------|------------------------------------------------------------------------------------------------------------------------------|---------------|
| pdns_setup_<br>per_plmn_type | Counter | sum(sgw_pdn_setup<br>{rat_type=\"EUTRAN\",<br>pdn_plmn_type!=\"null\",<br>status=\"setup\"}) by<br>(pdn_plmn_type,namespace) | pdn_plmn_type |
| active_<br>pdn_emps          | Gauge   | sum(sgw_pdn_emps_<br>counters{status=\"active\"})<br>by (namespace)                                                          | status        |
| pdn_<br>setup_emps           | Counter | sum(sgw_pdn_emps_<br>stats{status=\"setup\"})<br>by (namespace)                                                              | status        |
| pdn_<br>released_emps        | Counter | sum(sgw_pdn_emps_<br>stats{status=\"release\"})<br>by (namespace)                                                            | status        |

## Procedural Bulkstats

The following table lists procedural bulkstats.

**Table 10: Procedural Bulkstats**

| Bulkstats Query Name  | Type    | Expression                                                                                                                                              | Label  |
|-----------------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| ue_attach_<br>attempt | Counter | sum(sgw_service_stats<br>{interface=\"interface_sgw_egress\",<br>sgw_procedure_type=<br>\"initial_attach\",<br>status=\"attempted\"}) by<br>(namespace) | status |
| ue_attach_<br>success | Counter | sum(sgw_service_stats<br>{interface=\"interface_sgw_egress\",<br>sgw_procedure_type=<br>\"initial_attach\",status=\"success\"})<br>by (namespace)       | status |

| Bulkstats Query Name          | Type    | Expression                                                                                                                                                                                                                                              | Label                  |
|-------------------------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| ue_detach_attempt             | Counter | sum(sgw_service_stats<br>{interface=\"interface_sgw_ingress\",<br>sgw_procedure_type=<br>\"delete_session_request\",<br>status=\"attempted\"})<br>by (namespace)                                                                                        | status                 |
| ue_detach_success             | Counter | sum(sgw_service_stats<br>{interface=\"interface_sgw_ingress\",<br>sgw_procedure_type=<br>\"delete_session_request\",<br>status=\"success\"})<br>by (namespace)                                                                                          | status                 |
| modify_bearer_request_attempt | Counter | sum(sgw_service_stats<br>{interface=\"interface_sgw_egress\",<br>sgw_procedure_type=~<br>'modify_bearer_req_uli_tz_change <br>modify_bearer_req_initial_attach <br>service_request',status=<br>\"attempted\"}) by<br>(sgw_procedure_type,<br>namespace) | sgw_procedure_<br>type |
| modify_bearer_request_success | Counter | sum(sgw_service_stats<br>{interface=\"interface_sgw_egress\",<br>sgw_procedure_type=~<br>'modify_bearer_req_uli_tz_change <br>modify_bearer_req_initial_attach <br>service_request',status=<br>\"success\"}) by<br>(sgw_procedure_type,<br>namespace)   | sgw_procedure_<br>type |

| Bulkstats Query Name                 | Type    | Expression                                                                                                                                             | Label  |
|--------------------------------------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| sx_association_<br>success           | Counter | sum(proto_udp_res_msg_<br>total{message_name=<br>\"association_setup_res\",<br>status=\"accepted\"})<br>by (namespace)                                 | status |
| sx_association_<br>failure           | Counter | sum(proto_udp_res_msg_total<br>{message_name=<br>\"association_setup_res\",<br>status!=\"accepted\"})<br>by (namespace)                                | status |
| sx_session_<br>establishment_success | Counter | sum(proto_udp_res_msg_total<br>{message_name=<br>\"session_establishment_res\",<br>status=\"accepted\"})<br>by (namespace)                             | status |
| sx_session_<br>establishment_failure | Counter | sum(proto_udp_res_msg_total<br>{message_name=<br>\"session_establishment_res\",<br>status!=\"accepted\"})<br>by (namespace)                            | status |
| sx_session_<br>modification_success  | Counter | sum(proto_udp_res_msg_total<br>{interface_type=\"SXA\",<br>message_name=<br>\"session_modification_res\",<br>status=\"accepted\"})<br>by (namespace)   | status |
| sx_session_<br>modification_failure  | Counter | sum(proto_udp_res_msg_total<br>{interface_type=\"SXA\",<br>message_name=<br>\"session_modification_res\",<br>status!=\" accepted\"})<br>by (namespace) | status |

| Bulkstats Query Name        | Type    | Expression                                                                                                                                         | Label  |
|-----------------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| sx_session_deletion_success | Counter | sum(proto_udp_res_msg_total<br>{message_name=<br>\"session_deletion_res\",<br>status=\"accepted\"})<br>by (namespace)                              | status |
| sx_session_deletion_failure | Counter | sum(proto_udp_res_msg_total<br>{message_name=<br>\"session_deletion_res\",<br>status!=\"accepted\"})<br>by (namespace)                             | status |
| sx_session_report_success   | Counter | sum(proto_udp_res_msg_total<br>{message_name=<br>\"session_report_res\",<br>status!=\"accepted\"})<br>by (namespace)                               | status |
| sx_session_report_failure   | Counter | sum(proto_udp_res_msg_total<br>{message_name=<br>\"session_report_res\",<br>status=\"accepted\"})<br>by (namespace)                                | status |
| create_bearer_attempt       | Counter | sum(sgw_service_stats<br>{interface=\"interface_sgw_egress\",<br>sgw_procedure_type=\"create_bearer\",<br>status=\"attempted\"})<br>by (namespace) | status |
| create_bearer_success       | Counter | sum(sgw_service_stats<br>{interface=\"interface_sgw_egress\",<br>sgw_procedure_type=\"create_bearer\",<br>status=\"success\"})<br>by (namespace)   | status |

| Bulkstats Query Name         | Type    | Expression                                                                                                                                                                                                                                                                                                                  | Label        |
|------------------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| create_bearer_<br>reject     | Counter | sum(sgw_service_stats<br>{fail_reason='gtp_cause_fail <br>gtp_validation_fail sx_cause_fail <br>timeout',interface=<br>\"interface_sgw_ingress\",<br>reject_cause!='null',<br>service_name=\"sgw-service\",<br>sgw_procedure_type=<br>\"create_bearer\",status=\"failure\"})<br>by (reject_cause,fail_<br>reason,namespace) | reject_cause |
| bearer_active_<br>per_qci    | Gauge   | sum(sgw_bearer_counters<br>{qci!='null',service_name=<br>\"sgw-service\",status=<br>\"active\"}) by (qci,namespace)                                                                                                                                                                                                         | qci          |
| bearer_setup_<br>per_qci     | Counter | sum(sgw_bearer_stats<br>{qci!='null',service_name=<br>\"sgw-service\",status=<br>\"setup\"}) by (qci,namespace)                                                                                                                                                                                                             | qci          |
| bearer_released_<br>per_qci  | Counter | sum(sgw_bearer_stats<br>{qci!='null',service_name=\"sgw-<br>service\",status=\"release\"})<br>by (qci,namespace)                                                                                                                                                                                                            | qci          |
| bearer_modified_<br>per_qci  | Counter | sum(sgw_bearer_stats<br>{qci!='null',service_name=<br>\"sgw-service\",status=\"modify\"})<br>by (qci,namespace)                                                                                                                                                                                                             | qci          |
| bearer_attempted_<br>per_qci | Counter | sum(sgw_bearer_stats<br>{qci!='null',service_name=\"sgw-<br>service\",status=\"attempted\"})<br>by (qci,namespace)                                                                                                                                                                                                          | qci          |

| Bulkstats Query Name            | Type    | Expression                                                                                                                                                                                                                                                                                       | Label        |
|---------------------------------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| update_bearer_attempt           | Counter | sum(sgw_service_stats {interface=\"interface_sgw_egress\", sgw_procedure_type= \"update_bearer\",status= \"attempted\"}) by (namespace)                                                                                                                                                          | status       |
| update_bearer_success           | Counter | sum(sgw_service_stats {interface=\"interface_sgw_egress\", sgw_procedure_type= \"update_bearer\",status= \"success\"}) by (namespace)                                                                                                                                                            | status       |
| update_bearer_reject            | Counter | sum(sgw_service_stats {fail_reason=~'gtp_cause_fail  gtp_validation_fail sx_cause_fail  timeout',interface= \"interface_sgw_ingress\", reject_cause!=\"null\",service_name= \"sgw-service\",sgw_procedure_type= \"update_bearer\",status= \"failure\"}) by (reject_cause, fail_reason,namespace) | reject_cause |
| delete_dedicated_bearer_attempt | Counter | sum(sgw_service_stats {interface=\"interface_sgw_egress\", sgw_procedure_type= \"pgw_initiated_dedicated_bearer_deletion\",status= \"attempted\"}) by (namespace)                                                                                                                                | status       |
| delete_dedicated_bearer_success | Counter | sum(sgw_service_stats {interface=\"interface_sgw_egress\", sgw_procedure_type= \"pgw_initiated_dedicated_bearer_deletion\",status= \"success\"}) by (namespace)                                                                                                                                  | status       |

| Bulkstats Query Name           | Type    | Expression                                                                                                                                                                                                                                                                                                               | Label        |
|--------------------------------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| delete_dedicated_bearer_reject | Counter | sum(sgw_service_stats {fail_reason=~'gtp_cause_fail gtp_validation_fail sx_cause_fail timeout',interface=\"interface_sgw_ingress\", reject_cause!=\"null\",service_name=\"sgw-service\", sgw_procedure_type=\"pgw_initiated_dedicated_bearer_deletion\",status=\"failure\"})<br>by (reject_cause,fail_reason, namespace) | reject_cause |
| modify_bearer_command_attempt  | Counter | sum(sgw_service_stats {interface=\"interface_sgw_ingress\", sgw_procedure_type=\"modify_bearer_command\", status=\"attempted\"})<br>by (namespace)                                                                                                                                                                       | status       |
| modify_bearer_command_success  | Counter | sum(sgw_service_stats {interface=\"interface_sgw_ingress\", sgw_procedure_type=\"modify_bearer_command\", status=\"success\"})<br>by (namespace)                                                                                                                                                                         | status       |
| modify_bearer_command_rejected | Counter | sum(sgw_service_stats {interface=\"interface_sgw_ingress\", sgw_procedure_type=\"modify_bearer_command\", status=\"rejected\"})<br>by (namespace)                                                                                                                                                                        | status       |

| Bulkstats Query Name           | Type    | Expression                                                                                                                                                     | Label  |
|--------------------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| delete_bearer_command_attempt  | Counter | sum(sgw_service_stats<br>{interface="interface_sgw_ingress",<br>sgw_procedure_type=<br>"delete_bearer_command",<br>status="attempted"})<br>by (namespace)      | status |
| delete_bearer_command_success  | Counter | sum(sgw_service_stats<br>{interface="interface_sgw_ingress",<br>sgw_procedure_type=<br>"delete_bearer_command",<br>status="success"}) by<br>(namespace)        | status |
| delete_bearer_command_rejected | Counter | sum(sgw_service_stats<br>{interface="interface_sgw_ingress",<br>sgw_procedure_type=<br>"delete_bearer_command",<br>status="rejected"})<br>by (namespace)       | status |
| ddn_attempted                  | Counter | sum(sgw_service_stats<br>{interface="interface_sgw_ingress",<br>sgw_procedure_type=<br>"downlink_data_notification",<br>status="attempted"})<br>by (namespace) | status |
| ddn_success                    | Counter | sum(sgw_service_stats<br>{interface="interface_sgw_ingress",<br>sgw_procedure_type=<br>"downlink_data_notification",<br>status="success"} )<br>by (namespace)  | status |

| Bulkstats Query Name               | Type    | Expression                                                                                                                                                                                                                                                                  | Label               |
|------------------------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| ddn_failure                        | Counter | sum(sgw_service_stats<br>{fail_reason!='null',<br>interface=\"interface_sgw_ingress\",<br>sub_fail_reason!='null',<br>service_name=\"sgw-service\",<br>sgw_procedure_type=<br>\"downlink_data_notification\",<br>status=\"failure\"}) by<br>(sub_fail_reason,<br>namespace) | sub_fail_<br>reason |
| secondary_pdn_<br>request_attempt  | Counter | sum(sgw_service_stats<br>{interface=\"interface_sgw_ingress\",<br>sgw_procedure_type=<br>\"secondary_pdn_creation\",<br>status=\"attempted\"})<br>by (namespace)                                                                                                            | status              |
| secondary_pdn_<br>response_success | Counter | sum(sgw_service_stats<br>{interface=\"interface_sgw_ingress\",<br>sgw_procedure_type=<br>\"secondary_pdn_creation\",<br>status=\"success\"})<br>by (namespace)                                                                                                              | status              |
| context_<br>replacement_attempt    | Counter | sum(sgw_service_stats<br>{interface=\"interface_sgw_ingress\",<br>sgw_procedure_type=<br>\"context_replacement\",<br>status=\"attempted\"})<br>by (namespace)                                                                                                               | status              |

| Bulkstats Query Name            | Type    | Expression                                                                                                                                           | Label  |
|---------------------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| context_<br>replacement_success | Counter | sum(sgw_service_stats<br>{interface="interface_sg_ingress",<br>sgw_procedure_type=<br>"context_replacement",<br>status="success"})<br>by (namespace) | status |

## Handover Bulkstats

The following table lists handover bulkstats.

**Table 11: Handover Bulkstats**

| Bulkstats Query Name | Type    | Expression                                                                                                                                                                                                                                                                                                                       | Label                  |
|----------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| handover_<br>attempt | Counter | sum(sgw_service_stats<br>{sgw_procedure_type=~<br>'s1_sgw_relocation_attach <br>x2_sgw_relocation_attach <br>inter_mme_handover <br>intra_mme_handover <br>inter_system_handover_attach <br>x2_gnnp_to_lte_relocation_attach <br>s1_gnnp_to_lte_relocation_attach',<br>status="attempted"}) by<br>(sgw_procedure_type,namespace) | sgw_procedure_<br>type |

| Bulkstats Query Name  | Type    | Expression                                                                                                                                                                                                                                                                                                                                                                                                                         | Label                  |
|-----------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| handover_<br>success  | Counter | sum(sgw_service_stats<br>{sgw_procedure_type=~<br>'s1_sgw_relocation_attach <br>x2_sgw_relocation_attach <br>inter_mme_handover <br>intra_mme_handover <br>inter_system_handover_attach <br>x2_gnnp_to_lte_relocation_attach <br>s1_gnnp_to_lte_relocation_attach',<br>status=\"success\"}) by<br>(sgw_procedure_type,namespace)                                                                                                   | sgw_procedure_<br>type |
| handover_<br>failures | Counter | sum(sgw_service_stats<br>{interface=\"interface_sgw_ingress\",<br>sgw_procedure_type=~<br>'s1_sgw_relocation_attach <br>x2_sgw_relocation_attach <br>inter_mme_handover <br>intra_mme_handover <br>inter_system_handover_attach <br>x2_gnnp_to_lte_relocation_attach <br>s1_gnnp_to_lte_relocation_attach',<br>fail_reason!=\"null\",reject_cause!=<br>'null',status=\"rejected\"})<br>by (reject_cause,fail_reason,<br>namespace) | reject_cause           |

| Bulkstats Query Name                 | Type    | Expression                                                                                                                                                                                                                                                                                                                                                                           | Label  |
|--------------------------------------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| handover_modify_<br>bearer_attempted | Counter | sum(sgw_service_stats<br>{sgw_procedure_type=~<br>'modify_bearer_req_s1_<br>ho_with_sgw_relocation <br>modify_bearer_req_t<br>au_ho_with_<br>sgw_relocation <br>modify_bearer_req_x2_<br>ho_with_sgw_relocation modify_<br>bearer_req_x2_gngp_to_lte_relocation <br>modify_bearer_req_s1_<br>gngp_to_lte_relocation',<br>status=\"attempted\"}) by<br>(sgw_procedure_type,namespace) | status |
| handover_modify_<br>bearer_success   | Counter | sum(sgw_service_stats<br>{sgw_procedure_type=~<br>'modify_bearer_req_s1_ho_<br>with_sgw_relocation <br>modify_bearer_<br>req_tau_ho_with_sgw_relocation <br>modify_bearer_req_x2_ho_with_<br>sgw_relocation modify_bearer_req_x2_<br>gngp_to_lte_relocation modify_<br>bearer_req_s1_gngp_to_<br>lte_relocation',status=<br>\"success\"}) by<br>(sgw_procedure_type,namespace)       | status |

## Interaction Bulkstats

The following table lists interaction bulkstats.

Table 12: Interaction Bulkstats

| Bulkstats Query Name                | Type    | Expression                                                                                                                                                                   | Label                  |
|-------------------------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| collision_abort_<br>svc_stats       | Counter | sum(sgw_service_stats<br>{fail_reason!='null',<br>service_name=\"sgw-service\"})<br>by (sgw_procedure_type,<br>interface, namespace)                                         | sgw_procedure_<br>type |
| collision_abort_<br>collision_stats | Counter | sum(sgw_collision_stats<br>{action_type!='null',new_<br>proc!='null',old_proc!='null',<br>service_name=\"sgw-service\"})<br>by (action_type,new_<br>proc,old_proc,namespace) | action_type            |

## Failure Bulkstats

The following table lists failure bulkstats.

Table 13: Failure Bulkstats

| Bulkstats Query Name      | Type    | Expression                                                                                                                                                                                                                                                      | Label        |
|---------------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| attach_<br>failure        | Counter | sum(sgw_service_stats<br>{fail_reason!='null',<br>interface=\"interface_sgw_ingress\",<br>reject_cause!='null',service_name=<br>\"sgw-service\",sgw_procedure_type=<br>\"initial_attach\",status=<br>\"rejected\"}) by (reject_cause,<br>fail_reason,namespace) | reject cause |
| ue_disconnect_<br>reason  | Counter | sum(sgw_ue_disconnect_<br>stats{reason!='null'})<br>by (reason,namespace)                                                                                                                                                                                       | reason       |
| pdn_disconnect_<br>reason | Counter | sum(sgw_pdn_disconnect_<br>stats{reason!='null'})<br>by (reason,namespace)                                                                                                                                                                                      | reason       |

| Bulkstats Query Name | Type    | Expression                                                                                                                                        | Label     |
|----------------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| retransmissions      | Counter | sum(sgw_service_stats<br>{interface!='null',<br>status=\"rejected\",<br>fail_reason=\"gtp_peer_<br>not_responding\"})<br>by (interface,namespace) | interface |

## Alerts

cnSGW-C alerts are divided into the following categories:

- Procedural
- Handovers
- Disconnect Reasons
- Interface

## LTE Procedure Alerts

The following table lists LTE procedure alerts.

**Table 14: LTE Procedure Alerts**

| Alert Rule                                                                                                                                                                                                                                                                                                                                                                  | Severity | Duration (in mins) | Type                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|---------------------|
| attach_success_rate                                                                                                                                                                                                                                                                                                                                                         | Major    | 15                 | Communication Alarm |
| <p><b>Expression:</b> sum(rate(sgw_service_stats<br/>{sgw_procedure_type=\"initial_attach\",<br/>status=\"success\"}[5m])) by (namespace)/sum(rate(sgw_service_stats<br/>{sgw_procedure_type=\"initial_attach\",status=\"attempted\"}<br/>[5m])) by (namespace) &lt; 0.90</p> <p><b>Description:</b> This alert is triggered when attach success rate is less than 90%.</p> |          |                    |                     |

| Alert Rule                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Severity | Duration (in mins) | Type                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|---------------------|
| detach_success_rate                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Major    | 15                 | Communication Alarm |
| <b>Expression:</b> sum(rate(sgw_service_stats{interface="interface_sgw_ingress",sgw_procedure_type="delete_session_request",status="success"}[5m])) by (namespace) /<br>sum(rate(sgw_service_stats{interface="interface_sgw_ingress",sgw_procedure_type="delete_session_request",status="attempted"}[5m])) by (namespace) < 0.90<br><b>Description:</b> This alert is triggered when detach success rate is less than 90%.                                            |          |                    |                     |
| bearer_creation_success_rate                                                                                                                                                                                                                                                                                                                                                                                                                                          | Major    | 15                 | Communication Alarm |
| <b>Expression:</b> sum(rate(sgw_service_stats{interface="interface_sgw_ingress",sgw_procedure_type="create_bearer",status="success"}[5m])) by (namespace) /<br>sum(rate(sgw_service_stats{interface="interface_sgw_ingress",sgw_procedure_type="create_bearer",status="attempted"}[5m])) by (namespace) < 0.90<br><b>Description:</b> This alert is triggered when bearer creation rate is less than 90%.                                                             |          |                    |                     |
| bearer_deletion_success_rate                                                                                                                                                                                                                                                                                                                                                                                                                                          | Major    | 15                 | Communication Alarm |
| <b>Expression:</b> sum(rate(sgw_service_stats{interface="interface_sgw_ingress",sgw_procedure_type="pgw_initiated_dedicated_bearer_deletion",status="success"}[5m])) by (namespace) /<br>sum(rate(sgw_service_stats{interface="interface_sgw_ingress",sgw_procedure_type="pgw_initiated_dedicated_bearer_deletion",status="attempted"}[5m])) by (namespace) < 0.90<br><b>Description:</b> This alert is triggered when bearer deletion success rate is less than 90%. |          |                    |                     |

| Alert Rule                                                                                                                                                                                                                                                                                                                                                                                                                                           | Severity | Duration (in mins) | Type                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|---------------------|
| bearer_modification_<br>success_rate                                                                                                                                                                                                                                                                                                                                                                                                                 | Major    | 15                 | Communication Alarm |
| <b>Expression:</b> sum(rate(sgw_service_stats{interface=<br>\"interface_sgw_ingress\",sgw_procedure_type=\"update_bearer\",<br>status=\"success\"}[5m])) by (namespace) /<br>sum(rate(sgw_service_stats{interface=\"interface_sgw_ingress\",<br>sgw_procedure_type=\"update_bearer\",status=\"attempted\"}<br>[5m])) by (namespace) < 0.90<br><b>Description:</b> This alert is triggered when bearer modification success rate is<br>less than 90%. |          |                    |                     |
| ddn_failure_rate                                                                                                                                                                                                                                                                                                                                                                                                                                     | Major    | 15                 | Communication Alarm |
| <b>Expression:</b> sum(rate(sgw_service_stats<br>{fail_reason!=\"null\",interface=\"interface_sgw_ingress\",<br>sub_fail_reason!=\"null\",service_name=\"sgw-service\",<br>sgw_procedure_type=\"downlink_data_notification\",status=<br>\"failure\"}[5m])) by (sub_fail_reason,fail_reason,namespace) > 0.10<br><b>Description:</b> This alert is triggered when DDN failure rate is greater than 10%.                                               |          |                    |                     |

## Handover Alerts

The following table lists Handover alerts.

Table 15: Handover Alerts

| Alert Rule                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Severity | Duration (in mins) | Type                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|---------------------|
| handover_<br>success_rate                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Major    | 15                 | Communication Alarm |
| <b>Expression:</b> sum(rate(sgw_service_stats{sgw_procedure_type='s1_sgw_relocation_attach x2_sgw_relocation_attach inter_mme_handover intra_mme_handover inter_system_handover_attach x2_gnnp_to_lte_relocation_attach s1_gnnp_to_lte_relocation_attach', status='\"success\"'}[5m])) by (sgw_procedure_type,namespace)/sum(rate(sgw_service_stats{sgw_procedure_type='s1_sgw_relocation_attach x2_sgw_relocation_attach inter_mme_handover intra_mme_handover inter_system_handover_attach x2_gnnp_to_lte_relocation_attach s1_gnnp_to_lte_relocation_attach', status='\"attempted\"'}[5m])) by (sgw_procedure_type,namespace) < 0.90<br><b>Description:</b> This alert is triggered when handover success rate is less than 90%. |          |                    |                     |

## Disconnect Reason Alerts

The following table lists disconnect reason alerts.

Table 16: Disconnect Reason Alerts

| Alert Rule                                                                                                                                                                                                                                                                                                                                         | Severity | Duration (in mins) | Type                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|---------------------|
| up_path_failure                                                                                                                                                                                                                                                                                                                                    | Major    | 15                 | Communication Alarm |
| <b>Expression:</b> sum(rate(sgw_ue_disconnect_stats{reason='\"sx_association_release\"'}[5m])) by (namespace) > 10<br><b>Description:</b> This alert is triggered when up path failure is detected.                                                                                                                                                |          |                    |                     |
| gtpc_path_failure                                                                                                                                                                                                                                                                                                                                  | Major    | 15                 | Communication Alarm |
| <b>Expression:</b> sum(rate(sgw_ue_disconnect_stats{reason=~'s11_path_failure s5e_path-failure s11_path_failure_local_purge s5e_path_failure_local_purge s5e_recovery s11_recovery s5e_recovery_local_purge s11_recovery_local_purge'}[5m])) by (namespace) > 1<br><b>Description:</b> This alert is triggered when GTPC path failure is detected. |          |                    |                     |

## Sx Procedure Alerts

The following table lists disconnect reason alerts.

**Table 17: Disconnect Reason Alerts**

| Alert Rule                                                                                                                                                                                                                                                             | Severity | Duration (in mins) | Type                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|---------------------|
| sx_association_<br>failure                                                                                                                                                                                                                                             | Major    | 15                 | Communication Alarm |
| <b>Expression:</b> sum(proto_udp_res_msg_total<br>{message_name="association_setup_res",status!=<br>"accepted"}) by (namespace) > 0<br><b>Description:</b> This alert is triggered when Sx association failure is detected.                                            |          |                    |                     |
| sx_peer_<br>status_down                                                                                                                                                                                                                                                | Major    | 15                 | Communication Alarm |
| <b>Expression:</b> sum(nodemgr_up_peer_status<br>{interface_type="SXA",service_name="nodemgr",<br>up_peer_ip!='null',up_peer_status="up_peer_path_down"})<br>by (up_peer_ip,namespace) > 0<br><b>Description:</b> This alert is triggered when up path is down.        |          |                    |                     |
| sx_peer_<br>status_up                                                                                                                                                                                                                                                  | Major    | 15                 | Communication Alarm |
| <b>Expression:</b> sum(nodemgr_up_peer_status<br>{interface_type="SXA",service_name="nodemgr",up_peer_ip!='null',<br>up_peer_status="up_peer_path_up"}) by (up_peer_ip,namespace) > 0<br><b>Description:</b> This alert is triggered when up path failure is detected. |          |                    |                     |



## CHAPTER 2

# cnSGW-C Metrics Reference

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- [sgw Metrics Reference, on page 33](#)

## sgw Metrics Reference

### CDL active sessions Category

#### **db\_records\_total**

Description: CDL active sessions. each label is prefix with SGW.

Sample Query: `avg(db_records_total{service_name=\"datastore-ep\"})by(session_type)`

Labels:

- Label: `emergency_call`  
Label Description: Number of emergency calls in cnSGW  
Example: SGW:emergency\_call:true
- Label: `rat_type`  
Label Description: Rat type of sessions. For cnSGW there is only one rat\_type EUTRAN  
Example: SGW:rat\_type:EUTRAN
- Label: `state`  
Label Description: Number of active or idle subscriber state.  
Example: SGW:state:active , SGW:state:idle
- Label: `pdn_active`  
Label Description: Number of active PDNs for that subscriber.  
Example: SGW:pdn\_active:1 , SGW:pdn\_active:2
- Label: `bearer_active`  
Label Description: Number of active Bearers for that subscriber.  
Example: SGW:bearer\_active:1 , SGW:bearer\_active:2

- Label: `apn`  
Label Description: Number of subscribers per apn.  
Example: SGW:apn:internet2, SGW:apn:ims2
- Label: `colocated`  
Label Description: Number of colocated or non-colocated subscriber.  
Example: SGW:colocated:true, SGW:colocated:false
- Label: `total`  
Label Description: Total number of sessions in CDL  
Example: total

## CDR container operations Category

### sgw\_charging\_cdr\_container

Description: CDR container operations total

Sample Query:

```
sgw_charging_cdr_container(gr_instance_id="1",action="close_final",change_condition="recordClosure",pdn_type="ipv4v6",pdn_plmn_type="visitor")
```

Labels:

- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2
- Label: `action`  
Label Description: Type of CDR operation  
Example: close\_final, close\_interim, open
- Label: `change_condition`  
Label Description: Reason for container close operation  
Example: recordClosure,qoSChange,userLocationChange,apnAmbrChange
- Label: `event`  
Label Description: Event that triggered CDR action  
Example: StartAccounting,SGWChange,NormalRelease etc.
- Label: `pdn_type`  
Label Description: The pdn\_type indicates the address type of PDN  
Example: ipv4, ipv6, ipv4v6, unknown
- Label: `pdn_plmn_type`  
Label Description: The pdn\_plmn\_type indicates the plmn type

Example: homer,visitor,roamer,unknown

## CDR operations Category

### sgw\_charging\_cdr

Description: CDR operations total

Sample Query:

```
sgw_charging_cdr(gr_instance_id=\"1\",action=\"close_final\",cause=\"servingNodeChange\",pdn_type=
\"ipv4v6\",pdn_plmn_type= \"visitor\")
```

Labels:

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

- Label: `action`

Label Description: Type of CDR operation

Example: close\_final, close\_interim, open

- Label: `cause`

Label Description: Reason for CDR close operation

Example: maxChangeCond,servingNodeChange,volumeLimit,LTEservingNodeChange,abnormalRelease etc.

- Label: `event`

Label Description: Event that triggered CDR action

Example: StartAccounting,SGWChange,NormalRelease etc.

- Label: `pdn_type`

Label Description: The `pdn_type` indicates the address type of PDN

Example: ipv4, ipv6, ipv4v6, unknown

- Label: `pdn_plmn_type`

Label Description: The `pdn_plmn_type` indicates the plmn type

Example: homer,visitor,roamer,unknown

## SGW usage report stats Category

### sgw\_sx\_usage\_report\_stats

Description: Total Sx Session usage reports processed

Sample Query:

```
sgw_sx_usage_report_stats{gr_instance_id="1",status="success",sx_usage_report_trigger_type="TEBUR"}
```

Labels:

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

- Label: `status`

Label Description: Processing status

Example: success, ur\_dropped\_invalid\_urr\_seqNo, ur\_dropped\_bearer\_not\_found, ur\_dropped\_urrInfo\_not\_found, ur\_dropped\_acct\_ctxt\_not\_found, ur\_dropped\_bearer\_not\_connected

- Label: `sx_usage_report_trigger_type`

Label Description: Usage Report Trigger Type

Example: VOLTH, TIMTH, TERMR, TEBUR etc

## SGW Bearer Level counters Category

### **sgw\_bearer\_counters**

Description: Bearer Level counters

Sample Query: `sgw_bearer_counters{gr_instance_id="1",status="active",qci="5"}`

Labels:

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

- Label: `status`

Label Description: Bearer Status

Example: active

- Label: `qci`

Label Description: Bearer QCI

Example: 1, 2, 3, 4, 5, 6, 7, 8, 9, 65, 66, 69, 70, 80, 82, 83, non-std-qci

## SGW Bearer Level statistics Category

### **sgw\_bearer\_stats**

Description: Bearer and Qci level statistics

**Sample Query:**

```
sgw_bearer_stats(gr_instance_id=\"1\", status=\"attempted\", qci=\"5\", numBearer=\"2\")
```

**Labels:**

- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2
- Label: `status`  
Label Description: Bearer Status  
Example: attempted, setup, release, modified
- Label: `qci`  
Label Description: Bearer QCI  
Example: 1, 2, 3, 4, 5, 6, 7, 8, 9, 65, 66, 69, 70, 80, 82, 83, non-std-qci

## SGW CDL update stats Category

**sgw\_cdl\_update\_stats**

Description: SGW CDL update Counter

**Sample Query:**

```
sgw_cdl_update_stats(gr_instance_id=\"1\", txn_type=\"S11ModifyBearerReqInitialAttach\", status=\"success\", cdl_update_type=\"full_cdl_update\")
```

**Labels:**

- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2
- Label: `txn_type`  
Label Description: Transaction type  
Example: ClearSubscriberSgwReq, N4SessionReportReq, NIntSgwSelfTxnBearerDisconnect, NIntSgwSelfTxnPagingStatusReq, NIntSgwSelfTxnPdnDisconnect, NIntSgwSelfTxnSxaSessRptReq, NSgwInternalTimerNotification, NSgwTimerNotificationReq, ReleaseAccessBearerReq, S11CreateSessReq, S11DeleteSessReq, S11ModifyBearerReq, S11ModifyBearerReqInitialAttach, S11ModifyBearerReqInterSystemHo, S11ModifyBearerReqIntraMMEX2S1HoNoSgwChange, S11ModifyBearerReqList, S11ModifyBearerReqListInterSystemHo, S11ModifyBearerReqListIntraMMEX2S1HoNoSgwChange, S11ModifyBearerReqListOnlyForUliChange, S11ModifyBearerReqListS1HOSgwRelocation, S11ModifyBearerReqListServiceRequest, S11ModifyBearerReqListUnknownMBR, S11ModifyBearerReqOnlyForUliChange, S11ModifyBearerReqS1HOSgwRelocation, S11ModifyBearerReqServiceRequest, S11ModifyBearerReqUnknownMBR, S5CreateBearerReq, S5DeleteBearerReq, S5S8BearerResourceCmd, S5UpdateBearerReq, S11SuspendNotf, S11ResumeNotf
- Label: `status`

Label Description: Indicate whether transaction is success, aborted or timeout

Example: success, collision\_abort, timeout

- Label: `cdl_update_type`

Label Description: Indicate CDL update type

Example: partial\_cdl\_update, full\_cdl\_update, no\_cdl\_update

## SGW Collision Stats Category

### **sgw\_collision\_stats**

Description: SGW Collision counters

Sample Query: `sgw_collision_stats{gr_instance_id="1",action_type="abort",new_proc="PDN Disconnect - UE initiated",old_proc="Create Bearer"}`

Labels:

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

- Label: `action_type`

Label Description: The pre-defined action taken to handle the collision. The action can be

Example: abort\_new, abort\_old, discard\_new, discard\_old

- Label: `new_proc`

Label Description: The new procedure and message type"

Example: Unknown, PDN Setup, PDN Modify, Create Bearer, Update Bearer, Delete Bearer, PDN Disconnect - UE initiated, PDN Disconnect - Admin initiated, PDN Disconnect - PGW initiated, PDN Disconnect - Self initiated, Modify Bearer Command, Delete Bearer Command, Release Access Bearer, Downlink Data Notification, Clear Subscriber - S5e Recovery Initiated, Clear Subscriber - Sx Recovery Initiated, Clear Subscriber - S11 Recovery Initiated, Clear Subscriber - S5e Path Failure Initiated, Clear Subscriber - Sx Path Failure Initiated, Clear Subscriber - S11 Path Failure Initiated, Clear Subscriber - S11 Path Failure Local Purge Initiated, Clear Subscriber - S11 Recovery Local Purge Initiated, Clear Subscriber - S5e Path Failure Local Purge Initiated, Clear Subscriber - S5e Recovery Local Purge Initiated, Clear Subscriber - Sx Association Release Initiated, Change Notification, PDN Disconnect - Upf Graceful Termination Initiated, PDN Disconnect - S5u Gtpu Error Local Purge Initiated, PDN Disconnect - S1u Gtpu Session replacement Initiated, PDN Disconnect - S5u Gtpu Session replacement Initiated, PDN Disconnect - S1u Gtpu Error Local Purge Initiated, PDN Disconnect - S5u Gtpu Error Local Purge Initiated, PDN Disconnect - S1u Gtpu Session replacement Local Purge Initiated, PDN Disconnect - S5u Gtpu Session replacement Local Purge Initiated, Clear Subscriber - Sx Session Idle Timeout Initiated, Bearer Disconnect - S1u Gtpu Error Local Purge Initiated, Bearer Disconnect - S5u Gtpu Error Local Purge Initiated, Bearer Disconnect - S1u Gtpu Session replacement Local Purge Initiated, Bearer Disconnect - S5u Gtpu Session replacement Local Purge Initiated, Bearer Disconnect - S5u Gtpu Error Local Purge Initiated, Bearer Disconnect - S1u Gtpu Session replacement Initiated, Bearer Disconnect - S5u Gtpu Session replacement Initiated, Clear Subscriber - S1u Gtpu Path Failure Initiated, Clear Subscriber - S5u Gtpu Path Failure Initiated, Clear Subscriber - S1u Gtpu Path Failure Local Purge Initiated,

Clear Subscriber - S5u Gtpu Path Failure Local Purge Initiated, Bearer Disconnect - S1u Gtpu Path Failure Initiated, Bearer Disconnect - S5u Gtpu Path Failure Initiated, Bearer Disconnect - S1u Gtpu Path Failure Local Purge Initiated, Bearer Disconnect - S5u Gtpu Path Failure Local Purge Initiated, upf\_initiated\_clear\_subscriber, upf\_initiated\_association\_release, upf\_recovery\_failure, sx\_urss\_association\_release\_initiated\_deletion, upf\_initiated\_self\_protection\_termination

- Label: old\_proc

Label Description: Indicates the ongoing procedure at eGTP-C when a new message arrived at the interface which caused the collision. The Msg Type in brackets specifies which message triggered this ongoing procedure"

Example: Unknown, PDN Setup, PDN Modify, Create Bearer, Update Bearer, Delete Bearer, PDN Disconnect - UE initiated, PDN Disconnect - Admin initiated, PDN Disconnect - PGW initiated, PDN Disconnect - Self initiated, Modify Bearer Command, Delete Bearer Command, Release Access Bearer, Downlink Data Notification, Clear Subscriber - S5e Recovery Initiated, Clear Subscriber - Sx Recovery Initiated, Clear Subscriber - S11 Recovery Initiated, Clear Subscriber - S5e Path Failure Initiated, Clear Subscriber - Sx Path Failure Initiated, Clear Subscriber - S11 Path Failure Initiated, Clear Subscriber - S11 Path Failure Local Purge Initiated, Clear Subscriber - S11 Recovery Local Purge Initiated, Clear Subscriber - S5e Path Failure Local Purge Initiated, Clear Subscriber - S5e Recovery Local Purge Initiated, Clear Subscriber - Sx Association Release Initiated, Change Notification, PDN Disconnect - Upf Graceful Termination Initiated, PDN Disconnect - S5u Gtpu Error Local Purge Initiated, PDN Disconnect - S1u Gtpu Session replacement Initiated, PDN Disconnect - S5u Gtpu Session replacement Initiated, PDN Disconnect - S1u Gtpu Error Local Purge Initiated, PDN Disconnect - S5u Gtpu Error Local Purge Initiated, PDN Disconnect - S1u Gtpu Session replacement Local Purge Initiated, PDN Disconnect - S5u Gtpu Session replacement Local Purge Initiated, Clear Subscriber - Sx Session Idle Timeout Initiated, Bearer Disconnect - S1u Gtpu Error Local Purge Initiated, Bearer Disconnect - S5u Gtpu Error Local Purge Initiated, Bearer Disconnect - S1u Gtpu Session replacement Local Purge Initiated, Bearer Disconnect - S5u Gtpu Session replacement Local Purge Initiated, Bearer Disconnect - S5u Gtpu Error Local Purge Initiated, Bearer Disconnect - S1u Gtpu Session replacement Initiated, Bearer Disconnect - S5u Gtpu Session replacement Initiated, Clear Subscriber - S1u Gtpu Path Failure Initiated, Clear Subscriber - S5u Gtpu Path Failure Initiated, Clear Subscriber - S1u Gtpu Path Failure Local Purge Initiated, Clear Subscriber - S5u Gtpu Path Failure Local Purge Initiated, Bearer Disconnect - S1u Gtpu Path Failure Initiated, Bearer Disconnect - S5u Gtpu Path Failure Initiated, Bearer Disconnect - S1u Gtpu Path Failure Local Purge Initiated, Bearer Disconnect - S5u Gtpu Path Failure Local Purge Initiated, upf\_initiated\_clear\_subscriber, upf\_initiated\_association\_release, upf\_recovery\_failure, sx\_urss\_association\_release\_initiated\_deletion, upf\_initiated\_self\_protection\_termination

## SGW DDN Stats Category

### sgw\_ddn\_stats

Description: Total SGW DDN Stats

Sample Query: sgw\_ddn\_stats{gr\_instance\_id="1",ddn\_stats\_type="high\_priority\_initiated"}

Labels:

- Label: gr\_instance\_id

Label Description: GR instance ID

Example: 1, 2

- Label: `ddn_stats_type`

Label Description: The pre-defined `ddn_stats_type`

Example: `high_priority_initiated`, `high_priority_suppressed`, `throttled`, `delayed`, `control_proc_triggered`, `data_triggered`, `gtpu_err_ind_triggered`

## SGW PDN Disconnect Stats Category

### **`sgw_pdn_disconnect_stats`**

Description: SGW PDN disconnects counters

Sample Query:

```
sgw_pdn_disconnect_stats{gr_instance_id="1",pdn_type="ipv4v6",rat_type="EUTRAN",reason="mme_init_pdn_sess_rel"}
```

Labels:

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

- Label: `pdn_type`

Label Description: The `pdn_type` indicates the address type of PDN

Example: `ipv4`, `ipv6`, `ipv4v6`, `unknown`

- Label: `rat_type`

Label Description: The `rat_type` indicates which Radio Access Technology is currently serving the UE"

Example: `EUTRAN`

- Label: `reason`

Label Description: The reason indicates the disconnect reason associate with the `pdn`"

Example: `admin_init_disconnect`, `remote_init_disconnect`, `pgw_init_pdn_sess_rel`, `mme_init_pdn_sess_rel`, `sx_request_rejected`, `sx_context_not_found`, `sx_msg_invalid_length`, `sx_no_resource_available`, `sx_no_response`, `sx_reason_unknown`, `no_response`, `s5_context_not_found`, `s11_context_not_found`, `local_disconnect`, `no_cause`, `userplane_info_not_available`, `setup_timeout`, `admin_init_local_purge`, `db_conflict_init_disconnect`, `context_replacement`, `userplane_session_idle_timeout`, `userplane_requested_graceful_termination`, `s1u_gtpu_error`, `s5u_gtpu_error`, `s1u_gtpu_session_replacement`, `s5u_gtpu_session_replacement`, `sx_recovery`, `sx_path_failure`, `s11_path_failure`, `s5e_path-failure`, `s11_path_failure_local_purge`, `s5e_path_failure_local_purge`, `s5e_recovery`, `s11_recovery`, `s5e_recovery_local_purge`, `s11_recovery_local_purge`, `s1u_gtpu_path_failure`, `s5u_gtpu_path_failure`, `stale_session_init_disconnect`, `mop_offline`, `userplane_initiated_clear_subscriber`, `userplane_initiated_association_release`, `userplane_initiated_recovery_failure`, `sx_urss_association_release`, `userplane_initiated_self_protection_termination`

## SGW PDN EMPS Counter Category

### **sgw\_pdn\_emps\_counter**

Description: Total number of active emps session

Sample Query: `sgw_pdn_emps_counters{gr_instance_id=\"1\",status=\"active\"}`

Labels:

- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2
- Label: `status`  
Label Description: Active emps session  
Example: active

## SGW PDN EMPS Stats Category

### **sgw\_pdn\_emps\_stats**

Description: Total number of emps session

Sample Query: `sgw_pdn_emps_stats{gr_instance_id=\"1\",status=\"release\"}`

Labels:

- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2
- Label: `status`  
Label Description: Status of emps session  
Example: setup, release

## SGW PDN Level Counters Category

### **sgw\_pdn\_counters**

Description: Pdn level counters

Sample Query:

`sgw_pdn_counters{ratType=\"EUTRAN\",pdnConnType=\"ipv4\",plmnType=\"homer\",grInstanceId=\"1\"}`

Labels:

- Label: `rat_type`  
Label Description: The `rat_type` indicates which Radio Access Technology is currently serving the UE"

Example: EUTRAN

- Label: `pdn_type`

Label Description: The `pdn_type` indicates the address type of PDN

Example: ipv4, ipv6, ipv4v6, unknown

- Label: `pdn_plmn_type`

Label Description: It indicates the plmn type for the subscriber

Example: homer, visitor, roamer, unknown

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

## SGW PDN Level statistics Category

### **sgw\_pdn\_stats**

Description: Pdn level statistics

Sample Query:

```
sgw_pdn_stats{ratType="EUTRAN",status="setup",pdnConnType="ipv4",plmnType="homer",grInstanceID="1"}
```

Labels:

- Label: `rat_type`

Label Description: The `rat_type` indicates which Radio Access Technology is currently serving the UE"

Example: EUTRAN

- Label: `status`

Label Description: Subscriber status

Example: setup, release

- Label: `pdn_type`

Label Description: The `pdn_type` indicates the address type of PDN

Example: ipv4, ipv6, ipv4v6, unknown

- Label: `pdn_plmn_type`

Label Description: It indicates the plmn type for the subscriber

Example: homer, visitor, roamer, unknown

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

## SGW Procedure Category

### sgw\_service\_stats

Description: SGW call flow procedure counters

Sample Query: `sgw_service_stats{gr_instance_id="1",sgw_procedure_type="create_bearer"}`

Labels:

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

- Label: `sgw_procedure_type`

Label Description: The procedure type associated with the call flow procedure

Example: `initial_attach`, `secondary_pdn_creation`, `mme_initiated_deletion`, `pgw_initiated_deletion`, `update_bearer`, `create_bearer`, `downlink_data_notification`, `downlink_data_notification_retry`, `pgw_initiated_dedicated_bearer_deletion`, `release_access_bearer`, `inter_mme_intra_sgw_idle_mode`, `intra_mme_intra_sgw_idle_mode`, `service_request`, `modify_bearer_req_initial_attach`, `inter_mme_handover`, `intra_mme_handover`, `inter_system_handover`, `modify_bearer_req_uli_tz_change`, `admin_initiated_deletion`, `s5_cnf_initiated_deletion`, `s11_cnf_initiated_deletion`, `sx_cnf_initiated_deletion`, `local_initiated_deletion`, `setup_timeout_deletion`, `create_indirect_data_forwarding_tunnel`, `delete_indirect_data_forwarding_tunnel`, `indirect_data_forwarding_tunnel_guard_timer_expiry`, `db_conflict_initiated_deletion`, `s1_sgw_relocation_attach`, `context_replacement`, `modify_bearer_command`, `delete_bearer_command`, `inter_system_handover_attach`, `x2_gnnp_to_lte_relocation_attach`, `s1_gnnp_to_lte_relocation_attach`, `inter_system_handover`, `modify_bearer_req_x2_gnnp_to_lte_relocation`, `modify_bearer_req_s1_gnnp_to_lte_relocation`, `change_notification`, `upf_sess_idle_timeout_deletion`, `upf_initiated_clear_subscriber`, `upf_initiated_association_release`, `upf_recovery_failure`, `sx_urss_association_release_initiated_deletion`, `upf_initiated_self_protection_termination`, `s5u_gtpu_error_initiated`, `s1u_gtpu_session_replacement_initiated`, `s5u_gtpu_session_replacement_initiated`, `s1u_gtpu_path_failure_initiated`, `s5u_gtpu_path_failure_initiated`, `s5u_gtpu_error_initiated_bearer_deletion`, `s1u_gtpu_error_local_purge_initiated_bearer_deletion`, `s5u_gtpu_error_local_purge_initiated_bearer_deletion`, `s1u_gtpu_session_replacement_initiated_bearer_deletion`, `s5u_gtpu_session_replacement_initiated_bearer_deletion`, `s1u_gtpu_session_replacement_local_purge_initiated_bearer_deletion`, `s5u_gtpu_session_replacement_local_purge_initiated_bearer_deletion`, `s1u_gtpu_path_failure_initiated_bearer_deletion`, `s5u_gtpu_path_failure_initiated_bearer_deletion`, `s1u_gtpu_path_failure_local_purge_initiated_bearer_deletion`, `s5u_gtpu_path_failure_local_purge_initiated_bearer_deletion`, `stale_session_initiated_deletion`, `dbcfi_cnf_local_purge_initiated_bearer_deletion`, `suspend_notification`, `resume_notification`, `pdn_state_sync`, `upf_initiated_clear_subscriber`, `upf_initiated_association_release`, `upf_recovery_failure`, `sx_urss_association_release_initiated_deletion`, `upf_initiated_self_protection_termination`

- Label: `interface`

Label Description: The interface type associated with the call flow procedure

Example: `interface_sgw_ingress`, `interface_sgw_egress`

- Label: `status`

Label Description: The status of the call flow procedure. In case of procedure failure it can indicate whether the message was rejected or was the message discarded.

Example: attempted, success, failure, rejected, discarded

- Label: `fail_reason`

Label Description: High level reason for failure status. For success and attempted it will be Empty

Example: `gtp_validation_fail`, `gtp_cause_fail`, `gtp_peer_not_responding`, `sx_validation_fail`, `sx_cause_fail`, `sx_peer_not_responding`, `timeout`, `internal_failure`, `userplane_selection_fail`, `gtp_partial_fail`, `sx_oci_throttling_reject`, `collision_abort`, `collision_discard`, `gtp_entity_in_congestion`

- Label: `sub_fail_reason`

Label Description: Incoming negative GTP/Sx Cause or type of TIMEOUT that led to the failure. For other failures it will be Empty

Example: `invalid_msg_format`, `version_not_supported`, `service_not_supported`, `imsi_imei_not_known`, `preferred_pdn_type_unsupported`, `mand_ie_missing`, `cond_ie_missing`, `invalid_len`, `mand_ie_incorrect`, `no_resource_available`, `temp_rejected_due_to_handover_in_progress`, `peer_not_responding`, `context_not_found`, `unable_to_page_ue`, `unable_to_page_ue_due_to_suspension`, `ue_already_reattached`, `temp_rejected_due_to_ho_in_progress`, `sx_req_rejected`, `invalid_fw_policy`, `invalid_fteid_alloc_opt`, `rule_creation_mod_fail`, `no_estab_sx_assoc`, `system_failure`, `pfcpc_entity_in_congestion`, `procedure_timeout`, `ipc_timeout`, `transaction_timeout`, `missing_or_unknown_apn`

- Label: `reject_cause`

Label Description: In case of procedure failure it will be used to indicate the outgoing GTP/Sx cause being sent to the peer. In other cases it will be Empty.

Example: `invalid_msg_format`, `version_not_supported`, `invalid_len`, `mandatory_ie_missing`, `conditional_ie_missing`, `mandatory_ie_incorrect`, `service_not_supported`, `imsi_imei_not_known`, `preferred_pdn_type_unsupported`, `system_failure`, `no_resources_available`, `temp_rejected_due_to_handover_in_progress`, `service_denied`, `peer_not_responding`, `context_not_found`, `request_rejected`, `missing_or_unknown_apn`, `entity_in_congestion`

- Label: `svc_to_svc`

Label Description: In case of gtp bypass, i.e. service to service communication this is set as True, else False

Example: True, False

## SGW Resource Management stats Category

### **sgw\_resource\_mgmt\_stats**

Description: It gives information about number of allocated/deallocated ID's from resource manager

Sample Query:

```
sgw_resource_mgmt_stats{label_id_type="id_alloc",status="success",grInstanceID="1"}
```

Labels:

- Label: `label_id_type`

Label Description: The `label_id_type` indicates if its ID allocation or deallocation"

Example: id\_alloc, id\_dealloc

- Label: status

Label Description: The status of ID allocation/deallocation

Example: attempted, success, failure

- Label: gr\_instance\_id

Label Description: GR instance ID

Example: 1, 2

## SGW Sx session report stats Category

### sgw\_sx\_session\_report\_stats

Description: Total Sx Session-Report-Requests processed

Sample Query:

```
sgw_sx_session_report_stats{gr_instance_id="1",reason="psdbu",sx_session_report_type="USAR",sx_usage_report_status="success"}
```

Labels:

- Label: gr\_instance\_id

Label Description: GR instance ID

Example: 1, 2

- Label: sx\_session\_report\_type

Label Description: Type of the session-report

Example: USAR, DLDR, ERIR, UPIR, SPTER, SRIR, GTER, UPRR, UISR

- Label: sx\_usage\_report\_status

Label Description: Processing status of usage report

Example: success, failure

- Label: reason

Label Description: Reason for Session Report Request

Example: psdbu

## SGW Timer Stats Category

### sgw\_tmr\_stats

Description: SGW Timer Counter

Sample Query:

```
sgw_tmr_stats{gr_instance_id="1",timer_type="internal_ddn_delay",status="start"}
```

Labels:

- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2
- Label: `timer_type`  
Label Description: Timer type  
Example: `internal_ddn_delay`
- Label: `status`  
Label Description: Status of timer  
Example: start, stop, expired

## SGW UE Disconnect Stats Category

### **sgw\_ue\_disconnect\_stats**

Description: SGW UE disconnects counters

Sample Query: `sgw_ue_disconnect_stats{gr_instance_id=\"1\",reason=\"admin_init_disconnect\"}`

Labels:

- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2
- Label: `reason`  
Label Description: The reason indicates the disconnect reason associated with the UE  
Example: `admin_init_disconnect`, `remote_init_disconnect`, `pgw_init_pdn_sess_rel`, `mme_init_pdn_sess_rel`, `sx_request_rejected`, `sx_context_not_found`, `sx_msg_invalid_length`, `sx_no_resource_available`, `sx_no_response`, `sx_reason_unknown`, `no_response`, `s5_context_not_found`, `s11_context_not_found`, `local_disconnect`, `no_cause`, `userplane_info_not_available`, `db_conflict_init_disconnect`, `userplane_session_idle_timeout`, `userplane_requested_graceful_termination`, `s1u_gtpu_error`, `s5u_gtpu_error`, `s1u_gtpu_session_replacement`, `s5u_gtpu_session_replacement`, `sx_recovery`, `sx_path_failure`, `s11_path_failure`, `s5e_path_failure`, `s11_path_failure_local_purge`, `s5e_path_failure_local_purge`, `s5e_recovery`, `s11_recovery`, `s5e_recovery_local_purge`, `s11_recovery_local_purge`, `s1u_gtpu_path_failure`, `s5u_gtpu_path_failure`, `stale_session_init_disconnect`, `mop_offline`, `userplane_initiated_clear_subscriber`, `userplane_initiated_association_release`, `userplane_initiated_recovery_failure`, `sx_urss_association_release`, `userplane_initiated_self_protection_termination`

## SGW UE Level Counters Category

### **sgw\_ue\_counters**

Description: UE level counter

Sample Query: `sgw_ue_counters{ratType=\"EUTRAN\",state=\"idle\",grInstanceId=\"1\"}`

Labels:

- Label: `rat_type`

Label Description: The `rat_type` indicates which Radio Access Technology is currently serving the UE"

Example: EUTRAN

- Label: `state`

Label Description: Subscriber state

Example: idle, connected

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

## SGW UE Level statistics Category

### **sgw\_ue\_stats**

Description: UE level statistics

Sample Query: `sgw_ue_stats{ratType=\"EUTRAN\",status=\"setup\",grInstanceId=\"1\"}`

Labels:

- Label: `rat_type`

Label Description: The `rat_type` indicates which Radio Access Technology is currently serving the UE"

Example: EUTRAN

- Label: `status`

Label Description: Subscriber status

Example: setup, release

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

## SGW Volte session counter Category

### **sgw\_voltesession\_counter**

Description: Total Sx Session usage reports processed

Sample Query: `sgw_voltesession_counter{gr_instance_id="1",state="VolteSession"}`

Labels:

- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2
- Label: `state`  
Label Description: Session type  
Example: VolteSession

## SGW callflow optimization stats Category

### **sgw\_callflow\_optimization\_stats**

Description: SGW Callflow Optimization Counter

Sample Query:

`sgw_callflow_optimization_stats{gr_instance_id="1",type="suppress_uli_reporting_on_s5"}`

Labels:

- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2
- Label: `type`  
Label Description: Callflow optimization type  
Example: `suppress_uli_reporting_on_s5`, `rab_prepone_ack`



## CHAPTER 3

# MIB Reference

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- [CISCO-CNEE-MIB, on page 49](#)
- [CISCO-SMI, on page 49](#)

## CISCO-CNEE-MIB

This is the MIB module for the Cisco Cloud Native Execution Environment (CNEE) platform. This MIB only handles notifications from the CNEE.



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**Note** The Cisco Cloud Native Execution Environment (CNEE) MIB (CISCO-CNEE-MIB.my) uses definitions that are defined in the Cisco Enterprise Structure of Management Information (SMI) MIB (CISCO-SMI.my).

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For more information, see the "*UCC Subscriber Microservice Infrastructure - Operations Guide*" > "SMI MIB Reference" chapter.

## CISCO-SMI

This is the Structure of Management Information for the Cisco Enterprise.



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**Note** The Cisco Cloud Native Execution Environment (CNEE) MIB (CISCO-CNEE-MIB.my) uses definitions that are defined in the Cisco Enterprise Structure of Management Information (SMI) MIB (CISCO-SMI.my).

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For more information, see the "*UCC Subscriber Microservice Infrastructure - Operations Guide*" > "SMI MIB Reference" chapter.

