Ultra Cloud Core 5G Session Management Function, Release 2023.04 - Statistics Reference

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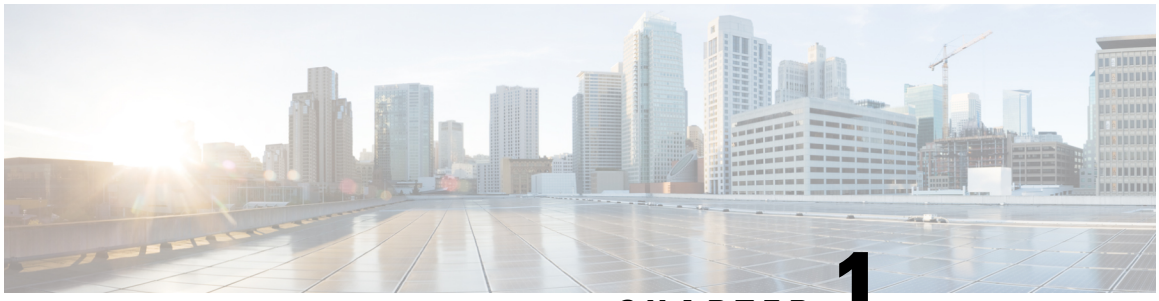
About this Guide

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

This 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.

About this Guide



CHAPTER 1

SMF Interface for Metrics

Feature Description

You can a monitor 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.

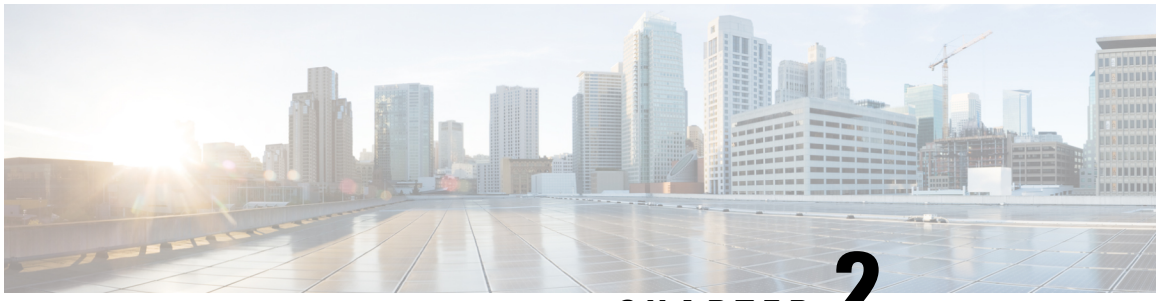
```
[smf] smf# show running-config infra metrics verbose application
 infra metrics verbose application
  level production
  metrics smf_service_stats
```

```
   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

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, ccau, ccat, rar, asr

- 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 unknow 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: ccri, ccru, ccrt, 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 unknow 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: gxProf1

- 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, 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

- 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: gxProf1

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 Managment Stats Category

gtpc_roaming_peer_path_mgmt

Description: GTPC Roaming Peer Path Managment 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`

  desciption: 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, NumRxCreateIDFTReq, NumTxCreateIDFTRsp, NumRxDeletIDFTReq, 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="cn1",data_center="cn1",instance_id="0",service_name="nodemgr",up_pathfail_reason="up_pathfail_ignored_hb_retry"}
1'
```

Labels:

- Label: `up_pathfail_reasons`

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

  Example:
  up_pathfail_ignored_hb_retry,up_pathfail_reason_hb_retry,up_pathfail_ignored_hb_rt_change,up_pathfail_reason_hb_rt_change,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="cn1",data_center="cn1",instance_id="1",interface_type="SX1",service_name="nodemgr",up_peer_ip="20.20.20.66:20.20.20.42",up_peer_status="up_peer_path_up"}
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 threhold hit is yes or no.

  Example: yes

- Label: `threshold_clear`

  Label Description: Indicates if threhold 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 diagnostics address validation counter Category

nodemgr_diag_ip_verify

Description: Node manager diagnostics address validation counter

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

Labels:

- Label: `status`

  Label Description: diagnostics address validation status

  Example: success, unknown, cdl_ipc_failure, ipv4_alloc_failed, ipv6_alloc_failed, ip_mismatch_ignored, duplicate_record_found

Nodemgr gtpc message statistics Category

nodemgr_gtpc_msg_stats

Description: Node manager gtpc message statistics for updating node status to gtpc peers like SGW, PGW or ePDG

Sample Query: `'nodemgr_gtpc_msg_stats{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_msg_type`

  Label Description: GTPC message triggered by the current node, or triggered by peer node

  Example: gtpc_echo_res_rx, gtpc_echo_res_tx, gtpc_echo_req_rx,

- 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: `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 recieved 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 recieved 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 recieved

  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 requeseted V4 = 1, IP type requeseted V6 = 2, IP type requeseted 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_pfcp_decode_msg_total

Description: Total number of pfcp decode by type,size

Sample Query: `'proto_pfcp_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_pfcp_encode_msg_total

Description: Total number of pfcp encode by type,size

Sample Query: `'proto_pfcp_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 pfcp

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, retransmited

- 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_pfcp_msg_total

Description: Total number of pcfp messages by type

Sample Query: `'proto_pfcp_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, retransmited

- 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 pcfp 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, retransmited

- 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_pfcp_msg_seconds_total

Description: Time Taken for pcfp messages by type

Sample Query: `'proto_pfcp_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, retransmited

- 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 pfcp 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, retransmited

- 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 pfcp 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, retransmited

- 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, retransmited

- 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, UdmSdmGetUESMSubscriptionData

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, 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_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, hearbeat, 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, hearbeat, 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 choosen 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: Iterface 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/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

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_OCCPUPIED, 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/nnrf-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/nnrf-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/nnrf-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/nnrf-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/nnrf-nfm/v1", direction="outbound", message_type="registration",result="timeouOrRPCError" }'`

Labels:

- Label: `host`

  Label Description: End Point address

  Example: http://10.105.227.109:8082/nnrf-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, hearbeat, 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/nnrf-nfm/v1", direction="outbound", message_type="registration",result="timeouOrRPCError" }'`

Labels:

- Label: `host`

  Label Description: End Point address

  Example: http://10.105.227.109:8082/nnrf-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, hearbeat, 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 choosen 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, PDN Session Modify - PCRF 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_pfcp_adc_report_stats

Description: The current count of PFCP adc reports towards PCF

Sample Query: `'smf_pfcp_adc_report_stats{adc_report_type="async"}'`

Labels:

- Label: `adc_report_type`

  Label Description: Synchronus 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_utwifi_to_nr_alwayson_requested, pdu_utwifi_to_nr_alwayson_allowed, pdu_utwifi_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 charing 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: Synchronus 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, onlinerpt_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

- Label: `trigger_reason`

  Label Value: `nat_binding_update`

  Label Description: Radius Accounting message handling corresponds to PFCP Session Report with NAT Binding updates (NBU).

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_marshal_stats

Description: SMF DB marshal stats

Sample Query: `sum(smf_db_marshal_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, PDN Session Modify - PCRF 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_pdutype_unsupported, disc_pdusetup_pdutype_denied, disc_pdusetup_snssai_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_nill, 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 Assignement

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="upf1",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="dp1",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="dnn1",servingArea="area1",nssai="slice1",pool="p1",addressType="IPv4",upf="dp1",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="dnn1",servingArea="area1",nssai="slice1",pool="p1",eventType="Allocation",addressType="IPv4",upf="p1",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 assosiated 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_PTI_VALUE,

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 assosiated with the message

  Example: NgapCauseEnum_RadioNetwork_DummyEnum, NgapCauseEnum_RadioNetwork_Unspecified, NgapCauseEnum_RadioNetwork_TXnRELOCOverall_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_TNGRELOCoverall_expiry, NgapCauseEnum_RadioNetwork_TNGRELOCprep_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 sucessess 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_failiure, 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_failiure, 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, PDN Session Modify - PCRF 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, PDN Session Modify - PCRF 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, PDN Session Modify - PCRF 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, PDN Session Modify - PCRF 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, PDN Session Modify - PCRF 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, SessionErirDelayTimeout

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, PDN Session Modify - PCRF 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, PDN Session Modify - PCRF 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, PDN Session Modify - PCRF 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, PDN Session Modify - PCRF 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, PDN Session Modify - PCRF 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`

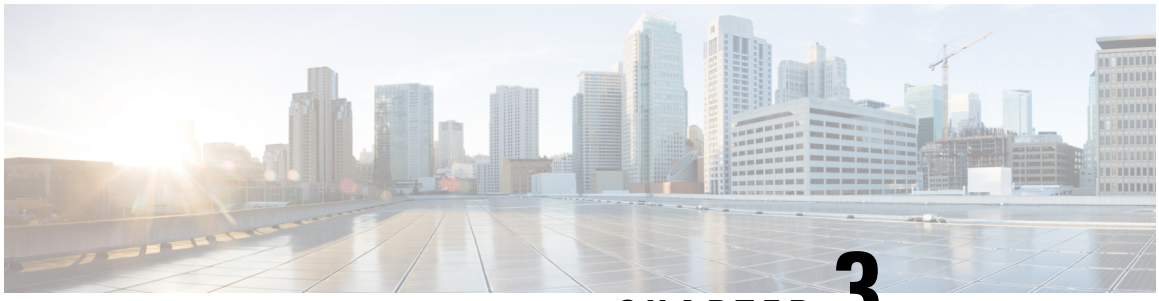
  Label Description: Message being sent or being received

  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

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.

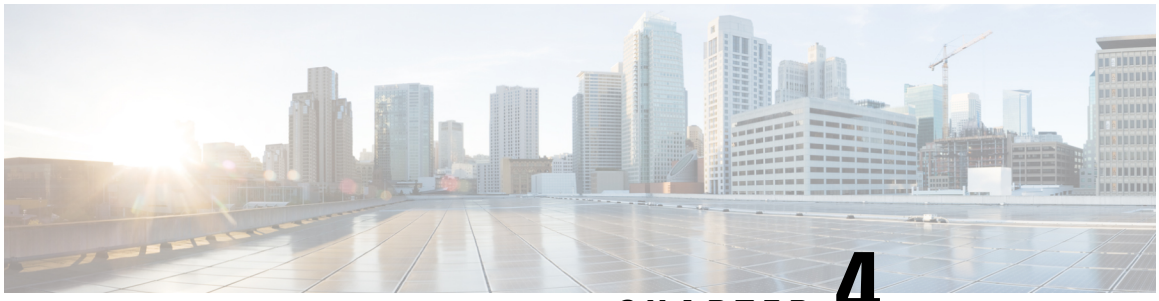
Disconnect Reason	Description
disc_pdusetup_create_over_create	The total number of ongoing 5G sessions rejected by the SMF when 5G session establishment is received while handling N11SmContextCreateRequest for 5G session establishment (Create over Create case).
disc_pdurel_amf_init_release_404	The total 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 **only-nr-capable-ue** to true.
disc_pdnsetup_udm_sub_fetch_failed	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. This disconnect reason is pegged in the following scenarios: • SMF request to UDM for fetching the session management subscription data (sm-data) fails. • SMF receives failure response from UDM for SM data request. • Validation of request from UE (SSC mode, PDU session type and Snssai) fails against the subscription allowed based on UDM response.

Disconnect Reason	Description
disc_pdnsetup_udm_sub_fetch_ resp_failed	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. This disconnect reason is pegged in the following scenarios: • SMF receives failure response from UDM for session management subscription data (sm-data) request. • Validation of request from UE (SSC mode, PDU session type, and Snssai) fails against the subscription allowed based on UDM response.
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	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. This disconnect reason is pegged in the following scenarios: • SMF registration request to UDM fails. • SMF receives failure response from UDM for registration request.

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	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. This disconnect reason is also pegged when there is no subscriber ID (SUPI or PEI) but the ueEpsPdnConnection parameter is present in the request.
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	The total number of sessions rejected by the SMF or PGW-C when IP address allocation fails. This disconnect reason is pegged in the following scenarios: • SMF service (node manager) which handles IP address allocation is down. • SMF service (node manager) couldn't allocate the IP address of the requested PDU session type.
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	The total number of sessions rejected by the SMF due to Policy Create Failure. This disconnect reason is pegged in the following scenarios: • SMF receives failure from PCF for Policy Create Request during 5G session establishment. • No response from PCF for Policy Create Failure.

Disconnect Reason	Description
disc_pdnsetup_csr_invalid	The total number of Create Session Requests rejected by the SMF when Create Session Request includes invalid parameters. This disconnect reason is pegged in the following scenarios: • Create Session Request with invalid parameters for new PDN connection (4G or Wi-Fi). • 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.
disc_n26_4g_5g_ho_n4_modify_failed	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. This disconnect reason is pegged in the following scenarios: • N4 Modification Request failure in the execution phase of N26 HO. • SMF receives failure response from UPF for N4 modification in the execution phase of N26 HO. • SLA timeout at SMF during N4 modification in the execution phase of N26 HO.
disc_sess_cp_idle_time_exp_release	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.
disc_pdusetup_dnn_not_supported_ in_slice	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.
disc_pdusetup_udm_reg_failed	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. This disconnect reason is pegged in the following scenarios: • SMF registration request to UDM fails. • SMF receives failure response from UDM for registration request.
disc_pdurel_db_conflict	The total number of sessions released by the SMF due to internal issue related to the database conflict.

Disconnect Reason	Description
disc_pdusetup_udm_sub_fetch_ resp_failed	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. This disconnect reason is pegged in the following scenarios: • SMF receives failure response from UDM for session management subscription data (sm-data) request. • Validation of request from UE (SSC mode, PDU session type and Snssai) fails against the subscription allowed based on UDM response.
disc_pdusetup_udm_sub_fetch_failure	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. This disconnect reason is pegged in the following scenarios: • SMF request to UDM for fetching the session management subscription data (sm-data) fails. • SMF receives failure response from UDM for SM data request. • Validation of request from UE (SSC mode, PDU session type, and Snssai) fails against the subscription allowed based on UDM response.



CHAPTER 4

MIB Reference

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.

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).

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.

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).

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