

Diameter Records Storage on HDD

This chapter describes the overview and implementation of the feature for storing Diameter (CCR-T) Records on Hard Disk Drive (HDD) during OCS failure.

This chapter discusses the following topics for this feature:

- Feature Description, on page 1
- Configuring Diameter Records Storage on HDD, on page 2
- Monitoring and Troubleshooting the Diameter Records Storage on HDD, on page 5

Feature Description

Overview

ASR 5500 supports Assume Positive configurations, and this feature is tailored to provide the service to users even when the Online Charging Server (OCS) is unreachable. This Assume Positive configuration allows the users to configure the interim-quota (either volume or time or both together along with the number of retries) that can be used when the charging servers are unreachable or not responding. This feature also lets the user to configure the action to be taken when the interim-quota and retries are exhausted.

In the existing implementation with Assume Positive feature, there are high chances of losing the usage data reported through the CCR-T when the session is being terminated while in Assume Positive mode. This problem is addressed by allowing the DCCA module to write the CCR-T messages (with locally assigned quota details) in the HDD of the chassis.

In cases where the Assume-Positive interim-quota is allocated, and CCR-T is not reported/answered, the CCR-T message is written to a local file, and saved in the HDD. This local file and directory information can be fetched and parsed to account for the lost bytes/usage. The retrieval of the file can be done with the PULL mechanism.

Note This feature requires a valid license to be installed prior to configuring this feature. Contact your Cisco account representative for more information on the licensing requirements.

In releases prior to 20, failed CCR-T is written to HDD only if the session is in Assume Positive state. In Release 20 and later, the existing behavior is modified such that, even if the sessions are not in Assume Positive

state, the failed CCR-Ts are written to HDD for later processing. This enhancement is applicable for all CCR-T failures like Tx/response timeouts, result code errors, diabase errors, etc.

In case of Session Recovery, if a DCCA session which is in pending-terminate state is recovered, then a fresh CCR-T will be initiated. This CCR-T will be written to hard disk if it fails. In case of ICSR, the sessions which are already in terminating state are not recovered.

Once the bearer/session gets terminated, the same in the standby will be deleted and that session will not come up in case of ICSR.

This feature is controlled through the CLI command "**diameter hdd**" introduced in the Credit Control Group configuration mode. When the CLI configuration is enabled, the DCCA application sends the failed CCR-T messages to the CDR module for storing in the HDD.

Relationships to Other Features

This feature is applicable for sessions that are in Server-Unreachable state. That is, this feature is applicable only when Assume Positive feature is enabled.

This dependency is no longer valid in Release 20 and later. In Release 20, this feature works even if the sessions are not in Assume Positive state.

License Requirements

This feature requires a valid license to be installed prior to configuring this feature. Contact your Cisco account representative for detailed information on specific licensing requirements. For information on installing and verifying licenses, refer to the *Managing License Keys* section of the *Software Management Operations* chapter in the *System Administration Guide*.

Limitations

The following are the limitations of this feature:

- When an ICSR event occurs unexpectedly before the CCR-T is written, the CCR-T will not written to the HDD and hence the usage will be lost.
- It is expected that the customers requiring this feature should monitor the HDD and periodically pull and delete the files so that the subsequent records can be buffered.
- It is recommended not to configure PUSH mechanism for the diameter-hdd-module.
- Diameter records will not be written to the HDD when CCR-T is not generated during session termination resulting due to certain error result codes in CCA-I/CCA-U.
- If Diameter records should be dumped to the HDD for all session terminations resulting from failed CCR-Us, then it is recommended to configure the **failure-handling template** CLI command in the Global Configuration mode. In this case, the CCR-T is generated during session termination for all CCR-U failures.
- T bit is set in the HDD records for CCR-T message failures (response/tx timeout and result code errors).

Configuring Diameter Records Storage on HDD

The following sections provide the configuration commands to enable the writing of Diameter records on HDD.

Enabling HDD for Credit Control Group

The commands illustrated below enable the HDD to store the failed CCR-T messages for the corresponding credit control group.

Note This command is license dependent. For more information, contact your Cisco account representative.

```
configure
    require active-charging-service
    active-charging-service service_name
         credit-control group  ccgroup_name
              diameter hdd
              end
```

Notes:

- **diameter hdd**: This CLI enables the HDD to store the failed CCR-T messages. When enabled, the Gy application sends the failed CCR-T messages to the CDR module for storing in the HDD. By default, this feature is disabled.
- **no diameter hdd**: Removes the HDD configuration for DCCA.

Important After you configure **require active-charging-service**, **active-charging-service** *service_name*, and **credit-control group** *ccgroup_name* CLI commands, you must save the configuration and then reload the chassis for the command to take effect. For information on saving the configuration file and reloading the chassis, refer to the *System Administration Guide* for your deployment.

Configuring HDD Module for Diameter Records

The commands illustrated below configure the HDD module for saving the failed CCR-T messages.

Note This command is license dependent. For more information, contact your Cisco account representative.

```
configure
    context  context_name
         diameter-hdd-module
              end
```

Notes:

- **diameter-hdd-module**: This command enters the Diameter HDD Module Configuration mode.
- **no diameter-hdd-module**: Deletes the HDD module from the context.

Configuring HDD Parameters

The commands illustrated below configure the the HDD specific parameters such as file creation properties for Diameter records.

Note This command is license dependent. For more information, contact your Cisco account representative.

```
configure
    context  context_name
         diameter-hdd-module
              diameter-event { purge { storage-limit storage_limit |
time-limit time_limit } [ max-files max_records_to_purge ] | push-interval
push_interval | push-trigger space-usage-percent trigger_percentage |
remove-file-after-transfer | transfer-mode { pull [ module-only ] | push
 primary { encrypted-url encrypted_url | url url } [ [ max-files max_records ]
 [ max-tasks task_num ] [ module-only ] [ secondary { encrypted-secondary-url
 encrypted_secondary_url | secondary-url secondary_url } ] [ via local-context ]
 + ] | use-harddisk }
              file [ compression { gzip | none } ] [ current-prefix string
 ] [ delete-timeout seconds ] [ directory directory_name ] [
exclude-checksum-record ] [ field-separator { hyphen | omit | underscore
 } ] [ name string ] [ reset-indicator ] [ rotation [ num-records number |
tariff-time minute seconds | time seconds | volume bytes ] ] [ sequence-number
 { length length | omit | padded | padded-six-length | unpadded } ] [
storage-limit limit ] [ time-stamp { expanded-format | rotated-format |
unix-format } ] [ trailing-text string ] [ trap-on-file-delete ] [
xor-final-record ] +
              end
```

Notes:

- **purge**: Specifies to purge/delete the Diameter records based on "time" or "volume" limit.
- **push-interval**: Specifies the transfer interval (in seconds) to push Diameter files to an external server.
- **push-trigger**: Specifies the record disk space utilization percentage, upon reaching which an automatic push is triggered and files are transferred to the configured external server.
- **remove-file-after-transfer**: Specifies that the system must delete Diameter files after they are transferred to the external server. Default: Disabled
- **transfer-mode**: Specifies the file transfer mode—how the Diameter files are transferred to the external server.
- **use-harddisk**: Specifies that the hard disk be used to store Diameter files.
- **compression**: Configures the file compression option for the Diameter records.
- **current-prefix**: Prefix to use for currently used Diameter file
- **delete-timeout**: Time to delete completed files in seconds
- **directory**: Creates the record files in the directory under */records/diameter*
- **exclude-checksum-record**: Excludes checksum record in the file
- **field-separator**: Separator to be used between the file format fields
- **name**: Base filename to use to generate file
- **reset-indicator**: Includes the reset-indicator counter value in the file name
- **rotation**: Criteria to rotate the record file
- **sequence-number**: Sequence number related configuration in the file name
- **storage-limit**: Total available storage for all the record (EDR/UDR/EVENT/DIAMETER) files.
- **time-stamp**: Time stamp format to be included in the file name.
- **trailing-text**: Text to be included in the file name

- **trap-on-file-delete**: Sends an SNMP notification (trap) when an EDR/UDR/EVENT/DIAMETER file is deleted
- **xor-final-record**: xor checksum record in the file

Verifying the Diameter HDD Configuration

Use the following command in Exec mode to display whether the HDD is enabled for each of the respective credit-control groups.

```
show active-charging service all
```

Use the following command in Exec mode to display/verify the configured and used file-space statistics.

```
show diameter-hdd-module file-space-usage
```

Monitoring and Troubleshooting the Diameter Records Storage on HDD

This section provides information regarding show commands and/or their outputs in support of this feature.

show active-charging service all

The following field has been added to the output of this show command to indicate whether or not the corresponding credit-control group has been configured to write the failed CCR-Ts in HDD.

- HDD

For descriptions of this statistics, see the *Statistics and Counters Reference* guide.

show active-charging credit-control statistics

The following fields have been added to the output of this show command to display the number of records written to HDD per credit-control group.

- HDD Stats
  - CCR-T

For descriptions of these statistics, see the *Statistics and Counters Reference* guide.

show cdr statistics

The following fields have been added to the output of this show command.

- Diameter-hdd-module Record Specific Statistics
  - Diameter-hdd-module files rotated
  - Diameter-hdd-module files rotated due to volume limit
  - Diameter-hdd-module files rotated due to time limit
  - Diameter-hdd-module files rotated due to tariff-time

- Diameter-hdd-module files rotated due to records limit
- Diameter-hdd-module file rotation failures
- Diameter-hdd-module files deleted
- Diameter-hdd-module records deleted
- Diameter-hdd-module records received
- Current open Diameter-hdd-module files
- Time of last Diameter-hdd-module file deletion

For descriptions of these statistics, see the *Statistics and Counters Reference* guide.

show diameter-hdd-module file-space-usage

The following fields have been added to the output of this show command.

- CDRMOD Instance Id
- Diameter-hdd-module File Storage LIMIT
- Diameter-hdd-module File Storage USAGE
- Percentage of Diameter-hdd-module file store usage

For descriptions of these statistics, see the *Statistics and Counters Reference* guide.

show diameter-hdd-module statistics

The following fields have been added to the output of this show command.

- Diameter-hdd-Module file Statistics:
  - CDRMOD Instance Id
  - Diameter-hdd-module files rotated
  - Diameter-hdd-module files rotated due to volume limit
  - Diameter-hdd-module files rotated due to time limit
  - Diameter-hdd-module files rotated due to tariff-time
  - Diameter-hdd-module files rotated due to records limit
  - Diameter-hdd-module file rotation failures
  - Diameter-hdd-module files deleted
  - Diameter-hdd-module records deleted
  - Diameter-hdd-module records received
  - Current open Diameter-hdd-module files
  - Time of last Diameter-hdd-module file deletion
- Diameter-hdd-module PUSH Statistics:
  - Successful File Transfers
  - Failed File Transfers
  - Num of times PUSH initiated
  - Num of times PUSH Failed
  - Num of times PUSH cancelled due to HD failure
  - Num of periodic PUSH
  - Num of manual PUSH
  - Current status of PUSH

- Last completed PUSH time
- Primary Server Statistics:
  - Successful File Transfers
  - Failed File Transfers
  - Num of times PUSH initiated
  - Num of times PUSH Failed
  - Num of periodic PUSH
  - Num of manual PUSH
  - Current status of PUSH
  - Last completed PUSH time
- Secondary Server Statistics:
  - Successful File Transfers
  - Failed File Transfers
  - Num of times PUSH initiated
  - Num of times PUSH Failed
  - Num of periodic PUSH
  - Num of manual PUSH
  - Current status of PUSH
  - Last completed PUSH time

For descriptions of these statistics, see the *Statistics and Counters Reference* guide.

Debugging Statistics

If an error is encountered, it is recommended to check the error level logs (if possible trace level as well) of "acsmgr" facility.

Search for the acsmgr-error log output "Maximum size exceeded for CCRT.." to see if the HDD writing is disabled due to the max-size limit. The acsmgr-trace message "CCRT-Msg (size xxxx) has been recorded to HDD" will be displayed when a CCR-T is saved in HDD successfully.

Bulk Statistics for Diameter Records Storage on HDD

DCCA Group Schema

The following statistics is included in the DCCA Group Schema in support of this feature.

Monitoring and Troubleshooting the Diameter Records Storage on HDD, on page 5

- cc-msg-ccrt-hdd

For descriptions of this variable, see the *Statistics and Counters Reference* guide.