



b-ucc-5g-smf-metrics-reference-release-2025-03

First Published: 2025-08-08

Americas Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

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CONTENTS

PREFACE

About this Guide xi

CHAPTER 1

SMF Interface for Metrics 1

Feature Description 1

How it Works 2

Configuring Metrics Collection 2

Configuration Example 4

Configuration Verification 4

CHAPTER 2

SMF Metrics 7

chf-service Metrics Reference 7

CCF Data Consistency Check Category 7

CCF Procedure Category 8

CCF Procedure Collision Category 9

CCF Procedure Total Time Statistics Category 10

CCF Start Procedure Statistics Category 10

CCF Stop Procedure Statistics Category 10

CCF Total Procedure Count Category 11

CCF Total Timedout Procedure Count Category 11

CCF Total Timedout Procedure Time Category 12

CCF Total Unhandled Event Statistics Category 12

CCF Total Unhandled Transaction Statistics Category 13

CCF Usage Report Stats Category 13

SLA Transaction Category 14

diameter-ep statistics Category 15

dns-proxy Metrics Reference 27

DNS Lookup Request Statistics Category	27
GTPC BGP Routed Count Stats Category	28
GTPC Roaming Peer Path Mgmt Stats Category	28
GTPC Short Circuit Map Count Category	29
GTPC Short Circuit Message Stats Category	30
Processing time of GTPC messages Category	30
Processing Time of SMF GTPC Messages Category	31
SGW TEID Cache Operation Stats Category	32
SMF GTPC Echo Stats Category	32
SMF GTPC Golang Encode Decode Stats Category	33
SMF GTPC messages Category	34
SMF GTPC Messages Total Category	35
SMF GTPC priority messages Category	35
SMF GTPC Unexpected Messages Category	36
SMF GTPC Validation Fail Stats Category	37
gtp-ep Metrics Reference	38
ASN1 Encoding stats Category	38
CDR Batch flush duration stats Category	38
CDR Batch flush stats Category	39
CDR Batching Stats Category	39
DupReqList buffer gauge Category	40
File based CDR Read Category	40
File based CDR Write Category	41
GTPP Archive List gauge Category	41
GTPP Messages Stats Category	41
GTPP Replication Msg Stats Category	42
Inbound CDR Requests Category	43
Processed CDR Requests Category	43
Read from GTPP Archive List Stats Category	44
SendReqList buffer gauge Category	44
Write to GTPP Archive List Stats Category	45
Nodemgr diagnostics address validation counter Category	45
Nodemgr gtpc message statistics Category	46
Nodemgr gtpc peer status statistics Category	47

Nodemgr GTPP link status Category	47
Nodemgr gtp message statistics Category	48
Nodemgr gtp peer status statistics Category	49
Nodemgr messages Category	50
Nodemgr node report message handling from UPF to current node stats Category	51
Nodemgr node report message handling timer stats Category	52
Nodemgr resource management batch reconciliation counter Category	53
Nodemgr resource management response statistics Category	53
Nodemgr UPF ip address threshold hit stats Category	54
Nodemgr UPF Path failure reasons Category	55
Nodemgr UPF Peer status Category	55
Nodemgr userplane heart beat message failure due to retransmission stats Category	56
Nodemgr userplane heart beat message failure stats Category	56
Nodemgr userplane heart beat message stats Category	57
Nodemgr userplane link status stats Category	58
Nodemgr userplane routes update or delete counter Category	59
Nodemgr userplane stats Category	59
SMF Recovery Value stats Category	60
oam Metrics Reference	60
Node level LCI metric Category	60
Node level OCI metric Category	61
Node level overload state Category	61
PFCP Decoded Messages Category	61
PFCP Encoded Messages Category	62
PFCP Message Retransmission from SMF Category	62
PFCP Messages Category	63
PFCP Messages Decode Time Category	64
PFCP Messages processing time Category	65
PFCP Message Stats Category	66
PFCP Request Messages Category	67
PFCP Response Messages Category	68
PFCP Response Messages processing time Category	69
radius-ep Metrics Reference	70
Radius COA and DM packet statistics Category	70

Radius Server status Category	71
Radius packet statistics Category	72
rest-ep Metrics Reference	74
Discover Messages Time statistics Category	74
Discover Messages statistics Category	75
NF End point selections Category	75
NF Send messages statistics Category	76
NF failure handling stats Category	78
NF management message time statistics Category	79
NF management messages statistics Category	79
NRF Discovery Category	80
NRF subscription messages statistics Category	81
REST EP message Exchange Time Category	81
REST EP messages Category	82
REST EP messages Decode Status Category	83
Charging final unit indication statistics Category	84
CHF Notification Statistics Category	84
Discover Messages statistics Category	85
Discover Messages Time statistics Category	85
Dropped Charging Data Requests Statistics Category	86
GTPC Message stats Category	86
Gy Online charging destination host change statistics Category	88
Gy Online charging reporting reason statistics Category	88
Gz Offline CDR drop statistics Category	89
Gz Offline CDR message statistics Category	89
Gz Offline SDF Containers statistics Category	90
Incoming Message Throttling Statistics Category	91
NF End point selections Category	91
NF failure handling stats Category	92
NF management messages statistics Category	92
NF management message time statistics Category	93
NRF Discovery Category	93
PDU UE Sync Procedure Category	94
Policy control active PCF statistics Category	94

Policy control ADC pcc rule statistics Category	95
Policy control current flow Category	95
Policy control dynamic pcc rule statistics Category	97
Policy control message statistics Category	99
Policy control NRF fail action statistics Category	100
Policy control PCF update statistics Category	101
Policy control pre-defined pcc rule statistics Category	102
Policy control rule report statistics Category	104
Policy control session rule statistics Category	104
Policy control static pcc rule statistics Category	105
Policy control total flow statistics Category	107
Policy destination host change statistics Category	108
Radius Authentication Message Stats Category	108
Radius Message stats Category	109
SLA Transaction Category	110
SMF 2G/3G Procedure Category	110
SMF ADC URR Statistics Category	111
SMF ALWAYS ON PDU SESSION Category	112
SMF Charging Descriptor Delete Stats Category	112
SMF Charging Descriptor Drop Stats Category	113
SMF Charging Failure Handling Stats Category	114
SMF Charging Message Stats Category	115
SMF Charging OOO Usage Report Stats Category	116
SMF Charging PFCP usage Report Stats Category	116
SMF Charging Quota Event Stats Category	117
SMF Charging Radius Accounting Message Stats Category	118
SMF Charging Session Limit Dynamic Stats Category	118
SMF Charging Usage Report Stats Category	119
SMF Charging Zero Usage Report Stats Category	120
SMF Data Consistency Check Category	120
SMF DB Marshal Category	121
SMF Disconnect stats Category	121
SMF EBI stats Category	123
SMF IPAM Address Events Current Counter Category	124

SMF IPAM Address Events Total Counter Category	125
SMF IPAM Chunk Events Current Counter Category	126
SMF IPAM Chunk Events Total Counter Category	127
SMF N1 Message stats Category	128
SMF N2 Message stats Category	129
SMF Node Manager stats Category	131
SMF PCSCF Server Stats Category	132
SMF PDU Status Category	133
SMF Procedure Category	134
SMF Procedure Collision Category	137
SMF Procedure Total Time Statistics Category	138
SMF Protocol message counters Category	138
SMF RAN failed stats Category	139
SMF RSRA stats Category	139
SMF Secondary RAT Usage Report Stats Category	140
SMF Service gtpc cache statistics Category	141
SMF Service Node Report Stats Category	141
SMF Service Resource Management Stats Category	142
SMF Session counters Category	143
SMF Session stats Category	145
SMF Start Procedure Statistics Category	145
SMF Stop Procedure Statistics Category	146
SMF Timeout stats Category	146
SMF Total Procedure Count Category	147
SMF Total Timedout Procedure Count Category	147
SMF Total Timedout Procedure Time Category	148
SMF Total Unhandled Event Statistics Category	148
SMF Total Unhandled Transaction Statistics Category	149
SMF User Plane Session counters Category	149
UDM Message Failure Action Stats Category	150
UDP Request Total Message Stats Category	150
UDP RPC message statistics Category	151
UPF selection stats Category	152
udp-proxy Metrics Reference	153

UDP-Proxy BGP Routes Count Category 153

UDP-Proxy messages Category 153

CHAPTER 3 **Failure Disconnect Reasons Reference 155**

SMF Disconnect Reasons 155

CHAPTER 4 **MIB Reference 161**

CISCO-CNEE-MIB 161

CISCO-SMI 161



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.



CHAPTER 1

SMF Interface for Metrics

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

Feature Description

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

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

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

The following snapshot is a sample of the Grafana dashboard.

Figure 1: Grafana Dashboard



How it Works

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

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

Configuring Metrics Collection

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

- Production
- Debug
- Granular

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

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

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

NOTES:

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

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

Configuration Example

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

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

The following is an example configuration to enable production level for smf_service_stats application metrics and debug level for all other application metrics.

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

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

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

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

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

The following is an example configuration to disable smf_service_stats application metrics and debug level for all other application metrics.

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

The following is an example configuration to configure NSSAI labels of smf_service_stats metrics.

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



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

Configuration Verification

To verify the configuration, use the following show command:

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

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

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

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

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



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

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

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

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




CHAPTER 2

SMF Metrics

- [chf-service Metrics Reference](#), on page 7
- [diameter-ep statistics Category](#), on page 15
- [dns-proxy Metrics Reference](#), on page 27
- [GTPC BGP Routed Count Stats Category](#), on page 28
- [GTPC Roaming Peer Path Mgmt Stats Category](#), on page 28
- [gtp-ep Metrics Reference](#), on page 38
- [Nodemgr diagnostics address validation counter Category](#), on page 45
- [Nodemgr gtpc message statistics Category](#), on page 46
- [oam Metrics Reference](#), on page 60
- [PFCP Decoded Messages Category](#), on page 61
- [PFCP Encoded Messages Category](#), on page 62
- [radius-ep Metrics Reference](#), on page 70
- [rest-ep Metrics Reference](#), on page 74
- [Charging final unit indication statistics Category](#), on page 84
- [CHF Notification Statistics Category](#), on page 84
- [udp-proxy Metrics Reference](#), on page 153

chf-service Metrics Reference

CCF Data Consistency Check Category

ccf_datacheck_stats

Description: Total number of sessions checked for consistency

Sample Query: 'ccf_datacheck_stats{rat_type="NR", status="failed"}'

Labels:

- Label: procedure_type

Label Description: Procedure Name

Example: N40 Charging Data Request Create, N40 Charging Data Request Release SMF Initiated, N40 Session Modify SMF Initiated, N40 Session Notify - Abort, N40 Session Notify - Reauth, N28 Spending

Limit Subscribe, N28 Spending Limit Subscribe Update, N28 Spending Limit UnSubscribe, N28 Spending Limit Notify Status, N28 Spending Limit Terminate Status, N28 Next Reval Notify, N40 Next Reval Notify

- 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: String format for failed reason

CCF Procedure Category

ccf_service_stats

Description: CCF call flow procedure counters

Sample Query: `'ccf_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`, `smf_req_pdu_sess_mod`, `smf_req_pdu_sess_rel`, `pdu_sess_notify_abort`, `pdu_sess_notify_reauth`, `spending_limit_notify_terminate`, `spending_limit_notify_status`, `spending_limit_create`, `spending_limit_update`, `spending_limit_delete`

- Label: `status`

Label Description: call flow procedure counter

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

- Label: `dnn`

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

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

- Label: `reason`

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

Example: proc_pdu_not_established, proc_pdu_ctx_not_found, internal_error, reason_unknown, pdn_create_over_created_pdn, auth_grpc_failed, maintenance_mode, quota_grpc_failed, auth_failed, cc_relay_failed

- 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: IN_BOUND, OUT_BOUND, none

- Label: `ccf_current_procedure`

Label Description: Current Procedure Name for Message Level Stats

Example:

CCF Procedure Collision Category

ccf_procedure_collision

Description: Total number of procedures collided

Sample Query: `sum(ccf_procedure_collision) by (ccf_current_procedure, ccf_current_state, ccf_new_procedure, ccf_current_procedure_action)`

Labels:

- Label: `ccf_current_procedure`

Label Description: Current Procedure Name

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

- Label: `ccf_current_state`

Label Description: Current Procedure State

Example: String format for procedure stat

- Label: `ccf_new_procedure`

Label Description: New Procedure Name

Example: String format for new procedure

- Label: `ccf_current_procedure_action`

Label Description: Current Procedure Action on Collision

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

CCF Procedure Total Time Statistics Category

ccf_procedure_seconds

Description: Total number of seconds taken to complete the procedure

Sample Query: 'ccf_procedure_seconds{ccf_proc_status="Aborted"}'

Labels:

- Label: `ccf_proc_type`

Label Description: Procedure Name

Example: N40 Charging Data Request Create, N40 Charging Data Request Release SMF Initiated, N40 Session Modify SMF Initiated, N40 Session Notify - Abort, N40 Session Notify - Reauth, N28 Spending Limit Subscribe, N28 Spending Limit Subscribe Update, N28 Spending Limit UnSubscribe, N28 Spending Limit Notify Status, N28 Spending Limit Terminate Status, N28 Next Reval Notify, N40 Next Reval Notify

- Label: `ccf_proc_status`

Label Description: Procedure Status

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

CCF Start Procedure Statistics Category

ccf_procedure_start

Description: Total number of procedures started

Sample Query: 'ccf_procedure_start{ccf_proc_type="PDN Connect"}'

Labels:

- Label: `ccf_proc_type`

Label Description: Procedure Name

Example: String format for procedure stat

CCF Stop Procedure Statistics Category

ccf_procedure_stop

Description: Total number of procedures stopped

Sample Query: 'ccf_procedure_stop{ccf_proc_type="PDU Session Establishment"}'

Labels:

- Label: `ccf_proc_type`

Label Description: Procedure Name

Example: String format for procedure stat

- Label: `ccf_proc_status`

Label Description: Procedure Status

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

CCF Total Procedure Count Category

ccf_procedure_total

Description: Total number of procedures executed

Sample Query: `'ccf_procedure_total{ccf_proc_status="Running"}'`

Labels:

- Label: `ccf_proc_type`

Label Description: Procedure Name

Example: N40 Charging Data Request Create, N40 Charging Data Request Release SMF Initiated, N40 Session Modify SMF Initiated, N40 Session Notify - Abort, N40 Session Notify - Reauth, N28 Spending Limit Subscribe, N28 Spending Limit Subscribe Update, N28 Spending Limit UnSubscribe, N28 Spending Limit Notify Status, N28 Spending Limit Terminate Status, N28 Next Reval Notify, N40 Next Reval Notify

- Label: `ccf_proc_status`

Label Description: Procedure Status

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

CCF Total Timedout Procedure Count Category

ccf_procedure_timeout

Description: Total number of procedures executed more than 10sec

Sample Query: `'ccf_procedure_timeout{ccf_proc_status="Running"}'`

Labels:

- Label: `ccf_proc_type`

Label Description: Procedure Name

Example: N40 Charging Data Request Create, N40 Charging Data Request Release SMF Initiated, N40 Session Modify SMF Initiated, N40 Session Notify - Abort, N40 Session Notify - Reauth, N28 Spending Limit Subscribe, N28 Spending Limit Subscribe Update, N28 Spending Limit UnSubscribe, N28 Spending Limit Notify Status, N28 Spending Limit Terminate Status, N28 Next Reval Notify, N40 Next Reval Notify

- Label: `ccf_proc_status`

Label Description: Procedure Status

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

CCF Total Timedout Procedure Time Category

ccf_procedure_timeout_seconds

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

Sample Query: 'ccf_procedure_timeout_seconds{ccf_proc_status="Running"}'

Labels:

- Label: `ccf_proc_type`

Label Description: Procedure Name

Example: N40 Charging Data Request Create, N40 Charging Data Request Release SMF Initiated, N40 Session Modify SMF Initiated, N40 Session Notify - Abort, N40 Session Notify - Reauth, N28 Spending Limit Subscribe, N28 Spending Limit Subscribe Update, N28 Spending Limit UnSubscribe, N28 Spending Limit Notify Status, N28 Spending Limit Terminate Status, N28 Next Reval Notify, N40 Next Reval Notify

- Label: `ccf_proc_status`

Label Description: Procedure Status

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

CCF Total Unhandled Event Statistics Category

ccf_procedure_unhndl_event

Description: Total number of unhandled events per procedure type

Sample Query: 'ccf_procedure_unhndl_event{ccf_proc_type="PDU Session Release - SMF initiated"}'

Labels:

- Label: `ccf_proc_type`

Label Description: Procedure Name

Example: String format for procedure stat

- Label: `message_type`

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

Example: String format for event details

- Label: `ccf_current_state`

Label Description: Current Procedure State

Example: String format for procedure state

- Label: `guard_timer`

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

Example: TRUE, FALSE

CCF Total Unhandled Transaction Statistics Category

ccf_procedure_unhndl_trans

Description: Total number of unhandled transactions per procedure type

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

Labels:

- Label: `ccf_proc_type`

Label Description: Procedure Name

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

- Label: `message_type`

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

Example: String format for event details

- Label: `ccf_current_state`

Label Description: Current Procedure State

Example: String format for procedure state

- Label: `guard_timer`

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

Example: TRUE, FALSE

CCF Usage Report Stats Category

ccf_usage_trigger_stats

Description: The current count for Used unit Container Recieved from SMF

Sample Query: `'ccf_usage_trigger_stats{ccf_proc_type="N40 Session Modify SMF Initiated"}'`

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: `ccf_proc_type`

Label Description: Which kind of procedure usage is reported to CCF

Example: Some String

- Label: `trigger`

Label Description: Trigger associated with UUC

Example: Triggers defined as per Specs 32.291

SLA Transaction Category

`ccf_sla_transaction_stats`

Description: Transaction SLA stats

Sample Query: `sum(ccf_sla_transaction_stats) by (ccf_sla_transaction_stats, ccf_proc_type, status, message_type)`

Labels:

- Label: `ccf_proc_type`

Label Description: Procedure Name

Example: N40 Charging Data Request Create, N40 Charging Data Request Release SMF Initiated, N40 Session Modify SMF Initiated, N40 Session Notify - Abort, N40 Session Notify - Reauth, N28 Spending Limit Subscribe, N28 Spending Limit Subscribe Update, N28 Spending Limit UnSubscribe, N28 Spending Limit Notify Status, N28 Spending Limit Terminate Status, N28 Next Reval Notify, N40 Next Reval Notify

- 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

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, ccua, 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 unknown AVPs were found during encoding where 0 indicates not found and 1 indicates found

Example: 0,1

- Label: `gr_instance`

Label Description: GR Instance ID

Example: 1 or 2

diameter_encode_message_total

Description: Count of encoding done by diameter endpoint

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

Labels:

- Label: `interface`

Label Description: name of the interface

Example: gx, gy

Labels:

- Label: `message_name`

Label Description: name of interface message

Example: ccni, ccru, ccrt, raa, asa

Labels:

- Label: `endpoint_name`

Label Description: name of endpoint profile used during processing

Example: gxProfl

- Label: `dict_name`

Label Description: name of the dictionary used

Example: gx_cust

- Label: `status`

Label Description: status of the request

Example: success, failure, partial

- Label: `unknown_avp`

Label Description: `unknown_avp` indicates if any unknown AVPs were found during encoding where 0 indicates not found and 1 indicates found

Example: 0,1

- Label: `gr_instance`

Label Description: GR Instance ID

Example: 1 or 2

diameter_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: ccni, ccru, ccrt, rar, asr

Labels:

- Label: `peer_address`

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

Example: 10.1.2.110:3868

Labels:

- Label: `status`

Label Description: status of the request

Example: attempted, peer_down, err_cfg, err_maxout, timeout_ipc, err_ipc, err_unmarshal

Labels:

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

diameter_response_message_seconds_total

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

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

Labels:

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

Labels:

- Label: `message_name`
Label Description: name of interface message
Example: `ccai`, `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 result-code or experimental-result-code that the diameter node encountered during response 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: gxProfl

- 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, ccaw, ccat, raa, asa

Labels:

- Label: `peer_address`

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

Example: 10.1.2.110:3868

Labels:

- Label: `status`

Label Description: status of the request

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

Labels:

- Label: `result_code`

Label Description: `result_code` describes the result-code or experimental-result-code that the diameter node encountered during response 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

dns-proxy Metrics Reference

DNS Lookup Request Statistics Category

DNS_Lookup_Requests_Statistics

Description: Total dns packets processed

Sample Query:

'DNS_Lookup_Requests_Statistics{dnsPacketDir="Rx",dnsProtocol="udp",dnsQueryType="ip4",dnsResult="Success",dnsSrcIP="172.17.0.2",dnsSrcPort="53",grInstId="1"}'

Labels:

- Label: dnsPacketDir
Label Description: Direction
Example: Tx, Rx
- Label: dnsProtocol
Label Description: Protocol
Example: udp, tcp
- Label: dnsQueryType
Label Description: DNS Lookup Query type

Example: ipv4, ipv6, ipv4v6

- Label: `dnsResult`

Label Description: Result

Example: Success, Failure, Timeout, Failure_No_Response

- Label: `dnsSvrIP`

Label Description: DNS Server IP Address

Example: Any string

- Label: `dnsSvrPort`

Label Description: DNS Server Port

Example: Any string

- Label: `grInstId`

Label Description: GR Instance Id

Example: 1 or 2

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 Mgmt Stats Category

gtpc_roaming_peer_path_mgmt

Description: GTPC Roaming Peer Path Mgmt Stats

Sample Query: `'gtpc_roaming_peer_path_mgmt{service_name="gtpc-ep",status="suppressed"}'`

Labels:

- Label: `gtpc_peer_type`
Label Description: Gtpc Peer type
Example: ROAMER, HOMER, VISITOR
- Label: `interface_type`
Label Description: Gtpc Interface type
Example: S5, S11, S5E, S2B, S8
- Label: `gtpc_msg_type`
description: Gtpc Message type
Example: NumEchoMsg, NumControlMsg
- Label: `status`
Label Description: Status
Example: suppressed
- Label: `gr_instance_id`
Label Description: GR instance ID
Example: 1, 2

GTPC Short Circuit Map Count Category

`gtpc_short_circuit_map_count`

Description: GTPC Short Circuit Map operation counter

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

Labels:

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

Example: 1, 2

GTPC Short Circuit Message Stats Category

gtpc_msg_short_circuit_stats

Description: GTPC Short Circuit MBResp Stats

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 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

- Label: `gtpc_msg_ver`
Label Description: GTP Message Version
Example: v1, v2

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

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

- Label: `gtpc_msg_ver`

Label Description: GTP Message Version

Example: v1, v2

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, NumRxCreateIDFTRsp, NumTxCreateIDFTRsp, NumRxDeleteIDFTRsp, 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

- Label: `gtpc_msg_ver`

Label Description: GTP Message Version

Example: v1, v2

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, rej_req_throttled_pending_req_limit, drop_req_throttled_pending_req_limit, rej_req_throttled_queue_full, drop_req_throttled_queue_full

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

- Label: `gtpc_msg_ver`

Label Description: GTP Message Version

Example: v1, v2

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 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

- Label: `gtpc_msg_ver`

Label Description: GTP Message Version

Example: v1, v2

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

- Label: `gtpc_msg_ver`

Label Description: GTP Message Version

Example: v1, v2

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

- Label: `gtpc_msg_ver`

Label Description: GTP Message Version

Example: v1, v2

gtp-ep Metrics Reference

ASN1 Encoding stats Category

gtp_asn1field_encoding_failures_total

Description: A counter for total number of fields failed to be ASN1 encoded

Sample Query: 'gtp_asn1field_encoding_failures_total{gtp_profile="pf1"}'

Labels:

- Label: `gtp_profile`
Label Description: Gtp Profile Name
Example: pf1, pf2
- Label: `dictionary`
Label Description: Gtp Dictionary Used
Example: custom6, custom24
- Label: `asn1_field`
Label Description: ASN1 Field
Example: ServedIMSI, ChargingID, ServingNodeAddress, ChargingCharacteristics
- Label: `reason`
Label Description: Reason for failure
Example: Constraint Violation

CDR Batch flush duration stats Category

gtp_batch_flush_duration_histogram_total

Description: Histogram time bins of batch flush time

Sample Query: 'gtp_batch_flush_duration_histogram_total{gtp_profile="pf1"}'

Labels:

- Label: `gtp_profile`
Label Description: Gtp Profile Name
Example: pf1, pf2
- Label: `dictionary`
Label Description: Gtp Dictionary Used

Example: custom6, custom24

- Label: status

Label Description: Status of the operation

Example: batch_success, batch_error

CDR Batch flush stats Category

gtpb_batch_flush_millis_total

Description: A Histogram for the time CDRs remain in batch before flushed

Sample Query: 'gtpb_batch_flush_millis_total{gtpb_profile="pf1"}'

Labels:

- Label: gtpb_profile

Label Description: Gtpb Profile Name

Example: pf1, pf2

- Label: dictionary

Label Description: Gtpb Dictionary Used

Example: custom6, custom24

- Label: status

Label Description: Status of the operation

Example: batch_success, batch_error

CDR Batching Stats Category

gtpb_batchedcdrs_total

Description: No. of CDRs in a batch for a given profile

Sample Query: 'gtpb_batchedcdrs_total{gtpb_profile="pf1"}'

Labels:

- Label: gtpb_profile

Label Description: Gtpb Profile Name

Example: pf1, pf2

- Label: dictionary

Label Description: Gtpb Dictionary Used

Example: custom6, custom24

- Label: status

Label Description: Status of the operation

Example: batch_success,batch_error

DupReqList buffer gauge Category

gtpg_dup_reqlist_counter

Description: GTPP Dup Req List

Sample Query: 'gtpg_dup_reqlist_counter{gtpg_profile="pf1"}'

Labels:

- Label: `gtpg_profile`

Label Description: Gtpg Profile Name

Example: pf1, pf2

- Label: `cgf_addr`

Label Description: Cgf Server Address

Example: 1.2.3.4

- Label: `state`

Label Description: Request Process State

Example: empty_cdr_rsp_wait,dup_cdr_rel_rsp_wait,dup_cdr_can_rsp_wait,to_send_empty_rsp_wait

File based CDR Read Category

gtpg_file_record_read

Description: GTPP CDR file based reads

Sample Query: 'gtpg_file_record_read{gtpg_profile="pf1"}'

Labels:

- Label: `gtpg_profile`

Label Description: Gtpg Profile Name

Example: pf1, pf2

- Label: `status`

Label Description: CDR read operation status

Example: success,failure

- Label: `pod_status`

Label Description: Active/StandBy

Example: active,standby

File based CDR Write Category

gtp_file_record_write

Description: GTPP CDR file based writes

Sample Query: 'gtp_file_record_write{gtp_profile="pf1"}'

Labels:

- Label: `gtp_profile`
Label Description: Gtp Profile Name
Example: pf1, pf2
- Label: `status`
Label Description: CDR write operation status
Example: success,failure
- Label: `pod_status`
Label Description: Active/StandBy
Example: active,standby

GTPP Archive List gauge Category

gtp_archive_list_counter

Description: GTPP Archive List

Sample Query: 'gtp_archive_list_counter{gtp_profile="pf1"}'

Labels:

- Label: `gtp_profile`
Label Description: Gtp Profile Name
Example: pf1, pf2
- Label: `pod_status`
Label Description: Active/StandBy
Example: active,standby

GTPP Messages Stats Category

gtp_msg_stats

Description: GTPP MSG Stats

Sample Query: 'gtp_msg_stats{gtp_profile="pf1"}'

Labels:

- Label: `gtp_p_profile`

Label Description: Gtp Profile Name

Example: pf1, pf2

- Label: `msg_type`

Label Description: GTPP Msg Name

Example: DataRecTransReq, DataRecTransReqPossibleDup, DataRecTransReqCancel, DataRecTransReqRelease, DataRecTransReqEmpty, DataRecTransReqRetried, DataRecTransReqPossibleDuplRetried, DataRecTransReqCancelRetried, DataRecTransReqReleaseRetried, DataRecTransReqEmptyRetried, DataRecTransRsp, DataRecTransPossibleDuplRsp, DataRecTransCancelRsp, DataRecTransReleaseRsp, DataRecTransEmptyRsp, EchoReqSent, EchoReqRcvd, EchoRspSent, EchoRspRcvd, NodeAliveReqSent, NodeAliveReqRcvd, NodeAliveRspSent, NodeAliveRspRcvd, TestEchoReqSent, TestEchoRspRcvd

- Label: `status`

Label Description: Request/Response Message Handling Status

Example: success,failure

- Label: `cause`

Label Description: GTPP Messages Response Cause

Example: accepted, mandatory_ie_incorrect, mandatory_ie_missing, invalid_message_format, optional_ie_incorrect, no_resources_available, system_failure, service_not_supported, version_not_supported, not_fulfilled, already_fulfilled, cdr_decode_error, sequence_numbers_incorrect,buffer_full,internal_failure,ipc_err

- Label: `cgf_addr`

Label Description: Cgf Server Address

Example: 1.2.3.4

- Label: `trigger_type`

Label Description: Trigger for this Message

Example: normal cdr, pod_switchover, peer_restart, cgf_down

GTPP Replication Msg Stats Category

`gtp_replication_stats`

Description: GTPP Replication Data Msg

Sample Query: `'gtp_replication_stats{gtp_p_profile="pf1"}'`

Labels:

- Label: `gtp_p_profile`

Label Description: Gtp Profile Name

Example: pf1, pf2

- Label: `cgf_addr`

Label Description: Cgf Server Address

Example: 1.2.3.4

- Label: `item`

Label Description: Peer Struct Replicated Item

Example:

`SndReqListTx,DupReqListTx,SeqPoolTx,SndReqListRx,DupReqListRx,SeqPoolRx,ArchiveListTx,ArchiveListRx,FileCdrTx,FileCdrRx`

- Label: `op_type`

Label Description: Operation Type

Example: Add,Update,Delete

- Label: `status`

Label Description: Peer Replication Msg Handling Status

Example: success,failure

Inbound CDR Requests Category

gtp_p_received_cdrs_total

Description: A counter for total number of CDRs received in request

Sample Query: `'gtp_p_received_cdrs_total{gtp_p_profile="pf1"}'`

Labels:

- Label: `gtp_p_profile`

Label Description: Gtp Profile Name

Example: pf1, pf2

- Label: `dictionary`

Label Description: Gtp Dictionary Used

Example: custom6, custom24

Processed CDR Requests Category

gtp_p_processed_cdrs_total

Description: A counter for total number of CDRs processed in transaction

Sample Query: `'gtp_p_processed_cdrs_total{gtp_p_profile="pf1"}'`

Labels:

- Label: `gtp_p_profile`
Label Description: Gtp Profile Name
Example: pf1, pf2
- Label: `dictionary`
Label Description: Gtp Dictionary Used
Example: custom6, custom24
- Label: `status`
Label Description: Status of processed CDR request
Example: Success, profile_error, not_leader_pod_error

Read from GTPP Archive List Stats Category

`gtp_archive_list_read`

Description: GTPP Archive List Read

Sample Query: `'gtp_archive_list_read(gtp_p_profile="pf1")'`

Labels:

- Label: `gtp_p_profile`
Label Description: Gtp Profile Name
Example: pf1, pf2
- Label: `status`
Label Description: Status of CDR read from Archive
Example: success, failure
- Label: `sub_status`
Label Description: Sub Status of CDR read from Archive
Example: lookup, send_to_cgf, send_to_hdd, purge
- Label: `pod_status`
Label Description: Active/StandBy
Example: active,standby

SendReqList buffer gauge Category

`gtp_send_reqlist_counter`

Description: GTPP Send Req List

Sample Query: `'gtp_send_reqlist_counter(gtp_p_profile="pf1")'`

Labels:

- Label: `gtp_p_profile`
Label Description: Gtp Profile Name
Example: pf1, pf2
- Label: `cgf_addr`
Label Description: Cgf Server Address
Example: 1.2.3.4
- Label: `state`
Label Description: Request Process State
Example: Normal_CDR_Rsp_Wait,Duplicate_CDR_Rsp_Wait

Write to GTPP Archive List Stats Category

`gtp_p_archive_list_write`

Description: GTPP Archive List Write

Sample Query: 'gtp_p_archive_list_write(gtp_p_profile="pf1")'

Labels:

- Label: `gtp_p_profile`
Label Description: Gtp Profile Name
Example: pf1, pf2
- Label: `status`
Label Description: Status of CDR write to Archive
Example: success, failure
- Label: `sub_status`
Label Description: Sub Status of CDR write to Archive
Example: purge_oldest_cdr
- Label: `pod_status`
Label Description: Active/StandBy
Example: active,standby

Nodemgr diagnostics address validation counter Category

`nodemgr_diag_ip_verify`

Description: Node manager diagnostics address validation counter

Labels:

- Label: status

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

Nodemgr gtpc message statistics Category

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

Labels:

- Label: gtpc_peer_ip

Example: 192.168.10.2

- Label: `gtpc_msg_type`

Example: gtpc_echo_res_rx, gtpc_echo_res_tx, gtpc_echo_req_rx,
gtpc_echo_req_tx, gtpc_echo_err_rx, gtpc_echo_err_tx, gtpc_echo_err_rx, gtpc_echo_err_tx, gtpc_echo_err_rx, gtpc_echo_err_tx

- Label: `interface_type`

Example: S11, S5E, S5, S8, S2B

- Label: `gr_instance_id`

Example: 1, 2

- Label: gtpc_msg_ver

Example: v_1, v_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

- Label: `gtpc_msg_ver`

Label Description: GTP Message Version

Example: v1, v2

Nodemgr GTPP link status Category

nodemgr_gtpp_stats

Description: Nodemgr gauge counter to keep track of GTPP peer (CGF) link status between CGF and SMF/SGW

Sample Query: 'nodemgr_gtpp_stats{gtpp_cgf_key="192.168.10.2:9001", gtpp_ca_key="192.168.10.3:9001"}'

Labels:

- Label: `gtp_cgfp_key`

Label Description: unique key to identify CGF `YYY.YYY.YYY.YYY:XXX` where `YYY.YYY.YYY.YYY` is the Ip address of the CGF and `XXX` is the port number

Example: 192.168.10.2:9001

- Label: `gtp_ca_key`

Label Description: unique key to identify Charging Agent (CA) `YYY.YYY.YYY.YYY:XXX` where `YYY.YYY.YYY.YYY` is the Ip address of Charging agent configured on the NF service like SGW / SMF and `XXX` is the port number

Example: 192.168.20.3:9001

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

Nodemgr gtp message statistics Category

`nodemgr_gtp_msg_stats`

Description: Node manager gtp message statistics to update stats for msg triggered by NodeMgr

Sample Query:

```
'nodemgr_gtp_msg_stats(ca_ip="10.65.45.181",ca_port="2222",cgf_ip="10.78.41.152",cgf_port="3386",gtp_msg_type="gtp_echo_req")'
```

Labels:

- Label: `ca_ip`

Label Description: Charging agent ip address

Example: 10.65.45.181

- Label: `ca_port`

Label Description: Charging agent port number

Example: 2222

- Label: `cgf_ip`

Label Description: Cgf ip address

Example: 10.78.41.152

- Label: `cgf_port`

Label Description: Cgf port number

Example: 3386

- Label: `gtp_msg_type`

Label Description: Msg triggered towards gtp-ep like echo req/path up/path down/peer restart

Example: gtpm_echo_req, gtpm_peer_path_up, gtpm_peer_path_down, gtpm_peer_restarted

Nodemgr gtpm peer status statistics Category

nodemgr_gtpm_peer_status

Description: Node manager gtpm peer status statistics for keeping track of cgf nodes via node alive/echo/gtpm control message success/failure or restart counter tracking

Sample Query:

```
'nodemgr_gtpm_peer_status(ca_ip="10.65.45.181",ca_port="2222",cgf_ip="10.78.41.152",cgf_port="3386",gtpm_peer_reason="PEER_ADD",gtpm_peer_status="gtpm_peer_path_up",restart_time="2023-03-29 15:46:27 +0530 IST")'
```

Labels:

- Label: ca_ip

Label Description: Charging agent ip address

Example: 10.65.45.181

- Label: ca_port

Label Description: Charging agent port number

Example: 2222

- Label: cgf_ip

Label Description: Cgf ip address

Example: 10.78.41.152

- Label: cgf_port

Label Description: Cgf port number

Example: 3386

- Label: gtpm_peer_reason

Label Description: Cgf update reason (add/update/delete) as a result of node alive/echo/gtpm control message success/failure or restart counter tracking

Example: PEER_ADD, PEER_UP, PEER_DELETE, NO_ECHO_RESPONSE, NO_CTRL_MSG_RESPONSE

- Label: gtpm_peer_status

Label Description: Cgf status (up/down/restart) as a result of node alive/echo/gtpm control message success/failure or restart counter tracking

Example: gtpm_peer_path_down, gtpm_peer_path_up, gtpm_peer_restarted

- Label: restart_time

Label Description: Cgf restart time

Example: 2023-03-29 15:46:27 +0530 IST

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 requested V4 = 1, IP type requested V6 = 2, IP type requested V4V6 = 3

Example: 0, 1, 2, 3

- Label: `status`

Label Description: Status of the request

Example: attempted, success, failed

- Label: `error`

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

Example: Unable to get UpfKey for upf

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

Nodemgr UPF ip address threshol hit stats Category

nodemgr_up_threshold_stats

Description: When particular IP address pool threshold hit for usage of ip addresses of a particular address type, 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", ip_ver_type="IP_TYPE_V4"}'

Labels:

- Label: up_ep_key

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

Example: 192.168.10.2:192.168.20.3

- Label: dnn

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

Example: sampleDNN

- Label: threshold_hit

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

Example: yes

- Label: threshold_clear

Label Description: Indicates if threshold hit is cleared or not

Example: yes

- Label: nodemgr_id

Label Description: Indicates which instance of nodemgr hit the threshold

Example: 1

- Label: gr_instance_id

Label Description: GR instance ID

Example: 1, 2

- Label: ip_ver_type

Label Description: Type of IP addresses for which threshold is hit or clear

Example: IP_TYPE_V4, IP_TYPE_V6

Nodemgr UPF Path failure reasons Category

nodemgr_up_pathfail_reasons

Description: Node manager userplane heart beat message failure reasons stats

Sample Query:

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

Labels:

- Label: up_pathfail_reasons

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

Example:

up_pathfail_ignored_hb_retry,up_pathfail_retransmission_failure,up_pathfail_rts_change,up_pathfail_sx_release

- Label: gr_instance_id

Label Description: GR instance ID

Example: 1, 2

Nodemgr UPF Peer status Category

nodemgr_up_peer_status

Description: Node manager userplane heart beat message failure reasons stats

Sample Query:

```
'nodemgr_up_peer_status(app_name="smf",cluster="cn",data_center="cn",instance_id="1",interface_type="SXA",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 userplane heart beat message failure due to retransmission stats Category

nodemgr_up_heartbeat_fail_stats

Description: Node Manager userplane heart beat 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 userplane heart beat message failure stats Category

nodemgr_up_hb_msg_fail_stats

Description: Node Manager userplane heart beat message failure counters between UPF node and SMF/PGW/SGW 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 userplane heart beat 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 userplane link status stats Category

`nodemgr_upf_link_status`

Description: Nodemgr gauge counter to keep track of userplane link status between UPF and SMF/SGW

Sample Query: `'nodemgr_upf_link_status{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

Nodemgr userplane routes update or delete counter Category

nodemgr_up_route_stats

Description: Nodemgr userplane routes update or delete counter

Sample Query:

```
'nodemgr_up_route_stats{op="sf",dir="u",data="u",instance_id="0",service="nbg",integration="jitter",status="Success",up_key="192.168.10.2:192.168.20.3",tx_type="NewTx",1}'
```

Labels:

- Label: `route_operation`

Label Description: Kind of route operation

Example: Update, Delete

- Label: `status`

Label Description: Status of the request

Example: Success, Failed, Dropped

- 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: `tx_type`

Label Description: Type of the transaction for the route operation

Example: NewTx, RefTx

Nodemgr userplane stats Category

nodemgr_up_stats

Description: Node Manager to userplane (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

oam Metrics Reference

Node level LCI metric Category

node_lci_metric

Description: Total node level LCI metric

Sample Query: `node_lci_metric{}`

Node level OCI metric Category

node_oci_metric

Description: Total node level OCI reduction metric

Sample Query: `node_oci_metric{}`

Node level overload state Category

node_overload_status

Description: Total node level overload state

Sample Query: `node_overload_status{}`

PFCP Decoded Messages Category

proto_pfc_decode_msg_total

Description: Total number of pfc decode by type,size

Sample Query: `'proto_pfc_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_pfcip_encode_msg_total

Description: Total number of pfcip encode by type,size

Sample Query: 'proto_pfcip_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 pfcip

Sample Query: 'proto_udp_retrans_msg_total{message_name="association_setup_req"}'

Labels:

- Label: message_name

Label Description: PFCP Message name

Example: association_setup_req, association_update_req, association_release_req, prime_pfd_management_req, heartbeat_req, node_report_req, session_report_res, association_setup_res, association_update_res, association_release_res, heartbeat_res, node_report_res, gtpu_router_advertisement_req, gtpu_router_solicitation_req

- Label: message_direction

Label Description: PFCP Message direction

Example: inbound, outbound

- Label: `status`
Label Description: PFCP Message status - accepted/denied/discarded
Example: accepted, denied, discarded
- Label: `transport_type`
Label Description: PFCP Message original or retransmission
Example: origin, retransmitted
- Label: `msgpriority`
Label Description: PFCP Message priority
Example: true
- Label: `interface_type`
Label Description: PFCP Message Interface Type
Example: SXA, SXB, SXAB, SXC, N4
- Label: `peer_info`
Label Description: PFCP Message Peer Info
Example: SMFIP:1.2.3.4:UPFIP:5.6.7.8
- Label: `gr_instance_id`
Label Description: GR instance ID
Example: 1, 2

PFCP Messages Category

proto_pfcplib_msg_total

Description: Total number of pcp messages by type

Sample Query: 'proto_pfcplib_msg_total{message_name="session_establishment_req"}'

Labels:

- Label: `message_name`
Label Description: PFCP Message name
Example: session_establishment_req, session_modification_req, session_report_req, session_deletion_req, association_setup_req, association_update_req, association_release_req, prime_pfd_management_req, heartbeat_req, node_report_req, gtpu_router_advertisement_req, gtpu_router_solicitation_req
- Label: `message_direction`
Label Description: PFCP Message direction
Example: inbound, outbound
- Label: `status`
Label Description: PFCP Message status - accepted/denied/discarded

Example: accepted, denied, discarded

- Label: `transport_type`

Label Description: PFCP Message original or retransmission

Example: origin, retransmitted

- Label: `msgpriority`

Label Description: PFCP Message priority

Example: true

- Label: `interface_type`

Label Description: PFCP Message Interface Type

Example: SXA, SXB, SXAB, SXC, N4

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

PFCP Messages Decode Time Category

proto_decode_msg_seconds_total

Description: Time Taken for pcpf decode by message type

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

Labels:

- Label: `message_name`

Label Description: PFCP Message name

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

- Label: `message_direction`

Label Description: PFCP Message direction

Example: inbound, outbound

- Label: `status`

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

Example: accepted, denied, discarded

- Label: `transport_type`

Label Description: PFCP Message original or retransmission

Example: origin, retransmitted

- Label: `msgpriority`
Label Description: PFCP Message priority
Example: true
- Label: `interface_type`
Label Description: PFCP Message Interface Type
Example: SXA, SXB, SXAB, SXC, N4
- Label: `gr_instance_id`
Label Description: GR instance ID
Example: 1, 2

PFCP Messages processing time Category

`proto_pfcps_msg_seconds_total`

Description: Time Taken for pfcps messages by type

Sample Query: `'proto_pfcps_msg_seconds_total{message_name="session_establishment_req"}'`

Labels:

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

Example: SXA, SXB, SXAB, SXC, N4

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

PFCP Message Stats Category

proto_pfcplib_msg_stats

Description: pfcplib response messages processed for N4 Session Establishment Req

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

Labels:

- Label: `message_name`

Label Description: PFCP Message name, metrics pegged only for N4 Session Establishment Req

Example: `session_establishment_res`

- Label: `status`

Label Description: PFCP Message status - success/failed

Example: `success, failed`

- Label: `transport_type`

Label Description: PFCP Message original or retransmission

Example: `origin, retransmitted`

- Label: `cause`

Label Description: PFCP Message Response cause

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

- Label: `interface_type`

Label Description: PFCP Message Interface Type

Example: SXA, SXB, SXAB, SXC, N4

- Label: `upf_id`

Label Description: SMF PFCP Endpoint IP and UPF PFCP Endpoint IP

Example: 81.81.5.4:192.10.22.201

- 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 pfcip request messages processed

Sample Query: 'proto_udp_req_msg_total{message_name="session_establishment_req"}'

Labels:

- Label: `message_name`

Label Description: PFCP Message name

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

- Label: `message_direction`

Label Description: PFCP Message direction

Example: inbound, outbound

- Label: `status`

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

Example: accepted, denied, discarded

- Label: `transport_type`

Label Description: PFCP Message original or retransmission

Example: origin, retransmitted

- Label: `msgpriority`

Label Description: PFCP Message priority

Example: true

- Label: `interface_type`

Label Description: PFCP Message Interface Type

Example: SXA, SXB, SXAB, SXC, N4

- Label: `peer_info`

Label Description: PFCP Message Peer Info

Example: SMFIP:1.2.3.4:UPFIP:5.6.7.8

- Label: `sec_pdr_present`

Label Description: Indicate whether secondary PDR present

Example: true, false

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

- Label: `bar_present`

Label Description: Indicate whether BAR present

Example: true, false

PFCP Response Messages Category

proto_udp_res_msg_total

Description: Total number of pfcf response messages processed

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

Labels:

- Label: `message_name`

Label Description: PFCP Message name

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

- Label: `message_direction`

Label Description: PFCP Message direction

Example: inbound, outbound

- Label: `status`

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

Example: accepted, denied, discarded

- Label: `transport_type`

Label Description: PFCP Message original or retransmission

Example: origin, retransmitted

- Label: `cause`

Label Description: PFCP Message Response cause

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

- Label: `msgpriority`

Label Description: PFCP Message priority

Example: true

- Label: `interface_type`

Label Description: PFCP Message Interface Type

Example: SXA, SXB, SXAB, SXC, N4

- Label: `peer_info`
Label Description: PFCP Message Peer Info
Example: SMFIP:1.2.3.4:UPFIP:5.6.7.8
- Label: `gr_instance_id`
Label Description: GR instance ID
Example: 1, 2

PFCP Response Messages processing time Category

`proto_udp_msg_seconds_total`

Description: Total number of seconds taken by message

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

Labels:

- Label: `message_name`
Label Description: PFCP Message name
Example: `session_establishment_res`, `session_modification_res`, `session_report_res`, `session_deletion_res`, `association_setup_res`, `association_update_res`, `association_release_res`, `prime_pfd_management_res`, `heartbeat_res`, `node_report_res`
- Label: `message_direction`
Label Description: PFCP Message direction
Example: inbound, outbound
- Label: `status`
Label Description: PFCP Message status - accepted/denied/discarded
Example: accepted, denied, discarded
- Label: `transport_type`
Label Description: PFCP Message original or retransmission
Example: origin, retransmitted
- Label: `cause`
Label Description: PFCP Message Response cause
Example: 1, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 101
- Label: `msgpriority`
Label Description: PFCP Message priority
Example: true
- Label: `interface_type`
Label Description: PFCP Message Interface Type

Example: SXA, SXB, SXAB, SXC, N4

- Label: `peer_info`

Label Description: PFCP Message Peer Info

Example: SMFIP:1.2.3.4:UPFIP:5.6.7.8

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: 1, 2

radius-ep Metrics Reference

Radius COA and 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 and DM packets sent and 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 and 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, UdmSdmGetUESMSSubscriptionData

- Label: `result`

Label Description: result of discover message

Example: SendSuccess, SendFailure

- Label: `status_code`

Label Description: result of NF send message

Example: 200, 201, 204,

nf_send_message_total_time

Description: NF send message total time taken

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

Labels:

- Label: `nf_type`

Label Description: Network Function type

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

Labels:

- Label: `svc_name`

Label Description: Network function service name

Example: nudm-sdm, namf-comm

- Label: `message_type`

Label Description: Message Type

Example: UdmUecmRegisterSMF, UdmSdmGetUESMSSubscriptionData

- Label: `result`

Label Description: result of discover message

Example: SendSuccess, SendFailure

- Label: `status_code`

Label Description: result of NF send message

Example: 200, 201, 204,

NF failure handling stats Category

nf_failure_handling_stats_total

Description: NF Failure handling stats

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

Labels:

- Label: `nf_type`

Label Description: Network Function type

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

- Label: `host`

Label Description: End Point address

Example: 10.105.227.109:8097

- Label: `svc_name`

Label Description: Network function service name

Example: nudm-sdm, namf-comm

- Label: `version`

Label Description: Api version info

Example: v1, v2,

- Label: `message_type`

Label Description: Message Type

Example: UdmUecmRegisterSMF, UdmSdmGetUESMSubscriptionData

- Label: `req`

Label Description: Request type

Example: initial, fallback,

- Label: `response`

Label Description: Response from the server

Example: 200, 201, 204, timeout_rpc_error,

- Label: `status`

Label Description: Status from the server

Example: retry, final

NF management message time statistics Category

nf_management_total_time

Description: NF management messages total time taken

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

Labels:

- Label: `host`

Label Description: End Point address

Example: 10.105.227.109:8082

- Label: `svc_name`

Label Description: Network function service name

Example: nudm-sdm, namf-comm

- Label: `version`

Label Description: Api version info

Example: v1, v2,

- Label: `direction`

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

Example: inbound, outbound

- Label: `message_type`

Label Description: Type of Message

Example: registration, heartbeat, subscription, notification

- Label: `result`

Label Description: result of discover message

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

NF management messages statistics Category

nf_management_stats_total

Description: NF management messages statistics

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

Labels:

- Label: `host`
Label Description: End Point address
Example: 10.105.227.109:8082
- Label: `svc_name`
Label Description: Network function service name
Example: nudm-sdm, namf-comm
- Label: `version`
Label Description: Api version info
Example: v1, v2,
- Label: `direction`
Label Description: Direction indicates about the message going out or coming in
Example: inbound, outbound
- Label: `message_type`
Label Description: Type of Message
Example: registration, heartbeat, subscription, notification
- Label: `result`
Label Description: result of discover message
Example: 200, 201, 204, success, timeout_rpc_error, response_parse_failure

NRF Discovery Category

`nf_discover_events_total`

Description: NF Discover Stats

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

Labels:

- Label: `nf_type`
Label Description: Network Function type
Example: nrf, udm, amf, pcf, chf, ciscocontrol
- Label: `response_type`
Label Description: Discovery response 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: Interface Type

Example: N11, N1, N2

- Label: `response_status`

Label Description: HTTP response status code

Example: 200, 201, 204

- Label: `application_error`

Label Description: Application error

Charging final unit indication statistics Category

chf_recieved_fui_stats

Description: Statistics for final unit indication with final unit action

Sample Query: 'sum (chf_recieved_fui_stats{interface_type="Gy"})'

Labels:

- Label: `chf_type`
Label Description: Type of CHF with which message is exchanged
Example: online, offline
- Label: `interface_type`
Label Description: Type of Interface communicate with PGW
Example: N40, Gy
- Label: `fua_type`
Label Description: Type of final unit action
Example: FinalUnitActionType_TERMINATE", "FinalUnitActionType_REDIRECT", "FinalUnitActionType_RESTRICT_ACCESS

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 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

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

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, suspend_notification, resume_notification, change_notification

- Label: `status`

Label Description: GTPC message status

Example: attempted, success, failures

- Label: `reason`

Label Description: The reason associated with failure

Example: ipc_failed, sgw_failure, EGTP_CAUSE_LOCAL_DETACH,
EGTP_CAUSE_RAT_CHANGED_FROM_3GPP_TO_NON_3GPP,
EGTP_CAUSE_COMPLETE_DETACH, EGTP_CAUSE_ISR_DEACTIVATION,
EGTP_CAUSE_ERROR_IND_RCVD_RNC_ENODE, EGTP_CAUSE_IMSI_DETACH_ONLY,
EGTP_CAUSE_REACTIVATION_REQUESTED,
EGTP_CAUSE_PDN_RECONNECTION_TO_THIS_APN_DISALLOWED,
EGTP_CAUSE_ACCESS_CHANGED_FROM_NON_3GPP_TO_3GPP,
EGTP_CAUSE_PDN_CONN_INACTIVITY_TIMER_EXPIRED,
EGTP_CAUSE_PGW_NOT_RESPONDING, EGTP_CAUSE_NETWORK_FAILURE,
EGTP_CAUSE_QOS_PARAMETER_MISMATCH, EGTP_CAUSE_REQ_ACCEPTED,
EGTP_CAUSE_REQ_ACCEPTED_PARTIALLY,
EGTP_CAUSE_NEW_PDN_TYPE_NETWORK_PREFERENCE,
EGTP_CAUSE_NEW_PDN_TYPE_SINGLE_ADDR_BEARER_ONLY,
EGTP_CAUSE_CONTEXT_NOT_FOUND, EGTP_CAUSE_INVALID_MESSAGE_FORMAT,
EGTP_CAUSE_VERSION_NOT_SUPPORTED_BY_NEXT_PEER,
EGTP_CAUSE_INVALID_LENGTH, EGTP_CAUSE_SERVICE_NOT_SUPPORTED,
EGTP_CAUSE_MANDATORY_IE_INCORRECT, EGTP_CAUSE_MANDATORY_IE_MISSING,
EGTP_CAUSE_SYSTEM_FAILURE, EGTP_CAUSE_NO_RESOURCES_AVAILABLE,
EGTP_CAUSE_SEMANTIC_ERROR_IN_TFT_OPERATION,
EGTP_CAUSE_SYNTACTIC_ERROR_IN_TFT_OPERATION,
EGTP_CAUSE_SEMANTIC_ERROR_IN_PKT_FILTERS,
EGTP_CAUSE_SYNTACTIC_ERROR_IN_PKT_FILTERS,
EGTP_CAUSE_MISSING_OR_UNKNOWN_APN, EGTP_CAUSE_UNEXPECTED_REPEATED_IE,
EGTP_CAUSE_GRE_KEY_NOT_FOUND, EGTP_CAUSE_REALLOCATION_FAILURE,
EGTP_CAUSE_DENIED_IN_RAT, EGTP_CAUSE_PREFERRED_PDN_TYPE_UNSUPPORTED,
EGTP_CAUSE_ALL_DYNAMIC_ADDR_OCCUPIED,
EGTP_CAUSE_UE_CTX_WO_TFT_ALREADY_ACTIVATED,
EGTP_CAUSE_PROTOCOL_TYPE_NOT_SUPPORTED, EGTP_CAUSE_UE_NOT_RESPONDING,
EGTP_CAUSE_UE_REFUSES, EGTP_CAUSE_SERVICE_DENIED,
EGTP_CAUSE_UNABLE_TO_PAGE_UE, EGTP_CAUSE_NO_MEMORY_AVAILABLE,
EGTP_CAUSE_USER_AUTHENTICATION_FAILED,
EGTP_CAUSE_APN_DENIED_NO_SUBSCRIPTION, EGTP_CAUSE_REQUEST_REJECTED,
EGTP_CAUSE_PTMSI_SIGNATURE_MISMATCH, EGTP_CAUSE_IMSI_IMEI_NOT_KNOWN,
EGTP_CAUSE_SEMANTIC_ERROR_IN_TAD_OPERATION,
EGTP_CAUSE_SYNTACTIC_ERROR_IN_TAD_OPERATION,
EGTP_CAUSE_RESERVED_MESSAGE_VALUE_RECEIVED,
EGTP_CAUSE_PEER_NOT_RESPONDING,
EGTP_CAUSE_COLLISION_WITH_NETWORK_INIT_REQUEST,
EGTP_CAUSE_UNABLE_TO_PAGE_UE_DUE_TO_SUSPENSION,
EGTP_CAUSE_CONDITIONAL_IE_MISSING, EGTP_CAUSE_INCOMPATIBLE_APN_REST_TYPE,
EGTP_CAUSE_INVALID_LENGTH_WITH_PIGGYBACK_MSG,
EGTP_CAUSE_DATA_FORWARDING_NOT_SUPPORTED,
EGTP_CAUSE_INVALID_REPLY_FROM_REMOTE_PEER,
EGTP_CAUSE_FALLBACK_TO_GTPV1, EGTP_CAUSE_INVALID_PEER,
EGTP_CAUSE_TEMP_REJECTED_DUE_TO_HANDOVER_IN_PROGRESS,
EGTP_CAUSE_REQ_REJECTED_FOR_PMIPv6_REASON, EGTP_CAUSE_APN_CONGESTION,
EGTP_CAUSE_BEARER_HANDLING_NOT_SUPPORTED,
EGTP_CAUSE_UE_ALREADY_REATTACHED,
EGTP_CAUSE_MULTI_PDN_CONNECTION_FOR_APN_NOT_ALLOWED,
EGTP_CAUSE_MME_SGSN_REFUSES_DUE_TO_VPLMN_POLICY,

EGTP_CAUSE_GTPC_ENTITY_CONGESTION,
 EGTP_CAUSE_TARGET_ACCESS_RESTRICTED_FOR_THE_SUBSCRIBER,
 EGTP_CAUSE_UE_TEMP_NOT_REACHABLE_DUE_TO_POWER_SAVING,
 EGTP_CAUSE_RELOC_FAILURE_DUE_TO_NAS_MSG_REDIRECTION,
 EGTP_CAUSE_MISSING_TIMESTAMP_OPTION,
 EGTP_CAUSE_MULTIPLE_HNP_NOT_ALLOWED, EGTP_CAUSE_SN_MALFORMED_MSG,
 EGTP_CAUSE_INT_TIMEOUT, cbr_fail_upstate_inactive, ubr_fail_upstate_inactive,
 mbc_retransmit_msg, change_notification_retransmit_msg, pdn_ho_2g_not_allowed_in_upgrade,
 pdn_ho_3g_not_allowed_in_upgrade, pdn_invalid_pcf_version, pdn_invalid_chf_version,
 pdn_2g3g_cli_not_enabled, pdn_ho_wifi_2g_not_allowed, pdn_ho_wifi_3g_not_allowed,
 pdn_ho_2g_wifi_not_allowed, pdn_ho_3g_wifi_not_allowed, pdn_ho_5g_2g_not_allowed,
 pdn_ho_5g_3g_not_allowed

- 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, UTRA, GERA, 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, pdn_modify_2g3g

Gy Online charging destination host change statistics Category

ocs_dest_host_change_stats

Description: Statistics for charging destination host change

Sample Query: 'sum (ocs_dest_host_change_stats)'

Gy Online charging reporting reason statistics Category

ocs_reporting_reason_stats

Description: Statistics for reporting reason to OCS

Sample Query: 'sum (ocs_reporting_reason_stats{Reporting_Reason="THRESHOLD"})'

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: `Reporting_Reason`

Label Description: Type of 3GPP reporting reason from OCS

Example: THRESHOLD, QHT, FINAL, QUOTA_EXHAUSTED, VALIDITY_TIME, OTHER_QUOTA_TYPE, RATING_CONDITION_CHANGE, FORCED_REAUTHORISATION, POOL_EXHAUSTED

Gz Offline CDR drop statistics Category

ofcs_cdr_drop_stats

Description: Statistics for CDR drop with trigger reason

Sample Query: `'sum (ofcs_cdr_drop_stats{TriggerType="final-cdr"})'`

Labels:

- Label: `procedure_type`

Label Description: The procedure name associated with a call flow procedure

Example: Any string

- Label: `TriggerType`

Label Description: Trigger reason

Example: final-cdr", "external-trigger-cdr", "internal-trigger-cdr

- Label: `dnn`

Label Description: DNN for which the flow is created

Example: cisco.com

Gz Offline CDR message statistics Category

ofcs_cdr_message_stats

Description: Statistics for CDR message with record closure reason to OFCS

Sample Query: `'sum (ofcs_cdr_message_stats{record_closure_reason="normalRelease"})'`

Labels:

- Label: `gtpb_profile`

Label Description: gtpb profile name used for bearer

Example: Any string

- Label: `RuleBase`

Label Description: RuleBase name used for bearer

Example: Any string

- Label: `record_closure_reason`

Label Description: CDR closure reason

Example: `normalRelease`, `abnormalRelease`, `cAMELInitCallRelease`, `volumeLimit`, `timeLimit`, `servingNodeChange`, `maxChangeCond`, `managementIntervention`, `intraSGSNIntersystemChange`, `rATChange`, `mSTimeZoneChange`, `sGSNPLMNIDChange`

- Label: `dnn`

Label Description: DNN for which the flow is created

Example: `cisco.com`

- Label: `TriggerType`

Label Description: Trigger reason

Example: `GZ_SECONDARY_RAT_USAGE_LIMIT_REACHED`

Gz Offline SDF Containers statistics Category

ofcs_sdf_container_stats

Description: Statistics for SDF Container with service condition change to OFCS

Sample Query: `'sum (ofcs_sdf_container_stats{service_condition_change="PdpContextRelease"})'`

Labels:

- Label: `service_condition_change`

Label Description: Service condition Change for SDF container

Example: `QoSChange`, `SgsnChange`, `SgsnPlmnIdChange`, `TariffTimeSwitch`, `PdpContextRelease`, `RatChange`, `ServiceIdleOut`, `ConfigurationChange`, `ServiceStop`, `DccaTimeThresholdReached`, `DccaVolumeThresholdReached`, `DccaServiceSpecificUnitThresholdReached`, `DccaTimeExhausted`, `DccaVolumeExhausted`, `DccaValidityTimeout`, `DccaReauthorisationRequest`, `DccaContinueOngoingSession`, `DccaRetryAndTerminateOngoingSession`, `DccaTerminateOngoingSession`, `CgiSaiChange`, `RaiChange`, `DccaServiceSpecificUnitExhausted`, `RecordClosure`, `TimeLimit`, `VolumeLimit`, `ServiceSpecificUnitLimit`, `EnvelopeClosure`, `EcgiChange`, `TaiChange`, `UserLocationChange`

- Label: `dnn`

Label Description: DNN for which the flow is created

Example: `cisco.com`

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 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, heartbeat, subscription, notification

- Label: `result`

Label Description: result of discover message

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

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, heartbeat, subscription, notification

- Label: `result`

Label Description: result of discover message

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

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 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
- Label: `interface_type`
Label Description: Type of Interface communicate with PGW

Example: pcf, perf

Policy control ADC pcc rule statistics Category

policy_adc_total

Description: PCC Rule total statistics for ADC

Sample Query: 'sum (policy_adc_total{app_id="abc"}) '

Labels:

- Label: `app_id`
Label Description: ADC Application ID for pcc rule
Example: Any string
- Label: `mute`
Label Description: Mute for ADC rule
Example: true, false
- Label: `operation`
Label Description: Operation performed on the ADC pcc rule
Example: install, modify, remove
- Label: `event`
Label Description: Event associated with the operation performed on the ADC pcc rule
Example: attempted, success, failure, abort
- Label: `gr_instance_id`
Label Description: GR instance ID
Example: Any string
- Label: `interface_type`
Label Description: Type of Interface communicate with PGW
Example: pcf, perf

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`

- Label: `interface_type`

Label Description: Type of Interface communicate with PGW

Example: `pcf`, `pcrf`

- Label: `mapped_flow`

Label Description: flow has mapped 5Qi or not

Example: `true`, `false`

- Label: `policy_type`

Label Description: policy type for the subscriber session

Example: `pcrf`, `pcrf`, `optimized`, `local_policy`

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

- Label: `interface_type`

Label Description: Type of Interface communicate with PGW

Example: pcf, pcrf

- Label: `is_adc`

Label Description: Type of rule is ADC or Non-ADC

Example: true, false

- Label: `mute`

Label Description: Mute is enabled or disabled for ADC rule

Example: true, false

- Label: `rule_fail_reason`

Label Description: PCC Rule Fail Reason

Example: Rulebase is inactive, Rulebase is not configured, Predefined rule is inactive, Predefined rule is not configured, Pcc Rule recvd w/o RefQos, Pcc Rule recvd with invalid RefQos, Delete Pcc Rule recvd with policy create, Pcc Rule Does not exist, Pcc Rule recvd with reserved precedence, Pcc Rule name and id mismatch, Pcc Rule id is invalid, Pcc Rule recvd with invalid flow direction, Pcc Rule recvd without expected RefQos, Pcc Rule recvd Max filters(16) overflow, Max supported filters reached, Pcc Rule recvd with mismatch RefQoS, Pcc Rule recvd with unexpeted qos desc, Skipped due to Charging Description validation, Pcc Rule recvd with missing charging descriptor, Pcc Rule recvd with invalid charging desc, Qos Desc unexpected content, Pcc Rule recvd with multiple RefQos, Pcc Rule recvd without Flow Information, Pcc Rule recvd with RefQos having invalid, binding params, Sess Rule recvd w/o sess rule id, Sess Rule recvd w/o uplink AMBR, Sess Rule recvd w/o downlink AMBR, Sess Rule recvd with non standard 5QI, Sess Rule Auth def Qos recvd w/o ARP, Sess Rule and Auth def Qos mismatch, Sess Rule Auth def Qos recvd from non default flow, Sess Rule Auth def Qos QCI present in other Qos Desc, Sess Rule name and id mismatch, ARP recvd with invalid params, Flow desc recvd with invalid format(Invalid ipaddr class), Expected format: permit <direction> <protocol> from <Srouce IP> <Srouce Port> to <Dest IP> <Dest Port>, Flow desc recvd with action not supported, Flow desc recvd with direction not supported, Flow desc recvd with protocol not supported, Flow desc recvd with protocol missing, Flow desc recvd with remote IP or mask invalid, Flow desc recvd with source IP or mask invalid, Flow desc invert modifier not allowed, Flow desc assigned not supported for remote IP, Qos Desc Qos ID mismatch, Qos Desc recvd with Non Std 5QI, Qos Desc recvd with Non invalid bitrate, Qos Desc MBR value should be more than GBR value, Qos Desc recvd with invalid QoSID, Qos Desc recvd w/o ARP, Received exisiting Qos Desc with different binding parameters, Policy Trig lastreq data unavailable, Charging Desc not referred by any PCC Rule Or referred by invalid PCC Rule, Received Charging Id different from charging desc map key, Charging Desc not referred by any PCC Rule Or referred by invalid PCC Rule, Received Charging Id not referred by any PCC Rule, Existing Charging

Desc unsupported modify, Invalid Input, Missing Charging ID information from Charging Descriptor, Missing RatingGroup information for Charging Id, Neither Online nor Offline charging method is enabled for charging descriptor Missing Service ID information for Charging Desc, Missing Service ID information for Charging Desc, URR ID not found for rating group, URR ID not found for rating group and service ID, Received Charging Desc conflicts with another charging descriptor, Charging Desc skipped due to Pcc Rule, Conflicting with dynamic charging descriptor, Duplicate report function data invalid, IsMatching function data invalid, Conflicting RG service ID, PCC Rule Dropped due to charging association, Last Rule data not available, PCC Rule Invalid due to Ref TC Data, TC ID - Name mismatch, Missing Redirect Server address, Invalid Address Type, Session Rule recvd with Invalid 5QI, Qos Desc recvd with Invalid 5QI, Pcc Rule recvd with RefQos having invalid Flow for Non-Std QCI, Received Qos Desc with different Flow parameters between same flow for Non-Std QCI, Received existing Qos Desc with different Flow parameters for Non-Std QCI, Received Std-QCI Non-GBR Flow with GBR value, Received Std-QCI GBR Flow without GBR value, Predefine Pcc Rule recvd without AppID but its configs as ADC Rule, Predefine Pcc Rule recvd with AppID but its configs as Non-ADC Rule, Application Id change is not supported for Predefine Pcc Rule, PCC Rule recvd with missing rule name, PCC Rule recvd with invalid Flow Description, PCC Rule recvd with Invalid ToS Traffic Class, PCC Rule recvd with Invalid SecurityParameterIndex, PCC Rule recvd with Invalid Flow Label, PCC Rule recvd with missing precedence, PCC Rule recvd with missing QoS Information, PCC Rule recvd with missing QCI in QoS Information, PCC Rule recvd with invalid or unsupported QCI in QoS Information, PCC Rule recvd with missing ARP priority level in QoS Information, PCC Rule recvd with invalid ARP priority level, PCC Rule recvd with invalid reporting level, PCC Rule recvd with invalid flow status, Def Bearer Qos received with missing QCI, Def Bearer Qos received with invalid or unsupported QCI, Def Bearer Qos received with invalid ARP priority level, Invalid BCM received, Failure due Result Code AVP, Failure due to Experimental Result Code AVP, Invalid or Missing Supported Feature AVP, Usage Monitoring data instance is not defined, Invalid Usage Monitoring data referenced in Sess or PCC rule, Pcc Rule recvd with invalid refUmData, Sess Rule recvd with invalid refUmData, Gx Session release cause received, ADC Rule recvd with both AppID and Flow Info, ADC Rule recvd with AppID not present in config, ADC Rule recvd with TDF App ID Modification, ADC Rule recvd without Mute Notification, ADC Rule recvd with invalid Mute Notification, Non-ADC Rule recvd with TDF App ID Modification

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
- Label: `result`
Label Description: result of policy message processing
Example: `cfg_issue`, `max_outsatnding`, `send_failure`, `timeout`, `proc_timeout`, `rc_with_err`, `ex_rc_with_err`, `none`
- Label: `policy_fh_action`
Label Description: Policy CHF action
Example: `continue`, `terminate`, `none`
- Label: `policy_fh_subaction`
Label Description: Policy CHF subaction
Example: `discard_traffic`, `local_fallback`, `retryserver_on_event`, `sendccrt_call_term`, `with_term_req`, `without_term_req`, `none`
- Label: `interface_type`
Label Description: Type of Interface communicate with PGW
Example: `pcf`, `pcrf`
- Label: `sess_rel_cause`
Label Description: Session release cause received from policy server in policy response or policy request
Example: `unspecified`, `ue_subscription`, `insuff_server_res`, `ip_can_sess_term`, `ue_ip_addr_rel`
- Label: `termination_cause`
Label Description: Termination cause sent in terminate request towards policy server
Example: `logout`, `service_not_provided`, `bad_answer`, `administrative`, `link_broken`, `auth_expired`, `user_moved`, `session_timeout`

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

- Label: `interface_type`

Label Description: Type of Interface communicate with PGW

Example: pcf, pcrf

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

- Label: `interface_type`

Label Description: Type of Interface communicate with PGW

Example: pcf, pcrf

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

- Label: `interface_type`

Label Description: Type of Interface communicate with PGW

Example: pcf, pcrf

- Label: rule_fail_reason

Label Description: PCC Rule Fail Reason

Example: Rulebase is inactive, Rulebase is not configured, Predefined rule is inactive, Predefined rule is not configured, Pcc Rule recvd w/o RefQos, Pcc Rule recvd with invalid RefQos, Delete Pcc Rule recvd with policy create, Pcc Rule Does not exist, Pcc Rule recvd with reserved precedence, Pcc Rule name and id mismatch, Pcc Rule id is invalid, Pcc Rule recvd with invalid flow direction, Pcc Rule recvd without expected RefQos, Pcc Rule recvd Max filters(16) overflow, Max supported filters reached, Pcc Rule recvd with mismatch RefQoS, Pcc Rule recvd with unexpeted qos desc, Skipped due to Charging Description validation, Pcc Rule recvd with missing charging descriptor, Pcc Rule recvd with invalid charging desc, Qos Desc unexpected content, Pcc Rule recvd with multiple RefQos, Pcc Rule recvd without Flow Information, Pcc Rule recvd with RefQos having invalid, binding params, Sess Rule recvd w/o sess rule id, Sess Rule recvd w/o uplink AMBR, Sess Rule recvd w/o downlink AMBR, Sess Rule recvd with non standard 5QI, Sess Rule Auth def Qos recvd w/o ARP, Sess Rule and Auth def Qos mismatch, Sess Rule Auth def Qos recvd from non default flow, Sess Rule Auth def Qos QCI present in other Qos Desc, Sess Rule name and id mismatch, ARP recvd with invalid params, Flow desc recvd with invalid format(Invalid ipaddr class), Expected format: permit <direction> <protocol> from <Srouce IP> <Srouce Port> to <Dest IP> <Dest Port>, Flow desc recvd with action not supported, Flow desc recvd with direction not supported, Flow desc recvd with protocol not supported, Flow desc recvd with protocol missing, Flow desc recvd with remote IP or mask invalid, Flow desc recvd with source IP or mask invalid, Flow desc invert modifier not allowed, Flow desc assigned not supported for remote IP, Qos Desc Qos ID mismatch, Qos Desc recvd with Non Std 5QI, Qos Desc recvd with Non invalid bitrate, Qos Desc MBR value should be more than GBR value, Qos Desc recvd with invalid QoSID, Qos Desc recvd w/o ARP, Received exisiting Qos Desc with different binding parameters, Policy Trig lastreq data unavailable, Charging Desc not referred by any PCC Rule Or referred by invalid PCC Rule, Received Charging Id different from charging desc map key, Charging Desc not referred by any PCC Rule Or referred by invalid PCC Rule, Received Charging Id not referred by any PCC Rule, Existing Charging Desc unsupported modify, Invalid Input, Missing Charging ID information from Charging Descriptor, Missing RatingGroup information for Charging Id, Neither Online nor Offline charging method is enabled for charging descriptor Missing Service ID inforamtion for Charging Desc, Missing Service ID inforamtion for Charging Desc, URR ID not found for rating group, URR ID not found for rating group and service ID, Received Charging Desc conflicts with another charging descriptor, Charging Desc skipped due to Pcc Rule, Conflicting with dynamic chargng descriptor, Duplicate report function data invalid, IsMatching function data invalid, Conflicting RG service ID, PCC Rule Dropped due to charging association, Last Rule data not available, PCC Rule Invalid due to Ref TC Data, TC ID - Name mismatch, Missing Redirect Server address, Invalid Address Type, Session Rule recvd with Invalid 5QI, Qos Desc recvd with Invalid 5QI, Pcc Rule recvd with RefQos having invalid Flow for Non-Std QCI, Received Qos Desc with different Flow parameters between same flow for Non-Std QCI, Received exisiting Qos Desc with different Flow parameters for Non-Std QCI, Received Std-QCI Non-Gbr Flow with GBR value, Received Std-QCI Gbr Flow without GBR value, Predefine Pcc Rule recvd without AppID but its configs as ADC Rule, Predefine Pcc Rule recvd with AppID but its configs as Non-ADC Rule, Application Id change is not supported for Predefine Pcc Rule, PCC Rule rcvd with missing rule name, PCC Rule rcvd with invlaid Flow Description, PCC Rule rcvd with Invalid ToS Traffic Class, PCC Rule rcvd with Invalid SecurityParameterIndex, PCC Rule rcvd with Invalid Flow Label, PCC Rule rcvd with missing precedence, PCC Rule rcvd with missing QoS Information, PCC Rule rcvd with missing QCI in QoS Information, PCC Rule rcvd with invalid or unsupported QCI in QoS Information, PCC Rule rcvd with missing ARP priority level in QoS Information, PCC Rule rcvd with invalid ARP priority level, PCC Rule rcvd with invalid reporting level, PCC Rule rcvd with invalid flow status, Def Bearer Qos received with missing QCI, Def Bearer Qos received with invalid or unsupported QCI, Def Bearer Qos received with invalid ARP priority level, Invalid BCM received, Failure due Result Code AVP, Failure due to Experimental

Result Code AVP, Invalid or Missing Supported Feature AVP, Usage Monitoring data instance is not defined, Invalid Usage Monitoring data referenced in Sess or PCC rule, Pcc Rule recvd with invalid refUmData, Sess Rule recvd with invalid refUmData, Gx Session release cause received

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
- Label: `interface_type`
Label Description: Type of Interface communicate with PGW
Example: pcf, pcrf

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

- Label: `interface_type`

Label Description: Type of Interface communicate with PGW

Example: pcf, pcrf

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

- Label: `interface_type`

Label Description: Type of Interface communicate with PGW

Example: pcf, pcrf

- Label: `rule_fail_reason`

Label Description: PCC Rule Fail Reason

Example: Rulebase is inactive, Rulebase is not configured, Predefined rule is inactive, Predefined rule is not configured, Pcc Rule recvd w/o RefQos, Pcc Rule recvd with invalid RefQos, Delete Pcc Rule recvd with policy create, Pcc Rule Does not exist, Pcc Rule recvd with reserved precedence, Pcc Rule

name and id mismatch, Pcc Rule id is invalid, Pcc Rule recvd with invalid flow direction, Pcc Rule recvd without expected RefQos, Pcc Rule recvd Max filters(16) overflow, Max supported filters reached, Pcc Rule recvd with mismatch RefQoS, Pcc Rule recvd with unexpeted qos desc, Skipped due to Charging Description validation, Pcc Rule recvd with missing charging descriptor, Pcc Rule recvd with invalid charging desc, Qos Desc unexpected content, Pcc Rule recvd with multiple RefQos, Pcc Rule recvd without Flow Information, Pcc Rule recvd with RefQos having invalid, binding params, Sess Rule recvd w/o sess rule id, Sess Rule recvd w/o uplink AMBR, Sess Rule recvd w/o downlink AMBR, Sess Rule recvd with non standard 5QI, Sess Rule Auth def Qos recvd w/o ARP, Sess Rule and Auth def Qos mismatch, Sess Rule Auth def Qos recvd from non default flow, Sess Rule Auth def Qos QCI present in other Qos Desc, Sess Rule name and id mismatch, ARP recvd with invalid params, Flow desc recvd with invalid format(Invalid ipaddr class), Expected format: permit <direction> <protocol> from <Srouce IP> <Srouce Port> to <Dest IP> <Dest Port>, Flow desc recvd with action not supported, Flow desc recvd with direction not supported, Flow desc recvd with protocol not supported, Flow desc recvd with protocol missing, Flow desc recvd with remote IP or mask invalid, Flow desc recvd with source IP or mask invalid, Flow desc invert modifier not allowed, Flow desc assigned not supported for remote IP, Qos Desc Qos ID mismatch, Qos Desc recvd with Non Std 5QI, Qos Desc recvd with Non invalid bitrate, Qos Desc MBR value should be more than GBR value, Qos Desc recvd with invalid QoSID, Qos Desc recvd w/o ARP, Received exisiting Qos Desc with different binding parameters, Policy Trig lastreq data unavailable, Charging Desc not referred by any PCC Rule Or referred by invalid PCC Rule, Received Charging Id different from charging desc map key, Charging Desc not referred by any PCC Rule Or referred by invalid PCC Rule, Received Charging Id not referred by any PCC Rule, Existing Charging Desc unsupported modify, Invalid Input, Missing Charging ID information from Charging Descriptor, Missing RatingGroup information for Charging Id, Neither Online nor Offline charging method is enabled for charging descriptor Missing Service ID inforamtion for Charging Desc, Missing Service ID inforamtion for Charging Desc, URR ID not found for rating group, URR ID not found for rating group and service ID, Received Charging Desc conflicts with another charging descriptor, Charging Desc skipped due to Pcc Rule, Conflicting with dynamic chargng descriptor, Duplicate report function data invalid, IsMatching function data invalid, Conflicting RG service ID, PCC Rule Dropped due to charging association, Last Rule data not available, PCC Rule Invalid due to Ref TC Data, TC ID - Name mismatch, Missing Redirect Server address, Invalid Address Type, Session Rule recvd with Invalid 5QI, Qos Desc recvd with Invalid 5QI, Pcc Rule recvd with RefQos having invalid Flow for Non-Std QCI, Received Qos Desc with different Flow parameters between same flow for Non-Std QCI, Received exisiting Qos Desc with different Flow parameters for Non-Std QCI, Received Std-QCI Non-Gbr Flow with GBR value, Received Std-QCI Gbr Flow without GBR value, Predefine Pcc Rule recvd without AppID but its configs as ADC Rule, Predefine Pcc Rule recvd with AppID but its configs as Non-ADC Rule, Application Id change is not supported for Predefine Pcc Rule, PCC Rule rcvd with missing rule name, PCC Rule rcvd with invlaid Flow Description, PCC Rule rcvd with Invalid ToS Traffic Class, PCC Rule rcvd with Invalid SecurityParameterIndex, PCC Rule rcvd with Invalid Flow Label, PCC Rule rcvd with missing precedence, PCC Rule rcvd with missing QoS Information, PCC Rule rcvd with missing QCI in QoS Information, PCC Rule rcvd with invalid or unsupported QCI in QoS Information, PCC Rule rcvd with missing ARP priority level in QoS Information, PCC Rule rcvd with invalid ARP priority level, PCC Rule rcvd with invalid reporting level, PCC Rule rcvd with invalid flow status, Def Bearer Qos received with missing QCI, Def Bearer Qos received with invalid or unsupported QCI, Def Bearer Qos received with invalid ARP priority level, Invalid BCM received, Failure due Result Code AVP, Failure due to Experimental Result Code AVP, Invalid or Missing Supported Feature AVP, Usage Monitoring data instance is not defined, Invalid Usage Monitoring data referenced in Sess or PCC rule, Pcc Rule recvd with invalid refUmData, Sess Rule recvd with invalid refUmData, Gx Session release cause received

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

- Label: `interface_type`

Label Description: Type of Interface communicate with PGW

Example: pcf, pcrf

- Label: `mapped_flow`

Label Description: flow has mapped 5Qi or not

Example: true , false

- Label: `policy_type`

Label Description: policy type for the subscriber session

Example: pcrf,pcf,optimized,local_policy

Policy destination host change statistics Category

policy_pcrf_dest_host_change

Description: Statistics for Policy destination host change

Sample Query: `'sum (policy_pcrf_dest_host_change{gr_instance_id="1"})'`

Labels:

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: Any string

- Label: `interface_type`

Label Description: Type of Interface communicate with PGW

Example: pcf, pcrf

Radius Authentication Message Stats Category

radius_authentication_message_stats

Description: Stats for Radius Authentication messages

Sample Query:

`'radius_authentication_message_stats{radius_auth_algorithm="radius_auth_algorithm_pap}"'`

Labels:

- Label: `dnn`

Label Description: name of the dnn associated with the request

Example: Any string

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

Radius Message stats Category

smf_radius_message_stats

Description: Stats for Radius interface messages

Sample Query: `'smf_radius_message_stats{message_type="radius_access_request"}'`

Labels:

- Label: `direction`
Label Description: Direction indicates about the message going out or coming in
Example: `inbound`, `outbound`
- Label: `message_type`
Label Description: Radius Message Type
Example: `radius_access_request`, `radius_access_accept`
- Label: `radius_avp_type`
Label Description: Radius AVP Type
Example: `radius_avp_pap_username`, `radius_avp_pap_user_password`, `radius_avp_chap_challenge`, `radius_avp_chap_response`, `radius_avp_mschap_challenge`, `radius_avp_mschap_response`, `radius_avp_idle_timeout`, `radius_avp_session_timeout`
- Label: `rat_type`
Label Description: Type of the radio access associated with the request
Example: `EUTRA`, `NR`, `WLAN`, `rat_type_unknown`

SLA Transaction Category

smf_sla_transaction_stats

Description: Transaction SLA stats

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

Labels:

- Label: `smf_proc_type`

Label Description: Procedure Name

Example: PDU Session Release - SMF initiated, PDU 5G to 4G Handover, PDU Session Modify - PCF initiated, PDU UE Sync Procedure, PDU Idle Mode Entry - RAN initiated, PDN Session Modify - PCRF 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 2G/3G Procedure Category

smf_service_stats_2g3g

Description: SMF call flow procedure counters for 2g/3g session

Sample Query: `'smf_service_stats_2g3g{procedure_type="pdn_mbr_2gv1"}'`

Labels:

- Label: `procedure_type`

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

Example: "pdn_mbr_2gv1, pdn_mbr_2gv2, pdn_mbr_3gv1, pdn_mbr_3gv2, pdn_ho_sgsn_2gv1, pdn_ho_sgw_2gv2, pdn_ho_sgsn_3gv1, pdn_ho_sgw_3gv2, pdn_ho_2gv1_2gv2, pdn_ho_2gv2_2gv1, pdn_ho_3gv2_3gv1, pdn_ho_3gv2_2gv2, pdn_ho_2gv1_4g, pdn_ho_2gv2_4g, pdn_ho_3gv1_4g, pdn_ho_3gv2_4g, pdn_ho_4g_2gv1, pdn_ho_4g_2gv2, pdn_ho_4g_3gv1, pdn_ho_4g_3gv2, pdn_ho_2gv1_3gv2, pdn_ho_2gv1_3gv1, pdn_ho_2gv2_3gv1, pdn_ho_2gv2_3gv2, pdn_ho_3gv1_2gv2, pdn_ho_3gv1_2gv1, pdn_ho_3gv1_3gv2, pdn_ho_3gv2_2gv1, pdn_ho_5g_3gv1, pdn_ho_5g_3gv2, pdn_ho_5g_2gv1, pdn_ho_5g_2gv2, pdn_ho_wifi_2gv1, pdn_ho_wifi_2gv2, pdn_ho_wifi_3gv1, pdn_ho_wifi_3gv2, pdn_ho_2gv1_wifi, pdn_ho_2gv2_wifi, pdn_ho_3gv1_wifi, pdn_ho_3gv2_wifi, pdn_ho_2gv1_upgrade, pdn_ho_2gv2_upgrade, pdn_ho_3gv1_upgrade, pdn_ho_3gv2_upgrade, pdn_ho_initial_attach_in_2g3g_4g_5g, location_changed_3gv1, location_changed_3gv2, location_changed_2gv1, location_changed_2gv2"

- Label: `status`

Label Description: Call flow procedure counter

Example: attempted, success, failures

- Label: `reason`

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

Example: `pdn_ho_5g_2g_not_allowed`, `pdn_ho_5g_3g_not_allowed`, `pdn_ho_wifi_2g_not_allowed`, `pdn_ho_wifi_3g_not_allowed`, `pdn_ho_2g_wifi_not_allowed`, `pdn_ho_3g_wifi_not_allowed`, `pdn_invalid_pcf_version`, `pdn_invalid_chf_version`, `pdn_2g3g_cli_not_enabled`, `pdn_ho_2g_5g_not_allowed`, `pdn_ho_3g_5g_not_allowed`, `pdn_ho_2g_not_allowed_in_upgrade`, `pdn_ho_3g_not_allowed_in_upgrade`, `pdn_initial_attach_in_2g3g_4g_to_5g_ho_not_allowed`

- Label: `rat_type`

Label Description: RAT Type of the Session

Example: UTRA, GERA, `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: `smf_current_procedure`

Label Description: Current Procedure Name for Message Level Stats

Example: `pdn_modify_2g3g`

SMF ADC URR Statistics Category

smf_pfcpc_adc_report_stats

Description: The current count of PFCPC adc reports towards PCF

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

Labels:

- Label: `adc_report_type`

Label Description: Synchronous adc report or Asynchronous adc report

Example: async, sync

- Label: `status`

Label Description: ADC report status

Example: dropped, processed

SMF ALWAYS ON PDU SESSION Category

smf_always_on_session_stats

Description: Always On Pdu Session Statistics

Sample Query: 'smf_always_on_session_stats{status="pdusetup_req_alwayson_requested"}'

Labels:

- Label: `status`

Label Description: always on status statistics

Example: `pdusetup_req_alwayson_requested`, `pdusetup_acc_alwayson_allowed`, `pdusetup_acc_alwayson_not_allowed`, `pdumod_req_alwayson_requested`, `pdumod_cmd_alwayson_allowed`, `pdumod_cmd_alwayson_not_allowed`, `pdumod_cmd_nw_init_alwayson_allowed`, `pdu_utwifit_to_nr_alwayson_requested`, `pdu_utwifit_to_nr_alwayson_allowed`, `pdu_utwifit_to_nr_alwayson_not_allowed`

- Label: `rat_type`

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

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

- Label: `pdu_type`

Label Description: pdu connection type

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

- Label: `dnn`

Label Description: name of the dnn associated with the request

Example: Any string

- Label: `ssc_mode`

Label Description: Type of ssc mode associated with the request

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

SMF Charging Descriptor Delete Stats Category

smf_chrg_desc_del_stats

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

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

Labels:

- Label: `charging_id`

Label Description: Charging Descriptor Identifier

Example: Any string

- Label: `rating_group`

Label Description: Rating Group for which charging descriptors is dropped

Example: Any string

- Label: `configured`

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

Example: true, false

- Label: `reason`

Label Description: Reason for the charging descriptor delete

Example: Error string value

SMF Charging Descriptor Drop Stats Category

smf_chrg_desc_drop_stats

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

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

Labels:

- Label: `rating_group`

Label Description: Rating Group for which charging descriptors is dropped

Example: Any string

- Label: `service_identifier`

Label Description: Service Identifier for which charging descriptors is dropped

Example: Any string

- Label: `action`

Label Description: Action with respect to Rule Id

Example: add, mod, del

- Label: `configured`

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

Example: true, false

- Label: `reason`

Label Description: Reason for the charging descriptor drop

Example: Error string value

SMF Charging Failure Handling Stats Category

chf_failure_handling_stats

Description: Statistics for application error received from CHF

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

Labels:

- Label: http2_err_code

Label Description: HTTP2 error code received from CHF

Example: HTTP_STATUS_CODE_403_FORBIDDEN

- Label: appl_err_code

Label Description: Application error code received from CHF

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

- Label: fh_action

Label Description: Action taken on failure from CHF

Example: Terminate, Drop Traffic, Disable Charging

- Label: fh_exchg_type

Label Description: CHF Exchange in which failure occurred

Example: update, initial

- Label: disposition

Label Description: SMF action on failure

Example: disable-charging, drop-traffic, terminate, convert-offline, allocate-max-quota

- 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`

- Label: `interface_type`

Label Description: Type of Interface communicate with PGW

Example: `N40`, `Gy`

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_pfcip_usage_report_stats

Description: The current count of PFCP usage reports towards CHF

Sample Query: 'smf_pfcip_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_endc_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, onlinrpt_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

- Label: `service_identifier`

Label Description: Service Identifier for CHF quota event

Example: Any string

SMF Charging Radius Accounting Message Stats Category

radius_accounting_message_stats

Description: SMF Radius accounting message stats

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

Labels:

- Label: `procedure_type`

Label Description: Charging Radius message type

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

- Label: `dnn`

Label Description: DNN for which the flow is created

Example: `cisco.com`

- Label: `status`

Label Description: Status of Radius charging message processing

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

- Label: `reason`

Label Description: Reason for Radius message failure

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

- Label: `rat_type`

Label Description: RAT type on which the flow is created

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

SMF Charging Session Limit Dynamic Stats Category

chf_sess_limit_dynamic_stats

Description: SMF Charging Session Limit stats

Sample Query:

`'chf_sess_limit_dynamic_stats{chf_sess_limit_dyn_reason="chf_sess_limit_dyn_del_all_trig_disabled"}'`

Labels:

- Label: `chf_sess_limit_dyn_reason`

Label Description: Reason for Charging session limit stats

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

SMF Charging Usage Report Stats Category

chf_usage_report_stats

Description: The current count for usage reports towards CHF

Sample Query: `'chf_usage_report_stats{charging_method="offline"}'`

Labels:

- Label: `rating_group`

Label Description: Rating Group for which usage is being reported

Example: Any string

- Label: `service_identifier`

Label Description: Service Identifier for which usage is being reported

Example: Any string

- Label: `charging_method`

Label Description: Metering method for the PDU Session

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

- Label: `charging_trigger_type`

Label Description: Trigger for usage report

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

- Label: `procedure_type`

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

Example: `pdu_sess_create`, `ue_req_pdu_sess_mod`, `smf_req_pdu_sess_mod`, `pcf_req_pdu_sess_mod`, `udm_req_pdu_sess_mod`, `gnb_req_pdu_sess_mod`, `ue_req_pdu_sess_rel`, `smf_req_pdu_sess_rel`, `pcf_req_pdu_sess_rel`, `amf_req_pdu_sess_rel`, `udm_req_pdu_sess_rel`, `gnb_req_pdu_sess_rel`, `chf_req_pdu_sess_rel`, `admin_req_pdu_sess_rel`, `ue_req_active_to_idle`, `ue_req_idle_to_active`,

nw_req_service_active, upf_notify_downlink_data,
 xn_path_switch, pdn_sess_create, pdn_5g_4g_handover, pcf_req_ded_brr_create, pcf_req_ded_brr_delete,
 pcf_req_ded_brr_mod, n2_handover, xn_handover, n26_4g_to_5g_handover, n26_4g_to_5g_im_mobility,
 pdu_im, pdn_sess_create, pcf_req_ded_brr_create, pcf_req_ded_brr_delete, pcf_req_ded_brr_mod,
 pcf_initiated_pdn_detach, smf_initiated_pdn_detach, upf_initiated_pdn_detach

SMF Charging Zero Usage Report Stats Category

chf_zero_usage_report_stats

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

Sample Query: 'chf_zero_usage_report_stats{measurement_type="volume"}'

Labels:

- Label: measurement_type

Label Description: Measurement type

Example: volume, duration, duration-volume

- Label: charging_trigger_type

Label Description: Trigger for usage report

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

SMF Data Consistency Check Category

smf_datacheck_stats

Description: Total number of sessions checked for consistency

Sample Query: 'smf_datacheck_stats{rat_type="NR", status="failed"}'

Labels:

- Label: procedure_type

Label Description: Procedure Name

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

smf_db_marshall_stats

Description: SMF DB marshal stats

Sample Query: `sum(smf_db_marshall_stats) by (module)`

Labels:

- Label: module

Label Description: module type counter

Example: policy, charging, upserv, access, generic

SMF Disconnect stats Category

smf_disconnect_stats

Description: SMF Disconnect stats counters

Sample Query: `'smf_disconnect_stats{reason="disc_pdurel_amf_init_detach"}'`

Labels:

- Label: rat_type

Label Description: RAT Type of the Session

Example: EUTRA, NR, WLAN, rat_type_unknown

- Label: reason

Label Description: The reason associated with an call disconnect

Example: disc_pdusetup_create_over_create, disc_pdusetup_release_over_create,
 disc_pdusetup_admin_clear, disc_pdusetup_n1_decode_failure, disc_pdusetup_n1_content_not_found,
 disc_pdusetup_sess_abs_timeout, disc_pdusetup_sess_idle_timeout, disc_pdusetup_sess_cp_idle_timeout,
 disc_pdusetup_sess_default_flow_only_timeout, disc_pdusetup_ssc_mode_not_supported,
 disc_pdusetup_ssc_mode_denied, disc_pdusetup_identity_conflict, disc_pdusetup_pdu_type_unsupported,
 disc_pdusetup_pdu_type_denied, disc_pdusetup_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_ext_invalid, disc_pdusetup_sm_ext_invalid_ie, disc_pdusetup_sm_ext_sess_id_err,
 disc_pdusetup_sm_ext_invalid_json, disc_pdusetup_sm_ext_n1_process_failed,
 disc_pdusetup_sm_ext_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_timeout, 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_secondary_auth_ip_addr_conflict, 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, disc_pdusetup_integrity_protected_mdr_not_acceptable, disc_pdnsetup_upip_status_req_denied_in_rat, disc_pdn_pcrf_init_release, disc_pdnsetup_pcrf_create_resp_failed, disc_pdnsetup_charging_create_resp_failed, disc_vsmf_insert_dtssa_acscr_not_configured, disc_vsmf_insert_interplmn_ho_not_configured, disc_vsm_insert_hsmf_retrieve_failure, disc_ro2ho_n2ho_interplmn_ho_not_configured, disc_ro2ho_n4_modify_failed, disc_ho2ro_n4_modify_failed, disc_ho2ro_failure, disc_ro2ho_failure, disc_ro2ho_guard_timer_expiry, disc_ho2ro_guard_timer_expiry

SMF EBI stats Category

smf_ebi_stats

Description: Stats for the EBI Assignment

Sample Query: 'smf_ebi_stats{status="success"}'

Labels:

- Label: procedure_type

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

Example: pdnsetup_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='nssai1',pool='pool1',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(dn="dn1",servingArea="area1",nssai="slice1",pool="p1",eventType="Allocation",allocationType="dynamic",addressType="IPv4",upf="up1",grInstId="1")'
```

Labels:

- Label: `dnn`

Label Description: name of the dnn associated with the request

Example: Any string

- Label: `servingArea`

Label Description: name of the serving area associated with the request

Example: Any string

- Label: `nssai`

Label Description: name of the nssai associated with the request

Example: Any string

- Label: `pool`

Label Description: name of the pool associated with the request

Example: Any string

- Label: `eventType`

Label Description: type of event associated with the request

Example: Allocation/Release

- Label: `allocationType`

Label Description: type of allocation associated with the request

Example: static/dynamic

- Label: `addressType`

Label Description: address type associated with the request

Example: IPv4/IPv6PD

- Label: `upf`

Label Description: upf identifier associated with the request

Example: Any string

- Label: `grInstId`

Label Description: GR Instance ID

Example: 1 or 2

SMF IPAM Chunk Events Current Counter Category

IPAM_chunk_allocations_current

Description: Current state of SMF IPAM Address Chunk allocations

Sample Query:

```
'IPAM_chunk_allocations_current(dn='dnl',servingArea='areal',nssai='sliced',pool='pl',addressType='IPv4',upf='upl',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(chr="dnn",servingArea="area1",nssai="slice1",pool="p1",eventType="Allocation",addressType="IPv4",upf="up1",grInstId="1",forRemoteSmf="true")'
```

Labels:

- Label: `dnn`

Label Description: name of the dnn associated with the request

Example: Any string

- Label: `servingArea`

Label Description: name of the serving area associated with the request

Example: Any string

- Label: `nssai`

Label Description: name of the nssai associated with the request

Example: Any string

- Label: `pool`

Label Description: name of the pool associated with the request

Example: Any string

- Label: `eventType`

Label Description: type of event associated with the request

Example: Allocation/Release

- Label: `addressType`

Label Description: address type associated with the request

Example: IPv4/IPv6PD

- Label: `upf`

Label Description: upf identifier associated with the request

Example: Any string

- Label: `grInstId`

Label Description: GR Instance ID

Example: 1 or 2

- Label: `forRemoteSmf`

Label Description: Indicates if chunk is reserved for Remote SMF

Example: true/false

SMF N1 Message stats Category

smf_n1_message_stats

Description: Stats for N1 Messages

Sample Query: 'smf_n1_message_stats(procedure_type="pcf_req_pdu_sess_mod")'

Labels:

- Label: `procedure_type`

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

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

- Label: `direction`

Label Description: Direction of N1 message

Example: outbound, inbound

- Label: `message_type`

Label Description: The N1 message type

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

- Label: `n1_cause`

Label Description: N1 cause associated with the message

Example: OPERATOR_DETERMINED_BARRING, INSUFFICIENT_RESOURCES, MISSING_OR_UNKNOWN_DNN, UNKNOWN_PDU_SESSION_TYPE, USER_AUTHENTICATION_OR_AUTHORIZATION_FAILED, REQUEST_REJECTED_UNSPECIFIED, SERVICE_OPTION_NOT_SUPPORTED, REQUESTED_SERVICE_OPTION_NOT_SUBSCRIBED, SERVICE_OPTION_TEMPORARILY_OUT_OF_ORDER, PTI_ALREADY_IN_USE, REGULAR_DEACTIVATION, NETWORK_FAILURE, REACTIVATION_REQUESTED, SEMANTIC_ERROR_IN_THE_TFT_OPERATION, SYNTACTICAL_ERROR_IN_THE_TFT_OPERATION, INVALID_PDU_SESSION_IDENTITY, SEMANTIC_ERRORS_IN_PACKET_FILTER, SYNTACTICAL_ERROR_IN_PACKET_FILTER, OUT_OF_LADN_SERVICE_AREA, PTI_MISMATCH, PDU_SESSION_TYPE_IPV4_ONLY_ALLOWED, PDU_SESSION_TYPE_IPV6_ONLY_ALLOWED, PDU_SESSION_DOES_NOT_EXIST, INSUFFICIENT_RESOURCES_FOR_SPECIFIC_SLICE_AND_DNN, NOT_SUPPORTED_SSC_MODE, INSUFFICIENT_RESOURCES_FOR_SPECIFIC_SLICE, MISSING_OR_UNKNOWN_DNN_IN_A_SLICE, INVALID_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 associated 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,
 NgapCauseEnum_UP_integrity_protection_not_possible,
 NgapCauseEnum_Encryption_and_or_integrity_protection_algorithms_not_supported

- 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 IpError, First NodeMgr responded with SmfRspFailure, First NodeMgr failed with IpError, Second NodeMgr failed with IpError, 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, UTRA, GERA, `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`, `pcrf_req_ded_brr_mod`, `pcrf_req_ded_brr_create`, `pcrf_req_ded_brr_delete`, `suspend_notification`, `resume_notification`, `change_notification`, `gx_validation_failure_pdn_sess_rel`, `smf_inter_plmn_ro2ho_n2ho`, `smf_inter_plmn_ho2ro_n2ho`, `smf_idft_inter_plmn_ro2ho_n2ho`, `smf_dft_inter_plmn_ro2ho_n2ho`, `smf_idft_inter_plmn_ho2ro_n2ho`

- Label: `status`

Label Description: call flow procedure counter

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

- Label: `pdu_type`

Label Description: pdu connection type

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

- Label: `dnn`

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

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

- Label: `reason`

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

Example: `proc_pdu_not_established, proc_pdu_ctx_not_found, n2ho_ie_validation_failed, n2ho_n4_ho_preparing_failed, n2ho_n4_ho_prepared_failed, n2ho_n4_ho_completed_failed, n2ho_ho_cancelled, n2ho_resource_alloc_unsuccess_transfer, n2ho_invalid_state, n2ho_preparation_unsuccess_transfer, n2ho_n1n2_transfer_failure, n2ho_dft_intra_amf, n2ho_dft_inter_amf, n2ho_idft_intra_amf, n2ho_idft_inter_amf, n2ho_default_flow_failed, n2ho_n2_decode_failure, 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_failure, 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_ctxtrive_rec_for_4g_session, n26ho_5g_4g_handover_cancel, n26ho_4g_5g_no_eps_5gs_continuity, n26ho_default_flow_failed, n26ho_n2_decode_failure, 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, aaa_framed_ip_addr_conflict, 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_db,
 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, upip_req_denied_in_rat,
 nr_to_untrusted_wifi_upip_status_req_denied_in_rat, pcrf_create_failure, cbr_fail_upstate_inactive,
 ubr_fail_upstate_inactive, pdnrel_conditional_ie_missing, pdn_create_over_created_pdn,
 interplmn_ho_not_configured, dtssa_acscr_not_supported, ho2ro_invalid_state, ro2ho_invalid_state,
 mbc_retransmit_msg, change_notification_retransmit_msg, pdn_ho_5g_2g_not_allowed,
 pdn_ho_5g_3g_not_allowed, pdn_ho_wifi_2g_not_allowed, pdn_ho_wifi_3g_not_allowed,
 pdn_ho_2g_wifi_not_allowed, pdn_ho_3g_wifi_not_allowed, pdn_invalid_pcf_version,
 pdn_invalid_chf_version, pdn_2g3g_cli_not_enabled, pdn_ho_2g_5g_not_allowed,
 pdn_ho_3g_5g_not_allowed, pdn_ho_2g_not_allowed_in_upgrade, pdn_ho_3g_not_allowed_in_upgrade,
 oper_not_supported_in_rat

- 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, UTRA, GERA, 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, pdn_modify_2g3g

- 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

- Label: `upip_active`

Label Description: UPIP activated for the session or not

Example: true, false

- Label: `local_policy`

Label Description: Flows or Bearers created based on local policy config

Example: true, false

SMF Procedure Collision Category

smf_procedure_collision

Description: Total number of procedures collided

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

Labels:

- Label: `smf_current_procedure`

Label Description: Current Procedure Name

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

- Label: `smf_current_state`

Label Description: Current Procedure State

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

- Label: `smf_new_procedure`

Label Description: New Procedure Name

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

- Label: `smf_current_procedure_action`

Label Description: Current Procedure Action on Collision

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

SMF Procedure Total Time Statistics Category

`smf_procedure_seconds`

Description: Total number of seconds taken to complete the procedure

Sample Query: `'smf_procedure_seconds{smf_proc_status="Aborted"}'`

Labels:

- Label: `smf_proc_type`

Label Description: Procedure Name

Example: PDU Session Release - SMF initiated, PDU 5G to 4G Handover, PDU Session Modify - PCF initiated, PDU UE Sync Procedure, PDU Idle Mode Entry - RAN initiated, PDN Session Modify - PCRF 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 gtpc cache statistics Category

smf_service_gtpc_cache_stats

Description: SMF Service gtpc cache counters

Sample Query: 'smf_service_gtpc_cache_stats{gr_instance_id="1"}'

Labels:

- Label: `smf_proc_type`

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

Example: `eps_fb_ded_brr`, `ue_req_ded_brr_mod`, `udm_req_ded_brr_mod`, `smf_req_ded_brr_del`, `mme_req_ded_brr_del`, `mme_req_ded_brr_mod`, `mme_req_ded_brr_del`, `pcrf_req_ded_brr_create`, `pcf_req_ded_brr_create`, `pcrf_req_ded_brr_delete`, `pcf_req_ded_brr_delete`, `pcrf_req_ded_brr_mod`, `pcf_req_ded_brr_mod`, `ProcessNoStateMBR`, `suspend_acknowledgement`

- Label: `message_type`

Label Description: GTPC Message Type

Example: `CreateBearerReq`, `UpdateBearerReq`, `DeleteBearerReq`, `ModifyBearerResp`, `DeleteSessionResp`, `ModifyBearerResp`, `CreateSessionResp`, `SuspendAck`,

- Label: `gtpc_cache_operation`

Label Description: GTPC cache operation

Example: `add`, `delete`

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: Any string

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, UTRA, GERA, 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`
- Label: `policy_type`
Label Description: Policy type of the subscriber session
Example: `pcf`, `pcrf`, `none`
- Label: `local_policy`
Label Description: Flows or Bearers created based on local policy config
Example: `true`, `false`

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, UTRA, GERA, `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`

- Label: `policy_type`

Label Description: Policy type of the subscriber session

Example: `pcf`, `pcrf`, `none`

SMF Start Procedure Statistics Category

smf_procedure_start

Description: Total number of procedures started

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

Labels:

- Label: `smf_proc_type`

Label Description: Procedure Name

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

SMF Stop Procedure Statistics Category

smf_procedure_stop

Description: Total number of procedures stopped

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

Labels:

- Label: `smf_proc_type`

Label Description: Procedure Name

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

- Label: `smf_proc_status`

Label Description: Procedure Status

Example: Queued, Running, Aborted, Suspended, Invalid, Cleanup, 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, SessionNrToUnTrustWifiHOTOTimeout, Session4GWifi4GHOTOTimeout, SessionWifiTo4GHoMBReqTimeout, SessionRouterSolicitTimeout, SessionUsageReportTimeout, SessionPathSwitchTimeout, SessionN1N2RetryAfter, SessionPDUIMN1N2RetryAfter,

SessionN2HoIdftTimeout, SessionN26HoIdftTimeout, SessionAbsoluteTimeout,
 SessionIwfn26IdftTimeout, SessionDedBrrReEstTimer, SessionDedBrrDelayTimer,
 Session4G5GN26Timeout, SessionN1N2RetryTimeout, SessionN1N2RetransTimeout,
 SessionPDUIMResumeTimeout, SessionUrrOutOfOrderWaitTimeout, SessionPduRelCmdRetryTimeout,
 SessionUnTrustWiFiToNrHTimeout, 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, PDU 5G to 4G Handover, PDU Session Modify - PCF initiated, PDU UE Sync Procedure, PDU Idle Mode Entry - RAN initiated, PDN Session Modify - PCRF initiated

- Label: smf_proc_status

Label Description: Procedure Status

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

SMF Total Timeout Procedure Count Category

smf_procedure_timeout

Description: Total number of procedures executed more than 10sec

Sample Query: 'smf_procedure_timeout{smf_proc_status="Running"}'

Labels:

- Label: smf_proc_type

Label Description: Procedure Name

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

- Label: smf_proc_status

Label Description: Procedure Status

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

SMF Total Timedout Procedure Time Category

smf_procedure_timeout_seconds

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

Sample Query: 'smf_procedure_timeout_seconds{smf_proc_status="Running"}'

Labels:

- Label: smf_proc_type

Label Description: Procedure Name

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

- Label: smf_proc_status

Label Description: Procedure Status

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

SMF Total Unhandled Event Statistics Category

smf_procedure_unhndl_event

Description: Total number of unhandled events per procedure type

Sample Query: 'smf_procedure_unhndl_event{smf_proc_type="PDU Session Release - SMF initiated"}'

Labels:

- Label: smf_proc_type

Label Description: Procedure Name

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

- Label: message_type

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

Example: N11SmContextUpdateSuccess, N11EbiAssignmentReq, N4HeartBeatFailure, S5CreateSessRsp, N1LiSubscriberQueryReq, RadiusCoaDisconnectReq, N7SmPolicyUpdateSuccess

- Label: smf_current_state

Label Description: Current Procedure State

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

- Label: `guard_timer`

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

Example: TRUE, FALSE

SMF Total Unhandled Transaction Statistics Category

smf_procedure_unhndl_trans

Description: Total number of unhandled transactions per procedure type

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

Labels:

- Label: `smf_proc_type`

Label Description: Procedure Name

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

- Label: `message_type`

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

Example: N11SmContextUpdateSuccess, N11EbiAssignmentReq, N4HeartBeatFailure, S5CreateSessRsp, N1LiSubscriberQueryReq, 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, UTEA, GERA, `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

UDP RPC message statistics Category

udp_rpc_msg_stats

Description: Statistics for UDP RPC

Sample Query: 'sum (udp_rpc_msg_stats{gr_instance_id="1"})'

Labels:

- Label: `msgtype`

Label Description: message Type

Example: MessageNone, PfcPProxyMsg, UdpProxyMsg, UnknownMsg

- Label: `direction`

Label Description: Direction of UDP RPC message

Example: inbound, outbound

- Label: `status`

Label Description: status of message processing

Example: success, failures

- Label: `transport_type`

Label Description: Transport type of message

Example: original, asyncmessage, retransmitted,

- Label: `gr_instance_id`

Label Description: GR instance ID

Example: Any string

- Label: `interface_type`

Label Description: Type of Interface communicate with PGW

Example: pcf, pcrf

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

udp_proxy_bgp_routes_count

Description: UDP Proxy BGP routes added count

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

Labels:

- Label: status

Label Description: Status of message while sending or receiving

Example: success, failed

UDP-Proxy messages Category

udp_proxy_msg_total

Description: UDP Proxy message counters being recieved or sent

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

Labels:

- Label: message_name

Label Description: UDP messages coming via udp-proxy service

Example: radius_request, radius_response, heartbeat_request, heartbeat_response

- Label: `message_direction`

Label Description: Message being sent or being received

Example: inbound, outbound

- Label: `status`

Label Description: Status of message while sending or receiving

Example: success, failed



CHAPTER 3

Failure Disconnect Reasons Reference

- [SMF Disconnect Reasons](#), on page 155

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 Snsai) 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.
disc_pdnsetup_secondary_auth_ip_addr_conflict	The total number of 4G sessions released by the SMF when the static UE IP address received from access side does not match the Framed IP address received in RADIUS Authentication response.
disc_pdnsetup_pcrf_create_failed	The total number of 4G sessions released by the SMF when the initial request to the PCRF server cannot be sent during session setup.
disc_pdnsetup_pcrf_create_resp_failed	The total number of 4G sessions released by the SMF when the processing of the response of the initial request to the PCRF server fails, resulting in session termination.
disc_pdnsetup_charging_create_resp_failed	The total number of 4G sessions released by the SMF when fetching the response to the initial charging request fails, resulting in session termination.
disc_pdusetup_static_duplicate_ip	The total number of 5G sessions that are rejected by SMF due to detection of duplicate static IP.
disc_pdnsetup_static_duplicate_ip	The total number of 4G or Wi-Fi sessions that are rejected by SMF due to detection of duplicate static IP.



CHAPTER 4

MIB Reference

- [CISCO-CNEE-MIB, on page 161](#)
- [CISCO-SMI, on page 161](#)

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.

