

Additional bulkstat variables for ePDG KPI monitoring

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Feature description

The ePDG implementation includes three independent enhancements to improve monitoring and analytics:

- **DBR and MBR Counters**: Bulkstat counters are introduced in the epdg-plmn schema to track specific failure causes in Delete Bearer Response (DBRsp) and Modify Bearer Response (MBRsp) messages, enhancing operational visibility and troubleshooting.
- **Idle Session Counters**: Bulkstat counters are added to monitor the number of idle sessions based on a configurable idle duration. A corresponding CLI command is available under the epdg-service configuration mode. These counters are supported in the epdg and epdg-interworking-5g schemas.
- **Diameter Authentication KPI**: Additional counters are provided in the diameter-auth schema to capture total and 5G-specific Diameter authentication failure result codes, improving analytical insight and diagnostic capabilities.
- **IPSec and IKEv2 authentication KPIs**: Enhanced monitoring support is provided through the addition of new bulk statistics counters for IPSec and IKEv2 authentication procedures. The ePDG provides bulk statistics for IPSec and IKEv2 authentication to support monitoring and analysis of control-plane authentication and tunnel establishment. These KPIs offer visibility into IKE_SA_INIT and IKE_AUTH procedures, including attempt, success, and failure metrics, as well as phase-based EAP-AKA authentication statistics (P1, P2, and P3). Separate statistics are maintained for 5G sessions, identified using the UE N1 mode capability.

Configuring idle session duration for bulkstat counters

This section describes the configuration required to define the idle session timeout value used for BulkStat counters. When a session remains idle beyond the configured duration, it is counted under the BulkStat variables **concurrent-idle-sess** and **iwk5g-concurrent-idle-sess**.

Configuration Syntax

```
configure
    context context_name
       epdg-service service_name
          [ default | no ] session-idle-duration  value
```



Note No or default form of the command shall reset the timeout value to 300 secs.

Show commands and outputs

This section provides the show commands and corresponding outputs used to verify the idle session duration configuration.

Verifying idle session duration configuration

Use the following commands to display the configured session idle duration for the ePDG service:

```
show epdg-service name <service_name>
show configuration [verbose]
```

Sample output:

```
show epdg-service name epdg1
  Service name:  epdg1
  Context: pdif
  Bind: Done
  Max Sessions : 800000
  ...
  Timeout Idle : Disabled
  Session Idle Duration :5000
  Suppress International Roamer Handover : Disabled
  5G Interworking : Disabled

show configuration verbose
          ...
          epdg-service epdg1
          no timeout idle
         session-idle-duration 300
          plmn id mcc 300 mnc 000
```

Bulk statistics

The following bulkstat variables are available and can be viewed using the **show bulkstat variables** and **show bulkstat data** commands

Variables	Description
diameter-auth schema	
der-req-id-sent	Displays the total number of DER messages sent.
der-req-id-sent-5g	Displays the total number of DER messages sent for 5G sessions.
dea-rcvd	Displays the total number of DEA messages received.
dea-rcvd-5g	Displays the total number of DEA messages received for 5G sessions.
dea-reject	Displays the total number of DEA reject messages received.
dea-reject-5g	Displays the total number of DEA reject messages received for 5G sessions.
dea-exp-result-user-unknown	Displays the total number of DEA messages received with an experimental result code: DIAMETER_ERROR_USER_UNKWNOWN – 5001.
dea-result-redirect-indication	Displays the total number of DEA messages received with a result code: DIAMETER_REDIRECT_INDICATION – 3006.
dea-exp-result-illegal-equipment	Displays the total number of DEA messages received with experimental result code: DIAMETER_ERROR_ILLEGAL_EQUIPMENT – 5554.
dea-exp-result-user-no-non-3gpp-sub	Displays the total number of DEA messages received with experimental result code: DIAMETER_ERROR_USER_NO_NON_3GPP_SUBSCRIPTION – 5450.
dea-exp-result-roaming-not-allowed	Displays the total number of DEA messages received with an experimental result code: DIAMETER_ERROR_ROAMING_NOT_ALLOWED – 5004
dea-result-unable-to-comply	Displays the total number of DEA messages received with result code: DIAMETER_UNABLE_TO_COMPLY – 5012
dea-result-author-rej	Displays the total number of DEA messages received with result code: DIAMETER_AUTHORIZATION_REJECTED – 5003

Variables	Description
dea-exp-result-user-no-apn-sub	Displays the total number of DEA messages received with experimental result code: DIAMETER_ERROR_USER_NO_APN_SUBSCRIPTION – 5451.
dea-exp-result-user-unknown-5g	Displays the total number of DEA messages received for 5G sessions with an experimental result code: DIAMETER_ERROR_USER_UNKWNOWN – 5001.
dea-result-redirect-indication-5g	Displays the total number of DEA messages received for 5G sessions with result code : DIAMETER_REDIRECT_INDICATION – 3006.
dea-exp-result-illegal-equipment-5g	Displays the total number of DEA messages received for 5G sessions with experimental result code: DIAMETER_ERROR_ILLEGAL_EQUIPMENT – 5554.
dea-exp-result-user-no-non-3gpp-sub-5g	Displays the total number of DEA messages received for 5G sessions with experimental result code: DIAMETER_ERROR_USER_NO_NON_3GPP_SUBSCRIPTION – 5450.
dea-exp-result-roaming-not-allowed-5g	Displays the total number of DEA messages received for 5G sessions with an experimental result code: DIAMETER_ERROR_ROAMING_NOT_ALLOWED – 5004.
dea-result-unable-to-comply-5g	Displays the total number of DEA messages received for 5G sessions with result code: DIAMETER_UNABLE_TO_COMPLY – 5012.
dea-result-author-rej-5g	Displays the total number of DEA messages received for 5G sessions with result code: DIAMETER_AUTHORIZATION_REJECTED – 5003.
dea-exp-result-user-no-apn-sub-5g	Displays the total number of DEA messages received for 5G sessions with experimental result code: DIAMETER_ERROR_USER_NO_APN_SUBSCRIPTION – 5451.
epdg-schema	
concurrent-idle-sess	The total number of 4G and 5G sessions idle beyond the configured timeout.
epdg-interworking-5g schema	
iwk5g-concurrent-idle-sess	The number of 5G sessions that remain idle longer than the CLI-configured timeout.
epdg-plmn schema	

Variables	Description
plmn-tun-recv-mbrespfail-context-not-found	Displays the total number of Modify Bearer Response messages received with the Context Not Found cause at the PLMN level.
plmn-tun-recv-mbrespfail-service-not-supported	Displays the total number of Modify Bearer Response messages received with the Service Not Supported cause at the PLMN level.
plmn-tun-recv-mbrespfail-context-not-found-5g	Displays the total number of Modify Bearer Response messages received with the Context Not Found cause for 5G calls at the PLMN level.
plmn-tun-recv-mbrespfail-service-not-supported-5g	Displays the total number of Modify Bearer Response messages received with the Service Not Supported cause for 5G calls at the PLMN level.
plmn-tun-sent-dbrespfail-bearer-context-not-found	Displays the total number of bearer contexts received in Delete Bearer Request messages for which the system sent a Context Not Found cause in the Bearer context of Delete Bearer Response at the PLMN level.
plmn-tun-sent-dbrespfail-bearer-context-not-found-5g	Displays the total number of bearer contexts received in Delete Bearer Request messages for which the system sent a Bearer Context Not Found cause in the Bearer Context of Delete Bearer Response for 5G calls at the PLMN level.



Note

- A session is considered 5G in the diameter-auth schema when the involved UE is 5G-capable.
- A session is considered 5G in the epdg and epdg-plmn schemas when the ePDG latches the session on PGW-C+SMF.

Limitations

- The counters are available only in bulk statistics.
- The configured idle session duration is used solely for statistical counting and does not trigger any system action based on the configured value.
- DBR counters are not incremented for invalid TEIDs.