Oracle® Communications Charging Traffic Monitor

User's Guide

Release 12.1

E80472-01

March 2017

ORACLE®

Oracle Communications Charging Traffic Monitor User's Guide, Release 12.1

E80472-01

Contents

Preface

The guide describes how to use Oracle Communications Charging Traffic Monitor to monitor the network traffic data of your online charging system (OCS).

Audience

This guide is intended for network administrators or network experts who are responsible for managing and operating IMS (based on SIP), VoLTE, and NGN multimedia networks and support personnel who identify and solve customer issues.

Downloading Oracle Communications Documentation

Oracle Communications Charging Traffic Monitor documentation and additional Oracle documentation is available from the Oracle Help Center Web Site:

http://docs.oracle.com

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Document Revision History

The following table lists the revision history for this document:

Version	Date	Description
E80472-01	March 2017	Initial release.

1

Getting Started with Charging Traffic Monitor

This chapter describes how to get started with the Oracle Communications Charging Traffic Monitor.

About Charging Traffic Monitor

Oracle Communications Charging Traffic Monitor monitors and troubleshoots online charging systems (OCS). Charging Traffic Monitor captures the traffic between the network elements and OCS. The messages are decoded and correlated in near real-time to generate reports, key performance indicators (KPIs), and troubleshooting information.

The Charging Traffic Monitor user interface provides functions that:

- Monitor real-time network traffic of your OCS.

- Capture and analyze the complete traffic sent and received by the OCS.

- Transform subscriber's current data into graphical reports that display telecom habits and usage metric based on the built-in KPIs, subscriber service issues, customer experience, and upgrade opportunities.

- Includes filters to display subscribers that match specific target based on the KPIs. For example, you can display only those subscribers who have a pre-paid plan.

About the Dashboard

The dashboard is the **Home Page** which enables you to monitor the network traffic with the pre-defined KPI metric.

> **Note:** You can access the Charging Traffic Monitor Dashboard using a web browser. You can request your system administrator for the URL, and user credentials to your application. For more information, see *Charging Traffic Monitor Installation and System Administration Guide*.

Click the **My Account** tab to modify the settings, and logout from the Charging Traffic Monitor application.

The **Home Page** displays the built-in KPI panels which expand to display the detailed graphical report for each KPI.

From this page, you can do the following:

- **My Account**: Enables you to modify the user settings for Global, Latency KPI and Transaction Result code KPI and logout from Charging Traffic Monitor application.

- **Streaming mode selection:** Enables you to view the real-time network traffic data. By default, the streaming mode is off. For more information, see "Streaming the Real-Time Data".

- **KPI:** Displays the list of built-in KPIs. The **Home Page** has all the available KPI panels displaying the network data for different metric. By default, the KPI list is expanded, click the angle arrow button to collapse the KPI list. Each KPI panel expands to a detailed graphical KPI view. For more information, see "Monitoring Transaction Key Performance Indicator (KPI)s" and "Monitoring Session KPIs".

- **Per-Session Display:** Enables you to filter the data based on the filters. You can filter the data based on User Id, Session, Latency, and States. For more information, see "Filtering Session Information".

- **User Settings**: Allows you to modify the settings for Global, Latency, and Transaction Result Code KPI.

> **Note:** The changes made in the User Settings page are lost when you clear the browser cache.

Streaming the Real-Time Data

You can stream real-time data for monitoring the diameter message transactions and session flow in the KPI panels.

By default, the streaming mode is off. To view the data in streaming mode, toggle the **Streaming Mode Selection - OFF**. The field changes to **Streaming Mode Selection** to **ON**.

> **Note:** The streaming mode is consistent throughout the application. Turning on and off streaming on one screen, is applicable throughout the application.

When streaming mode selection is on, the data on the KPI panels refreshes every three seconds by default. You can set the data refresh frequency for a maximum of 30 seconds. See "Setting the Refresh Frequency Rate for Graphs".

Setting the Refresh Frequency Rate for Graphs

You can set the network traffic data refresh rate when you are monitoring real-time network data.

> **Note:** Any changes made to Global settings are applicable through the entire application.

To set the refresh frequency rates for graphs:

1. From the **Home Page**, click **My Account** and, select **User Settings**.

   The **Settings** page appears. By default, the **Global** settings details page appears.

2. In the **Graph refresh frequency (secs)** field, enter the number of seconds between three and 30.

   The default graph refresh frequency is three seconds.

3. Click **Save & Close** to save the changes or click **Cancel** to close the **Settings** page.

In the **Home Page** and in the individual KPI pages, the data in the KPI panels refreshes after the set frequency.

Setting the Warning and Critical Threshold for the Latency KPI

You can set the warning and critical thresholds for the Latency. The changes made for Latency settings are applicable only to the Latency KPI and reflects in the Latency KPI panel in the **Home Page** and **Latency KPI** page.

The report displays the warning and critical lines when latency in sessions reaches the set threshold.

To set the warning and critical threshold for Latency:

1. From the **Home Page**, click **My Account** and, select **User Settings**.

   The **Settings** page appears. By default, the **Global** settings details page appears.

2. Click **Latency**.

   The **Latency Settings** page appears.

3. In the **Warning Line** field, enter the value between zero and 500.

   A yellow dotted line appears in the graph when the latency reaches the set threshold.

4. In the **Critical Line** field, enter the value between zero and 500.

   A red dotted line appears in the graph when the latency reaches the set threshold.

5. Click **Save & Close** to save the changes or click **Cancel** to close the User Settings screen.

The values for warning line and critical line are updated for the Latency KPI.

Setting Warning and Critical Indicators for Transaction Result Code KPI

You can set the warning and critical indicators for the Transaction Result Code KPI. The warning and critical indicator appears in the Transaction Result Code KPI panel in the **Home Page** when any of the session data reaches the specified threshold.

> **Note:**   Any changes to the Transaction Result Code settings are applicable only to the Transaction Result Code KPI which appears in the **Home Page**.

To set the warning and critical indicators for Transaction Result Code KPI:

1. From **Home Page**, click **My Account** and, select **User Settings**.

   The **Settings** page appears. By default, the **Global** settings details appears.

2. Click **Transaction Result Code**.

   The **Transaction Result Code** page appears.

3. For Protocol Errors (3xxx) Percent:

- In the **Critical Indicator** field, enter a value greater than the warning indicator value and less than 100.00.

  A yellow triangle icon appears in the table when the transaction result code reaches the set threshold.

- In the **Warning Indicator** field, enter a value greater than 0.01 and less the critical indicator value.

  A red color circle icon appears in the table when the transaction result code reaches the set threshold.

4. For Transient Failures (4xxx) Percent:

- In the **Critical Indicator** field, enter a value greater than the warning indicator and less than 100.00.

  A yellow color triangle icon appears in the table when the transaction result code reaches the set threshold.

- In the **Warning Indicator** field, enter a value greater than 0.01 and less than critical indicator value.

  A red color circle icon appears in the table when the transaction result code reaches the set threshold.

5. For Permanent Failures (5xxx) Percent:

- In the **Critical Indicator** field, enter a value greater than warning indicator value and less than 100.00.

  A yellow color triangle icon appears in the table when the transaction result code reaches the set threshold.

- In the **Warning Indicator** field, enter a value greater than 0.01 and less than critical indicator value.

  A red color circle icon appears in the table when the transaction result code reaches the set threshold.

6. Click **Save & Close** to save the changes or click **Cancel** to close the **User Settings** screen.

The values for warning indicator and critical indicator are updated for the Transaction Result Code KPI.

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Monitoring Network Traffic

This chapter describes how to monitor the network traffic of your Online Charging System (OCS) with Oracle Communications Charging Traffic Monitor.

About Filtering Options

This section explains the available filters for Charging Traffic Monitor.

About Service Type Filter

Use the **Service Type** filter for monitoring the network data by a specific service. Indicates the type of services provided or the services to which user has subscribed. When selected, indicates the type of service for which the request has been sent.

Service Type is a combination of the following three attribute-value pair (AVP)s:

- **Service-Context-Id:** Service-Context-Id is an unique identifier of the Diameter credit-control service specific document that applies to the request. A service provider allocates the service-context Id that identifies a given Diameter credit-control service specific document. For more information, see https://tools.ietf.org/html/rfc4006#section-8.42.

- **Service-Identifier:** Service-Identifier identifies a service. This specific service the request relates to is uniquely identified by the combination of Service-Context-Id and Service-Identifier. For more information, see https://tools.ietf.org/html/rfc4006#section-8.28.

- **Rating-Group:** Rating-Group contains the identifier of a rating group. The specific rating group the request relates to is uniquely identified by the combination of Service-Context-Id and Rating-Group AVPs. For more information, see https://tools.ietf.org/html/rfc4006#section-8.29.

If service type is available in the mediation table, you can view the concatenation of product type and event type separated by '_' in the user interface, or the combination is displayed delimited by '_'.

To configure the service types, see *Oracle Communications Charging Traffic Monitor Installation and System Administration Guide*.

About Operation Type Filter

Use **Operation Type** filter to identify the network operation of transaction. The operation type is defined by a combination of the following two fields:

- **Command Codes:** Command code identifies the type of command. For more information, see https://tools.ietf.org/html/rfc4006#section-12.2.

- **Credit-Control-Request-Type:** Credit-Control-Request-Type identifies the Credit-Control messages. For more information, see https://tools.ietf.org/html/rfc4006#section-3.

Table 2–1 describes the operation types defined for Charging Traffic Monitor.

Table 2–1   Operation Types

Operation Type	Notes
INITIAL_REQUEST	See https://tools.ietf.org/html/rfc6733#section-8.3 for information on INITIAL_REQUEST.
UPDATE_REQUEST	See https://tools.ietf.org/html/rfc6733#section-8.3 for information on UPDATE_REQUEST.
TERMINATION_REQUEST	See https://tools.ietf.org/html/rfc6733#section-8.3 for information on TERMINATION_REQUEST.
EVENT_REQUEST	See https://tools.ietf.org/html/rfc6733#section-8.3 for information on EVENT_REQUEST.
SESSION_TERMINATION	See https://tools.ietf.org/html/rfc6733#section-8.4 for information on SESSION_TERMINATION
RE_AUTHORIZATION	See https://tools.ietf.org/html/rfc4006#section-8.13 for information on RE_AUTHORIZATION.

To configure the operation type, see *Oracle Communications Charging Traffic Monitor Installation and System Administration Guide*.

About Diameter Front End Filter

Use **Diameter Front End** filter to identify the origin of a Diameter request message. The AVP is origin-host from the request message. For more information on origin-host, see https://tools.ietf.org/html/rfc6733#section-6.3.

To configure the Diameter front end, see *Oracle Communications Charging Traffic Monitor Installation and System Administration Guide*.

About Network Location Filter

Use the **Network Location** filter to identify the location from which the Diameter answer message originated. The AVP is origin-host from the answer message. For more information, see https://tools.ietf.org/html/rfc6733#section-6.3.

To add the network locations, see *Oracle Communications Charging Traffic Monitor Installation and System Administration Guide*.

Monitoring Transaction Key Performance Indicator (KPI)s

Transaction KPIs monitor the network data based on the transactions between the network elements.

There are three types of transactions:

- A **transaction** consists of Diameter Request Message and Diameter Answer Message.

- A **partial transaction** is a transaction which consists of only Diameter Answer Message.

- A **timeout transaction** is a transaction which consists of only Diameter Request Message.

Customizing the Time for Monitoring Network Data

When monitoring network data, the session data appears for the previous five minutes. You can select a different time frame or display data from a custom time frame.

To customize the time for the network data:

1. From **Home Page**, click a KPI link.

   The KPI page appears.

2. Toggle **Streaming Mode Selection** to **Off**.

3. In the **Time Preset** field, select **Custom.**

4. Enter the date in MM/DD/YY format or click the calendar icon and select the date.

5. In the **From** field, select the time from the drop-down list.

   You can select a time interval of half an hour in HH:MM format.

6. In the **To** field, select the time from the drop-down list.

   You can select a time interval of half an hour in HH:MM format.

   > **Note:** For Session Duration KPI, the data is displayed for the previous one hour and you can select a time interval of one hour.

7. Click **Apply**.

   The network data is displayed for the selected time.

Latency Page

Latency is defined as the time difference between the reception of Credit-Control-Request (CCR) and Credit-Control-Answer (CCA) messages for a single transaction.

To view the Latency information, from the **Home Page**, under **KPI** section, click the **Latency** link. The latency page appears.

You can perform the following:

- View the network traffic data in graph. The X-axis represents the selected time such as seconds, minutes, hours, days, or a month and Y-axis represents the latency.

- **View network data by Latency key:** The key identifies the type of latency in the graph. Click a latency type key to display or remove from the graph. For example, if you click **Minimum**, the corresponding line in the graph disappears. Click **Minimum** again to display the line in the graph.

- **View real-time data:** Turn-on streaming mode to view the real-time network data. When streaming is on, the data refreshes at the set graph refresh frequency rate. By default, the graph refresh frequency rate is three seconds. You can set the graph refresh frequency rate up to 30 seconds. For more information, see "Streaming the Real-Time Data".

- **Select the duration:** By default, the network data is displayed for the previous five minutes. From the **Time Preset** field drop-down list, select the desired duration or select **custom** for customizing the time. See "Customizing the Time for Monitoring Network Data".

  > **Note:** The **Time Preset** option is available only when **Streaming Mode Selection** is **OFF**. Records are generated every second. For partial or timeout transactions, the latency values are unavailable and are marked as zero.

- **Filter the data by Service Type:** Select the required service type from the Service Type drop-down list and click **Apply** to view the data for selected service type or click **Reset** to cancel the selection. The data gets displayed for the selected service type. For more information, see "About Service Type Filter".

- **Filter the data by Operation Type:** Select the required operation type from the Operation Type drop-down list and click **Apply** to view the data for selected operation type or click **Reset** to cancel the selection. The data gets displayed for the selected Operation Type. For more information, see "About Operation Type Filter".

- **Filter the data by Network Location:** Select the required network location from the Network Location drop-down list and click **Apply** to view the data for selected network location or click **Reset** to cancel the selection. The data gets displayed for the selected network location. For more information, see "About Network Location Filter".

- **Filter the data by Diameter Front End:** Select the required Diameter front end from the Diameter Front End drop-down list and click **Apply** to view the data for selected Diameter front end or click **Reset** to cancel the selection. The data gets displayed for the selected Diameter front end. For more information, see "About Diameter Front End Filter".

  > **Note:** You can apply only a single filter among Service Type, Operation Type, Diameter Front End, and Network Location. Error occurs when you try to select multiple filters.

- **View the enlarged graph for selected duration:** You can drag the lower graph edges to reduce the time for viewing the enlarged graph. The legend in the graph indicates the various latency information.

  > **Note:** The lower graph is available only when **Streaming Mode Selection** is **OFF**.

Transaction Volume Page

Transaction Volume is defined as the number of transactions per second.

To view the Transaction Volume information, from the **Home Page**, under **KPI** section, click the **Transaction Volume** link. The transaction volume page appears.

You can perform the following:

- View the network traffic data in graph. The X-axis represents the selected time such as seconds, minutes, hours, days, or a month and Y-axis represents the count of transactions.

- **View real-time data:** Turn-on streaming mode to view the real-time network data. When streaming is on, the data refreshes at the set graph refresh frequency rate. By default, the graph refresh frequency rate is three seconds. You can set the graph refresh frequency rate up to 30 seconds. For more information, see "Streaming the Real-Time Data".

- **Select the duration:** By default, the network data is displayed for the previous five minutes. From the **Time Preset** field drop-down list, select the desired duration or select **custom** for customizing the time. See "Customizing the Time for Monitoring Network Data".

  > **Note:** The **Time Preset** option is available only when **Streaming Mode Selection** is **OFF**. Records are generated every second. For partial or timeout transactions, the transaction volumes values are unavailable and are marked as zero.

- **Filter the data by Service Type:** Select the required service type from the Service Type drop-down list and click **Apply** to view the data for selected service type or click **Reset** to cancel the selection. The data gets displayed for the selected service type. For more information, see "About Service Type Filter".

- **Filter the data by Operation Type:** Select the required operation type from the Operation Type drop-down list and click **Apply** to view the data for selected operation type or click **Reset** to cancel the selection. The data gets displayed for the selected Operation Type. For more information, see "About Operation Type Filter".

- **Filter the data by Diameter Front End:** Select the required Diameter front end from the Diameter Front End drop-down list and click **Apply** to view the data for selected Diameter front end or click **Reset** to cancel the selection. The data gets displayed for the selected Diameter front end. For more information, see "About Diameter Front End Filter".

  > **Note:** You can apply only a single filter among Service Type, Operation Type, Diameter Front End, and Network Location. Error occurs when you try to select multiple filters.

- **Filter the data by Network Location:** Select the required network location from the Network Location drop-down list and click **Apply** to view the data for selected network location or click **Reset** to cancel the selection. The data gets displayed for the selected network location. For more information, see "About Network Location Filter".

- **View the enlarged graph for selected duration:** You can drag the lower graph edges to reduce the time for viewing the enlarged graph. The legend in the graph indicates the transaction volume information.

  > **Note:** The lower graph is available only when **Streaming Mode Selection** is **OFF**.

Transaction Result Code Page

Transaction Result code is defined as the number of transactions per seconds for a given transaction result code.

Table 2–2 describes the transaction result code available for the Charging Traffic Monitor.

Table 2–2   Transaction Result Codes

Transaction Result Code	Value	Notes
Informational	1xxx	See https://tools.ietf.org/html/rfc6733#section-7.1.1 for information on Informational.
Success	2xxx	See https://tools.ietf.org/html/rfc6733#section-7.1.2 for information on Success.
Protocol Errors	3xxx	See https://tools.ietf.org/html/rfc6733#section-7.1.3 for information on Protocol Errors
Transient Failures	4xxx	See https://tools.ietf.org/html/rfc6733#section-7.1.4 for information on Transient Failures.
Permanent Failures	5xxx	See https://tools.ietf.org/html/rfc6733#section-7.1.5 for information on Permanent Failures.

To view the transaction result code information, from the **Home Page**, under **KPI** section, click the **Transaction Result Code** link. The transaction result code page appears.

You can perform the following:

- View the network traffic data in graph. The X-axis represents the selected time such as seconds, minutes, hours, days, or a month and Y-axis represents the count per second per transaction result code.

- **View network data by Key:** The key identifies the types of transaction result codes that appear in graph. Click a transaction result code in the key to display or remove the code type from the graph. For example, if you click **2xxx**, the corresponding lines in the graph disappears. Click **2xxx** again to display the lines in the graph.

- **View real-time data:** Turn-on streaming mode to view the real-time network data. When streaming is on, the data refreshes at the set graph refresh frequency rate. By default, the graph refresh frequency rate is three seconds. You can set the graph refresh frequency rate up to 30 seconds. For more information, see "Streaming the Real-Time Data".

- **Select the duration:** By default, the network data is displayed for the previous five minutes. From the **Time Preset** field drop-down list, select the desired duration or select **custom** for customizing the time. See "Customizing the Time for Monitoring Network Data".

  > **Note:**   The **Time Preset** option is available only when **Streaming Mode Selection** is **OFF**. Records are generated every second. For partial or timeout transactions, the transaction result code values are unavailable and are marked as zero.

- **Filter the data by Service Type:** Select the required service type from the Service Type drop-down list and click **Apply** to view the data for selected service type or

click **Reset** to cancel the selection. The data gets displayed for the selected service type. For more information, see "About Service Type Filter".

- **Filter the data by Operation Type:** Select the required operation type from the Operation Type drop-down list and click **Apply** to view the data for the selected operation type or click **Reset** to cancel the selection. The data gets displayed for the selected Operation Type. For more information, see "About Operation Type Filter".

- **Filter the data by Network Location:** Select the required network location from the Network Location drop-down list and click **Apply** to view the data for selected network location or click **Reset** to cancel the selection. The data gets displayed for the selected network location. For more information, see "About Network Location Filter".

- **Filter the data by Diameter Front End:** Select the required Diameter front end from the Diameter Front End drop-down list and click **Apply** to view the data for selected Diameter front end or click **Reset** to cancel the selection. The data gets displayed for the selected Diameter front end. For more information, see "About Diameter Front End Filter".

- **Filter the data by Groups:** Select the required group which includes types of transaction result code from the Groups drop-down list and click **Apply** to view the data for selected transaction result code group or click **Reset** to cancel the selection. The data gets displayed for the selected group.

> **Note:** You can apply only a single filter among Service Type, Operation Type, Diameter Front End, and Network Location. Error occurs when you try to select multiple filters.

- **View the enlarged graph for selected duration:** You can drag the lower graph edges to reduce the time for viewing the enlarged graph. The legend in the graph indicates the various transaction result codes information.

> **Note:** The lower graph is available only when **Streaming Mode Selection** is **OFF**.

Monitoring Session KPIs

Session KPIs display the network data for sessions.

A session is the time of communication between two network elements.

About Concurrent Sessions

A concurrent session represents the maximum number of sessions concurrently open during a specified period of time.

A **Sampling Period** is the time for which the KPI is calculated.

Sampling period calculation includes all sessions active at the start of the sampling period, all initiated sessions, and all terminated sessions.

For example, consider that there exist 100 concurrent active sessions prior to a sampling period. During the sampling period, assume:

- At 0:10, 10 new sessions were initiated, then the total number of active sessions are 110.

- At 0:20, five existing sessions were terminated, then the total number of active sessions are 105, and the maximum number of sessions are 110.

- At 0:30, 20 new sessions were initiated, then the total number of active sessions are 125, and the maximum number of sessions are 125.

- At 0:40, 50 existing sessions were terminated, total number of active sessions are 75, and the maximum number of sessions are 125.

- The time, 0:10, 0:20, 0:30, and 0:40 are within the sampling period.

Now end the sampling period.

At the end of sampling period, the graph displays 125 concurrent sessions and the next sampling period begins with 75 concurrent sessions.

This KPI also counts the number of sessions initiated and terminated during the sampling period.

To view the concurrent session information, from the **Home Page**, under **KPI** section, click the **Concurrent Session** link. The concurrent session page appears.

The concurrent session page includes two graphs, **Concurrent Sessions** and **Session Initiation and Termination**.

Note: If you apply any filter on Concurrent Sessions page, the changes are reflected on Concurrent Session graph and Session Initiation and Termination graph.

For more information on concurrent session graph, see "Concurrent Sessions Page".

About Session Duration

The session duration is computed for each session. If a session is not terminated when the KPI is computed, the session duration is counted from the start time of a session until the KPI computed time.

Session Duration is calculated in hours in UTC time zone. For example, consider an hour from 1:00 AM to 2:00 AM.

The following example demonstrates how sessions are computed.

Figure 2–1 shows an example image for computing session duration.

Figure 2–1 Session Duration Example
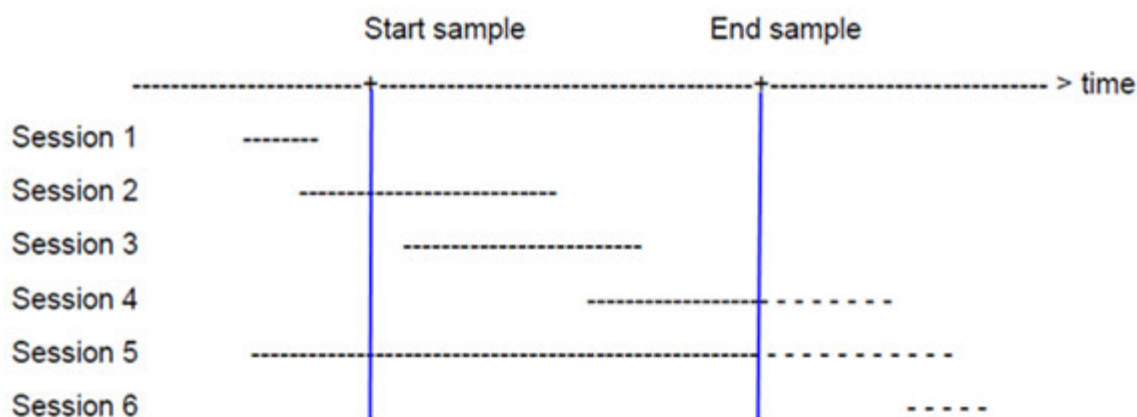
From the figure:

- Session 1 must be ignored as it occurred outside of the sampling period.

- Session 2 is considered as it started before the sampling period and finished during the sampling period.

- Session 3 is considered as it started and finished during the sampling period.

- Session 4 is considered as it started during the sampling period and has not finished yet.

- Session 5 is considered as it started before the sampling period and not finished yet. This leads to the long session duration.

- Session 6 must be ignored as it occurs in the future.

> **Note:** When you install the Charging Traffic Monitor for the first time, approximately, one and half hour is required to display the Session Duration KPI in the user interface.

For more information on session duration graph, see "Session Duration Page".

Concurrent Sessions Page

Concurrent sessions page displays the concurrent sessions, initiated sessions, and terminated sessions. For more information on concurrent sessions, see "About Concurrent Sessions".

To view the concurrent session information, from the **Home Page**, under **KPI** section, click the **Concurrent Session** link. The concurrent session page appears.

The concurrent session page includes two graphs, **Concurrent Sessions** and **Session Initiation and Termination**.

You can perform the following from the concurrent session page:

- View the network traffic data in graph. The X-axis represents the selected time such as seconds, minutes, hours, days, or a month and Y-axis represents the number of concurrent sessions for concurrent session graph, and number of sessions in sessions initiated and terminated for session initiation and termination graph.

- **View network data by key:** The key identifies the types of sessions in the graph. Click a session type key to remove or display in the graph. For example, click the **Initiated** key and corresponding line in the graph disappears. Click **Initiated** again to display the line in the graph.

- **View real-time data:** Turn-on streaming mode to view the real-time network data. When streaming is on, the data refreshes at the set graph refresh frequency rate. By default, the graph refresh frequency rate is three seconds. You can set the graph refresh frequency rate up to 30 seconds. For more information, see "Streaming the Real-Time Data".

- **Select the duration:** By default, the network data is displayed for the previous five minutes. From the **Time Preset** field drop-down list, select the desired duration or select **custom** for customizing the time. See "Customizing the Time for Monitoring Network Data".

  Note: The **Time Preset** option is available only when **Streaming Mode Selection** is **OFF**.

- **View the enlarged graph for selected duration:** You can drag the lower graph edges to reduce the time for viewing the enlarged graph. The legend in the graph indicates the concurrent sessions, session initiated and session terminated.

  Note: The lower graph is available only when **Streaming Mode Selection** is **OFF**.

- **Change the view:** By default the graph is displayed in **List** view. Click **Thumb** to view the graphs one beside each other.

Session Duration Page

Session Duration page displays the number of sessions as per the configured time slots for the selected time period. For more information on session duration, see "About Session Duration".

To view the session duration information, from the **Home Page**, under **KPI** section, click the **Session Duration** link. The session duration page appears.

You can perform the following from the session duration KPI page:

- View the network traffic data in graph. The X-axis represents the selected time such as seconds, minutes, hours, days, or a month and Y-axis represents the number of sessions for a given time period.

- **View network data by key:** The key indicates the sessions in the graph. Click the **Sessions** key and the sessions bar disappears from the graph. Click **Sessions** again to display the bars in the graph.

- **Select the duration:** By default, the network data is displayed for the previous one hour. From the **Time Preset** field drop-down list, select the desired duration or select **custom** for selecting the predefined one hour time intervals. See "Customizing the Time for Monitoring Network Data".

- **View the enlarged graph for selected duration:** You can drag the lower graph edges to reduce the time for viewing the enlarged graph. The legend in the graph indicates the concurrent sessions, session initiated and session terminated.

> **Note:** The lower graph is available only when **Streaming Mode Selection** is **OFF**.

Filtering Session Information

Use the filters in **Per-Session Display** page to view the specific session data. You can filter session information to display network data based on user Id, state, latency, and sessions.

Filtering Data for User Id

To filter the data by user Id:

1. From the **Home Page**, click **Per-Session Display**.

    The **Per-Session Display** page appears.

2. Expand the **Filter by User Id** section.

> **Note:** You are not allowed to enter single quotes or double quotes in the fields available under **Filter by User Id**.

The filters available for User Id appear. You can filter the data by entering the value in the following fields:

- **Session Id:** Session Id is an AVP with a string format. Session Id is an unique identifier which begins with the sender's identity encoded in the Diameter identity and ends with a special character. Oracle recommends the following format:

  `<DiameterIdentity>;<high 32-bit>;<low 32-bit>;``<optional_value>`

  where:

  <optional_value> indicates an optional element.

  <high 32-bit> and <low 32-bit> are the decimal representations of the high and low 32-bit. The 64-bit value is divided in two parts to simplify the format with 32-bit processors.

- **MSISDN:** MSISDN is the Mobile Station (MS) international ISDN number allocated from the ITU-T Recommendation E.164 numbering plan; see also ITU-T Recommendation E.213. The number consists of Country Code (CC) of the country in which the MS is registered, followed by National (significant) mobile number, which consists of National Destination Code (NDC) and Subscriber Number (SN). For GSM/UMTS applications, a National Destination Code is allocated to each PLMN. In some countries more than one NDC may be required for each PLMN.

- **IMSI:** IMSI is composed of three parts:

  - Mobile Country Code (MCC) consisting of three digits. The MCC identifies uniquely the country of domicile of the mobile subscriber.

  - Mobile Network Code (MNC) consisting of two or three digits for GSM applications. The MNC identifies the home GSM PLMN of the mobile subscriber. The length of the MNC (two or three digits) depends on the value of the MCC. A mixture of two and three digit MNC codes within a

single MCC area is not recommended and is outside the scope of this specification.

– Mobile Subscriber Identification Number (MSIN) identifying the mobile subscriber within a GSM PLMN. The National Mobile Subscriber Identity (NMSI) consists of the Mobile Network Code and the Mobile Subscriber Identification Number.

■ **SIP URI:** The SIP schemes follow the guidelines in RFC 2396. SIP URI expressed in the form of an e-mail address, which includes SIP request-header fields and the SIP message-body that specify the subject, media type, or urgency of sessions initiated by using a URI on a web page or in an e-mail message. Following is the SIP format:

```
sips:user:password@host:port;uri-parameters?headers
```

■ **NAI:** Network Access Identifier (NAI) authenticates the user's network.

■ **Private Id:** Private Id is a private identifier for the Credit-Control server.

3. Click **Apply** to view the data for selected fields or click **Reset** to cancel the selection.

The system updates the data in **Session Results Table** based on the specified criteria.

Filtering Data by Sessions

To filter the data by sessions:

1. From the **Home Page**, click **Per-Session Display**.

The **Per-Session Display** page appears.

2. Expand **Filter by Session** section.

You can filter the data by entering the value in the following fields:

■ **Number of Transactions:** Enter a number for the transactions between zero and 1000000.

■ **Duration since last Update (seconds):** Enter the last updated time by clicking inside the field or use the arrows to select the time. Enter a value between zero to 3600.

■ **Session Start Time:** Enter the start time of the session by clicking inside the field or click the icons to select the time.

■ **Session End Time:** Enter the end time of the session by clicking inside the field or click the icons to select the time.

■ **Session Duration:** Enter the duration by clicking inside the field or click the icons to select the time. You can select the duration in hours, minutes, and seconds. The range allowed is from zero to 1000.

3. Click **Apply** to view the data for selected fields or click **Reset** to cancel the selection.

The system updates the data in **Session Results Table** based on the specified criteria.

Filtering Data by Latency

To filter the data for Latency:

1. From the **Home Page**, click **Per-Session Display**.

The **Per-Session Display** page appears.

2. Expand the **Filter by Latency** section.

    The filter detail appears. You can filter the data by entering the value in the following fields:

    ■ **Average latency (micro seconds):** Enter the average latency in micro seconds between zero and 1000000.

    ■ **Max latency (micro seconds):** Enter the maximum latency in micro seconds between zero and 1000000.

3. Click **Apply** to view the data for selected fields or click **Reset** to cancel the selection.

The system updates the data in **Session Results Table** based on the specified criteria.

Filtering Data by States

To filter the data for States:

1. From the **Home Page**, click **Per-Session Display**.

    The **Per-Session Display page** appears.

2. Expand the **Filter by States** section.

    The filter details appears. You can filter the data by entering the value in the following fields

    ■ **Session State:** Select the session state from the drop-down list by clicking inside the field. You can select multiple session states.

    ■ **Session Termination Code:** Select the session termination code from the drop-down list by clicking inside the field. You can select multiple session termination codes.

    ■ **Service Type:** Select the service type from the drop-down list by clicking inside the field. You can select multiple service types.

    ■ **Diameter Front End:** Select the Diameter front end from the drop-down list by clicking inside the field. You can select multiple Diameter front end.

    ■ **Network Location:** Select the network location from the drop-down list by clicking inside the field. You can select multiple network locations.

    ■ **Session of Interest Reason:** Select the session of interest reason from the drop-down list by clicking inside the field. You can select multiple session of interest reason.

    ■ **IMEI-SV TAC & SV:** Select the mobile device models from the drop-down list by clicking inside the field. You can select multiple IMEI-SV.

3. Click **Apply** to view the data for selected fields or click **Reset** to cancel the selection.

The system updates the data in **Session Results Table** based on the specified criteria.

Viewing the Sequence Transactions Diagram

The sequence transactions diagram provides the detailed information for the selected session. Each protocol message is numbered in brackets in the order of the call event transaction between the network devices.

To view the sequence diagram:

1. From the **Home Page**, click **Per-Session Display.**

   The Per-Session display page appears.

2. In the **Session Results Table**, click a link in **Session Id** column.

   The Sequence Transactions Diagram screen appears. You can view the information about IP address, Transaction details, Reason of Interest and Absolute time. Click any of these criteria to display or remove the related information from the diagram.

3. You can toggle with the following buttonset to view or remove the specific information from the diagram:

   ■ **IP: port addresses:** Indicates IP port address.

   ■ **Transaction details:** Indicates the type of transaction details such as service type or request type.

   ■ **Reasons of Interest:** Indicates the reason of interest.

   ■ **Absolute time:** When selected, indicates the time of the Diameter message. For example, 17/01/16 15:42:33.000.

     When not selected, indicates the first Diameter message time as zero, and the second message shows the time interval between the first Diameter message and the second Diameter message time.

4. Click **Zoom In** to expand the Sequence Transactions Diagram.

5. Click **Zoom Out** to minimize the Sequence Transactions Diagram.

6. (Optional) Resize, or move the protocol message by dragging the title bar of the screen to the required position within the message flow.

7. Click the **Close** icon in the protocol message title bar or press the **ESC** key, which closes the Sequence Transactions Diagram.