



CPS Policy Reporting Guide, Release 23.1.0

First Published: 2023-02-24

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Preface

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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 document is a part of the Cisco Policy Suite documentation set.

For information about available documentation, see the *CPS Documentation Map* for this release at [Cisco.com](https://www.cisco.com).



Note The PATS/ATS, ANDSF, and MOG products have reached end of life and are not supported in this release. Any references to these products (specific or implied), their components or functions in this document are coincidental and are not supported. Full details on the end of life for these products are available at: <https://www.cisco.com/c/en/us/products/wireless/policy-suite-mobile/eos-eol-notice-listing.html>.

Audience

This guide is best used by these readers:

- Network administrators

- Network engineers
- Network operators
- System administrators

This document assumes a general understanding of network architecture, configuration, and operations.

Additional Support

For further documentation and support:

- Contact your Cisco Systems, Inc. technical representative.
- Call the Cisco Systems, Inc. technical support number.
- Write to Cisco Systems, Inc. at support@cisco.com.
- Refer to support matrix at <https://www.cisco.com/c/en/us/support/index.html> and to other documents related to Cisco Policy Suite.

Conventions (all documentation)

This document uses the following conventions.

Conventions	Indication
bold font	Commands and keywords and user-entered text appear in bold font.
<i>italic</i> font	Document titles, new or emphasized terms, and arguments for which you supply values are in <i>italic</i> font.
[]	Elements in square brackets are optional.
{x y z }	Required alternative keywords are grouped in braces and separated by vertical bars.
[x y z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
courier font	Terminal sessions and information the system displays appear in courier font.
< >	Nonprinting characters such as passwords are in angle brackets.

Conventions	Indication
[]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.



Note Means reader take note. Notes contain helpful suggestions or references to material not covered in the manual.



Caution Means reader be careful. In this situation, you might perform an action that could result in equipment damage or loss of data.



Warning IMPORTANT SAFETY INSTRUCTIONS.

Means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.

SAVE THESE INSTRUCTIONS



Note Regulatory: Provided for additional information and to comply with regulatory and customer requirements.

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[Cisco Bug Search Tool](#) (BST) is a web-based tool that acts as a gateway to the Cisco bug tracking system that maintains a comprehensive list of defects and vulnerabilities in Cisco products and software. BST provides you with detailed defect information about your products and software.

Important Notes

**Important**

Any feature or GUI functionality that is not documented may not be supported in this release or may be customer specific, and must not be used without consulting your Cisco Account representative.



CHAPTER 1

Policy Reporting Overview

- [Features, on page 1](#)
- [Policy Reporting Interface, on page 1](#)

Features

The Policy Reporting interface is a feature that lets you export subscriber records from the policy engine of Cisco Policy Suite to another system to define file format for further processing.

The Cisco Policy Suite Reporting Interface can export subscriber accounting records in these ways:

- Export to an internal data structure
- Replicate to a MySQL database
- Replicate to a CSV (comma separated value) file

With the Reporting interface installed and configured, you can treat account records in the following ways:

- Define a reporting server that groups similar records for exportation in a similar manner.
- Define a reporting record that contains 1 to n fields, each field of a basic type (String, Long, Decimal, and so on).
- Mark a record as a statistic record. A statistic record indicates to the system that it updates a given set of key fields with statistical data.
- Export records to a CSV file or to a MySQL database.

If preferred, you can enable Redis and disable Mongo for Policy reporting. To do this, you must configure two new parameters in the `qns.conf` file. See the "Enabling Redis Reporting" section in [Configuration File Parameters, on page 30](#).

Policy Reporting Interface

This section discusses and defines the features used by the Policy Reporting Interface:

- Formats available for replication, JDBC CDR (Call Data Record) Replication, CSV Replication, and Realtime CSV Replication.

- Reporting server indicates to Cisco Policy Suite where the records are physically stored.

For more information on replication parameters, refer to [Configuration File Parameters, on page 30](#).

JDBC CDR (Call Data Record) Replication

Database replication is enabled by adding a JDBC replication object for reporting. All attributes are standard MySQL connections with the exception of the following attributes:

- Run on Instances - The instances where the reporting JDBC replication runs. You can select instances that need to participate in replication of reporting records.
- Replication Period Seconds - How often the temporary JDBC records are updated with data from the work queue.
- Camel Case to DB Name Conversion - Translate names such as "thisIsATest" to the following DB field THIS_IS_A_TEST.

CSV Replication

CSV replication is set up by adding a CSV replication child to the reporting server configuration.



Note Only one CSV configuration should be added under a given server.

- Run on Instances - The instances where the reporting JDBC replication runs. You can select instances that need to participate in replication of reporting records.
- Replication Period Seconds - How often the temporary JDBC records are updated with data from the work queue.

Realtime CSV Replication

Real time CSV replication is the same as normal CSV except in these ways:

- CSV files are written out even if they are empty.
- The cut over to the next CSV file occurs at the defined time, even if a new file is not needed due to file size.

Reporting Server

A reporting server is a grouping of related reporting records that are exported in the same manner to the same destination. A reporting server is defined in the Reporting Server section of the Reference Data tab.

The purpose of a reporting server is to indicate to Cisco Policy Suite where the records is physically stored.



CHAPTER 2

Reporting Plug-in Configuration

- [Install Policy Reporting Plug-in, on page 3](#)
- [Configure Policy Reporting Plug-in, on page 4](#)
- [Configure a Reporting Server, on page 6](#)
- [Define Policies in Cisco Policy Builder, on page 11](#)
- [Policy CDR Management, on page 13](#)
- [Charging Characteristics AVP in Diameter GY CDR's, on page 27](#)
- [Remove MySQL JDBC Connectors from Standard Load Line-up, on page 30](#)
- [Configuration File Parameters, on page 30](#)

Install Policy Reporting Plug-in

By default, policy reporting plug-in is not installed in CPS. To install policy reporting plug-in, perform the following steps:

Procedure

Step 1 Edit the features files on Cluster Manager VM:

- a) In the `/etc/broadhop/pb/features` file, add the following line:

```
com.broadhop.client.feature.policyintel
```

- b) In the `/etc/broadhop/pcrf/features` file, add the following line:

```
com.broadhop.policyintel.service.feature
```

- c) (Optional) In a HA environment, you can enable the service feature for Policy Director (lb) nodes (`/etc/broadhop/iomanangerxx/features`) if you want to enable FTP from those nodes. To enable the service feature, add `com.broadhop.policyintel.service.feature` line in corresponding Policy Director (iomanager).

For example, for `iomanager01`, user needs to add the following line in `/etc/broadhop/iomananger01/features`:

```
com.broadhop.policyintel.service.feature
```

Step 2 After modifying the feature files, execute the following commands from Cluster Manager:

```
/var/qps/install/current/scripts/build_all.sh
```

If VMs are already deployed, after modifying the feature files, execute the following commands from Cluster Manager:

```
/var/qps/install/current/scripts/build_all.sh
```

```
/var/qps/install/current/scripts/upgrade/reinit.sh
```

Configure Policy Reporting Plug-in

To configure the policy reporting plug-in feature, perform the following steps:

Procedure

- Step 1** Login to the Cisco Policy Builder. The default **Reference Data** tab opens up displaying **Summary** pane on the left side.
- Step 2** Expand the **Systems** created. Click **Plugin Configurations** to display **Plugin Configurations Summary** pane on the right side.
- Step 3** Click **Policy Reporting Configuration** and the configuration pane is displayed.

Figure 1: Policy Reporting Configuration

Policy Reporting Configuration

***Staging Db Host Primary**

***Staging Port**

***Staging Failover Sla**

***Cdr Staging Size Mb**

Cdr Db Host Secondary

***Cdr Write Concern**

***Cdr Max Replication Time**

Disabled Policy Reports

- Location Usage
- System Usage
- Location Duration
- Mac Address Usage
- Session Duration

Add

Remove

Staging Db Host Secondary

***Staging Write Concern**

***Staging Max Replication Time**

Cdr Db Host Primary

***Cdr Port**

***Cdr Failover Sla**

***Time To Live In Days**

☐ Keep U T C Timing In C D R

Jdbc Replication ☐

Ftp Server Configuration ☐

▼ Actions

Create Child:

The following parameters can be configured under **Policy Reporting Configuration**:

Table 1: Policy Reporting Configuration Parameters

Parameter	Description
Staging Db Host Primary	Enter the name of the primary host database
Staging Db Host Secondary	Enter the name of the secondary host database
Staging Port	Enter the staging port number.
Staging Write Concern	Select staging write concern from the drop-down list.
Staging Failover Sla	Enter the staging failover Sla.

Parameter	Description
Staging Max Replication Time	Enter the staging maximum replication time.
Cdr Staging Size Mb	Enter the CDR staging size in Mb.
Cdr Db Host Primary	Enter the name of the primary CDR host database.
Cdr Db Host Secondary	Enter the name of the secondary CDR host database.
Cdr Port	Enter the CDR port number.
Cdr Write Concern	Select CDR write concern from the drop-down list.
Cdr Failover Sla	Enter the CDR failover Sla.
Cdr Max Replication Time	Enter the maximum CDR replication time.
Time To Live In Days	Enter the time to live in days.
Disabled Policy Reports	Click Add , a window appears asking you to select Policy Reporting Field. Select the required policy reporting configuration object and click OK to add the selected object in Disabled Policy Reports pane.
Keep UTC Timing in CDR	When we enable this check box, the system will keep the timing in UTC when replicating the CDRs to different databases.
Use separate DB per CDR collection	Enabled when there are multiple CDR types.

Configure a Reporting Server

To configure a reporting server, perform the following steps:

Procedure

- Step 1** On the **Policy Reporting Configuration** page, under **Create Child:** click **Reporting Server Configuration**.
- Step 2** The **Reporting Server Configuration** page opens up. Click **select** near **Related Cdr** field.
- Step 3** Select the required policy CDR object from **Please select a 'PolicyCdr' object...** and click **OK**. The added policy CDR is added in the **Related Cdr** field.

Note

Using a Reporting Server, the user can create JDBC CDR replication, CSV replication and Realtime CSV replication. The user can also copy the current reporting server configuration.

Replicate JDBC CDR

Use this procedure if your deployment stores records for offline accounting as JDBC. To enable JDBC CDR database replication, perform the following steps:

The following steps resume from the Step 3 in [Configure a Reporting Server, on page 6](#).

Procedure

-
- Step 1** Begin from **Reference Data > Systems > *name of the system* > Plugin Configurations > Policy Reporting Configuration > Reporting Server Configuration**.
- Step 2** Click **Jdbc Cdr Replication** to open JDBC CDR Replication page.
-

Replicate CSV

Use this procedure if your deployment uses a CSV format to store subscriber records. This screen specifies the location of the subscriber records in the output directory.



Note Only one CSV configuration should be added under a given server. You can also copy the current CSV Replication configuration.

The **File Generation Schedule Location** and **File Naming Rules** related sections under Csv replication are not used for logging based CDR implementation and instead are configured via logback configuration).

To enable CSV Replication, perform the following steps:

The following steps resume from Step 3 in [Configure a Reporting Server, on page 6](#).

Procedure

-
- Step 1** Begin from **Reference Data > Systems > *name of your system* > Plugin Configuration > Policy Reporting Configuration > Reporting Server Configuration**.
- Step 2** Click **CSV Replication** to open CSV Replication page.

The following parameters can be configured under **Csv Replication**:

Table 2: CSV Replication Parameters

Parameter	Description
Separator (Records)	Enter the separator character to use when writing out fields in a record. The delimiter between fields, for example a comma or semicolon. Default is ,(comma).

Parameter	Description
Quote	Enter the quote character to use when writing out records. This is an optional field. Not setting a value results in a CSV file free of quotation marks. Set to a specific character, perhaps ' single quote) or " (double quote) to use those characters in the csv file.
Escape	Enter the escape character to use when writing out records.
Attribute Mask for Date Time	This can be used to specify the date time format used for logging any Date time fields in the report. If not specified the default format yyyyMMddhhmmss is used.
Date Attributes As Timestamp	When checked, converts date type fields into time stamps (and ignores the Attribute Mask for Date Time field) while writing to CDRs (millisec since epoch).
Store In Gzip Format	When checked, the policy reports in the configured directory are stored in the GZip format.
Max Minutes For File	Enter the maximum number of minutes to keep the tmp file open for writing. Using the default of 60 minutes, if CPS starts writing to the file at 1:05 pm, it stops writing to the file at 2:05 pm. Using the default, CPS generates a new file every 60 minutes regardless of file size it may attain. Choose either Max Minutes For File or Max File Size Bytes , not both.
Max File Size Bytes	Enter the maximum file size to write. When the tmp file reaches the size defined here, CPS opens a new file. Choose either Max File Size Bytes or Max Minutes For File , not both.
Output Directory	Enter the file path where to write out the files.
Max Number Of Files	This field represents the maximum number of files that can exist in the configured output directory. On reaching the limit, addition of files takes place by deleting the oldest file in the configured output directory. Default: 200
Replication Period Seconds	Enter the replication time in seconds. That is, how often to update the temporary CSV file with data from the work queue of CSV records.
Run on Instances	You can limit offline reporting to specific machines. You can select instances that need to participate in replication of reporting records. Click Add to display the instances that are defined under cluster in Policy Builder configuration. User needs to make sure that the Policy Reporting plugin is also installed on the specified instances otherwise the instance will not be participating in replication of recording records even if it is specified in the list. If the list is empty then all the instances having Policy Reporting plugin installed may participate in replication of reporting records.
File Part Separator	Enter the separator character to use when writing out file names. The default is a hyphen (-). The file name syntax by default is file part file part <i><dbname><separator><collection name><separator><date format mask><.suffix></i> .

Parameter	Description
Date Format Mask	<p>This variable impacts the <date format mask> part of the name. Normally the format is <code>yyyymmddmmss</code> (year month day minutes seconds). However, you can set this variable to the special word "long" to use the Unix timestamp that includes hours and seconds.</p> <p>Example: 1310998213 (2011-07-18 14:10:13Z)</p> <p>Note If using the special word "long", HH provides 24-hour clock time and hh, lower case letters, provide 12-hour clock time. The file name syntax by default is: <code><db name><separator><collection name><separator><date format mask><.suffix></code>.</p>
Suffix	<p>Enter the decimal point and three-letter suffix you want to append to your filename. This could be .csv, .xls, .txt, and so on.</p> <p>Note This field has no default. Be sure to specify it.</p>
File Name includes Db Name check box	Database name is added to csv file name if the checkbox is selected.
File Name includes Collection Name check box	Collection name is added to csv file name if the checkbox is selected.

Replicate Real-time CSV

Use this procedure if your deployment uses a realtime CSV format to store subscriber records. This screen specifies the location of the subscriber records in the output directory.



Note Only one realtime CSV configuration should be added under a given server. The user can also copy the current realtime CSV Replication configuration.

To enable Realtime CSV Replication, perform the following steps:

The following steps resume from Step 3 in [Configure a Reporting Server, on page 6](#).

Procedure

- Step 1** Begin from **Reference Data > Systems > *name of your system* > Plugin Configuration > Policy Reporting Configuration > Reporting Server Configuration**.
- Step 2** Click **Realtime CSV Replication** to open Realtime CSV Replication page.

Figure 2: Realtime CSV Replication

Realtime Csv Replication

File Formatting Rules

*Separator

 Quote

 Escape

☐ Suppress Empty Quotes
 Attribute Mask For Date Time

 Header Record

File Generation Schedule

☐ Disable Replication On Instance
 *File Creation Schedule

 *Output Directory

 Output Directory2

 *Replication Period Seconds

 Run On Instances

File Naming Rules

Override File Name Mask

 File Name System Properties

Actions

Copy:

The following parameters can be configured under **Realtime Csv Replication**:

Table 3: Realtime CSV Replication Parameters

Parameter	Description
Separator (Records)	Enter the separator character to use when writing out fields in a record. The delimiter between fields, for example a comma or semicolon. Default is comma (,).
Quote	Enter the quote character to use when writing out records. This is an optional field. Not setting a value results in a CSV file free of quotation marks. Set to a specific character, perhaps ' single quote) or " double quote to use those characters in the csv file.
Escape	Enter the escape character to use when writing out records.
Attribute Mask For Date Time	This can be used to specify the date time format used for logging any Date time fields in the report. If not specified the default format yyyyMMddhhmmss is used.
File Creation Schedule	This field represents the frequency in minutes of the time schedule to write into the csv files for real time replication.
Output Directory	Enter the file path to write the files into
Output Directory2	This is an additional path to store the CSV file. This field is optional

Parameter	Description
Replication Period Seconds	Enter the replication time in seconds. That is, how often to update the temporary realtime CSV file with data from the work queue of CSV records
Run on Instances	<p>You can limit offline reporting to specific machines. You can select instances that need to participate in replication of reporting records.</p> <p>Click Add to display the instances that are defined under cluster in Policy Builder configuration. User needs to make sure that the Policy Reporting plugin is also installed on the specified instances otherwise the instance will not be participating in replication of recording records even if it is specified in the list. If the list is empty then all the instances having Policy Reporting plugin installed may participate in replication of reporting records.</p>
Override File Name Mask	This field is used to override the default file name for the generated CSV report. If not specified, a default file name of the format <PolicyCDRName-TableNameeyyyMMddhmmss> is used.
File Name System Properties	This option can be specified to replace any system properties with actual run-time values when Override File Name Mask is selected. A list of system properties separated by commas can be specified. The value in Override File Name Mask is compared against each matching value from this list and replaced with the run time system property. The final replaced value is used for the filename.

Define Policies in Cisco Policy Builder

When configuring extension points under Initial Blueprint for Policy Reporting:

- Send outbound messages records the CDRs before the outbound message is sent by the CPS.
- Post outbound message policies are executed after the outbound message is sent across by the CPS.

Based on the extension point used for configuration, the results may differ.

For example, in cases of session termination, the conditions depending on the presence of a session are not satisfied.

If *A Diameter Gx TGPP Session exists* is configured in the **Conditions** pane under **Send outbound messages**, it captures CDRs for all messages including CCR-T message.

But if *A Diameter Gx TGPP Session exists* is configured for **Post outbound message** policies, it can capture blank CDRs for CCR-T message. This is due to the session being deleted once the CCR-T message is sent.

As mentioned above, since post outbound message policy is executed after the outbound message is sent across by the CPS, the condition *A Diameter Gx TGPP Session exists* does not hold true for CCR-T message, resulting in blank CDRs being captured.

To define a policy in the Policy Builder, add the required fields in the Policy CDR using the data fields available in the Policy Reporting field category.



Note The CDR in the reporting database should be load balanced across the session managers. If high CDR (approx. 8k) is reported on primary reporting replica-set member, there is a chance of getting an issue "Secondary replica lagging behind the Primary replica" which leads to the diagnostics output in the hang state. So, the load balancing has to be done as a policy change and can be configured based on the customer environment. For more information, contact your Cisco Account representative.

Procedure

Step 1 To add a field into a report, use the following steps:

- Log in to Cisco Policy Builder. Select **Reference Data** tab.
- Click **Policy Reporting > Policy Cdrs**.
- In the **Actions** tab, click **Policy Cdr** to create a report.
- In the **Policy Cdr** window, under **Reporting Cdr Columns**, click **Add** to add a new column in the report.

The default *Cdr Field Type* value is set to **Literal**. If the CDR Field Type **Data** is selected, the field name entered should have the same name as that of the data fields in the **Policy Reporting Field Type**.

- To set a particular CDR field type, click on the default value, a drop-down appears from which you can select the required CDR Field type.

The field added into the report should be mapped with the data fields under the **Policy Reporting Field Type**.

Step 2 To map the fields, use the following steps:

- Select the field in the **Reporting Cdr Columns** table to be mapped, and click **select** under **Reporting Column Details > Data > Field**. A window appears asking you to select Policy Reporting Field.

Important

Field is available only when **Cdr Field Type** is **Data** under **Reporting Cdr Columns** table.

- Navigate to the data field that matches the field defined in the Reporting CDR column and click **OK**.

Step 3 Once the fields are defined for a report, conditions and policies need to be defined, which are available in the **Policies** tab. To specify a condition, use the following steps:

- In the Policy Builder, select **Policies** tab.
- Expand **Initial Blueprint > Send outbound messages**. A default policy window appears. Enter a policy name of your choice in the **Name** field.
- Select **Conditions** tab to specify your condition.
- To add a new condition, click **Add**. A window appears asking you to select a condition phrase. Select the required condition phrase and click **OK**.

Figure 3: Policy

Policy

*Name: Copy: [Current Policy](#) Move: [Reparent](#)

Conditions | Actions | Advanced

Conditions

When all conditions are true, the actions on the adjacent tab are executed.

Name

- A Diameter Rx TGPP Session exists
- A reporting state exists

Add Remove

Step 4 The user needs to initialize the Input Variables, Type and Operator Value to establish a connection with the Report. To initialize the values, use the following steps:

- Select **Actions** tab.
- Select **Add global reporting data**.
- Set the **Input Variables** required, the **Type** and **Operator Value**.

Note

The Operator Value for the Input Variable Name should be the same as that of the data field defined in the Reporting CDR columns table.

Policy CDR Management

Cisco Policy Suite (CPS) generates Call Data Records (CDR). For improved management, the generated CDRs are moved onto a server, which provides external tools and dashboards for Reporting.

The following topics briefs you on the Policy CDR Management:

- Policy Reports
- Configuring Maximum Number of Files
- Configure File Transfer Protocol (FTP) for Policy CDRs
- Store files in GZip format

Policy Reports

The Policy Reports are designed to provide all its relevant details in a single page.

Viewing of the Policy Reports can be classified in two ways:

- Categorized Policy Reporting Field Types
- View Policy CDR Fields

Categories of Policy Reporting Field Types

Data Fields that are available for the Policy Reporting field Types are categorized into the following:

- NETWORK
- TRAFFIC
- PCRF
- SUBSCRIBER
- BALANCE
- SESSION

The Data Fields for each of the above mentioned Policy Reporting Fields are displayed in columns on the same page.

For example, The Data Fields for NETWORK is displayed in columns on the same page, along with its other relevant details.

View Data Fields of a Category

To view a categorized list of Policy Reporting Fields and its Data Fields, use the following steps:

Procedure

Step 1 Log in to Cisco Policy Builder. By default, the screen displays **Reference Data > Summary** window.

Step 2 Click **Policy Reporting**.

Step 3 Select **Policy Reporting Field Types**.

Step 4 Select a Policy Reporting Field Type from the categorized list.

For example, click NETWORK to view the list of data fields that belong to NETWORK on the right side.

The data fields related to NETWORK are displayed.

Figure 4: Policy Reporting Field Type - NETWORK

Policy Reporting Field Type (Read Only)

Name

Policy Reporting Fields

*Code	*Db Field Name	*Db Type	*Precision
accessType	access_type	VARCHAR	30
cellSiteId	cell_site_id	VARCHAR	20
chargingId	charging_id	VARCHAR	60
circuitId	circuit_id	VARCHAR	20
deviceRatingGroup	device_rating_group	VARCHAR	30
framedTo	framed_to	VARCHAR	20

Actions

Copy:
[Current Policy Reporting Field Type](#)

Apart from the fields in the categorized list mentioned, extra fields can be created and configured separately under a new category. These extra fields are called non-default fields.

Create a Non-default Field

To create a non-default field, perform the following steps:

Procedure

- Step 1** Click **Policy Reporting > Policy Reporting Field Types**.
- Step 2** On the right side, under **Create Child:**, click **Policy Reporting Field Type** to open policy reporting field type page.
- Step 3** Provide a name to the category in the **Name** field. New policy reporting fields can be added to this category.
- Step 4** Click **Add** to create a field.
 - a) Provide a name to the field in the **Code** column.
 - b) Provide a name to the field in the **Db Field Name** column.
 - c) By default, **Db Type** is set to VARCHAR. To change the database type, click on the default field, a drop-down list appears. Select the **Db Type** required from the drop-down list.

Figure 5: Policy Reporting Field Type - Customized

Policy Reporting Field Type

Name
test

Policy Reporting Fields

*Code	*Db Field Name	*Db Type
testfield	testfield_d	VARCHAR

Add Remove ↑ ↓

View Policy CDR Fields

The Policy CDR provides for the configuration of all the Policy Reporting Fields in the same page, avoiding the creation of multiple child pages for each Policy Report.

To view and configure the Policy Reporting Fields, perform the following steps:

Procedure

- Step 1** Log in to Cisco Policy Builder.
- Step 2** Click **Policy Reporting > Policy Cdrs**.
- Step 3** Click **Policy Cdr** under **Create Child**.

A single report that can be configured along with its relevant details is displayed on the same page.

Accumulate CDR Column Values

You can configure a CDR column to report an accumulated value. For example, as shown in the following figure, if you want to report an accumulated value for balance used, you can set the **Type** for the **balanceUsed** column to **accumulation**, which displays the accumulated balance used reported by each CCR-U during a Gx session.

Procedure

- Step 1** In Policy Builder in the **Reference Data** tab, select **Policy Reporting > Policy Cdrs** in the left pane.
- Step 2** Click **Policy Cdrs** under **Create Child**.
- Step 3** Configure the relevant details for the report.

Step 4 Under **Reporting Cdr Columns**, select a **Type** of **accumulation** beside the name of the column whose values you want to accumulate.

Notice that, in this example configuration, the **imsi** CRD column is the key column.

Figure 6: Selecting a Type of accumulation for reporting CDR columns

The screenshot shows the Cisco Policy Builder interface. The left sidebar contains a tree view with categories like Systems, Account Balance Templates, Andsf Clients, Custom Reference Data Tables, DM Configuration, Diameter Agents, Diameter Clients, Diameter Defaults, Fault List, Notifications, Policy Enforcement Points, Policy Reporting, RADIUS Service Templates, Rule Retry Profiles, Subscriber Data Sources, and Tariff Times. The 'Policy Reporting' section is expanded, showing 'Summary', 'Policy Reporting Field Types', 'Policy Reporting Records', and 'Policy Cdrs'. The 'Policy Cdrs' section is selected, showing a list of 'EventRecords (Read Only)' and 'PCRF-CDR'. The main area displays the 'Policy Cdr' configuration for 'PCRF-CDR'. It includes fields for *Name, *Table Name, Date Time Format, and *Version. Below these are 'Closing Reasons' and a table for 'Reporting Cdr Columns'. The 'Reporting Cdr Columns' table has columns for Code, Cdr Field Type, Type, Export Field, and Default Value. The 'balanceUsed' row is highlighted with a red border, showing a Type of 'accumulation' and an Export Field checked.

*Name	*Table Name	Date Time Format	*Version
PCRF-CDR	PCRF-CDR		1

*Code	Time Limit	Usage Limit	Usage Field
SESSION_CLOSED	0	0	

Code	Cdr Field Type	Type	Export Field	Default Value
msisdn	Data	key	<input checked="" type="checkbox"/>	
imsi	Data	key	<input checked="" type="checkbox"/>	
quotaCode	Data	set	<input checked="" type="checkbox"/>	
balanceCode	Data	set	<input checked="" type="checkbox"/>	
balanceUsed	Data	accumulation	<input checked="" type="checkbox"/>	

Step 5 Select the Policy Builder **Policies** tab.

Step 6 In the left pane, select **Initial Blueprint > Send outbound messages**.

Step 7 Select **PCRF-CDR** (the name of the policy CDR created above), and click the **Actions** tab in the **Policy** pane.

Step 8 Under **Actions**, click **Add**.

Step 9 In the dialog box, search for and select **Add reporting data**, and click **OK**.

Step 10 Select the new **Add reporting data** action in the **Actions** list. The **Policy** pane now looks like the following figure.

Figure 7: Select Add reporting data Action

The screenshot shows the 'Policy' configuration window. The 'Name' field is 'PCRF-CDR'. The 'Copy' button is 'Current Policy' and the 'Move' button is 'Reparent'. The 'Conditions' tab is active, and the 'Actions' tab is selected. The 'Actions' list shows 'Add reporting data' selected. Below the list, the 'Input Variables' table is shown with columns for 'Input Variables', 'Type', 'Operator', and 'Value'. The table has three rows: 'IReportingState (IReportingState)*' with 'Output' type and 'default' operator, 'Name (String)*' with 'Literal' type and 'default' operator, and 'Value (Object)*' with 'Literal' type and 'default' operator. All three rows are marked as 'Required'. Below the table, the 'Available Input Variables' section shows 'Add All' and 'Add Reporting Scope (Object)'.

Input Variables	Type	Operator	Value	
IReportingState (IReportingState)*	Output	default		Required
Name (String)*	Literal	default		Required
Value (Object)*	Literal	default		Required

Available Input Variables -
[Add All](#)
[Add Reporting Scope \(Object\)](#)

- Step 11** Under **Type**, select **Output** for **IReportingState (IReportingState)**. The **Available Output Variables** dialog box opens.
- Step 12** Select **IReportingState** under **A reporting state exists**, and click **OK**.
- Step 13** For **Name (String)**, type the name of the CRD column that you configured as an accumulation type (**balanceUsed** in our example).
- Step 14** Under **Type**, select **Output** for **Value (Object)**. The **Available Output Variables** dialog box opens.
- Step 15** Select the appropriate variable, and click **OK**. In our example, for the **balanceUsed** column, you would select **Amount Charged1** under **An OCSChargeReservationResponse exists**.
- Step 16** Under **Available Input Variables**, click **Add** beside **Reporting Scope (Object)**.
- Step 17** Under **Type**, select **Output** for **Reporting Scope (Object)**. The **Available Output Variables** dialog box opens.
- Step 18** Select the name of the key CDR column under **A Diameter Gx TGPP Session exists** (**imsi** is the key column in our example) and click **OK**.

The configuration should now look like that shown in the following figure.

Figure 8: Final configuration

Policy

***Name** PCRF-CDR **Copy:** [Current Policy](#) **Move:** [Reparent](#)

Conditions Actions Advanced

Actions
Executed when all conditions are true.

Name
Add reporting data
Add reporting data
Add reporting data

Add Remove Up Down

Input Variables	Type	Operator	Value	
IReportingState (IReportingState)*	Output	default	IReportingState (A reporting state exists)	Required
Name (String)*	Literal	default	balanceUsed	Required
Value (Object)*	Output	default	Amount Charged1 (An OCSCChargeReservationResponse exists)	Required
Reporting Scope (Object)	Output	default	Imsi (A Diameter Gx TGPP Session exists)	Remove

Configure Maximum Number of Files

Using maximum number of files field, you can configure the maximum limit of files that can be stored in the configured output directory. On reaching the maximum limit, the oldest report is deleted.

To set the maximum number of files, perform the following steps:

Procedure

- Step 1** Log in to Cisco Policy Builder.
- Step 2** Click **Reference Data > Systems > *select an existing system***.
- Step 3** Expand the existing system to navigate to **Plugin Configurations**.
- Step 4** Select **Policy Reporting Configuration** under the **Plugin Configuration** summary page. The **Policy Reporting Configuration** page is displayed.
- Step 5** Scroll down to locate **Reporting Server Configuration**, under **Actions** and click on the link.
- Step 6** From the **Reporting Server Configuration** page, under **Actions** select **Csv Replication**.
- Step 7** Under **File Generation Schedule**, in the **Max Number of Files** configure the maximum value in the field provided.

Figure 9: File Generation Schedule

The following parameters can be configured under **File Generation Schedule**:

Table 4: File Generation Schedule Parameters

Parameter	Description
Max Number of Files	This field represents the maximum number of files that can exist in the configured output directory. On reaching the limit, addition of files takes place by deleting the oldest file in the configured output directory.
Allowed value	Integer
Default value	200

Configure File Transfer Protocol (FTP) for Policy CDRs

When the FTP server is configured, the generated Policy CDR reports are copied to the configured destination directory on the primary remote server using File Transfer Protocol. If the primary remote server is not reachable, the Policy CDR reports are copied to the configured destination directory on the secondary remote server.

To configure FTP server, perform the following steps:

Procedure

- Step 1** Log in to Cisco Policy Builder.
- Step 2** Click **Reference Data > Systems > select an existing system**.

- Step 3** Navigate to **Plugin Configuration**.
- Step 4** Select **Policy Reporting Configuration** under the **Plugin Configurations**. The **Policy Reporting Configuration** page appears.
- Step 5** Locate **Ftp Server Configuration** check box and select it.

Figure 10: FTP Server Configuration

Disabled Policy Reports

☐ Keep U T C Timing In C D R

Jdbc Replication ☐

Ftp Server Configuration ☒

Frequency In Minutes
60

*Primary Server
10.10.1.1

*Primary User Name
test

*Primary Password

*Primary Destination Path
/

Secondary Server

Secondary User Name

Secondary Password

Secondary Destination Path
/

▼ Actions
Create Child:
[Reporting Server Configuration](#)

The following parameters can be configured under **Ftp Server Configuration**:

Table 5: FTP Server Configuration Parameters

Parameter	Description
Frequency In Minutes	<p>This field represents the time interval after which the files are pushed (FTP'ed) to the remote destination.</p> <p>Allowed values = Integer</p> <p>Default = 60</p>
Primary Server	<p>This field represents the host name or IP address of the primary server to which the files are pushed (FTP'ed).</p> <p>Allowed values = String</p> <p>Default = None</p>

Parameter	Description
Primary User Name	This field represents the user name of the FTP account on the primary server. Allowed values = String Default = None
Primary Password	This field represents the password of the FTP account on the primary server. Allowed values = String Default = None
Primary Destination Path	This field represents the destination folder of the FTP account on the primary server. Note that this folder is the path relative to the FTP home folder of the user. Allowed values = String Default = None
Secondary Server	This field represents the host name or IP address of the backup server or secondary server to which the files are pushed (FTP'ed) if the primary host is not reachable. Allowed values = String Default = None
Secondary User Name	This field represents the user name of the FTP account on the secondary server. Allowed values = String Default = None
Secondary Password	This field represents the password of the FTP account on the secondary server. Allowed values = String Default = None
Secondary Destination Path	This field represents the destination folder of the FTP account on the secondary server. Note that this folder is path relative to the FTP home folder of the user. Allowed values = String Default = None

Store files in GZip Format

The policy reports in the configured directory can be stored in the GZip format.

To store the file in the GZip format, perform the following steps:

Procedure

- Step 1** Log in to Cisco Policy Builder.
- Step 2** Click **Reference data > Systems > Summary > Plugin Configurations > Policy Reporting Configuration**. The Policy Reporting Configuration page appears on the right side.
- Step 3** Under **Actions**, click **Reporting Server Configuration > Csv Replication**.
- Step 4** Under **File Generation Schedule**, select **Store In Gzip Format** check box.

By default this check box is unchecked. If this check box is enabled, the files are stored in GZip format in the configured output directory. Otherwise, files are not zipped.

Non-blocking CDRs

During the time when CDR database is down/slow, CDR attempts be logged in the Policy Server (QNS) logger (to its best but not 100% writes) and not in database, so that live traffic can be served. CDR can be made non-blocking and non-guaranteed (best effort to make it available), so that policy engine performance does not get degraded. CPS does best try to preserve CDR, however there is no guarantee.



Note Cisco recommends disabling blocking CDRs and enable compression.

Procedure

- Step 1** Configure non-blocking CDR: Non-blocking CDR do not block the processing threads when CDR writing takes time. This prevents performance degradation of live traffic.

- a) Add the following parameter in `/etc/broadhop/qns.conf` file:

```
-Dcisco.cdr.disableBlocking=true
```

- b) In Cluster Manager, execute the following command to synchronize the changes to the VM nodes:

```
copytoall.sh /etc/broadhop/qns.conf /etc/broadhop/qns.conf
```

- c) Execute the following commands to publish configuration and restart CPS:

```
/var/qps/bin/control/restartall.sh
```

restartall.sh script process will prompt for either Y/N to restart process. Enter Y to restart the process.

Caution

Executing `restartall.sh` will cause messages to be dropped.

- Step 2** Configure CDR compression: CDR compression is used to compress CDR records and adds padding to improve the write performance. It also helps in preventing database lock (%) to grow over period.

- a) Add the following parameter in `/etc/broadhop/qns.conf` file:

```
-Dcisco.cdr.compression=true
```

- b) In Cluster Manager, execute the following command to synchronize the changes to the VM nodes:

```
copytoall.sh /etc/broadhop/qns.conf /etc/broadhop/qns.conf
```

- c) Execute the following commands to publish configuration and restart CPS:

```
/var/qps/bin/control/restartall.sh
```

restartall.sh script process will prompt for either Y/N to restart process. Enter Y to restart the process.

Caution

Executing restartall.sh will cause messages to be dropped.

Step 3 Configure CDR mongo parameters:

- a) Add the following parameters in /etc/broadhop/qns.conf file:

```
-DdbSocketTimeout.cdrrep=1000
-DdbConnectTimeout.cdrrep=1200
-Dmongo.client.thread.maxWaitTime.cdrrep=1200
-Dmongo.connections.per.host.cdrrep=10
-Dmongo.threads.allowed.to.wait.for.connection.cdrrep=10
-DdbSocketTimeout.cdr=1000
-DdbConnectTimeout.cdr=1200
-Dmongo.client.thread.maxWaitTime.cdr=1200
-Dmongo.connections.per.host.cdr=10
-Dmongo.threads.allowed.to.wait.for.connection.cdr=10
```

- b) In Cluster Manager, execute the following command to synchronize the changes to the VM nodes:

```
copytoall.sh /etc/broadhop/qns.conf /etc/broadhop/qns.conf
```

- c) Execute the following commands to publish configuration and restart CPS:

```
/var/qps/bin/control/restartall.sh
```

restartall.sh script process will prompt for either Y/N to restart process. Enter Y to restart the process.

Caution

Executing restartall.sh will cause messages to be dropped.

Step 4 Configure logger, to see dropped message. When non-blocking CDR is configured, CDR may dropped.

Note

Configuring logger does not make sure that 100% records will be captured in logs. Writing too many logs impacts the performance.

- a) Edit the /etc/broadhop/controlcenter/logback.xml file and add the following in appender section:

```
<appender name="CONSOLIDATED-REPORTING"
  class="ch.qos.logback.core.rolling.RollingFileAppender">
  <file>${com.broadhop.log.dir:-/var/log/broadhop}/consolidated-reporting.log</file>
  <rollingPolicy
    class="ch.qos.logback.core.rolling.FixedWindowRollingPolicy">
    <fileNamePattern>
      ${com.broadhop.log.dir:-/var/log/broadhop}/consolidated-reporting.%i.log.gz
    </fileNamePattern>
    <minIndex>1</minIndex>
    <maxIndex>5</maxIndex>
```



```

    </rollingPolicy>
    <triggeringPolicy
      class="ch.qos.logback.core.rolling.SizeBasedTriggeringPolicy">
      <maxFileSize>100MB</maxFileSize>
    </triggeringPolicy>
    <encoder>
      <pattern>%property{HOSTNAME} ${DEFAULT_PATTERN}</pattern>
    </encoder>
  </appender>

```

- b) Edit the `/etc/broadhop/controlcenter/logback.xml` file and add the following in logger section:

```

<logger name="remote.com.broadhop.reporting.errors" level="info" additivity="false">
  <appender-ref ref="CONSOLIDATED-REPORTING" />
</logger>

```

- c) Edit the `/etc/broadhop/logback.xml` file and add the following in logger section:

```

<logger name="com.broadhop.reporting.errors" level="info" additivity="false">
  <appender-ref ref="SOCKET" />
</logger>

```

- d) Copy logger files to all VMs.

```

copytoall.sh /etc/broadhop/logback.xml /etc/broadhop/logback.xml
copytoall.sh /etc/broadhop/controlcenter/logback.xml /etc/broadhop/controlcenter/logback.xml

```

Step 5 Configure grafana to see the average number of CDR drops and writes.

Jmx counters:

- `cdr.drop`: CDR has dropped.
- `cdr.write`: CDR has written.

Sample grafana query: `groupByNode(cisco.quantum.qps.*qns*.node1.counters.cdr.*, 6, 'sum')`

CDR Closing Reasons Configuration

You can configure the closing reasons in the policy builder using the Policy Reporting configuration. CDR closing reasons configuration in the policy builder controls the CDR output.

The system validates all the configured closing reasons and closes the current CDR session and updates the details in the database.

Following are the closing reasons parameters:

Table 6: Closing Reasons Parameters

Parameter	Description
Code	<p>The string indicates a short code for a specific closing reason code.</p> <p>Type: String</p>

Parameter	Description
Time_limit	Once this time limit reaches, the current CDR session closes and the details are updated in the DB. Unit: Seconds
Usage_limit	Enter the limit value for a particular <code>Usage_Field</code> . When the UsageField value \geq UsageLlimit, the current CDR session closes and the details are updated in the DB. Unit: Long
Usage_Field	Map the value for this parameter with the code column from the Reporting CDR Columns table. It calculates the UsageLimit.
Changed CDR Key	Map the key value with the code column from the Reporting CDR Columns table. If the <code>Changed CDR Key</code> data value changes, it closes the current CDR session and updates the details to the DB.
Session_Close	When you enable this option, the default closing reason code <code>SESSION-CLOSED</code> is applicable on the termination of a diameter session.

Configuration

Use the following configuration procedure:

- Login to the Cisco Policy Builder and click the **Reference Data** tab that opens up the **Policy Reporting** pane on the left side.
- Click the **Policy Reporting** and select the **Policy CDRs** option in the left pane.
- Click **Policy CDRs** under **Create Child**.
- Under **Closing Reasons**, configure the relevant details for the report.

The screenshot displays the Cisco Policy Builder web interface. The top navigation bar includes the Cisco logo and 'POLICY BUILDER' title. The left sidebar contains a tree view with categories like Systems, Account Balance Templates, Custom Reference Data Tables, Diameter Agents, Diameter Clients, Diameter Defaults, Fault List, Notifications, Policy Enforcement Points, Policy Reporting (selected), Rule Retry Profiles, Subscriber Data Sources, and Tariff Times. The main content area is titled 'Policy Cdr' and contains several sections:

- Policy Cdr Fields:** Includes *Name, *Table Name, Date Time Format, and *Version.
- Closing Reasons:** A table with columns: *Code, Time Limit, Usage Limit, Usage Field, Changed Cdr Key, and *Session Close.
- Reporting Cdr Columns:** A table with columns: Code, Cdr Field Type, Type, Export Field, Default Value, and Format.
- Reporting Columns Details:** A section for Value Translations with a table having columns: From, To, Value, SessionAvp, System, and Data Precision.

Charging Characteristics AVP in Diameter GY CDR's

Cisco Policy Suite(CPS) provides the ability to produce reports on Gy Charging Characteristics AVP in Call Data Records (EDR/CDRs).

When a Gy session takes place, PS-Information in the AVPs is processed from the Gy CDR messages and populated in the reporting records. The Policy Builder is configured to populate the CDRs with the required fields, when a Gy Session is initiated.

This section covers the following topics:

- Add Variables to Policy Reporting Field Types
- Create Call Data Record (CDR) for a Gy Session
- Define Conditions for a Gy Session

Add Variables to Policy Reporting Field Types

To add variable to a non-default Policy Reporting Field Type, perform the following steps:

Procedure

- Step 1** Log in to Policy Builder.
- Step 2** Click **Reference Data > Policy Reporting > Policy Reporting Field Types**. A summary window appears on the right side.
- Step 3** In the summary window, click **Policy Reporting Field Type** to create a non-default policy reporting field type.
- Step 4** Provide a name for the policy reporting field type in the **Name** field.
- Step 5** In the **Policy Reporting Fields** table, click **Add** to add a variable.
- Step 6** To create the CDR for the Gy Session, the AVP (variables) need to be added.
 - a) Enter the variable name in the **Code** column.

- b) Enter the database field name in the **Db Field Name** column.
- c) Select the database type from the **Db Type** drop-down list. By default, the database type is set to *VARCHAR*.
- d) Enter the value of precision in the **Precision** column.

Step 7 Click **Add** to add more variables to the Policy Reporting Field Type.

Figure 11: Add Variables to Policy Reporting Field Types

Policy Reporting Field Type

Name
GyFields

Policy Reporting Fields

*Code	*Db Field Name	*Db Type	*Precision
chargingRuleBaseName	charging_rule_base_name	VARCHAR	0
requestedTotalOctets	requested_total_octets	BIGINT	0

Add Remove ↑ ↓

▼ Actions

Copy:
Current Policy Reporting Field Type

Step 8 Click the **Save** icon to save the new policy reporting field type.

Create Call Data Record (CDR) for a Gy Session

To create a CDR for a Gy session, perform the following steps:

Procedure

- Step 1** Log in to Policy Builder.
- Step 2** Click **Reference Data > Policy Reporting > Policy Cdr**. A summary window appears on the right side.
- Step 3** In the summary window, click **Policy Cdr** to create a new report.
- Step 4** Provide name and table name to the new report in the **Name** field and the **Table Name** field respectively.
- Step 5** Enter a value for the **Version** field.
- Step 6** In the **Reporting Cdr Columns** table, add the variables required as defined in the **Policy Reporting Field Types** created for the Gy session. To add required the required variables:
 - a) Click **Add** to add a new row to the table.
 - b) Enter the variable name in the **Code** column. The variable being added should be the same as the variable defined in the Policy Reporting Field Type.
 - c) Set the **Cdr Field Type** value by selecting a type from the drop-down list. By default, the value is *Literal*.
 - d) Set the **Type** using the values from the drop-down list. By default, the value is *key*.

After the addition of all the required variables in the **Reporting Cdr Columns** table, the variables need to be associated to its field defined in the Policy Reporting Field Type.

Step 7 To associate the variables with the Policy Reporting Field Type:

Repeat the following steps for all the variables defined in **Reporting Cdr Columns** table.

- a) Select the variable from the Reporting Cdr Column to be associated.
- b) In the **Reporting Column Details > Data > Field**, click **select**. A window is displayed.
- c) Select the field to which the variable needs to be associated with and click **OK**.

Important

Field is active only for those reporting CDR column entries for which **Cdr Field Type** is *Data*.

Define Conditions for a Gy Session

When a Gy session is initiated the Policy Report defined in the above sections is populated with the Call Data Records (CDR).

In order to populate the policy report when a Gy session is initiated, conditions are needed to be defined. These conditions are defined under the **Policies** tab. When a Gy session is initiated if the conditions is matched, the policy report is populated for the required fields in the CDR.

To define a condition, perform the following steps:

Procedure

Step 1 Click on the **Policies** Tab, a summary window is displayed.

Step 2 In the left pane, click **Initial Blueprint > Post outbound message policies > GyCDR**.

Step 3 In the **Policy** page, select **Conditions** tab.

Step 4 Select the required condition from the **Conditions** tab.

A list of available input variables are displayed, which can be assigned to the condition in the **Actions** tab, where all the defined conditions are executed.

Step 5 Select **Actions** tab and click **Add** to add an action. A window is displayed requesting the user to select an **Action Phrase**.

Step 6 Select *Add reporting data* and click **OK**. For the selected action, assign the Input Variables, Type and Operator Value.

Step 7 For the input variable, *IReportingState*, assign the output variable type from the drop-down list. Select *Output*. A window displaying the available output variables is displayed. Select the required output variable and click **OK**.

Step 8 For the input variable, *Value*, assign the output variable type from the drop-down list. Select *Output*. A window displaying the available output variables is displayed. Select the required output variable and click **OK**.

Step 9 For the input variable, *Name*, enter the field name such that the field name is matched with the Gy field name created in Policy Cdr field.

The output field name defined for **Name** should be the same as defined in the Policy Cdr to populate the column in the policy report accordingly.

When a Gy session is initiated, the condition *A Gy V8 session exists* is checked. If the condition is matched, the values that are defined in the **Actions** tab are executed and the fields in the policy report are populated respectively.

Remove MySQL JDBC Connectors from Standard Load Line-up

Procedure

-
- Step 1** Add the following entry to `qns.conf` file on all the Cisco Policy Suite boxes.
- ```
-DmysqlDriver=file:///var/broadhop/jdbc/jdbc_5_1_6.jar
```
- Step 2** Download MySQL jdbc 5.1.6 binary jar from <http://ebr.springsource.com> (search for com.springsource.com.mysql.jdbc and download version 5.1.6 from the link).
- Step 3** Rename the downloaded jar file to `jdbc_5_1_6.jar` and copy the jar file to `/var/broadhop/jdbc/` directory on all the system boxes.
- Step 4** Synchronize all the boxes and then restart the system.
- 

## Configuration File Parameters

In addition to the configurations mentioned in the above sections, the following parameters need to be set in `qns.conf` file.

- Parameter `disableCdrReplication` in `qns.conf` file:

This flag is used to specify whether the process should participate in doing CDR replication or not.

- If `disableCdrReplication` is set to true (as `disableCdrReplication=true`) then the processes using corresponding configuration file will not participate in CDR replication.
- If `disableCdrReplication` is set to false (as `disableCdrReplication=false`) then the processes using corresponding configuration file will participate in CDR replication.
- If `disableCdrReplication` is not specified then `disableCdrReplication=false` will be used as default and corresponding behavior is applicable.

By default, this flag is set as false. Configuration is applicable only for processes for which `com.broadhop.policyintel.service.feature` is installed. It does not have any effect on other processes.

Example:

- With `disableCdrReplication=true` in `/var/broadhop/qns.conf` file, none of the processes will participate in CDR replication as `/var/broadhop/qns.conf` is used by all processes.

- With `disableCdrReplication=true` in `/etc/broadhop/pcrf/qns.conf` file, Policy Server (QNS) VMs processes will not participate in CDR replication as `/etc/broadhop/pcrf/qns.conf` is used by process on Policy Server VMs.

For synchronizing configuration files from Cluster Manager to VM, refer to *CPS Installation Guide* for 9.0.0 and prior releases or *CPS Installation Guide for VMware* for 9.1.0 and later releases.

- Parameter `oracleDriver` in `qns.conf` file.

This flag is used to specify the oracle driver to be used for replication to database.

Configuration is applicable only for processes that have `com.broadhop.policyintel.service.feature` installed and are participating in database replication. It does not have any effect for other processes.

Example:

```
-DoracleDriver=file:///var/broadhop/odbc7.jar
```

Oracle ODBC jar can be downloaded from <http://www.oracle.com/technetwork/database/features/jdbc/>.

Downloaded jar may need to be renamed to the name specified in configuration and needs to be copied to all required VMs at the same path that is specified in above configuration.

### Enabling Redis Reporting

You can add the following parameters in the `qns.conf` file to enable Redis for reporting purposes. When you enable these parameters, the current Mongo storage is bypassed, and each Policy Server node writes the CDRs to a Redis queue.

- The `enableRedisReporting` parameter enables Redis reporting and bypasses Mongo when set to true. This parameter should be configured on each Policy Server and Policy Director. Possible values are true and false. If this parameter is not present in the `qns.conf` file, the default value is false.

Example:

```
-DenableRedisReporting=true
```

- The `reporting.redisSLA` parameter sets the time an incoming message from the Redis server remains in the reporting queue before being dropped. This parameter should be configured on all Policy Director nodes, or on any node that is performing replication. The value is in milliseconds, and the default value is 500. You may want to increase this value based on your requirements.

Example:

```
-Dreporting.redisSLA=1000
```







## CHAPTER 3

# CDR/EDR Field Descriptions

- [Default Policy Reporting Fields, on page 33](#)
- [Diameter EDR counter List for Gx, on page 53](#)

## Default Policy Reporting Fields



**Note** RADIUS-based policy control is no longer supported in CPS 14.0.0 and later releases as 3GPP Gx Diameter interface has become the industry-standard policy control interface.

*Table 7: Default Policy Reporting Fields*

| Group                           | Type  | Field Name   | Field Data Type | Descriptions                                                                                                                                            |
|---------------------------------|-------|--------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Default Policy Reporting Fields |       |              |                 |                                                                                                                                                         |
|                                 | ANDSF |              |                 |                                                                                                                                                         |
|                                 |       | PolicyType   | VARCHAR         | Indicates type of policy. For example, ISMP or ISRP.                                                                                                    |
|                                 |       | devId        | VARCHAR         | Indicates Id of the device from where the request is received.                                                                                          |
|                                 |       | LocationType | VARCHAR         | Indicates type of location such as. <ul style="list-style-type: none"><li>• wlan</li><li>• 3GPP</li><li>• 3GPP2</li><li>• WiMAX</li><li>• Geo</li></ul> |

## Default Policy Reporting Fields

| Group | Type    | Field Name        | Field Data Type | Descriptions                                                                                                                                                  |
|-------|---------|-------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |         | Location          | VARCHAR         | Name of the location.                                                                                                                                         |
|       |         | PolicyName        | VARCHAR         | Name of the policy or MO Tree name provided to subscriber / UE.                                                                                               |
|       |         | PolicyUpdateCount | INT             | Indicates the number of times policy is updated in the UE.                                                                                                    |
|       |         | authUserName      | VARCHAR         | Authentication user name provided by the UE.                                                                                                                  |
|       |         | devType           | VARCHAR         | Indicates the type of device. For example, iPhone or Android.                                                                                                 |
|       |         | clientName        | VARCHAR         | Name of the ANDSF client in UE.                                                                                                                               |
|       |         | uuid              | VARCHAR         | iPhone UE uuid.                                                                                                                                               |
|       | NETWORK |                   |                 |                                                                                                                                                               |
|       |         | Access Type       | VARCHAR         | IPCAN types such as: <ul style="list-style-type: none"> <li>• 3GPP</li> <li>• GPS</li> <li>• EPS</li> </ul>                                                   |
|       |         | Cell Site Id      | VARCHAR         | Unique identifier for Cell site.                                                                                                                              |
|       |         | chargingId        | VARCHAR         | A subscriber might have a unique charging ID. Using this, usage by members of a sub account, or 'children' of the subscriber can be billed to their 'parent'. |
|       |         | Circuit Id        | VARCHAR         | Information specific to which circuit the request came in on.                                                                                                 |

| Group | Type | Field Name          | Field Data Type | Descriptions                                                                                                                                                                                                                                                                                                                         |
|-------|------|---------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |      | Device Rating Group | VARCHAR         | The Rating-Group AVP is of type Unsigned32 (AVP Code 432) and contains the identifier of a rating group. All the services subject to the same rating type are part of the same rating group. The specific rating group the request relates to is uniquely identified by the combination of Service-Context-Id and Rating-Group AVPs. |
|       |      | Framed IP           | VARCHAR         | This Attribute indicates the address to be configured for the user. It MAY be used in Access-Accept packets. It MAY be used in an Access-Request packet as a hint by the NAS to the server that it would prefer that address, but the server is not required to honor the hint.                                                      |
|       |      | Imei Sv             | VARCHAR         | IMEISV (16 digits) includes information on the origin, model, and serial number of the device.                                                                                                                                                                                                                                       |
|       |      | IMSI                | VARCHAR         | International mobile Subscriber Identity is a unique identification associated with all cellular networks. It is stored as a 64 bit field and is sent by the phone to the network.                                                                                                                                                   |
|       |      | MAC Address         | VARCHAR         | A unique identifier assigned to network interfaces for communications on the physical network segment.                                                                                                                                                                                                                               |
|       |      | MSISDN              | VARCHAR         | A number uniquely identifying a subscription in a GSM or a UMTS mobile network.                                                                                                                                                                                                                                                      |
|       |      | NAS IP              | VARCHAR         | IP address for the Network Access Server                                                                                                                                                                                                                                                                                             |
|       |      | RAT Type            | VARCHAR         | Unique identifier for Radio Access Type.                                                                                                                                                                                                                                                                                             |

| Group | Type       | Field Name           | Field Data Type | Descriptions                                                                                                                                                    |
|-------|------------|----------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |            | SGSN Address         | VARCHAR         | Diameter based network node<br>- can be used for location reporting                                                                                             |
|       | TRAFFIC    |                      |                 |                                                                                                                                                                 |
|       |            | In Bytes             | BIGINT          | In Bytes per Accounting Record                                                                                                                                  |
|       |            | Out Bytes            | BIGINT          | The number of output bytes.                                                                                                                                     |
|       |            | Total Bytes          | BIGINT          | The number of Total bytes.                                                                                                                                      |
|       |            | Traffic Type         | VARCHAR         | Streaming, Gaming - This is Diameter Dependent.                                                                                                                 |
|       | PCRF       |                      |                 |                                                                                                                                                                 |
|       |            | Device Service       | VARCHAR         | The current Active Device Service.                                                                                                                              |
|       |            | Device Session Id    | VARCHAR         | Unique identifier for a single session on a single device.                                                                                                      |
|       |            | NAS ID               | VARCHAR         | Unique identifier for the Network Access Server.                                                                                                                |
|       |            | Service              | VARCHAR         | The current Active Service Code.                                                                                                                                |
|       |            | Service Code         | VARCHAR         | The current Active Service Code                                                                                                                                 |
|       |            | User Domain Info     | VARCHAR         | The domain associated to the subscriber.                                                                                                                        |
|       |            | User Name            | VARCHAR         | User name                                                                                                                                                       |
|       | SUBSCRIBER |                      |                 |                                                                                                                                                                 |
|       |            | SubscriberExternalId | VARCHAR         | Occasionally, a subscriber may need to connect with or relate to an external third-party system. This field identifies the subscriber to that external service. |
|       |            | Subscriber Realm     | VARCHAR         | Default Login Realm, Ex. USuM Auth, AAA Proxy                                                                                                                   |
|       |            | Subscriber Status    | VARCHAR         | Active, Expired                                                                                                                                                 |

| Group | Type    | Field Name         | Field Data Type                                 | Descriptions                                                                                                                                                                                            |
|-------|---------|--------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |         | Sub User Name      | VARCHAR                                         | The networkId is a unique string value that identifies the subscriber. This can be any value such as MSISDN, MAC Address, IP Address, IMPI, Email Address, Telephone number, etc.                       |
|       |         | User Location Info | VARCHAR                                         | Location code corresponding to one of several possible location identifiers (MAC, SSID, IP subnet).                                                                                                     |
|       | BALANCE |                    |                                                 |                                                                                                                                                                                                         |
|       |         | Balance Code       | VARCHAR                                         | Account Balance Code is the code of the balance template defined in the Policy Server (QNS) reference data that corresponds to the balance (group of quotas) to be credited, debited, provisioned, etc. |
|       |         | Balance Remaining  | BIGINT                                          | The exact balance remaining. The balanceRemaining (Long) field is rounded to a whole number.                                                                                                            |
|       |         | Balance Used       | BIGINT                                          | Amount of balance used currently by subscriber.                                                                                                                                                         |
|       |         | Credit End Date    | DATETIME (E<br>MMM dd<br>HH:mm:ss time<br>zone) | Date credit expires.                                                                                                                                                                                    |
|       |         | Credit Start Date  | DATETIME (E<br>MMM dd<br>HH:mm:ss time<br>zone) | Start and End date are when you want the credit to become valid and when you want it to expire. If not specified, the start date defaults to now.                                                       |
|       |         | Original Amount    | BIGINT                                          | Original amount of subscriber balance before any debits applied.                                                                                                                                        |

## Default Policy Reporting Fields

| Group | Type    | Field Name                        | Field Data Type                                 | Descriptions                                                                                                                                                                                                                                                          |
|-------|---------|-----------------------------------|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |         | Quota Code                        | VARCHAR                                         | Quota Code is the code of the quota template defined in the Policy Server (QNS) reference data that corresponds to the quota (actual bucket) to be credited.                                                                                                          |
|       |         | Rate                              | VARCHAR                                         | Rate at which balance is charged. 1x, 3x.                                                                                                                                                                                                                             |
|       |         | Rated Total Amount                | VARCHAR                                         | Total amount with the rate applied.                                                                                                                                                                                                                                   |
|       |         | Rate Plan Code                    | VARCHAR                                         | Optional Rate Plan Code.                                                                                                                                                                                                                                              |
|       |         | Refresh Date of Credit            | DATETIME (E<br>MMM dd<br>HH:mm:ss time<br>zone) | Date credit is refreshed to pre-configured amount.                                                                                                                                                                                                                    |
|       |         | Refresh Day of Month<br>Of Credit | DATETIME (E<br>MMM dd<br>HH:mm:ss time<br>zone) | Date when Balance/Quota refreshes to original amount.                                                                                                                                                                                                                 |
|       |         | Reservation_Amount                | BIGINT                                          | Quota reservation amount.                                                                                                                                                                                                                                             |
|       |         | Tariff Code                       | VARCHAR                                         | Code linked to subscriber service. Different service options can be applied to services at specified time ex. Holidays.                                                                                                                                               |
|       |         | Tariff Time Id                    | VARCHAR                                         | Time of day boundary.                                                                                                                                                                                                                                                 |
|       |         | Unrated Total Amount              | VARCHAR                                         | Total amount with no rate applied.                                                                                                                                                                                                                                    |
|       | SESSION |                                   |                                                 |                                                                                                                                                                                                                                                                       |
|       |         | Rejected Start                    | BIGINT                                          | If any value of the received Attributes is not acceptable, then the RADIUS server MUST transmit a packet with the Code field set to 3 (Access-Reject). It MAY include one or more Reply-Message Attributes with a text message which the NAS MAY display to the user. |
|       |         | Session Duration                  | BIGINT                                          | The amount of time the session has been up, in clock time                                                                                                                                                                                                             |

| Group | Type | Field Name    | Field Data Type | Descriptions                                                        |
|-------|------|---------------|-----------------|---------------------------------------------------------------------|
|       |      | Start Session | BIGINT          | Number of Start Sessions.                                           |
|       |      | Stop Session  | BIGINT          | This number increments when a session stops for reporting purposes. |

## Custom Reference Data



**Note** RADIUS-based policy control is no longer supported in CPS 14.0.0 and later releases as 3GPP Gx Diameter interface has become the industry-standard policy control interface.

**Table 8: Custom Reference Data**

| Group                 | Type                                     | Field Name     | Field Data Type | Descriptions                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------|------------------------------------------|----------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Custom Reference Data |                                          |                |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                       | User                                     | Name           |                 | This Attribute indicates the name of the user to be authenticated. It MUST be sent in Access-Request packets if available. It MAY be sent in an Access-Accept packet, in which case the client SHOULD use the name returned in the Access-Accept packet in all Accounting-Request packets for this session. If the Access- Accept includes Service-Type = Rlogin and the User-Name attribute, a NAS MAY use the returned User-Name when performing the Rlogin function. |
|                       | Any registered AVP of RADIUS or Diameter | Value          |                 | Type and description applies based on AVP chosen, which cannot be specified explicitly.                                                                                                                                                                                                                                                                                                                                                                                 |
| Policy Report Fields  |                                          |                |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                       | Reference Data Field                     |                |                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                       |                                          | Device Service | VARCHAR         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Group | Type | Field Name          | Field Data Type | Descriptions                                                                                                                                                                                                                                                                                                                         |
|-------|------|---------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |      | Session Duration    | BIGINT          | The amount of time the session has been up, in clock time.                                                                                                                                                                                                                                                                           |
|       |      | NAS ID              | VARCHAR         | Unique identifier for the Network Access Server.                                                                                                                                                                                                                                                                                     |
|       |      | Access Type         | VARCHAR         | IPCAN types, 3GPP, GPS, EPS                                                                                                                                                                                                                                                                                                          |
|       |      | MAC Address         | VARCHAR         | A unique identifier assigned to network interfaces for communications on the physical network segment.                                                                                                                                                                                                                               |
|       |      | Device Rating Group | VARCHAR         | The Rating-Group AVP is of type Unsigned32 (AVP Code 432) and contains the identifier of a rating group. All the services subject to the same rating type are part of the same rating group. The specific rating group the request relates to is uniquely identified by the combination of Service-Context-Id and Rating-Group AVPs. |
|       |      | MSISDN              | VARCHAR         | A number uniquely identifying a subscription in a GSM or a UMTS mobile network.                                                                                                                                                                                                                                                      |
|       |      | Rejected Start      | BIGINT          | If any value of the received attributes is not acceptable, then the RADIUS server transmits a packet with the Code field set to 3 (Access-Reject). The packet might include one or more Reply-Message Attributes with a text message, which the NAS displays to the user.                                                            |
|       |      | Balance Remaining   | BIGINT          | The exact balance remaining. The balanceRemaining (Long) field is rounded to a whole number.                                                                                                                                                                                                                                         |
|       |      | Out Bytes           | BIGINT          | The number of output bytes as reported by the SCE.                                                                                                                                                                                                                                                                                   |
|       |      | Tariff Code         | VARCHAR         | Code linked to subscriber service. Different service options can be applied to services at specified time.                                                                                                                                                                                                                           |
|       |      | Balance Used        | BIGINT          | Amount of balance used currently by subscriber.                                                                                                                                                                                                                                                                                      |



| Group | Type | Field Name                        | Field Data Type                                 | Descriptions                                                                                                                                                                                            |
|-------|------|-----------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |      | Original Amount                   | BIGINT                                          | Original amount of subscriber balance before any debits applied.                                                                                                                                        |
|       |      | Balance Code                      | VARCHAR                                         | Account Balance Code is the code of the balance template defined in the Policy Server (QNS) reference data that corresponds to the balance (group of quotas) to be credited, debited, provisioned, etc. |
|       |      | Cell Site Id                      | VARCHAR                                         | Unique identifier for Cell site.                                                                                                                                                                        |
|       |      | RAT Type                          | VARCHAR                                         | Unique identifier for Radio Access Type.                                                                                                                                                                |
|       |      | Tariff Time Id                    | VARCHAR                                         | Time of day boundary.                                                                                                                                                                                   |
|       |      | Reservation_<br>Amount            | BIGINT                                          | Quota reservation amount.                                                                                                                                                                               |
|       |      | Refresh Date of<br>Credit         | DATETIME (E<br>MMM dd<br>HH:mm:ss time<br>zone) | Date credit is refreshed to pre-configured amount.                                                                                                                                                      |
|       |      | User Domain<br>Info               | VARCHAR                                         | This drop-down list lets you assign the subscriber a domain. Domains themselves are created in the Cisco Policy Builder interface.                                                                      |
|       |      | Circuit Id                        | VARCHAR                                         | Information specific to which circuit the request came in on.                                                                                                                                           |
|       |      | Quota Code                        | VARCHAR                                         | Quota Code is the code of the quota template defined in the Policy Server (QNS) reference data that corresponds to the quota (actual bucket) to be credited.                                            |
|       |      | Start Session                     |                                                 | Number of Start Sessions.                                                                                                                                                                               |
|       |      | Rate                              | VARCHAR                                         | Rate at which balance is charged. 1x, 3x                                                                                                                                                                |
|       |      | Refresh Day of<br>Month Of Credit | DATETIME (E<br>MMM dd<br>HH:mm:ss time<br>zone) | Date when Balance/Quota refreshes to original amount.                                                                                                                                                   |
|       |      | Total Bytes                       | BIGINT                                          | Total Bytes based of Radius Accounting packet.                                                                                                                                                          |

| Group | Type | Field Name                  | Field Data Type                        | Descriptions                                                                                                                                                                                             |
|-------|------|-----------------------------|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |      | Device Session Id           | VARCHAR                                | Unique identifier for a single session on a single device.                                                                                                                                               |
|       |      | Stop Session                | BIGINT                                 | This number increments when a session stops for reporting purposes.                                                                                                                                      |
|       |      | Rated Total Amount          | VARCHAR                                | Total amount with the rate applied.                                                                                                                                                                      |
|       |      | Credit Start Date           | DATETIME (E MMM dd HH:mm:ss time zone) | Start and End date are when you want the credit to become valid and when you want it to expire. If not specified, the start date defaults to now.                                                        |
|       |      | Framed IP                   | VARCHAR                                | This Attribute indicates the address to be configured for the user. It is used in Access-Accept packets or used in an Access-Request packet as a hint by the NAS to the server for the required address. |
|       |      | Imei Sv                     | VARCHAR                                | IMEISV (16 digits) includes information on the origin, model, and serial number of the device.                                                                                                           |
|       |      | IMSI                        | VARCHAR                                | International mobile Subscriber Identity is a unique identification associated with all cellular networks. It is stored as a 64 bit field and is sent by the phone to the network.                       |
|       |      | Unrated Total Amount        | VARCHAR                                | Total amount with no rate applied.                                                                                                                                                                       |
|       |      | User Name                   | VARCHAR                                | User name.                                                                                                                                                                                               |
|       |      | Device Service              | VARCHAR                                | ISG, WLC, CAR                                                                                                                                                                                            |
|       |      | In Bytes                    | BIGINT                                 | In Bytes per Accounting Record.                                                                                                                                                                          |
|       |      | SGSN Address                | VARCHAR                                | Diameter based network node - can be used for location reporting.                                                                                                                                        |
|       |      | Traffic Type                | VARCHAR                                | Streaming, Gaming - This is Diameter Dependent                                                                                                                                                           |
|       |      | Policy Server (QNS) Service | VARCHAR                                | Unique identifier for the Policy Server (QNS) service type.                                                                                                                                              |

| Group  | Type    | Field Name           | Field Data Type                        | Descriptions                                                                                                                                                                      |
|--------|---------|----------------------|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |         | User Location Info   | VARCHAR                                | Location code corresponding to one of several possible location identifiers (MAC, SSID, IP subnet).                                                                               |
|        |         | Credit End Date      | DATETIME (E MMM dd HH:mm:ss time zone) | Date credit expires.                                                                                                                                                              |
|        |         | NAS IP               | VARCHAR                                | IP address for the Network Access Server.                                                                                                                                         |
|        |         | Sub User Name        | VARCHAR                                | The networkId is a unique string value that identifies the subscriber. This can be any value such as MSISDN, MAC Address, IP Address, IMPI, Email Address, Telephone number, etc. |
|        |         | Subscriber Realm     | VARCHAR                                | Default Login Realm, Ex. USuM Auth, AAA Proxy.                                                                                                                                    |
|        |         | Subscriber Status    | VARCHAR                                | Active, Expired                                                                                                                                                                   |
|        |         | Service Code         | VARCHAR                                | Their Active Service.                                                                                                                                                             |
|        |         | Rate Plan Code       | VARCHAR                                | Optional Rate Plan Code                                                                                                                                                           |
| Common |         |                      |                                        |                                                                                                                                                                                   |
|        | Session |                      |                                        |                                                                                                                                                                                   |
|        |         | next Evaluation Date | Date (YYYY-MM-DD)                      | Checks for change of service                                                                                                                                                      |
|        |         | expiration Date      | Date (YYYY-MM-DD)                      | Session expiration                                                                                                                                                                |

## Field Descriptions: SPR Common



### Note

RADIUS-based policy control is no longer supported in CPS 14.0.0 and later releases as 3GPP Gx Diameter interface has become the industry-standard policy control interface.

Table 9: Field Descriptions: SPR Common

| Group      | Type       | Field Name                      | Field Data Type      | Description                                                                                                                                                                       |
|------------|------------|---------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SPR Common |            |                                 |                      |                                                                                                                                                                                   |
|            | Credential | type                            | String               | Credential type specifies the type of unique identifier (username/Password, Network ID).                                                                                          |
|            | Credential | description                     | String               | Description of the unique identifier.                                                                                                                                             |
|            | Credential | networkID                       | String               | The networkId is a unique string value that identifies the subscriber. This can be any value such as MSISDN, MAC Address, IP Address, IMPI, Email Address, Telephone number, etc. |
|            | Credential | expiration<br>Time<br>Remaining | Integer              | Defines the time remaining.                                                                                                                                                       |
|            | Schedule   | State                           | String               | Indicates whether the time/date and cron values evaluate from a positive or negative perspective.                                                                                 |
|            | Schedule   | Enabled                         | Boolean              | This code specifies whether or not a service schedule is enabled or disabled.                                                                                                     |
|            | Schedule   | End time                        | String               | The service's end time.                                                                                                                                                           |
|            | Schedule   | Start time                      | String               | The service's starttime.                                                                                                                                                          |
|            | Schedule   | Repeat                          | Repeat               | Handles how the schedule repeats within that timeframe.                                                                                                                           |
|            | Schedule   | End date                        | Date<br>(YYYY-MM-DD) | The service's end date.                                                                                                                                                           |
|            | Schedule   | Start date                      | Date<br>(YYYY-MM-DD) | The service's end date.                                                                                                                                                           |
|            | Service    | Enabled                         | Boolean              | This code specifies whether or not a service is enabled or disabled.                                                                                                              |
|            | Service    | Code                            | String               | Service code.                                                                                                                                                                     |

| Group | Type | Field Name  | Field Data Type   | Description                                                                                                                                                     |
|-------|------|-------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | User | Name        | Name              | The name of the user the accounting record is being logged for.                                                                                                 |
|       | User | Status      | String            | Represents the type of accounting record and maps to the RADIUS acct-status-type attribute. A value of 1=start, 2=stop, and 3=update.                           |
|       | User | End date    | Date (YYYY-MM-DD) | Use the calendar to specify the start and stop date and time of service to the subscriber.                                                                      |
|       | User | Role        | String            | When the subscriber logs in to your subscriber portal, this field determines how much read-write privilege is granted to them.                                  |
|       | User | External ID | String            | Occasionally, a subscriber may need to connect with or relate to an external third-party system. This field identifies the subscriber to that external service. |
|       | User | Charging ID | String            | A subscriber might have a unique charging ID. Using this, usage by members of a sub-account, or 'children' of the subscriber can be billed to their 'parent'.   |
|       | User | startDate   | Date (YYYY-MM-DD) | Use the calendar to specify the start and stop date and time of service to the subscriber.                                                                      |

## Field Descriptions: Diameter

*Table 10: Field Descriptions: Diameter*

| Group           | Type | Field Name | Field Data Type | Description                                            |
|-----------------|------|------------|-----------------|--------------------------------------------------------|
| Diameter: GxSce |      |            |                 |                                                        |
|                 |      | destHost   | String          | This contains the host the message must be routed to.  |
|                 |      | destRealm  | String          | This contains the realm the message must be routed to. |

## Field Descriptions: Diameter

| Group          | Type | Field Name | Field Data Type | Description                                                                                                                                                                        |
|----------------|------|------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                |      | appId      | Long            | All Diameter messages contain an Application Identifier, which is used in the message forwarding process.                                                                          |
|                |      | userName   | String          | The User-Name AVP which contains the User-Name, in a format consistent with the NAI specification.                                                                                 |
|                |      | appName    | String          | String representing the application name for the appId.                                                                                                                            |
|                |      | imsi       | String          | International mobile Subscriber Identity is a unique identification associated with all cellular networks. It is stored as a 64 bit field and is sent by the phone to the network. |
|                |      | msisdn     | String          | A number uniquely identifying a subscription in a GSM or a UMTS mobile network.                                                                                                    |
| Diameter: GxV9 |      |            |                 |                                                                                                                                                                                    |
|                |      | mnc        | String          | Portion of IMSI containing the Mobile Network Code.                                                                                                                                |
|                |      | mcc        | String          | Portion of IMSI containing the Mobile Country Code.                                                                                                                                |
|                |      | rai        | String          | Routing Area Identity. A routing area is normally a subdivision of a location area.                                                                                                |
|                |      | ipcanType  | Integer         | It indicates the type of Connectivity Access Network in which the user is connected.                                                                                               |
|                |      | ratType    | Integer         | This is used to identify the radio access technology that is serving the UE.                                                                                                       |
|                |      | destHost   | String          | This contains the host the message must be routed to.                                                                                                                              |
|                |      | destRealm  | String          | This contains the realm the message must be routed to.                                                                                                                             |
|                |      | appId      | Long            | All Diameter messages contain an Application Identifier, which is used in the message forwarding process.                                                                          |
|                |      | mccmnc     | String          | Combination of MCC and MNC.                                                                                                                                                        |

| Group | Type | Field Name          | Field Data Type | Description                                                                                                                                                                                                                                                                     |
|-------|------|---------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |      | appName             | String          | String representing the application name for the appId.                                                                                                                                                                                                                         |
|       |      | imsi                | String          | International mobile Subscriber Identity is a unique identification associated with all cellular networks. It is stored as a 64 bit field and is sent by the phone to the network.                                                                                              |
|       |      | msisdn              | String          | A number uniquely identifying a subscription in a GSM or a UMTS mobile network.                                                                                                                                                                                                 |
|       |      | framedIp            | String          | This Attribute indicates the address to be configured for the user. It MAY be used in Access-Accept packets. It MAY be used in an Access-Request packet as a hint by the NAS to the server that it would prefer that address, but the server is not required to honor the hint. |
|       |      | lac                 | Integer         | To each location area, a unique number called a location area code is assigned.                                                                                                                                                                                                 |
|       |      | userLocationInfo    | String          | Location code corresponding to one of several possible location identifiers (MAC, SSID, IP subnet).                                                                                                                                                                             |
|       |      | sgsnIpAddress       | String          | IP Address of Diameter based network node - can be used for location reporting                                                                                                                                                                                                  |
|       |      | tgppRatType         | Integer         | This is used to identify the radio access technology that is serving the UE.                                                                                                                                                                                                    |
|       |      | eventTriggers       | Integer         | When sent from PCRF to PCEF, this AVP indicates that an event shall cause a re-request of PCC rules. When sent from the PCEF to the PCRF this AVP indicates that the corresponding event has occurred at the gateway.                                                           |
|       |      | outOfCredit         | Boolean         | True or false option indicating if the subscriber is out of credit.                                                                                                                                                                                                             |
|       |      | qosUpgradeSupported | Boolean         | True or false option indicating if Quality of Service upgrade is supported for the subscriber.                                                                                                                                                                                  |

| Group            | Type | Field Name       | Field Data Type | Description                                                                                                                              |
|------------------|------|------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------|
|                  |      | rac              | Integer         | Routing Area Code is a fixed length code of 1 octet identifying a routing area within a location area.                                   |
|                  |      | sac              | Integer         | Service Area Code has a length of two octets and is unique within the location Area.                                                     |
|                  |      | ci               | Integer         | Cell identity for GSM or Service Area Code (SAC) at the time of Record Opening Time.                                                     |
|                  |      | cgi              | String          | Cell Global Identity is a standard identifier for mobile phones cells, providing means to geographically locate connected mobile phones. |
|                  |      | ecgi             | String          | E-UTRAN Cell Global Identifier.                                                                                                          |
|                  |      | tai              | String          | Tracking Area Identifier                                                                                                                 |
|                  |      | sai              | String          | Service Area Identifier                                                                                                                  |
|                  |      | tac              | Integer         | Type Allocation Code (TAC) is the initial eight-digit portion of the 15-digit IMEI code.                                                 |
|                  |      | ect              | Integer         | Explicit Communication Transfer                                                                                                          |
|                  |      | imeisv           | String          | IMEISV (16 digits) includes information on the origin, model, and serial number of the device.                                           |
|                  |      | bcm              | Integer         | Bearer control mode applied to the IP-CAN session.                                                                                       |
|                  |      | framedIpv6Prefix | String          | The IPv6 prefix allocated for the user.                                                                                                  |
| Diameter: GxTGPP |      |                  |                 |                                                                                                                                          |
|                  |      | mnc              | String          | Portion of IMSI containing the Mobile Network Code.                                                                                      |
|                  |      | mcc              | String          | Portion of IMSI containing the Mobile Country Code.                                                                                      |
|                  |      | rai              | String          | Routing Area Identity. A routing area is normally a subdivision of a location area.                                                      |
|                  |      | ipcanType        | Integer         | It indicates the type of Connectivity Access Network in which the user is connected.                                                     |



| Group | Type | Field Name       | Field Data Type | Description                                                                                                                                                                                                                                                                     |
|-------|------|------------------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |      | ratType          | Integer         | This is used to identify the radio access technology that is serving the UE.                                                                                                                                                                                                    |
|       |      | destHost         | String          | This contains the host the message must be routed to.                                                                                                                                                                                                                           |
|       |      | destRealm        | String          | This contains the realm the message must be routed to.                                                                                                                                                                                                                          |
|       |      | appId            | Long            | All Diameter messages contain an Application Identifier, which is used in the message forwarding process.                                                                                                                                                                       |
|       |      | mccmnc           | String          | Combination of MCC and MNC                                                                                                                                                                                                                                                      |
|       |      | appName          | String          | String representing the application name for the appId.                                                                                                                                                                                                                         |
|       |      | imsi             | String          | International mobile Subscriber Identity is a unique identification associated with all cellular networks. It is stored as a 64 bit field and is sent by the phone to the network.                                                                                              |
|       |      | msisdn           | String          | A number uniquely identifying a subscription in a GSM or a UMTS mobile network.                                                                                                                                                                                                 |
|       |      | framedIp         | String          | This Attribute indicates the address to be configured for the user. It MAY be used in Access-Accept packets. It MAY be used in an Access-Request packet as a hint by the NAS to the server that it would prefer that address, but the server is not required to honor the hint. |
|       |      | lac              | Integer         | To each location area, a unique number called a location area code is assigned.                                                                                                                                                                                                 |
|       |      | userLocationInfo | String          | Location code corresponding to one of several possible location identifiers (MAC, SSID, IP subnet).                                                                                                                                                                             |
|       |      | sgsnIpAddress    | String          | IP Address of Diameter based network node - can be used for location reporting.                                                                                                                                                                                                 |
|       |      | tgppRatType      | Integer         | This is used to identify the radio access technology that is serving the UE.                                                                                                                                                                                                    |

| Group | Type | Field Name          | Field Data Type | Description                                                                                                                                                                                                           |
|-------|------|---------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |      | eventTriggers       | Integer         | When sent from PCRF to PCEF, this AVP indicates that an event shall cause a re-request of PCC rules. When sent from the PCEF to the PCRF this AVP indicates that the corresponding event has occurred at the gateway. |
|       |      | outOfCredit         | Boolean         | True or false option indicating if the subscriber is out of credit.                                                                                                                                                   |
|       |      | qosUpgradeSupported | Boolean         | True or false option indicating if Quality of Service upgrade is supported for the subscriber.                                                                                                                        |
|       |      | rac                 | Integer         | Routing Area Code is a fixed length code of 1 octet identifying a routing area within a location area.                                                                                                                |
|       |      | sac                 | Integer         | Service Area Code has a length of two octets and is unique within the location Area.                                                                                                                                  |
|       |      | ci                  | Integer         | Cell identity for GSM or Service Area Code (SAC) at the time of Record Opening Time.                                                                                                                                  |
|       |      | cgi                 | String          | Cell Global Identity is a standard identifier for mobile phones cells, providing means to geographically locate connected mobile phones.                                                                              |
|       |      | ecgi                | String          | E-UTRAN Cell Global Identifier                                                                                                                                                                                        |
|       |      | tai                 | String          | Tracking Area Identifier                                                                                                                                                                                              |
|       |      | sai                 | String          | Service Area Identifier                                                                                                                                                                                               |
|       |      | tac                 | Integer         | Type Allocation Code (TAC) is the initial eight-digit portion of the 15-digit IMEI code.                                                                                                                              |
|       |      | ect                 | Integer         | Explicit Communication Transfer                                                                                                                                                                                       |
|       |      | imeisv              | String          | IMEISV (16 digits) includes information on the origin, model, and serial number of the device.                                                                                                                        |
|       |      | bcm                 | Integer         | Bearer control mode applied to the IP-CAN session.                                                                                                                                                                    |
|       |      | framedIpv6Prefix    | String          | The IPv6 prefix allocated for the user.                                                                                                                                                                               |

| Group            | Type | Field Name                      | Field Data Type | Description                                                                                                                                                                                                            |
|------------------|------|---------------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Diameter: RxTGPP |      |                                 |                 |                                                                                                                                                                                                                        |
|                  |      | appId                           | Long            | All Diameter messages contain an Application Identifier, which is used in the message forwarding process.                                                                                                              |
|                  |      | appName                         | String          | String representing the application name for the appId.                                                                                                                                                                |
|                  |      | serviceInfoStatus               | Integer         | Status of the service being executed.                                                                                                                                                                                  |
|                  |      | specificAction                  | Integer         | Within an initial AA request the AF may use the Specific-Action AVP to request specific actions from the server at the bearer events and to limit the contact to such bearer events where specific action is required. |
|                  |      | serviceURN                      | String          | It indicates whether an AF session is used for emergency traffic.                                                                                                                                                      |
|                  |      | isEmergency                     | Boolean         | Indication of Emergency Session                                                                                                                                                                                        |
| Diameter: GyV8   |      |                                 |                 |                                                                                                                                                                                                                        |
|                  |      | shared<br>Bucket<br>Reservation | String          | Reservation amount for quota when more than one subscriber shares the quota.                                                                                                                                           |
|                  |      | destHost                        | String          | This contains the host the message must be routed to.                                                                                                                                                                  |
|                  |      | destRealm                       | Long            | This contains the realm the message must be routed to.                                                                                                                                                                 |
|                  |      | appId                           | String          | All Diameter messages contain an Application Identifier, which is used in the message forwarding process.                                                                                                              |
|                  |      | userName                        | String          | The User-Name AVP which contains the User-Name, in a format consistent with the NAI specification                                                                                                                      |
|                  |      | appName                         | String          | String representing the application name for the appId.                                                                                                                                                                |
|                  |      | msisdn                          | String          | A number uniquely identifying a subscription in a GSM or a UMTS mobile network.                                                                                                                                        |

## Field Descriptions: Diameter

| Group           | Type | Field Name       | Field Data Type | Description                                                                                                                         |
|-----------------|------|------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------|
|                 |      | userLocationInfo | String          | Location code corresponding to one of several possible location identifiers (MAC, SSID, IP subnet).                                 |
|                 |      | sgsnIpAddress    | String          | IP Address of SGSN, a Diameter based network node - can be used for location reporting.                                             |
|                 |      | ggsnIpAddress    | String          | IP Address of GGSN, a Diameter based network node.                                                                                  |
|                 |      | apn              | String          | Access point name is the name of the gateway between the mobile network and another network.                                        |
|                 |      | sessionId        | String          | Unique identifier of a session.                                                                                                     |
| Diameter: Gy/Ro |      |                  |                 |                                                                                                                                     |
|                 |      | inOctets         | Long            | It contains the number of requested, granted, or used octets that can be/have been received from the end user.                      |
|                 |      | outOctets        | Long            | It contains the number of requested, granted, or used octets that can be/have been sent to the end user.                            |
|                 |      | totalTime        | Long            | This indicates the length of the requested, granted, or used time in seconds.                                                       |
|                 |      | cmdCode          | Long            | The possible values for command-code are credit-control-request and credit-control-answer.                                          |
|                 |      | serviceCode      | String          | The current active service.                                                                                                         |
|                 |      | terminationCause | Integer         | The Termination-Cause AVP contains information about the termination reason.                                                        |
|                 |      | totalOctets      | Long            | It contains the total number of requested, granted, or used octets.                                                                 |
|                 |      | resultCode       | Integer         | This indicates any error present in the Credit-Control-Request message.                                                             |
|                 |      | requestType      | integer         | This contains the reason for sending the credit-control request message. It MUST be present in all Credit-Control-Request messages. |

| Group | Type | Field Name    | Field Data Type | Description                                                                                                  |
|-------|------|---------------|-----------------|--------------------------------------------------------------------------------------------------------------|
|       |      | requestNumber | Long            | Uniquely identifies the request within a session.                                                            |
|       |      | redirectURL   | String          | The URL to which session is redirected to.                                                                   |
|       |      | ratingGroup   | String          | It contains the charging key. Each quota allocated to a Diameter CC session has a unique Rating Group value. |
|       |      | sessionId     | String          | Unique identifier of a session.                                                                              |

## Diameter EDR counter List for Gx

- To enable EDR to be written by CPS internally, EDR\_ENABLE flag needs to be set as true in `qns.conf` file.
- Required counter that the customer wants in EDR must be configured in policy reporting configuration. The names of different EDR counters are mentioned in the following table:

**Table 11: Diameter EDR counter List for Gx**

| Counter Name       | Description                         |
|--------------------|-------------------------------------|
| session_id         | Session ID of Gx session            |
| command_code       | Command code of Message             |
| request_type       | Request type of CCR message         |
| apn_original       | Called station ID                   |
| apn_modified       | Called station ID for CPS overrides |
| framed_ip          | Framed IP                           |
| Ci                 | Parsed from user location           |
| Lac                | Parsed from user location           |
| rat_type           | Radio Access Type                   |
| Timezone           | Timezone comes in Diameter AVP      |
| eventTrigger       | Event trigger value                 |
| chargingRuleRemove | Rule which is removed over Gx       |
| chargingRuleAdd    | Rule which is installed over Gx     |
| timestamp2         | Time of Message in or out from CPS  |

Diameter EDR counter List for Gx