Event Data Records

EDR Feature Description

Table 1: Feature History

Feature Name	Release Information	Description
Event Data Record (EDR) Support	2024.03.0	AMF supports the storage of the EDR files in the EDR monitor pods. You can use the EDR files for debugging and troubleshooting. Command introduced: **edr reporting { enable [all subscribers | file [transaction | transaction-collision]] | disable file [transaction | transaction-collision] }** to enable EDR in AMF. **Default Setting**: Disabled – Configuration Required

Event Data Records (EDRs) collect information that you can use to perform the following functions:

- Debug and monitor the AMF application behavior
- Diagnose issues with call flows for specific subscribers

AMF supports generation of EDRs for all the messages exchanged on:

- N1 & N2 interface
- UE specific events only

The AMF generates EDR files in comma-separated value (CSV) file format. The CSV files can be optionally compressed before sending to an external server.

EDR Format

AMF generates EDR with certain common transaction fields and also adds procedure-id and event-id along with respective field values. AMF defines the procedure-id, event-id, and field-id for individual messages. This mapping is used to format the CSV event entry in the EDR. Each event entry consists of comma-separated procedure-id, event-id, and field-value. These registered mappings can also be used in CLI commands to disable EDRs at procedure, event, or field level.

Transaction EDR Format

EDR Transaction File

Event Entries

AMF generates EDRs with procedure-level details, event-level details, and field-level details. These granular details help in debugging errors and issues.

The following is a sample transaction entry along with a list of events in the CSV format.

```
Version, Field-Count, Transaction-id-value, Start-Time, Elapsed-Time, ……,
Procedure-id1, event-id1, field-id1-value, field-id2-value……,
Procedure-id1, event-id2, field-id1-value, field-id2-value……,
Procedure-id1, event-id3, field-id1-value, field-id2-value……
```

Note There might be different set of fields for a combination of procedure-id and event-id. You can enable or disable the EDRs dynamically during runtime by using a CLI command. For configuration details, see the Configuring Transaction Level EDR Generation, on page 40 section in this guide.

EDR File Storage Location

This section provides details on the archival location of EDR files in AMF service pod and EDR monitor pod.

EDR Files in AMF Service Pod

The EDR file is generated in each AMF service pod where the subscriber sessions and events are processed. Based on the EDR file size, the files are archived periodically in non-persistent volume, that is, the AMF service pod. A new file is created before archiving the existing file.

The format of the transaction EDR file name and transaction collision EDR file name are as follows:

<pod-name>_<pod_instance>_<PodStartTime>.transaction.csv

<pod-name>_<pod_instance>_<PodStartTime>.transaction_collision.csv

The directory path of service pod is `/tmp/edr/`.

Example:

amf-service-n0-0_0_ 20220730233455.transaction.csv

Where the pod name is amf-service-n0-0, pod instance is 0, and the pod start time "20220730181014" means 30nd July 2022 18:10:14 UTC.

The format of compressed file name is as follows:

<pod-name>_<pod_instance>_<PodStartTime>.transaction.csv.<fileArchivedTime>.<FileRotationCounter>.gz

Example:

example-service-n0-0_1_20220730181014.transaction.csv.20220730181844.1.gz

EDR Files in EDR Monitor Pod

The AMF service pod sends all the EDR files to edr-monitor pod every 30 seconds. The EDR files remain in edr-monitor pod persistent directory as .csv file. When the total size of all the files exceeds the configured maximum file size, the oldest file is deleted.

The format of file name in edr-monitor pod is <*pod-name*>_<*pod_instance*>_<*PodStartTime*>.*transaction.csv*.

Example:

edr-monitor pod-n0-0_0_ 20220730233455.transaction.csv

The directory path of edr-monitor pod is `/logs/edr/`.

The EDR file size, maximum archived EDR file count, and maximum persistent volune size are configured through CLI commands. For information on the configuration commands, see the Configuring EDR Parameters, on page 41 section.

To access the files in the persistent volume of EDR monitor pod, log on to the Ops center with required credentials, and use the edr-monitor pod ingress URL.

To determine the ingress URL, use the following command:

kubectl get ingress -n *namespace* **| grep edr**

Example:

cloud-user@svi-cndp-tb41-gr-setup-amf-cluster-2-cndp-server-1:~$ **kubectl get ingress -n amf-amf | grep edr**

edr-archives-amf-amf nginx **edr-archives.amf-amf.172.18.128.82.nip.io** 10.109.13.65 80, 443 4d5h

EDR Transaction File

The EDR transaction file dumps the transaction information at the end of the transaction. By default, the file generation is disabled.

The following table provides the information that is stored in the file.

Table 2: EDR Transaction File Fields

Field Number	Field Name	Field Description
1	Version	EDR version number. Default value is v1. **Note** The version will change only when there is a change in the encoding order of transaction header fields or change in encoding procedure of any individual field.
2	Field Count	Total number of fields in transaction EDR header. The default value is 15.
3	Transaction ID	Transaction ID

Field Number	Field Name	Field Description
4	Start Time	The transaction start time in yyyy/MM/dd HH:mm:ss.SSS format.
5	Elapsed Ms	The time taken for transaction to end in milliseconds.
6	Subscriber ID	The subscriber ID. For example, imsi-123456789012345
7	Transaction Type	The transaction type (integer) which is defined internally in the application.
8	Transaction Description	The transaction description in string format.
9	Session Primary Key	The primary key of the session.
10	Session Unique Keys	The unique keys for the session separated by |.
11	Session Non Unique Keys	The non-unique keys for the session separated by |.
12	Status	The transaction status (success or error).
13	Status Code	The transaction status code to indicate the failure reason.
14	Procedure Name	The procedure name for which the transaction is submitted.
15	Sub Procedure Name	The sub procedure name for which the transaction is submitted.

Field Number	Field Name	Field Description
16	State	The transaction state. It can be: • Started • New • Ready • Active • Pending • Suspend • SuspendWaitingForResponse • SuspendWaitingForLock • Abort • Finished • Timeout • Unknown
17	Execution stages	The list of stages the transaction went through its lifecycle separated by |

NOTES:

- Each field is separated by comma (,).
- Fields session_uks, session_nuks, execution_stages are a list. These fields are separated by pipe (|). For example, session_uks is denoted as uk1|uk2|uk3.

CSV Format Examples:

```
V1,15,16,2023/11/02 15:36:21.156,9,imsi-123456789012345,
101,N1RegistrationRequest,supi:123456789012345,
guti:12345601038301000001|guti:12345601038301000002|
stmsi:038301000002|ngapId:4|guti:12345601038301000003|
stmsi:038301000003,imei:123456789012345|gpsi:msisdn-8899776655|
ranId:4194304123456,success,success,UERegistration,
N1RegistrationRequest,Active,init_done|finished,
guti:12345601038301000002|supi:123456789012345|
ranId:4194304123456|ngapId:4|guti:12345601038301000003|stmsi:038301000003
```

Procedure Level EDR Generation

The Event Logging feature captures procedure-level information per subscriber. Upon completing a procedure, either successfully or unsuccessfully, the AMF generates event data records capturing the details of procedures and events.

The EDR generation per procedure is configurable. For configuration details, see the Configuring Transaction Level EDR Generation, on page 40 section in this guide.

The following table lists the supported procedures and the corresponding IDs.

Table 3: Procedure List

Procedure	Procedure-ID
UE Registration	3
DE-Registration	4
Service Request (Idle to Active)	5
UE Context release (Active to Idle)	6
Paging	7
PDU N2 Response **Note** This procedure captures the events for the N2 responses generated as a part of service request procedure.	11
Xn Handover	14
N2 (Intra AMF) interface	15

Note At the end of each procedure, AMF logs a Metadata event with event id as 3099.

Fields prefixed with "n1ul" or "n2ul" indicate the fields that are present in messages received by AMF.

Fields prefixed with "n1dl" or "n2dl" indicate the fields that are initiated by AMF.

Further, the AMF captures event-level information per procedure. The following table provides details on the subscriber events and the respective event IDs.

The events captured per procedure are configurable. For configuration details, see the Configuring Transaction Level EDR Generation, on page 40 section in this guide.

The following tables list the detailed event records for:

- UE Registration
- DE-Registration
- Service Request (Idle to Active)
- UE Context Release (Active to Idle)
- PDU N2 Response
- Paging, Xn Handover
- N2 (Intra AMF) Interface

N1 Registration Message

AMF supports the following fields for the N1 registration message. The fields are in the same sequence as in the table.

IE Name	Sample Format
Procedure	3
Event	101 [Registration Request]
version	V1
field-count	24
n2ul-msgtype	15
n2ul-amf-ue-ngapid	123
n2ul-ran-ue-ngapid	12346
n1ul-msgtype	101
n1ul-regtype	For|VgsRegistrationTypeValue
n1ul-ngksi	Tsc|NasKeySetIdentifierValue
n1ul-mobileid	VTypeOfIdentity-IdentityType For Guti – VTypeOfIdentity-Mcc;Mnc| VAMFRegionId| VAMFSetId| VAMFPointer| VGTmsi
n1ul-noncurr-nasksi	Tsc|NasKeySetIdentifierValue
n1ul-mmcapability	Lpp|Ho|S1Mode
n1ul-uesec-capability	Encryption|Integrity
n1ul-reqnssai	Sst;Sdt;MapCfgSst;MapCfgSdt
n1ul-lastvisted-reg-tai	Mcc1Mcc2Mcc3|Mnc1Mnc2Mnc3|TAC,
n1ul-uestatus	N1ModeReg | S1ModeReg
n1ul-ue-usage-setting	1
n1ul-req-drxparam	1
n1ul-payload-cont-type	1
n1ul-nw-slicing-ind	Dcni|Nssci
n1ul-updatetype	NgRanDcu| SmsRequested
n2ul-userloc-info	The NCGI denotes the NRLOC and ECGI denotes the EUTRANLOC Format: NCGI:Mcc;Mnc;CellId | TAI: Mcc;Mnc;Tac| Timestamp Example: NCGI:123;456;30 |TAI:567;789;30 | 1705848410 Example:ECGI:123;456;30 | TAI:567;789;30| 1705848410

IE Name	Sample Format
n2ul-rrc-est-cause	3
n2ul-contextrequest	1
n2ul-allowed-nssai	Sst;Sd | Sst;Sd
n1ul-uplink-datastatus	PSI0|PSI1|PSI2|PSI3|PSI4| PSI5|PSI6|PSI7 PSI8|PSI9|PSI0|PSI11|PSI2| PSI3|PSI4|PSI5,
n1ul-pdusess-status	PSI0|PSI1|PSI2|PSI3|PSI4| PSI5|PSI6|PSI7 PSI8|PSI9|PSI0|PSI11|PSI2| PSI3|PSI4|PSI5,

AMF doesn't support any additional fields apart from the fields captured in the preceding table.

Note

- UE Context Request:
  - 1 – UE context was requested.
  - 0 – UE context wasn’t requested.
- AMF does not support the functionalities of the following Information Elements (IEs); however, it still records these IEs in the EDR
  - NonCurrentNativeNASKsi
  - LastVisitedRegisteredTai
- When you enable the EDR for individual SUPIs, the AMF captures EDR messages only after it identifies the SUPI during the Initial UE Registration procedure.

The following is the sample CSV message format for the N1 registration procedure:

```
,3,101,V1,24,15,,12347,101,126,0,1|2,0|1,guti-123;
456|1|14|3|33554439,,,e0|e0,2;333333;2;333333,,
1|0,0,,,,NrLoc|TAI;plmnId_123_456;30|
NCGI;plmnId_123_456;1|1700142239,3,0,,,
```

Authentication Request and Response

Authentication request and response (success or failure) are combined events, and AMF logs the details of these events under the registration procedure.

The following table captures the details for the authentication request and successful response.

CLI Fields	Sample Format
Procedure	3
Event	151
Version	V1
Field-Count	15

CLI Fields	Sample Format
status	Success
n2dl-msgtype	4
n2-amf-ue-ngapid	16
n2-ran-ue-ngapid	12346
n1dl-msgtype	86
n1dl-ngksi	0|1
n2ul-msgtype	46
n1ul-msgtype	87
n2ul-userloc-info	The NCGI denotes the NRLOC and ECGI denotes the EUTRANLOC Format: NCGI:Mcc;Mnc;CellId | TAI: Mcc;Mnc;Tac| Timestamp Example: NCGI:123;456;30 |TAI:567;789;30 | 1705848410 Example:ECGI:123;456;30 | TAI:567;789;30| 1705848410
n2ul-vgmmcause	
n2ul-failparam	

The following table captures the details for the authentication request with failed response.

Cli Fields	Sample Format
Procedure	3
Event	151
Version	V1
Field-Count	15
status	Failure
n2dl-msgtype	4
n2-amf-ue-ngapid	5
n2-ran-ue-ngapid	12347
n1dl-msgtype	86
n1dl-ngksi	0|2
n2ul-msgtype	46
n1ul-msgtype	89

Cli Fields	Sample Format
n2ul-userloc-info	The NCGI denotes the NRLOC and ECGI denotes the EUTRANLOC Format: NCGI:Mcc;Mnc;CellId | TAI: Mcc;Mnc;Tac| Timestamp Example: NCGI:123;456;30 |TAI:567;789;30 | 1705848410 Example:ECGI:123;456;30 | TAI:567;789;30| 1705848410
n2ul-vgmmcause	20
n2ul-failparam	0|0|0|0|0|0|0|0|0|0|0|0|48

Authentication Reject

Upon failure of the authentication procedure, AMF initiates the authentication reject with the following details:

CLI Fields	Sample Format
Procedure	3
Event	151
Version	V1
Field-Count	15
n2dl-msgtype	4
n2dl-amf-ue-ngapid	16
n2dl-ran-ue-ngapid	12346
n1dl-msgtype	88
n1dl-eap-msg	0|0|0|0|0|0|0|0|0|0|0|0|48

Security Mode Command

The Security Mode Command and its Complete/Reject response are logged as a combined event by the AMF under the registration procedure. The following table lists the details of a successful Security Mode Command and Complete message, as well as for a Security Mode Command and Reject message.

CLI Fields	Sample Format
Procedure	3
Event	164
Version	V1
Field-Count	19
status	Success/Failure
n2dl-msgtype	4

CLI Fields	Sample Format
n2-amf-ue-ngapid	1
n2-ran-ue-ngapid	12346
n1dl-msgtype	93
n1dl-selnassec-algo	0|1
n1dl-ngksi	0|1
n1dl-replay-uesec-capability	e0|e0
n1dl-imeisv-req	1
n1dl-sel-eps-nassec-algo	2|2
n2ul-msgtype	46
n1ul-msgtype	94
n1ul-imeisv	imeisv-3520990017614823
n2ul-userloc-info	The NCGI denotes the NRLOC and ECGI denotes the EUTRANLOC Format: NCGI:Mcc;Mnc;CellId | TAI: Mcc;Mnc;Tac| Timestamp Example: NCGI:123;456;30 |TAI:567;789;30 | 1705848410 Example:ECGI:123;456;30 | TAI:567;789;30| 1705848410
n1ul-cause **Note** This field is populated for Security Mode Reject.	23

Registration Accept

CLI-Name	Sample Format
Procedure	3
Event	154 Registration Accept
version	V1
field-count	29
n2dl-msgtype	4
n2dl-amf-ue-ngapid	123

CLI-Name	Sample Format
n2dl-ran-ue-ngapid	12346
n1dl-msgtype	66
n1dl-vgsregresult	EmergencyRegistered|NssaaPerformed|SmsAllowed| VgsRegistrationResultValue
n1dl-5gguti	VTypeOfIdentity-Mcc;Mnc| VAMFRegionId| VAMFSetId| VAMFPointer| VGTmsi Example: guti-123;456|1|14|3|33554450
n1dl-tai-list	type;numberofElements;mcc_mnc_tac1%tac2 or type;numberofElements;mcc_mnc_Startingtac 00;3;123_456_10%20%30 01;5;123_456_100
n1dl-allowed-nssai	Sst;sd|sst;sd Example: 0b;111111|02;
n1dl-rejected-nssai	Sst;sd;cause| Sst;sd;cause Example: 02;111999;0|ff;;0|04;300000;1|ff;;1
n1dl-configured-nssai	Sst;sd|sst;sd Example: 0b;111111|02;
n1dl-vgsnetworkfeatsupport	Mpsi | IwkN26| Emf|Emc| ImsVopsN3GPP| ImsVops3GPP| Mcsi| Emcn3 Example: 0|1|1|1|0|1|0|0
n1dl-pdusess-status	PSI0|PSI1|PSI2|PSI3|PSI4| PSI5|PSI6|PSI7 PSI8|PSI9|PSI0|PSI11|PSI2| PSI3|PSI4|PSI5, Example: 0|0|0|0|0|1|1|0|0|0|0|0|0|0|0
n1dl-pdusessreactivateres	PSI0|PSI1|PSI2|PSI3|PSI4| PSI5|PSI6|PSI7 PSI8|PSI9|PSI0|PSI11|PSI2| PSI3|PSI4|PSI5, Example: 0|0|0|0|0|1|1|0|0|0|0|0|0|0|0
n1dl-pdusessreactivatereserrcause	SessionId:CauseValue Example: 5:28|6:28
n1dl-nw-slicing-ind	Dcni| Nssci

CLI-Name	Sample Format
n1dl-servarealist	allowedType;TypeofList;NumberOfElements; mcc_mnc_tac1%tac2 or allowedType;TypeofList;NumberOfElements; mcc_mnc_startingTac or allowedType;TypeofList;NumberOfElements; mcc_mnc Examples: 1;00;2;123_456_30%20|1;01;2;123_456_65534 Or 0;01;2;123_456_65534 Or 0;11;1;123_456
n1dl-t3512	29
n1dl-t3502	2c
n1dl-emergencylist	numberOfElemet|svcCatageory_number; svcCatageory_number Example: 2|1_100;2_109
n1dl-extemergency-numlist	numberOfElement|subsvc_number; subsvc_number Example: 2|sos.uk_555;_9999
n1dl-sortranscontainer	SorDataTyp; ListIndication;ListType;Ack Example: 0;1;1;1
n1dl-nssaiinclusionmode	1
n1dl-negotiated-drx-param	3
n1dl-epsbrrctx-status	PSI0|PSI1|PSI2|PSI3|PSI4| PSI5|PSI6|PSI7 PSI8|PSI9|PSI0|PSI11|PSI2| PSI3|PSI4|PSI5,
n2dl-oldamf	string
n2dl-mobrestrictions	See Mobility Restriction List

CLI-Name	Sample Format
n2dl-allowed-nssai	Sst;sd|sst;sd Example: 03;000004|0b;111111

Registration Reject

CLI-Name	Sample Format
Procedure	3
Event	155 Registration Reject
version	V1
field-count	11
n2dl-msgtype	4
n2dl-amf-ue-ngap-id	123
n2dl-ran-ue-ngap-id	12346
n1dl-msgtype	68
n1dl-5gmm-cause	11
n1dl-t3346	2c
n1dl-t3502	2c
n1dl-rejected-nssai	Sst;sd;cause| Sst;sd;cause Example: 02;111999;0|ff;;0|04;300000;1|ff;;1
n2dl-old-amf	string

Note AMF logs the UE context release sent after a registration reject or registration complete as a separate event.

Registration Complete

CLI-Name	Sample Format
Procedure	3
Event	102 Registration Complete
version	V1
field-count	9
status	Success or Failure
n2ul-msgtype	46

CLI-Name	Sample Format
n2ul-amf-ue-ngap-id	12346
n2ul-ran-ue-ngap-id	101
n1ul-msgtype	67
n1ul-sortranscontainer	SorDataType;;; Example: 0;0;0;0 -> SorDatatype;ListIndication;ListType;Ack 1;;; -> SorDatatype;;;
N2ul-user-loc-info	NrLoc|TAI;plmnId_123_456;30|NCGI; plmnId_123_456;1|1701489704

Note

- AMF logs the following events in a single line:
  Registration Request, Authentication, Security Mode, ICSR, and Registration Accept.
- Registration complete is a separate entry in EDR.

Initial Context Setup Request

CLI-Name	Sample Format
Procedure	3
Event	3000 Initial Context Setup Request
version	V1
field-count	14
n2dl-msgtype	14
n2dl-amf-ue-ngap-id	10
n2dl-ran-ue-ngap-id	123456
n2dl-old-amf	string
n2dl-ueAggMBR	Integer | Integer
n2dl-guami	123;456|3|14|1

CLI-Name	Sample Format
n2dl-sessressetupctxreq	Format - PDUSessionId;SSt;Sd;PayloadConttype; Backofftimer;Cause | PDUSessionId1;SSt1;Sd1;PayloadConttype1; Backofftimer1;Cause1 **Note** AMF derives the payload container type, backoff timer, and cause value from NAS PDU.
n2dl-allowed-nssai	02;333333
n2dl-ue-security-capabilities	c0;00|c0;00|00;00|00;00
n2dl-security-key	32|a776370429201fd6ac20212ac7f62bda 6fff2bc58b523e908c085f3026be7a0c
n2dl-mobrestrictions	See Mobility Restriction List
n2dl-emergencyFBId	1|1
n2dl-redirectionVoiceFallback	0

Initial Context Setup Response

CLI-Name	Sample Format
Procedure	3
Event	3001 Initial Context Setup Response
version	V1
field-count	5
n2ul-msgtype	14
n2ul-amf-ue-ngap-id	10
n2ul-ran-ue-ngap-id	12345
n2ul-PDUSessResSetupRsp	Single PDU: “PDU session ID” Example: 5 List of PDUs: (for Ex:2) “PDU session ID” | “PDU session ID” Example: 5|6

CLI-Name	Sample Format
n2ul-PDUSessResSetupfail	Single PDU: "PDU session ID" Example: 5 List of PDUs: (for Ex:2) "PDU session ID" | "PDU session ID" Example: 5|6

Initial Context Setup Failure

CLI-Name	Sample Format
Procedure	3
Event	3002 Initial Context Setup Failure
version	V1
field-count	6
status	Failure
n2ul-msgtype	14
n2ul-amf-ue-ngap-id	10
n2ul-ran-ue-ngap-id	12345
n2ul-PDUSessResSetupfail	Single PDU: "PDU session ID" Example: 5 List of PDUs: (for Ex:2) "PDU session ID" | "PDU session ID" Example: 5|6
n2ul-cause	0|23

UE Context Release Request

The following table list the event details for a gNB initiated UE context release request towards AMF.

CLI-Name	Sample Format
Procedure	6
Event	3003 UE Context Release Request
version	V1
field-count	5
n2ul-msgtype	42

CLI-Name	Sample Format
n2ul-amf-ue-ngapid	2099211
n2ul-ran-ue-ngapid	12346
n2ul-pduSessRsrcList	5|6
n2ul-cause	Cause_group | Value 0|0

UE Context Release Command

This event encompasses both UE context release and complete commands and is part of multiple procedures, such as registration, deregistration, and service requests. In certain cases, the AMF does not wait for the UE Context Release Complete and, therefore, does not update the status field in such instances.

CLI-Name	Sample Format
Procedure	3 [Refer Note]
Event	3004 UE Context Release Command
version	V1
field-count	8
Status	Success, Failure, or empty
n2-msgtype	41
n2-amf-ue-ngapid	4567
n2-ran-ue-ngapid	1234
n2dl-cause	Cause_group | Value 2|0
n2ul-userloc-info	The NCGI denotes the NRLOC and ECGI denotes the EUTRANLOC Format: NCGI:Mcc;Mnc;CellId | TAI: Mcc;Mnc;Tac| Timestamp Example: NCGI:123;456;30 |TAI:567;789;30 | 1705848410 Example:ECGI:123;456;30 | TAI:567;789;30| 1705848410

CLI-Name	Sample Format
n2ul-recommendedCellRanNodes-paging	NCGI:Mcc_Mnc_CellId;TimeStayedInCell|Mcc1 _Mnc1_CellId1;TimeStayedInCell1 ECGI:Mcc_Mnc_CellId;TimeStayedInCell|Mcc1_ Mnc1_CellId1;TimeStayedInCell1 Example - NCGI:214_365_00000002d;35 | NCGI:214_365_00000002e;36 Example - ECGI:214_365_000001f;5 | ECGI:123_456_000002f;12
n2ul-pduSessRsrcList	5|6

Note Procedure code varies based on the parent procedure under which this event is enabled.

UE Initiated Deregistration

CLI-Name	Sample Format
Procedure	4
Event	104
version	V1
field-count	13
Status	Success/Failure
n2ul-msgtype	46
n2-amf-ue-ngapid	1
n2-ran-ue-ngapid	12346
n1ul-msgtype	69
n1ul-dereg-type	0|0|1
n1ul-ngksi	0|1
n1ul-mobileid	guti-123;456|1|14|3|16777217

CLI-Name	Sample Format
n2ul-userloc-info	The NCGI denotes the NRLOC and ECGI denotes the EUTRANLOC Format: NCGI:Mcc;Mnc;CellId | TAI: Mcc;Mnc;Tac| Timestamp Example: NCGI:123;456;30 |TAI:567;789;30 | 1705848410 Example:ECGI:123;456;30 | TAI:567;789;30| 1705848410
n2dl-msgtype	4
n1dl-msgtype	70

UDM Initiated Deregistration

CLI-Name	Sample Format
Procedure	4
Event	158
version	V1
field-count	12
Status	Success/Failure
n2dl-msgtype	4
n2dl-amf-ue-ngapid	2
n2dl-ran-ue-ngapid	12346
n1dl-msgtype	71
n1-dereg-type	0|0|1
n1dl-cause	23
n1dl-t3346	1
n2ul-msgtype	46
n1ul-msgtype	72

Deregistration DL NAS Transport

CLI-Name	Sample Format
Procedure	4
Event	158
version	V1

CLI-Name	Sample Format
field-count	8
n2dl-msgtype	0
n2dl-amf-ue-ngapid	1
n2dl-ran-ue-ngapid	12346
n1dl-msgtype	104
n1dl-pdu-sessid	5
n1dl-payload-cont-type	1
n1dl-t3346	1
n2dl-cause	2c

Xn-HandOver

CLI-Name	Sample Format
Procedure	14
Event	3006
version	V1
field-count	18
status	Success/ Failure
n2ul-msgtype	25
n2ul-src-amf-ue-ngapid	136314888
n2ul-ran-ue-ngapid	12346
n2ul-userloc-info	The NCGI denotes the NRLOC and ECGI denotes the EUTRANLOC Format: NCGI:Mcc;Mnc;CellId | TAI: Mcc;Mnc;Tac| Timestamp Example: NCGI:123;456;30 |TAI:567;789;30 | 1705848410 Example:ECGI:123;456;30 | TAI:567;789;30| 1705848410
n2ul-ue-security-capabilities	00;01|00;01|00;01|00;01
n2ul-pdu-session-resource-to-be-switched-list	“PDU session ID” | “PDU session ID” Example: 5|6
n2ul-pdu-session-resource-failed-setup-list	“PDU session ID” | “PDU session ID” Example: 7|8

CLI-Name	Sample Format
n2dl-msgtype	25
n2dl-amf-ue-ngapid	136314889
n2dl-ran-ue-ngapid	22346
n2dl-ue-security-capabilities	00;00|00;00|00;00|00;00
n2dl-security-context	Ncc|nh Example: 2|e90712066cc7e598809fc11534ae7b8c4ce 6d1866f855ae77a62c96cd8b430d8
n2dl-pdu-session-resource-switched-list	"PDU session ID" | "PDU session ID" Example: 5|6
n2dl-pdu-session-resource-released-list	"PDU session ID" | "PDU session ID" Example: 7|8
n2dl-allowed-nssai	02;333333
n2dl-redirectionVoiceFallback	1
n2dl-pdu-session-resource-failed-release-list	"PDU session ID" | "PDU session ID" Example: 5|6

N1 Identity Request

AMF logs the N1 identity request and response as combined events and captures the IE details under the registration procedure.

CLI Fields	Sample Format
Procedure	3
Event	162
Version	V1
Field-Count	12
status	Success
n2dl-msgtype	4
n2-amf-ue-ngapid	16
n2-ran-ue-ngapid	12346
n1dl-msgtype	86
n1dl-identity-type	SUCI
n2ul-msgtype	46
n1ul-msgtype	87

CLI Fields	Sample Format
n1ul-mobileid	suci-0-123-456-0-0-0-789012345
n2ul-userloc-info	The NCGI denotes the NRLOC and ECGI denotes the EUTRANLOC Format: NCGI:Mcc;Mnc;CellId | TAI: Mcc;Mnc;Tac| Timestamp Example: NCGI:123;456;30 |TAI:567;789;30 | 1705848410 Example:ECGI:123;456;30 | TAI:567;789;30| 1705848410

N1 Request and Failure Response

CLI Fields	Sample Format
Procedure	3
Event	162
Version	V1
Field-Count	12
status	Failure
n2dl-msgtype	4
n2-amf-ue-ngapid	16
n2-ran-ue-ngapid	12346
n1dl-msgtype	86
n1dl-identity-type	SUCI
n2ul-msgtype	
n1ul-msgtype	
n1ul-mobileid	
n2ul-userloc-info	The NCGI denotes the NRLOC and ECGI denotes the EUTRANLOC Format: NCGI:Mcc;Mnc;CellId | TAI: Mcc;Mnc;Tac| Timestamp Example: NCGI:123;456;30 |TAI:567;789;30 | 1705848410 Example:ECGI:123;456;30 | TAI:567;789;30| 1705848410

Meta Data Information

Following are the procedure level information captured for the meta data.

CLI Fields	Sample Format
Procedure	3
Event	3099
Version	V1
Field-Count	9
proc-start-time	2024/02/09 14:36:31.559
proc-end-time	2024/02/09 14:36:31.811
proc-status	Success
ue-5gmm-state	MM_REGISTERED
ue-roaming-status	HOMER
ue-serving-area	UNKNOWN_AREA
ue-neg-security-capabilty	5G-EA0|128-5G-IA1
ue-gnb-data	12346|4|1663|123_456;4194304
ue-initial-ctx-setup-done	1
ue-nas-dl-ul-count	2|2

Following are the detailed level information captured for the meta data.

proc-start-time	Procedure Start Time: Format :(Year/Month/Day Hour: Min: Second: Milliseconds)
proc-end-time	Procedure End Time: Date time format :(Year/Month/Day Hour: Min: Second: Milliseconds)
proc-status	Procedure status can be either Success or Failure)
ue-5gmm-state	5GMM state • MM_DEREGISTERED • MM_COMM_PROC_INIT • MM_REGISTERED • MM_DEREGISTRATION_INIT • MM_IDLE
ue-roaming-status	Following are the possible values for roaming status: • HOMER • ROAMER • UNKNOWN

ue-serving-area	UE serving area represent currently UE has been imposed service area restriction or not. Following are the possible values for SAR: • ALLOWED • NOT ALLOWED • UNKNOWN_AREA	
ue-neg-security-capabilty	AMF logs the following fields as part of negotiated Security capability: • 5G-NegEA : Negotiated Encryption Algorithms. Example: 5G-EA0. • 5G-NegIA: Negotiated Integrity Algorithms, Example : 128-5G-IA1.	
ue-gnb-data	AMF captures the following details as part of UE-gNB-data:	
	Sub-field • RAN-UE-NGAP-ID • AMF-UE-NGAP-ID • NGAP-conn-ID • GNB ID	Data Type • Integer type • Integer type • Integer type • PLMN ID - mcc, BYTE[] • Ran-Ngap-Gnb-Id - Integer type Example: 12346|4|1663|123_456;4194304
ue-initial-ctx-setup-done	Initial Context Setup done (1 or 0) 1 means initial context setup done 0: Initial Context Setup not done	
ue-nas-dl-ul-count	DL NAS Count | UL NAS Count	

Paging Request

N2 paging request IE is an individual event and the following are the fields listed for the paging procedure.

CLI Fields	Sample Format
Procedure	7
Event	3009
version	V1

CLI Fields	Sample Format
field-count	6
n2dl-msgtype	22
n2dl-uepagingIdentity	3|14|16777238
n2dl-pagingdrx	2
n2dl-pagingpriority	5
n2dl-assistancedatapaging	NCGI:Mcc_Mnc_CellId_TimeStayedInCell; Mcc1_Mnc1_CellId1_TimeStayedInCell1| PagingAttemptCount;IntendedNumberOfPagingAttempts; NextPagingAreaScope ECGI:Mcc_Mnc_CellId_TimeStayedInCell; Mcc1_Mnc1_CellId1_TimeStayedInCell1| PagingAttemptCount;IntendedNumberOfPagingAttempts; NextPagingAreaScope Example - NCGI:214_365_00000002d_35 ; NCGI:214_365_00000002e_36|1;2;0 Example - ECGI:214_365_000001f_5 ; ECGI:123_456_000002f_12|1;5;5
n2dl-tailistpaging	TAI:Mcc;Mnc;Tac TAI:123;456;30|TAI:440;784;10

N2 Handover

AMF supports the EDR storage only for intra-N2 handover.

Handover Required

CLI Fields	Sample Format
Procedure	15
Event	3010
version	V1
field-count	8
n2ul-msgtype	12
n2ul-amf-ue-ngapid	2097153
n2ul-ran-ue-ngapid	12346
n2ul-handoverType	0

CLI Fields	Sample Format
n2ul-cause	Cause_group | Value 0|3
n2ul-targetId	Global RAN Node ID: GnbId (Global gNB ID) added as prefix to denote NG-RAN choice. gNB: mcc_mnc_ cellIdentity (Example: GnbId:123_456_4194305) Selected TAI: mcc_mnc_tac (Example: 123_456_30) Prefix “0:” for NG-RAN added as prefix for TargetId. Sample Value: NG-RAN – 0;GnbId:123_456_4194305|TAI:123_456_30
n2ul-direct-frwrd -path-avail	0
n2ul-pdu-session -resource-list	“PDU session ID” | “PDU session ID” 5|6

Handover Request/Acknoweledgement/Failure

CLI Fields	Sample Format
Procedure	15
Event	3011
version	V1
field-count	18
status	Success/Failure
n2dl-msgtype	13
n2-amf-ue-ngapid	12346
n2dl-handoverType	0 (intra5gs)
n2dl-cause	Cause_group | Value 0|3
n2dl-ueAggMaxBitRate	256000|256000
n2dl-ue-security-capabilities	00;01|00;01|00;01|00;01
n2dl-security-context	Ncc|nh Example: 2|e90712066cc7e598809fc11534ae7b8c 4ce6d1866f855ae77a62c96cd8b430d8

CLI Fields	Sample Format
n2dl-pdu-session-resource-list	“PDU session ID” | “PDU session ID” Example: 5|6
n2dl-allowed-nssai	2;333333
n2dl-mobrestrictions	See Mobility Restriction List
n2dl-guami	123;456|3|14|1
n2dl-redirectionVoiceFallback	1
n2ul-msgtype	13
n2-ran-ue-ngapid	12345
n2ul-pdu-session-resource-admitted-list	“PDU session ID” | “PDU session ID” Example: 5|6
n2ul-pdu-session-resource-failed-list	“PDU session ID” | “PDU session ID” Example: 5|6
n2ul-cause	0|13

Handover Preparation Failure

CLI Fields	Sample Format
Procedure	15
Event	3014
version	V1
field-count	4
n2dl-msgtype	12
n2dl-amf-ue-ngapid	12346
n2dl-ran-ue-ngapid	335
n2dl-cause	Cause_group | Value 0|3

Handover Command

CLI Fields	Sample Format
Procedure	15
Event	3013
version	V1
field-count	4
n2dl-msgtype	12

CLI Fields	Sample Format
n2dl-amf-ue-ngapid	12346
n2dl-ran-ue-ngapid	335
n2dl-handoverType	0 - means intra handover type
n2dl-pdu-session-resource-ho-list	5 |6
n2dl-pdu-session-resource-rel-list	6 (empty when not present)

Handover Notify

CLI Fields	Sample Format
Procedure	15
Event	3015
version	V1
field-count	4
n2ul-msgtype	11
n2ul-amf-ue-ngapid	12346
n2ul-ran-ue-ngapid	335
n2ul-userloc-info	NCGI:123;456;1|TAI:123;456;20|

Uplink RAN Status Transfer

CLI Fields	Sample Format
Procedure	15
Event	3016
version	V1
field-count	4
n2ul-msgtype	49
n2ul-amf-ue-ngapid	12346
n2ul-ran-ue-ngapid	335

Downlink RAN Status Transfer

CLI Fields	Sample Format
Procedure	15
Event	3017
version	V1
field-count	4
n2dl-msgtype	7

CLI Fields	Sample Format
n2dl-amf-ue-ngapid	12346
n2dl-ran-ue-ngapid	335

Handover Cancel and Handover Cancel Acknoweledge

CLI Fields	Sample Format
Procedure	15
Event	3019
version	V1
field-count	5
status	Success
n2-msgtype	10
n2-amf-ue-ngapid	12346
n2-ran-ue-ngapid	335
n2ul-cause	0|5

Service Request

CLI Fields	Sample Format
Procedure	5
Event	105
version	V1
field-count	14
n2ul-msgtype	46
n2ul-amf-ue-ngapid	5
n2ul-ran-ue-ngapid	12346
n1ul-msgtype	76
n1ul-ngksi	0|1
n1ul-servicetype	4
n1ul-stmsi	stmsi-3|14|16777219
n1ul-uplink-datastatus	0|0|0|0|0|0|0|0|0|0|0|0|0|0|0|0
n1ul-pdusess-status	0|0|0|0|0|1|0|0|0|0|0|0|0|0|0|0

CLI Fields	Sample Format
n2ul-userloc-info	The NCGI denotes the NRLOC and ECGI denotes the EUTRANLOC Format: NCGI:Mcc;Mnc;CellId | TAI: Mcc;Mnc;Tac| Timestamp Example: NCGI:123;456;30 |TAI:567;789;30 | 1705848410 Example:ECGI:123;456;30 | TAI:567;789;30| 1705848410
n2ul-rrc-est-cause	3
n2ul-contextrequest	1
n2ul-allowed-nssai	Sst;sd|sst;sd Example: 03;000004|0b;111111

Service Accept

CLI Fields	Sample Format
Procedure	5
Event	159
version	V1
field-count	9
n2dl-msgtype	0
n2dl-amf-ue-ngapid	15
n2dl-ran-ue-ngapid	12346
n1dl-msgtype	78
n1dl-pdusess-status	0|0|0|0|0|1|1|0|0|0|0|0|0|0|0|0
n1dl-pdusessreactivateres	0|0|0|0|0|1|0|0|0|0|0|0|0|0|0|0
n1dl-pdusessreactivatereserrcause	0|0|0|0|0|1|0|0|0|0|0|0|0|0|0|0
n2dl-mobrestrictions	See Mobility Restriction List

Service Reject

CLI Fields	Sample Format
Procedure	5
Event	160
version	V1
field-count	8

CLI Fields	Sample Format
n2dl-msgtype	0
n2dl-amf-ue-ngapid	8
n2dl-ran-ue-ngapid	12346
n1dl-msgtype	77
n1ul-cause	28
n1dl-pdusess-status	0|0|0|0|0|1|0|0|0|0|0|0|0|0|0|0
n1dl-t3346	2c

UE Context Modification

CLI Fields	Sample Format
Procedure	5
Event	3021
version	V1
field-count	4
n2dl-msgtype	38
n2dl-amf-ue-ngapid	36
n2dl-ran-ue-ngapid	12346
n2dl-emergencyFBId	0|0

PDU Session Resource Setup Request

CLI Fields	Sample Format
Procedure	5
Event	3022
version	V1
field-count	5
n2dl-msgtype	29
n2dl-amf-ue-ngapid	36
n2dl-ran-ue-ngapid	12346

CLI Fields	Sample Format
n2dl-pdusess-res-setup-req-item	Format - PDUSessionId;SSt;Sd;PayloadConttype; Backofftimer;Cause | PDUSessionId1;SSt1;Sd1;PayloadConttype1; Backofftimer1;Cause1 **Note** AMF derives the payload container type, backoff timer, and cause value from NAS PDU.
n2dl-ueAggMBR	25600|25600

PDU Session Resource Setup Modify Request

CLI Fields	Sample Format
Procedure	5
Event	3023
version	V1
field-count	4
n2dl-msgtype	26
n2dl-amf-ue-ngapid	8
n2dl-ran-ue-ngapid	12346
n2dl-pdusessres-mod	Format - PDUSessionId;PayloadConttype;Backofftimer;Cause | PDUSessionId1;PayloadConttype1;Backofftimer1;Cause1 **Note** AMF derives the payload container type, backoff timer, and cause value from NAS PDU. Example – 5;1;10;3 | 6;2;;

PDU Session Resource Release Command

CLI Fields	Sample Format
Procedure	5
Event	3024
Version	V1
field-count	4

CLI Fields	Sample Format
n2dl-msgtype	38
n2dl-amf-ue-ngapid	7
n2dl-ran-ue-ngapid	12346
n2dl-pdusessres-rellist	PduSessionID0|PduSessionId1 5|6
n2dl-naspdu	PayloadConttype| backofftimer | Cause 1|10|3

PDU N2 Response Procedure

PDU N2 response events are recorded in the EDR upon the occurrence of the following events:

- When the AMF initiates requests as part of PDU procedures, such as creation, modification, or release.
- During service request procedures, including PDU setup, ICSR, and UE context modification.
- During registration procedures, such as reactivation.

PDU Session Resource Setup Response

CLI Fields	Sample Format
Procedure	11
Event	3025
version	V1
field-count	5
n2ul-msgtype	29
n2ul-amf-ue-ngapid	2097155
n2ul-ran-ue-ngapid	12346
n2ul-pdu-session-resource-setup-response-list	Single PDU: “PDU session ID” Example: 5 List of PDUs: (for Ex:2) “PDU session ID” | “PDU session ID” Example: 5|6

CLI Fields	Sample Format
n2ul-pdu-session-resource-setup-failure-list	Single PDU: “PDU session ID” Example: 6 List of PDUs: (for Ex:2) “PDU session ID” | “PDU session ID” Example: 5|6

PDU Session Resource Modify Response

CLI Fields	Sample Format
Procedure	11
Event	3026
version	V1
field-count	6
n2ul-msgtype	26
n2ul-amf-ue-ngapid	2097155
n2ul-ran-ue-ngapid	12346
n2ul-pdu-session-resource-modify-response-list	Single PDU: “PDU session ID” Example: 5 List of PDUs: (for Ex:2) “PDU session ID” | “PDU session ID” Example: 5|6
n2ul-pdu-session-resource-modify-failure-list	Single PDU: “PDU session ID” Example: 6 List of PDUs: (for Ex:2) “PDU session ID” | “PDU session ID” Example: 5|6

CLI Fields	Sample Format
n2ul-userloc-info	The NCGI denotes the NRLOC and ECGI denotes the EUTRANLOC Format: NCGI:Mcc;Mnc;CellId | TAI: Mcc;Mnc;Tac| Timestamp Example: NCGI:123;456;30 |TAI:567;789;30 | 1705848410 Example:ECGI:123;456;30 | TAI:567;789;30| 1705848410

PDU Session Resource Release Response

CLI Fields	Sample Format
Procedure	11
Event	3027
Version	V1
field-count	5
n2ul-msgtype	28
n2ul-amf-ue-ngapid	2097153
n2ul-ran-ue-ngapid	12346
n2ul-pdu-session-resource-release-response-list	Single PDU: “PDU session ID” Example: 5 List of PDUs: (for Ex:2) “PDU session ID” | “PDU session ID” Example: 5|6
n2ul-userloc-info	The NCGI denotes the NRLOC and ECGI denotes the EUTRANLOC Format: NCGI:Mcc;Mnc;CellId | TAI: Mcc;Mnc;Tac| Timestamp Example: NCGI:123;456;30 |TAI:567;789;30 | 1705848410 Example:ECGI:123;456;30 | TAI:567;789;30| 1705848410

UE Context Modification Response

CLI Fields	Sample Format
Procedure	11
Event	3028
version	V1
field-count	7
status	Success/Failure
n2ul-msgtype	40
n2ul-amf-ue-ngapid	2097154
n2ul-ran-ue-ngapid	12346
n2ul-rrc-state	0
n2ul-userloc-info	The NCGI denotes the NRLOC and ECGI denotes the EUTRANLOC Format: NCGI:Mcc;Mnc;CellId | TAI: Mcc;Mnc;Tac| Timestamp Example: NCGI:123;456;30 |TAI:567;789;30 | 1705848410 Example:ECGI:123;456;30 | TAI:567;789;30| 1705848410
n2ul-cause	Cause_group | Value 0|0

Mobility Restriction List

SUB IE's	SUB-SUB IE's	Printing Format in EDR
ServingPLMN	Mcc -> string Mnc -> string	servingplmn:mcc;mnc
EquivalentPLMNs	List 0: Mcc -> string Mnc -> string List 1: Mcc -> string Mnc -> string Etc	Single list: equiplmn:mcc_mnc Multiple List: equiplmn:mcc0_mnc0;mcc1_mnc1

RATRestrictions	List of PBRATRestrictionsItem List 0: Mcc Mnc string List 1: Mcc Mnc string etc	Single List: ratrest:mcc_mnc_val Multiple List: ratrest:mcc_mnc_val1;mcc1_mnc1_val2
ServiceAreaInformation	List of PBServiceAreaInformationItem List 0: Mcc Mnc [][]byte [][]byte List 1: Mcc Mnc [][]byte [][]byte etc	Single List: SAInfo:mcc1_mnc1_alltac% alltac%alltac_nalltac%nalltac Muliple List: SAInfo:mcc1_mnc1_alltac %alltac%alltac_nalltac%nalltac ; mcc2_mnc2_alltac11%alltac12%alltac12 _nalltac12%nalltac12

Each SUB IE under mobility restriction list is separated by "|" delimiter.

```
servingplmn:mcc;mnc|
equiplmn:mcc_mnc;mcc1_mnc1|
ratrest:mcc_mnc_val1;mcc1_mnc1_val2|
SAInfo:mcc1_mnc1_alltac%alltac%alltac_nalltac%nalltac ;
mcc2_mnc2_alltac11%alltac12%alltac12_nalltac12%nalltac12
```

Examples:

- For single list - servingplmn:123;456||ratrest:123_456_80|SAInfo:123_456_10%20_40%50|
- For multiple list: servingplmn:123;456||ratrest:123_456_80;123_456_40|SAInfo:123_456__10%20%30;123_456_40%50%60_|

EDR Transaction Collision

For collision, AMF provides collision related information in a separate file. This file is present only for debugging and is for internal use. For validation of collision cases, it is recommended to validate contents of the EDR transaction file having content present in the amf-service.

EDR Limitations

The EDR Logging feature has the following limitations:

- Event record generation does not work for the following scenario:
  - All handover (HO) procedures except Xn HO and intra AMF N2 HO. Further, AMF logs the EDR details only for messages exchanged on N1 and N2 interface.
- AMF supports EDR reporting exclusively based on the IMSI (SUPI) identifier.
- The AMF currently supports EDR generation in CSV format. The EDR file storage format is not configurable.
- AMF doesn't support EDRs for messages on AUSF (N12), UDM (N8), SMF (N11), PCF (N14), MME (N26), and AMF (N14) interfaces.

Configuring EDRs

This section describes how to configure the EDR Logging feature.

Configuring EDR Reporting

Note EDR generation occurs after you configure the subscriber ID. Then, you can enable EDR reporting for a specific subscriber or for all the subscribers. If you have enabled the EDR reporting for all the subscribers, then the AMF ignores the individual subscriber ID configuration.

Note To optimize the performance, it is recommended to enable EDR reporting only for a subset of subscribers with specific procedure ID. You can enable or disable the EDRs dynamically during runtime. The existing EDR records remain the same and the runtime changes get reflected only in the newly generated EDR records.

To enable or disable the EDR generation for subscribers, use the following sample configuration:

```
config
    edr reporting { enable [ all subscribers | file [ transaction |
transaction-collision ] ] | disable file [ transaction |
transaction-collision ] }
    edr all subscribers
    end
```

NOTES:

- **edr reporting { enable [all subscribers | file [transaction | transaction-collision]] | disable file [transaction | transaction-collision] }**—Specify this keyword to configure the EDR reporting on AMF. Use the **edr reporting enable** command to enable the EDR reporting functionality. Use the **edr reporting disable***file* command to disable the EDR reporting functionality for a specific file. By default, the EDR reporting is disabled.

  For **transaction-collision** details, see EDR Transaction Collision, on page 39.

- Use the **edr reporting enable all subscribers** command or **edr all subscribers** to enable the EDR for all the subscribers.

Note

- To enable EDR reporting for a subscriber, use the **edr subscribers** *subscriber_id* command. *subscriber_id* must be an alphanumeric string. The default value is empty. Ensure to specify the exact subscriber key in this command. The AMF supports only IMSI (SUPI)-based EDR reporting.
- Configure a minimum of one subscriber upon enabling the EDR reporting.
- You can configure a maximum of 10 subscribers for generation of transaction collision EDRs.

Configuring Transaction Level EDR Generation

Use the following sample configuration to generate the EDR events at transaction level.

```
config
   edr file { transaction | transaction-collision }
      procedure-id procedure_value
         event-id event_value
            field-id field_value
            end
```

- **edr file { transaction | transaction-collision }**: Specify to generate EDR files with transaction or transaction-collision level details for subscriber sessions. For **transaction-collision**, see EDR Transaction Collision, on page 39
- **procedure-id** *procedure_value*: Specify the procedure ID or procedure name for which the event reporting must be enabled.
- **event-id** *event_value*: Specify the event ID or event name for which the event reporting must be enabled.
- **field-id** *field_value*: Specify the field ID or field name for which the event reporting must be enabled.
- All procedure IDs, event IDs, and field IDs registered by application, are enabled by default.
- If one or more procedures are enabled, then all the other procedures will be disabled and will not be populated in the transaction EDR. Similarly, if one or more events are enabled under a procedure, all other events under that procedure will be disabled and will not be populated in the transaction EDR.
- If a procedure-id is disabled, no event start, add field, or event-end will be honored for the procedure-id.
- If an event-id is disabled within a procedure id, then event-start, event-end, or add field will not be honored for the procedure-id and event-id combination.

- If a field-id is disabled for an event-id, then add-field will not be honored, and a blank entry will be present instead of value in CSV entry.

Example Configuration:

```
edr file transaction
  procedure-id 24 32
  procedure-id 25
    event-id 5 7 8
    event-id 5
      field-id 10 12 14
```

In the preceding example, **event-id 5 7 8** means enable the event-id 5, 7, and 8 for procedure-id 25. The **field-id 10 12 14** means enable the field-id 10, 12, and 14 for procedure-id 25 and event-id 5.

Configuring EDR Parameters

To define the EDR parameters, use the following sample configuration:

```
config
   edr file transaction
      flush interval file_flush_interval
      limit [ size file_size | count file_count| storage edr_storage_size ]
      procedure procedure_value event event_value field field_value
      rate rate_value
      reporting [ disable | enable ]
      threshold [ cpu cpu_threshold | session session_thresold  ]
      end
```

NOTES:

- **flush interval** *file_flush_interval*—Specify the time interval, in milliseconds, to flush the EDR files. The default value is 1000 ms.
- **limit [size** *file_size* **| count** *file_count*| **storage** *edr_storage_size***]**—Specify the file-related limits.
  - Use the **limit size** *file_size* command to specify the maximum size of an EDR file, after which the EDR file is compressed and new CSV file is created. The default file size is 100 MB.

    The *file_size* must be an integer in the range of 1 to 2048.

Note The system periodically monitors the size of an EDR file once per second or after the configured flush interval, whichever value is higher. After the EDR file reaches its maximum size, it's compressed and new CSV file is created. However, in some scenarios, the data is being continuously written to the EDR file just before the system performs a periodic check based on the previously mentioned threshold limits. This results in an EDR file that might slightly exceed the configured maximum file size.

  - Use the **limit count** *file_count* command to specify the maximum number of EDR files to be preserved. The default file count is 10.

    The *file_count* must be an integer in the range of 2 to 128.

    When the configured file count is reached, the file is moved to persistent volume and then deleted.

- Use the **limit storage** *edr_storage_size* command to specify the EDR storage size of persistent volume in GiB.

  The *edr_storage_size* must be an integer in the range of 1 to 24. The default storage size is 4 GiB.

- Use the **limit storage** *edr_storage_size* command to specify the EDR storage size of persistent volume in GiB.

  The *edr_storage_size* must be an integer in the range of 0 to 64. Set the value to 0 to disable persistent volume in edr-monitor pod. The default storage size is 24 GiB.

Important The storage limit can be changed only in "system mode shutdown" mode. Hence, disabling of persistent volume can be done only when the system is in shutdown state.

- **procedure** *procedure_value* **event** *event_value* **field** *field_value*—Specify the transaction-level procedure ID configuration information. The *procedure_value* must be a procedure ID or a procedure name. The *event_value* must be an event ID or an event name along with a field value.

Note

- By default, all the procedure IDs, event IDs, and field IDs, which are registered during the application-start, are enabled.
- If one or more procedures are enabled, then all other procedures are disabled and are not populated in the transaction EDR.
- If one or more events are enabled in a procedure, then all other events in that procedure are disabled and are not populated in the transaction EDR.
- If one or more fields are enabled in an event, then all other fields in that event are disabled and are not populated in the transaction EDR.
- For the disabled procedure IDs, no event-start, add field, or event-end are honored.
- For the disabled event IDs in a procedure ID, no event-start, event-end, or add field are honored for the procedure ID and event ID combination.
- For a disabled field ID within an event ID, no add-field is honored, and a blank entry is available instead of value in CSV entry.

- **rate** *rate_value* —Specify the allowed rate per second to generate EDR records. The default rate is 4096.

  rate_value must be an integer in the range of 32 to 65535.

  When the EDR generation rate limit is reached, transaction EDRs are dropped and a metric is added to track EDR generated, dropped, drop reason, and so on. Note that the rate limiting is performed per service (amf-service) pod instance.

- **reporting [disable | enable]**—Specify the file for which you have to enable or disable reporting.

Important The edr-monitor pods are spawned only when the transaction edr is enabled.

- **threshold [cpu** *cpu_threshold* **| session** *session_thresold* **]**—Specify the threshold to limit the EDR generation.
  - Use the **threshold cpu** *cpu_threshold* command to configure the CPU threshold in percentage. If the threshold is breached for a AMF service pod instance, then the application stops generating EDRs. The *cpu_threshold* must be an integer in the range of 1 to 100, with default value of 80%.
  - Use the **threshold session** *session_thresold* command to configure session threshold per GR instance. If the threshold is breached for a GR instance, then the application stops generating EDRs. The *session_thresold* must be an integer in the range of 0 to 1,000,000, with default value of 100,000.

Note If the rack is running with active-active mode, the session threshold is applied individually for both the GR instances.

Verifying EDR Transactions

Use the following show commands to display the currently registered procedures, events, and fields for the application along with their respective IDs.

show edr transaction-procedure *procedure_id* **event** *event_id*

show edr event *event_id*

You can provide all the procedures and events. Otherwise, you can provide a particular procedure name and event name or procedure-id and event-id.

Note The show command output is based on the mapping registered by the application.

The following is an example of the show command output.

```
Procedure-id 20, Procedure-Name: xyz
    Event-id 1, Event-Name: abc
         1 - Field1-Name
         2 - Field2-Name
         …
         …
         …
     Event-id 2, Event-Name: efgh
          1 - Field1-Name
          2 - Field2-Name
          …
          …
          …
    …
    …
    …
Procedure-id 21, Procedure-Name: bbbb
     Event-id 1, Event-Name: cccc
```

```
        1 - Field1-Name
        2 - Field2-Name
        …
        …
        …
Event-id 2, Event-Name: dddd
        1 - Field1-Name
        2 - Field2-Name
        …
        …
        …
```

This output helps the operator to know current CSV format of a particular procedure-id and event-id pair.

OAM Support for EDR Logging

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

Bulk Statistics for EDR Transactions and EDR Reporting

The AMF maintains the following bulk statistics as part of this feature.

- edr_error_total

  Labels:

  - error_code – The EDR writing error code

This metric is pegged whenever an error occurs during EDR writing. This metric displays "EdrQueueFull" as the error_code when the writing queue is full and the EDR is dropped.

Following metric is used to monitor the EDR count and status.

- edr_total

  Labels:

  - name – Name of the transaction EDR.
  - status – Status of the EDR transaction if it is successful or has any errors.
  - status_code – The following status codes are supported:
    - EdrReportingDisabled
    - EdrTxnReportingDisabled
    - EdrSessThreshold
    - EdrCpuThreshold
    - EdrRateLimitExceeded
    - EdrFileWriteFailed
    - EdrInvalidEdrId
    - EdrQueueFull
    - EdrIgnored_NoEventRecorded

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    - EdrQueueFull
    - EdrIgnored_NoEventRecorded