



Ultra Cloud Core 5G Access and Mobility Management Function, Release 2021.04 - 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	<p>This typeface represents commands that you enter, for example:</p> <p>show ip access-list</p> <p>This document always gives the full form of a command in lowercase letters. Commands are not case sensitive.</p>
Text represented as a command <i>variable</i>	<p>This typeface represents a variable that is part of a command, for example:</p> <p>show card <i>slot_number</i></p> <p><i>slot_number</i> is a variable representing the applicable chassis slot number.</p>
Text represented as menu or sub-menu names	<p>This typeface represents menus and sub-menus that you access within a software application, for example:</p> <p>Click the File menu, then click New</p>

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.



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AMF AUSF Service Statistics Category

n12_service_stats

Description: AMF Ausf service stats

Sample Query:

```
n12_service_stats(message_type=\"NausfUeAuthReq\",status=\"success\",reason=\"AUTHENTICATION_SUCCESS\",slice_data=\"2-333333\")
```

Labels:

- Label: `message_type`

Label Description: The message type associated with an AUSF service.

Example: NausfUeAuthReq, NausfUeAuthRsp, NausfUe5gAkaCnfReq, NausfUe5gAkaCnfRsp

- Label: `status`

Label Description: Overall status

Example: success, failures, attempted

- 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 Failed, Mac 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

- Label: `slice_data`

Label Description: Slice data.

Example: 2-333333

AMF Debug Proto Map Statistics Category

amf_debug_proto_map_stats

Description: Debug statistics.

Sample Query:

```
amf_debug_proto_map_stats(msg_type=\"N2UeRadioCapabilityCheckRsp\",action=\"dropped\",reason=\"connection_not_found\")
```

Labels:

- Label: `msg_type`

Label Description: Message type.

Example: N2UeRadioCapabilityCheckRsp, N2InitialContextSetupRsp

- Label: `action`

Label Description: Action

Example: dropped

- Label: `reason`

Label Description: Reason

Example: connection_not_found

AMF Disconnect Statistics Category

amf_disconnect_stats

Description: AMF Disconnect statistics counters.

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

Labels:

- Label: `reason`

Label Description: The reason associated with call disconnect.

Example: `disc_ue_init_dereg`, `disc_nw_init_dereg`, `Ausf_AuthReject`, `Ausf_DropPeerMsg`

AMF EBI Assign Failures Category

amf_ebi_assign_failures

Description: EBI Assign failure statistics.

Sample Query:

```
amf_ebi_assign_failures{message_type=\"amf_ebi_rejected_no_n26\",status=\"success\",reason=\"Unable to get rsp\",slice_data=\"2-333333\"}
```

Labels:

- Label: `message_type`

Label Description: The message type associated with an EBI service.

Example: `amf_ebi_rejected_no_n26`, `amf_ebi_fail_pdu_session_id`, `amf_ebi_fail_bearers_not_found`

- Label: `status`

Label Description: Overall status.

Example: success, failures

- Label: `reason`

Label Description: The reason associated with an EBI.

Example: Unable to get rsp, Unable to retrieve msg from rsp, Unknown Subscriber, Internal Error, Msg Timeout

- Label: `slice_data`

Label Description: Slice data

Example: 2-333333

AMF Initial Context Setup Statistics Category

ics_service_stats

Description: Initial Context Setup statistics.

Sample Query:

```
ics_service_stats(message_type="N2InitialContextSetupReq",status="success",reason="Success",slice_data="2-333333")
```

Labels:

- Label: `message_type`

Label Description: The message type associated with an ICSR service.

Example: N2InitialContextSetupReq, N2InitialContextSetupRsp, N2InitialContextSetupFailure

- Label: `status`

Label Description: Overall status.

Example: success, failures

- Label: `reason`

Label Description: The reason associated with an ICSR.

Example: Suspend, Suspend for Async, Unable to get rsp, Unable to retrieve msg from rsp, Internal Error, Success

- Label: `slice_data`

Label Description: Slice data.

Example: 2-333333

AMF Metrics NGAP Message Total Category

amf_ngap_message_total

Description: Total number of NGAP messages.

Sample Query:

```
amf_ngap_message_total(message_direction="inbound",message_type="N2NGSetupRsp")
```

Labels:

- Label: `message_direction`

Label Description: Message direction.

Example: outbound, inbound

- Label: `message_type`

Label Description: Message type.

Example: N2RanConfigUpdateFailure, N2AmfConfigUpdate, N2DownlinkNASTransport, N2NGSetupFailure, N2NGSetupRsp, N2ErrorIndication, N2UeContextReleaseCommand, N2InitialContextSetupReq, N2PduSessResouceModifyReq, N2RanConfigUpdateAck, Paging, N2PduSessResouceSetupReq, N2PathSwitchReqAckMsg, N2PathSwitchReqFailureMsg, N2DLRanStatuTransfer, N2HandoverRequest, N2HandoverCommand, N2HandoverCancelAck, N2HandoverPreparationFailure, N2NGResetAck, N2UeRadioCapabilityCheckReq, NonUeN2WriteReplaceWarningReq, N2HandoverRequired, N2HandoverCancel, N2UeContextReleaseRequest, N2HandoverFailure, N2AmfConfigUpdateTimeout, N2NGSetupReq, N2InitialUeMessage, N2UplinkNASTransport, N2PduSessResourceSetupRsp, N2PduSessResourceReleaseRsp, N2PduSessResourceModifyRsp, N2ErrorIndication, N2UeContextReleaseComplete, N2InitialContextSetupRsp, N2InitialContextSetupFail, N2AmfConfigUpdateAck, N2AmfConfigUpdateFailure, N2RanConfigUpdate, N2PathSwitchReqMsg, N2HandoverRequestAck, N2HandoverNotify, N2UeRadioCapabilityInfoInd, N2UeRadioCapabilityCheckRsp, N2UplinkRanStatusTransfer, NonUeN2WriteReplaceWarningRsp, NonUeN2PWSCancelWarningRsp, NonUeN2PWSFailureIndication, NonUeN2PWSRestartIndication, N2NGReset

AMF NAS ASN Decode ERR Statistics Category

`nas_asn_decode_error_stats`

Description: NAS ASN Decoding errors.

Sample Query:

```
nas_asn_decode_error_stats{message_type=\"N1RegistrationRequest\",asn_failures=\"\"}
```

Labels:

- Label: `message_type`

Label Description: Message type.

Example: N1RegistrationRequest, N1RegistrationComplete, N1UINasTransport, N1DeRegistrationRequestUeOrigDereg, N1DeRegistrationAcceptUeTermDereg, N1ServiceRequest, N1AuthenticationResponse, N1SecurityModeComplete, N1SecurityModeReject, N1AuthenticationFailure, N1IdentityResponse, N1ConfigurationUpdateComplete

- Label: `asn_failures`

Label Description: Failure reason

Example: CauseProtocolTransferSyntaxError

AMF NAS ASN Encode ERR Statistics Category

nas_asn_encode_error_stats

Description: NAS ASN Encoding errors.

Sample Query:

```
nas_asn_encode_error_stats(message_type=\"N1AuthenticationRequest\",asn_failures=\"\")
```

Labels:

- Label: `message_type`

Label Description: Message type.

Example: N1AuthenticationRequest, N1AuthenticationResult, N1AuthenticationReject, N1RegistrationAccept, N1RegistrationReject, N1DINasTransport, N1DeRegistrationAcceptUeOrigDereg, N1DeRegistrationRequestUeTermDereg, N1ServiceAccept, N1ServiceReject, N1ConfigurationUpdateCommand, N1IdentityRequest, N1Notification, N1SecurityModeCommand

AMF NAS Integrity Failure Category

IntegrityCheckFailure

Description: Integrity failures.

Sample Query: `IntegrityCheckFailure(message_type=\"N1IdentityResponse\")`

Labels:

- Label: `message_type`

Label Description: Message type.

Example: Unsupported_N1_Msg, N1DeRegistrationAcceptUeTermDereg, N1DeRegistrationRequestUeOrigDereg, N1IdentityResponse

AMF NGAP ASN Decode ERR Statistics Category

ngap_asn_decode_error_stats

Description: NGAP ASN Decoding errors.

Sample Query:

```
ngap_asn_decode_error_stats(message_type=\"N2NGSetupReq\",asn_failures=\"CauseProtocolTransferSyntaxError\")
```

Labels:

- Label: `message_type`

Label Description: NGAP message type.

Example: N2NGSetupReq, N2InitialUeMessage, N2UplinkNASTransport, N2PduSessResourceSetupRsp, N2PduSessResourceReleaseRsp, N2PduSessResourceModifyRsp, N2UeContextReleaseRequest, N2UeContextReleaseRequest, N2ErrorIndication, N2UeContextReleaseComplete, N2InitialContextSetupRsp, N2AmfConfigUpdateAck, N2AmfConfigUpdateFailure, N2RanConfigUpdate, N2PathSwitchReqMsg, N2HandoverRequired, N2HandoverRequestAck, N2HandoverNotify, N2UeRadioCapabilityInfoInd, N2UeRadioCapabilityCheckRsp, N2UplinkRanStatusTransfer, NonUeN2WriteReplaceWarningRsp, NonUeN2PWSFailureIndication, NonUeN2PWSRestartIndication, N2NGReset, N2HandoverCancel

- Label: `asn_failures`

Label Description: Failure reason.

Example: CauseProtocolTransferSyntaxError

AMF NGAP ASN Encode ERR Statistics Category

`ngap_asn_encode_error_stats`

Description: NGAP ASN Encoding errors

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

Labels:

- Label: `message_type`

Label Description: NGAP message type.

Example: RanConfigUpdateFailure, DINasTransport, NgSetupFail, NgSetupResponse, UeErrorIndication, UeCtxReleaseCommand, InitialContextSetupRequest, PduSessModifyRequest, PduSessReleaseCommand, RanConfigUpdateAck, Paging, PduSessResourceSetupRequest, PathSwitchRequestAck, PathSwitchRequestFailure, DownlinkRanStatusTransfer, HandoverRequest, HandoverCommand, HandoverCancelAck, HandoverPreparationFailure, NGResetAcknowledge, UeCapabilityCheckReq, NgAmfConfigurationUpdate

AMF NGAP DL Message Statistics Category

`ngap_dl_msg_stats`

Description: AMF NGAP DL message statistics.

Sample Query:

`ngap_dl_msg_stats{message_type="N2HandoverCancelAck",status="success",reason="",slice_data="2-333333"}`

Labels:

- Label: `message_type`

Label Description: The message type associated with the NGAP DL message.

Example: N2HandoverCancelAck, N2HandoverRequest, N2HandoverCommand, N2HandoverPreparationFailure

- Label: `status`

Label Description: Overall status.

Example: success, failures

- Label: `reason`

Label Description: The reason associated with the NGAP DL message.

Example: Unable to get rsp, Unable to retrieve msg from rsp, Unknown Subscriber, Internal Error, Msg Timeout, Peer Info Not Available, 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

AMF NGAP UL Message Statistics Category

`ngap_ul_msg_stats`

Description: AMF NGAP UL message statistics.

Sample Query:

```
ngap_ul_msg_stats{message_type="N2HandoverFailure",status="success",reason="",slice_data="2-333333"}
```

Labels:

- Label: `message_type`

Label Description: The message type associated with the NGAP UL message.

Example: N2HandoverFailure, N2HandoverRequest, N2HandoverRequestAck, N2HandoverNotify, N2HandoverRequired, N2HandoverCancel

- Label: `status`

Label Description: Overall status.

Example: success, failures

- Label: `reason`

Label Description: The reason associated with the NGAP UL message.

Example: Unable to get rsp, Unable to retrieve msg from rsp, Unknown Subscriber, Internal Error, Msg Timeout, Peer Info Not Available, 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

AMF NAS Message Total Category

amf_nas_message_total

Description: The number of NAS messages 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: The event type associated with the NAS message.

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: Paging_Trigger_N1N2_Msg_Xfer, N1DeRegReq_UeOriginatingDereg, N1DeRegReq_UeOriginatingDereg_NormalDereg, N1RegComplete, N1RegComplete, N1RegRequest, N1RegRequest_IdentityType_SUCI, N1RegRequest_RegType_INITIAL_REGISTRATION, N1ServiceReq, N1ServiceReq_Idle, N1ServiceReq_SIGNALLING, N1ServiceReq_WithPdu, PduEstablishmentReq, PduModifyReq_NwInitiated, N1DINasTransport, N1RegistrationAccept, N1ServiceAcc, N1UINasTransport, Paging, Paging_Stage_1, Paging_TriggerType_5qi

AMF PCF Service Statistics Category

n15_service_stats

Description: AMF PCF service statistics.

Sample Query:

```
n15_service_stats{message_type="NpcfAmPolicyControlCreateReq",status="success",reason="Unable to get rsp",slice_data="2-333333"}
```

Labels:

- Label: `message_type`

Label Description: The message type associated with a PCF service.

Example: NpcfAmPolicyControlCreateReq, NpcfAmPolicyControlCreateRsp, NpcfAmPolicyControlDeleteReq, NpcfAmPolicyControlDeleteRsp

- Label: `status`

Label Description: Overall status.

Example: success, failures

- Label: `reason`

Label Description: The reason associated with a PCF service.

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

- Label: `slice_data`

Label Description: Slice data.

Example: 2-333333

AMF Procedure Seconds Category

amf_procedure_seconds

Description: Total number of seconds taken to complete the procedure.

Sample Query: `amf_procedure_seconds{proc_type="UE Registration",status="success",proc_status="",slice_data="2-333333"}`

Labels:

- Label: `proc_type`

Label Description: The procedure type associated with a call flow.

Example: UE Registration, UE DeRegistration, Pdu Create, Pdu N1N2, Pdu N2Rs, Pdu N1Rsp, Pdu Mod, UE Context Release, Pdu Notify, EBI, Paging, Service Request, Context Transfer, Context Transfer Upd, Xn Handover, N2 Handover Src, Handover to EPC, UeRadioCapInfoInd, NGRreset, N2 Handover Tgt, Handover From EPC, UeCfgUpdate, Domain Selection Info, Amf Redirection

- 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

- 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=\"UE Registration\", status=\"success\", proc_status=\"\", slice_data=\"2-333333\"}`

Labels:

- Label: `proc_type`

Label Description: The procedure type associated with a call flow.

Example: UE Registration, UE DeRegistration, Pdu Create, Pdu N1N2, Pdu N2Rsp, Pdu N1Rsp, Pdu Mod, UE Context Release, Pdu Notify, EBI, Paging, Service Request, Context Transfer, Context Transfer Upd, Xn Handover, N2 Handover Src, Handover to EPC, UeRadioCapInfoInd, NGRreset, N2 Handover Tgt, Handover From EPC, UeCfgUpdate, Domain Selection Info, Amf Redirection

- 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

- Label: `slice_data`

Label Description: Slice data.

Example: 2-333333

AMF Retransmission Statistics 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: Paging, N1AuthenticationRequest, N1AuthenticationResult, N1AuthenticationReject, N1RegistrationAccept, N1RegistrationReject, N1DINas Transport, N1DeRegistrationAcceptUeOrigDereg, N1DeRegistrationRequestUeTermDereg, N1ServiceAccept, N1ServiceReject,

N1ConfigurationUpdateCommand, N1IdentityRequest, N1Notification, N1SecurityModeCommand, N2MsgNgapDL,MsgNgap

- Label: `status`

Label Description: Overall status.

Example: success, failures, max_retry_exceeded

AMF Session Statistics Category

amf_session_stats

Description: AMF Session statistics counters.

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

Labels:

- Label: `ueType`

Label Description: Type of the UE associated with the request.

Example: homer, roamer, unknown

- Label: `status`

Label Description: UE session status indicated at AMF.

Example: attempted, success, setup

AMF SMF Service Statistics Category

n11_service_stats

Description: AMF SMF service statistics.

Sample Query:

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

Labels:

- Label: `message_type`

Label Description: The message type associated with SMF service.

Example: N11SMContextUpdateReq, N11SMContextUpdateRsp, N11SMContextRetrieveRsp, N11SMContextRetrieveReq, N11SMContextCreateReq, N11SMContextCreateRsp

- Label: `status`

Label Description: Overall status.

Example: success, failures

- Label: `reason`

Label Description: The reason associated with SMF service.

Example: Unable to get rsp, Unable to retrieve msg from rsp, Unknown Subscriber, Internal Error, Msg Timeout, Peer Info Not Available, 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

AMF UDM Service Statistics Category

`n8_service_stats`

Description: AMF UDM service statistics.

Sample Query:

```
n8_service_stats(message_type="NudmSdmDataReq",status="success",reason="INVALID_GUAMI",slice_data="2-333333")
```

Labels:

- Label: `message_type`

Label Description: The message type associated with the UDM service.

Example: NudmSdmDataReq, NUdmUecmDeregisterNotificationRequest, NUdmUecmDeregisterNotificationResponse, NudmSdmUnSubscriptionReq, NudmSdmUnSubscriptionRsp, NudmPcscfRestorationReq, NudmPcscfRestorationRsp, NudmUecmRegistrationReq, NudmUecmRegistrationRsp, NudmSdmDataReq, NudmSdmDataRsp, NudmSdmSubscriptionReq, NudmSdmSubscriptionRsp

- Label: `status`

Label Description: Overall status.

Example: success, failures

- Label: `reason`

Label Description: The reason associated with the 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

- Label: `slice_data`

Label Description: Slice data.

Example: 2-333333

AMF UE Service Statistics Category

n1_service_stats

Description: AMF UE service statistics.

Sample Query:

```
n1_service_stats{message_type="IdentityResponse",status="success",reason="key
Mismatch",slice_data="2-333333"}
```

Labels:

- Label: `message_type`

Label Description: The message type associated with an UE service.

Example: IdentityResponse, N1SecurityModeComplete, N1AuthenticationRsp, N1SecurityModeCommand, N1AuthenticationReq, N1AuthFail_SyncFailure, N1AuthenticationReject, N1AuthFail_MacFailure, IdentityRequest_Imei, IdentityRequest_Suci, N1DeRegAccept_UeTerminatedDereg, N1UeConfigurationUpdCmd

- Label: `status`

Label Description: Overall status.

Example: success, failures, attempted

- 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

ASN Failure Mandatory IE Missing Category

asn_failures_mandatory_ie_missing

Description: Mandatory missing IEs.

Sample Query:

```
asn_failures_mandatory_ie_missing{missing_ie="MessageId",message_type="WriteReplaceWarningRequest"}
```

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, UINasTransport, NgapReset

Discover Messages Time Statistics Category

`nf_discover_total_time`

Description: Discover Messages total time statistics.

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

Labels:

- Label: `nf_type`

Label Description: Network function type.

Example: nrf, udm, amf, pcf, ausf, smf

- Label: `host`

Label Description: Endpoint address.

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

- Label: `result`

Label Description: Result of discover message.

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

Discover Messages Statistics Category

`nf_discover_messages_total`

Description: Discover Messages statistics.

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

Labels:

- Label: `nf_type`

Label Description: Network function type.

Example: nrf, udm, amf, pcf, ausf, smf

- Label: `host`

Label Description: Endpoint 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

Marshal Failures Category

`marshal_failures`

Description: Total number of Marshal error statistics.

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

Labels:

- Label: `message_type`

Label Description: The message type associated with Marshal failure statistics.

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

N26 Service Statistics Category

`n26_service_stats`

Description: AMF N26 statistics.

Sample Query:

`n26_service_stats{message_type="GTPCRxIdentificationRequest",status="success",reason="N1 mode Not Supported",slice_data="2-333333"}`

Labels:

- Label: `message_type`

Label Description: The message type associated with the N26 service.

Example: `GTPCRxIdentificationRequest, GTPCTxIdentificationRequest, GTPCRxContextRequest, GTPCRxContextResponse, GTPCRxContextAck, GTPCTxContextAck, GTPCRxFwdRelocCmpNotf, GTPCTxFwdRelocCmpNotf, GTPCRxRelocCancelReq, GTPCTxRelocCancelRsp, GTPCTxFwdRelocResponse`

- Label: `status`

Label Description: Overall status.

Example: success, failures

- Label: `reason`

Label Description: The reason associated with the N26 service.

Example: Unable to get rsp, Unable to retrieve msg from rsp, Unknown Subscriber, Internal Error, Msg Timeout, Peer Info Not Available, 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

NF Endpoint Selections Category

`nf_endpoint_selections_total`

Description: NF Endpoint selection statistics.

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

Labels:

- Label: `message_type`

Label Description: The message type associated with the failure statistics.

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

- Label: `nf_type`

Label Description: Network function type.

Example: nrf, udm, amf, pcf, ausf, smf

- Label: `host`

Label Description: Endpoint address.

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

- Label: `req`

Label Description: Request type.

Example: initial, fallback,

NF Failure Handling Statistics Category

`nf_failure_handling_stats_total`

Description: NF failure handling statistics

Sample Query:

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

Labels:

- Label: `message_type`

Label Description: The message type associated with the failure statistics.

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

- Label: `nf_type`

Label Description: Network function type.

Example: `nrf, udm, amf, pcf, ausf, smf`

- Label: `host`

Label Description: Endpoint 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=\"timeoutOrRPCError\" }`

Labels:

- Label: `host`
Label Description: Endpoint address.
Example: `http://10.105.227.109:8082/nrf-nfm/v1`
- Label: `direction`
Label Description: Direction indicates about the message going out or coming in.
Example: `inbound, outbound`
- Label: `message_type`
Label Description: Type of Message.
Example: `registration, heartbeat, subscription, notification`
- Label: `result`
Label Description: Result of discover message.
Example: `200, 201, 204, success, timeout_rpc_error, response_parse_failure, request_parse_failure, invalid_notify_event, invalid_nf_instance_uri, internal_error`

NF Management Messages Statistics Category

`nf_management_stats_total`

Description: NF management messages statistics.

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

Labels:

- Label: `host`
Label Description: Endpoint address.
Example: `http://10.105.227.109:8082/nrf-nfm/v1`
- Label: `direction`
Label Description: Direction indicates about the message going out or coming in.
Example: `inbound, outbound`
- Label: `message_type`
Label Description: Type of Message
Example: `registration, heartbeat, subscription, notification`
- Label: `result`

Label Description: Result of discover message.

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

NRF Discovery Category

nf_discover_events_total

Description: NF Discover statistics.

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, ausf, smf

- Label: `response_type`

Label Description: Discovery response selected from

Example: local, cache, expired-cache

Unmarshal Failures Category

unmarshal_failures

Description: Total number of Unmarshal error statistics.

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

Labels:

- Label: `message_type`

Label Description: The message type associated with Unmarshal failure statistics.

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 21](#)
- [Feature Description, on page 21](#)
- [OAM Support, on page 22](#)

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.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • proc_name • bin
sub_procedure_service_total	Total number of sub procedures executed in service.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • msg_type • proc_name • sub_proc_name
sub_procedure_service_duration_histogram_total	Histogram time bins for executing the sub procedure in service pod.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • 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 (DB).	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://1.0.0.1:1001/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

MIB Reference

- [CISCO-CNEE-MIB, on page 27](#)
- [CISCO-SMI, on page 27](#)

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 *SMI MIB Reference* chapter in the *Ultra Cloud Core Subscriber Microservices Infrastructure - Operations Guide*.

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 *SMI MIB Reference* chapter in the *Ultra Cloud Core Subscriber Microservices Infrastructure - Operations Guide*.

