



## **Ultra Cloud Core 5G Session Management Function, Release 2023.03 - Statistics Reference**

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## About this Guide

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This guide describes the metrics supported by 5G Session Management Function (SMF). This guide also provides information on how to gather the statistics or counters from its microservices.





## CHAPTER

# 1

## SMF Interface for Metrics

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- [Feature Description, on page 1](#)
- [How it Works, on page 2](#)
- [Configuring Metrics Collection, on page 2](#)

### Feature Description

You can monitor a wide range of application and system statistics, and key performance indicators (KPI) within the SMF infrastructure. KPIs are useful to gain insight into the overall health of the SMF environment. Statistics offer a simplified representation of the SMF configurations and utilization-specific data.

The SMF integrates with Prometheus, a third-party monitoring and alerting solution to capture and preserve the performance data. This data is reported as statistics and can be viewed in the web-based dashboard. Grafana provides a graphical or text-based representation of statistics and counters, which the Prometheus database collects. The Grafana dashboard projects a comprehensive set of quantitative and qualitative data that encourages you to analyze SMF metrics in the reporting tool of your choice and take informed decisions.

By default, the monitoring solution is enabled, which indicates that Prometheus continually monitors your SMF environment and the Prometheus data source is associated with Grafana. You must have the administrative privileges to access Grafana. However, to view a specific dashboard, run the Prometheus queries. The queries are available in the built-in and custom format.

The following snapshot is a sample of the Grafana dashboard.

Figure 1: Grafana Dashboard



## How it Works

KPIs constitute of metrics, such as statistics and counters. These metrics represent the performance improvement or degradation. By default, Prometheus is enabled on the system where SMF is deployed, and configured with Grafana. Prometheus dynamically starts monitoring the data sources that are available on the system. For new dashboard panels, execute queries in Prometheus.

For more information about Prometheus, consult the Prometheus documentation at <https://prometheus.io/docs/introduction/overview/>.

## Configuring Metrics Collection

The labels of each SMF metrics are classified into the following three categories:

- Production
- Debug
- Granular

All the SMF application metrics are controlled through the CLI command for performance optimization.

To collect the necessary SMF metrics and labels, use the following sample configuration:

```
config
  infra metrics verbose { service | protocol | load-balancer | application
  } [ level { debug | off | production | trace } | metrics metrics_name [
granular-labels label_name | level { debug | off | production | trace } |
pod pod_name | level { debug | off | production | trace } ] ]
end
```

**NOTES:**

- If the metrics verbosity is not configured, then the default verbosity level for pod type is as follows.
  - LoadBalancer = Production
  - Protocol = Trace
  - Service = Trace
  - Application = Debug
- The order of the level for verbose metrics is in the following priority order:
  - **metrics [ [metrics\_name] level [production|debug|trace|off]:** [Priority 1]
  - **pod [[pod\_Name]] level [ production | debug | trace | off]]** [Priority 2]
  - **level [production | debug | trace | off]** [Priority 3]
- **infra metrics verbose { service | protocol | load-balancer | application }**: Enable the metric collection. This configuration helps to collect the required application metrics and labels. By default, this command captures the debug labels of metrics.
- **level { debug | off | production | trace }**: Specify the application metrics category to capture the required application metrics and labels.
  - **debug**: Capture all the labels that are classified as production and debug categories. This option is the default configuration.
  - **off**: Disable the application level metrics collection.  
For example, configuring the **infra metrics verbose application smf\_service\_stats level off** command disables the `smf_service_stats` application metrics.
  - **production**: Capture the labels that are classified as production category.
  - **trace**: This option is not supported for SMF application metrics. If this option is configured, the SMF treats this option as **debug**.
- If production and debug classification is empty for a metrics, then all the labels except granular-labels (if configured) are classified as debug.
- **metrics metrics\_name**: Specify the metrics name to capture only the labels that correspond to the given metrics. The metric-level configuration takes precedence over the application-level configuration. If the metrics level is not configured, the labels are captured at the application level.
- **granular-labels**: Capture only the granular labels. By default, this option is disabled.  
If a granular label is required for KPI, then that label must be configured. For example, to capture `dnn` labels of `smf_service_stats` metrics, you must configure the following CLI command:  
**infra metrics verbose application metrics smf\_service\_stats level debug granular-labels [ dnn ]**

## Configuration Example

The following is an example configuration to enable only production level for all the application metrics.

```
infra metrics verbose application level production
```

The following is an example configuration to enable production level for smf\_service\_stats application metrics and debug level for all other application metrics.

```
infra metrics verbose application smf_service_stats level production
```

The following is an example configuration to enable debug level for smf\_service\_stats application metrics along with granular labels and production level for all other application metrics.

```
infra metrics verbose application level production smf_service_stats level debug granular-labels [ dnn ]
```

The following is an example configuration to enable production level for smf\_service\_stats application metrics along with granular labels and debug level for all other application metrics.

```
infra metrics verbose application smf_service_stats level production granular-labels [ dnn ]
```

The following is an example configuration to disable smf\_service\_stats application metrics and debug level for all other application metrics.

```
infra metrics verbose application smf_service_stats level off
```

The following is an example configuration to configure NSSAI labels of smf\_service\_stats metrics.

```
infra metrics verbose application metrics smf_service_stats level debug granular-labels [ snssai ]
```




---

**Note** The NSSAI statistics are not pegged without configuring the NSSAI label in the granular-labels configuration.

---

## Configuration Verification

To verify the configuration, use the following show command:

```
show running-config infra metrics verbose application
```

The following are example outputs of the **show running-config infra metrics verbose application** command.

```
[smf] smf# show running-config infra metrics verbose application
infra metrics verbose application
metrics smf_service_stats
  level production
  granular-labels [ dnn ]
exit
exit
```

The preceding output indicates that the configuration to capture production labels for smf\_service\_stats application metrics along with granular labels and debug levels of all other application metrics is enabled.

```
[smf] smf# show running-config infra metrics verbose application
infra metrics verbose application
  level production
metrics smf_service_stats
```

```
    level debug
    granular-labels [ [dnn] ]
  exit
exit
```

The preceding output indicates that the configuration to capture debug labels for smf\_service\_stats application metrics along with granular labels and production level of all other application metrics is enabled.

To verify the slice information on procedure and session statistics, use the following show command:

```
show running-config infra metrics verbose application
infra metrics verbose application
metrics smf_service_stats
  level debug
  granular-labels [ snssai ]
exit
```





## CHAPTER 2

# SMF Metrics

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## Diameter Endpoint Metrics Reference

### diameter-ep statistics Category

#### **diam\_base\_msg\_seconds\_total**

Description: Cumulative response time in seconds of diameter base message requests processed by diameter endpoint

Sample Query: 'diam\_base\_msg\_seconds\_total{message\_name="DPR"}'

Labels:

- Label: `message_name`  
Label Description: name of interface message  
Example: DPR
- Label: `origin_host`  
Label Description: name of the origin host  
Example: 192.168.169.107
- Label: `origin_realm`  
Label Description: name of the origin realm  
Example: xyz.com

- Label: `disconnect_cause`  
Label Description: reason for the disconnection  
Example: REBOOTING, BUSY, DO\_NOT\_WANT\_TO\_TALK\_TO\_YOU
- Label: `result_code`  
Label Description: `result_code` describes the error that the diameter node encountered in its processing  
Example: 2001, 5012
- Label: `gr_instance`  
Label Description: GR Instance ID  
Example: 1 or 2

### **diam\_base\_msg\_total**

Description: Count of diameter base message requests processed by diameter endpoint

Sample Query: `'diam_base_msg_total{message_name="DPR}'`

Labels:

- Label: `message_name`  
Label Description: name of interface message  
Example: DPR
- Label: `origin_host`  
Label Description: name of the origin host  
Example: 192.168.169.107
- Label: `origin_realm`  
Label Description: name of the origin realm  
Example: xyz.com
- Label: `disconnect_cause`  
Label Description: reason for the disconnection  
Example: REBOOTING, BUSY, DO\_NOT\_WANT\_TO\_TALK\_TO\_YOU
- Label: `result_code`  
Label Description: `result_code` describes the error that the diameter node encountered in its processing  
Example: 2001, 5012
- Label: `gr_instance`  
Label Description: GR Instance ID  
Example: 1 or 2

**diameter\_decode\_message\_total**

Description: Count of decoding done by diameter endpoint

Sample Query: 'diameter\_decode\_message\_total{interface="gx"}'

Labels:

- Label: `interface`  
Label Description: name of the interface  
Example: `gx, gy`

Labels:

- Label: `message_name`  
Label Description: name of interface message  
Example: `ccai, ccou, ccat, rar, asr`
- Label: `endpoint_name`  
Label Description: name of endpoint profile used during processing  
Example: `gxProfl`
- Label: `dict_name`  
Label Description: name of the dictionary used  
Example: `gx_cust`
- Label: `status`  
Label Description: status of the request  
Example: `success, failure, partial`
- Label: `unknown_avp`  
Label Description: `unknown_avp` indicates if any unknown AVPs were found during encoding where 0 indicates not found and 1 indicates found  
Example: `0,1`
- Label: `gr_instance`  
Label Description: GR Instance ID  
Example: `1 or 2`

**diameter\_encode\_message\_total**

Description: Count of encoding done by diameter endpoint

Sample Query: 'diameter\_encode\_message\_total{interface="gx"}'

Labels:

- Label: `interface`  
Label Description: name of the interface

Example: gx, gy

Labels:

- Label: `message_name`  
Label Description: name of interface message  
Example: ccru, ccru, ccru, raa, asa

Labels:

- Label: `endpoint_name`  
Label Description: name of endpoint profile used during processing  
Example: gxProf1
- Label: `dict_name`  
Label Description: name of the dictionary used  
Example: gx\_cust
- Label: `status`  
Label Description: status of the request  
Example: success, failure, partial
- Label: `unknown_avp`  
Label Description: unknown\_avp indicates if any unknown AVPs were found during encoding where 0 indicates not found and 1 indicates found  
Example: 0,1
- Label: `gr_instance`  
Label Description: GR Instance ID  
Example: 1 or 2

### **diameter\_pod\_status**

Description: Pod status as active/standby

Sample Query: `'diameter_pod_status{vip="10.0.0.1"}'`

Labels:

- Label: `vip`  
Label Description: any ip  
Example: 10.0.0.1

### **diameter\_request\_message\_total**

Description: Count of diameter requests processed by diameter endpoint

Sample Query: `'diameter_request_message_total{interface="gx"}'`

## Labels:

- Label: `interface`  
Label Description: name of the interface  
Example: `gx, gy`

## Labels:

- Label: `message_name`  
Label Description: name of interface message  
Example: `ccri, ccru, ccrt, rar, asr`

## Labels:

- Label: `peer_address`  
Label Description: `peer_address` will be empty for inbound requests, could be empty for outbound requests depending on point of failure  
Example: `10.1.2.110:3868`

## Labels:

- Label: `status`  
Label Description: status of the request  
Example: `attempted, peer_down, err_cfg, err_maxout, timeout_ipc, err_ipc, err_unmarshal`

## Labels:

- Label: `retry`  
Label Description: retry count  
Example: `0`
- Label: `gr_instance`  
Label Description: GR Instance ID  
Example: `1 or 2`
- Label: `transaction_type`  
Label Description: transaction type  
Example: `origin`
- Label: `endpoint_name`  
Label Description: name of endpoint profile used during processing  
Example: `gxProfl`
- Label: `message_direction`  
Label Description: direction of message from Diameter perspective  
Example: `inbound, outbound`

**diameter\_response\_message\_seconds\_total**

Description: Cumulative response time in seconds of diameter requests processed by diameter endpoint

Sample Query: 'diameter\_response\_message\_seconds\_total{interface="gx"}'

Labels:

- Label: `interface`

Label Description: name of the interface

Example: `gx, gy`

Labels:

- Label: `message_name`

Label Description: name of interface message

Example: `ccai, ccaw, ccat, raa, asa`

Labels:

- Label: `peer_address`

Label Description: `peer_address` will be empty for inbound requests, could be empty for outbound requests depending on point of failure

Example: `10.1.2.110:3868`

Labels:

- Label: `status`

Label Description: status of the request

Example: `success, err_cfg, err_maxout, err_send, timeout_res, timeout_ipc, err_ipc, err_unmarshal, err_rc, err_exp_rc`

Labels:

- Label: `result_code`

Label Description: `result_code` describes the error that the diameter node encountered in its processing

Example: `1001, 2001, 3001, 4001, 5001`

Labels:

- Label: `action`

Label Description: action

Example: `continue, terminate`

Labels:

- Label: `sub_action`

Label Description: sub action

Example: discard-traffic, local-fallback, retry-server-on-event, send-ccrt-on-call-termination, with-term-req, without-term-req

- Label: `gr_instance`

Label Description: GR Instance ID

Example: 1 or 2

- Label: `endpoint_name`

Label Description: name of endpoint profile used during processing

Example: gxProf1

- Label: `message_direction`

Label Description: direction of message from Diameter perspective

Example: inbound, outbound

### **diameter\_response\_message\_total**

Description: Count of diameter responses processed by diameter endpoint

Sample Query: 'diameter\_response\_message\_total{interface="gx"}'

Labels:

- Label: `interface`

Label Description: name of the interface

Example: gx, gy

Labels:

- Label: `message_name`

Label Description: name of interface message

Example: ccai, ccau, ccat, raa, asa

Labels:

- Label: `peer_address`

Label Description: `peer_address` will be empty for inbound requests, could be empty for outbound requests depending on point of failure

Example: 10.1.2.110:3868

Labels:

- Label: `status`

Label Description: status of the request

Example: success, err\_cfg, err\_maxout, err\_send, timeout\_res, timeout\_ipc, err\_ipc, err\_unmarshal, err\_rc, err\_exp\_rc

Labels:

- Label: `result_code`

Label Description: `result_code` describes the error that the diameter node encountered in its processing

Example: 1001, 2001, 3001, 4001, 5001

Labels:

- Label: `action`

Label Description: `action`

Example: `continue`, `terminate`

Labels:

- Label: `sub_action`

Label Description: `sub action`

Example: `discard-traffic`, `local-fallback`, `retry-server-on-event`, `send-ccrt-on-call-termination`, `with-term-req`, `without-term-req`

Labels:

- Label: `gr_instance`

Label Description: GR Instance ID

Example: 1 or 2

Labels:

- Label: `endpoint_name`

Label Description: name of endpoint profile used during processing

Example: `gxProfl`

Labels:

- Label: `message_direction`

Label Description: direction of message from Diameter perspective

Example: `inbound`, `outbound`

### **diameter\_route\_expires\_total**

Description: Count of all dynamic routes expired

Sample Query: `'diameter_route_expires_total{gr_instance="1"}'`

Labels:

- Label: `route`

Label Description: route identified by host, realm and peer

Example: `OCS1:OCS.COM:DRA1`

Labels:

- Label: `peer_name`  
Label Description: peer name used by the route  
Example: DRA1

Labels:

- Label: `gr_instance`  
Label Description: GR Instance ID  
Example: 1 or 2

### **diameter\_route\_hits\_total**

Description: Count of all route hits for messages processed by diameter endpoint

Sample Query: `'diameter_route_hits_total{route_type="S"}'`

Labels:

- Label: `route`  
Label Description: route identified by host, realm and peer  
Example: OCS1:OCS.COM:DRA1

Labels:

- Label: `route_type`  
Label Description: type of the route  
Example: S or D

Labels:

- Label: `peer_name`  
Label Description: peer name used by the route  
Example: DRA1

Labels:

- Label: `wild_carded_route`  
Label Description: route with wild carded host or realm  
Example: \*:OCS.COM:DRA1

Labels:

- Label: `gr_instance`  
Label Description: GR Instance ID  
Example: 1 or 2

**diameter\_route\_misses\_total**

Description: Count of all route misses for messages processed by diameter endpoint

Sample Query: 'diameter\_route\_misses\_total{route="OCS1:OCS.COM:DRA1"}'

Labels:

- Label: `route`

Label Description: route identified by host, realm and peer

Example: OCS1:OCS.COM:DRA1

Labels:

- Label: `route_type`

Label Description: type of the route

Example: S or D

Labels:

- Label: `peer_name`

Label Description: peer name used by the route

Example: DRA1

Labels:

- Label: `gr_instance`

Label Description: GR Instance ID

Example: 1 or 2

**diameter\_route\_status**

Description: Status of a route

Sample Query: 'diameter\_route\_status{route="OCS1:OCS.COM:DRA1"}'

Labels:

- Label: `route`

Label Description: route identified by host, realm and peer

Example: OCS1:OCS.COM:DRA1

Labels:

- Label: `route_type`

Label Description: type of the route

Example: S or D

Labels:

- Label: `peer_name`

Label Description: peer name used by the route

Example: DRA1

Labels:

- Label: `gr_instance`

Label Description: GR Instance ID

Example: 1 or 2

Labels:

- Label: `route_status`

Label Description: status of the route

Example: Pending or Active or Inactive or Failed or Deleted or Expired or Cloned

{{- end}}

### **diameter\_routes\_total**

Description: Count of all diameter routes added by diameter endpoint

Sample Query: 'diameter\_routes\_total{gr\_instance="1"}'

Labels:

- Label: `route_type`

Label Description: type of the route

Example: S or D

Labels:

- Label: `peer_name`

Label Description: peer name used by the route

Example: DRA1

Labels:

- Label: `gr_instance`

Label Description: GR Instance ID

Example: 1 or 2

### **dispatch\_error\_seconds\_total**

Description: Cumulative time in seconds spent during dispatching of inbound requests to service that had error or timeout

Sample Query: 'dispatch\_error\_seconds\_total{gr\_instance="1"}'

Labels:

- Label: `application`

Label Description: name of the application

Example: diameter

Labels:

- Label: `command_code`

Label Description: command code

Example: RAR

Labels:

- Label: `error_code`

Label Description: error code

Example: 3002

Labels:

- Label: `gr_instance`

Label Description: GR Instance ID

Example: 1 or 2

### **dispatch\_error\_total**

Description: Count of inbound requests that had error or timeout during dispatch to service

Sample Query: `'dispatch_error_total{gr_instance="1"}'`

Labels:

- Label: `application`

Label Description: name of the application

Example: diameter

Labels:

- Label: `command_code`

Label Description: command code

Example: RAR

Labels:

- Label: `error_code`

Label Description: error code

Example: 3002

Labels:

- Label: `gr_instance`

Label Description: GR Instance ID

Example: 1 or 2

### **policy\_engine\_message\_seconds\_total**

Description: Cumulative time in seconds spent during processing of message sent to service

Sample Query: 'policy\_engine\_message\_seconds\_total{gr\_instance="1"}'

Labels:

- Label: `application`  
Label Description: name of the application  
Example: `diameter`

Labels:

- Label: `command_code`  
Label Description: command code  
Example: `RAR`

Labels:

- Label: `gr_instance`  
Label Description: GR Instance ID  
Example: 1 or 2

### **policy\_engine\_message\_total**

Description: Count of messages sent to service for which response is received

Sample Query: 'policy\_engine\_message\_total{gr\_instance="1"}'

Labels:

- Label: `application`  
Label Description: name of the application  
Example: `diameter`

Labels:

- Label: `command_code`  
Label Description: command code  
Example: `RAR`

Labels:

- Label: `gr_instance`  
Label Description: GR Instance ID  
Example: 1 or 2

# gtpc-ep Metrics Reference

## GTPC BGP Routed Count Stats Category

### **gtpc\_app\_bgp\_routes\_count**

Description: BGP routes add counter

Sample Query: 'gtpc\_app\_bgp\_routes\_count{status="success"}'

Labels:

- Label: `status`  
Label Description: status  
Example: success, failed
- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2

## GTPC Roaming Peer Path Management Stats Category

### **gtpc\_roaming\_peer\_path\_mgmt**

Description: GTPC Roaming Peer Path Management Statistics.

Sample Query: 'gtpc\_roaming\_peer\_path\_mgmt{service\_name="gtpc-ep",status="suppressed"}'

Labels:

- Label: `gtpc_peer_type`  
Label Description: Gtpc Peer type  
Example: ROAMER, HOMER, VISITOR
- Label: `interface_type`  
Label Description: Gtpc Interface type  
Example: S5, S11, S5E, S2B, S8
- Label: `gtpc_msg_type`  
description: Gtpc Message type  
Example: NumEchoMsg, NumControlMsg
- Label: `status`  
Label Description: Status  
Example: suppressed

- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2

## GTPC Short Circuit Map Count Category

### **gtpc\_short\_circuit\_map\_count**

Description: GTPC Short Circuit Map operation counter

Sample Query: `'gtpc_short_circuit_map_count{message_name="TxModifyBearerRes"}'`

Labels:

- Label: `message_name`  
Label Description: Message Name  
Example: TxCreateBearerReq, TxUpdateBearerReq, TxDeleteBearerReq, TxModifyBearerRes, TxDeleteSessRsp, TxCreateSessionRsp, RecordExpired
- Label: `gtpc_short_circuit_map_operation`  
Label Description: Gtpc short circuit counter type  
Example: increment, decrement
- Label: `gtpc_short_circuit_map_teid_changed`  
Label Description: Gtpc short circuit teid cache operation type  
Example: added, updated, deleted
- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2

## GTPC Short Circuit Message Stats Category

### **gtpc\_msg\_short\_circuit\_stats**

Description: GTPC Short Circuit Modify Bearer Response Statistics.

Sample Query: `'gtpc_msg_short_circuit_stats{gtpc_msg_type="RxModifyBearerReq"}'`

Labels:

- Label: `gtpc_msg_type`  
Label Description: Gtpc Message type  
Example: RxModifyBearerReq, SkippingShortCircuit
- Label: `gtpc_short_circuit_category`  
Label Description: Category

Example: WithServingNetwork, WithIndication, WithBearerContext, MBREventExpired, SendSCMBResp, GetSCMBRespFailed, LastSequenceNumberSame

- Label: `interface_type`

Label Description: Gtpc Interface type

Example: S5, S11, S5E, S2B, S8

## Processing Time of SMF GTPC Messages Category

### **gtpc\_msg\_seconds**

Description: Time taken for GTPC message processing

Sample Query: `'gtpc_msg_seconds{message_name="S5S8_MSG_CREATE_SESSION_REQUEST"}'`

Labels:

- Label: `message_name`

Label Description: Message Name

Example: S5S8\_MSG\_CREATE\_SESSION\_REQUEST, S5S8\_MSG\_CREATE\_SESSION\_RESPONSE, S5S8\_MSG\_MODIFY\_BEARER\_REQUEST, S5S8\_MSG\_MODIFY\_BEARER\_RESPONSE, S5S8\_MSG\_DELETE\_BEARER\_REQUEST, S5S8\_MSG\_DELETE\_BEARER\_RESPONSE, S5S8\_MSG\_DELETE\_SESSION\_REQUEST, S5S8\_MSG\_DELETE\_SESSION\_RESPONSE

- Label: `message_direction`

Label Description: Direction

Example: inbound, outbound

- Label: `status`

Label Description: Status

Example: no\_rsp\_received\_tx, accepted

- Label: `transport_type`

Label Description: Transport Type

Example: origin, retransmitted

- Label: `interface_type`

Label Description: Gtpc Interface type

Example: S5, S11, S5E, S2B, S8

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

## Processing time of GTPC messages Category

### **gtpc\_app\_events\_seconds**

Description: Total time taken by GTPC messages

Sample Query: 'gtpc\_app\_events\_seconds{event\_type="csreq"}'

Labels:

- Label: `event_type`  
Label Description: Gtpc Event type  
Example: csreq, mbreq, cbreq, ubreq, dbreq, dsreq, rabreq, cidftreq, didftreq, changenotfreq, mbreqlist
- Label: `interface_type`  
Label Description: Gtpc Interface type  
Example: S5, S11, S5E, S2B, S8
- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2

## SGW TEID Cache Operation Stats Category

### **sgw\_teid\_cache\_total**

Description: SGW TEID cache operation counter

Sample Query: 'sgw\_teid\_cache\_total{action="create"}'

Labels:

- Label: `action`  
Label Description: TEID cache operation type  
Example: create, update, delete, cache\_found, expired, no\_cache, cache\_full
- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2

## SMF GTPC Echo Stats Category

### **gtpc\_echo\_msg\_stats**

Description: GTPC Echo Req Rx and Echo Resp Tx

Sample Query: 'gtpc\_echo\_msg\_stats{gtpc\_msg\_type="gtpc\_echo\_req\_rx"}'

Labels:

- Label: `gtpc_peer_ip`  
Label Description: Gtpc Peer IP of nodes like SGW,ePDG etc  
Example: 1.2.3.4
- Label: `gtpc_msg_type`  
Label Description: Gtpc Message type  
Example: `gtpc_echo_req_rx`, `gtpc_echo_res_tx`
- Label: `interface_type`  
Label Description: Gtpc Interface type  
Example: S5, S11, S5E, S2B, S8
- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2

## SMF GTPC Golang Encode Decode Stats Category

### **`gtpc_golang_enc_dec_stats`**

Description: Messages Encoded/Decoded using Golang

Sample Query: `'gtpc_golang_enc_dec_stats{gtpc_msg_type="RxModifyBearerReq"}'`

Labels:

- Label: `gtpc_msg_type`  
Label Description: Gtpc Message type  
Example: `NumRxEchoReq`, `NumTxEchoReq`, `NumRxEchoRes`, `NumTxEchoRes`,  
`NumRxCreateSessionReq`, `NumTxCreateSessionReq`, `NumRxCreateSessionRes`, `NumTxCreateSessionRes`,  
`NumRxDeleteSessionReq`, `NumTxDeleteSessionReq`, `NumRxDeleteSessionRes`, `NumTxDeleteSessionRes`,  
`NumRxModifyBearerReq`, `NumTxModifyBearerReq`, `NumRxModifyBearerRes`, `NumTxModifyBearerRes`,  
`NumRxDeleteBearerReq`, `NumTxDeleteBearerReq`, `NumRxDeleteBearerRes`, `NumTxDeleteBearerRes`,  
`NumTxCreateBearerReq`, `NumRxCreateBearerReq`, `NumTxCreateBearerRes`, `NumRxCreateBearerRes`,  
`NumTxUpdateBearerReq`, `NumRxUpdateBearerReq`, `NumTxUpdateBearerRes`, `NumRxUpdateBearerRes`,  
`NumRxModifyBearerCmd`, `NumTxModifyBearerCmd`, `NumRxModifyBearerFail`,  
`NumTxModifyBearerFail`, `NumRxDeleteBearerCmd`, `NumTxDeleteBearerCmd`, `NumRxDeleteBearerFail`,  
`NumTxDeleteBearerFail`, `NumTxChangeNotfReq`, `NumRxChangeNotfReq`, `NumRxChangeNotfRes`,  
`NumTxChangeNotfRes`, `NumRxSuspendNotf`, `NumTxSuspendNotf`, `NumRxSuspendAck`,  
`NumTxSuspendAck`, `NumRxResumeNotf`, `NumTxResumeNotf`, `NumRxResumeAck`, `NumTxResumeAck`,  
`NumTxReleaseAccessBearerRsp`, `NumRxReleaseAccessBearerReq`, `NumRxContextReq`,  
`NumTxContextReq`, `NumRxContextAck`, `NumTxContextAck`, `NumRxDDN`, `NumTxDDN`, `NumRxIDReq`,  
`NumTxIDReq`, `NumRxIDRsp`, `NumTxIDRsp`, `NumRxDDNFail`, `NumTxDDNFail`, `NumRxCreateIDFTRReq`,  
`NumTxCreateIDFTRsp`, `NumRxDeletIDFTRReq`, `NumTxDeleteIDFTRsp`, `NumRxBearerResCmd`
- Label: `gtpc_msg_len`

Label Description: Message Length

Example: 36, 24, 45

- Label: `interface_type`

Label Description: Gtpc Interface type

Example: S5, S11, S5E, S2B, S8

- Label: `gtpc_msg_operation`

Label Description: Operation

Example: encode, decode

- Label: `gtpc_msg_status`

Label Description: Status

Example: success, error

- Label: `gtpc_msg_status_cause`

Label Description: Error Cause

Example: HeaderDecodeFailure, ParseIEsFromPayloadFailure, MBRFromIEFailure

## SMF GTPC Messages Total Category

### **gtpc\_msg\_total**

Description: Total GTPC Messages

Sample Query: `'gtpc_msg_total{message_name="S5S8_MSG_CREATE_SESSION_REQUEST"}'`

Labels:

- Label: `message_name`

Label Description: Message Name

Example: S5S8\_MSG\_CREATE\_SESSION\_REQUEST, S5S8\_MSG\_CREATE\_SESSION\_RESPONSE, S5S8\_MSG\_MODIFY\_BEARER\_REQUEST, S5S8\_MSG\_MODIFY\_BEARER\_RESPONSE, S5S8\_MSG\_DELETE\_BEARER\_REQUEST, S5S8\_MSG\_DELETE\_BEARER\_RESPONSE, S5S8\_MSG\_DELETE\_SESSION\_REQUEST, S5S8\_MSG\_DELETE\_SESSION\_RESPONSE

- Label: `message_direction`

Label Description: Direction

Example: inbound, outbound

- Label: `status`

Label Description: Status

Example: no\_rsp\_received\_tx, accepted

- Label: `transport_type`

Label Description: Transport Type

Example: origin, retransmitted

- Label: `interface_type`

Label Description: Gtpc Interface type

Example: S5, S11, S5E, S2B, S8

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

## SMF GTPC Unexpected Messages Category

### **gtpc\_app\_total\_unexpected\_gtpc\_msg\_events**

Description: Unexpected GTPC Messages received

Sample Query: `'gtpc_app_total_unexpected_gtpc_msg_events{service_name="gtpc-ep}'`

Labels:

- Label: `message_type`

Label Description: Gtpc Message type

Example: `unexpected_gtpc_message`

- Label: `interface_type`

Label Description: Gtpc Interface type

Example: S5, S11, S5E, S2B, S8

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

## SMF GTPC Validation Fail Stats Category

### **gtpc\_app\_validation\_events**

Description: Stats of Message decode failures

Sample Query: `'gtpc_app_validation_events{service_name="gtpc-ep}'`

Labels:

- Label: `message_type`

Label Description: Gtpc Message type

Example: `csreq, csrsp, mbreq, mbrsp, cbreq, cbrsp, ubreq, ubrsp, dbreq, dbrsp, dsreq, dsrsp, mbcmd, mbcfi, dbcmd, dbcfi, ddnfi, ddnack, rabreq, upcreq`

- Label: `interface_type`  
Label Description: Gtpc Interface type  
Example: `sgw_ingress`, `pgw_ingress`, `S5`, `S11`, `S5E`, `S2B`, `S8`
- Label: `failure_type`  
Label Description: Failure Type  
Example: `msg_validation_fail`, `hdr_decode_failure`
- Label: `hdr_decode_fail_reason`  
Label Description: Header Decode Fail Reason  
Example: `incorrect_gtp_version`, `unsupported_message`, `incorrect_msg_len`, `invalid_msg_format`, `invalid_seq_no`, `hdr_decode_fail_reason`
- Label: `action_type`  
Label Description: Action Type  
Example: `discarded`, `rejected`
- Label: `reject_cause`  
Label Description: Reject Cause  
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`, `unknown`

## SMF GTPC messages Category

### **gtpc\_app\_events**

Description: GTPC message counter

Sample Query: `'gtpc_app_events{service_name="gtpc-ep"}'`

Labels:

- Label: `event_type`  
Label Description: Gtpc Event type  
Example: `NumRxCreateSessionReq`, `NumTxCreateSessionRes`, `NumRxDeleteSessionReq`, `NumTxDeleteSessionRes`, `NumRxModifyBearerReq`, `NumTxModifyBearerRes`, `NumTxDeleteBearerReq`, `NumRxDeleteBearerRsp`, `NumTxCreateBearerReq`, `NumRxCreateBearerRes`, `NumTxUpdateBearerReq`, `NumRxUpdateBearerRes`, `NumTxModifyBearerFailureInd`, `NumModifyBearerTimeout`, `NumRxDeleteBearerCmd`, `NumCreateBearerFailure`, `NumCreateBearerSuccess`, `NumCreateSessionSuccess`, `NumCreateSessionFailure`, `NumDeleteSessionSuccess`, `NumDeleteSessionFailure`, `NumCreateBearerReqRetrans`, `NumUpdateBearerReqRetrans`, `NumDeleteBearerReqRetrans`
- Label: `interface_type`  
Label Description: Gtpc Interface type

Example: S5, S11, S5E, S2B, S8

- Label: `gtpc_msg_fail_cause`

Label Description: Contains Gtpc message fail cause

Example: `send_to_service_error`, `nil_raw_response`, `unmarshal_fail`

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

## SMF GTPC priority messages Category

### `gtpc_app_priority_events`

Description: GTPC priority message counter

Sample Query: `'gtpc_app_priority_events{service_name="gtpc-ep}'`

Labels:

- Label: `event_type`

Label Description: Gtpc Event type

Example: `NumRxCreateSessionReq`, `NumTxCreateSessionRes`, `NumRxDeleteSessionReq`, `NumTxDeleteSessionRes`, `NumRxModifyBearerReq`, `NumTxModifyBearerRes`, `NumTxDeleteBearerReq`, `NumRxDeleteBearerRsp`, `NumTxCreateBearerReq`, `NumRxCreateBearerRes`, `NumTxUpdateBearerReq`, `NumRxUpdateBearerRes`, `NumTxModifyBearerFailureInd`, `NumModifyBearerTimeout`, `NumRxDeleteBearerCmd`, `NumCreateBearerFailure`, `NumCreateBearerSuccess`, `NumCreateSessionSuccess`, `NumCreateSessionFailure`, `NumDeleteSessionSuccess`, `NumDeleteSessionFailure`, `NumCreateBearerReqRetrans`, `NumUpdateBearerReqRetrans`, `NumDeleteBearerReqRetrans`

- Label: `priority_msg`

Label Description: priority

Example: true

- Label: `interface_type`

Label Description: Gtpc Interface type

Example: S5, S11, S5E, S2B, S8

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

# nodemgr Metrics Reference

## Nodemgr UPF Path Failure Reasons Category

### nodemgr\_up\_pathfail\_reasons

Description: Node manager userplane heart beat message failure reasons stats

Sample Query:

```
'nodemgr_up_pathfail_reasons(app_name="smf",cluster="cn",data_center="cn",instance_id="0",service_name="nodemgr",up_pathfail_reason="up_pathfail_ignored_lb_retry")
1'
```

Labels:

- Label: up\_pathfail\_reasons

Label Description: Node manager UPF Path Failure reasons due to retransmission failure, RTS change and Sx Release from peer node

Example:

```
up_pathfail_ignored_lb_retry,up_pathfail_reason_lb_retry,up_pathfail_ignored_lb_retry,up_pathfail_reason_lb_retry,up_pathfail_reason_association_release
```

- Label: gr\_instance\_id

Label Description: GR instance ID

Example: 1, 2

## Nodemgr UPF Peer Status Category

### nodemgr\_up\_peer\_status

Description: Node manager userplane heart beat message failure reasons stats

Sample Query:

```
'nodemgr_up_peer_status(app_name="smf",cluster="cn",data_center="cn",instance_id="1",interface_type="SA",service_name="nodemgr",up_peer_ip="20.20.20.66:20.20.20.42",up_peer_status="up_peer_pathup")
1'
```

Labels:

- Label: up\_peer\_ip

Label Description: unique key to identify UPF `YYY.YYY.YYY.YYY:XXX.XXX.XXX.XXX` where `XXX.XXX.XXX.XXX` is Ip address of the NF service like SGW / SMF and `YYY.YYY.YYY.YYY` is the IP address of UPF

Example: 20.20.20.66:20.20.20.42

- Label: up\_peer\_status

Label Description: Node manager UPF Peer status

Example: up\_peer\_path\_down,up\_peer\_path\_up

- Label: interface\_type

Label Description: nterface type between Peer Node (UPF)

Example: SXA

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

## Nodemgr UPF IP Address Threshold Hit Stats Category

### `nodemgr_up_threshold_stats`

Description: When particular IP address pool threshold hit for usage of ip addresses, this stats will be recorded

Sample Query: `'nodemgr_up_threshold_stats{up_ep_key="192.168.10.2:192.168.20.3", dnn="sampleDNN", threshold_hit="yes"}'`

Labels:

- Label: `up_ep_key`

Label Description: unique key to identify UPF XXX.XXX.XXX.XXX:YYY.YYY.YYY.YYY where XXX.XXX.XXX.XXX is Ip address of the NF service like SGW / SMF and YYY.YYY.YYY.YYY is the IP address of UPF

Example: 192.168.10.2:192.168.20.3

- Label: `dnn`

Label Description: DNN of which ip pool reached the configured threshold usgae.

Example: sampleDNN

- Label: `threshold_hit`

Label Description: Indicates if threshold hit is yes or no.

Example: yes

- Label: `threshold_clear`

Label Description: Indicates if threshold hit is cleared or not

Example: yes

- Label: `nodemgr_id`

Label Description: Indicates which instance of nodemgr hit the threshold

Example: 1

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2



## Nodemgr gtpc peer status statistics Category

### nodemgr\_gtpc\_peer\_status

Description: Node manager gtpc peer status statistics for keeping track of gtpc peers like SGW, PGW or ePDG via keep alive or restart counter tracking

Sample Query: 'nodemgr\_gtpc\_peer\_status{gtpc\_peer\_ip="192.168.10.2", gtpc\_msg\_type="gtpc\_echo\_res\_rx", interface\_type="S11"}'

Labels:

- Label: `gtpc_peer_ip`  
Label Description: IP address of a gtpc peer like SGW, PGW or ePDG  
Example: 192.168.10.2
- Label: `gtpc_peer_status`  
Label Description: GTPC peer current status as a result of keep alive success/failure or restart counter tracking  
Example: `gtpc_peer_path_down`, `gtpc_peer_path_up`, `gtpc_peer_restarted`
- Label: `interface_type`  
Label Description: Interfaces on which the gtpc message is recieved or sent PGW, SGW-Egress, SGW-Ingress etc  
Example: S11, S5E, S5, S8, S2B
- Label: `restart_time`  
Label Description: Gtpc peer restart time  
Example: 2022-09-30 14:32:52 +0000 UTC
- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2

## Nodemgr messages Category

### nodemgr\_msg\_stats

Description: Node Manager Resource management message counters

Sample Query: 'nodemgr\_msg\_stats{nodemgr\_id="0", id\_req\_type="ID\_REQ\_ALLOC", ip\_req\_type="IP\_REQ\_ALLOC", ip\_version="IP\_TYPE\_V4", sent\_to\_owner="0", service\_user="SERVICE\_USER\_SMF"}'

Labels:

- Label: `nodemgr_id`  
Label Description: Node Manager instance for which statistics are to be checked

Example: 0, 1, 2, 3, 4, 5, 6, 7, 8

- Label: `id_req_type`

Label Description: Type of request received at node manager message

Example: `ID_REQ_NONE`, `ID_REQ_ALLOC`, `ID_REQ_REL`, `ID_REQ_REALLOC`

- Label: `ip_req_type`

Label Description: Type of request received at node manager for IP address

Example: `IP_REQ_NONE`, `IP_REQ_ALLOC`, `IP_REQ_REL`, `IP_REQ_REALLOC`, `IP_REQ_STATIC`

- Label: `ip_version`

Label Description: IP address type for which request was received

Example: `IP_TYPE_NONE`, `IP_TYPE_V4`, `IP_TYPE_V6`, `IP_TYPE_V4V6`

- Label: `sent_to_owner`

Label Description: Current Node Manager instance for which statistics are to be checked

Example: 0, 1, 2, 3, 4, 5, 6, 7, 8

- Label: `service_user`

Label Description: Node Type which has requested the Node Manager services

Example: `SERVICE_USER_NONE`, `SERVICE_USER_SMF`, `SERVICE_USER_SGW`

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

## Nodemgr Node Report Message Handling from UPF to Current Node Stats Category

### **nodemgr\_node\_report\_stats**

Description: Node Manager handling of node report from UPF about the status of NR's or gNB's having sessions with the UPF

Sample Query: `'nodemgr_node_report_stats{up_ep_key="192.168.10.2:192.168.20.3", node_report_peer_gtpu="192.168.30.4", node_report_no_of_sess="0", status="success", node_report_type="", session_tmr="10", backlog_tmr="1564555678270689300"}'`

Labels:

- Label: `up_ep_key`

Label Description: unique key to identify UPF `XXX.XXX.XXX.XXX:YYY.YYY.YYY.YYY` where `XXX.XXX.XXX.XXX` is Ip address of the NF service like SGW / SMF and `YYY.YYY.YYY.YYY` is the IP address of UPF

Example: `192.168.10.2:192.168.20.3`

- Label: `node_report_peer_gtpu`  
Label Description: Peer GTPU IP address of gNB or NR to which UPF has established the userplane session  
Example: 192.168.30.4
- Label: `node_report_no_of_sess`  
Label Description: Total number of session established for the Peer GTPU gNB or NR via the UPF  
Example: 0
- Label: `status`  
Label Description: Node report message handling status by Node manager  
Example: attempted, success, failure
- Label: `node_report_type`  
Label Description: Type of node report message being handled  
Example: upd\_TS\_failed, duplicate, origin
- Label: `session_tmr`  
Label Description: Time duration in minutes during which the node report message has to be handled by the SMF/SGW/PGW node  
Example: 0, 10
- Label: `backlog_tmr`  
Label Description: Current time stamp in unix epoch value for node report message processing  
Example: 1564555678270689300
- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2

## Nodemgr Node Report Message Handling Timer Stats Category

### `nodemgr_node_rpt_timer_stats`

Description: Timer to handle Node Manager handling of node report from UPF about the status of NR's or gNB's having sessions with the UPF

Sample Query: `'nodemgr_node_rpt_timer_stats{up_ep_key="192.168.10.2:192.168.20.3", node_report_peer_gtpu="192.168.30.4", node_report_no_of_sess="0", status="success", node_report_type="", backlog_tmr="1564555678270689300"}'`

Labels:

- Label: `up_ep_key`

Label Description: unique key to identify UPF XXX.XXX.XXX.XXX:YYY.YYY.YYY.YYY where XXX.XXX.XXX.XXX is Ip address of the NF service like SGW / SMF and YYY.YYY.YYY.YYY is the IP address of UPF

Example: 192.168.10.2:192.168.20.3

- Label: `node_report_peer_gtpu`

Label Description: Peer GTPU IP address of gNB or NR to which UPF has established the userplane session

Example: 192.168.30.4

- Label: `node_report_no_of_sess`

Label Description: Total number of session established for the Peer GTPU gNB or NR via the UPF

Example: 0

- Label: `status`

Label Description: Node report message handling status by Node manager

Example: attempted, success, failure

- Label: `node_report_type`

Label Description: Type of node report message being handled

Example: `tmr_start_failed`, `dbg_tmr`, `retry_clrBlkSubs`

- Label: `backlog_tmr`

Label Description: Current time stamp in unix epoch value for node report message processing

Example: 1564555678270689300

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

## Nodemgr Resource Management Batch Reconciliation Counter Category

### `nodemgr_rmgr_batch_reconcile_stats`

Description: Node manager resource management batch reconciliation counter

Sample Query: `'nodemgr_rmgr_batch_reconcile_stats{status="success"}'`

Labels:

- Label: `status`

Label Description: reconciliation status

Example: success, failed

## Nodemgr Resource Management Response Statistics Category

### **nodemgr\_resource\_mgmt\_resp\_stats**

Description: Node Manager resource management response statistics

Sample Query: 'nodemgr\_resource\_mgmt\_resp\_stats{req\_type="1", ip\_ver\_type="1", status="attempted", error=""}'

Labels:

- Label: req\_type

Label Description: The request for which this response is being sent, Request with no operation = 0, Request with IP allocation = 1, Request with IP release = 2, Request with IP reallocation = 3, Request with Static IP allocation = 4

Example: 0, 1, 2, 3, 4

- Label: ip\_ver\_type

Label Description: Type of IP addresses requested in the message, IP type requested NONE = 0, IP type requested V4 = 1, IP type requested V6 = 2, IP type requested V4V6 = 3

Example: 0, 1, 2, 3

- Label: status

Label Description: Status of the request

Example: attempted, success, failed

- Label: error

Label Description: A non unique error String in case of Status is failure, for other cases use this value as empty string

Example: Unable to get UpfKey for upf

- Label: gr\_instance\_id

Label Description: GR instance ID

Example: 1, 2

## Nodemgr User Plane Heartbeat Message Failure Due to Retransmission Stats Category

### **nodemgr\_up\_heartbeat\_fail\_stats**

Description: Node Manager userplane heartbeat message failure counters between UPF node and SMF/PGW/SGW node as retransmission requests exhausted to UPF

Sample Query: 'nodemgr\_up\_heartbeat\_fail\_stats{up\_ep\_key="192.168.10.2:192.168.20.3", primary\_nodemgr\_id="0", current\_nodemgr\_id="0", up\_msg\_type="up\_heartbeat\_req\_tx", interface\_type="SXB}'

Labels:

- Label: `up_ep_key`

Label Description: unique key to identify UPF XXX.XXX.XXX.XXX:YYY.YYY.YYY.YYY where XXX.XXX.XXX.XXX is Ip address of the NF service like SGW / SMF and YYY.YYY.YYY.YYY is the IP address of UPF

Example: 192.168.10.2:192.168.20.3

- Label: `interface_type`

Label Description: Interface type between current node (SMF/SGW) and Peer Node (UPF)

Example: SXA, SXB, SXAB, SXC, N4

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

## Nodemgr User Plane Heartbeat Message Failure Stats Category

### `nodemgr_up_hb_msg_fail_stats`

Description: Node Manager userplane heartbeat message failure counters between UPF node and SMF, P-GW, S-GW node as unable to send request to UPF

Sample Query: `'nodemgr_up_hb_msg_fail_stats{up_ep_key="192.168.10.2:192.168.20.3", primary_nodemgr_id="0", current_nodemgr_id="0", up_msg_type="up_heartbeat_req_tx", interface_type="SXB"}'`

Labels:

- Label: `up_ep_key`

Label Description: unique key to identify UPF XXX.XXX.XXX.XXX:YYY.YYY.YYY.YYY where XXX.XXX.XXX.XXX is Ip address of the NF service like SGW / SMF and YYY.YYY.YYY.YYY is the IP address of UPF

Example: 192.168.10.2:192.168.20.3

- Label: `primary_nodemgr_id`

Label Description: Node Manager instance Identifier of SGW/SMF service which originally established interaction with UPF

Example: 0, 1, 2, 3, 4, 5, 6, 7, 8

- Label: `current_nodemgr_id`

Label Description: Current Node Manager instance Identifier of SGW/SMF service which is currently established and interacting with UPF

Example: 0, 1, 2, 3, 4, 5, 6, 7, 8

- Label: `up_msg_type`

Label Description: Message type which is received or sent for heartbeat messaging

Example: `up_heartbeat_req_tx`, `up_heartbeat_req_retx`, `up_heartbeat_rsp_rx`

- Label: `interface_type`  
Label Description: Interface type between current node (SMF/SGW) and Peer Node (UPF)  
Example: SXA, SXB, SXAB, SXC, N4
- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2

## Nodemgr User Plane Heartbeat Message Stats Category

### `nodemgr_up_hb_msg_stats`

Description: Node Manager userplane heart beat message counters between UPF node and SMF/PGW/SGW node

Sample Query: `'nodemgr_up_hb_msg_stats{up_ep_key="192.168.10.2:192.168.20.3", primary_nodemgr_id="0", current_nodemgr_id="0", up_msg_type="up_heartbeat_req_tx", interface_type="SXB"}'`

Labels:

- Label: `up_ep_key`  
Label Description: unique key to identify UPF XXX.XXX.XXX.XXX:YYY.YYY.YYY.YYY where XXX.XXX.XXX.XXX is Ip address of the NF service like SGW / SMF and YYY.YYY.YYY.YYY is the IP address of UPF  
Example: 192.168.10.2:192.168.20.3
- Label: `primary_nodemgr_id`  
Label Description: Node Manager instance Identifier of SGW/SMF service which originally established interaction with UPF  
Example: 0, 1, 2, 3, 4, 5, 6, 7, 8
- Label: `current_nodemgr_id`  
Label Description: Current Node Manager instance Identifier of SGW/SMF service which is currently established and interacting with UPF  
Example: 0, 1, 2, 3, 4, 5, 6, 7, 8
- Label: `up_msg_type`  
Label Description: Message type which is received or sent for heartbeat messaging  
Example: `up_heartbeat_req_tx`, `up_heartbeat_req_retx`, `up_heartbeat_rsp_rx`
- Label: `interface_type`  
Label Description: Interface type between current node (SMF/SGW) and Peer Node (UPF)  
Example: SXA, SXB, SXAB, SXC, N4
- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

## Nodemgr User Plane Stats Category

### **nodemgr\_up\_stats**

Description: Node Manager to User Plane (UPF) link status up guage counters

Sample Query: 'nodemgr\_up\_stats{up\_ep\_key="192.168.10.2:192.168.20.3", primary\_nodemgr\_id="0", peer\_nodemgr\_id="0", interface\_type="SXB}'

Labels:

- Label: `up_ep_key`

Label Description: unique key to identify UPF XXX.XXX.XXX.XXX:YYY.YYY.YYY.YYY where XXX.XXX.XXX.XXX is Ip address of the NF service like SGW / SMF and YYY.YYY.YYY.YYY is the IP address of UPF

Example: 192.168.10.2:192.168.20.3

- Label: `primary_nodemgr_id`

Label Description: Current Node Manager instance Identifier of SGW/SMF service

Example: 0, 1, 2, 3, 4, 5, 6, 7, 8

- Label: `peer_nodemgr_id`

Label Description: Peer Node Manager instance Identifier of UPF service

Example: 0, 1, 2, 3, 4, 5, 6, 7, 8

- Label: `interface_type`

Label Description: Interface type between current node (SMF/SGW) and Peer Node (UPF)

Example: SXA, SXB, SXAB, SXC, N4

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

## SMF Recovery Value Stats Category

### **smf\_recovery\_value**

Description: SMF Recovery Value stats

Sample Query: 'smf\_recovery\_value{smf\_ip="192.168.10.2}'

Labels:

- Label: `smf_ip`

Label Description: smf ip address

Example: 192.168.10.2

# Protocol Metrics Reference

## PFCP Decoded Messages Category

### **proto\_pfcg\_decode\_msg\_total**

Description: Total number of pfcg decode by type,size

Sample Query: 'proto\_pfcg\_decode\_msg\_total{message\_name="session\_modification\_res"}'

Labels:

- Label: `message_name`

Label Description: PFCP Message name

Example: session\_modification\_res, session\_report\_req, session\_deletion\_res, heartbeat\_res, heartbeat\_req

- Label: `optimised`

Label Description: PFCP Message decode optimised

Example: true, false

- Label: `status`

Label Description: PFCP Message status - accepted/denied/discarded

Example: accepted, denied, discarded

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

## PFCP Encoded Messages Category

### **proto\_pfcg\_encode\_msg\_total**

Description: Total number of pfcg encode by type,size

Sample Query: 'proto\_pfcg\_encode\_msg\_total{message\_name="session\_modification\_req"}'

Labels:

- Label: `message_name`

Label Description: PFCP Message name

Example: session\_establishment\_req, session\_modification\_req, session\_report\_req, session\_deletion\_req, heartbeat\_req, heartbeat\_res, session\_report\_res

- Label: `msgbufsize`  
Label Description: PFCP Message buffer size  
Example: little, jumbo, optimized
- Label: `status`  
Label Description: PFCP Message status - accepted/denied/discarded  
Example: accepted, denied, discarded
- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2

## PFCP Message Retransmission from SMF Category

### `proto_udp_retrans_msg_total`

Description: Total number of retransmitted message at pfcf

Sample Query: `'proto_udp_retrans_msg_total(message_name="association_setup_req")'`

Labels:

- Label: `message_name`  
Label Description: PFCP Message name  
Example: `association_setup_req`, `association_update_req`, `association_release_req`, `prime_pfd_management_req`, `heartbeat_req`, `node_report_req`, `session_report_res`, `association_setup_res`, `association_update_res`, `association_release_res`, `heartbeat_res`, `node_report_res`, `gtpu_router_advertisement_req`, `gtpu_router_solicitation_req`
- Label: `message_direction`  
Label Description: PFCP Message direction  
Example: inbound, outbound
- Label: `status`  
Label Description: PFCP Message status - accepted/denied/discarded  
Example: accepted, denied, discarded
- Label: `transport_type`  
Label Description: PFCP Message original or retransmission  
Example: origin, retransmitted
- Label: `msgpriority`  
Label Description: PFCP Message priority  
Example: true
- Label: `interface_type`

Label Description: PFCP Message Interface Type

Example: SXA, SXB, SXAB, SXC, N4

- Label: `peer_info`

Label Description: PFCP Message Peer Info

Example: SMFIP:1.2.3.4:UPFIP:5.6.7.8

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

## PFCP Messages Category

### **proto\_pfcplib\_msg\_total**

Description: Total number of pfcplib messages by type

Sample Query: `'proto_pfcplib_msg_total(message_name="session_establishment_req')'`

Labels:

- Label: `message_name`

Label Description: PFCP Message name

Example: `session_establishment_req`, `session_modification_req`, `session_report_req`, `session_deletion_req`, `association_setup_req`, `association_update_req`, `association_release_req`, `prime_pfd_management_req`, `heartbeat_req`, `node_report_req`, `gtpu_router_advertisement_req`, `gtpu_router_solicitation_req`

- Label: `message_direction`

Label Description: PFCP Message direction

Example: inbound, outbound

- Label: `status`

Label Description: PFCP Message status - accepted/denied/discarded

Example: accepted, denied, discarded

- Label: `transport_type`

Label Description: PFCP Message original or retransmission

Example: origin, retransmitted

- Label: `msgpriority`

Label Description: PFCP Message priority

Example: true

- Label: `interface_type`

Label Description: PFCP Message Interface Type

Example: SXA, SXB, SXAB, SXC, N4

- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2

## PFCP Messages Decode Time Category

### **proto\_decode\_msg\_seconds\_total**

Description: Time Taken for pfcfp decode by message type

Sample Query: `'proto_decode_msg_seconds_total{message_name="session_establishment_res"}'`

Labels:

- Label: `message_name`  
Label Description: PFCP Message name  
Example: `session_establishment_req`, `session_modification_req`, `session_report_req`, `session_deletion_req`, `association_setup_req`, `association_update_req`, `association_release_req`, `prime_pfd_management_req`, `heartbeat_req`, `node_report_req`, `gtpu_router_advertisement_req`, `gtpu_router_solicitation_req`
- Label: `message_direction`  
Label Description: PFCP Message direction  
Example: `inbound`, `outbound`
- Label: `status`  
Label Description: PFCP Message status - `accepted/denied/discarded`  
Example: `accepted`, `denied`, `discarded`
- Label: `transport_type`  
Label Description: PFCP Message original or retransmission  
Example: `origin`, `retransmitted`
- Label: `msgpriority`  
Label Description: PFCP Message priority  
Example: `true`
- Label: `interface_type`  
Label Description: PFCP Message Interface Type  
Example: `SXA`, `SXB`, `SXAB`, `SXC`, `N4`
- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2

## PFCP Messages Processing Time Category

### **proto\_pfcg\_msg\_seconds\_total**

Description: Time Taken for pfcg messages by type

Sample Query: 'proto\_pfcg\_msg\_seconds\_total{message\_name="session\_establishment\_req"}'

Labels:

- Label: `message_name`

Label Description: PFCP Message name

Example: `session_establishment_req`, `session_modification_req`, `session_report_req`, `session_deletion_req`, `association_setup_req`, `association_update_req`, `association_release_req`, `prime_pfd_management_req`, `heartbeat_req`, `node_report_req`, `gtpu_router_advertisement_req`, `gtpu_router_solicitation_req`

- Label: `message_direction`

Label Description: PFCP Message direction

Example: `inbound`, `outbound`

- Label: `status`

Label Description: PFCP Message status - `accepted`/`denied`/`discarded`

Example: `accepted`, `denied`, `discarded`

- Label: `transport_type`

Label Description: PFCP Message original or retransmission

Example: `origin`, `retransmitted`

- Label: `msgpriority`

Label Description: PFCP Message priority

Example: `true`

- Label: `interface_type`

Label Description: PFCP Message Interface Type

Example: `SXA`, `SXB`, `SXAB`, `SXC`, `N4`

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: `1`, `2`

## PFCP Request Messages Category

### **proto\_udp\_req\_msg\_total**

Description: Total number of pfcg request messages processed

Sample Query: 'proto\_udp\_req\_msg\_total{message\_name="session\_establishment\_req"}'

## Labels:

- Label: `message_name`  
Label Description: PFCP Message name  
Example: `session_establishment_req`, `session_modification_req`, `session_report_req`, `session_deletion_req`, `association_setup_req`, `association_update_req`, `association_release_req`, `prime_pfd_management_req`, `heartbeat_req`, `node_report_req`, `gtpu_router_advertisement_req`, `gtpu_router_solicitation_req`
- Label: `message_direction`  
Label Description: PFCP Message direction  
Example: `inbound`, `outbound`
- Label: `status`  
Label Description: PFCP Message status - `accepted/denied/discarded`  
Example: `accepted`, `denied`, `discarded`
- Label: `transport_type`  
Label Description: PFCP Message original or retransmission  
Example: `origin`, `retransmitted`
- Label: `msgpriority`  
Label Description: PFCP Message priority  
Example: `true`
- Label: `interface_type`  
Label Description: PFCP Message Interface Type  
Example: `SXA`, `SXB`, `SXAB`, `SXC`, `N4`
- Label: `peer_info`  
Label Description: PFCP Message Peer Info  
Example: `SMFIP:1.2.3.4:UPFIP:5.6.7.8`
- Label: `sec_pdr_present`  
Label Description: Indicate whether secondary PDR present  
Example: `true`, `false`
- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: `1`, `2`

## PFCP Response Messages Category

### proto\_udp\_res\_msg\_total

Description: Total number of pfcpl response messages processed

Sample Query: 'proto\_udp\_res\_msg\_total{message\_name="session\_establishment\_res"}'

Labels:

- Label: `message_name`

Label Description: PFCP Message name

Example: `session_establishment_res`, `session_modification_res`, `session_report_res`, `session_deletion_res`, `association_setup_res`, `association_update_res`, `association_release_res`, `prime_pfd_management_res`, `heartbeat_res`, `node_report_res`

- Label: `message_direction`

Label Description: PFCP Message direction

Example: `inbound`, `outbound`

- Label: `status`

Label Description: PFCP Message status - `accepted`/`denied`/`discarded`

Example: `accepted`, `denied`, `discarded`

- Label: `transport_type`

Label Description: PFCP Message original or retransmission

Example: `origin`, `retransmitted`

- Label: `cause`

Label Description: PFCP Message Response cause

Example: `1`, `64`, `65`, `66`, `67`, `68`, `69`, `70`, `71`, `72`, `73`, `74`, `75`, `76`, `77`, `101`

- Label: `msgpriority`

Label Description: PFCP Message priority

Example: `true`

- Label: `interface_type`

Label Description: PFCP Message Interface Type

Example: `SXA`, `SXB`, `SXAB`, `SXC`, `N4`

- Label: `peer_info`

Label Description: PFCP Message Peer Info

Example: `SMFIP:1.2.3.4:UPFIP:5.6.7.8`

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

## PFCP Response Messages Processing Time Category

### **proto\_udp\_msg\_seconds\_total**

Description: Total number of seconds taken by message

Sample Query: 'proto\_udp\_msg\_seconds\_total{message\_name="session\_establishment\_res"}'

Labels:

- Label: `message_name`

Label Description: PFCP Message name

Example: `session_establishment_res`, `session_modification_res`, `session_report_res`, `session_deletion_res`, `association_setup_res`, `association_update_res`, `association_release_res`, `prime_pfd_management_res`, `heartbeat_res`, `node_report_res`

- Label: `message_direction`

Label Description: PFCP Message direction

Example: `inbound`, `outbound`

- Label: `status`

Label Description: PFCP Message status - `accepted/denied/discarded`

Example: `accepted`, `denied`, `discarded`

- Label: `transport_type`

Label Description: PFCP Message original or retransmission

Example: `origin`, `retransmitted`

- Label: `cause`

Label Description: PFCP Message Response cause

Example: `1`, `64`, `65`, `66`, `67`, `68`, `69`, `70`, `71`, `72`, `73`, `74`, `75`, `76`, `77`, `101`

- Label: `msgpriority`

Label Description: PFCP Message priority

Example: `true`

- Label: `interface_type`

Label Description: PFCP Message Interface Type

Example: `SXA`, `SXB`, `SXAB`, `SXC`, `N4`

- Label: `peer_info`

Label Description: PFCP Message Peer Info

Example: `SMFIP:1.2.3.4:UPFIP:5.6.7.8`

- Label: `gr_instance_id`  
Label Description: GR instance ID  
Example: 1, 2

## radius-ep Metrics Reference

### Radius COA DM packet statistics Category

#### Radius\_CoaDM\_Requests\_Current

Description: Current outstanding radius COA/DM requests

Sample Query:

```
'Radius_CoaDM_Requests_Current{radSvrIp="1.1.1.1",radMsgCode="CoaReq",grInstId="1"}'
```

Labels:

- Label: `radSvrIp`  
Label Description: Radius Server IP address  
Example: Any string
- Label: `radMsgCode`  
Label Description: Message type  
Example: DisconnectRequest, CoARequest
- Label: `grInstId`  
Label Description: GR Instance Id  
Example: 1 or 2

#### Radius\_CoaDM\_Requests\_Statistics

Description: Total number of radius COA DM packets sent received

Sample Query:

```
'Radius_CoaDM_Requests_Statistics{radSvrIp="1.1.1.1",radMsgCode="CoaRequest",grInstId="1"}'
```

Labels:

- Label: `radSvrIp`  
Label Description: Radius Server IP address  
Example: Any string
- Label: `radMsgCode`  
Label Description: Message type  
Example: DisconnectRequest, DisconnectACK, DisconnectNAK, CoARequest, CoaDMReq, CoAACK

- Label: `radPacketType`  
Label Description: Direction  
Example: Tx, Rx
- Label: `radResult`  
Label Description: Result  
Example: Success, Failure\_Invalid\_Request
- Label: `grInstId`  
Label Description: GR Instance Id  
Example: 1 or 2

## Radius Server status Category

### Radius\_Server\_Status

Description: Display active/inactive status of radius-server

Sample Query:

```
'Radius_Server_Status{radSvrIp="1.1.1.1",radSvrPort="1812",radSvrPortType="Auth"}'
```

Labels:

- Label: `radSvrIP`  
Label Description: Radius Server IP address  
Example: Any string
- Label: `radSvrPort`  
Label Description: Radius Server Port  
Example: Any string
- Label: `radSvrPortType`  
Label Description: Type of server  
Example: Auth, Acct

## Radius packet statistics Category

### Radius\_requests\_current

Description: Current outstanding radius requests

Sample Query:

```
'Radius_requests_current{radSvrIp="1.1.1.1",radSvrPort="1812",radSvrPortType="Auth",grInstId="1"}'
```

Labels:

- Label: `radSvrIp`

Label Description: Radius Server IP address

Example: Any string

- Label: `radSvrPort`

Label Description: Radius Server Port

Example: Any string

- Label: `radSvrPortType`

Label Description: Type of server

Example: Auth, Acct

- Label: `radMsgCode`

Label Description: Message type

Example: SecondaryAuthenReq, RadiusAcctReq, TestAuth, TestAcct

- Label: `radPacketType`

Label Description: Direction

Example: Tx, Rx

- Label: `dnn`

Label Description: DNN of session

Example: Any string

- Label: `procType`

Label Description: Procedure type

Example: Any string

- Label: `ratType`

Label Description: RAT Type

Example: Any string

- Label: `sessType`

Label Description: Session type

Example: Any string

- Label: `grInstId`

Label Description: GR Instance Id

Example: 1 or 2

### Radius\_requests\_statistics

Description: Total number of radius packets sent received

Sample Query:

```
'Radius_requests_statistics{radSvrIp="1.1.1.1",radSvrPort="1812",radSvrPortType="Auth",grInstId="1"}'
```

## Labels:

- Label: `radSvrIp`  
Label Description: Radius Server IP address  
Example: Any string
- Label: `radSvrPort`  
Label Description: Radius Server Port  
Example: Any string
- Label: `radSvrPortType`  
Label Description: Type of server  
Example: Auth, Acct
- Label: `radMsgCode`  
Label Description: Message type  
Example: SecondaryAuthenReq, RadiusAcctReq, TestAuth, TestAcct
- Label: `radPacketType`  
Label Description: Direction  
Example: Tx, Retry\_Tx, Rx
- Label: `radResult`  
Label Description: Result  
Example: Success, Timeout, Failure\_Reject, Failure\_NoServer
- Label: `dnn`  
Label Description: DNN of session  
Example: Any string
- Label: `procType`  
Label Description: Procedure type  
Example: Any string
- Label: `ratType`  
Label Description: RAT Type  
Example: Any string
- Label: `sessType`  
Label Description: Session type  
Example: Any string
- Label: `grInstId`  
Label Description: GR Instance Id  
Example: 1 or 2

# rest-ep Metrics Reference

## Discover Messages Time statistics Category

### **nf\_discover\_total\_time**

Description: Discover Messages Total time statistics

Sample Query: `nf_discover_total_time{nf_type="udm", host="10.105.227.109:8082", svc_name="nudm-sdm", version="v1", result="timeouOrRPCError"}`

Labels:

- Label: `nf_type`  
Label Description: Network Function type  
Example: nrf, udm, amf, pcf, chf, ciscocontrol
- Label: `host`  
Label Description: End Point address  
Example: 10.105.227.109:8082
- Label: `svc_name`  
Label Description: Network function service name  
Example: nudm-sdm, namf-comm
- Label: `version`  
Label Description: Api version info  
Example: v1, v2,
- Label: `result`  
Label Description: result of discover message  
Example: 200, 201, 204, success, timeout\_rpc\_error, response\_parse\_failure

## Discover Messages statistics Category

### **nf\_discover\_messages\_total**

Description: Discover Messages statistics

Sample Query: `nf_discover_messages_total{nf_type="udm", host="10.105.227.109:8082", svc_name="nudm-sdm", version="v1", result="timeouOrRPCError"}`

Labels:

- Label: `nf_type`  
Label Description: Network Function type

Example: nrf, udm, amf, pcf, chf, ciscocontrol

- Label: `host`

Label Description: End Point address

Example: 10.105.227.109:8082

- Label: `svc_name`

Label Description: Network function service name

Example: nudm-sdm, namf-comm

- Label: `version`

Label Description: Api version info

Example: v1, v2,

- Label: `result`

Label Description: result of discover message

Example: 200, 201, 204, success, timeout\_rpc\_error, response\_parse\_failure

## NF End point selections Category

### **nf\_endpoint\_selections\_total**

Description: NF End Point Selection Statistics

Sample Query: `nf_endpoint_selections_total{nf_type="udm", host="10.105.227.109:8097", svc_name="nudm-sdm", version="v1", req="initial"}`

Labels:

- Label: `nf_type`

Label Description: Network Function type

Example: nrf, udm, amf, pcf, chf, ciscocontrol

- Label: `host`

Label Description: End Point address

Example: 10.105.227.109:8097

- Label: `svc_name`

Label Description: Network function service name

Example: nudm-sdm, namf-comm

- Label: `version`

Label Description: Api version info

Example: v1, v2,

- Label: `req`

Label Description: req type

Example: initial, fallback,

## NF Send messages statistics Category

### **nf\_req\_recieved\_messages\_total**

Description: NF recieved messages to NRF client library

Sample Query: `nf_req_recieved_messages_total{nf_type=\"udm\", svc_name=\"nudm-sdm\", message_type=\"UdmUecmRegisterSMF\"}`

Labels:

- Label: `nf_type`  
Label Description: Network Function type  
Example: udm, amf, pcf, chf, ciscocontrol
- Label: `svc_name`  
Label Description: Network function service name  
Example: nudm-sdm, namf-comm
- Label: `message_type`  
Label Description: Message Type  
Example: UdmUecmRegisterSMF, UdmSdmGetUESMSSubscriptionData

### **nf\_resp\_sent\_messages\_total**

Description: NF message responses sent from NRF client library

Sample Query: `nf_resp_sent_messages_total{nf_type=\"udm\", svc_name=\"nudm-sdm\", message_type=\"UdmUecmRegisterSMF\", result=\"SendSuccess\", status_code=\"200\"}`

Labels:

- Label: `nf_type`  
Label Description: Network Function type  
Example: nrf, udm, amf, pcf, chf, ciscocontrol
- Label: `svc_name`  
Label Description: Network function service name  
Example: nudm-sdm, namf-comm
- Label: `message_type`  
Label Description: Message Type  
Example: UdmUecmRegisterSMF, UdmSdmGetUESMSSubscriptionData
- Label: `result`

Label Description: result of discover message

Example: SendSuccess, SendFailure

- Label: `status_code`

Label Description: result of NF send message

Example: 200, 201, 204,

### **nf\_send\_message\_total\_time**

Description: NF send message total time taken

Sample Query: `nf_send_message_total_time{nf_type="udm", svc_name="nudm-sdm", message_type="UdmUecmRegisterSMF", result="SendSuccess", status_code="200"}`

Labels:

- Label: `nf_type`

Label Description: Network Function type

Example: nrf, udm, amf, pcf, chf, ciscocontrol

Labels:

- Label: `svc_name`

Label Description: Network function service name

Example: nudm-sdm, namf-comm

- Label: `message_type`

Label Description: Message Type

Example: UdmUecmRegisterSMF, UdmSdmGetUESMSubscriptionData

- Label: `result`

Label Description: result of discover message

Example: SendSuccess, SendFailure

- Label: `status_code`

Label Description: result of NF send message

Example: 200, 201, 204,

## **NF failure handling stats Category**

### **nf\_failure\_handling\_stats\_total**

Description: NF Failure handling stats

Sample Query: `nf_failure_handling_stats_total{nf_type="udm", host="10.105.227.109:8097", svc_name="nudm-sdm", version="v1", message_type="UdmUecmRegisterSMF", req="initial", response="202", status="final"}`

## Labels:

- Label: `nf_type`  
Label Description: Network Function type  
Example: nrf, udm, amf, pcf, chf, ciscocontrol
- Label: `host`  
Label Description: End Point address  
Example: 10.105.227.109:8097
- Label: `svc_name`  
Label Description: Network function service name  
Example: nudm-sdm, namf-comm
- Label: `version`  
Label Description: Api version info  
Example: v1, v2,
- Label: `message_type`  
Label Description: Message Type  
Example: UdmUecmRegisterSMF, UdmSdmGetUESMSubscriptionData
- Label: `req`  
Label Description: Request type  
Example: initial, fallback,
- Label: `response`  
Label Description: Response from the server  
Example: 200, 201, 204, timeout\_rpc\_error,
- Label: `status`  
Label Description: Status from the server  
Example: retry, final

## NF management message time statistics Category

### **nf\_management\_total\_time**

Description: NF management messages total time taken

Sample Query: `nf_management_total_time{host=\"10.105.227.109:8082\", svc_name=\"nudm-sdm\", version=\"v1\", direction=\"outbound\", message_type=\"registration\", result=\"timeouOrRPCError\" }`

## Labels:

- Label: `host`

Label Description: End Point address

Example: 10.105.227.109:8082

- Label: `svc_name`

Label Description: Network function service name

Example: nudm-sdm, namf-comm

- Label: `version`

Label Description: Api version info

Example: v1, v2,

- Label: `direction`

Label Description: Direction indicates about the message going out or coming in

Example: inbound, outbound

- Label: `message_type`

Label Description: Type of Message

Example: registration, heartbeat, subscription, notification

- Label: `result`

Label Description: result of discover message

Example: 200, 201, 204, success, timeout\_rpc\_error, response\_parse\_failure, request\_parse\_failure, invalid\_notify\_event, invalid\_nf\_instance\_uri, internal\_error

## NF management messages statistics Category

### `nf_management_stats_total`

Description: NF management messages statistics

Sample Query: `nf_management_stats_total{host="10.105.227.109:8082", svc_name="nudm-sdm", version="v1", direction="outbound", message_type="registration", result="timeouOrRPCError" }`

Labels:

- Label: `host`

Label Description: End Point address

Example: 10.105.227.109:8082

- Label: `svc_name`

Label Description: Network function service name

Example: nudm-sdm, namf-comm

- Label: `version`

Label Description: Api version info

Example: v1, v2,

- Label: `direction`

Label Description: Direction indicates about the message going out or coming in

Example: inbound, outbound

- Label: `message_type`

Label Description: Type of Message

Example: registration, heartbeat, subscription, notification

- Label: `result`

Label Description: result of discover message

Example: 200, 201, 204, success, timeout\_rpc\_error, response\_parse\_failure

## NRF Discovery Category

### **`nf_discover_events_total`**

Description: NF Discover Stats

Sample Query: `nf_discover_events_total{nf_type="pcf", response_type="local"}`

Labels:

- Label: `nf_type`

Label Description: Network Function type

Example: nrf, udm, amf, pcf, chf, ciscocontrol

- Label: `response_type`

Label Description: Discovery response chosen from

Example: local, cache, expired-cache

## NRF subscription messages statistics Category

### **`nrf_subscription_send_messages_total`**

Description: NRF Subscription send messages total

Sample Query: `nrf_subscription_send_messages_total{host="10.105.227.109:8082", message_type="subscription", req="initial"}`

Labels:

- Label: `host`

Label Description: End Point address

Example: 10.105.227.109:8082

- Label: `message_type`  
Label Description: subscription message typwe  
Example: unsubscription,subscription,updateSubscription
- Label: `req`  
Label Description: req type  
Example: resourceUri, initial,retry\_2

## REST EP message Exchange Time Category

### **smf\_restep\_http\_msg\_seconds**

Description: SMF REST time between request and response messages

Sample Query: 'smf\_restep\_http\_msg\_seconds{message\_direction="inbound",nf\_type="amf"}'

Labels:

- Label: `nf_type`  
Label Description: Network Function type  
Example: nrf, udm, amf, pcf, chf, ciscocontrol
- Label: `message_direction`  
Label Description: direction of message from SMF perspective  
Example: inbound, outbound
- Label: `api_name`  
Label Description: API name  
Example: register\_ue, deregister\_ue, subscription\_req, sdm\_subscription\_req, sdm\_data\_change\_notify, nf\_registration, nf\_discovery, slice\_selection, amf\_create\_sm\_context, amf\_update\_sm\_context, amf\_release\_sm\_context, amf\_n1\_n2\_transfer, amf\_n1\_n2\_transfer\_notify\_failure, amf\_assign\_ebi, amf\_status\_notify, pcf\_sm\_policy\_control\_create, chf\_charging\_data\_request, pcf\_sm\_policy\_control\_update, pcf\_sm\_policy\_control\_delete, pcf\_sm\_policy\_control\_update\_notify, cisco\_control\_clear\_subscriber, cisco\_control\_show\_subscriber, pcf\_sm\_policy\_control\_terminate\_notify, chf\_abort\_notify
- Label: `nf_uri`  
Label Description: Network Function URI  
Example: actual HTTP URI of the message
- Label: `response_status`  
Label Description: HTTP response status code  
Example: 200, 201, 204
- Label: `response_cause`  
Label Description: HTTP response cause code

Example: cause string as received from peer nf

## REST EP messages Category

### **smf\_restep\_http\_msg\_total**

Description: SMF REST message counter

Sample Query: 'smf\_restep\_http\_msg\_total{message\_direction="inbound",nf\_type="amf"}'

Labels:

- Label: `nf_type`

Label Description: Network Function type

Example: nrf, udm, amf, pcf, chf, ciscocontrol

- Label: `message_direction`

Label Description: direction of message from SMF perspective

Example: inbound, outbound

- Label: `api_name`

Label Description: API name

Example: register\_ue, deregister\_ue, subscription\_req, sdm\_subscription\_req, sdm\_data\_change\_notify, nf\_registration, nf\_discovery, slice\_selection, amf\_create\_sm\_context, amf\_update\_sm\_context, amf\_release\_sm\_context, amf\_n1\_n2\_transfer, amf\_n1\_n2\_transfer\_notify\_failure, amf\_assign\_ebi, amf\_status\_notify, pcf\_sm\_policy\_control\_create, chf\_charging\_data\_request, pcf\_sm\_policy\_control\_update, pcf\_sm\_policy\_control\_delete, pcf\_sm\_policy\_control\_update\_notify, cisco\_control\_clear\_subscriber, cisco\_control\_show\_subscriber, pcf\_sm\_policy\_control\_terminate\_notify, chf\_abort\_notify

- Label: `nf_uri`

Label Description: Network Function URI

Example: actual HTTP URI of the message

- Label: `response_status`

Label Description: HTTP response status code

Example: 200, 201, 204

## REST EP messages Decode Status Category

### **smf\_restep\_http\_msg\_decode**

Description: SMF REST number of decoding failures

Sample Query:

'smf\_restep\_http\_msg\_decode{nf\_type="amf",api\_name="register\_ue",decoding\_status="decoding\_failure"}'

Labels:

- Label: `nf_type`  
Label Description: Network Function type  
Example: nrf, udm, amf, pcf, chf, ciscocontrol
- Label: `api_name`  
Label Description: API name  
Example: register\_ue, deregister\_ue, subscription\_req, sdm\_subscription\_req, sdm\_data\_change\_notify, nf\_registration, nf\_discovery, slice\_selection, amf\_create\_sm\_context, amf\_update\_sm\_context, amf\_release\_sm\_context, amf\_n1\_n2\_transfer, amf\_n1\_n2\_transfer\_notify\_failure, amf\_assign\_ebi, amf\_status\_notify, pcf\_sm\_policy\_control\_create, chf\_charging\_data\_request, pcf\_sm\_policy\_control\_update, pcf\_sm\_policy\_control\_delete, pcf\_sm\_policy\_control\_update\_notify, cisco\_control\_clear\_subscriber, cisco\_control\_show\_subscriber, pcf\_sm\_policy\_control\_terminate\_notify, chf\_abort\_notify
- Label: `decoding_status`  
Label Description: Decoding status  
Example: decoding\_failure
- Label: `interface_type`  
Label Description: Interface Type  
Example: N11, N1, N2
- Label: `response_status`  
Label Description: HTTP response status code  
Example: 200, 201, 204
- Label: `application_error`  
Label Description: Application error

## smf-service Metrics Reference

### CHF Notification Statistics Category

#### **smf\_chf\_notification\_stats**

Description: SMF Charging CHF Notification stats

Sample Query: 'smf\_chf\_notification\_stats{notification\_type="reauthorization"}'

Labels:

- Label: `notification_type`  
Label Description: Type of notification request  
Example: reauthorization, abort\_charging

- Label: `dnn`  
Label Description: DNN for which the flow is created  
Example: cisco.com
- Label: `status`  
Label Description: Status of notify message processing  
Example: attempted, success, failures
- Label: `rat_type`  
Label Description: RAT type on which the flow is created  
Example: EUTRA, NR, WLAN, VIRTUAL, rat\_type\_unknown
- Label: `reason`  
Label Description: Reason for notify message failure  
Example: pdu\_session\_not\_established, charging\_failed, offline\_converted

## Discover Messages Time statistics Category

### `nf_discover_total_time`

Description: Discover Messages Total time statistics

Sample Query: `'nf_discover_total_time{nf_type="amf", host="http://10.105.227.109:8082/nnrf-nfm/v1", result="timeouOrRPCError"}'`

Labels:

- Label: `nf_type`  
Label Description: Network Function type  
Example: nrf, udm, amf, pcf, chf, ciscocontrol
- Label: `host`  
Label Description: End Point address  
Example: http://10.105.227.109:8082/nnrf-nfm/v1
- Label: `result`  
Label Description: result of discover message  
Example: 200, 201, 204, success, timeout\_rpc\_error, response\_parse\_failure

## Discover Messages statistics Category

### `nf_discover_messages_total`

Description: Discover Messages statistics

Sample Query: 'nf\_discover\_messages\_total{nf\_type="amf", host="http://10.105.227.109:8082/nrf-nfm/v1", result="timeouOrRPCError"}'

Labels:

- Label: `nf_type`  
Label Description: Network Function type  
Example: nrf, udm, amf, pcf, chf, ciscocontrol
- Label: `host`  
Label Description: End Point address  
Example: http://10.105.227.109:8082/nrf-nfm/v1
- Label: `result`  
Label Description: result of discover message  
Example: 200, 201, 204, success, timeout\_rpc\_error, response\_parse\_failure

## Dropped Charging Data Requests Statistics Category

### `cdr_dropped_stats`

Description: The current count for charging data requests dropped due to zero usage

Sample Query: 'cdr\_dropped\_stats{procedure\_type="pdu\_sess\_create"}'

Labels:

- Label: `procedure_type`  
Label Description: The procedure type associated with an call flow procedure  
Example: pdu\_sess\_create, ue\_req\_pdu\_sess\_mod, smf\_req\_pdu\_sess\_mod, pcf\_req\_pdu\_sess\_mod, udm\_req\_pdu\_sess\_mod, gnb\_req\_pdu\_sess\_mod, ue\_req\_pdu\_sess\_rel, smf\_req\_pdu\_sess\_rel, pcf\_req\_pdu\_sess\_rel, amf\_req\_pdu\_sess\_rel, udm\_req\_pdu\_sess\_rel, gnb\_req\_pdu\_sess\_rel, chf\_req\_pdu\_sess\_rel, admin\_req\_pdu\_sess\_rel, ue\_req\_active\_to\_idle, ue\_req\_idle\_to\_active, nw\_req\_service\_active, upf\_notify\_downlink\_data, xn\_path\_switch, pdn\_sess\_create, pdn\_5g\_4g\_handover, pcf\_req\_ded\_brr\_create, pcf\_req\_ded\_brr\_delete, pcf\_req\_ded\_brr\_mod, n2\_handover, xn\_handover, n26\_4g\_to\_5g\_handover, n26\_4g\_to\_5g\_im\_mobility, pdu\_im, pdn\_sess\_create, pcf\_req\_ded\_brr\_create, pcf\_req\_ded\_brr\_delete, pcf\_req\_ded\_brr\_mod, pcf\_initiated\_pdn\_detach, smf\_initiated\_pdn\_detach, upf\_initiated\_pdn\_detach

## GTPC Message stats Category

### `smf_gtpc_msg_stats`

Description: Stats for GTPC interface messages

Sample Query: 'smf\_gtpc\_msg\_stats{message\_type="create\_bearer\_request"}'

Labels:

- Label: `message_type`

Label Description: GTPC Message Type

Example: `delete_bearer_request`, `create_bearer_request`, `delete_bearer_request_async`

- Label: `status`

Label Description: GTPC message status

Example: `attempted`, `success`, `failures`

- Label: `reason`

Label Description: The reason associated with failure

Example: `ipc_failed`, `sgw_failure`, `EGTP_CAUSE_LOCAL_DETACH`,  
`EGTP_CAUSE_RAT_CHANGED_FROM_3GPP_TO_NON_3GPP`,  
`EGTP_CAUSE_COMPLETE_DETACH`, `EGTP_CAUSE_ISR_DEACTIVATION`,  
`EGTP_CAUSE_ERROR_IND_RCVD_RNC_ENODE`, `EGTP_CAUSE_IMSI_DETACH_ONLY`,  
`EGTP_CAUSE_REACTIVATION_REQUESTED`,  
`EGTP_CAUSE_PDN_RECONNECTION_TO_THIS_APN_DISALLOWED`,  
`EGTP_CAUSE_ACCESS_CHANGED_FROM_NON_3GPP_TO_3GPP`,  
`EGTP_CAUSE_PDN_CONN_INACTIVITY_TIMER_EXPIRED`,  
`EGTP_CAUSE_PGW_NOT_RESPONDING`, `EGTP_CAUSE_NETWORK_FAILURE`,  
`EGTP_CAUSE_QOS_PARAMETER_MISMATCH`, `EGTP_CAUSE_REQ_ACCEPTED`,  
`EGTP_CAUSE_REQ_ACCEPTED_PARTIALLY`,  
`EGTP_CAUSE_NEW_PDN_TYPE_NETWORK_PREFERENCE`,  
`EGTP_CAUSE_NEW_PDN_TYPE_SINGLE_ADDR_BEARER_ONLY`,  
`EGTP_CAUSE_CONTEXT_NOT_FOUND`, `EGTP_CAUSE_INVALID_MESSAGE_FORMAT`,  
`EGTP_CAUSE_VERSION_NOT_SUPPORTED_BY_NEXT_PEER`,  
`EGTP_CAUSE_INVALID_LENGTH`, `EGTP_CAUSE_SERVICE_NOT_SUPPORTED`,  
`EGTP_CAUSE_MANDATORY_IE_INCORRECT`, `EGTP_CAUSE_MANDATORY_IE_MISSING`,  
`EGTP_CAUSE_SYSTEM_FAILURE`, `EGTP_CAUSE_NO_RESOURCES_AVAILABLE`,  
`EGTP_CAUSE_SEMANTIC_ERROR_IN_TFT_OPERATION`,  
`EGTP_CAUSE_SYNTACTIC_ERROR_IN_TFT_OPERATION`,  
`EGTP_CAUSE_SEMANTIC_ERROR_IN_PKT_FILTERS`,  
`EGTP_CAUSE_SYNTACTIC_ERROR_IN_PKT_FILTERS`,  
`EGTP_CAUSE_MISSING_OR_UNKNOWN_APN`, `EGTP_CAUSE_UNEXPECTED_REPEATED_IE`,  
`EGTP_CAUSE_GRE_KEY_NOT_FOUND`, `EGTP_CAUSE_REALLOCATION_FAILURE`,  
`EGTP_CAUSE_DENIED_IN_RAT`, `EGTP_CAUSE_PREFERRED_PDN_TYPE_UNSUPPORTED`,  
`EGTP_CAUSE_ALL_DYNAMIC_ADDR_OCCUPIED`,  
`EGTP_CAUSE_UE_CTX_WO_TFT_ALREADY_ACTIVATED`,  
`EGTP_CAUSE_PROTOCOL_TYPE_NOT_SUPPORTED`, `EGTP_CAUSE_UE_NOT_RESPONDING`,  
`EGTP_CAUSE_UE_REFUSES`, `EGTP_CAUSE_SERVICE_DENIED`,  
`EGTP_CAUSE_UNABLE_TO_PAGE_UE`, `EGTP_CAUSE_NO_MEMORY_AVAILABLE`,  
`EGTP_CAUSE_USER_AUTHENTICATION_FAILED`,  
`EGTP_CAUSE_APN_DENIED_NO_SUBSCRIPTION`, `EGTP_CAUSE_REQUEST_REJECTED`,  
`EGTP_CAUSE_PTMSI_SIGNATURE_MISMATCH`, `EGTP_CAUSE_IMSI_IMEI_NOT_KNOWN`,  
`EGTP_CAUSE_SEMANTIC_ERROR_IN_TAD_OPERATION`,  
`EGTP_CAUSE_SYNTACTIC_ERROR_IN_TAD_OPERATION`,  
`EGTP_CAUSE_RESERVED_MESSAGE_VALUE_RECEIVED`,  
`EGTP_CAUSE_PEER_NOT_RESPONDING`,  
`EGTP_CAUSE_COLLISION_WITH_NETWORK_INIT_REQUEST`,  
`EGTP_CAUSE_UNABLE_TO_PAGE_UE_DUE_TO_SUSPENSION`,

EGTP\_CAUSE\_CONDITIONAL\_IE\_MISSING,EGTP\_CAUSE\_INCOMPATIBLE\_APN\_REST\_TYPE,  
 EGTP\_CAUSE\_INVALID\_LENGTH\_WITH\_PIGGYBACK\_MSG,  
 EGTP\_CAUSE\_DATA\_FORWARDING\_NOT\_SUPPORTED,  
 EGTP\_CAUSE\_INVALID\_REPLY\_FROM\_REMOTE\_PEER,  
 EGTP\_CAUSE\_FALLBACK\_TO\_GTPV1,EGTP\_CAUSE\_INVALID\_PEER,  
 EGTP\_CAUSE\_TEMP\_REJECTED\_DUE\_TO\_HANDOVER\_IN\_PROGRESS,  
 EGTP\_CAUSE\_REQ\_REJECTED\_FOR\_PMIPv6\_REASON,EGTP\_CAUSE\_APN\_CONGESTION,  
 EGTP\_CAUSE\_BEARER\_HANDLING\_NOT\_SUPPORTED,  
 EGTP\_CAUSE\_UE\_ALREADY\_REATTACHED,  
 EGTP\_CAUSE\_MULTI\_PDN\_CONNECTION\_FOR\_APN\_NOT\_ALLOWED,  
 EGTP\_CAUSE\_MME\_SGSN\_REFUSES\_DUE\_TO\_VPLMN\_POLICY,  
 EGTP\_CAUSE\_GTPC\_ENTITY\_CONGESTION,  
 EGTP\_CAUSE\_TARGET\_ACCESS\_RESTRICTED\_FOR\_THE\_SUBSCRIBER,  
 EGTP\_CAUSE\_UE\_TEMP\_NOT\_REACHABLE\_DUE\_TO\_POWER\_SAVING,  
 EGTP\_CAUSE\_RELOC\_FAILURE\_DUE\_TO\_NAS\_MSG\_REDIRECTION,  
 EGTP\_CAUSE\_MISSING\_TIMESTAMP\_OPTION,  
 EGTP\_CAUSE\_MULTIPLE\_HNP\_NOT\_ALLOWED,EGTP\_CAUSE\_SN\_MALFORMED\_MSG,  
 EGTP\_CAUSE\_INT\_TIMEOUT

- Label: qos\_5qi

Label Description: 5Qi applicable for the QoS flow

Example: 1, 2, 5

- Label: rat\_type

Label Description: Type of the radio access associated with the request

Example: EUTRA, NR, WLAN, rat\_type\_unknown

- Label: smf\_current\_procedure

Label Description: Current Procedure Name for Message Level Stats

Example: nr\_to\_untrusted\_wifi\_handover, eps\_fb\_ded\_brr, PdnDisconnectProcedure,  
 enb\_to\_untrusted\_wifi\_handover, pcf\_req\_ded\_brr\_create, pcf\_req\_ded\_brr\_delete, pcf\_req\_ded\_brr\_mod,  
 smf\_initiated\_pdn\_detach, untrusted\_wifi\_to\_enb\_handover, upf\_sess\_report\_srir\_sess\_rel,  
 utn3gpp\_to\_5g\_handover

## Incoming Message Throttling Statistics Category

### smf\_inc\_msg\_throttling\_stats

Description: Stats of throttled incoming messages

Sample Query: 'smf\_inc\_msg\_throttling\_stats(message\_type="S5S8CreateSessReq")'

Labels:

- Label: interface

Label Description: Interface Type

Example: S5, S8, S2B

- Label: message\_type

Label Description: Message type corresponding to given interface

Example: S5S8CreateSessReq, S5S8DeleteSessReq, S5S8ModifyBearerReq, S5S8ModifyBearerCmd, S5S8BearerResourceCmd, S5S8DeleteBearerCmd

- Label: Cause

Label Description: Cause of Message Throttling

Example: EGTP\_CAUSE\_GTPC\_ENTITY\_CONGESTION

## NF End point selections Category

### **nf\_endpoint\_selections\_total**

Description: NF End Point Selection Statistics

Sample Query: 'nf\_endpoint\_selections\_total{nf\_type="amf", host="http://10.105.227.109:8082/nrf-nfm/v1", req="initial"}'

Labels:

- Label: nf\_type

Label Description: Network Function type

Example: nrf, udm, amf, pcf, chf, ciscocontrol

- Label: host

Label Description: End Point address

Example: http://10.105.227.109:8082/nrf-nfm/v1

- Label: req

Label Description: req type

Example: initial, fallback,

## NF failure handling stats Category

### **nf\_failure\_handling\_stats\_total**

Description: NF Failure handling stats

Sample Query: 'nf\_failure\_handling\_stats\_total{nf\_type="amf", host="http://10.105.227.109:8082/nrf-nfm/v1", req="initial", response="202", status="final"}'

Labels:

- Label: nf\_type

Label Description: Network Function type

Example: nrf, udm, amf, pcf, chf, ciscocontrol

- Label: host

Label Description: End Point address

Example: `http://10.105.227.109:8082/nrf-nfm/v1`

- Label: `req`

Label Description: Request type

Example: `initial, fallback,`

- Label: `response`

Label Description: Response from the server

Example: `200, 201, 204, timeout_rpc_error,`

- Label: `status`

Label Description: Status from the server

Example: `retry, final`

## NF management message time statistics Category

### `nf_management_total_time`

Description: NF management messages total time taken

Sample Query: `'nf_management_total_time{host="http://10.105.227.109:8082/nrf-nfm/v1", direction="outbound", message_type="registration", result="timeouOrRPCError" }'`

Labels:

- Label: `host`

Label Description: End Point address

Example: `http://10.105.227.109:8082/nrf-nfm/v1`

- Label: `direction`

Label Description: Direction indicates about the message going out or coming in

Example: `inbound, outbound`

- Label: `message_type`

Label Description: Type of Message

Example: `registration, heartbeat, subscription, notification`

- Label: `result`

Label Description: result of discover message

Example: `200, 201, 204, success, timeout_rpc_error, response_parse_failure, request_parse_failure, invalid_notify_event, invalid_nf_instance_uri, internal_error`

## NF management messages statistics Category

### **nf\_management\_stats\_total**

Description: NF management messages statistics

Sample Query: 'nf\_management\_stats\_total{host="http://10.105.227.109:8082/nrf-nfm/v1", direction="outbound", message\_type="registration", result="timeouOrRPCError" }'

Labels:

- Label: `host`

Label Description: End Point address

Example: `http://10.105.227.109:8082/nrf-nfm/v1`

- Label: `direction`

Label Description: Direction indicates about the message going out or coming in

Example: `inbound`, `outbound`

- Label: `message_type`

Label Description: Type of Message

Example: `registration`, `heartbeat`, `subscription`, `notification`

- Label: `result`

Label Description: result of discover message

Example: `200`, `201`, `204`, `success`, `timeout_rpc_error`, `response_parse_failure`

## NRF Discovery Category

### **nf\_discover\_events\_total**

Description: NF Discover Stats

Sample Query: 'nf\_discover\_events\_total{nf\_type="pcf", response\_type="local"}'

Labels:

- Label: `nf_type`

Label Description: Network Function type

Example: `nrf`, `udm`, `amf`, `pcf`, `chf`, `ciscocontrol`

- Label: `response_type`

Label Description: Discovery response chosen from

Example: `local`, `cache`, `expired-cache`

## PDU UE Sync Procedure Category

### **pdu\_ue\_sync\_proc**

Description: PDU UE Sync Procedure counter

Sample Query: 'pdu\_ue\_sync\_proc{status="attempted"}'

Labels:

- Label: `status`

Label Description: call flow procedure status counter

Example: attempted, success, failures, suspend, resume, abort

## Policy control NRF fail action statistics Category

### **policy\_msg\_nrf\_fail\_action**

Description: NRF fail action stats for policy messages

Sample Query: 'sum (policy\_msg\_nrf\_fail\_action{policy\_control\_msg="SmPolicyCreate"})'

Labels:

- Label: `policy_control_msg`

Label Description: Type of policy control message

Example: SmPolicyCreate, SmPolicyUpdate, SmPolicyDelete

- Label: `policy_nrf_action`

Label Description: NRF failure action

Example: ignore, continue, terminate

- Label: `pcf_end_point`

Label Description: PCF IP Address

Example: 10.84.17.11

## Policy control PCF update statistics Category

### **policy\_pcf\_updates\_total**

Description: Statistics for triggers sent to PCF in SmPolicyUpdate Request to PCF

Sample Query: 'sum (policy\_pcf\_updates\_total{trigger="rat\_change"})'

Labels:

- Label: `trigger`

Label Description: Trigger sent in the policy update request sent to PCF

Example: ue\_ip\_change, plmn\_change, res\_mod\_req, access\_type\_change, ue\_ip\_change, credit\_mon\_sess\_fail, def\_qos\_change, sess\_ambr\_change, no\_credit, serving\_area\_change, revalidation\_timeout, resoure\_release, resource\_alloc, rat\_change

- Label: smf\_current\_procedure

Label Description: Current procedure associated with the operation performed on the pcc rule

Example: pdn\_sess\_create, pdu\_sess\_create, smf\_initiated\_pdn\_detach, disc\_pdurel\_smf\_init\_release, pcf\_req\_pdu\_sess\_mod, pcf\_req\_ded\_brr\_mod, enb\_to\_untrusted\_wifi\_handover, untrusted\_wifi\_to\_enb\_handover, nr\_to\_untrusted\_wifi\_handover, utn3gpp\_to\_5g\_handover, xn\_handover, n26\_4g\_to\_5g\_handover, pdn\_5g\_4g\_handover, n26\_4g\_to\_5g\_im\_mobility

## Policy control active PCF statistics Category

### session\_policy\_type\_total

Description: Stats for PCF active Sessions

Sample Query: 'sum (session\_policy\_type\_total{policy\_type="local"})'

Labels:

- Label: policy\_type

Label Description: Policy type

Example: local, pcf

- Label: pcf\_address

Label Description: PCF IP Address

Example: 10.84.17.11

- Label: access\_type

Label Description: Access type

Example: Ipv4PduSession, Ipv6PduSession, Ipv4V6PduSession

## Policy control current flow Category

### policy\_pdu\_flows\_current

Description: QoS flow current counts

Sample Query: 'sum (policy\_pdu\_flows\_current{flow\_type="gbr"}) by(qos\_5qi, arp)'

Labels:

- Label: rat\_type

Label Description: RAT type on which the flow is created

Example: nr, WLAN, EUTRA

- Label: ssc\_mode

Label Description: SSC mode for the session which created the QoS flow

Example: one, two, three

- Label: `pdn_type`

Label Description: PDN type of the session which created the QoS flow

Example: v4, v6, v4v6

- Label: `dnn`

Label Description: DNN for which the flow is created

Example: cisco.com

- Label: `flow_type`

Label Description: Flow type for the QoS flow

Example: gbr, non\_gbr

- Label: `qos_5qi`

Label Description: 5Qi applicable for the QoS flow

Example: 1, 2, 5

- Label: `arp`

Label Description: Priority level of ARP applicable for the QoS flow

Example: 10, 20

- Label: `smf_current_procedure`

Label Description: Current procedure associated with the operation performed on the pcc rule

Example: `pdn_sess_create`, `pdu_sess_create`, `pcf_req_pdu_sess_mod`, `pcf_req_ded_brr_mod`, `enb_to_untrusted_wifi_handover`, `untrusted_wifi_to_enb_handover`, `nr_to_untrusted_wifi_handover`, `utn3gpp_to_5g_handover`, `xn_handover`, `n26_4g_to_5g_handover`, `pdn_5g_4g_handover`, `n26_4g_to_5g_im_mobility`

## Policy control dynamic pcc rule statistics Category

### **policy\_dynamic\_pcc\_rules\_total**

Description: PCC Rule total statistics for dynamic rules pushed from PCF

Sample Query: `'sum (policy_dynamic_pcc_rules_total{rule_id="Rule-1"}) by(qos_5qi, arp)'`

Labels:

- Label: `rule_id`

Label Description: Rule Id for the received dynamic pcc rule

Example: PccRule-1

- Label: `operation`

Label Description: Operation performed on the dynamic pcc rule

Example: install, modify, remove

- Label: `event`

Label Description: Event associated with the operation performed on the pcc rule

Example: attempted, success, failure, abort

- Label: `qos_5qi`

Label Description: 5Qi applied on the dynamic pcc rule

Example: 1, 2, 5

- Label: `arp`

Label Description: Priority level of ARP applied on the dynamic pcc rule

Example: 10, 20

- Label: `tc_event`

Label Description: Traffic Control event applied on the dynamic pcc rule

Example: enabled\_ul, enabled\_dl, enabled, disabled, removed

- Label: `charging_type`

Label Description: Charging type applied on the dynamic pcc rule

Example: online, offline, online-offline

- Label: `charging_method`

Label Description: Charging method applied on the dynamic pcc rule

Example: volume, time, vol\_time

- Label: `details`

Label Description: Details on the operation applied on the dynamic pcc rule

Example: success, failed, validation\_failed

- Label: `smf_current_procedure`

Label Description: Current procedure associated with the operation performed on the pcc rule

Example: pdn\_sess\_create, pdu\_sess\_create, pcf\_req\_pdu\_sess\_mod, pcf\_req\_ded\_brr\_mod, enb\_to\_untrusted\_wifi\_handover, untrusted\_wifi\_to\_enb\_handover, nr\_to\_untrusted\_wifi\_handover, utn3gpp\_to\_5g\_handover, xn\_handover, n26\_4g\_to\_5g\_handover, pdn\_5g\_4g\_handover, n26\_4g\_to\_5g\_im\_mobility

- Label: `pccrule_change_type`

Label Description: pcc rule parameter change type

Example: NA, binding\_param\_change, no\_binding\_param\_change

## Policy control message statistics Category

### **policy\_msg\_processing\_status**

Description: Policy message handling Stats

Sample Query: 'sum  
(policy\_msg\_processing\_status{policy\_notification\_msg="SmPolicyUpdateNotify"}) '

Labels:

- Label: `policy_notification_msg`  
Label Description: Policy message type  
Example: SmPolicyUpdateNotify, SmPolicyTerminate, SmPolicyCreate, SmPolicyUpdate, SmPolicyDelete
- Label: `msg_status`  
Label Description: Policy processing message status  
Example: accepted, rejected, skipped, attempted, failed, exp\_attempted, exp\_accepted, exp\_rejected, exp\_failed
- Label: `pcf_end_point`  
Label Description: PCF IP Address  
Example: 10.84.17.11
- Label: `rat_type`  
Label Description: RAT type of the flow  
Example: nr, WLAN, EUTRA

## Policy control pre-defined pcc rule statistics Category

### **policy\_predefined\_pcc\_rules\_total**

Description: PCC Rule total statistics for pre-defined rules activated by PCF

Sample Query: 'sum (policy\_predefined\_pcc\_rules\_total{rule\_id="Rule-1"}) by(event, operation) '

Labels:

- Label: `rulebase`  
Label Description: Rulebase to which this pre-defined rule belongs  
Example: Rulebase-1
- Label: `operation`  
Label Description: Operation performed on the pre-defined pcc rule  
Example: install, modify, remove
- Label: `event`  
Label Description: Event associated with the operation performed on the pre-defined rule

Example: attempted, success, failure

- Label: qos\_5qi

Label Description: 5Qi applied on the pre-defined pcc rule

Example: 1, 2, 5

- Label: arp

Label Description: Priority level of ARP applied on the pre-defined pcc rule

Example: 10, 20

- Label: charging\_type

Label Description: Charging type applied on the pre-defined pcc rule

Example: online, offline, online-offline

- Label: charging\_method

Label Description: Charging method applied on the pre-defined pcc rule

Example: volume, time, vol\_time

- Label: smf\_current\_procedure

Label Description: Current procedure associated with the operation performed on the pcc rule

Example: pdn\_sess\_create, pdu\_sess\_create, smf\_initiated\_pdn\_detach, disc\_pdurel\_smf\_init\_release, pcf\_req\_pdu\_sess\_mod, pcf\_req\_ded\_brr\_mod, enb\_to\_untrusted\_wifi\_handover, untrusted\_wifi\_to\_enb\_handover, nr\_to\_untrusted\_wifi\_handover, utn3gpp\_to\_5g\_handover, xn\_handover, n26\_4g\_to\_5g\_handover, pdn\_5g\_4g\_handover, n26\_4g\_to\_5g\_im\_mobility

## Policy control rule report statistics Category

### pcf\_rule\_report\_stats

Description: Statistics for Rule Report sent to PCF

Sample Query: 'sum (pcf\_rule\_report\_stats(pcf\_rule\_report\_fail\_code="INCOR\_FLOW\_INFO"))'

Labels:

- Label: pcf\_rule\_report\_fail\_code

Label Description: Failure code sent in RuleReport

Example: INCOR\_FLOW\_INFO

## Policy control session rule statistics Category

### policy\_session\_rules\_total

Description: Session total statistics for session rules applied

Sample Query: 'sum (policy\_session\_rules\_total(rule\_id="SessRule-1"))'

Labels:

- Label: `rule_id`  
Label Description: Rule Id for the received session rule from PCF  
Example: SessRule-1
- Label: `operation`  
Label Description: Operation performed on the session rule  
Example: install, modify, remove
- Label: `event`  
Label Description: Event associated with the operation performed on the rulebase  
Example: attempted, success, failure
- Label: `smf_current_procedure`  
Label Description: Current procedure associated with the operation performed on the pcc rule  
Example: pdn\_sess\_create, pdu\_sess\_create, smf\_initiated\_pdn\_detach, disc\_pdurel\_smf\_init\_release, pcf\_req\_pdu\_sess\_mod, pcf\_req\_ded\_brr\_mod, enb\_to\_untrusted\_wifi\_handover, untrusted\_wifi\_to\_enb\_handover, nr\_to\_untrusted\_wifi\_handover, utn3gpp\_to\_5g\_handover, xn\_handover, n26\_4g\_to\_5g\_handover, pdn\_5g\_4g\_handover, n26\_4g\_to\_5g\_im\_mobility

## Policy control static pcc rule statistics Category

### **policy\_static\_pcc\_rules\_total**

Description: PCC Rule total statistics for static rules activated via rulebase

Sample Query: `'sum (policy_static_pcc_rules_total{rulebase="Rulebase-1"})'`

Labels:

- Label: `rulebase`  
Label Description: Rulebase to which the static rules belong  
Example: Rulebase-1
- Label: `operation`  
Label Description: Operation performed on the rulebase  
Example: install, remove
- Label: `event`  
Label Description: Event associated with the operation performed on the rulebase  
Example: attempted, success, failure
- Label: `smf_current_procedure`  
Label Description: Current procedure associated with the operation performed on the pcc rule

Example: pdn\_sess\_create, pdu\_sess\_create, smf\_initiated\_pdn\_detach, disc\_pdurel\_smf\_init\_release, pcf\_req\_pdu\_sess\_mod, pcf\_req\_ded\_brr\_mod, enb\_to\_untrusted\_wifi\_handover, untrusted\_wifi\_to\_enb\_handover, nr\_to\_untrusted\_wifi\_handover, utn3gpp\_to\_5g\_handover, xn\_handover, n26\_4g\_to\_5g\_handover, pdn\_5g\_4g\_handover, n26\_4g\_to\_5g\_im\_mobility

## Policy control total flow statistics Category

### policy\_pdu\_flows\_total

Description: QoS flow total statistics

Sample Query: 'sum (policy\_pdu\_flows\_total{flow\_type="gbr"}) by (qos\_5qi, arp) '

Labels:

- Label: `operation`  
Label Description: Operation performed on the QoS flow  
Example: install, modify, remove
- Label: `event`  
Label Description: Event associated with the operation performed on QoS flow  
Example: attempted, success, failure, abort
- Label: `rat_type`  
Label Description: RAT type on which the flow is created  
Example: nr, WLAN, EUTRA
- Label: `ssc_mode`  
Label Description: SSC mode for the session which created the QoS flow  
Example: one, two, three
- Label: `pdn_type`  
Label Description: PDN type of the session which created the QoS flow  
Example: v4, v6, v4v6
- Label: `dnn`  
Label Description: DNN for which the flow is created  
Example: cisco.com
- Label: `flow_type`  
Label Description: Flow type for the QoS flow  
Example: gbr, non\_gbr
- Label: `init_or_ho`  
Label Description: Flow operation phase  
Example: initial, ho

- Label: `qos_5qi`  
Label Description: 5Qi applicable for the QoS flow  
Example: 1, 2, 5
- Label: `arp`  
Label Description: Priority level of ARP applicable for the QoS flow  
Example: 10, 20

## Radius Authentication Message Stats Category

### `radius_authentication_message_stats`

Description: Stats for Radius Authentication messages

Sample Query:

```
'radius_authentication_message_stats(radius_auth_algorithm="radius_auth_algorithm_pap)'
```

Labels:

- Label: `dnn`  
Label Description: name of the dnn associated with the request  
Example: Any string
- Label: `radius_auth_algorithm`  
Label Description: Radius Authentication Algorithm used  
Example: `radius_auth_algorithm_pap`, `radius_auth_algorithm_chap`, `radius_auth_algorithm_mschap`, `radius_auth_algorithm_default`
- Label: `status`  
Label Description: Radius Auth message status  
Example: `attempted`, `success`, `encode_failed`, `decode_failed`, `failed`
- Label: `reason`  
Label Description: The reason associated with failure  
Example: `timeout`, `parse_error`, `invalid_code`, `invalid_pco`, `invalid_apco`, `invalid_epco`, `write_error`
- Label: `rat_type`  
Label Description: Type of the radio access associated with the request  
Example: `EUTRA`, `NR`, `WLAN`, `rat_type_unknown`

## Radius Message stats Category

### `smf_radius_message_stats`

Description: Stats for Radius interface messages

Sample Query: 'smf\_radius\_message\_stats{message\_type="radius\_access\_request"}'

Labels:

- Label: `direction`

Label Description: Direction indicates about the message going out or coming in

Example: inbound, outbound

- Label: `message_type`

Label Description: Radius Message Type

Example: radius\_access\_request, radius\_access\_accept

- Label: `radius_avp_type`

Label Description: Radius AVP Type

Example: radius\_avp\_pap\_username, radius\_avp\_pap\_user\_password, radius\_avp\_chap\_challenge, radius\_avp\_chap\_response, radius\_avp\_mschap\_challenge, radius\_avp\_mschap\_response, radius\_avp\_idle\_timeout, radius\_avp\_session\_timeout

- Label: `rat_type`

Label Description: Type of the radio access associated with the request

Example: EUTRA, NR, WLAN, rat\_type\_unknown

## SLA Transaction Category

### **smf\_sla\_transaction\_stats**

Description: Transaction SLA stats

Sample Query: `sum(smf_sla_transaction_stats) by (smf_sla_transaction_stats,smf_proc_type,status, message_type)`

Labels:

- Label: `smf_proc_type`

Label Description: Procedure Name

Example: PDU Session Release - SMF initiated, PDU 5G to 4G Handover, PDU Session Modify - PCF initiated, PDU UE Sync Procedure, PDU Idle Mode Entry - RAN initiated

- Label: `status`

Label Description: gives status of the procedure

Example: Queued, Running, Aborted, Suspended, Invalid, Cleanedup, RequireSuspend, RequireCleanup, RequireAbort, Unknown

- Label: `message_type`

Label Description: gives the message type received during sla transaction

Example: IntSelfTxnSla

## SMF ADC URR Statistics Category

### **smf\_pfcpc\_adc\_report\_stats**

Description: The current count of PFCPC adc reports towards PCF

Sample Query: 'smf\_pfcpc\_adc\_report\_stats{adc\_report\_type="async"}'

Labels:

- Label: `adc_report_type`  
Label Description: Synchronous adc report or Asynchronous adc report  
Example: `async`, `sync`
- Label: `status`  
Label Description: ADC report status  
Example: `dropped`, `processed`

## SMF ALWAYS ON PDU SESSION Category

### **smf\_always\_on\_session\_stats**

Description: Always On Pdu Session Statistics

Sample Query: 'smf\_always\_on\_session\_stats(status="pdusetup\_req\_alwayson\_requested)'

Labels:

- Label: `status`  
Label Description: always on status statistics  
Example: `pdusetup_req_alwayson_requested`, `pdusetup_acc_alwayson_allowed`, `pdusetup_acc_alwayson_not_allowed`, `pdumod_req_alwayson_requested`, `pdumod_cmd_alwayson_allowed`, `pdumod_cmd_alwayson_not_allowed`, `pdumod_cmd_nw_init_alwayson_allowed`, `pdu_utwifit_to_nr_alwayson_requested`, `pdu_utwifit_to_nr_alwayson_allowed`, `pdu_utwifit_to_nr_alwayson_not_allowed`
- Label: `rat_type`  
Label Description: Type of the radio access associated with the request  
Example: `EUTRA`, `NR`, `WLAN`, `VIRTUAL`, `rat_type_unknown`
- Label: `pdu_type`  
Label Description: pdu connection type  
Example: `ipv4`, `ipv6`, `ipv4v6`, `unknown`
- Label: `dnn`  
Label Description: name of the dnn associated with the request  
Example: Any string

- Label: `ssc_mode`

Label Description: Type of ssc mode associated with the request

Example: `ssc_mode_1`, `ssc_mode_2`, `ssc_mode_3`, `ssc_mode_unknown`

## SMF Charging Descriptor Delete Stats Category

### **smf\_chrg\_desc\_del\_stats**

Description: The current count of charging descriptors deleted because of all associate Rule Ids are deleted

Sample Query: `'smf_chrg_desc_del_stats{rating_group="10"}'`

Labels:

- Label: `charging_id`

Label Description: Charging Descriptor Identifier

Example: Any string

- Label: `rating_group`

Label Description: Rating Group for which charging descriptors is dropped

Example: Any string

- Label: `configured`

Label Description: Configured signifies if a Rule Id is configured or is dynamic

Example: `true`, `false`

- Label: `reason`

Label Description: Reason for the charging descriptor delete

Example: Error string value

## SMF Charging Descriptor Drop Stats Category

### **smf\_chrg\_desc\_drop\_stats**

Description: The current count of charging descriptors dropped due to validation error on Rule Id

Sample Query: `'smf_chrg_desc_drop_stats{rating_group="10"}'`

Labels:

- Label: `rating_group`

Label Description: Rating Group for which charging descriptors is dropped

Example: Any string

- Label: `service_identifier`

Label Description: Service Identifier for which charging descriptors is dropped

Example: Any string

- Label: `action`

Label Description: Action with respect to Rule Id

Example: add, mod, del

- Label: `configured`

Label Description: Configured signifies if Rule Id is configured or is dynamic

Example: true, false

- Label: `reason`

Label Description: Reason for the charging descriptor drop

Example: Error string value

## SMF Charging Failure Handling Stats Category

### `chf_failure_handling_stats`

Description: Statistics for application error received from CHF

Sample Query: `'chf_failure_handling_stats{appl_err_code="HTTP_STATUS_CODE_403_FORBIDDEN"}'`

Labels:

- Label: `http2_err_code`

Label Description: HTTP2 error code received from CHF

Example: `HTTP_STATUS_CODE_403_FORBIDDEN`

- Label: `appl_err_code`

Label Description: Application error code received from CHF

Example: `END_USER_REQUEST_REJECTED, QUOTA_LIMIT_REACHED, CHARGING_FAILED, USER_UNKNOWN, END_USER_REQUEST_DENIED, QUOTA_LIMIT_REACHED, CHARGING_NOT_APPLICABLE`

- Label: `fh_action`

Label Description: Action taken on failure from CHF

Example: Terminate, Drop Traffic, Disable Charging

- Label: `fh_exchg_type`

Label Description: CHF Exchange in which failure occurred

Example: update, initial

- Label: `disposition`

Label Description: SMF action on failure

Example: disable-charging, drop-traffic, terminate, convert-offline

- Label: `procedure_type`

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

Example: `pdu_sess_create, ue_req_pdu_sess_mod, smf_req_pdu_sess_mod, pcf_req_pdu_sess_mod, udm_req_pdu_sess_mod, gnb_req_pdu_sess_mod, ue_req_pdu_sess_rel, smf_req_pdu_sess_rel, pcf_req_pdu_sess_rel, amf_req_pdu_sess_rel, udm_req_pdu_sess_rel, gnb_req_pdu_sess_rel, chf_req_pdu_sess_rel, admin_req_pdu_sess_rel, ue_req_active_to_idle, ue_req_idle_to_active, nw_req_service_active, upf_notify_downlink_data, xn_path_switch, pdn_sess_create, pdn_5g_4g_handover, pcf_req_ded_brr_create, pcf_req_ded_brr_delete, pcf_req_ded_brr_mod, n2_handover, xn_handover, n26_4g_to_5g_handover, n26_4g_to_5g_im_mobility, pdu_im, pdn_sess_create, pcf_req_ded_brr_create, pcf_req_ded_brr_delete, pcf_req_ded_brr_mod, pcf_initiated_pdn_detach, smf_initiated_pdn_detach, upf_initiated_pdn_detach`

## SMF Charging Message Stats Category

### **chf\_message\_stats**

Description: Charging Message Statistics

Sample Query: `'chf_message_stats{procedure_type="charging_initial"}'`

Labels:

- Label: `procedure_type`

Label Description: Charging message type

Example: `charging_initial, charging_update, charging_terminate`

- Label: `dnn`

Label Description: DNN for which the flow is created

Example: `cisco.com`

- Label: `status`

Label Description: Status of OOO usage report processing

Example: `attempted, success, timeout`

- Label: `rat_type`

Label Description: RAT type on which the flow is created

Example: `EUTRA, NR, WLAN, VIRTUAL, rat_type_unknown`

- Label: `chf_type`

Label Description: Type of CHF with which message is exchanged

Example: `online, offline`

- Label: `smf_current_procedure`

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

Example: `pdu_sess_create, ue_req_pdu_sess_mod, smf_req_pdu_sess_mod, pcf_req_pdu_sess_mod, udm_req_pdu_sess_mod, gnb_req_pdu_sess_mod, ue_req_pdu_sess_rel, smf_req_pdu_sess_rel,`

pcf\_req\_pdu\_sess\_rel, amf\_req\_pdu\_sess\_rel, udm\_req\_pdu\_sess\_rel, gnb\_req\_pdu\_sess\_rel, chf\_req\_pdu\_sess\_rel, admin\_req\_pdu\_sess\_rel, ue\_req\_active\_to\_idle, ue\_req\_idle\_to\_active, nw\_req\_service\_active, upf\_notify\_downlink\_data, xn\_path\_switch, pdn\_sess\_create, pdn\_5g\_4g\_handover, pcf\_req\_ded\_brr\_create, pcf\_req\_ded\_brr\_delete, pcf\_req\_ded\_brr\_mod, n2\_handover, xn\_handover, n26\_4g\_to\_5g\_handover, n26\_4g\_to\_5g\_im\_mobility, pdu\_im, pdn\_sess\_create, pcf\_req\_ded\_brr\_create, pcf\_req\_ded\_brr\_delete, pcf\_req\_ded\_brr\_mod, pcf\_initiated\_pdn\_detach, smf\_initiated\_pdn\_detach, upf\_initiated\_pdn\_detach

## SMF Charging OOO Usage Report Stats Category

### smf\_ooo\_usage\_report

Description: The current count for OOO usage report

Sample Query: 'smf\_ooo\_usage\_report{procedure\_type="pdu\_sess\_create"}'

Labels:

- Label: procedure\_type

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

Example: pdu\_sess\_create, ue\_req\_pdu\_sess\_mod, smf\_req\_pdu\_sess\_mod, pcf\_req\_pdu\_sess\_mod, udm\_req\_pdu\_sess\_mod, gnb\_req\_pdu\_sess\_mod, ue\_req\_pdu\_sess\_rel, smf\_req\_pdu\_sess\_rel, pcf\_req\_pdu\_sess\_rel, amf\_req\_pdu\_sess\_rel, udm\_req\_pdu\_sess\_rel, gnb\_req\_pdu\_sess\_rel, chf\_req\_pdu\_sess\_rel, admin\_req\_pdu\_sess\_rel, ue\_req\_active\_to\_idle, ue\_req\_idle\_to\_active, nw\_req\_service\_active, upf\_notify\_downlink\_data, xn\_path\_switch, pdn\_sess\_create, pdn\_5g\_4g\_handover, pcf\_req\_ded\_brr\_create, pcf\_req\_ded\_brr\_delete, pcf\_req\_ded\_brr\_mod, n2\_handover, xn\_handover, n26\_4g\_to\_5g\_handover, n26\_4g\_to\_5g\_im\_mobility, pdu\_im, pdn\_sess\_create, pcf\_req\_ded\_brr\_create, pcf\_req\_ded\_brr\_delete, pcf\_req\_ded\_brr\_mod, pcf\_initiated\_pdn\_detach, smf\_initiated\_pdn\_detach, upf\_initiated\_pdn\_detach

- Label: dnn

Label Description: DNN for which the flow is created

Example: cisco.com

- Label: status

Label Description: Status of OOO usage report processing

Example: attempted, success, timeout

## SMF Charging PFCP usage Report Stats Category

### smf\_pfcp\_usage\_report\_stats

Description: The current count of PFCP usage reports towards CHF

Sample Query: 'smf\_pfcp\_usage\_report\_stats{usage\_report\_type="async"}'

Labels:

- Label: usage\_report\_type

Label Description: Synchronous usage report or Asynchronous usage report

Example: async, sync

- Label: `status`

Label Description: Usage report status

Example: recieved, dropped, ignored, processed

- Label: `procedure_type`

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

Example: pdu\_sess\_create, ue\_req\_pdu\_sess\_mod, smf\_req\_pdu\_sess\_mod, pcf\_req\_pdu\_sess\_mod, udm\_req\_pdu\_sess\_mod, gnb\_req\_pdu\_sess\_mod, ue\_req\_pdu\_sess\_rel, smf\_req\_pdu\_sess\_rel, pcf\_req\_pdu\_sess\_rel, amf\_req\_pdu\_sess\_rel, udm\_req\_pdu\_sess\_rel, gnb\_req\_pdu\_sess\_rel, chf\_req\_pdu\_sess\_rel, admin\_req\_pdu\_sess\_rel, ue\_req\_active\_to\_idle, ue\_req\_idle\_to\_active, nw\_req\_service\_active, upf\_notify\_downlink\_data, xn\_path\_switch, pdn\_sess\_create, pdn\_5g\_4g\_handover, pcf\_req\_ded\_brr\_create, pcf\_req\_ded\_brr\_delete, pcf\_req\_ded\_brr\_mod, n2\_handover, xn\_handover, n26\_4g\_to\_5g\_handover, n26\_4g\_to\_5g\_im\_mobility, pdu\_im, pdn\_sess\_create, pcf\_req\_ded\_brr\_create, pcf\_req\_ded\_brr\_delete, pcf\_req\_ded\_brr\_mod, pcf\_initiated\_pdn\_detach, smf\_initiated\_pdn\_detach, upf\_initiated\_pdn\_detach

- Label: `usage_report_discard_reason`

Label Description: Reason for usage report rejection

Example: uuc\_encd\_cond\_not\_met, charg\_parm\_not\_found, start\_of\_traffic\_rcvd, ignore\_rule\_base\_urr, no\_valid\_trgr\_present, ignore\_immd\_trgr, urr\_not\_present, no\_term\_and\_drop\_traffic, onlinertp\_false\_or\_drop\_traffic, mandatory\_ie\_incorrect, session\_ctxt\_not\_found, radius\_accounting, radius\_accounting\_not\_enabled, urr\_or\_radius\_accounting\_missing

## SMF Charging Quota Event Stats Category

### `chf_quota_event_stats`

Description: The current count for quota event received from CHF

Sample Query: `'chf_quota_event_stats{quota_type="initial"}'`

Labels:

- Label: `rating_group`

Label Description: Rating group for which quota is received from CHF

Example: Any string

- Label: `quota_type`

Label Description: Quota type as received from CHF

Example: initial, update, initial\_final, update\_final, fail

- Label: `quota_method`

Label Description: Quota method received from CHF

Example: time, volume, time\_volume

- Label: `quota_status`

Label Description: Result for the quota received from CHF

Example: SUCCESS, END\_USER\_SERVICE\_DENIED, QUOTA\_MANAGEMENT\_NOT\_APPLICABLE, QUOTA\_LIMIT\_REACHED, END\_USER\_SERVICE\_REJECTED, RATING\_FAILED

- Label: `quota_fail_action`

Label Description: Action on quota failure

Example: No Action , Disable charging, Drop Traffic, Offline Converted

## SMF Charging Radius Accounting Message Stats Category

### `radius_accounting_message_stats`

Description: SMF Radius accounting message stats

Sample Query: `'radius_accounting_message_stats{procedure_type="radius_initial"}'`

Labels:

- Label: `procedure_type`

Label Description: Charging Radius message type

Example: `radius_initial`, `radius_update`, `radius_terminate`

- Label: `dnn`

Label Description: DNN for which the flow is created

Example: `cisco.com`

- Label: `status`

Label Description: Status of Radius charging message processing

Example: `attempted`, `success`, `failures`

- Label: `reason`

Label Description: Reason for Radius message failure

Example: `error`, `reject`, `timeout`, `invalid_arg`

- Label: `rat_type`

Label Description: RAT type on which the flow is created

Example: `EUTRA`, `NR`, `WLAN`, `VIRTUAL`, `rat_type_unknown`

## SMF Charging Session Limit Dynamic Stats Category

### `chf_sess_limit_dynamic_stats`

Description: SMF Charging Session Limit stats

**Sample Query:**

```
'chf_sess_limit_dynamic_stats(chf_sess_limit_dyn_reason="chf_sess_limit_dyn_del_all_trig_disabled")'
```

**Labels:**

- Label: `chf_sess_limit_dyn_reason`

Label Description: Reason for Charging session limit stats

Example: `chf_sess_limit_dyn_del_all_trig_disabled`, `chf_sess_limit_dyn_del_vol_time_nil`,  
`chf_sess_limit_dyn_add_in_cdru`

## SMF Charging Usage Report Stats Category

**chf\_usage\_report\_stats**

Description: The current count for usage reports towards CHF

Sample Query: `'chf_usage_report_stats(charging_method="offline")'`

**Labels:**

- Label: `rating_group`

Label Description: Rating Group for which usage is being reported

Example: Any string

- Label: `service_identifier`

Label Description: Service Identifier for which usage is being reported

Example: Any string

- Label: `charging_method`

Label Description: Metering method for the PDU Session

Example: `online`, `offline`, `online_offline`

- Label: `charging_trigger_type`

Label Description: Trigger for usage report

Example: `QUOTA_THRESHOLD`, `QHT`, `FINAL`, `QUOTA_EXHAUSTED`, `VALIDITY_TIME`,  
`OTHER_QUOTA_TYPE`, `FORCED_REAUTHORISATION`, `UNIT_COUNT_INACTIVITY_TIMER`,  
`ABNORMAL_RELEASE`, `QOS_CHANGE`, `VOLUME_LIMIT`, `TIME_LIMIT`, `EVENT_LIMIT`,  
`PLMN_CHANGE`, `USER_LOCATION_CHANGE`, `RAT_CHANGE`, `UE_TIMEZONE_CHANGE`,  
`TARIFF_TIME_CHANGE`, `MAX_NUMBER_OF_CHANGES_IN_CHARGING_CONDITIONS`,  
`MANAGEMENT_INTERVENTION`,  
`CHANGE_OF_UE_PRESENCE_IN_PRESENCE_REPORTING_AREA`,  
`CHANGE_OF_3GPP_PS_DATA_OFF_STATUS`, `SERVING_NODE_CHANGE`, `REMOVAL_OF_UPF`,  
`ADDITION_OF_UPF`, `START_OF_SERVICE_DATA_FLOW`, `AMBR_CHANGE`

- Label: `procedure_type`

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

Example: `pdu_sess_create`, `ue_req_pdu_sess_mod`, `smf_req_pdu_sess_mod`, `pcf_req_pdu_sess_mod`,  
`udm_req_pdu_sess_mod`, `gnb_req_pdu_sess_mod`, `ue_req_pdu_sess_rel`, `smf_req_pdu_sess_rel`,

pcf\_req\_pdu\_sess\_rel, amf\_req\_pdu\_sess\_rel, udm\_req\_pdu\_sess\_rel, gnb\_req\_pdu\_sess\_rel, chf\_req\_pdu\_sess\_rel, admin\_req\_pdu\_sess\_rel, ue\_req\_active\_to\_idle, ue\_req\_idle\_to\_active, nw\_req\_service\_active, upf\_notify\_downlink\_data, xn\_path\_switch, pdn\_sess\_create, pdn\_5g\_4g\_handover, pcf\_req\_ded\_brr\_create, pcf\_req\_ded\_brr\_delete, pcf\_req\_ded\_brr\_mod, n2\_handover, xn\_handover, n26\_4g\_to\_5g\_handover, n26\_4g\_to\_5g\_im\_mobility, pdu\_im, pdn\_sess\_create, pcf\_req\_ded\_brr\_create, pcf\_req\_ded\_brr\_delete, pcf\_req\_ded\_brr\_mod, pcf\_initiated\_pdn\_detach, smf\_initiated\_pdn\_detach, upf\_initiated\_pdn\_detach

## SMF Charging Zero Usage Report Stats Category

### chf\_zero\_usage\_report\_stats

Description: The current count for usage reports dropped due to zero usage

Sample Query: 'chf\_zero\_usage\_report\_stats(measurement\_type="volume")'

Labels:

- Label: measurement\_type

Label Description: Measurement type

Example: volume, duration, duration-volume

- Label: charging\_trigger\_type

Label Description: Trigger for usage report

Example: QUOTA\_THRESHOLD, QHT, FINAL, QUOTA\_EXHAUSTED, VALIDITY\_TIME, OTHER\_QUOTA\_TYPE, FORCED\_REAUTHORISATION, UNIT\_COUNT\_INACTIVITY\_TIMER, ABNORMAL\_RELEASE, QOS\_CHANGE, VOLUME\_LIMIT, TIME\_LIMIT, EVENT\_LIMIT, PLMN\_CHANGE, USER\_LOCATION\_CHANGE, RAT\_CHANGE, UE\_TIMEZONE\_CHANGE, TARIFF\_TIME\_CHANGE, MAX\_NUMBER\_OF\_CHANGES\_IN\_CHARGING\_CONDITIONS, MANAGEMENT\_INTERVENTION, CHANGE\_OF\_UE\_PRESENCE\_IN\_PRESENCE\_REPORTING\_AREA, CHANGE\_OF\_3GPP\_PS\_DATA\_OFF\_STATUS, SERVING\_NODE\_CHANGE, REMOVAL\_OF\_UPF, ADDITION\_OF\_UPF, START\_OF\_SERVICE\_DATA\_FLOW, AMBR\_CHANGE

## SMF DB Marshal Category

### smf\_db\_marshall\_stats

Description: SMF DB marshal stats

Sample Query: sum(smf\_db\_marshall\_stats) by (module)

Labels:

- Label: module

Label Description: module type counter

Example: policy, charging, upserv, access, generic

## SMF Data Consistency Check Category

### smf\_datacheck\_stats

Description: Total number of sessions checked for consistency

Sample Query: 'smf\_datacheck\_stats{rat\_type="NR", status="failed"}'

Labels:

- Label: `procedure_type`  
Label Description: Procedure Name  
Example: PDU Session Release - SMF initiated, PDU 5G to 4G Handover, PDU Session Modify - PCF initiated, PDU UE Sync Procedure, PDU Idle Mode Entry - RAN initiated
- Label: `rat_type`  
Label Description: Type of the radio access associated  
Example: EUTRA, NR, WLAN, VIRTUAL, rat\_type\_unknown
- Label: `pdu_type`  
Label Description: Type of PDU session  
Example: ipv4, ipv6, ipv4v6, unknown
- Label: `status`  
Label Description: Procedure status after data consistency check  
Example: success, failed
- Label: `reason`  
Label Description: Failure reason of data inconsistency  
Example: invalid\_n4\_data\_in\_txn\_start, invalid\_n4\_data\_in\_txn\_end, invalid\_n7\_data\_in\_txn\_start, invalid\_n7\_data\_in\_txn\_end, invalid\_n40\_data\_in\_txn\_start, invalid\_n40\_data\_in\_txn\_end

## SMF Disconnect stats Category

### smf\_disconnect\_stats

Description: SMF Disconnect stats counters

Sample Query: 'smf\_disconnect\_stats{reason="disc\_pdurel\_amf\_init\_detach"}'

Labels:

- Label: `rat_type`  
Label Description: RAT Type of the Session  
Example: EUTRA, NR, WLAN, rat\_type\_unknown
- Label: `reason`  
Label Description: The reason associated with an call disconnect

Example: disc\_pdusetup\_create\_over\_create, disc\_pdusetup\_release\_over\_create, disc\_pdusetup\_admin\_clear, disc\_pdusetup\_n1\_decode\_failure, disc\_pdusetup\_n1\_content\_not\_found, disc\_pdusetup\_sess\_abs\_timeout, disc\_pdusetup\_sess\_idle\_timeout, disc\_pdusetup\_sess\_cp\_idle\_timeout, disc\_pdusetup\_sess\_default\_flow\_only\_timeout, disc\_pdusetup\_ssc\_mode\_not\_supported, disc\_pdusetup\_ssc\_mode\_denied, disc\_pdusetup\_identity\_conflict, disc\_pdusetup\_pdu\_type\_unsupported, disc\_pdusetup\_pdu\_type\_denied, disc\_pdusetup\_snsai\_denied, disc\_pdusetup\_dnn\_denied, disc\_pdusetup\_iwf\_denied, disc\_pdusetup\_subscription\_denied, disc\_pdusetup\_dnn\_not\_supported, disc\_pdusetup\_dnn\_not\_supported\_in\_slice, disc\_pdusetup\_network\_failure, disc\_pdusetup\_pdu\_sess\_does\_not\_exist, disc\_init\_chg\_data\_err, disc\_pdusetup\_ip\_alloc\_failed, disc\_pdusetup\_static\_ip\_alloc\_failed, disc\_pdusetup\_pdu\_fetch\_failure, disc\_pdusetup\_udm\_reg\_failed, disc\_pdusetup\_udm\_sub\_fetch\_failure, disc\_pdusetup\_udm\_sub\_fetch\_resp\_failed, disc\_pdusetup\_udm\_sub\_notify\_failed, disc\_pdusetup\_upf\_setup\_cause\_not\_accepted, disc\_pdusetup\_secondary\_auth\_failed, disc\_pdusetup\_secondary\_auth\_resp\_failed, disc\_pdusetup\_sm\_cxt\_invalid, disc\_pdusetup\_sm\_cxt\_invalid\_ie, disc\_pdusetup\_sm\_cxt\_sess\_id\_err, disc\_pdusetup\_sm\_cxt\_invalid\_json, disc\_pdusetup\_sm\_cxt\_n1\_process\_failed, disc\_pdusetup\_sm\_cxt\_man\_param\_missing, disc\_pdusetup\_pcf\_create\_exchg\_failure, disc\_pdusetup\_pcf\_create\_rsp\_failure, disc\_pdusetup\_rm\_exchg\_failure, disc\_pdusetup\_rm\_rsp\_failure, disc\_pdusetup\_pcf\_update\_exchg\_failure, disc\_pdusetup\_pcf\_update\_rsp\_failure, disc\_chf\_data\_exchg\_failure, disc\_chf\_data\_rsp\_failure, disc\_pdusetup\_upf\_setup\_exchg\_failure, disc\_pdusetup\_upf\_setup\_rsp\_failure, disc\_pdusetup\_n1n2\_transfer\_exchg\_failure, disc\_pdusetup\_n1n2\_transfer\_rsp\_failure, disc\_pdusetup\_n2\_setup\_failed, disc\_pdusetup\_ue\_init\_release, disc\_pdusetup\_amf\_assign\_ebi\_failure, disc\_pdusetup\_upf\_modify\_exchg\_failure, disc\_pdusetup\_upf\_modify\_rsp\_failure, disc\_pdusetup\_upf\_modify\_failed, disc\_pdusetup\_upf\_serv\_data\_null, disc\_pdusetup\_upf\_dl\_tunnel\_info\_not\_found, disc\_pdusetup\_upf\_tunnel\_id\_not\_found, disc\_pdusetup\_upf\_mod\_gnb\_tun\_params\_failed, disc\_pdusetup\_upf\_mod\_rsra\_tun\_params\_failed, disc\_pdusetup\_upf\_mod\_tun\_param\_tos-failed, disc\_pdusetup\_smf\_mop\_offline, disc\_pdusetup\_sm\_context\_nssai\_not\_supported, disc\_pdusetup\_sm\_context\_network\_failure, disc\_pdusetup\_lbo\_rejected, disc\_pdusetup\_home\_route\_not\_supported, disc\_pdusetup\_internal\_error, disc\_pdusetup\_plmn\_not\_supported, disc\_pdurel\_amf\_sends\_ue\_not\_found, disc\_pdusetup\_dnn\_missing, disc\_pdusetup\_udm\_dnn\_missing, disc\_pdusetup\_resource\_mgr\_rsp\_failed, disc\_pdusetup\_apply\_wps\_failed, disc\_pdurel\_ue\_init\_release, disc\_pdurel\_amf\_init\_release, disc\_pdurel\_amf\_init\_release\_404, disc\_pdurel\_amf\_init\_release\_mod\_req, disc\_pdurel\_pcf\_reconciliation, disc\_rel\_chf\_err, disc\_pdurel\_pcf\_init\_release, disc\_pdurel\_udm\_init\_release, disc\_pdurel\_gnb\_init\_release, disc\_pdurel\_smf\_init\_release, disc\_pdurel\_upf\_init\_association\_release, disc\_pdurel\_radius\_init\_release, disc\_pdurel\_upf\_init\_path\_failure, disc\_pdurel\_upf\_recovered, disc\_pdurel\_config\_change, disc\_db\_conflict\_release, disc\_pdurel\_pcf\_reconciliation, disc\_n2ho\_n4\_modify\_failed, disc\_n2ho\_failure, disc\_n2ho\_guard\_timer\_expiry, disc\_n2ho\_idft\_timer\_expiry, disc\_n26\_4g\_5g\_ho\_n4\_modify\_failed, disc\_n26\_4g\_5g\_im\_mobility\_n4\_modify\_failed, disc\_pdumodify\_context\_not\_found, disc\_pdumodify\_invalid\_pdu\_sess\_identity, disc\_pdurelease\_invalid\_pdu\_sess\_identity, disc\_pduim\_context\_not\_found, disc\_n26\_4g\_5g\_ho, disc\_n26\_5g\_4g\_ho, disc\_n26\_5g\_4g\_ho\_timer\_expired\_post\_exec, disc\_n26\_4g\_5g\_ho\_udm\_reg\_failed, disc\_n26\_5g\_4g\_ho\_mbr\_failed, disc\_pdusetup\_upf\_rule\_creation\_mod\_failure, disc\_non3gpp\_utn\_5g\_ho, disc\_5gtonon3gpp\_utn\_ho, disc\_4g\_non3gpp\_utn\_ho, disc\_non3gpp\_utn\_4g\_ho, disc\_enb\_wifi\_ho\_failed, disc\_utn3gpp\_5g\_ho\_failed, disc\_sess\_report\_srsr\_pdu\_sess\_rel, disc\_pdn\_ue\_init\_release, disc\_pdn\_mme\_init\_release, disc\_pdn\_chf\_reconciliation, disc\_pdn\_pcf\_reconciliation, disc\_pdn\_pcf\_init\_release, disc\_pdn\_pcf\_fallback, disc\_pdn\_udm\_init\_release, disc\_pdn\_chf\_init\_release, disc\_pdn\_upf\_init\_release, disc\_admin\_init\_release, disc\_sess\_time\_exp\_release, disc\_sess\_cp\_idle\_time\_exp\_release, disc\_session\_recreate, disc\_gtpc\_peer\_pathfail, disc\_gtpc\_peer\_restart, disc\_upf\_init\_path\_failure,

disc\_transaction\_timedout, disc\_upf\_recovered, disc\_sgw\_ctx\_failure, disc\_pdn\_internal\_release, disc\_reason\_unknown,, disc\_pdnsetup\_iwk\_5gs\_flag\_false, disc\_pdnsetup\_pduid\_init\_failed, disc\_pdnsetup\_csr\_invalid, disc\_pdnsetup\_udm\_reg\_failed, disc\_pdnsetup\_udm\_reg\_req\_create\_failed, disc\_pdnsetup\_udm\_rpc\_failed, disc\_pdnsetup\_udm\_dnn\_missing, disc\_pdnsetup\_udm\_reg\_resp\_failed, disc\_pdnsetup\_udm\_sub\_fetch\_failed, disc\_pdnsetup\_udm\_sub\_fetch\_resp\_failed, disc\_pdnsetup\_udm\_sub\_notify\_failed, disc\_pdnsetup\_udm\_sub\_notify\_resp\_failed, disc\_pdnsetup\_udm\_sgw\_u\_teid\_missing, disc\_pdnsetup\_secondary\_auth\_failed, disc\_pdnsetup\_secondary\_auth\_resp\_failed, disc\_pdnsetup\_pcf\_create\_failed, disc\_pdnsetup\_pcf\_create\_resp\_failed, disc\_pdnsetup\_pcf\_update\_req\_create\_failed, disc\_pdnsetup\_pcf\_update\_exchg\_failed, disc\_pdnsetup\_pcf\_update\_resp\_failed, disc\_pdnsetup\_resource\_mgr\_exchg\_failed, disc\_pdnsetup\_resource\_mgr\_resp\_failed, disc\_pdnsetup\_upf\_sess\_setup\_exchg\_failed, disc\_pdnsetup\_upf\_sess\_setup\_resp\_failed, disc\_pdnsetup\_upf\_sgw\_tunnelid\_error, disc\_pdnsetup\_upf\_local\_fteid\_error, disc\_pdnsetup\_ssc\_mode\_denied, disc\_pdnsetup\_pdu\_type\_denied, disc\_pdnsetup\_pdu\_type\_not\_supported, disc\_pdnsetup\_ssc\_mode\_not\_supported, disc\_pdnsetup\_subscription\_denied, disc\_pdnsetup\_smf\_mop\_offline, disc\_pdnsetup\_plmn\_not\_supported, disc\_pdnsetup\_non5gcapableue\_not\_allowed, disc\_pdnsetup\_default\_flow\_only\_timeout, disc\_affinity\_add\_error, disc\_pdnsetup\_sgwctx\_brr\_data\_invalid, disc\_ue\_int\_n1\_5g\_sm\_status, disc\_pdu\_ctx\_not\_found, disc\_internal\_affinity\_add\_error, upf\_sess\_report\_gter\_pdn\_sess\_rel, upf\_sess\_report\_srir\_pdn\_sess\_rel, upf\_sess\_report\_spter\_pdn\_sess\_rel, upf\_sess\_report\_srsr\_pdn\_sess\_rel, upf\_sess\_report\_erir\_pdn\_sess\_rel, upf\_sess\_report\_upir\_pdn\_sess\_rel, disc\_sess\_report\_srsr\_pdn\_sess\_rel, disc\_originatingEntity\_request\_timed\_out, disc\_new\_pdn\_type\_due\_to\_single\_addr\_bearer\_only, disc\_new\_pdn\_type\_due\_to\_network\_preference, disc\_pdnsetup\_dnn\_missing\_or\_unknown, disc\_request\_timeout\_at\_originating\_entry

## SMF EBI stats Category

### smf\_ebi\_stats

Description: Stats for the EBI Assignment

Sample Query: 'smf\_ebi\_stats{status="success"}'

Labels:

- Label: procedure\_type

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

Example: pdusetup\_ebi\_assignment

- Label: status

Label Description: status of EBI Assignment

Example: attempted, success, failures

## SMF IPAM Address Events Current Counter Category

### IPAM\_address\_allocations\_current

Description: Current state of SMF IPAM Address allocations

## Sample Query:

```
'IPAM_address_allocations_current(dnn='dnn1',servingArea='area1',nssai='slice1',pool='p1',allocationType='dynamic',addressType='IPv4',upf='up1',grInstId='1')
```

## Labels:

- Label: `dnn`  
Label Description: name of the dnn associated with the request  
Example: Any string
- Label: `servingArea`  
Label Description: name of the serving area associated with the request  
Example: Any string
- Label: `nssai`  
Label Description: name of the nssai associated with the request  
Example: Any string
- Label: `pool`  
Label Description: name of the pool associated with the request  
Example: Any string
- Label: `allocationType`  
Label Description: type of allocation associated with the request  
Example: static/dynamic
- Label: `addressType`  
Label Description: address type associated with the request  
Example: IPv4/IPv6PD
- Label: `upf`  
Label Description: upf identifier associated with the request  
Example: Any string
- Label: `grInstId`  
Label Description: GR Instance ID  
Example: 1 or 2

## SMF IPAM Address Events Total Counter Category

### IPAM\_address\_events\_total

Description: Total number of SMF IPAM Address events

## Sample Query:

```
'IPAM_address_events_total{dnn="dnn1",servingArea="area1",nssai="slice1",pool="p1",eventType="Allocation",allocationType="dynamic",addressType="IPv4", upf="up1",grInstId="1"}
```

## Labels:

- Label: `dnn`  
Label Description: name of the dnn associated with the request  
Example: Any string
- Label: `servingArea`  
Label Description: name of the serving area associated with the request  
Example: Any string
- Label: `nssai`  
Label Description: name of the nssai associated with the request  
Example: Any string
- Label: `pool`  
Label Description: name of the pool associated with the request  
Example: Any string
- Label: `eventType`  
Label Description: type of event associated with the request  
Example: Allocation/Release
- Label: `allocationType`  
Label Description: type of allocation associated with the request  
Example: static/dynamic
- Label: `addressType`  
Label Description: address type associated with the request  
Example: IPv4/IPv6PD
- Label: `upf`  
Label Description: upf identifier associated with the request  
Example: Any string
- Label: `grInstId`  
Label Description: GR Instance ID  
Example: 1 or 2

## SMF IPAM Chunk Events Current Counter Category

### **IPAM\_chunk\_allocations\_current**

Description: Current state of SMF IPAM Address Chunk allocations

## Sample Query:

```
'IPAM_chunk_allocations_current(dnn='dnn',servingArea='area1',nssai='slice1',pool='pl',addressType='IPv4',upf='tpl',grInstId='1',forRemoteSmf='true')
```

## Labels:

- Label: `dnn`  
Label Description: name of the dnn associated with the request  
Example: Any string
- Label: `servingArea`  
Label Description: name of the serving Area associated with the request  
Example: Any string
- Label: `nssai`  
Label Description: name of the nssai associated with the request  
Example: Any string
- Label: `pool`  
Label Description: name of the pool associated with the request  
Example: Any string
- Label: `addressType`  
Label Description: address type associated with the request  
Example: IPv4/IPv6PD
- Label: `upf`  
Label Description: upf identifier associated with the request  
Example: Any string
- Label: `grInstId`  
Label Description: GR Instance ID  
Example: 1 or 2
- Label: `forRemoteSmf`  
Label Description: Indicates if chunk is reserved for Remote SMF  
Example: true/false

## SMF IPAM Chunk Events Total Counter Category

### IPAM\_chunk\_events\_total

Description: Total number of SMF IPAM Address Chunk events

## Sample Query:

```
'IPAM_chunk_events_total(dnn='dnn',servingArea='area1',nssai='slice1',pool='pl',eventType='Allocation',addressType='IPv4',upf='tpl',grInstId='1',forRemoteSmf='true')
```

## Labels:

- Label: `dnn`  
Label Description: name of the dnn associated with the request  
Example: Any string
- Label: `servingArea`  
Label Description: name of the serving area associated with the request  
Example: Any string
- Label: `nssai`  
Label Description: name of the nssai associated with the request  
Example: Any string
- Label: `pool`  
Label Description: name of the pool associated with the request  
Example: Any string
- Label: `eventType`  
Label Description: type of event associated with the request  
Example: Allocation/Release
- Label: `addressType`  
Label Description: address type associated with the request  
Example: IPv4/IPv6PD
- Label: `upf`  
Label Description: upf identifier associated with the request  
Example: Any string
- Label: `grInstId`  
Label Description: GR Instance ID  
Example: 1 or 2
- Label: `forRemoteSmf`  
Label Description: Indicates if chunk is reserved for Remote SMF  
Example: true/false

## SMF N1 Message stats Category

### **smf\_n1\_message\_stats**

Description: Stats for N1 Messages

Sample Query: `'smf_n1_message_stats{procedure_type="pcf_req_pdu_sess_mod}'`

Labels:

- Label: `procedure_type`

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

Example: `pdu_sess_create`, `ue_req_pdu_sess_mod`, `smf_req_pdu_sess_mod`, `pcf_req_pdu_sess_mod`, `udm_req_pdu_sess_mod`, `gnb_req_pdu_sess_mod`, `ue_req_pdu_sess_rel`, `smf_req_pdu_sess_rel`, `pcf_req_pdu_sess_rel`, `amf_req_pdu_sess_rel`, `udm_req_pdu_sess_rel`, `gnb_req_pdu_sess_rel`, `chf_req_pdu_sess_rel`, `admin_req_pdu_sess_rel`, `ue_req_active_to_idle`, `ue_req_idle_to_active`, `nw_req_service_active`, `upf_notify_downlink_data`, `xn_path_switch`, `pdn_sess_create`, `pdn_5g_4g_handover`, `pcf_req_ded_brr_create`, `pcf_req_ded_brr_delete`, `pcf_req_ded_brr_mod`, `n2_handover`, `xn_handover`, `n26_4g_to_5g_handover`, `n26_4g_to_5g_im_mobility`, `pdu_im`, `pdn_sess_create`, `pcf_req_ded_brr_create`, `pcf_req_ded_brr_delete`, `pcf_req_ded_brr_mod`, `pcf_initiated_pdn_detach`, `smf_initiated_pdn_detach`, `upf_initiated_pdn_detach`, `smf_eps_fb`

- Label: `direction`

Label Description: Direction of N1 message

Example: `outbound`, `inbound`

- Label: `message_type`

Label Description: The N1 message type

Example: `pdu_session_establishment_reject`, `pdu_session_release_request`, `pdu_session_modification_command_reject`, `pdu_session_modification_reject`, `pdu_session_release_reject`, `5g_sm_status_msg_release`, `5g_sm_status_msg_no_action`, `5g_sm_status_msg_invalid_pti`

- Label: `n1_cause`

Label Description: N1 cause associated with the message

Example: `OPERATOR_DETERMINED_BARRING`, `INSUFFICIENT_RESOURCES`, `MISSING_OR_UNKNOWN_DNN`, `UNKNOWN_PDU_SESSION_TYPE`, `USER_AUTHENTICATION_OR_AUTHORIZATION_FAILED`, `REQUEST_REJECTED_UNSPECIFIED`, `SERVICE_OPTION_NOT_SUPPORTED`, `REQUESTED_SERVICE_OPTION_NOT_SUBSCRIBED`, `SERVICE_OPTION_TEMPORARILY_OUT_OF_ORDER`, `PTI_ALREADY_IN_USE`, `REGULAR_DEACTIVATION`, `NETWORK_FAILURE`, `REACTIVATION_REQUESTED`, `SEMANTIC_ERROR_IN_THE_TFT_OPERATION`, `SYNTACTICAL_ERROR_IN_THE_TFT_OPERATION`, `INVALID_PDU_SESSION_IDENTITY`, `SEMANTIC_ERRORS_IN_PACKET_FILTER`, `SYNTACTICAL_ERROR_IN_PACKET_FILTER`, `OUT_OF_LADN_SERVICE_AREA`, `PTI_MISMATCH`, `PDU_SESSION_TYPE_IPV4_ONLY_ALLOWED`, `PDU_SESSION_TYPE_IPV6_ONLY_ALLOWED`, `PDU_SESSION_DOES_NOT_EXIST`, `INSUFFICIENT_RESOURCES_FOR_SPECIFIC_SLICE_AND_DNN`, `NOT_SUPPORTED_SSC_MODE`, `INSUFFICIENT_RESOURCES_FOR_SPECIFIC_SLICE`, `MISSING_OR_UNKNOWN_DNN_IN_A_SLICE`, `INVALID_PTIValue`, `MAXIMUM_DATA_RATE_PER_UE_FOR_USER_PLANE_INTEGRITY_PROTECTION_IS_TOO_LOW`, `SEMANTIC_ERROR_IN_THE_QOS_OPERATION`, `SYNTACTICAL_ERROR_IN_THE_QOS_OPERATION`, `INVALID_MAPPED_EPS_BEARER_IDENTITY`, `SEMANTICALLY_INCORRECT_MESSAGE`, `INVALID_MANDATORY_INFORMATION`, `MESSAGE_TYPE_NON_EXISTENT_OR_NOT_IMPLEMENTED`, `MESSAGE_TYPE_NOT_COMPATIBLE_WITH_THE_PROTOCOL_STATE`, `INFORMATION_ELEMENT_NON_EXISTENT_OR_NOT_IMPLEMENTED`,

CONDITIONAL\_IE\_ERROR, MESSAGE\_NOT\_COMPATIBLE\_WITH\_THE\_PROTOCOL\_STATE, PROTOCOL\_ERROR\_UNSPECIFIED

## SMF N2 Message stats Category

### smf\_n2\_message\_stats

Description: Stats for N2 Messages

Sample Query: 'smf\_n2\_message\_stats{procedure\_type="pcf\_req\_pdu\_sess\_mod"}'

Labels:

- Label: `procedure_type`

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

Example: pdu\_sess\_create, ue\_req\_pdu\_sess\_mod, smf\_req\_pdu\_sess\_mod, pcf\_req\_pdu\_sess\_mod, udm\_req\_pdu\_sess\_mod, gnb\_req\_pdu\_sess\_mod, ue\_req\_pdu\_sess\_rel, smf\_req\_pdu\_sess\_rel, pcf\_req\_pdu\_sess\_rel, amf\_req\_pdu\_sess\_rel, udm\_req\_pdu\_sess\_rel, gnb\_req\_pdu\_sess\_rel, chf\_req\_pdu\_sess\_rel, admin\_req\_pdu\_sess\_rel, ue\_req\_active\_to\_idle, ue\_req\_idle\_to\_active, nw\_req\_service\_active, upf\_notify\_downlink\_data, xn\_path\_switch, pdn\_sess\_create, pdn\_5g\_4g\_handover, pcf\_req\_ded\_brr\_create, pcf\_req\_ded\_brr\_delete, pcf\_req\_ded\_brr\_mod, n2\_handover, xn\_handover, n26\_4g\_to\_5g\_handover, n26\_4g\_to\_5g\_im\_mobility, pdu\_im, pdn\_sess\_create, pcf\_req\_ded\_brr\_create, pcf\_req\_ded\_brr\_delete, pcf\_req\_ded\_brr\_mod, pcf\_initiated\_pdn\_detach, smf\_initiated\_pdn\_detach, upf\_initiated\_pdn\_detach, smf\_eps\_fb

- Label: `direction`

Label Description: Direction of N2 message

Example: outbound, inbound

- Label: `n2_Ngap_ie_type`

Label Description: The N2 Ngap IE type

Example: N2\_PDU\_SESSION\_RESOURCE\_RELEASE\_COMMAND\_TRANSFER, N2\_PDU\_SESSION\_PATH\_SWITCH\_REQUEST\_TRANSFER, N2\_INVALID\_OR\_UNSUPPORTED\_NGAP\_IE\_TYPE, N2\_PDU\_SESSION\_PATH\_SWITCH\_REQUEST\_SETUP\_FAILED\_TRANSFER, N2\_PDU\_SESSION\_RESOURCE\_SETUP\_UNSUCCESS\_TRANSFER, N2\_PDU\_SESSION\_RESOURCE\_NOTIFY\_RELEASED\_TRANSFER, N2\_PDU\_SESSION\_RESOURCE\_MODIFY\_UNSUCCESS\_TRANSFER, N2\_PDU\_SESSION\_HANDOVER\_REQUEST\_ACK\_TRANSFER, N2\_PDU\_SESSION\_HANDOVER\_RESOURCE\_ALLOC\_UNSUCCESS\_TRANSFER, N2\_INVALID\_OR\_UNSUPPORTED\_NGAP\_TYPE, N2\_PDU\_SESSION\_RESOURCE\_SETUP\_RESPONSE\_TRANSFER

- Label: `n2_cause_group`

Label Description: The N2 Cause Group

Example: NgapCauseGroupEnum\_RadioNetworkCause, NgapCauseGroupEnum\_TransportLayerCause, NgapCauseGroupEnum\_NASCause, NgapCauseGroupEnum\_ProtocolCause, NgapCauseGroupEnum\_MiscCause, NgapCauseGroupEnum\_NgapCauseGroupDummy

- Label: n2\_cause

Label Description: N2 cause associated with the message

Example: NgapCauseEnum\_RadioNetwork\_DummyEnum, NgapCauseEnum\_RadioNetwork\_Unspecified, NgapCauseEnum\_RadioNetwork\_TXnRELOCOoverall\_expiry, NgapCauseEnum\_RadioNetwork\_Successful\_handover, NgapCauseEnum\_RadioNetwork\_Release\_due\_to\_NG\_RAN\_generated\_reason, NgapCauseEnum\_RadioNetwork\_Release\_due\_to\_5GC\_generated\_reason, NgapCauseEnum\_RadioNetwork\_Handover\_cancelled, NgapCauseEnum\_RadioNetwork\_Partial\_handover, NgapCauseEnum\_RadioNetwork\_Handover\_failure\_in\_target\_5GC\_NG\_RAN\_node\_or\_target\_system, NgapCauseEnum\_RadioNetwork\_Handover\_target\_not\_allowed, NgapCauseEnum\_RadioNetwork\_TNGRELOCOoverall\_expiry, NgapCauseEnum\_RadioNetwork\_TNGRELOCOprep\_expiry, NgapCauseEnum\_RadioNetwork\_Cell\_not\_available, NgapCauseEnum\_RadioNetwork\_Unknown\_target\_ID, NgapCauseEnum\_RadioNetwork\_No\_radio\_resources\_available\_in\_target\_cell, NgapCauseEnum\_RadioNetwork\_Unknown\_local\_UE\_NGAP\_ID, NgapCauseEnum\_RadioNetwork\_Inconsistent\_remote\_UE\_NGAP\_ID, NgapCauseEnum\_RadioNetwork\_Handover\_desirable\_for\_radio\_reasons, NgapCauseEnum\_RadioNetwork\_Time\_critical\_handover, NgapCauseEnum\_RadioNetwork\_Resource\_optimisation\_handover, NgapCauseEnum\_RadioNetwork\_Reduce\_load\_in\_serving\_cell, NgapCauseEnum\_RadioNetwork\_User\_inactivity, NgapCauseEnum\_RadioNetwork\_Radio\_connection\_with\_UE\_lost, NgapCauseEnum\_RadioNetwork\_Radio\_resources\_not\_available, NgapCauseEnum\_RadioNetwork\_Invalid\_QoS\_combination, NgapCauseEnum\_RadioNetwork\_Failure\_in\_the\_radio\_interface\_procedure, NgapCauseEnum\_RadioNetwork\_Interaction\_with\_other\_procedure, NgapCauseEnum\_RadioNetwork\_Unknown\_PDU\_Session\_ID, NgapCauseEnum\_RadioNetwork\_Unknown\_QoS\_Flow\_ID, NgapCauseEnum\_RadioNetwork\_Multiple\_PDU\_Session\_ID\_Instances, NgapCauseEnum\_RadioNetwork\_Multiple\_QoS\_Flow\_ID\_Instances, NgapCauseEnum\_RadioNetwork\_Encryption\_and\_or\_integrity\_protection\_algorithms\_not\_supported, NgapCauseEnum\_RadioNetwork\_NG\_intra\_system\_handover\_triggered, NgapCauseEnum\_RadioNetwork\_NG\_inter\_system\_handover\_triggered, NgapCauseEnum\_RadioNetwork\_Xn\_handover\_triggered, NgapCauseEnum\_RadioNetwork\_Not\_supported\_5QI\_value, NgapCauseEnum\_RadioNetwork\_UE\_context\_transfer, NgapCauseEnum\_RadioNetwork\_IMS\_voice\_EPS\_fallback\_or\_RAT\_fallback\_triggered, NgapCauseEnum\_RadioNetwork\_UP\_integrity\_protection\_not\_possible, NgapCauseEnum\_RadioNetwork\_UP\_confidentiality\_protection\_not\_possible, NgapCauseEnum\_RadioNetwork\_Slice\_not\_supported, NgapCauseEnum\_RadioNetwork\_UE\_in\_RRC\_INACTIVE\_state\_not\_reachable, NgapCauseEnum\_RadioNetwork\_Redirection, NgapCauseEnum\_RadioNetwork\_Resources\_not\_available\_for\_the\_slice, NgapCauseEnum\_RadioNetwork\_UE\_maximum\_integrity\_protected\_data\_rate\_reason, NgapCauseEnum\_RadioNetwork\_Release\_due\_to\_CN\_detected\_mobility, NgapCauseEnum\_RadioNetwork\_N26\_Interface\_Not\_Available, NgapCauseEnum\_RadioNetwork\_Release\_Due\_To\_Pre\_Emption, NgapCauseEnum\_Transport\_resource\_unavailable, NgapCauseEnum\_Transport\_Unspecified,

NgapCauseEnum\_Nas\_Normal\_release, NgapCauseEnum\_Nas\_Authentication\_failure,  
 NgapCauseEnum\_Nas\_Deregister, NgapCauseEnum\_Nas\_Nas\_Unspecified,  
 NgapCauseEnum\_Protocol\_Transfer\_syntax\_error,  
 NgapCauseEnum\_Protocol\_Abstract\_syntax\_error\_reject,  
 NgapCauseEnum\_Protocol\_Abstract\_syntax\_error\_ignore\_and\_notify,  
 NgapCauseEnum\_Protocol\_Message\_not\_compatible\_with\_receiver\_state,  
 NgapCauseEnum\_Protocol\_Semantic\_error,  
 NgapCauseEnum\_Protocol\_Abstract\_syntax\_error\_falsely\_constructed\_message,  
 NgapCauseEnum\_Protocol\_Proto\_Unspecified, NgapCauseEnum\_Misc\_Control\_processing\_overload,  
 NgapCauseEnum\_Misc\_Not\_enough\_user\_plane\_processing\_resources,  
 NgapCauseEnum\_Misc\_Hardware\_failure, NgapCauseEnum\_Misc\_O\_M\_intervention,  
 NgapCauseEnum\_Misc\_Unknown\_PLMN, NgapCauseEnum\_Misc\_Unspecified

- Label: `n2_fail_reason`

Label Description: N2 failure reason

Example: None, N2 Decode Failed, Invalid N2 Container, upfServData is Nil, DL TunnelInfo is Not Found, UPF Tunnel ID lookup Failed, UPF MOD GNB Tunnel Params Failed, UPF MOD RSRA Tunnel Params Failed, UPF MOD Apply WPS Failed, MOD Tunnel LI Params Failed, Qos Mod Info Failed, Missing N2 SM Info, PDU Context Not Found, Default QFI (1) present in failed QosFlowList, RSRA Tunnel Recreation Failed For HO, Update QER Rule Map Failed, Rollback N2 Failed, Invalid Cause N2 SM Info, Mandatory IE incorrect in N2 SM Info, Xn HO Tobe Switch Flag Is Not Set in SmContextUpdateData, Invalid QFI List in PathSwitchRequest, QoS Flow Accepted List not found in XnHO, at least one Qfi to be accepted, PDU Session is Not Established, Missing T-gNB DL UP TunnelInfo, Missing S-gNB DL UP TunnelInfo, Default QFI is present in the Failed QFI List, N4 Session Modification failed, SLA Timeout

## SMF Node Manager stats Category

### **smf\_service\_node\_mgr\_stats**

Description: Stats for SMF Node Manager

Sample Query: `'smf_service_node_mgr_stats(ip_req_type="ip-alloc")'`

Labels:

- Label: `upf_ep_key`  
 Label Description: UPF Endpoint Key  
 Example: IP String Value
- Label: `first_nodemgr_inst`  
 Label Description: First Nodemgr instance ID  
 Example: unsigned integer
- Label: `second_nodemgr_inst`  
 Label Description: Second Nodemgr instance ID  
 Example: unsigned integer
- Label: `error`

Label Description: Error in case of Node Mgr failure

Example: None, Both associated nodemgr instances are down, Second nodeMgr down and First NodeMgr responded with SmfRspFailure, Second nodeMgr down and First NodeMgr failed with IpcError, First NodeMgr responded with SmfRspFailure, First NodeMgr failed with IpcError, Second NodeMgr failed with IpcError, Second NodeMgr responded with SmfRspFailure

- Label: `retransmit`

Label Description: Is retransmit message

Example: true, false

- Label: `ip_req_type`

Label Description: Type of IP request

Example: ip-alloc, ip-dealloc, ip-static, ip-static-subscription, ip-static-radius

- Label: `pdu_type`

Label Description: pdu connection type

Example: ipv4, ipv6, ipv4v6, unknown

## SMF PCSCF Server Stats Category

### **smf\_pcscf\_server\_stats**

Description: Stats for SMF PCSCF Server

Sample Query: `'smf_pcscf_server_stats{PrimaryIPv4="1.2.3.4"}'`

Labels:

- Label: `PrimaryIPv4`

Label Description: Primary PCSCF IPV4 address

Example: 1.2.3.4

- Label: `SecondaryIPv4`

Label Description: Secondary PCSCF IPV4 address

Example: 1.2.3.4

- Label: `TertiaryIPv4`

Label Description: Tertiary PCSCF IPV4 address

Example: 1.2.3.4

- Label: `PrimaryIPv6`

Label Description: Primary PCSCF IPV6 address

Example: IPv6 IP

- Label: `SecondaryIPv6`

Label Description: Secondary PCSCF IPV6 address

Example: IPv6 IP

- Label: `TertiaryIPv6`

Label Description: Tertiary PCSCF IPV6 address

Example: IPv6 IP

- Label: `ResolvedFrom`

Label Description: Info used to resolve PCSCF Address

Example: DNS, LocalConfig

## SMF PDU Status Category

### **smf\_service\_counters**

Description: The current count of SMF pdu sessions

Sample Query: `'smf_service_counters{pdu_state="all_pdu"}'`

Labels:

- Label: `pdu_state`

Label Description: PDU session status indicated by N3 UPF tunnel status

Example: `all_pdu`, `idle`, `connected`

- Label: `rat_type`

Label Description: RAT Type of the Session

Example: `EUTRA`, `NR`, `WLAN`, `rat_type_unknown`

- Label: `dnn`

Label Description: Dnn configured in dnn-policy, also can have `virtual_dnn` if configured, separated by #

Example: `intershat`, `intershat#cisco.com`

- Label: `roaming_status`

Label Description: Roaming status of the subscriber session

Example: `visitor-lbo`, `visitor-hr`, `roamer`, `homer`, `none`

- Label: `ssc_mode`

Label Description: SSC Mode of the session

Example: `ssc_mode_1`, `ssc_mode_2`, `ssc_mode_3`, `ssc_mode_unknown`

- Label: `flow_type`

Label Description: Indicates whether it's total bearer or dedicated bearer

Example: `dedicated_bearer`, `total_bearer`

## SMF Procedure Category

### smf\_service\_stats

Description: SMF call flow procedure counters

Sample Query: 'smf\_service\_stats{procedure\_type="pdu\_sess\_create"}'

Labels:

- Label: `procedure_type`

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

Example: pdu\_sess\_create, ue\_req\_pdu\_sess\_mod, smf\_req\_pdu\_sess\_mod, pcf\_req\_pdu\_sess\_mod, udm\_req\_pdu\_sess\_mod, gnb\_req\_pdu\_sess\_mod, ue\_req\_pdu\_sess\_rel, smf\_req\_pdu\_sess\_rel, pcf\_req\_pdu\_sess\_rel, amf\_req\_pdu\_sess\_rel, udm\_req\_pdu\_sess\_rel, gnb\_req\_pdu\_sess\_rel, chf\_req\_pdu\_sess\_rel, admin\_req\_pdu\_sess\_rel, ue\_req\_active\_to\_idle, ue\_req\_idle\_to\_active, nw\_req\_service\_active, upf\_notify\_downlink\_data, xn\_path\_switch, pdn\_sess\_create, pdn\_5g\_4g\_handover, pcf\_req\_ded\_brr\_create, pcf\_req\_ded\_brr\_delete, pcf\_req\_ded\_brr\_mod, n2\_handover, xn\_handover, n26\_4g\_to\_5g\_handover, n26\_4g\_to\_5g\_im\_mobility, pdu\_im, pdn\_sess\_create, pcf\_req\_ded\_brr\_create, pcf\_req\_ded\_brr\_delete, pcf\_req\_ded\_brr\_mod, pcf\_initiated\_pdn\_detach, smf\_initiated\_pdn\_detach, upf\_initiated\_pdn\_detach, smf\_eps\_fb, misc\_pdu\_sess\_rel

- Label: `status`

Label Description: call flow procedure counter

Example: attempted, success, failures

- Label: `pdu_type`

Label Description: pdu connection type

Example: ipv4, ipv6, ipv4v6, unknown

- Label: `dnn`

Label Description: Dnn configured in dnn-policy, also can have virtual\_dnn if configured, separated by #

Example: intershat, intershat#cisco.com

- Label: `reason`

Label Description: Reason for failure status. For success and attempted it will be Empty

Example: proc\_pdu\_not\_established, proc\_pdu\_ctx\_not\_found, n2ho\_ie\_validation\_failed, n2ho\_n4\_ho\_preparing\_failed, n2ho\_n4\_ho\_prepared\_failed, n2ho\_n4\_ho\_completed\_failed, n2ho\_ho\_cancelled, n2ho\_resource\_alloc\_unsuccess\_transfer, n2ho\_invalid\_state, n2ho\_preparation\_unsuccess\_transfer, n2ho\_n1n2\_transfer\_failure, n2ho\_dft\_intra\_amf, n2ho\_dft\_inter\_amf, n2ho\_idft\_intra\_amf, n2ho\_idft\_inter\_amf, n2ho\_default\_flow\_failed, n2ho\_n2\_decode\_faliure, n2ho\_chf\_update\_failure, n2ho\_invalid\_response, xnho\_tobe\_switched\_flag\_not\_set, xnho\_dl\_tunnel\_info\_not\_found, xnho\_invalid\_accepted\_qfi\_list, xnho\_n4\_modification\_failed, xnho\_n1n2\_transfer\_failure//NotUsedtoberemoved, xnho\_n2\_decode\_faliure, xnho\_pdu\_state\_error, n26ho\_4g\_5g\_n1n2\_transfer\_failure, n26ho\_4g\_5g\_invalid\_state, n26ho\_4g\_5g\_n4\_failed\_prepared\_state, n26ho\_4g\_5g\_resource\_alloc\_unsuccess\_transfer, n26ho\_4g\_5g\_timedout\_in\_post\_exec\_state,

n26ho\_4g\_5g\_n4\_failed\_completed\_state, n26ho\_4g\_5g\_handover\_cancelled,  
n26ho\_4g\_5g\_send\_n4mod\_failed\_preparing\_state, n26ho\_4g\_5g\_n4mod\_rsp\_failed\_preparing\_state,  
n26ho\_4g\_5g\_n4mod\_rsp\_timeout\_preparing\_state, n26ho\_4g\_5g\_im\_mobility\_send\_n4mod\_failed,  
n26ho\_4g\_5g\_im\_mobility\_n4mod\_rsp\_failed, n26ho\_4g\_5g\_im\_mobility\_n4mod\_rsp\_timeout,  
n26ho\_4g\_5g\_invalid\_eps\_pdn\_connlist, n26ho\_4g\_5g\_udm\_reg\_failed, n26ho\_4g\_5g\_dft,  
n26ho\_4g\_5g\_idft, n26ho\_5g\_4g\_dft, n26ho\_5g\_4g\_idft, n26ho\_5g\_4g\_ctxrtrive\_rec\_for\_4g\_session,  
n26ho\_5g\_4g\_handover\_cancel, n26ho\_4g\_5g\_no\_eps\_5gs\_continuity, n26ho\_default\_flow\_failed,  
n26ho\_n2\_decode\_failiure, n26ho\_chf\_update\_failure, n26im\_mobility\_4g\_5g\_no\_eps\_5gs\_continuity,  
n26im\_mobility\_4g\_5g\_default\_eps\_bearer\_inactive, pduim\_n1n2\_transfer\_failure,  
pduim\_n2\_setup\_response\_failure, pduim\_n1n2\_txfr\_failure\_notification, pduim\_n4\_modification\_failed,  
pduim\_misc\_error, pduim\_n1n2ack\_decode\_error, pduim\_n1n2ack\_unhndl\_cause,  
pduim\_n1n2ack\_unhndl\_rsp\_code, pduim\_n1n2ack\_unhndl\_prb\_cause, pduim\_suspended\_procedure,  
pduim\_amf\_ctx\_not\_found, pduim\_internal\_error, pduim\_upstate\_not\_in\_deactivated\_state,  
pduim\_pdu\_access\_type\_mismatch, pduim\_pdu\_gnb\_tunnel\_not\_available,  
pduim\_pdu\_n4\_deactivated\_state, pduim\_sla\_timer\_expired, pduim\_temp\_reject\_max\_retry, upf\_failure,  
pcf\_failure, idft\_release\_failure, access\_4g\_already, idft\_setup\_failure, mbr\_setup\_failure, sgw\_failure,  
udm\_registration\_failure, udm\_subscription\_fetch\_failure, udm\_subscribe\_notify\_failure,  
udm\_update\_notify\_failure, aaa\_subscribe\_auth\_failure, pcf\_create\_failure, pcf\_update\_failure,  
charging\_data\_failure, no\_rule\_matched, invalid\_protocol, invalid\_dst\_mask, invalid\_src\_mask,  
invalid\_5qi, invalid\_arp, invalid\_other, internal\_error, invalid\_ebi, invalid\_framed\_ipv6\_pfx\_length,  
invalid\_acct\_sess\_id\_radius\_dm, reason\_unknown, invalid\_rat\_type, session\_associated\_to\_online\_chf,  
session\_not\_in\_state, unknown, n4\_release\_failed, gtpu\_peer\_path\_failed,  
rel\_received\_for\_non\_5g\_session, qfi\_failed\_to\_setup, utn3gppto5gho\_n4\_failed\_completed\_state,  
utn3gppto5gho\_n4\_failed\_prepared\_state, utn3gppto5gho\_resource\_alloc\_unsuccess\_transfer,  
utn3gppto5gho\_invalid\_state, utn3gppto5gho\_policy\_update\_failure,  
utn3gppto5gho\_charging\_update\_failure, utn3gppto5gho\_n1n2\_transfer\_failure,  
utn3gppto5gho\_pcf\_update\_failed\_post\_ho, utn3gppto5gho\_chf\_update\_failed\_post\_ho,  
utn3gppto5gho\_n4\_failed\_post\_ho, utn3gppto5gho\_del\_bearer\_failed,  
utn3gppto5gho\_partial\_flow\_failure, utn3gppto5gho\_default\_flow\_failed, utn3gppto5gho\_eps\_fallback,  
utn3gppto5gho\_setup\_unsuccess\_transfer, utn3gppto5gho\_fail\_due\_n2msg\_rsp\_not\_rcvd,  
utn3gppto5gho\_ctxt\_create\_res\_failure, utn3gppto5gho\_invalid\_ctxt\_create\_req,  
utn3gpp\_epsfallback\_failed\_during\_5g\_4g\_ho, utn3gpp\_epsfallback\_failed\_guard\_timer\_expiry,  
nr\_to\_untrusted\_wifi\_invalid\_sess\_state, nr\_to\_untrusted\_wifi\_invalid\_json,  
nr\_to\_untrusted\_wifi\_invalid\_paa, nr\_to\_untrusted\_wifi\_invalid\_msg, nr\_to\_untrusted\_wifi\_pcf\_failed,  
nr\_to\_untrusted\_wifi\_n40\_failed, nr\_to\_untrusted\_wifi\_n4\_failed,  
nr\_to\_untrusted\_wifi\_pcf\_failed\_post\_cb, nr\_to\_untrusted\_wifi\_n40\_failed\_post\_cb,  
nr\_to\_untrusted\_wifi\_n4\_failed\_post\_cb, nr\_to\_untrusted\_wifi\_cbr\_failed,  
nr\_to\_untrusted\_wifi\_ubr\_failed, nr\_to\_untrusted\_wifi\_cb\_res\_failed,  
nr\_to\_untrusted\_wifi\_n1n2\_release\_failed, nr\_to\_untrusted\_wifi\_n4\_failed\_post\_ho,  
nr\_to\_untrusted\_wifi\_pcf\_update\_failed\_post\_ho, nr\_to\_untrusted\_wifi\_chf\_update\_failed\_post\_ho,  
nr\_to\_untrusted\_wifi\_sla\_timer\_expired, nr\_to\_untrusted\_wifi\_dbr\_failed,  
enb\_to\_untrusted\_wifi\_to\_enb\_ho\_reject, enb\_to\_untrusted\_wifi\_to\_enb\_invalid\_sess\_state,  
enb\_to\_untrusted\_wifi\_to\_enb\_invalid\_json, enb\_to\_untrusted\_wifi\_to\_enb\_invalid\_paa,  
enb\_to\_untrusted\_wifi\_to\_enb\_invalid\_msg, enb\_to\_untrusted\_wifi\_to\_enb\_udm\_failed,  
enb\_to\_untrusted\_wifi\_to\_enb\_pcf\_failed, enb\_to\_untrusted\_wifi\_to\_enb\_n40\_failed,  
enb\_to\_untrusted\_wifi\_to\_enb\_n4\_failed, enb\_to\_untrusted\_wifi\_to\_enb\_pcf\_failed\_post\_cb,  
enb\_to\_untrusted\_wifi\_to\_enb\_mbr\_failed, enb\_to\_untrusted\_wifi\_to\_enb\_n4\_failed\_post\_mbr,  
enb\_to\_untrusted\_wifi\_to\_enb\_n40\_failed\_post\_cb, enb\_to\_untrusted\_wifi\_to\_enb\_n4\_failed\_post\_cb,  
enb\_to\_untrusted\_wifi\_to\_enb\_n40\_failed\_post\_db, enb\_to\_untrusted\_wifi\_to\_enb\_pcf\_failed\_post\_db,  
enb\_to\_untrusted\_wifi\_to\_enb\_cbr\_failed, enb\_to\_untrusted\_wifi\_to\_enb\_dbr\_failed,  
enb\_to\_untrusted\_wifi\_to\_enb\_ubr\_failed, dsr\_target\_rat\_rejected

- Label: `emergency_call`  
Label Description: Flag indicating if it is an emergency call  
Example: true, false
- Label: `rat_type`  
Label Description: RAT Type of the Session  
Example: EUTRA, NR, WLAN, `rat_type_unknown`
- Label: `roaming_status`  
Label Description: Roaming status of the subscriber session  
Example: visitor-lbo, visitor-hr, roamer, homer, none
- Label: `up_state`  
Label Description: Userplane connection status of the session  
Example: `UpState_None`, `UpState_Establishing`, `UpState_Activating`, `UpState_Activated`, `UpState_Deactivating`, `UpState_Deactivated`, `UpState_Modifying`, `UpState_Deleting`, `UpState_Deleted`
- Label: `qos_5qi`  
Label Description: 5Qi applicable for the QoS flow  
Example: 1, 2, 5
- Label: `always_on`  
Label Description: always on status  
Example: enable, disable
- Label: `dcnr`  
Label Description: UE DCNR status  
Example: enable, disable
- Label: `smf_current_procedure`  
Label Description: Current Procedure Name for Message Level Stats  
Example: `DedBearerProc`, `eps_fb_ded_brr`, `ue_req_ded_brr_mod`, `udm_req_ded_brr_mod`, `smf_req_ded_brr_del`, `upf_req_ded_brr_del`, `mme_req_ded_brr_del`, `mme_req_ded_brr_mod`, `pcf_req_ded_brr_mod`, `pcf_req_ded_brr_create`, `pcf_req_ded_brr_delete`
- Label: `fourg_only_ue`  
Label Description: Only 4g capable UE flag  
Example: true, false
- Label: `pra`  
Label Description: Presence Reporting Area Information  
Example: enable, none

## SMF Procedure Collision Category

### smf\_procedure\_collision

Description: Total number of procedures collided

Sample Query: `sum(smf_procedure_collision) by (smf_current_procedure, smf_current_state, smf_new_procedure, smf_current_procedure_action)`

Labels:

- Label: `smf_current_procedure`

Label Description: Current Procedure Name

Example: PDU Session Release - SMF initiated, PDU 5G to 4G Handover, PDU Session Modify - PCF initiated, PDU UE Sync Procedure, PDU Idle Mode Entry - RAN initiated

- Label: `smf_current_state`

Label Description: Current Procedure State

Example: DEDICATED BEARER: Await N7 Policy Update, PDN5G4GHO: Await UPF Modify Response, 4G RELEASE: Idle, MODIFY: Await N2 Update, RELEASE: Await PCF Delete, SETUP: Post UPF Modify

- Label: `smf_new_procedure`

Label Description: New Procedure Name

Example: PDU Session Release - SMF initiated, PDU 5G to 4G Handover, PDU Session Modify - PCF initiated, PDU UE Sync Procedure, PDU Idle Mode Entry - RAN initiated

- Label: `smf_current_procedure_action`

Label Description: Current Procedure Action on Collision

Example: Ignore, Suspend, Resume, Abort, Cleanup, Continue, Ready, INVALID ACTION

## SMF Procedure Total Time Statistics Category

### smf\_procedure\_seconds

Description: Total number of seconds taken to complete the procedure

Sample Query: `'smf_procedure_seconds(smf_proc_status="Aborted")'`

Labels:

- Label: `smf_proc_type`

Label Description: Procedure Name

Example: PDU Session Release - SMF initiated, PDU 5G to 4G Handover, PDU Session Modify - PCF initiated, PDU UE Sync Procedure, PDU Idle Mode Entry - RAN initiated

- Label: `smf_proc_status`

Label Description: Procedure Status

Example: Queued, Running, Aborted, Suspended, Invalid, Cleanedup, RequireSuspend, RequireCleanup, RequireAbort, ProcStatusComplete, Unknown

## SMF Protocol message counters Category

### **smf\_proto\_udp\_msg\_total**

Description: SMF Protocol message statistics

Sample Query: 'smf\_proto\_udp\_msg\_total{message\_direction="inbound",nf\_type="amf"}'

Labels:

- Label: `message_name`

Label Description: name of N4 interface message

Example: n4\_session\_establishment\_req, n4\_session\_establishment\_res, n4\_session\_modification\_req, n4\_session\_modification\_res, n4\_session\_report\_req, n4\_session\_report\_res, n4\_session\_deletion\_req, n4\_session\_deletion\_res, n4\_association\_setup\_req, n4\_association\_setup\_res, n4\_association\_update\_req, n4\_association\_update\_res, n4\_association\_release\_req, n4\_association\_release\_res, n4\_prime\_pfd\_management\_req, n4\_prime\_pfd\_management\_res, n4\_heartbeat\_req, n4\_heartbeat\_res, n4\_node\_report\_req, n4\_node\_report\_res

- Label: `message_direction`

Label Description: direction of message from SMF perspective

Example: inbound, outbound

- Label: `status`

Label Description: status of message processing

Example: accepted, denied, discarded

## SMF RAN failed stats Category

### **smf\_ran\_failed\_flows**

Description: Stats for the failed QFIs sent in UE Sync

Sample Query: 'smf\_ran\_failed\_flows{procedure\_type="pdu\_ue\_sync\_proc}'

Labels:

- Label: `procedure_type`

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

Example: pdu\_ue\_sync\_proc

- Label: `reason`

Label Description: The reason associated with failure

Example: qfi\_failed\_to\_setup

## SMF RSRA stats Category

### **smf\_service\_rsra\_stats**

Description: Stats for SMF Service RSRA

Sample Query: 'smf\_service\_rsra\_stats{rat\_type="NR"}'

Labels:

- Label: `procedure_type`  
Label Description: The RSRA procedure type  
Example: `router_advt_solicit_request`, `router_advt_unsolicit_request`, `router_solicit_request`
- Label: `status`  
Label Description: status of RSRA  
Example: `failed`, `sent`, `retransmit`, `received`
- Label: `rat_type`  
Label Description: Type of the radio access associated with the request  
Example: `EUTRA`, `NR`, `WLAN`, `rat_type_unknown`
- Label: `upf_ep_key`  
Label Description: UPF Endpoint Key  
Example: IP String Value
- Label: `reason`  
Label Description: reason for the failed status  
Example: `userplane_error`, `ho_in_progress`, `ipc_failed`, `userplane_error`, `encode_failed`, `decode_failed`

## SMF Secondary RAT Usage Report Stats Category

### **smf\_secondary\_rat\_usage\_report\_stats**

Description: Stats for SMF Secondary RAT Usage Report

Sample Query: 'smf\_secondary\_rat\_usage\_report\_stats{rat\_type="NR"}'

Labels:

- Label: `status`  
Label Description: Status of Sec RAT Usage Report  
Example: `ReceivedFromSgw`
- Label: `reason`  
Label Description: The reason associated with status  
Example: `success`

- Label: `rat_type`  
Label Description: Type of the radio access associated with the request  
Example: NR
- Label: `ebi`  
Label Description: ebi number as string  
Example: unsigned int as string or NA
- Label: `qfi`  
Label Description: qfi number as string  
Example: unsigned int as string or NA

## SMF Service Node Report Stats Category

### `smf_service_node_report_stats`

Description: Stats for SMF Service Node Report

Sample Query: `'smf_service_node_report_stats{procedure_type="upf_node_report_pdu_sess_rel}'`

Labels:

- Label: `procedure_type`  
Label Description: The SMF procedure type  
Example: `upf_node_report_pdu_sess_rel`, `upf_node_report_pdn_sess_rel`
- Label: `status`  
Label Description: Status of SMF Service Node Report  
Example: `attempted`, `failures`, `success`
- Label: `pdu_type`  
Label Description: pdu connection type  
Example: `ipv4`, `ipv6`, `ipv4v6`, `unknown`
- Label: `rat_type`  
Label Description: Type of the radio access associated with the request  
Example: `EUTRA`, `NR`, `WLAN`, `rat_type_unknown`
- Label: `up_state`  
Label Description: Userplane connection status of the session  
Example: `UpState_None`, `UpState_Establishing`, `UpState_Activating`, `UpState_Activated`, `UpState_Deactivating`, `UpState_Deactivated`, `UpState_Modifying`, `UpState_Deleting`, `UpState_Deleted`
- Label: `peer_gtpu_ep_key`  
Label Description: GTP Peer

Example: IP String

- Label: `upf_endpoint`

Label Description: UPF Endpoint

Example: IP String Value

## SMF Service Resource Management Stats Category

### `smf_service_resource_mgmt_stats`

Description: SMF Service Resource Management Stats

Sample Query:

```
'smf_service_resource_mgmt_stats{ip_req_type="ip-alloc",pdu_type="ipv4",dnn="dnn1"}'
```

Labels:

- Label: `ip_req_type`

Label Description: Type of IP request

Example: ip-alloc, ip-dealloc, ip-static, ip-static-subscription, ip-static-radius

- Label: `procedure_type`

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

Example: pdu\_sess\_create, ue\_req\_pdu\_sess\_mod, smf\_req\_pdu\_sess\_mod, pcf\_req\_pdu\_sess\_mod, udm\_req\_pdu\_sess\_mod, gnb\_req\_pdu\_sess\_mod, ue\_req\_pdu\_sess\_rel, smf\_req\_pdu\_sess\_rel, pcf\_req\_pdu\_sess\_rel, amf\_req\_pdu\_sess\_rel, udm\_req\_pdu\_sess\_rel, gnb\_req\_pdu\_sess\_rel, chf\_req\_pdu\_sess\_rel, admin\_req\_pdu\_sess\_rel, ue\_req\_active\_to\_idle, ue\_req\_idle\_to\_active, nw\_req\_service\_active, upf\_notify\_downlink\_data, xn\_path\_switch, pdn\_sess\_create, pdn\_5g\_4g\_handover, pcf\_req\_ded\_brr\_create, pcf\_req\_ded\_brr\_delete, pcf\_req\_ded\_brr\_mod, n2\_handover, xn\_handover, n26\_4g\_to\_5g\_handover, n26\_4g\_to\_5g\_im\_mobility, pdu\_im, pdn\_sess\_create, pcf\_req\_ded\_brr\_create, pcf\_req\_ded\_brr\_delete, pcf\_req\_ded\_brr\_mod, pcf\_initiated\_pdn\_detach, smf\_initiated\_pdn\_detach, upf\_initiated\_pdn\_detach, smf\_eps\_fb, Cleanuplocal

- Label: `status`

Label Description: status of resource management request

Example: attempted, success, failures

- Label: `pdu_type`

Label Description: pdu connection type

Example: ipv4, ipv6, ipv4v6, unknown

- Label: `dnn`

Label Description: name of the dnn associated with the request

Example: Any string

- Label: `emergency_call`

Label Description: Flag indicating if it is an emergency call

Example: true, false

- Label: `rat_type`

Label Description: Type of the radio access associated with the request

Example: EUTRA, NR, WLAN, `rat_type_unknown`

## SMF Session counters Category

### `smf_session_counters`

Description: SMF current active Session counters

Sample Query:

```
'smf_session_counters{rat_type="NR",pdu_type="ipv4",dnn="dnn1",ssc_mode="ssc_mode_1"}'
```

Labels:

- Label: `rat_type`

Label Description: Type of the radio access associated with the request

Example: EUTRA, NR, WLAN, `rat_type_unknown`

- Label: `pdu_type`

Label Description: pdu connection type

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

- Label: `dnn`

Label Description: Dnn configured in dnn-policy, also can have `virtual_dnn` if configured, separated by #

Example: `intershat`, `intershat#cisco.com`

- Label: `ssc_mode`

Label Description: Type of ssc mode associated with the request

Example: `ssc_mode_1`, `ssc_mode_2`, `ssc_mode_3`, `ssc_mode_unknown`

- Label: `always_on`

Label Description: always on status

Example: `enable`, `disable`

- Label: `dcnr`

Label Description: UE DCNR status

Example: `enable`, `disable`

- Label: `emergency_call`

Label Description: Flag indicating if it is an emergency call

Example: true, false

- Label: `fourg_only_ue`  
Label Description: Only 4g capable UE flag  
Example: true, false
- Label: `unauthenticated_supi`  
Label Description: indicates if SUPI is unauthenticated  
Example: true, false
- Label: `pra`  
Label Description: Presence Reporting Area Information  
Example: enable, none
- Label: `roaming_status`  
Label Description: Roaming status of the subscriber session  
Example: visitor-lbo, visitor-hr, roamer, homer, none

## SMF Session stats Category

### **smf\_session\_stats**

Description: SMF Session stats counters

Sample Query:

```
'smf_session_stats{rat_type="NR",pdu_type="ipv4",dnn="dnn1",ssc_mode="ssc_mode_1",status="attempted"}'
```

Labels:

- Label: `rat_type`  
Label Description: Type of the radio access associated with the request  
Example: EUTRA, NR, WLAN, rat\_type\_unknown
- Label: `pdu_type`  
Label Description: pdu connection type  
Example: ipv4, ipv6, ipv4v6, unknown
- Label: `dnn`  
Label Description: Dnn configured in dnn-policy, also can have virtual\_dnn if configured, separated by #  
Example: intershat, intershat#cisco.com
- Label: `ssc_mode`  
Label Description: Type of ssc mode associated with the request  
Example: ssc\_mode\_1, ssc\_mode\_2, ssc\_mode\_3, ssc\_mode\_unknown
- Label: `status`  
Label Description: PDU session status indicated at SMF

Example: attempted, success, setup

- Label: `roaming_status`

Label Description: Roaming status of the subscriber session

Example: visitor-lbo, visitor-hr, roamer, homer, none

## SMF Start Procedure Statistics Category

### **smf\_procedure\_start**

Description: Total number of procedures started

Sample Query: `'smf_procedure_start{smf_proc_type="PDN Connect"}'`

Labels:

- Label: `smf_proc_type`

Label Description: Procedure Name

Example: PDU Session Release - SMF initiated, PDU 5G to 4G Handover, PDU Session Modify - PCF initiated, PDU UE Sync Procedure, PDU Idle Mode Entry - RAN initiated

## SMF Stop Procedure Statistics Category

### **smf\_procedure\_stop**

Description: Total number of procedures stopped

Sample Query: `'smf_procedure_stop{smf_proc_type="PDU Session Establishment"}'`

Labels:

- Label: `smf_proc_type`

Label Description: Procedure Name

Example: PDU Session Release - SMF initiated, PDU 5G to 4G Handover, PDU Session Modify - PCF initiated, PDU UE Sync Procedure, PDU Idle Mode Entry - RAN initiated

- Label: `smf_proc_status`

Label Description: Procedure Status

Example: Queued, Running, Aborted, Suspended, Invalid, Cleanedup, RequireSuspend, RequireCleanup, RequireAbort, ProcStatusComplete

## SMF Timeout stats Category

### **smf\_timeout\_stats**

Description: SMF Timeout stats

Sample Query: 'smf\_timeout\_stats{timeout\_type="SessionSetupTimeout"}'

Labels:

- Label: `timeout_type`

Label Description: SMF Timeout type

Example: SessionSetupTimeout, SessionCallflowTimeout, SessionEpsFbTimeout, SessionPolicyRevalTimeout, SessionRsRaAdvTime, SessionModifyTimeout, SessionReleaseTimeout, SessionN2HoTimeout, SessionImTimeout, SessionDedBearerTimeout, SessionPdnSetupTimeout, SessionPdnDisconnectTimeout, SessionPdnModifyTimeout, SessionPduIdftTimeout, SessionPdu5G4GHandover, SessionNrToUnTrustWifiHOTimeout, Session4GWifi4GHOTimeout, SessionWifiTo4GHoMBReqTimeout, SessionRouterSolicitTimeout, SessionUsageReportTimeout, SessionPathSwitchTimeout, SessionN1N2RetryAfter, SessionPDUIMN1N2RetryAfter, SessionN2HoIdftTimeout, SessionN26HoIdftTimeout, SessionAbsoluteTimeout, SessionIwfN26IdftTimeout, SessionDedBrrReEstTimer, SessionDedBrrDelayTimer, Session4G5GN26Timeout, SessionN1N2RetryTimeout, SessionN1N2RetransTimeout, SessionPDUIMResumeTimeout, SessionUrrOutOfOrderWaitTimeout, SessionPduRelCmdRetryTimeout, SessionUnTrustWiFiToNrHOTimeout, SessionUbrRetryTimer, SessionDbrRetryTimer, SessionPduUeSyncTimeout, SessionAmfChangeGuardTimeout, SessionPduSetupProcSLA, SessionPduImProcSLA, ProcedureSlaTimeout, SessionN2HOProcSLA, SessionCatchAllTimeout, SessionIdleTimeout, SessionCpIdleTimeout, SessionTempRejectHoTimeout, SessionDefaultFlowOnlyTimeout, SessionEriDelayTimeout

## SMF Total Procedure Count Category

### **smf\_procedure\_total**

Description: Total number of procedures executed

Sample Query: 'smf\_procedure\_total{smf\_proc\_status="Running"}'

Labels:

- Label: `smf_proc_type`

Label Description: Procedure Name

Example: PDU Session Release - SMF initiated, PDU 5G to 4G Handover, PDU Session Modify - PCF initiated, PDU UE Sync Procedure, PDU Idle Mode Entry - RAN initiated

- Label: `smf_proc_status`

Label Description: Procedure Status

Example: Queued, Running, Aborted, Suspended, Invalid, Cleanedup, RequireSuspend, RequireCleanup, RequireAbort, ProcStatusComplete, Unknown

## SMF Total Timedout Procedure Count Category

### **smf\_procedure\_timeout**

Description: Total number of procedures executed more than 10sec

Sample Query: 'smf\_procedure\_timeout{smf\_proc\_status="Running"}'

Labels:

- Label: smf\_proc\_type

Label Description: Procedure Name

Example: PDU Session Release - SMF initiated, PDU 5G to 4G Handover, PDU Session Modify - PCF initiated, PDU UE Sync Procedure, PDU Idle Mode Entry - RAN initiated

- Label: smf\_proc\_status

Label Description: Procedure Status

Example: Queued, Running, Aborted, Suspended, Invalid, Cleanedup, RequireSuspend, RequireCleanup, RequireAbort, ProcStatusComplete, Unknown

## SMF Total Timedout Procedure Time Category

### smf\_procedure\_timeout\_seconds

Description: Total number of seconds taken by procedures executed more than 10sec

Sample Query: 'smf\_procedure\_timeout\_seconds{smf\_proc\_status="Running"}'

Labels:

- Label: smf\_proc\_type

Label Description: Procedure Name

Example: PDU Session Release - SMF initiated, PDU 5G to 4G Handover, PDU Session Modify - PCF initiated, PDU UE Sync Procedure, PDU Idle Mode Entry - RAN initiated

- Label: smf\_proc\_status

Label Description: Procedure Status

Example: Queued, Running, Aborted, Suspended, Invalid, Cleanedup, RequireSuspend, RequireCleanup, RequireAbort, ProcStatusComplete, Unknown

## SMF Total Unhandled Event Statistics Category

### smf\_procedure\_unhndl\_event

Description: Total number of unhandled events per procedure type

Sample Query: 'smf\_procedure\_unhndl\_event{smf\_proc\_type="PDU Session Release - SMF initiated"}'

Labels:

- Label: smf\_proc\_type

Label Description: Procedure Name

Example: PDU Session Release - SMF initiated, PDU 5G to 4G Handover, PDU Session Modify - PCF initiated, PDU UE Sync Procedure, PDU Idle Mode Entry - RAN initiated

- Label: `message_type`

Label Description: Type of Request/Response Message associated with Unhandled Event

Example: N11SmContextUpdateSuccess, N11EbiAssignmentReq, N4HeartBeatFailure, S5CreateSessRsp, NLiSubscriberQueryReq, RadiusCoaDisconnectReq, N7SmPolicyUpdateSuccess

- Label: `smf_current_state`

Label Description: Current Procedure State

Example: DEDICATED BEARER: Await N7 Policy Update, PDN5G4GHO: Await UPF Modify Response, 4G RELEASE: Idle, MODIFY: Await N2 Update, RELEASE: Await PCF Delete, SETUP: Post UPF Modify

- Label: `guard_timer`

Label Description: This is a check for Guard Timeout. TRUE if Guard Timer has expired, else FALSE

Example: TRUE, FALSE

## SMF Total Unhandled Transaction Statistics Category

### `smf_procedure_unhndl_trans`

Description: Total number of unhandled transactions per procedure type

Sample Query: `'smf_procedure_unhndl_trans{message_type="RadiusCoaDisconnectReq}'`

Labels:

- Label: `smf_proc_type`

Label Description: Procedure Name

Example: PDU Session Release - SMF initiated, PDU 5G to 4G Handover, PDU Session Modify - PCF initiated, PDU UE Sync Procedure, PDU Idle Mode Entry - RAN initiated

- Label: `message_type`

Label Description: Type of Request/Response Message associated with Unhandled Transaction

Example: N11SmContextUpdateSuccess, N11EbiAssignmentReq, N4HeartBeatFailure, S5CreateSessRsp, NLiSubscriberQueryReq, RadiusCoaDisconnectReq, N7SmPolicyUpdateSuccess

- Label: `smf_current_state`

Label Description: Current Procedure State

Example: DEDICATED BEARER: Await N7 Policy Update, PDN5G4GHO: Await UPF Modify Response, 4G RELEASE: Idle, MODIFY: Await N2 Update, RELEASE: Await PCF Delete, SETUP: Post UPF Modify

- Label: `guard_timer`

Label Description: This is a check for Guard Timeout. TRUE if Guard Timer has expired, else FALSE

Example: TRUE, FALSE

## SMF User Plane Session counters Category

### **smf\_up\_session\_counters**

Description: SMF current active User Plane Sessions

Sample Query: 'smf\_up\_session\_counters{pdu\_type="ipv4",dnn="dnn1",ssc\_mode="ssc\_mode\_1"}'

Labels:

- Label: `rat_type`  
Label Description: Type of the radio access associated with the request  
Example: EUTRA, NR, WLAN, rat\_type\_unknown
- Label: `pdu_type`  
Label Description: pdu connection type  
Example: ipv4, ipv6, ipv4v6, unknown
- Label: `dnn`  
Label Description: name of the dnn associated with the request  
Example: Any string
- Label: `ssc_mode`  
Label Description: Type of ssc mode associated with the request  
Example: ssc\_mode\_1, ssc\_mode\_2, ssc\_mode\_3, ssc\_mode\_unknown

## UDM Message Failure Action Stats Category

### **smf\_udm\_msg\_fail\_action**

Description: Stats for UDM Message Failure Action

Sample Query: 'smf\_udm\_msg\_fail\_action{udm\_msg="UdmRegistration"}'

Labels:

- Label: `udm_msg`  
Label Description: Type of UDM Message  
Example: UdmRegistration, UdmDeregistration, UdmSmSubscription, UdmSubscribeToNotify, UdmUnSubscribeToNotify
- Label: `udm_failure_action`  
Label Description: Action taken on UDM Message failure  
Example: ignore, continue, terminate
- Label: `udm_end_point`  
Label Description: UDM Endpoint

Example: IP String

## UDP Request Total Message Stats Category

### **smf\_service\_udp\_req\_msg\_total**

Description: Stats for Total UDP Request Messages

Sample Query: 'smf\_service\_udp\_req\_msg\_total{status="attempted"}'

Labels:

- Label: `message_type`  
Label Description: Type of UDP Message  
Example: N4SessionEstablishmentReq
- Label: `upf_endpoint`  
Label Description: UPF Endpoint  
Example: IP String Value
- Label: `status`  
Label Description: Status of UDP Message  
Example: attempted, success, failures
- Label: `trans_type`  
Label Description: Transmission type of UDP Message  
Example: trans\_type\_origin, trans\_type\_reselected
- Label: `cause_code`  
Label Description: Causecode of UDP Message  
Example: Reserved, Request\_Accepted, Request\_Rejected\_Unspecified, Session\_Ctx\_Not\_Found, Mandatory\_IE\_Missing, Cond\_IE\_Missing, Invalid\_Length, Mandatory\_IE\_Incorrect, Invalid\_FW\_Policy, Invalid\_FTEID\_Alloc\_Opt, No\_Established\_PFCP\_Assc, Rule\_Creation\_Mod\_Failure, PFCP\_Entity\_In\_Congestion, No\_Resource\_Available, Service\_Not\_Supported, System\_failure, No\_Response, Duplicate\_Userplane\_Id, OutOfRange\_Userplane\_Id

## UPF selection stats Category

### **upf\_selection\_stats**

Description: Stats for the UPF Selection

Sample Query: 'upf\_selection\_stats{upf\_selection\_type="preferred"}'

Labels:

- Label: `upf_selection_type`  
Label Description: Type of UPF Selection

Example: preferred

- Label: `upf_fqdn`

Label Description: FQDN of the UPF selected

Example: string

- Label: `status`

Label Description: Status the UPF selected

Example: attempted, failed

- Label: `reason`

Label Description: Reason for status of the UPF selected

Example: `upf_not_associated`, `upf_profile_not_found`, `upf_not_active`

- Label: `dnn`

Label Description: name of the dnn associated with the request

Example: Any string

- Label: `rat_type`

Label Description: Type of the radio access associated with the request

Example: EUTRA, NR, WLAN, `rat_type_unknown`

- Label: `pdu_session_type`

Label Description: PDU Session type

Example: `ip-alloc`, `ip-dealloc`, `ip-static`

- Label: `pdu_subscription_type`

Label Description: PDU Subscription type

Example: `ip-alloc`, `ip-dealloc`, `ip-static`

- Label: `snssai`

Label Description: SNSSAI of the session having `sd` and `sst`

Example: `sd:<string> sst:<uint>`

## udp-proxy Metrics Reference

### UDP-Proxy BGP Routes Count Category

#### **upd\_proxy\_bgp\_routes\_count**

Description: UDP Proxy BGP routes added count

Sample Query: `'upd_proxy_bgp_routes_count{service_name="udp-proxy", status="success"}'`

Labels:

- Label: `status`

Label Description: Status of message while sending or receiving

Example: success, failed

## UDP-Proxy messages Category

### `udp_proxy_msg_total`

Description: UDP Proxy message counters being recieved or sent

Sample Query: `'udp_proxy_msg_total{message_name="radius_request", message_direction="inbound", status="success"}'`

Labels:

- Label: `message_name`

Label Description: UDP messages coming via udp-proxy service

Example: radius\_request, radius\_response, heartbeat\_request, heartbeat\_response

- Label: `message_direction`

Label Description: Message being sent or being received

Example: inbound, outbound

- Label: `status`

Label Description: Status of message while sending or receiving

Example: success, failed



## CHAPTER 3

# Failure Disconnect Reasons Reference

- [SMF Disconnect Reasons](#), on page 119

## SMF Disconnect Reasons

This section describes the procedure failure disconnect reasons supported on SMF.

The following table provides the descriptions for the key failure disconnect reasons.

**Table 1: Failure Disconnect Reasons**

Disconnect Reason	Description
disc_chf_reconciliation	The total number of sessions released by the SMF due to CHF reconciliation.
disc_sess_report_erir_pdn_sess_rel	The total number of 4G or Wi-Fi sessions released by the SMF due to N4 Session Report Request from UPF with ERIR report type. If the ERIR delay timer is configured under access profile, the configured value delays the N4 Session Report Request handling.
disc_pdusetup_create_over_create	The total number of ongoing 5G sessions rejected by the SMF when 5G session establishment is received while handling N11SmContextCreateRequest for 5G session establishment (Create over Create case).
disc_pdurel_amf_init_release_404	The total number of 5G sessions released by the SMF due to 404 response from AMF for N1N2Transfer Request during 5G session modification.
disc_sess_report_erir_pdn_sess_rel	The total number of 4G or Wi-Fi sessions released by the SMF due to N4 Session Report Request from UPF with ERIR report type. If the ERIR delay timer is configured under access profile, the configured value delays the N4 Session Report Request handling.

Disconnect Reason	Description
disc_pdusetup_create_over_create	The total number of ongoing 5G sessions rejected by the SMF when 5G session establishment is received while handling N11SmContextCreateRequest for 5G session establishment (Create over Create case).
disc_pdurel_amf_init_release_404	The total number of 5G sessions released by the SMF due to 404 response from AMF for N1N2Transfer Request during 5G session modification.
disc_pduim_context_not_found	The total number of 5G sessions released by the SMF due to 404 response from AMF for N1N2Transfer Request during idle to active mobility and vice versa.
disc_pdnsetup_smf_mop_offline	The total number of 4G or Wi-Fi sessions rejected by the SMF due to Session Create received when SMF is in maintenance mode and when the offline mode configuration is set in the SMF profile or specifically for a DNN in the DNN profile.
disc_pdusetup_n2_setup_failed	The total number of 5G sessions rejected by the SMF when N2_PDU_SESSION_RESOURCE_SETUP_UNSUCCESS_TRANSFER is received from AMF indicating the N2 failure during 5G session establishment.
disc_pdusetup_n1n2_transfer_rsp_failure	The total number of 5G sessions rejected by the SMF due to N11N1N2MessageTransferFailure response from AMF during 5G session setup.
disc_pdnsetup_non5gcapableue_not_allowed	The total number of 4G or Wi-Fi sessions rejected by the SMF due to Session Create received without 5G InterWorking (IWK_5GS) indication and when the DNN profile is configured to support only NR capable UE by setting <b>only-nr-capable-ue</b> to true.
disc_pdnsetup_udm_sub_fetch_failed	<p>The total number of sessions rejected by the SMF due to failure in fetching the session management subscription data (sm-data) from UDM during 4G or Wi-Fi session establishment time.</p> <p>This disconnect reason is pegged in the following scenarios:</p> <ul style="list-style-type: none"> <li>• SMF request to UDM for fetching the session management subscription data (sm-data) fails.</li> <li>• SMF receives failure response from UDM for SM data request.</li> <li>• Validation of request from UE (SSC mode, PDU session type and Snsai) fails against the subscription allowed based on UDM response.</li> </ul>

Disconnect Reason	Description
disc_pdnsetup_udm_sub_fetch_resp_failed	<p>The total number of sessions rejected by the SMF due to failure in fetching the session management subscription data (sm-data) from UDM during 4G or Wi-Fi session establishment time.</p> <p>This disconnect reason is pegged in the following scenarios:</p> <ul style="list-style-type: none"> <li>• SMF receives failure response from UDM for session management subscription data (sm-data) request.</li> <li>• Validation of request from UE (SSC mode, PDU session type, and Snsai) fails against the subscription allowed based on UDM response.</li> </ul>
disc_pdusetup_release_over_create	The total number of 5G sessions rejected by the SMF due to 5G session release event during ongoing 5G session establishment.
disc_pdusetup_pdu_sess_does_not_exist	The total number of 5G sessions rejected by the SMF when SmContextCreateRequest is received with RequestType as EXISTING_PDU_SESSION during Wi-Fi to 5G handover, but the session doesn't exist with SMF.
disc_sess_cp_idle_time_exp_release	The total number of 4G or Wi-Fi sessions released by the SMF due to Control Plane (CP) idle timeout that started on successful session establishment. The idle timeout is configured in the DNN profile.
disc_sgw_ctx_failure	The total number of 4G or Wi-Fi sessions rejected by the SMF due to default flow failure caused by S-GW.
disc_pdnsetup_pcf_create_resp_failed	The total number of 4G or Wi-Fi sessions rejected by the SMF due to PCF Create Failure during 4G or Wi-Fi session establishment.
disc_gtpc_peer_pathfail	The total number of 4G or Wi-Fi sessions released by the SMF due to GTPC path failure in the network.
disc_pdusetup_rm_exchg_failure	The total number of 5G sessions rejected by the SMF due to IP allocation failure for the PDU session during 5G session setup.
disc_rel_chf_err	The total number of sessions released by the SMF due to CHF-initiated session release.
disc_pdnsetup_udm_reg_resp_failed	<p>The total number of sessions rejected by the SMF due to SMF registration failure with UDM during 4G or Wi-Fi session establishment time. The SMF sends registration request to UDM for storing UE context management information.</p> <p>This disconnect reason is pegged in the following scenarios:</p> <ul style="list-style-type: none"> <li>• SMF registration request to UDM fails.</li> <li>• SMF receives failure response from UDM for registration request.</li> </ul>

Disconnect Reason	Description
disc_pdumodify_context_not_found	The total number of 5G sessions released by the SMF due to 404 response from AMF for N1N2Transfer Request during 5G session modification.
disc_pdusetup_sm_cxt_sess_id_err	<p>The total number of sessions rejected by the SMF when pduSessionId in 5G PDU Session Establishment Request (N11SmContextCreate Request) is either zero or not in the expected format.</p> <p>This disconnect reason is also pegged when there is no subscriber ID (SUPI or PEI) but the ueEpsPdnConnection parameter is present in the request.</p>
disc_pdusetup_upf_setup_rsp_failure	The total number of sessions rejected by the SMF when N4 session establishment with UPF fails during 5G session establishment time.
disc_pdusetup_sess_cp_idle_timeout	The total number of PDN sessions released by the SMF due to Control Plane (CP) idle timer expiry. The CP idle timer expires when there is no control plane activity within the CP idle timeout.
disc_pdusetup_ip_alloc_failed	<p>The total number of sessions rejected by the SMF or PGW-C when IP address allocation fails.</p> <p>This disconnect reason is pegged in the following scenarios:</p> <ul style="list-style-type: none"> <li>• SMF service (node manager) which handles IP address allocation is down.</li> <li>• SMF service (node manager) couldn't allocate the IP address of the requested PDU session type.</li> </ul>
disc_pdusetup_n1n2_transfer_exchg_failure	The total number of sessions rejected by the SMF when there is failure in N1N2 Transfer Request with AMF during 5G PDU session establishment.
disc_pdnsetup_resource_mgr_exchg_failed	The total number of sessions rejected by the SMF or PGW-C when resource manager exchange fails due to IP address allocation failure during 4G or Wi-Fi PDN connection time.
disc_pdusetup_pcf_create_rsp_failure	<p>The total number of sessions rejected by the SMF due to Policy Create Failure.</p> <p>This disconnect reason is pegged in the following scenarios:</p> <ul style="list-style-type: none"> <li>• SMF receives failure from PCF for Policy Create Request during 5G session establishment.</li> <li>• No response from PCF for Policy Create Failure.</li> </ul>

Disconnect Reason	Description
disc_pdsetup_csr_invalid	<p>The total number of Create Session Requests rejected by the SMF when Create Session Request includes invalid parameters.</p> <p>This disconnect reason is pegged in the following scenarios:</p> <ul style="list-style-type: none"> <li>• Create Session Request with invalid parameters for new PDN connection (4G or Wi-Fi).</li> <li>• Create Session Request with invalid parameters in handover requests—5G to Wi-Fi HO, 4G to Wi-Fi HO, and Wi-Fi to 4G HO.</li> </ul>
disc_n26_4g_5g_ho_n4_modify_failed	<p>The total number of sessions released by the SMF or PGW-C when N4 modification with UPF fails in the execution phase of 4G to 5G N26 handover.</p> <p>This disconnect reason is pegged in the following scenarios:</p> <ul style="list-style-type: none"> <li>• N4 Modification Request failure in the execution phase of N26 HO.</li> <li>• SMF receives failure response from UPF for N4 modification in the execution phase of N26 HO.</li> <li>• SLA timeout at SMF during N4 modification in the execution phase of N26 HO.</li> </ul>
disc_sess_cp_idle_time_exp_release	<p>The total number of PDN sessions released by the SMF or PGW-C due to Control Plane (CP) idle timer expiry. The CP idle timer expires when there is no control plane activity within the CP idle timeout.</p>
disc_pdsetup_dnn_not_supported_in_slice	<p>The total number of sessions rejected by the SMF where the 5G PDU Session Establishment Request (N11smContextCreate) received from AMF contains DNN which is not supported in the requested network slice.</p>
disc_pdsetup_udm_reg_failed	<p>The total number of sessions rejected by the SMF due to SMF registration failure with UDM during 5G session establishment time. The SMF sends registration request to UDM for storing UE context management information.</p> <p>This disconnect reason is pegged in the following scenarios:</p> <ul style="list-style-type: none"> <li>• SMF registration request to UDM fails.</li> <li>• SMF receives failure response from UDM for registration request.</li> </ul>
disc_pdurel_db_conflict	<p>The total number of sessions released by the SMF due to internal issue related to the database conflict.</p>

Disconnect Reason	Description
disc_pdusetup_udm_sub_fetch_resp_failed	<p>The total number of sessions rejected by the SMF due to failure in fetching the session management subscription data (sm-data) from UDM during 5G session establishment time.</p> <p>This disconnect reason is pegged in the following scenarios:</p> <ul style="list-style-type: none"> <li>• SMF receives failure response from UDM for session management subscription data (sm-data) request.</li> <li>• Validation of request from UE (SSC mode, PDU session type and Snsai) fails against the subscription allowed based on UDM response.</li> </ul>
disc_pdusetup_udm_sub_fetch_failure	<p>The total number of sessions rejected by the SMF due to failure in fetching the session management subscription data (sm-data) from UDM during 5G session establishment time.</p> <p>This disconnect reason is pegged in the following scenarios:</p> <ul style="list-style-type: none"> <li>• SMF request to UDM for fetching the session management subscription data (sm-data) fails.</li> <li>• SMF receives failure response from UDM for SM data request.</li> <li>• Validation of request from UE (SSC mode, PDU session type, and Snsai) fails against the subscription allowed based on UDM response.</li> </ul>



## CHAPTER 4

# MIB Reference

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- [CISCO-CNEE-MIB, on page 125](#)
- [CISCO-SMI, on page 125](#)

## 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.

