



SMF Metrics

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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/nrf-nfm/v1\", result=\"timeouOrRPCError\"}`

Labels:

- Label: `nf_type`
Label Description: Network Function type
Example: nrf, udm, amf, pcf, chf, ciscocontrol
- Label: `host`
Label Description: End Point address
Example: `http://10.105.227.109:8082/nrf-nfm/v1`
- Label: `result`
Label Description: result of discover message
Example: 200, 201, 204, success, timeout_rpc_error, response_parse_failure

Discover Messages statistics Category

nf_discover_messages_total

Description: Discover Messages statistics

Sample Query: `nf_discover_messages_total{nf_type=\"amf\", host=\"http://10.105.227.109:8082/nrf-nfm/v1\", result=\"timeouOrRPCError\"}`

Labels:

- Label: `nf_type`
Label Description: Network Function type
Example: nrf, udm, amf, pcf, chf, ciscocontrol
- Label: `host`
Label Description: End Point address
Example: `http://10.105.227.109:8082/nrf-nfm/v1`
- Label: `result`
Label Description: result of discover message

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

NF End point selections Category

nf_endpoint_selections_total

Description: NF End Point Selection Statistics

Sample Query: `nf_endpoint_selections_total{nf_type=\"amf\", host=\"http://10.105.227.109:8082/nrf-nfm/v1\", req=\"initial\"}`

Labels:

- Label: `nf_type`
Label Description: Network Function type
Example: nrf, udm, amf, pcf, chf, ciscocontrol
- Label: `host`
Label Description: End Point address
Example: `http://10.105.227.109:8082/nrf-nfm/v1`
- Label: `req`
Label Description: req type
Example: initial, fallback,

NF failure handling stats Category

nf_failure_handling_stats_total

Description: NF Failure handling stats

Sample Query: `nf_failure_handling_stats_total{nf_type=\"amf\", host=\"http://10.105.227.109:8082/nrf-nfm/v1\", req=\"initial\", response=\"202\", status=\"final\"}`

Labels:

- Label: `nf_type`
Label Description: Network Function type
Example: nrf, udm, amf, pcf, chf, ciscocontrol
- Label: `host`
Label Description: End Point address
Example: `http://10.105.227.109:8082/nrf-nfm/v1`
- Label: `req`

Label Description: Request type

Example: initial, fallback,

- Label: `response`

Label Description: Response from the server

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

- Label: `status`

Label Description: Status from the server

Example: `retry`, `final`

NF management message time statistics Category

`nf_management_total_time`

Description: NF management messages total time taken

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

Labels:

- Label: `host`

Label Description: End Point address

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

- Label: `direction`

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

Example: `inbound`, `outbound`

- Label: `message_type`

Label Description: Type of Message

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

- Label: `result`

Label Description: result of discover message

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

NF management messages statistics Category

`nf_management_stats_total`

Description: NF management messages statistics

Sample Query: `nf_management_stats_total{host=\"http://10.105.227.109:8082/nnrf-nfm/v1\", direction=\"outbound\", message_type=\"registration\", result=\"timeoutOrRPCError\" }`

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`

NRF Discovery Category

`nf_discover_events_total`

Description: NF Discover Stats

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

Labels:

- Label: `nf_type`

Label Description: Network Function type

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

- Label: `response_type`

Label Description: Discovery response chosen from

Example: `local, cache, expired-cache`

PDU UE Sync Procedure Category

`pdu_ue_sync_proc`

Description: PDU UE Sync Procedure counter

Sample Query: `pdu_ue_sync_proc{status=\"attempted\"}`

Labels:

- Label: `status`

Label Description: call flow procedure status counter

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

Policy control 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`

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, eutran`

- 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

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`, `validation failure`

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: `rule_id`
Label Description: Rule Id for the received pre-defined pcc rule
Example: `PccRule-1`
- 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

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

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

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, eutran
- 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`

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 type counter

Example: `pdu_sess_create`

- Label: `status`

Label Description: gives status of the procedure

Example: `abort`

- Label: `message_type`

Label Description: gives the message type received during sla transaction

Example: `IntSelfTxnSla`

SMF ALWAYS ON PDU SESSION Category

metrics: `SMF_ALWAYS_ON_SESSION_STATS`

Description: Always On Pdu Session Statistics

- Label: `status`

Label Description: always on status statistics

Example: `pdusetup_req_always_on_requested`, `pdusetup_acc_always_on_allowed`, `pdusetup_acc_always_on_not_allowed`, `pdu_mod_req_always_on_requested`, `pdu_mod_cmd_always_on_allowed`, `pdu_mod_cmd_always_on_not_allowed`, `pdu_mod_cmd_nw_init_always_on_allowed`, `pdu_utwifit_to_nr_always_on_requested`, `pdu_utwifit_to_nr_always_on_allowed`, `pdu_utwifit_to_nr_always_on_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: `pduType`

Label Description: name of the nssai associated with the request

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

- Label: `dnn`

Label Description: name of the dnn associated with the request

Example: Any string

- Label: `sscMode`

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 Application Error Stats Category

`chf_appl_err_stats`

Description: Statistics for application error received from CHF

Sample Query: `chf_appl_err_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: `appl_err_action`
Label Description: Action taken on failure from CHF
Example: Terminate, Drop Traffic, Disable Charging
- Label: `appl_err_exchg_type`
Label Description: CHF Exchange in which failure occurred
Example: update, initial

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: `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_type`
Label Description: Quota type as received from CHF
Example: initial, update, initial_final, update_final, fail
- Label: `quota_fail_action`
Label Description: Action on quota failure
Example: No Action, Disable charging, Drop Traffic, Offline Converted
- Label: `rating_group`
Label Description: Rating group for which quota is received from CHF
Example: Any string

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: `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: `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

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: `reason`

Label Description: The reason associated with an call disconnect

Example:

- `disc_pdusetup_create_over_create`: Create-Over-CreateRelease.
- `disc_pdusetup_admin_clear`: SMF initiated PDU release.
- `disc_pdusetup_n1_decode_failure`: PDU setup failure due to NAS decoding failure in SM Context Create Request message
- `disc_pdusetup_n1_content_not_found`: PDU setup failure when NAS content is not present in SM context create request message.
- `disc_pdusetup_sess_abs_timeout`: PDU setup failure due to session absolute timer timeout.
- `disc_pdusetup_ssc_mode_not_supported`: Failure in PDU setup procedure because SSC mode is not supported or when neither UDM nor configuration has information on supported SSC mode.
- `disc_pdusetup_ssc_mode_denied`: Failure in PDU setup procedure when the UE requested SSC mode is not allowed either by the UDM or the local configuration.
- `disc_pdusetup_identity_conflict`: PDU setup procedure failure due to mismatch in PDU session ID present in N11 and N1 content of SM Context Create Request message.
- `disc_pdusetup_pdu_type_unsupported`: Failure in PDU setup procedure when the PDU type could not be derived from both configuration and UDM.
- `disc_pdusetup_pdu_type_denied`: Failure in PDU Setup procedure when the UE requested PDN type is not allowed as per the PDU types provided by UDM.
- `disc_pdusetup_init_chg_data_err`: Failure in PDU setup due to charging data failure.
- `disc_pdusetup_ip_alloc_failed`: PDU release due to IP allocation failure.
- `disc_pdusetup_pdu_fetch_failure`: Failure due to error in fetching PDU context for the incoming request.
- `disc_pdusetup_udm_reg_failed`: Failure in PDU setup procedure due to failure in UDM Registration procedure.
- `disc_pdusetup_udm_sub_fetch_failure`: Failure in PDU setup procedure due to UDM Get subscription procedure failure.
- `disc_pdusetup_udm_sub_notify_failed`: Failure in PDU setup procedure due to UDM subscribe to notify procedure failure.
- `disc_pdusetup_upf_setup_cause_not_accepted`: Failure in PDU setup procedure when N4 Session establishment response has cause code other than "Request Accepted".
- `disc_pdusetup_sm_cxt_invalid`: Failure in PDU Setup procedure when SM Context create request has any invalid message content.
- `disc_pdusetup_sm_cxt_invalid_ie`: Failure in PDU Setup procedure when any mandatory IE processing fails in SM context create request.
- `disc_pdusetup_sm_cxt_sess_id_err`: Failure in PDU setup procedure due to error in PDU session ID/SUPI IEs.
- `disc_pdusetup_sm_cxt_invalid_json`: Failure in PDU Setup procedure when SM Context create request processing fails.

- `disc_pdusetup_sm_cxt_n1_process_failed`: Failure in PDU setup due to n1 process failed.
- `disc_pdusetup_sm_cxt_man_param_missing`: Failure in PDU setup due to context param missing.
- `disc_pdusetup_pcf_create_exchg_failure`: Failure in PDU setup procedure due to SM Policy create procedure failure with PCF.
- `disc_pdusetup_pcf_create_rsp_failure`: Failure in PDU setup procedure due to any failure response or failure in processing of SM Policy create response from PCF.
- `disc_pdusetup_rm_exchg_failure`: Resource allocation failure in SMF during PDU setup.
- `disc_pdusetup_rm_rsp_failure`: Failure in PDU setup procedure due to RM response failure.
- `disc_pdusetup_pcf_update_exchg_failure`: Failure in PDU setup procedure due to SM Policy update procedure failure with PCF.
- `disc_pdusetup_pcf_update_rsp_failure`: Failure in PDU setup procedure due to any failure response or failure in processing of SM Policy update response from PCF.
- `disc_pdusetup_chf_data_exchg_failure`: Failure in PDU setup procedure due to CHF data exchange failure.
- `disc_pdusetup_chf_data_rsp_failure`: Failure in PDU setup procedure due to CHF data response failure.
- `disc_pdusetup_upf_setup_exchg_failure`: Failure in PDU setup procedure due to N4 Setup exchange failure.
- `disc_pdusetup_upf_setup_rsp_failure`: Failure in PDU setup procedure when N4 Setup response failure is received from UPF.
- `disc_pdusetup_n1n2_transfer_exchg_failure`: Failure in PDU setup procedure due to N1N2 Transfer exchange failure.
- `disc_pdusetup_n1n2_transfer_rsp_failure`: Failure in PDU Setup procedure due to decoding error in N1N2 transfer response message.
- `disc_pdusetup_n1n2_transfer_failure_rsp_code`: Failure in PDU Setup procedure due to failure response from AMF for N1N2 Transfer message.
- `disc_pdusetup_amf_assign_ebi_failure`: Failure in PDU Setup procedure due to EBI Assignment failure.
- `disc_pdusetup_upf_modify_exchg_failure`: Failure in PDU setup procedure due to modify exchange failure.
- `disc_pdusetup_upf_modify_rsp_failure`: Failure in PDU setup procedure when N4 Modification response failure is received from UPF.
- `disc_pdusetup_upf_modify_failed`: Failure in PDU setup procedure due to N4 Modification exchange failure.
- `disc_pdusetup_upf_serv_data_nill`: Failure in PDU Setup procedure when UPF information retrieval internal to SMF fails.
- `disc_pdusetup_upf_dl_tunnel_info_not_found`: Failure in PDU Setup procedure when DI Tunnel Info is not found in PduSessionSetupResponseTransfer.

- `disc_pdusetup_upf_tunnel_id_not_found`: Failure in PDU setup procedure when gNB tunnel ID lookup fails internally in SMF.
- `disc_pdusetup_upf_mod_gnb_tun_params_failed`: Failure in PDU Setup procedure when there is any internal failure in gNB tunnel processing for N4 session modification request with UPF.
- `disc_pdusetup_upf_mod_rsra_tun_params_failed`: Failure in PDU Setup procedure when there is any internal failure in rs-ra tunnel processing for N4 session modification request with UPF.
- `disc_pdusetup_upf_mod_tun_param_tos-failed`: Failure in PDU setup UPF modification tunnel param tos-failed.
- `disc_pdurel_amf_sends_ue_not_found`: Failure in UE initiated PDU release in AMF.
- `disc_pdusetup_dnn_missing`: Failure in PDU setup procedure when DNN is not allowed.
- `disc_pdurel_ue_init_detach`: PDU release due to UE detach initiated.
- `disc_pdurel_amf_init_detach`: PDU release due to AMF detach initiated.
- `disc_pdurel_pcf_init_detach`: PDU release due to PCF detach initiated.
- `disc_pdurel_udm_init_detach`: PDU release due to UDM detach initiated.
- `disc_pdurel_gnb_init_detach`: PDU release due to gNB detach initiated.
- `disc_pdurel_chf_init_detach`: PDU release due to CHF detach initiated.
- `disc_n2ho_n4_modify_failed`: PDU release due to N4 modification failure in N2 HO procedure.
- `disc_n26_4g_5g_ho_n4_modify_failed`: 4G to 5G handover failure due to failure in N4 modification.
- `disc_pdumodify_context_not_found`: Failure in PDU modify procedure when PDU context retrieval fails.
- `disc_pduim_context_not_found`: Failure in PDU IM procedure when PDU context retrieval fails.

SMF GTPC messages Category

`smf_gtpc_app_events`

Description: SMF GTPC message counter

Sample Query: `smf_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

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='dnn',servingArea='area',nssai='slice',pool='pl',allocationType='dynamic',addressType='IPv4',upf='upf')
```

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

SMF IPAM Address Events Total Counter Category

IPAM_address_events_total

Description: Total number of SMF IPAM Address events

Sample Query:

```
IPAM_address_events_total(dnn='dnn',servingArea='area',nssai='slice',pool='pl',eventType='Allocation',allocationType='dynamic',addressType='IPv4',upf='pl')
```

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

SMF IPAM Chunk Events Current Counter Category

IPAM_chunk_allocations_current

Description: Current state of SMF IPAM Address Chunk allocations

Sample Query:

```
IPAM_chunk_allocations_current(dnn="dnn1",servingArea="area1",nssai="slice1",pool="p1",addressType="IPv4",upf="up1")
```

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

SMF IPAM Chunk Events Total Counter Category

IPAM_chunk_events_total

Description: Total number of SMF IPAM Address Chunk events

Sample Query:

```
IPAM_chunk_events_total(dnn="dnn1",servingArea="area1",nssai="slice1",pool="p1",eventType="Allocation",addressType="IPv4",upf="up1")
```

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

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`

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

- Label: `status`

Label Description: call flow procedure counter

Example: attempted, success, failures

- Label: `pdu_type`

Label Description: Type of pdu session

Example: ipv4, ipv6, ipv4v6, unknown

- Label: `dnn`

Label Description: Dnn requested by UE

Example: intershat, cisco.com

- Label: `reason`

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

Example: udm_registration_failure, udm_subscription_fetch_failure, udm_subscribe_notify_failure, pcf_create_failure, pcf_update_failure, charging_data_failure, pdn_5g_4g_handover, idft_setup_failure, mbr_setup_failure, sgw_failure, upf_failure, pcf_req_ded_brr_mod, pcf_req_ded_brr_create, pcf_req_ded_brr_delete, ue_req_ded_brr_mod, udm_req_ded_brr_mod, smf_req_ded_brr_mod, rm_failure, upf_setup_failure, upf_modify_failure, ebi_assign_failure, n1n2_transfer_failure, smcontext_modify_req_processing_failure, session_setup_timer_expired, pcf_update_exchg_failure, create_over_create, sm_cxt_sess_id_err, sm_cxt_invalid_json, sm_cxt_invalid_ie, sm_cxt_invalid, sm_cxt_n1_process_failed, n1n2_transfer_exchg_failure, n2ho_pdu_not_established, 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, ,

xnho_pdu_not_established, 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, xnho_pdu_ctx_not_found, , n26ho_5g_4g_n1n2_transfer_failure, n26ho_5g_4g_invalid_state, n26ho_5g_4g_n4_failed_prepared_state, n26ho_5g_4g_resource_alloc_unsuccess_transfer, n26ho_5g_4g_n4_failed_completed_state, n26ho_5g_4g_handover_cancelled, n26ho_5g_4g_pdu_ctx_not_found, n26ho_5g_4g_n4_failed_preparing_state, n26ho_5g_4g_n4_modify_failed, n26ho_5g_4g_invalid_eps_pdn_connlist, pduim_n1n2_transfer_failure, pduim_n1n2_txfr_failure_notification, pduim_n4_modification_failed, pduim_misc_error, pduim_suspended_procedure, pduim_amf_ctx_not_found, pduim_internal_error, pduim_upstate_not_in_deactivated_state, n26ho_4g_5g_no_eps_5gs_continuity, n26im_mobility_4g_5g_no_eps_5gs_continuity, n26im_mobility_4g_5g_default_eps_bearer_inactive, pduimn26mob_n2_setup_response_success, pduimn26mob_n2_setup_response_failure

SMF Protocol message counters Category

smf_proto_udp_req_msg_total

Description: SMF Protocol message statistics

Sample Query: `smf_proto_udp_req_msg_total{message_direction="inbound",status="accepted"}`

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 not present`

smf_proto_udp_res_msg_total

Description: SMF Protocol message statistics

Sample Query: `smf_proto_udp_res_msg_total{message_direction="inbound",status="accepted"}`

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 not present

SMF REST message exchange time Category

smf_restep_http_msg

Description: SMF REST time between request and response messages

Sample Query: `smf_restep_http_msg{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

SMF REST 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

SMF Session counters Category

smf_session_counters

Description: SMF current active Session counters

Sample Query:

```
smf_session_counters{ratType=\"rat_type_4g\", pduType=\"ipv4\", dnn=\"dnn1\", sscMode=\"ssc_mode_1\"}
```

Labels:

- Label: `rat_type`

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

Example: `rat_type_2g`, `rat_type_3g`, `rat_type_4g`, `rat_type_5g`, `rat_type_4g_5g`, `rat_type_wifi`, `rat_type_unknown`

- Label: `pduType`

Label Description: name of the nssai associated with the request

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

- Label: `dnn`

Label Description: name of the dnn associated with the request

Example: Any string

- Label: `sscMode`

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`

SMF Session stats Category

smf_session_stats

Description: SMF Session stats counters

Sample Query:

```
smf_session_stats{ratType=\"rat_type_4g\", pduType=\"ipv4\", dnn=\"dnn1\", sscMode=\"ssc_mode_1\", status=\"attempted\"}
```

Labels:

- Label: `rat_type`

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

Example: rat_type_2g, rat_type_3g, rat_type_4g, rat_type_5g, rat_type_4g_5g, rat_type_wifi, rat_type_unknown

- Label: pduType

Label Description: name of the nssai associated with the request

Example: ipv4, ipv6, ipv4v6, unknown

- Label: dnn

Label Description: name of the dnn associated with the request

Example: Any string

- Label: sscMode

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

SMF User Plane Session counters Category

smf_up_session_counters

Description: SMF current active User Plane Sessions

Sample Query:

```
smf_up_session_counters{ratType=\"rat_type_4g\",pduType=\"ipv4\",dnn=\"dnn1\",sscMode=\"ssc_mode_1\"}
```

Labels:

- Label: rat_type

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

Example: rat_type_2g, rat_type_3g, rat_type_4g, rat_type_5g, rat_type_4g_5g, rat_type_wifi, rat_type_unknown

- Label: pduType

Label Description: name of the nssai associated with the request

Example: ipv4, ipv6, ipv4v6, unknown

- Label: dnn

Label Description: name of the dnn associated with the request

Example: Any string

- Label: sscMode

Label Description: Type of ssc mode associated with the request

Example: ssc_mode_1, ssc_mode_2, ssc_mode_3, ssc_mode_unknown