

Ultra Cloud Core 5G Access and Mobility Management Function, Release 2025.03 - Metrics Reference

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About this Guide

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

This preface describes the *Ultra Cloud Core 5G Access and Mobility Management Function - Metrics Reference*, the document conventions, and the customer support details.

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Conventions Used

The following tables describe the conventions used throughout this documentation.

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

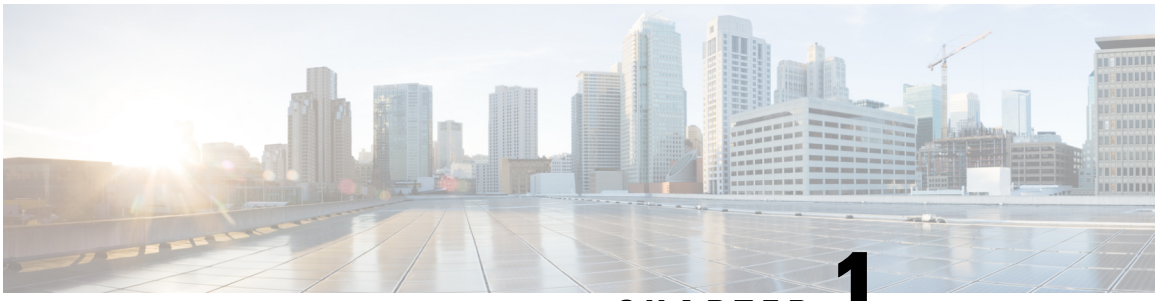
Typeface Conventions	Description
Text represented as a `screen display`	This typeface represents displays that appear on your terminal screen, for example: `Login:`

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

Contacting Customer Support

Use the information in this section to contact customer support.

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



CHAPTER 1

AMF Metrics Reference

- amf Metrics Reference, on page 1

amf Metrics Reference

AMF Amf service stats Category

n14_service_stats

Description: AMF AMF service stats

Sample Query:

```
n14_service_stats{message_type=\"N14TxUeContextTransferUpdate\",status=\"failures\",reason=\"Unable to get rsp\",roaming_status=\"HOMER\",slice_data=\"2-333333\"}
```

Labels:

- Label: `message_type`

  Label Description: The message type associated with an amf service

  Example: N14TxUeContextCreateReq, N14RxUeContextCreateRsp, N14RxUeContextCreateReq, N14TxUeContextCreateRsp, N14TxUeContextTransferUpdate, N14RxUeContextTransferUpdateRsp, N14RxUeContextTransferUpdate, N14TxUeContextTransferUpdateRsp, N14RxUeContextTransferReq, N14TxUeContextTransferRsp, N14TxUeContextTransferReq, N14RxUeContextTransferRsp, N14RxN2InfoNotifyRequest, N14TxN2InfoNotifyResponse, N14TxN2InfoNotifyRequest, N14RxN2InfoNotifyResponse, N14N1MessageNotifyClientRequest, N14N1MessageNotifyClientResponse, N14N1MessageNotifyRequest, N14N1MessageNotifyResponse, N14TxN1N2MessageTransferRequest ,N14RxN1N2MessageTransferResponse, N14TxUeContextReleaseReq, N14RxUeContextReleaseRsp, N14TxUeContextReleaseRsp, N14RxN1N2MessageTransferRequest, N14TxN1N2MessageTransferResponse, N14RxUeContextReleaseReq

- Label: `status`

  Label Description: Overall status

  Example: success, failures

- Label: `reason`

Label Description: The reason associated with an amf service

Example: Unable to get rsp, Unable to retrieve msg from rsp, Unknown Subscriber, Internal Error, Invalid Input, Invalid PduSession, Not Found, Forbidden,Internal Server Error, Gateway Timeout

- Label: `slice_data`

  Label Description: slice data

  Example: 2-333333

- Label: `roaming_status`

  Label Description: Roaming Info

  Example: HOMER, ROAMER, UNKNOWN

AMF Attach rate throttle Category

attach_rate_throttle

Description: Message level stats for rejection or drop due to throttle

Sample Query: `attach_rate_throttle{message_type=\"N1RegistrationRequest\",action=\"drop\"}`

Labels:

- Label: `message_type`

  Label Description: incoming message throttled

  Example: N1RegistrationRequest, GTPCFwdRelocReq, N14UeContextCreateReq

- Label: `action`

  Label Description: throttled message dropped or rejected

  Example: drop, reject

AMF AUSF Service Stats Category

n12_service_stats

Description: AMF Ausf service stats

Sample Query:
`n12_service_stats{message_type=\"NausfUeAuthReq\",status=\"success\",reason=\"AUTHENTICATION_SUCCESS\",roaming_status=\"HOMER\",slice_data=\"2-333333\"}`

Labels:

- Label: `message_type`

  Label Description: The message type associated with an ausf service

  Example: NausfUeAuthReq, NausfUeAuthRsp, NausfUe5gAkaCnfReq, NausfUe5gAkaCnfRsp, NausfUeEapAkaCnfReq, NausfUeEapAkaRsp

- Label: `status`

Label Description: Overall status

Example: success, failures

- Label: `reason`

  Label Description: The reason associated with an ausf service

  Example: Suspend, Suspend for Async, Unable to retrieve msg from rsp, Supi mismatch, Internal Error,Sync FailedMac Failure, Auth Challenge Failed, Auth Cfm Failed, Sync Failed Exceeded, Timeout, Others, No Security Context from Peer, Peer Provided Sec Context Failed, NgKsi Already In Use, Scheduled ipc action in background, Unable to retrieve identity rsp, Unable to get Supi, AUTHENTICATION_SUCCESS, AUTHENTICATION_REJECTED, AV_GENERATION_PROBLEM, CONTEXT_NOT_FOUND, INVALID_HN_PUBLIC_KEY_IDENTIFIER, INVALID_SCHEME_OUTPUT, NETWORK_FAILURE, SERVING_NETWORK_NOT_AUTHORIZED, UNSUPPORTED_PROTECTION_SCHEME, UPSTREAM_SERVER_ERROR, USER_NOT_FOUND, Unable to get rsp, AUTHENTICATION_FAILURE

- Label: `slice_data`

  Label Description: slice data

  Example: 2-333333

- Label: `roaming_status`

  Label Description: Roaming Info

  Example: HOMER, ROAMER, UNKNOWN

AMF CBCF service_stats Category

n50_service_stats

Description: AMF CBCF service stats

Sample Query:
`n50_service_stats{message_type=\"NonueN2InfoTxfrReqData\",status=\"success\",reason=\"\"}`

Labels:

- Label: `message_type`

  Label Description: The message type associated with an CBCF service

  Example: NonueN2InfoTxfrReqData, NonueN2InfoTxfrRspData, NonueN2InfoSubsCreatedDataReq, NonueN2InfoSubsCreatedDataRsp, NonueN2InfoUnSubcribeReq, NonueN2InfoUnSubcribeRsp, NonueN2InfoNotifyReq, NonueN2InfoNotifyRsp, NlmfNonUEN2InfoSubscribeReq,NlmfNonUEN2InfoSubscribeRsp, NlmfNonUEN2InfoUnSubscribeReq, NlmfNonUEN2InfoUnSubscribeRsp

- Label: `status`

  Label Description: Overall status

  Example: success, failures

- Label: `reason`

Label Description: The reason associated with an CBCF service

Example: Unable to get rsp, Unable to retrieve msg from rsp, Internal Error, INVALID_MSG_FORMAT, INSUFFICIENT_RESOURCES, SYSTEM_FAILURE

AMF collision stats Category

amf_collision_stats

Description: Statistics for tracking and debugging the collisions encountered in AMF

Sample Query:
```
amf_collision_stats{proc1=\"PduCreate\",proc2=\"UEOrNwDeRegistration\",action_type=\"abort_proc1\"}
```

Labels:

- Label: `proc1`

  Label Description: Name of the colliding procedure

  Example: UERegistration_INITIAL_REGISTRATION, UERegistration_MOBILITY_REGISTRATION_UPDATING, UERegistration_PERIODIC_REGISTRATION_UPDATING, UERegistration_EMERGENCY_REGISTRATION, UEOrNwDeRegistration, PduCreate, PduN1N2, PduN2Rsp, PduN1Rsp, PduMod, UEContextRelease, PduNotify, EBI, Paging, ServiceRequest, ContextTransfer, ContextTransferUpdate, XnHandover, N2HandoverSrcWithoutAmfChange, N2HandoverSrcWithAmfChange, HandovertoEPC, UeRadioCapInfoInd, NGReset, N2HandoverTgt, HandoverFromEPC, UeCfgUpdate, DomainSelectionInfo, AmfRedirection, UpLinkDownlink, LawfulIntercept, RegistrationComplete, ContextTransferEPC, LocationPosition_MTLR, LocationPosition_NILR, UdmDataChangeNotify, EventExposure

- Label: `proc2`

  Label Description: Name of the colliding procedure

  Example: UERegistration_INITIAL_REGISTRATION, UERegistration_MOBILITY_REGISTRATION_UPDATING, UERegistration_PERIODIC_REGISTRATION_UPDATING, UERegistration_EMERGENCY_REGISTRATION, UEOrNwDeRegistration, PduCreate, PduN1N2, PduN2Rsp, PduN1Rsp, PduMod, UEContextRelease, PduNotify, EBI, Paging, ServiceRequest, ContextTransfer, ContextTransferUpdate, XnHandover, N2HandoverSrcWithoutAmfChange, N2HandoverSrcWithAmfChange, HandovertoEPC, UeRadioCapInfoInd, NGReset, N2HandoverTgt, HandoverFromEPC, UeCfgUpdate, DomainSelectionInfo, AmfRedirection, UpLinkDownlink, LawfulIntercept, RegistrationComplete, ContextTransferEPC, LocationPosition_MTLR, LocationPosition_NILR, UdmDataChangeNotify, EventExposure

- Label: `action_type`

  Label Description: action taken by collision resolver

  Example: abort_proc1, cleanup_proc1

AMF Disconnect stats Category

amf_disconnect_stats

Description: Total number of session disconnect

Sample Query: `amf_disconnect_stats{reason=\"Dereg_UeRequested\"}`

Labels:

- Label: `reason`

  Label Description: The reason associated with a call disconnect

  Example: Dereg_AdminClear, Dereg_Implicit, Dereg_UeRequested, Dereg_RESTRICTED, Dereg_UDM_RESTRICTED, Dereg_Udm_SUBSCRIPTION_WITHDRAWN

AMF EIR service_stats Category

n17_service_stats

Description: AMF EIR service stats

Sample Query:
`n17_service_stats{message_type=\"N17EquipmentStatusCheckReq\",status=\"success\",reason=\"\",roaming_status=\"HOMER\",slice_data=\"2-333333\"}`

Labels:

- Label: `message_type`

  Label Description: The message type associated with an EIR service

  Example: N17EquipmentStatusCheckReq, N17EquipmentStatusCheckRsp

- Label: `status`

  Label Description: Overall status

  Example: success, failures

- Label: `reason`

  Label Description: The reason associated with an EIR service

  Example: Unable to get rsp, Unable to retrieve msg from rsp, Invalid Input, WHITELISTED, BLACKLISTED, GREYLISTED, ERROR_EQUIPMENT_UNKNOWN

- Label: `slice_data`

  Label Description: slice data

  Example: 2-333333

- Label: `roaming_status`

  Label Description: Roaming Info

  Example: HOMER, ROAMER, UNKNOWN

AMF GMLC service_stats Category

nl2_service_stats

Description: AMF GMLC service stats

Sample Query:

```
nl2_service_stats{message_type=\"NgmlcRequestPositiongInfo\",status=\"success\",reason=\"\",roaming_status=\"HOMER\",slice_data=\"2-333333\"}
```

Labels:

- Label: `message_type`

  Label Description: The message type associated with an GMLC service

  Example: NgmlcRequestPositiongInfo, NgmlcProvidePositiongInfoRsp, NgmlcEventNotificationReq, NgmlcEventNotificationRsp, NgmlcNotifiedPosInfoReq, NgmlcNotifiedPosInfoRsp

- Label: `status`

  Label Description: Overall status

  Example: success, failures

- Label: `reason`

  Label Description: The reason associated with an GMLC service

  Example: Unable to get rsp, Unable to retrieve msg from rsp, Unknown Subscriber, Internal Error, Invalid Input

- Label: `slice_data`

  Label Description: slice data

  Example: 2-333333

- Label: `roaming_status`

  Label Description: Roaming Info

  Example: HOMER, ROAMER, UNKNOWN

AMF LMF service_stats Category

nl1_service_stats

Description: AMF LMF service stats

Sample Query:

```
nl1_service_stats{message_type=\"NlmfDetermineLocReq\",status=\"success\",reason=\"\",roaming_status=\"HOMER\",slice_data=\"2-333333\"}
```

Labels:

- Label: `message_type`

  Label Description: The message type associated with an LMF service

  Example: NlmfN1N2MessageTransferReq, NlmfN1N2MessageTransferRsp, NlmfN1N2MessageTransferfailurenotifyReq, NlmfN1N2MessageTransferfailurenotifyRsp,

NlmfN1MessageNotifyRequest,
NlmfN1MessageNotifyResponse,NlmfDetermineLocReq,NlmfDetermineLocRsp,
NlmfN2InfoNotifyRequest,NlmfN2InfoNotifyResponse, NlmfNonUEN2InfoNotifyRequest,
NlmfNonUEN2InfoNotifyResponse, NlmfNonUEN2MessageTransferRequest,
NlmfNonUEN2MessageTransferResponse, NlmfN1N2MessageSubscribeReq,
NlmfN1N2MessageSubscribeRsp, NlmfN1N2MessageUnSubscribeReq,
NlmfN1N2MessageUnSubscribeRsp

- Label: `status`

  Label Description: Overall status

  Example: success, failures

- Label: `reason`

  Label Description: The reason associated with an LMF service

  Example: Unable to get rsp, Unable to retrieve msg from rsp, Unknown Subscriber, Internal Error, Invalid Input, Invalid LCS Correlation ID, INVALID_MSG_FORMAT, SYSTEM_FAILURE

- Label: `slice_data`

  Label Description: slice data

  Example: 2-333333

- Label: `roaming_status`

  Label Description: Roaming Info

  Example: HOMER, ROAMER, UNKNOWN

AMF METRICS NGAP MESSAGE TOTAL Category

amf_ngap_message_total

Description: "Total number of NGAP msgs". This statistic is controlled through the CLI. Refer to the CLI Command Reference Guide for details.

Sample Query:
`amf_ngap_message_total{message_direction=\"inbound\",message_type=\"N2NGSetupRsp\"}`

Labels:

- Label: `message_direction`

  Label Description: Indicates whether the message is inbound or outbound.

  Example: outbound,inbound

- Label: `message_type`

  Label Description: Message type

  Example:
  [redacted]

AMF NAS ASN DECODE ERR STATS Category

nas_asn_decode_error_stats

Description: Nas ASN Decoding errors. This statistic is controlled through the CLI. Refer to the CLI Command Reference Guide for details.

Sample Query:
`nas_asn_decode_error_stats{message_type=\"N1RegistrationRequest\",asn_failures=\"CauseProtocolTransferSyntaxError\"}`

Labels:

- Label: `message_type`

  Label Description: Message Type

  Example:

- Label: `asn_failures`

  Label Description: Failure reason

  Example: CauseProtocolTransferSyntaxError

AMF NAS ASN ENCODE ERR STATS Category

nas_asn_encode_error_stats

Description: Nas ASN Encoding errors. This statistic is controlled through the CLI. Refer to the CLI Command Reference Guide for details.

Sample Query:
`nas_asn_encode_error_stats{message_type=\"N1AuthenticationRequest\",asn_failures=\"\"}`

Labels:

- Label: `message_type`

  Label Description: Message Type

  Example:

- Label: `asn_failures`

  Label Description: Failure reason

  Example:

AMF Nas Message Total Category

amf_nas_message_total

Description: The number of nas message received or sent

Sample Query:

```
amf_nas_message_total{message_direction=\"inbound\",message_type=\"Paging_Trigger_N1N2_Msg_Xfer\",slice_data=\"2-333333\"}
```

Labels:

- Label: `message_direction`

  Label Description: Indicates whether the message is inbound or inbound.

  Example: inbound, outbound

- Label: `slice_data`

  Label Description: slice data

  Example: 2-333333

- Label: `message_type`

  Label Description: The message type associated with the nas message

  Example: N1RegRequest, N1RegRequest_RegType_[TYPE], N1RegRequest_IdentityType_[TYPE], N1RegAccept, N1RegAccept_[REG_TYPE], N1RegComplete, N1RegComplete_Timeout, N1RegReject, N1[REG_TYPE]RegReject,N1DeRegAccept_UeOriginatingDereg, N1DeRegAccept_UeTerminatedDereg, N1DeRegReq_UeOriginatingDereg, N1DeRegReq_UeOriginatingDereg_NormalDereg, N1DeRegReq_UeOriginatingDereg_SwitchOff, N1DeRegReq_UeTerminatedDereg, N1DeRegReq_UeTerminatedDereg_[CAUSE],N1AuthenticationReq,N1AuthenticationReject, N1AuthenticationRsp, N1AuthenticationFailure, N1AuthenticationReject_[CAUSE],N1UeCfgUpdateComplete, N1UeCfgUpdateCommand,N1SecurityModeCommand, N1SecurityModeComplete, N1SecurityModeReject,N1PduEstablistmentRequest, N1PduEstablistmentRequest_Dnn_Truncated, N1PduModifyRequest_NwInitiated, N1PduModifyRequest_UeInitiated, N1PduReleaseRequest_NwInitiated, N1PduReleaseRequest_UeInitiated, N1PduReject, N1PduReject_[CAUSE],N1DlNasTransport, N1DlNasTransport_LPP, N1DlNasTransport_SMS, N1DlNasTransport_SOR, N1UlNasTransport, N1UlNasTransport_LPP, N1UlNasTransport_PduN1Rsp, N1UlNasTransport_SMS, N1UlNasTransport_SOR,N1ServiceRequest, N1ServiceRequest_Connected, N1ServiceRequest_Deregistration_Init, N1ServiceRequest_Idle, N1ServiceRequest_pdu, N1ServiceRequest_[SERVICE_TYPE], N1ServiceAccept, N1ServiceReject, N1ServiceReject_[CAUSE],N1IdentityRequest, N1IdentityRequest_[IDENTITY_TYPE], N1IdentityResponse,Paging, Paging_Stage_[X], Paging_Stage_[X]Reattempt, Paging_TriggerType[TriggerType], Paging_Trigger_[TRIGGER]

AMF NGAP ASN DECODE ERR STATS Category

ngap_asn_decode_error_stats

Description: Ngap ASN Decoding errors. This statistic is controlled through the CLI. Refer to the CLI Command Reference Guide for details.

Sample Query:

```
ngap_asn_decode_error_stats{message_type=\"N2NGSetupReq\",asn_failures=\"CauseProtocolTransferSyntaxError\"}
```

Labels:

- Label: `message_type`

  Label Description: NGAP Message Type

Example:
[redacted]

- Label: `asn_failures`

  Label Description: Failure reason

  Example: CauseProtocolTransferSyntaxError

AMF NGAP ASN ENCODE ERR STATS Category

ngap_asn_encode_error_stats

Description: Ngap ASN Encoding errors. This statistic is controlled through the CLI. Refer to the CLI Command Reference Guide for details.

Sample Query: `ngap_asn_encode_error_stats{message_type=\"NgSetupResponse\",asn_failures=\"\"}`

Labels:

- Label: `message_type`

  Label Description: NGAP Message Type

  Example:
  [redacted]
  NgAmfStatusIndication, ReRouteNas Request,
  UeContextModificationRequest,LocationReportingControl,DownlinkUEAssociatedNRPPaTransport,NgAmfOverloadStop,NgAmfOverloadStart

- Label: `asn_failures`

  Label Description: Failure reason

  Example:

AMF NGAP service_stats Category

n2_service_stats

Description: AMF NGAP service stats

Sample Query:
`n2_service_stats{message_type=\"N2HandoverCommand\",status=\"success\",reason=\"\",roaming_status=\"HOMER\",slice_data=\"2-333333\"}`

Labels:

- Label: `message_type`

  Label Description: The message type associated with an NGAP service

  Example: N2PduSessResourceSetupRsp, N2PduSessResourceReleaseRsp, N2PduSessResourceModifyRsp, N2UeContextReleaseRequest, N2UeContextReleaseComplete, N2UplinkRanStatusTransfer, N2UeRadioCapabilityInfoInd, N2UeRadioCapabilityCheckReq, N2UeRadioCapabilityCheckRsp, N2InitialContextSetupRsp, N2InitialContextSetupFail, N2UEContextModificationRsp, N2UEContextModificationFail, NonUeN2WriteReplaceWarningReq, NonUeN2WriteReplaceWarningRsp, NonUeN2PWSCancelWarningReq, NonUeN2PWSCancelWarningRsp, NonUeN2PWSFailureIndication,

NonUeN2PWSRestartIndication, N2NGReset, N2UeContextReleaseCommand, N2InitialContextSetupReq, N2UEContextModificationReq, N2PduSessResouceModifyReq, N2PathSwitchReqAckMsg, N2PathSwitchReqFailureMsg, N2HandoverRequired, N2HandoverRequestAck, N2HandoverFailure, N2HandoverRequest, N2HandoverCommand, N2HandoverPreparationFailure, N2HandoverNotify, N2HandoverCancel, N2HandoverCancelAck, N2DLRanStatuTransfer, N2PathSwitchReqMsg, N2PduSessResouceReleaseCmd, Paging, N2PduSessResouceSetupReq, N2LocationReportingControl, N2LocationReport, N2LocationReportingFailureIndication, N2ReRouteNasRequest, UeAssociatedNRPPaTransport, DlUeAssociatedNRPPaTransport, UlNonUeAssociatedNRPPaTransport, DlNonUeAssociatedNRPPaTransport, N2InfoNotify, N2InfoNotifyRspData, N2InfoNotifyRspInfo

- Label: `status`

  Label Description: Overall status

  Example: success, failures

- Label: `reason`

  Label Description: The reason associated with Ngap message failure

  Example: NgResetDropped,No GNB Matched,Unable to get rsp,Unable to retrieve msg from rsp,Internal Error,Msg Timeout,Invalid Input,Mandatory IE Missing,Invalid PduSession,No connection with GNB

- Label: `slice_data`

  Label Description: slice data

  Example: 2-333333

- Label: `roaming_status`

  Label Description: Roaming Info

  Example: HOMER, ROAMER, UNKNOWN

AMF PCF Service Stats Category

n15_service_stats

Description: AMF PCF service stats

Sample Query:
`n15_service_stats{message_type=\"NpcfAmPolicyControlCreateReq\",status=\"failures\",reason=\"Unable to get rsp\",roaming_status=\"HOMER\",slice_data=\"2-333333\"}`

Labels:

- Label: `message_type`

  Label Description: The message type associated with an pcf service

  Example: NpcfAmPolicyControlCreateReq, NpcfAmPolicyControlCreateRsp, NpcfAmPolicyControlDeleteReq, NpcfAmPolicyControlDeleteRsp

- Label: `status`

  Label Description: Overall status

  Example: success, failures

- Label: `reason`

Label Description: The reason associated with an pcf service

Example: Unable to get rsp, Unable to retrieve msg from rsp, Failure in PCF Response, Internal Error

- Label: `slice_data`

  Label Description: slice data

  Example: 2-333333

- Label: `roaming_status`

  Label Description: Roaming Info

  Example: HOMER, ROAMER, UNKNOWN

AMF Procedure Seconds Category

amf_procedure_seconds

Description: Total number of seconds took for complete procedure

Sample Query:
`amf_procedure_seconds{proc_type=\"UERegistration\",status=\"success\",proc_status=\"ProcStatusComplete\",slice_data=\"2-333333\"}`

Labels:

- Label: `proc_type`

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

  Example: Unknown, UERegistration, UEOrNwDeRegistration, PduCreate, PduN1N2, PduN2Rsp, PduN1Rsp, PduMod, UEContextRelease, PduNotify, EBI, Paging, ServiceRequest, ContextTransfer, ContextTransferUpdate, XnHandover, N2HandoverSrc, HandovertoEPC, UeRadioCapInfoInd, NGReset, N2HandoverTgt, HandoverFromEPC, UeCfgUpdate, DomainSelectionInfo, AmfRedirection, UpLinkDownlink, LawfulIntercept, RegistrationComplete, ContextTransferEPC, LocationPosition, UdmDataChangeNotify, EventExposure

- Label: `status`

  Label Description: The overall status of procedure

  Example: success, failures, attempted

- Label: `proc_status`

  Label Description: The current status of procedure

  Example: ProcStatusComplete, Aborted

- Label: `slice_data`

  Label Description: slice data

  Example: 2-333333

AMF Procedure total Category

amf_procedure_total

Description: Total number of procedure executed counter

Sample Query:
`amf_procedure_total{proc_type=\"UERegistration\",status=\"success\",proc_status=\"ProcStatusComplete\",slice_data=\"2-333333\"}`

Labels:

- Label: `proc_type`

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

  Example: Unknown, UERegistration, UEOrNwDeRegistration, PduCreate, PduN1N2, PduN2Rsp, PduN1Rsp, PduMod, UEContextRelease, PduNotify, EBI, Paging, ServiceRequest, ContextTransfer, ContextTransferUpdate, XnHandover, N2HandoverSrc, HandovertoEPC, UeRadioCapInfoInd, NGReset, N2HandoverTgt, HandoverFromEPC, UeCfgUpdate, DomainSelectionInfo, AmfRedirection, UpLinkDownlink, LawfulIntercept, RegistrationComplete, ContextTransferEPC, LocationPosition, UdmDataChangeNotify, EventExposure

- Label: `status`

  Label Description: The overall status of procedure

  Example: success, failures, attempted

- Label: `proc_status`

  Label Description: The current status of procedure

  Example: ProcStatusComplete, Aborted

- Label: `slice_data`

  Label Description: slice data

  Example: 2-333333

AMF RETRANSMISSION STATS Category

retransmission_stats

Description: number of Retransmissions

Sample Query: `retransmission_stats{msg_type=\"Paging\",status=\"success\"}`

Labels:

- Label: `msg_type`

  Label Description: Message Type

  Example:
  GTPCFwdRelocCmpNotf, GTPCRelocCancelReq, GTPCIdentificationReq, GTPCContextReq

- Label: `status`

Label Description: overall Status

Example: success,failures,max_retry_exceeded

AMF Smf service stats Category

n11_service_stats

Description: AMF Smf service stats

Sample Query:

```
n11_service_stats{message_type=\"N11SMContextUpdateReq\",status=\"failures\",reason=\"Unable to get rsp\",roaming_status=\"HOMER\",slice_data=\"2-333333\"}
```

Labels:

- Label: `message_type`

  Label Description: The message type associated with an smf service

  Example: N11SMContextUpdateReq, N11SMContextUpdateRsp, N11SMContextRetrieveRsp, N11SMContextRetrieveReq, N11SMContextCreateReq, N11SMContextCreateRsp, N11SMContextReleaseReq, N11SMContextReleaseRsp, PostAssignEbiReq, PostAssignEbiRsp, N11N1N2MessageTransferReq, N11N1N2MessageTransferRsp, N11N1N2MessageTransferfailurenotifyReq, N11N1N2MessageTransferfailurenotifyRsp,N11SMContextStatusNotifyReq, N11SMContextStatusNotifyRsp

- Label: `status`

  Label Description: Overall status

  Example: success, failures

- Label: `reason`

  Label Description: The reason associated with an smf service

  Example: Unable to get rsp, Unable to retrieve msg from rsp, Unknown Subscriber, Internal Error, Msg Timeout, Peer Info Not Avaliable, Req Not Accepted, Sub IMSI Not Received, PGW FQDN Not Received, Mandatory IE Missing, Invalid Input, No Bearer Context, No Linked EBI, SM Context Failed for PDU, S1 mode Not Supported, SM Context PDU failed without N2smInfo, SM Context data received from SMF is NIL, N1 mode Not Supported

- Label: `slice_data`

  Label Description: slice data

  Example: 2-333333

- Label: `roaming_status`

  Label Description: Roaming Info

  Example: HOMER, ROAMER, UNKNOWN

AMF Smsf service stats Category

n20_service_stats

Description: AMF Smsf service stats

Sample Query:
```
n20_service_stats{message_type=\"sms_activate_response\",status=\"success\",reason=\"Created\",slice_data=\"2-333333\"}
```

Labels:

- Label: `message_type`

  Label Description: The message type associated with an smsf service

  Example: sms_activate_request, sms_activate_response, sms_deactivate_request, sms_deactivate_response, sms_send_msg_request, sms_send_msg_rsp, sms_n1n2_message_transfer_req, sms_n1n2_message_transfer_rsp, sms_enable_ue_reachability

- Label: `status`

  Label Description: Overall status

  Example: success, failures

- Label: `reason`

  Label Description: The reason associated with an smsf service

  Example: Created, No Content, Gateway Timeout, Unknown Subscriber

- Label: `slice_data`

  Label Description: slice data

  Example: 2-333333

AMF System Overload Status Category

amf_overload_status

Description: "Indicates the current system overload state. The possible overload state values are - 0 : None, 1 : Minor, 2 : Major, 3 : Critical". This statistic is controlled through the CLI. Refer to the CLI Command Reference Guide for details.

Sample Query: `amf_overload_status{}`

AMF UDM Service Stats Category

n8_service_stats

Description: AMF UDM service stats

Sample Query:
```
n8_service_stats{message_type=\"NudmSdmDataReq\",status=\"failures\",reason=\"INVALID_GUAMI\",roaming_status=\"HOMER\",slice_data=\"2-333333\"}
```

Labels:

- Label: `message_type`

  Label Description: The message type associated with an udm service

  Example: NudmSdmDataReq, NUdmUecmDeregisterNotificationRequest, NUdmUecmDeregisterNotificationResponse, NudmSdmUnSubscriptionReq, NudmSdmUnSubscriptionRsp, NudmPcscfRestorationReq, NudmPcscfRestorationRsp, NudmUecmRegistrationReq, NudmUecmRegistrationRsp, NudmSdmDataReq, NudmSdmDataRsp, NudmSdmSubscriptionReq, NudmSdmSubscriptionRsp, NudmSdmSorAckInfoReq, NudmSdmSorAckInfoRsp, NudmTadsReq, NudmTadsRsp, NudmAMFCreateSubscriptionReq, NudmAMFCreateSubscriptionRsp, NudmSdmDataChgNotfReq, NudmSdmDataChgNotfRsp

- Label: `status`

  Label Description: Overall status

  Example: success, failures

- Label: `reason`

  Label Description: The reason associated with an udm service

  Example: Suspend, Suspend for Async, Unable to get rsp, Unable to retrieve msg from rsp, Others, Internal Error, Missing Supi, Failure from Udm, SUBSCRIPTION_WITHDRAWN, UE_INITIAL_REGISTRATION, CONTEXT_NOT_FOUND, DATA_NOT_FOUND, UNSUPPORTED_RESOURCE_URI, USER_NOT_FOUND, ACCESS_NOT_ALLOWED, INVALID_GUAMI, NO_PS_SUBSCRIPTION, RAT_NOT_ALLOWED, ROAMING_NOT_ALLOWED, UNKNOWN_5GS_SUBSCRIPTION, UNPROCESSABLE_REQUEST, Invalid Input, Unknown Subscriber

- Label: `slice_data`

  Label Description: slice data

  Example: 2-333333

- Label: `roaming_status`

  Label Description: Roaming Info

  Example: HOMER, ROAMER, UNKNOWN

AMF Ue Service Stats Category

n1_service_stats

Description: AMF Ue service stats

Sample Query:

```
n1_service_stats{message_type=\"IdentityResponse\",status=\"failures\",reason=\"key Mismatch\",roaming_status=\"HOMER\",slice_data=\"2-333333\"}
```

Labels:

- Label: `message_type`

  Label Description: The message type associated with an UE service

Example: N1RegRequest , N1RegAccept ,N1RegComplete , N1RegReject , N1UnknownTypeRegReject , N1InitialRegReject , N1MobilityRegReject N1PeriodicRegReject , N1EmergencyRegReject , N1ReservedRegReject , N1SecurityModeCommand , N1AuthenticationRsp , N1AuthenticationReq , N1AuthenticationFailure , N1AuthFail_SyncFailure , N1AuthFail_NgKsiInUseFailure , N1AuthFail_MacFailure , N1AuthenticationReject N1UeCfgUpdateComplete , N1UeCfgUpdateCommand , N1SecurityModeComplete , N1SecurityModeReject , N1DeRegAccept_UeOriginatingDereg , N1DeRegReq_UeOriginatingDereg , N1DeRegAccept_UeTerminatedDereg , N1DeRegReq_UeTerminatedDereg , N1PduEstablistmentRequest , N1PduModifyRequest , N1PduReleaseRequest , N1DlNasTransport , N1UlNasTransport , N1PduReject , N1ServiceRequest , N1ServiceReq_Connected , N1ServiceReq_Idle , N1ServiceAccept , N1ServiceReq_SIGNALLING, N1ServiceReject , N1IdentityRequest_Suci , N1IdentityRequest , N1IdentityResponse , N1IdentityRequest_Imei

- Label: `status`

  Label Description: Overall status

  Example: success, failures

- Label: `reason`

  Label Description: The reason associated with an UE service

  Example: Suspend, Suspend for Async, Unable to get rsp, Unable to retrieve msg from rsp, Supi mismatch, Internal Error, Sync Failed, Timeout, Others, No Security Context from Peer, Peer Provided Sec Context Failed, NgKsi Already In Use, Scheduled ipc action in background, Unable to retrieve identity rsp, Unable to get Supi, key Mismatch

- Label: `slice_data`

  Label Description: slice data

  Example: 2-333333

- Label: `roaming_status`

  Label Description: Roaming Info

  Example: HOMER, ROAMER, UNKNOWN

AMF X1 Message total Category

amf_x1_message_total

Description: Total number of X1 messages

Sample Query:

```
amf_x1_message_total{message_direction=\"outbound\",message_type=\"ActivateTaskResponse\",
reason=\"\", req_msg_name=\"ActivateTask\", status=\"success\",x1_error_code=\"0\"}
```

Labels:

- Label: `message_type`

  Label Description: Message type for which counter is incremented

  Example: X1RequestMessage, X1RequestMessageTypeInvalid, X1ActivateTask, X1ModifyTask, X1DeactivateTask, X1DeactivateAllTasks, X1GetTaskDetails, X1CreateDestination,

X1ModifyDestination, X1RemoveDestination, X1RemoveAllDestinations, X1GetDestinationDetails, X1GetNEStatus, X1GetAllDetails, X1ListAllDetails, X1Ping, X1Keepalive

- Label: `message_direction`

  Label Description: Direction of the message flow

  Example: inbound, outbound

- Label: `status`

  Label Description: The overall status of the message

  Example: success, failure

- Label: `req_msg_name`

  Label Description: Corresponding request message type for responses

  Example: X1ActivateTask, X1ModifyTask, X1DeactivateTask, X1DeactivateAllTasks, X1GetTaskDetails, X1CreateDestination, X1ModifyDestination, X1RemoveDestination, X1RemoveAllDestinations, X1GetDestinationDetails, X1GetNEStatus, X1GetAllDetails, X1ListAllDetails, X1Ping, X1Keepalive

- Label: `x1_error_code`

  Label Description: Error code in case of status failure

  Example: 1010, 1000, 1020, 2010, 3010, 5000

- Label: `reason`

  Label Description: Error string in case of failures

  Example: Unsupported version, XID already exists on NE, Unsupported TargetIdentifier type, Generic error, Generic CreateDestination failure

AMF X2 Message Total Category

li_ep_x2_msg_total

Description: Total number of X2 messages sent

Sample Query: `li_ep_x2_msg_total{message_name=\"AMFRegistration\", status=\"msg_sent\"}`

Labels:

- Label: `message_name`

  Label Description: Name of the message

  Example: AMFRegistration, AMFDeregistration, AMFLocationUpdate, AMFStartOfInterceptionWithRegisteredUE, AMFUnsuccessfulProcedure, AMFIdentifierAssociation, X2KeepAlive, X2KeepAliveAck

- Label: `status`

  Label Description: The overall status of the message

  Example: msg_sent, msg_drop, msg_received

ASN FAILURE MANDATORY IE MISSING Category

asn_failures_mandatory_ie_missing

Description: mandatory missing Ies. This statistic is controlled through the CLI. Refer to the CLI Command Reference Guide for details.

Sample Query:
`asn_failures_mandatory_ie_missing{message_type=\"WriteReplaceWarningRequest\",missing_ie=\"MessageId\"}`

Labels:

- Label: `missing_ie`

  Label Description: Missing IE

  Example:
  MessageId,SerialNumber,GlobalRANNodeID,RANNodeName,SupportedTAList,RanUeNgapId,NasPdu,UserLocationInformation,Cause,ResetType

- Label: `message_type`

  Label Description: Message Type

  Example:
  WriteReplaceWarningRequest,NgSetupRequest,RanConfigUpdate,InitialUeMessage,UlNasTransport,NgapReset

Discover Messages statistics Category

nf_discover_messages_total

Description: Discover Messages statistics

Sample Query: `nf_discover_messages_total{nf_type=\"AMF\", host=\"10.105.227.109:8082\", result=\"success\", version=\"v1\", svc_name=\"nnrf-disc\", gr_instance_id=\"1\"}`

Labels:

- Label: `nf_type`

  Label Description: Network Function type

  Example: AMF, AUSF, GMLC, LMF, NSSF, PCF, SCP, SMF, SMSF, UDM, 5G_EIR

- Label: `host`

  Label Description: End Point address

  Example: 10.105.227.109:8082

- Label: `result`

  Label Description: result of discover message

  Example: 404, success, timeout_rpc_error, response_parse_failure

- Label: `version`

  Label Description: API version being used

  Example: v1

- Label: `svc_name`

  Label Description: The service name being accessed

  Example: nnrf-disc

- Label: `gr_instance_id`

  Label Description: Geographic redundancy instance ID

  Example: 1

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=\"10.105.227.109:8082\", result=\"success\", version=\"v1\", svc_name=\"nnrf-disc\", gr_instance_id=\"1\"}`

Labels:

- Label: `nf_type`

  Label Description: Network Function type

  Example: AMF, AUSF, GMLC, LMF, NSSF, PCF, SCP, SMF, SMSF, UDM, 5G_EIR

- Label: `host`

  Label Description: End Point address

  Example: 10.105.227.109:8082

- Label: `result`

  Label Description: result of discover message

  Example: 404, success, timeout_rpc_error, response_parse_failure

- Label: `version`

  Label Description: API version being used

  Example: v1

- Label: `svc_name`

  Label Description: The service name being accessed

  Example: nnrf-disc

- Label: `gr_instance_id`

  Label Description: Geographic redundancy instance ID

  Example: 1

DNS related statistics Category

dns_request_total

Description: Number of requests sent to CoreDNS for DNS resolution

Sample Query: `dns_request_total{method_name=\"get\", attempt=\"first\", type=\"ipv4\", fqdn=\"example.com\"}`

Labels:

- Label: `method_name`

  Label Description: The method name for DNS resolution

  Example: get

- Label: `attempt`

  Label Description: The attempt to resolve the fully qualified domain name (FQDN)

  Example: first, second

- Label: `type`

  Label Description: The type of DNS request

  Example: ipv4, ipv6

- Label: `fqdn`

  Label Description: The fully qualified domain name being queried

  Example: fqdn1.com, fqdn2.com

dns_response_total

Description: Number of response received from CoreDNS for DNS resolution

Sample Query: `dns_response_total{method_name=\"get\", attempt=\"first\", type=\"ipv4\", fqdn=\"example.com\", status=\"success\", status_code=\"ipv4NotFound\"}`

Labels:

- Label: `attempt`

  Label Description: The attempt to resolve the fully qualified domain name (FQDN)

  Example: first, second

- Label: `type`

  Label Description: The type of DNS response

  Example: ipv4, ipv6

- Label: `fqdn`

  Label Description: The fully qualified domain name for which the response was received

  Example: fqdn1.com, fqdn2.com

- Label: `status`

Label Description: The status of the DNS response

Example: success, error

- Label: `status_code`

  Label Description: The status code in case of an error

  Example: ipv4NotFound, ipv6NotFound

fqdn_dns_msg_total

Description: Number of FQDN resolution Attempted/Success/Failure for targetNfType and service name

Sample Query: `fqdn_dns_msg_total{fqdn=\"example.com\", nf_type=\"SCP\", svc_name=\"nudm-sdm\", req=\"resolution\", status=\"attempted\", error=\"entry_not_found\"}`

Labels:

- Label: `fqdn`

  Label Description: The fully qualified domain name involved in the message

  Labels:

- Label: `nf_type`

  Label Description: The network function type

  Example: SCP,UDM,PCF

- Label: `svc_name`

  Label Description: Service name for which DNS query was sent

  Example: nudm-sdm, nausf-auth

- Label: `req`

  Label Description: FQDN resolution done using cache or DNS server

  Example: resolution, cache

- Label: `status`

  Label Description: DNS resolution status such as attempted, success, or failure

  Example: attempted, success, failure

- Label: `error`

  Label Description: The error code in case of a failure

  Example: ipv4NotFound, ipv6NotFound

Marshal Failures Category

marshal_failures

Description: total number of Marshal error statss

Sample Query: `marshal_failures{message_type=\"SmfSmContextDelete\"}`

Labels:

- Label: `message_type`

  Label Description: The message type associated with Marshal failure stats

  Example: AusfAuthenticationCfm, AusfAuthenticationReq, UdmDeRegistrationReq, UdmRegistrationReq, UdmSubscriptionReq, UdmUnSubscriptionReq, PcfAmfPolicyControlCreate, PcfAmfPolicyControlDelete, SmfSmContextCreate, SmfSmContextDelete, SmfSmContextUpdate, AmfCommCreateUeContext, AmfCommN1N2MessageTransfer

N22 Service Stats Category

n22_service_stats

Description: AMF N22 stats

Sample Query: `n22_service_stats{message_type=\"NssfGetNetworkSliceInformationResp\", status=\"failures\", reason=\"Unable to get rsp\"}`

Labels:

- Label: `message_type`

  Label Description: The message type associated with an N22 interface

  Example: NssfGetNetworkSliceInformationReq, NssfGetNetworkSliceInformationResp

- Label: `status`

  Label Description: Overall status

  Example: success, failures

- Label: `reason`

  Label Description: The reason associated with an N22 service

  Example: Unable to get rsp, Unable to retrieve msg from rsp, Msg Timeout

N26 Service Stats Category

n26_service_stats

Description: AMF N26 stats

Sample Query: `n26_service_stats{message_type=\"GTPCRxIdentificationRequest\",status=\"failures\",reason=\"N1 mode Not Supported\",roaming_status=\"HOMER\",slice_data=\"2-333333\"}`

Labels:

- Label: `message_type`

  Label Description: The message type associated with an N26 service

Example: GTPCRxIdentificationRequest, GTPCTxIdentificationRequest, GTPCRxContextRequest, GTPCTxContextRequest, GTPCRxContextResponse, GTPCTxContextResponse, GTPCRxContextAck, GTPCTxContextAck, GTPCRxFwdRelocRequest, GTPCTxFwdRelocRequest, GTPCRxFwdRelocResponse, GTPCTxFwdRelocResponse, GTPCRxFwdRelocCmpNotf, GTPCTxFwdRelocCmpNotf, GTPCRxFwdRelocCmpAck, GTPCTxFwdRelocCmpAck, GTPCRxRelocCancelReq, GTPCTxRelocCancelReq, GTPCRxRelocCancelRsp, GTPCTxRelocCancelRsp, GTPCTxIdentificationResponse, GTPCRxIdentificationResponse

- Label: `status`

  Label Description: Overall status

  Example: success, failures

- Label: `reason`

  Label Description: The reason associated with an N26 service

  Example: Unable to get rsp, Unable to retrieve msg from rsp, Unknown Subscriber, Internal Error, Msg Timeout, Peer Info Not Avaliable, Req Not Accepted, Sub IMSI Not Received, Mandatory IE Missing, No Linked EBI, N1 mode Not Supported, Integrity Check Failed

- Label: `slice_data`

  Label Description: slice data

  Example: 2-333333

- Label: `roaming_status`

  Label Description: Roaming Info

  Example: HOMER, ROAMER, UNKNOWN

NF End point selections Category

nf_endpoint_selections_total

Description: NF End Point Selection Statistics

Sample Query: `nf_endpoint_selections_total{message_type=\"SmfSmContextDelete\", nf_type=\"SMF\", host=\"10.105.227.109:8082\", svc_name=\"nsmf-pdusession\", version=\"v1\", req=\"initial\", result=\"result_200\", response_type=\"internal\", retransmit=\"false\", gr_instance_id=\"1\"}`

Labels:

- Label: `message_type`

  Label Description: The message type associated with the endpoint selection

  Example: SmfSmContextCreate, SmfSmContextUpdate, SmfSmContextRetrieve, SmfSmContextDelete, SmfN1N2MsgTxfrFailureNotification, NrfHpcfIdQuery, NssfNSSelectionReq, UdmRegistrationReq, UdmSdmGetUeAmSubscriptionData, UdmSubscriptionReq, UdmSorAckInfoReq, UdmSubscribedSnssaisAckReq, AusfAuthenticationReq, AusfAuthenticationCfm, SmsfActivationReq, SmsfDeactivationReq, SmsfSendSms, EirCheckEquipmentIdentity, AmfEventNotification, AmfCommN1N2MessageTransfer, AmfCommCreateUeContext, AmfCommReleaseUeContext, AmfCommUeContextTransfer, AmfCommUeContextTransferUpdate, AmfN1MessageNotifyClient,

AmfN2InfoNotifyClient, LmfN1MessageNotify, LmfN2InfoNotify, LmfDetermineLocation, NotifiedPosInfo, AmfStatusChangeNotify, CbcfN2InfoNotify

- Label: `nf_type`

  Label Description: Network Function type

  Example: AMF, AUSF, GMLC, LMF, NSSF, PCF, SCP, SMF, SMSF, UDM, 5G_EIR, CBCF

- Label: `host`

  Label Description: End Point address

  Example: 10.105.227.109:8082

- Label: `req`

  Label Description: req type

  Example: initial, fallback,

- Label: `result`

  Label Description: The outcome of the selected endpoint

  Example: result_200, result_404, rpc_host_not_found, peer_down_failure

- Label: `svc_name`

  Label Description: The service name being accessed

  Example: nsmf-pdusession, nudm-sdm, namf-comm, etc.

- Label: `response_type`

  Label Description: How the response was obtained

  Example: internal, external

- Label: `version`

  Label Description: API version being used

  Example: v1, v2

- Label: `retransmit`

  Label Description: Retransmission information

  Example: \"\"", retransmit_0, retransmit_1, retransmit_2

- Label: `gr_instance_id`

  Label Description: Geographic redundancy instance ID

  Example: 1

NF failure handling stats Category

nf_failure_handling_stats_total

Description: NF Failure handling stats

Sample Query: `nf_failure_handling_stats_total{message_type=\"SmfSmContextDelete\", nf_type=\"SMF\", host=\"10.105.227.109:8082\", svc_name=\"nsmf-pdusession\", version=\"v1\", req=\"initial\", response=\"503\", status=\"final\", response_type=\"internal\", gr_instance_id=\"1\"}`

Labels:

- Label: `message_type`

  Label Description: The message type associated with the failure stats

  Example: SmfSmContextCreate, SmfSmContextUpdate, SmfSmContextRetrieve, SmfSmContextDelete, SmfN1N2MsgTxfrFailureNotification, NrfHpcfIdQuery, NssfNSSelectionReq, UdmRegistrationReq, UdmSdmGetUeAmSubscriptionData, UdmSubscriptionReq, UdmSorAckInfoReq, UdmSubscribedSnssaisAckReq, AusfAuthenticationReq, AusfAuthenticationCfm, SmsfActivationReq, SmsfDeactivationReq, SmsfSendSms, EirCheckEquipmentIdentity, AmfEventNotification, AmfCommN1N2MessageTransfer, AmfCommCreateUeContext, AmfCommReleaseUeContext, AmfCommUeContextTransfer, AmfCommUeContextTransferUpdate, AmfN1MessageNotifyClient, AmfN2InfoNotifyClient, LmfN1MessageNotify, LmfN2InfoNotify, LmfDetermineLocation, NotifiedPosInfo, AmfStatusChangeNotify, CbcfN2InfoNotify

- Label: `nf_type`

  Label Description: Network Function type

  Example: AMF, AUSF, GMLC, LMF, NSSF, PCF, SCP, SMF, SMSF, UDM, 5G_EIR, CBCF

- Label: `host`

  Label Description: End Point address

  Example: 10.105.227.109:8082

- Label: `req`

  Label Description: Request type

  Example: initial, fallback,

- Label: `response`

  Label Description: Response from the server

  Example: 503, 500, 404, timeout_rpc_error

- Label: `status`

  Label Description: Status from the server

  Example: retry, final

- Label: `svc_name`

  Label Description: The service name being accessed

  Example: nsmf-pdusession, nudm-sdm, namf-comm, etc.

- Label: `version`

  Label Description: API version being used

  Example: v1, v2

- Label: `response_type`

  Label Description: How the response was obtained

  Example: \"\",internal

- Label: `gr_instance_id`

  Label Description: Geographic redundancy instance ID

  Example: 1

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=\"nnrf-nfm\", version=\"v1\", direction=\"outbound\", message_type=\"registration\", notification_event_type=\"\", condition_event_type=\"\", result=\"success\", gr_instance_id=\"1\"}`

Labels:

- Label: `host`

  Label Description: End Point address

  Example: 10.105.227.109:8082

- 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, deregistration, heartbeat, nfUpdate, nfUpdatePatch, subscription, notification, updateSubscription, unsubscription

- Label: `result`

  Label Description: Result of the management message

  Example: 404, success, timeout_rpc_error, response_parse_failure, request_parse_failure, invalid_notify_event, invalid_nf_instance_uri, internal_error

- Label: `svc_name`

  Label Description: The service name being accessed

  Example: nnrf-nfm

- Label: `version`

  Label Description: API version being used

  Example: v1

- Label: `notification_event_type`

  Label Description: Type of notification event (for notification messages)

  Example: \"\"", NF_REGISTERED, NF_DEREGISTERED, NF_PROFILE_CHANGED

- Label: `condition_event_type`

  Label Description: Type of condition event (for notification messages)

  Example: \"\"", NF_ADDED, NF_REMOVED

- Label: `gr_instance_id`

  Label Description: Geographic redundancy instance ID

  Example: 1

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=\"nnrf-nfm\", version=\"v1\", direction=\"outbound\", message_type=\"registration\", result=\"success\", gr_instance_id=\"1\"}`

Labels:

- Label: `host`

  Label Description: End Point address

  Example: 10.105.227.109:8082

- Label: `direction`

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

  Example: inbound, outbound

- Label: `svc_name`

  Label Description: The service name being accessed

  Example: nnrf-nfm

- Label: `version`

  Label Description: API version being used

  Example: v1

- Label: `message_type`

  Label Description: Type of Message

  Example: registration, deregistration, heartbeat, nfUpdate, nfUpdatePatch, subscription, updateSubscription, unsubscription

- Label: `result`

Label Description: Result of the management message

Example: 404, success, timeout_rpc_error, response_parse_failure, request_parse_failure, invalid_notify_event, invalid_nf_instance_uri, internal_error

NF Message Processing Time Category

nf_send_message_total_time

Description: NF Send Message Total Time

Sample Query: `nf_send_message_total_time{nf_type=\"AMF\", svc_name=\"namf-comm\", message_type=\"AmfCommCreateUeContext\", result=\"SendSuccess\", status_code=\"200\", gr_instance_id=\"1\"}`

Labels:

- Label: `nf_type`

  Label Description: Network Function type that processed the message

  Example: AMF, AUSF, GMLC, LMF, NSSF, PCF, SCP, SMF, SMSF, UDM, 5G_EIR, CBCF, ANY

- Label: `svc_name`

  Label Description: The service name that processed the message

  Example: namf-comm, nsmf-pdusession, nudm-sdm, nausf-auth, npcf-am-policy-control, etc.

- Label: `message_type`

  Label Description: The type of message that was processed

  Example: SmfSmContextCreate, SmfSmContextUpdate, SmfSmContextRetrieve, SmfSmContextDelete, SmfN1N2MsgTxfrFailureNotification, NrfHpcfIdQuery, NssfNSSelectionReq, UdmRegistrationReq, UdmSdmGetUeAmSubscriptionData, UdmSubscriptionReq, UdmSorAckInfoReq, UdmSubscribedSnssaisAckReq, AusfAuthenticationReq, AusfAuthenticationCfm, SmsfActivationReq, SmsfDeactivationReq, SmsfSendSms, EirCheckEquipmentIdentity, AmfEventNotification, AmfCommN1N2MessageTransfer, AmfCommCreateUeContext, AmfCommReleaseUeContext, AmfCommUeContextTransfer, AmfCommUeContextTransferUpdate, AmfN1MessageNotifyClient, AmfN2InfoNotifyClient, LmfN1MessageNotify, LmfN2InfoNotify, LmfDetermineLocation, NotifiedPosInfo, AmfStatusChangeNotify, CbcfN2InfoNotify

- Label: `result`

  Label Description: Overall result of the message processing

  Example: SendSuccess, SendFailure, LibPeerDownFailure

- Label: `status_code`

  Label Description: HTTP status code or error type of the response

  Example: 0,200, 201, 404, 403, 504, dns_failure

- Label: `gr_instance_id`

  Label Description: Geographic redundancy instance ID

  Example: 1

NF Request Messages Category

nf_req_recieved_messages_total

Description: NF Send Messages request received Total

Sample Query: `nf_req_recieved_messages_total{nf_type=\"AMF\", svc_name=\"namf-comm\", message_type=\"AmfCommCreateUeContext\", gr_instance_id=\"1\"}`

Labels:

- Label: `nf_type`

  Label Description: Network Function type that received the request

  Example: AMF, AUSF, GMLC, LMF, NSSF, PCF, SCP, SMF, SMSF, UDM, 5G_EIR, CBCF, ANY

- Label: `svc_name`

  Label Description: The service name that received the request

  Example: namf-comm, nsmf-pdusession, nudm-sdm, nausf-auth, npcf-am-policy-control, etc.

- Label: `message_type`

  Label Description: The type of message received

  Example: SmfSmContextCreate, SmfSmContextUpdate, SmfSmContextRetrieve, SmfSmContextDelete, SmfN1N2MsgTxfrFailureNotification, NrfHpcfIdQuery, NssfNSSelectionReq, UdmRegistrationReq, UdmSdmGetUeAmSubscriptionData, UdmSubscriptionReq, UdmSorAckInfoReq, UdmSubscribedSnssaisAckReq, AusfAuthenticationReq, AusfAuthenticationCfm, SmsfActivationReq, SmsfDeactivationReq, SmsfSendSms, EirCheckEquipmentIdentity, AmfEventNotification, AmfCommN1N2MessageTransfer, AmfCommCreateUeContext, AmfCommReleaseUeContext, AmfCommUeContextTransfer, AmfCommUeContextTransferUpdate, AmfN1MessageNotifyClient, AmfN2InfoNotifyClient, LmfN1MessageNotify, LmfN2InfoNotify, LmfDetermineLocation, NotifiedPosInfo, AmfStatusChangeNotify, CbcfN2InfoNotify

- Label: `gr_instance_id`

  Label Description: Geographic redundancy instance ID

  Example: 1

NF Response Messages Category

nf_resp_sent_messages_total

Description: NF Send Messages response sent Total

Sample Query: `nf_resp_sent_messages_total{nf_type=\"AMF\", svc_name=\"namf-comm\", message_type=\"AmfCommCreateUeContext\", result=\"SendSuccess\", status_code=\"200\", gr_instance_id=\"1\"}`

Labels:

- Label: `nf_type`

  Label Description: Network Function type that sent the response

Example: AMF, AUSF, GMLC, LMF, NSSF, PCF, SCP, SMF, SMSF, UDM, 5G_EIR, CBCF, ANY

- Label: `svc_name`

  Label Description: The service name that sent the response

  Example: namf-comm, nsmf-pdusession, nudm-sdm, nausf-auth, npcf-am-policy-control, etc.

- Label: `message_type`

  Label Description: The type of message for which response was sent

  Example: SmfSmContextCreate, SmfSmContextUpdate, SmfSmContextRetrieve, SmfSmContextDelete, SmfN1N2MsgTxfrFailureNotification, NrfHpcfIdQuery, NssfNSSelectionReq, UdmRegistrationReq, UdmSdmGetUeAmSubscriptionData, UdmSubscriptionReq, UdmSorAckInfoReq, UdmSubscribedSnssaisAckReq, AusfAuthenticationReq, AusfAuthenticationCfm, SmsfActivationReq, SmsfDeactivationReq, SmsfSendSms, EirCheckEquipmentIdentity, AmfEventNotification, AmfCommN1N2MessageTransfer, AmfCommCreateUeContext, AmfCommReleaseUeContext, AmfCommUeContextTransfer, AmfCommUeContextTransferUpdate, AmfN1MessageNotifyClient, AmfN2InfoNotifyClient, LmfN1MessageNotify, LmfN2InfoNotify, LmfDetermineLocation, NotifiedPosInfo, AmfStatusChangeNotify, CbcfN2InfoNotify

- Label: `result`

  Label Description: Overall result of the message processing

  Example: SendSuccess, SendFailure, LibPeerDownFailure

- Label: `status_code`

  Label Description: HTTP status code or error type of the response

  Example: 0,200, 201, 404, 403, 504, dns_failure

- Label: `gr_instance_id`

  Label Description: Geographic redundancy instance ID

  Example: 1

NRF Access Token Category

nf_oauth_messages_total

Description: Total AccessToken Message count

Sample Query: `nf_oauth_messages_total{nf_type=\"PCF\", host=\"10.105.227.109:8082\", svc_name=\"nnrf-oauth2\", version=\"v1\", result=\"success\", gr_instance_id=\"1\"}`

Labels:

- Label: `nf_type`

  Label Description: Network Function type

  Example: AMF, AUSF, GMLC, LMF, NSSF, PCF, SMF, SMSF, UDM, 5G_EIR

- Label: `result`

  Label Description: Overall status of the OAuth message

Example: success, error, result_401, result_403

- Label: `host`

  Label Description: End Point address (hostname/IP of the target endpoint)

  Example: 10.105.227.109:8082

- Label: `svc_name`

  Label Description: The service name being accessed

  Example: nnrf-oauth2

- Label: `version`

  Label Description: API version being used

  Example: v1

- Label: `gr_instance_id`

  Label Description: Geographic redundancy instance ID

  Example: 1

NRF Discovery Category

nf_discover_events_total

Description: NF Discover Stats

Sample Query: `nf_discover_events_total{nf_type=\"PCF\", response_type=\"local\", gr_instance_id=\"1\"}`

Labels:

- Label: `nf_type`

  Label Description: Network Function type

  Example: AMF, AUSF, GMLC, LMF, NSSF, PCF, SCP, SMF, SMSF, UDM, 5G_EIR

- Label: `response_type`

  Label Description: Discovery response choosen from

  Example: local, cache, expired-cache

- Label: `gr_instance_id`

  Label Description: Geographic redundancy instance ID

  Example: 1

NRF Subscription Messages 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\", subscrCond=\"NFInstanceId\", gr_instance_id=\"1\"}`

Labels:

- Label: `host`

  Label Description: End Point address (hostname/IP of the target NRF)

  Example: 10.105.227.109:8082

- Label: `message_type`

  Label Description: Type of subscription message

  Example: subscription, updateSubscription, unsubscription

- Label: `req`

  Label Description: Request type/attempt for subscription operations

  Example: resourceUri, initial, retry_1, retry_2

- Label: `gr_instance_id`

  Label Description: Geographic redundancy instance ID

  Example: 1

- Label: `subscrCond`

  Label Description: Subscription condition type

  Example: \"\"", "NFInstanceId

Security Algorithm Category

amf_nas_security_algos_seconds_total

Description: Statistic for capturing duration taken for security algorithm. This statistic is controlled through the CLI. Refer to the CLI Command Reference Guide for details.

Sample Query:
`amf_nas_security_algos_seconds_total{algos_type=\"128-5G-IA1\", status=\"success\", reason=\"\", algos_lang=\"3Glang\", message_type=\"N1IdentityResponse\", message_direction=\"inbound\"}`

Labels:

- Label: `message_type`

  Label Description: The name of the message type

  Example: N1IdentityResponse, N1RegistrationRequest, N1RegistrationAccept, N1RegistrationComplete, N1RegistrationReject, N1AuthenticationRequest, N1AuthenticationResponse, N1AuthenticationResult,

N1AuthenticationFailure, N1SecurityModeCommand, N1IdentityRequest, N1ServiceAccept, N1ServiceReject, N1ConfigurationUpdateCommand, N1ConfigurationUpdateComplete, N1DeRegistrationAcceptUeOrigDereg, N1DeRegistrationRequestUeTermDereg, N1DlNasTransport, N1UeCfgUpdateFailure, N1SecurityModeComplete, N1SecurityModeReject, N1DeRegistrationAcceptUeTermDereg, N1UlNasTransport, N1DeRegistrationRequestUeOrigDereg, N1ServiceRequest

- Label: `status`

  Label Description: Status of the application of security algorithm

  Example: success, failures

- Label: `reason`

  Label Description: The reason for failure

  Example: integrity check failed,Security Context Not Found

- Label: `algos_type`

  Label Description: The type of algorithm

  Example: 128-5G-IA1, 5G-EA0, 128-5G-EA2, 5G-IA0, 128-5G-IA1, 128-5G-IA2

- Label: `message_direction`

  Label Description: The direction of the message flow

  Example: inbound, outbound

- Label: `algos_lang`

  Label Description: The implemtnation of security algorithm

  Example: GoLang

amf_nas_security_algos_total

Description: Statistic for capturing counter of security algorithm. This statistic is controlled through the CLI. Refer to the CLI Command Reference Guide for details.

Sample Query:

```
amf_nas_security_algos_total{algos_type=\"128-5G-IA1\",status=\"success\",reason=\"\",algos_lang=\"GoLang\",message_type=\"N1IdentityResponse\",message_direction=\"inbound\"}
```

Labels:

- Label: `message_type`

  Label Description: The name of the message type

  Example: N1IdentityResponse, N1RegistrationRequest, N1RegistrationAccept, N1RegistrationComplete, N1RegistrationReject, N1AuthenticationRequest, N1AuthenticationResponse, N1AuthenticationResult, N1AuthenticationFailure, N1SecurityModeCommand, N1IdentityRequest, N1ServiceAccept, N1ServiceReject, N1ConfigurationUpdateCommand, N1ConfigurationUpdateComplete, N1DeRegistrationAcceptUeOrigDereg, N1DeRegistrationRequestUeTermDereg, N1DlNasTransport, N1UeCfgUpdateFailure, N1SecurityModeComplete, N1SecurityModeReject, N1DeRegistrationAcceptUeTermDereg, N1UlNasTransport, N1DeRegistrationRequestUeOrigDereg, N1ServiceRequest

- Label: `status`

Label Description: Status of the application of security algorithm

Example: success, failures

- Label: `reason`

  Label Description: The reason for failure

  Example: integrity check failed,Security Context Not Found

- Label: `algos_type`

  Label Description: The type of algorithm

  Example: 128-5G-IA1, 5G-EA0, 128-5G-EA2, 5G-IA0, 128-5G-IA1, 128-5G-IA2

- Label: `message_direction`

  Label Description: The direction of the message flow

  Example: inbound, outbound

- Label: `algos_lang`

  Label Description: The implemtnation of security algorithm

  Example: GoLang

Unmarshal Failures Category

unmarshal_failures

Description: total number of Unmarshal error stats

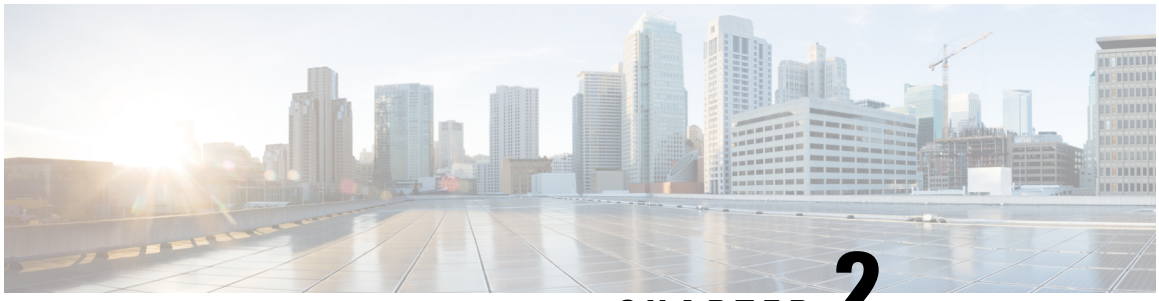
Sample Query: `unmarshal_failures{message_type=\"SmfSmContextDelete\"}`

Labels:

- Label: `message_type`

  Label Description: The message type associated with Unmarshal failure stats

  Example: AusfAuthenticationCfm, AusfAuthenticationReq, UdmDeRegistrationReq, UdmRegistrationReq, UdmSubscriptionReq, UdmUnSubscriptionReq, PcfAmfPolicyControlCreate, PcfAmfPolicyControlDelete, SmfSmContextCreate, SmfSmContextDelete, SmfSmContextUpdate, AmfCommCreateUeContext, AmfCommN1N2MessageTransfer



CHAPTER 2

KPI Support for Multiple Replicas

- Feature Summary and Revision History, on page 37
- Feature Description, on page 37
- OAM Support, on page 38

Feature Summary and Revision History

Summary Data

Table 1: Summary Data

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

Revision History

Table 2: Revision History

Revision Details	Release
First introduced.	2021.04.0

Feature Description

This feature supports the following statistics:

- Procedural
- Service-based Interface (SBI)

- Session
  - gNB ID
  - Tracking Area (TA)

OAM Support

This section describes operations, administration, and maintenance information for this feature.

Procedural Statistics

The following procedural statistics are supported.

Metrics	Description	Labels
procedure_execution_seconds_total	Total time in seconds for executing the procedure.	• execution_stage • msg_type • proc_name • sub_proc_name
procedure_service_total	Total number of procedures executed in service.	proc_name
procedure_service_duration_seconds_total	Total time in seconds for executing the procedure in service pod.	proc_name
procedure_service_duration_histogram_total	Histogram time bins for executing the procedure in service pod.	• proc_name • bin
sub_procedure_service_total	Total number of sub procedures executed in service.	• msg_type • proc_name • sub_proc_name
sub_procedure_service_duration_seconds_total	Total time in seconds for executing the sub procedure in service pod.	• msg_type • proc_name • sub_proc_name
sub_procedure_service_duration_histogram_total	Histogram time bins for executing the sub procedure in service pod.	• msg_type • proc_name • sub_proc_name • bin

SBI Statistics

The following SBI statistics are supported.

Metrics	Description	Labels
rpc_response_total	Total number of Remote Process Call (RPC) responses received.	• background • dest_host • dest_set • interface • method_name • msg_type • namespace • proc_name • retry • rpc_name • service_name • stage • status • status_code • sub_proc_name • txn_type

Session Statistics

The following session statistics are supported.

Metrics	Description	Labels
db_records_total	Total number of records present in database.	• CipheringAlgo • IntegrityAlgo • session_type

Bulk Statistics

The following are examples of KPI Support for Multiple Replicas.

Procedural Statistics Example

```
procedure_execution_seconds_total{app_name="amf",cluster="clu1",data_center="dc1",execution_stage="AppInfra",
instance_id="0",msg_type="N1RegistrationRequest",proc_name="UE
Registration",service_name="amf-service",
sub_proc_name="N1RegistrationRequest"} 0.004000576
```

```
procedure_service_duration_histogram_total{app_name="amf",bin="50to500ms",cluster="clu1",data_center="dc1",instance_id="0",
proc_name="UE Registration",service_name="amf-service"} 1
```

```
procedure_service_duration_seconds_total{app_name="amf",cluster="clu1",data_center="dc1",instance_id="0",
proc_name="UE Registration",service_name="amf-service"} 0.201723819
```

```
procedure_service_total{app_name="amf",cluster="clu1",data_center="dc1",instance_id="0",
proc_name="UE Registration",service_name="amf-service"} 1
```

```
sub_procedure_service_duration_histogram_total{app_name="amf",bin="50to500ms",cluster="clu1",data_center="dc1",instance_id="0",
msg_type="N1RegistrationRequest",proc_name="UE
Registration",service_name="amf-service",sub_proc_name="N1RegistrationRequest"}
1
```

```
sub_procedure_service_duration_seconds_total{app_name="amf",cluster="clu1",data_center="dc1",instance_id="0",
msg_type="N1RegistrationRequest",proc_name="UE
Registration",service_name="amf-service",sub_proc_name="N1RegistrationRequest"}
0.201668683
```

```
sub_procedure_service_total{app_name="amf",cluster="clu1",data_center="dc1",instance_id="0",msg_type="N1RegistrationRequest",
proc_name="UE
Registration",service_name="amf-service",sub_proc_name="N1RegistrationRequest"}
1
```

Procedure Service Duration Histogram Statistics Example

```
procedure_service_duration_histogram_total{app_name="AMF",bin="<=50ms",cluster="clu1",data_center="dc1",instance_id="2",
proc_name="Pdu N1N2",service_name="amf-service"} 2
```

Sub-procedure Service Duration Histogram Statistics Example

```
sub_procedure_service_duration_histogram_total{app_name="AMF",bin="<=50ms",cluster="clu1",
data_center="dc1",instance_id="0",msg_type="N1N2MessageTransfer",proc_name="Pdu
N1N2",service_name="amf-service",
sub_proc_name="N1N2MessageTransfer"} 1
```

```
sub_procedure_service_total{app_name="AMF",cluster="clu1",data_center="dc1",instance_id="0",
msg_type="N1N2MessageTransfer",proc_name="Pdu
N1N2",service_name="amf-service",sub_proc_name="N1N2MessageTransfer"}1
```

Procedure Service Statistics Example

```
procedure_service_total{app_name="AMF",cluster="clu1",data_center="dc1",instance_id="2",proc_name="UE
 Registration",
service_name="amf-service"} 4
```

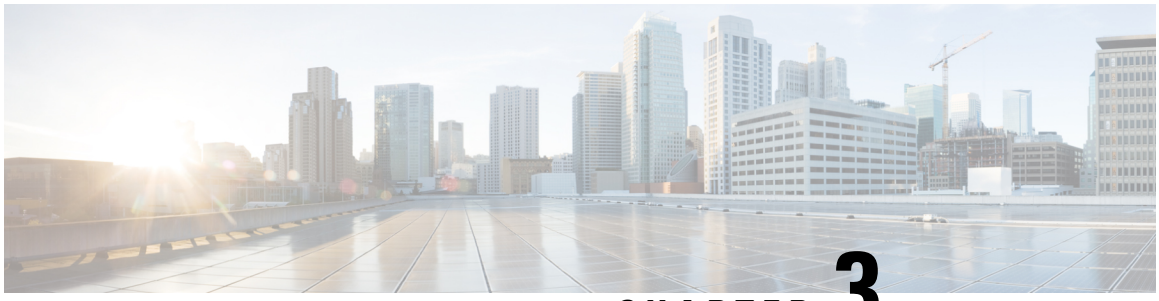
SBI Statistics Example

```
rpc_response_total{app_name="amf",background="false",cluster="clu1",data_center="dc1",
dest_host="http://1.0.0.1:1000/nausf-auth/v1",dest_set="",instance_id="1",interface="Rest",
method_name="Authenticate",msg_type="AusfauthRequest",namespace="0",proc_name="Authentication",
retry="0",rpc_name="AUSF",service_name="amf-rest-ep",stage="init_done",status="success",status_code="201",
sub_proc_name="N1RegistrationRequest",txn_type="NausfUeAuthentication"} 1
```

```
rpc_response_total{app_name="amf",background="false",cluster="clu1",data_center="dc1",
dest_host="http://1.0.0.1:1001/nudm-uecm/v1",dest_set="",instance_id="1",interface="Rest",
method_name="Register",msg_type="UdmRegRequest",namespace="0",proc_name="UDM
Registration",
retry="0",rpc_name="UDM",service_name="amf-rest-ep",stage="init_done",status="error",
status_code="RestClientUnableToSend",sub_proc_name="N1RegistrationRequest",
txn_type="NudmUecmRegistration"} 1
```

DB Records Statistics Example

```
db_records_total{appInstanceId="0",app_name="datastore-ep",cluster="session",data_center="test",db="session",
instance_id="3232278441",service_name="datastore-ep",session_type="EmergencyRegistered:false",
sliceName="slice1",systemId=""} 1
db_records_total{appInstanceId="0",app_name="datastore-ep",cluster="session",data_center="test",db="session",
instance_id="3232278441",service_name="datastore-ep",session_type="PLMNType:HOMER",
sliceName="slice1",systemId=""} 2
db_records_total{appInstanceId="0",app_name="datastore-ep",cluster="session",data_center="test",db="session",
instance_id="3232278441",service_name="datastore-ep",session_type="UeUsageSetting:NA",
sliceName="slice1",systemId=""} 0
db_records_total{appInstanceId="0",app_name="datastore-ep",cluster="session",data_center="test",db="session",
instance_id="3232278441",service_name="datastore-ep",session_type="gnb_id:4194304123456",
sliceName="slice1",systemId=""} 0
db_records_total{appInstanceId="0",app_name="datastore-ep",cluster="session",data_center="test",db="session",
instance_id="3232278441",service_name="datastore-ep",session_type="tac:30",
sliceName="slice1",systemId=""} 0
db_records_total{appInstanceId="0",app_name="datastore-ep",cluster="session",data_center="test",db="session",
instance_id="3232278441",service_name="datastore-ep",session_type="total",
sliceName="slice1",systemId="1"} 3
```



CHAPTER 3

AMF Bulk Statistics and MME Equivalent KPI Support

- Feature Summary and Revision History, on page 43
- Feature Description, on page 43
- How it Works, on page 44
- OAM Support, on page 44

Feature Summary and Revision History

Summary Data

Table 3: Summary Data

Applicable Products or Functional Area	AMF
Applicable Platforms	SMI
Feature Default Setting	Enabled – Always-on
Related Documentation	Not Applicable

Revision History

Table 4: Revision History

Revision Details	Release
First introduced.	2022.01.0

Feature Description

The bulk statistics and Key Performance Indicators (KPIs) are used for analyzing the AMF performance.

The following is a list of applicable bulk statistics:

- **Gauge:**
  - A snapshot value that shows the statistic at the time of reporting.
  - These statistics values can increment or decrement continuously.
  - **Example:** The number of current PDP contexts, simultaneous Active EPS Bearers, and so on
- **Counter:**
  - A historic value that shows the statistic accumulated for a specific time range.
  - These statistics values can only increment except in the following two scenarios:
    - **Rollover:** Where a counter exceeds its maximum value and rolls over to zero.
    - **Reset:** Where a counter is manually reset to zero.
  - **Example:** The total number of CSR requests received.

How it Works

This section describes how this feature works.

Bulk statistics allows you to configure various schemas for collecting statistics from the system. It also offloads those statistics to a collector for offline review and analysis. They are further processed for the following scenarios:

- Controlling the statistics gathering and reporting
- Collecting and transferring on both the active and the standby chassis
- Providing specific requirements for more selective statistics obtained on standby
- Acting as a subset of the total statistics collected over a specific timeline

OAM Support

This section describes operations, administration, and maintenance support for this feature.

Supported Service Request Counters

All scenarios are supported as per the required references. The following table lists various supported service request counters and their descriptions.

Table 5: Supported Service Request Counters

Name	Description	Trigger
Sctp Outgoing SCTPPacket stats	The total number of SCTP packets sent. Retransmitted DATA chunks are included.	Increments when the AMF sends the SCTP packet to the gNB.
Sctp Incoming SCTPPacket stats	The total number of SCTP packets received. Duplicates are included.	Increments when the AMF receives the SCTP packet from the gNB.
Sctp Init stats	The total number of times that AMF received SCTP INIT and association reached to established state.	Increments when the AMF received SCTP INIT and SCTP association is successfully established.
Sctp Shutdowns stats	The total number of times that associations terminated gracefully from AMF side or gNB.	Increments when the gNB is disconnected from the AMF.
Sctp Fragmented Message stats	The total number of user messages that needs to be fragmented due to the presence of the MTU.	Increments when the SCTP message is fragmented, due to the presence of the MTU.
Sctp Reassembled Message stats	The total number of user messages reassembled, after converting into DATA chunks.	Increments when the SCTP message is reassembled, due to the data fragment received from the gNB.
Ausf Ue eapaka rsp	The total number of EAPAKA or EAP-AKA or EAP-AKA-Prime responses received by the AMF.	Increments when the AMF receives an EAPAKA or EAP-AKA or EAP-AKA-Prime response for the eap-session request.
Ausf Ue eapaka cfm	The total number of EAPAKA or EAP-AKA or EAP-AKA-Prime authorization confirmation sent by the AMF.	Increments when the AMF sends AUSF EAPAKA or EAP-AKA or EAP-AKA-Prime CFM to AUSF.
Ausf Autentication Cfm Rsp Stats	The total numbers of 5g-aka confirm response received from the AUSF.	Increments when the AMF receives 5g-aka authentication confirm response.
Ausf Autentication Cfm Stats	The total numbers of 5g-aka confirm requests sent to the AUSF.	Increments when the AMF sends 5g-aka authentication confirm request to the AUSF.
Ausf Autentication Req Stats	The total number of AUSF authentication requests sent by the AMF.	Increments when the AMF receives authentication request.
Ausf Autentication Rsp Stats	The total number of AUSF authentications responses received by the AMF.	Increments when the AMF receives authentication response from the AUSF.

Name	Description	Trigger
Authentication Mac Failed	The total number of authentication MAC failures received during UE authentications.	Increments when the N1 authentication rejection is sent due to the MAC failure.
Authentication Reject	The total number of authentication rejections sent by the AMF.	Increments when the 5g-aka authentication fails.
Authentication Sync Failed	The total number of AMF authentication rejections due to the sync failure.	Increments when the N1 authentication rejection is sent due to the sync failure.
Ebi Fail Bearers Not Found	The total number of failures in EPS Bearer ID setup failed due to Bearer ID not found.	Increments when the EPS bearer ID allocation fails as the bearer ID isn't found.
Ebi Fail Invalid Pdu Session	The total number of failures due to PDU session ID not found.	Increments when the EPS bearer ID allocation fails as the PDU session ID isn't present.
Ebi Rejected No N26	The total number of failures due to the restriction of EPS bearer ID allocation.	Increments when the EBI allocation failure happens, due to the EBI allocation restriction.
Gnb Ics Fail Stats	The total number of initial context setup requests failed.	Increments when the AMF ICS fails.
Gnb Ics Req Stats	Total number of initial context setup requests sent by the AMF.	Increments when the AMF sends ICS requests.
Gnb Ics Rsp Stats	The total number of initial context setup responses received.	Increments when the AMF receives ICS responses.
Pcf Delete Req Stats	The total numbers of PCF delete requests sent during the PDU release deregistration procedure. It's triggered during clear subscriber process.	Increments when the AMF tried to clear the subscriber requests towards the UDM and the PCF.
Pcf Delete Rsp Stats	The total numbers of PCF delete responses received during the PDU release deregistration procedure.	Increments when the AMF tries to clear the subscriber response towards the UDM and the PCF.
Udm Pcscf Restor Req Stats	The total number of PCSCF restoration requests sent to the UDM.	Increments when the AMF sends the PCSCF restoration request to the UDM.
Udm Pcscf Restor Rsp Stats	The total number of PCSCF restoration responses received from the UDM.	Increments during the PDU modification process, when the PDU map doesn't have an entry, when the AMF receives the PCSCF restoration notification from the UDM.

Name	Description	Trigger
Udm Registration Req Stats	The total number of UDM registration requests sent.	Increments when the AMF sends the UDM registration request.
Udm Registration Rsp Stats	The total number of UDM registration responses received by the AMF.	Increments when the AMF receives the UDM registration response.
Udm Subscriber Data Req Stats	The total number of subscriber data requests sent to the UDM.	Increments when the AMF sends the subscriber data request to the UDM.
Udm Subscriber Data Rsp Stats	The total number of subscriber data response received from the UDM.	Increments when the AMF receives the subscriber data response.
Udm Subscriber Notify Req Stats	The total numbers of subscriber notify requests sent to the UDM.	Increments when subscriber notify requests are sent to the UDM, during the UDM registration procedure.
Udm Subscriber Notify Rsp Stats	The total number of subscribers notify responses received by the AMF.	Increments when the AMF receives the UDM subscriber notify response.
Udm Unsubscriber Notify Req Stats	The total numbers of UDM unsubscriber notify requests sent to the UDM.	During deregistration process, it's the total number of unsubscribe requests sent to the UDM.
Udm Unsubscriber Notify Rsp Stats	The total numbers of UDM response unsubscriber notify statistics received by the UDM.	During deregistration process, it's the total number of unsubscribe responses received from the UDM.
Ue Authentication Req Stats	The total number of UE authentication requests sent.	During the UE authentication procedure, this is incremented, when the UE authentication request is sent.
Ue Authentication Rsp Stats	The total number of UE authentication responses received.	During the UE authentication procedure, this is incremented, when the UE authentication response is received.
Ue Configuration Update Cmd	The total number of UE configuration update commands sent by the AMF.	Increments when the AMF sends the UE configuration update command.
Ue Configuration Update Complete	The total number of UE configuration update responses received with completion note of the procedure.	Increments when the AMF receives the UE config update response, for completion.
Ue Security Cmd Req Stats	The total number of security mode CMD sent from the AMF towards the UE.	Increments when the AMF sends the security mode command to the UE.

Name	Description	Trigger
Ue Security Cmd Rsp Stats	The total number of security mode complete messages received by the AMF.	Increments when the AMF receives the security mode completed messages.
Gtpc Rx Context Ack	The total number of GTPC contexts ACK received from the MME.	Increments when the AMF receives the context ACK from the MME.
Gtpc Rx Context Req	The total number of GTPC context requests received from the MME.	Increments when the AMF receives the GTPC context request from the MME.
Gtpc Rx Context Rsp	The total number of GTPC context request responses received from the MME.	Increments when the AMF receives the GTPC context response from the MME.
Gtpc Rx Fwd Reloc Cmp Ack	The total number of GTPC forward relocations complete ACK received from the MME.	Increments when the AMF receives the GTPC forward relocation complete ACK is received from the MME.
Gtpc Rx Fwd Reloc Req	The total number of GTPC forward relocation requests received from the MME.	Increments when the AMF receives the GTPC forward relocation request from the MME.
Gtpc Rx Fwd Reloc Rsp	The total number of GTPC forward relocation responses received from the MME.	Increments when the AMF receives the GTPC forward relocation response from the MME.
Gtpc Rx Identification Req	The total number of GTPC identification requests received from the MME.	Increments when the AMF receives the GTPC identification requests from the MME.
Gtpc Rx Identification Rsp	The total number of GTPC identification responses received from the MME.	Increments when the AMF receives the GTPC identification response from the MME.
Gtpc Rx Reloc Cancel Req	The total numbers of GTPC cancel requests received from the MME.	Increments when the AMF receives the GTPC cancel request from the MME.
Gtpc Rx Reloc Cancel Rsp	The total numbers of GTPC cancel response received from the MME.	Increments when the AMF receives the GTPC cancel response from the peer MME.
Gtpc Tx Context Ack	The total number of GTPC contexts ACK sent to the MME.	Increments when the AMF sends the GTPC context ACK to the MME.
Gtpc Tx Context Req	The total number of GTPC context requests sent to the MME.	Increments when the AMF sends the GTPC context request to the MME.
Gtpc Tx Context Rsp	The total number of GTPC context responses sent to the MME.	Increments when the AMF sends the GTPC context response to the MME.

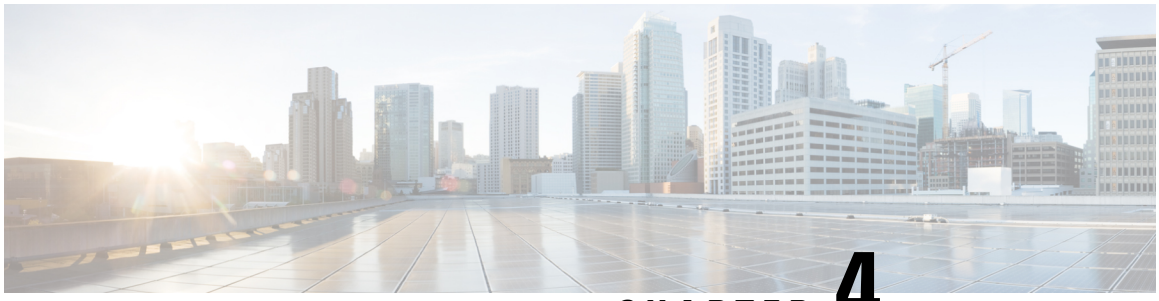
Name	Description	Trigger
Gtpc Tx Fwd Reloc Cmp Ack	The total number of GTPC forward relocations complete ACK sent to the MME.	Increments when the AMF sends the GTPC forward relocation complete ACK to the MME.
Gtpc Tx Fwd Reloc Cmp Notf	The total number of GTPC forward relocation complete notifications sent to the MME.	Increments when the AMF sends the GTPC forward relocation complete notification to the MME.
Gtpc Tx Fwd Reloc Req	The total number of GTPC forward relocation requests sent to the MME.	Increments when the AMF sends the GTPC forward relocation request to the MME.
Gtpc Tx Fwd Reloc Rsp	The total number of GTPC forward relocation responses sent to the MME.	Increments when the AMF sends the GTPC forward relocation response to the MME.
Gtpc Tx Identification Req	The total number of GTPC identification requests sent to the MME.	Increments when the AMF sends the GTPC identification request to the MME.
Gtpc Tx Reloc Cancel Req	The total numbers of GTPC cancel relocation requests sent to the MME.	Increments when the AMF sends the GTPC relocation cancel request to the MME.
Gtpc Tx Reloc Cancel Rsp	The total number of GTPC relocations cancel response sent to the MME.	Increments when the AMF sends the GTPC relocation cancel response to the MME.
Gtpc Tx Req	The total number of context requests or identification request failures towards the MME.	Increments when there's a failure in sending the GTPC context request or identification request, due to the peer MME not ready, or epsnas container not present, and so on.
Nas In Identity Response	The total number of identity responses received from the UE.	Increments when the AMF recieves an identity response from the UE.
Nas In Ue Deregistration Accept	The total number of network initiated deregistration received.	Increments when the network initiated deregistration is received.
Nas Out Identity Request Imei	The total number of identity requests with IMEI as matching value.	Increments when the IMEI-based identity request is sent.
Nas Out Identity Request Suci	The total number of identity requests with SUCI as matching value.	Increments when the SUCI-based identity request is sent.
Ngap Dl Handover Command Msg	The total number of handover commands sent to the source gNB.	Increments when the AMF sends the handover command to the source gNB.

Name	Description	Trigger
Ngap Dl Handover Preparation Failure Msg	The total number of handovers prepare failure sent by the AMF.	Increments when the AMF sends the handover preparation failure to the gNB.
Ngap Dl Handover Request Msg	The total number of handover request messages sent to the gNB.	Increments when the AMF sends the handover request message to the gNB.
Ngap Ul Handover Cancel Msg	The total numbers of handover cancel requests received from the gNB.	Increments when the AMF receives the handover cancel request from the gNB.
Ngap Ul Handover Request Ack Msg	The total number of handover ACK messages received by the AMF.	Increments when the AMF recieves the handover ACK message from the gNB.
Ngap Ul Handover Required Msg	The total number of handover required messages received by the AMF.	Increments when the AMF receives the handover required message from the gNB.
Smf Sm Ctxt Create Req	The total numbers of SMF SM context create request sent to the SMF.	Increments when the AMF sends the SM context create request to the SMF.
Smf Sm Ctxt Create Rsp	The total number of SM contexts create response received from the SMF.	Increments when the AMF receives the SM context create response from the SMF.
Smf Sm Ctxt Retrieve Req	The total number of SM contexts retrieve request sent to the SMF.	Increments when the AMF sends the message to retrieve the context.
Smf Sm Ctxt Update Req	The total number of SMF context updates request sent to the SMF.	Increments when the AMF sends the SM context update request to the SMF.
Smf Sm Ctxt Update Rsp	The total number of SM context update responses received for the update contexted data from the SMF.	Increments when the AMF receives the SM context update response from the SMF.
Udm Initiated Dereg Request	The total number of UDM initiated deregistration request received.	Increments when the AMF receives the UDM initiated deregistration request.
Udm Initiated Dereg Response	The total number of UDM initiated deregistration responses sent to the UDM.	Increments when the AMF sends the UDN-initiated deregistration responses to the SMF.

Bulk Statistics Support

The following are supported bulk statistics in AMF for Attempted, Success, and Failure scenarios:

- Registration
- All procedures and features



CHAPTER 4

MIB Reference

- CISCO-CNEE-MIB, on page 53
- CISCO-SMI, on page 53

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.