

**Oracle® Communications
Evolved Communications Application Server**
Operator's Guide
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Preface

This document describes the tasks that an operator performs to create and use services with Oracle Communications Evolved Communications Application Server (OCECAS).

Audience

This document is intended for an OCECAS operator who is tasked with adding subscribers to OCECAS and implementing services for them.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at
<http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

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<http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info> or visit
<http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs> if you are hearing impaired.

Accessing Oracle Communications Documentation

OCECAS documentation is available from the Oracle Documentation Web site:
<http://docs.oracle.com>.

Related Documents

For more information, see the following OCECAS documentation:

- *Oracle Communications Evolved Communications Application Server Release Notes*
- *Oracle Communications Evolved Communications Application Server Installation Guide*
- *Oracle Communications Evolved Communications Application Server Concepts*
- *Oracle Communications Evolved Communications Application Server System Administrator's Guide*
- *Oracle Communications Evolved Communications Application Server Security Guide*
- *Oracle Communications Evolved Communications Application Server Compliance Guide*

- *Oracle Communications Evolved Communications Application Server RESTful API Reference*
- *Oracle Fusion Middleware 12c Documentation Library*
- *Oracle Database Installation Guide 12c Release 1 (12.1) for Linux*
- *Oracle Database Administrator's Guide 12c Release 1 (12.1)*

Using Oracle Communications Evolved Communications Application Server

This chapter describes how to access and use Oracle Communications Evolved Communications Application Server (OCECAS). Using OCECAS consists of using the Session Design Center to create and access subscriber services and using the subscriber data store to provision and access subscribers.

For an introduction to OCECAS and an overview of Session Design Center and the subscriber data store, see *Oracle Communications Evolved Communications Application Server Concepts*. For information on how to configure and administer OCECAS, see *Oracle Communications Evolved Communications Application Server System Administrator's Guide*.

For a description of scenarios and corresponding call-session flows that OCECAS supports, see [Appendix B, "External References for Supported Interactions."](#)

About the Session Design Center

Session Design Center runs in the OCECAS management domain. It is a graphical environment that enables you to create and manage application service logic without writing code.

Accessing Session Design Center

To log in to OCECAS and access Session Design Center:

1. In your web browser, enter the URL to go to the Session Design Center.

For example:

`https://hostname:port/sdc/login.html?target=`

The OCECAS login page displays.

2. In the **User Name** field, enter the user name for your account.
3. In the **Password** field, enter the password.
4. Click **Sign In**.

Once you successfully log in, the Home page, which is also known as the landing page, displays.

If your interaction with Session Design Center is idle for 30 minutes, the application logs you out.

Using the Session Design Center Console

The Session Design Center Home page includes the following elements:

- Header bar

The bar at the top of the interface that includes the name of the application, a **Help** link, and a **user** drop-down menu, which allows you to log out.

- Navigation panes

Below the header bar, the following panes provide access to principal areas of functionality:

- **Application** contains a **View Application Configuration >** link that provides access to application control flows and resources.

The Application section contains the VoLTE and VoWiFi application, all of the control flows that have been created for the application, and all of the resources that are available to the application. The VoLTE and VoWiFi application is the core of OCECAS's capabilities. You tailor OCECAS to your customer's requirements by creating control flows to add subscriber services.

- **Projects, or Open Projects**, provides access to change sets.

If open projects exist, the title of the section becomes **Open Projects** and links to any open projects are listed below. A **View All Projects >** link takes you to a list of all change sets for the application.

The Projects section contains all of the change sets, which are also known as projects, that have been created to make changes to the application. A change set is a group of related configuration and control flow changes.

- **Environments** provides access to the deployment pipeline, which consists of Testing, Staging, and Production environments. Use the **View Environment Configuration >** link to view and access projects in their stages of deployment.

You deploy change sets sequentially into environments to safely migrate them into production. Each environment also provides access to its service configuration.

To return to the **Home** page at any time, click the Home icon () displayed below the Header bar.

WARNING: Do not open multiple instances of Session Design Center in different browser tabs or windows.

Using Control Flows, Resources and Change Sets

The remainder of the Session Design Center interface is dedicated to working with control flows, resources, and change sets. See the following chapters for more information on using the Session Design Center:

- [Working with Control Flows](#)
- [Working with Resources](#)
- [Working with Change Sets](#)

Provisioning and Accessing Subscriber Data

For information on working with the subscriber data store to provision and access subscriber data, see "[Working with Subscriber Data](#)".

For a detailed description of the subscriber data store schema, see [Appendix A, "The Default ESS Subscriber Store Schema."](#)

Working with Control Flows

This chapter describes how to create and work with control flows to augment the services provided by the VoLTE and VoWiFi application in Oracle Communications Evolved Communications Application Server (OCECAS).

For an introduction to the Session Design Center and an overview of control flows, see "About the Session Design Center" in *Oracle Communications Evolved Communications Application Server Concepts*.

About the VoLTE and VoWiFi Application

The VoLTE and VoWiFi application provides session control and services for voice calls and multimedia sessions over Long Term Evolution (LTE) and for voice calls over Wi-Fi. To define new services and behaviors for subscribers, you make changes to the VoLTE and VoWiFi application by creating or modifying control flows. You create and modify control flows in the context of a change set. For more information about change sets and change management, see "[Working with Change Sets](#)".

The VoLTE and VoWiFi application consists of four message control flows and five application control flows.

About the Message Control Flows

Message control flows are triggered when the application server receives one of the following SIP messages: SIP INVITE, SIP OPTIONS, SIP REGISTER, or SIP SUBSCRIBE. Each of these SIP messages triggers a control flow of the same name:

- The SIP INVITE control flow analyzes the message headers, retrieves data about the subscriber and the mobile virtual network operator (MVNO), and invokes the Session Origination or Session Termination service.
- The SIP OPTIONS control flow manages the transfer and negotiation of video sessions during the handoff from a packet-switched to a circuit-switched network.
- The SIP REGISTER control flow analyzes the message headers and stores the endpoint's registration expiry and contact headers in the subscriber record. It also manages the life cycle of registration and supports Access Transfer during the handoff from a packet-switched to a circuit-switched network.
- The SIP SUBSCRIBE control flow responds to a SIP SUBSCRIBE message during endpoint subscription.

You can view the Message Control Flows by clicking **View Application Configuration** from the SDC home page and then clicking the name of the Message Control Flow that you want to view under the Application tab.

About the Application Control Flows

The VoLTE and VoWiFi Application control flows provide supplementary services and manage the phases of a session life cycle. The Session Origination and Session Termination control flows invoke additional control flows to deliver supplementary services. Supplementary services are services that supplement the telephony and data services.

The Session Deregistration control flow manages the life cycle of deregistration.

The Session Origination control flow manages the life cycle of the originating session. It executes additional control flows to invoke the following supplementary services:

- Ad-hoc Conferencing - allows a subscriber to transform a one-to-one call session into a multi-party call session
- Communication Hold Charging
- Communication Hold (origination)
- Originating Identity Restriction
- Outgoing Communication Barring
- Terminating Identity Presentation

The Session Registration control flow manages the life cycle of registration.

The Session Termination control flow manages the life cycle of the terminating session. It executes additional control flows to invoke these supplementary services:

- Anonymous Communication Restriction
- Communication Diversion
- Communication Hold (termination)
- Early Communication Diversion
- Incoming Communication Barring
- Originating Identity Presentation
- Terminating Identity Restriction

The Terminating Access Domain Selection control flow selects the circuit-switched access or packet-switched access network(s) to use to deliver a terminating voice session to the user endpoint.

You can add Activities to the **VoLTE**, **VoWiFi** and **eSRVCC** session registration and de-registration control flows to perform specific tasks required by a customer in response to registration or de-registration events.

About Control Flow Activities

A session control flow consists of logically linked Activities, such as **Start**, **Run Web Service**, **Start Charging Session**, **Start Conference Session**, and so on. You must configure an Activity when you add it to a control flow.

Configuring an Activity consists of specifying values for the following elements:

- Name

This is the Activity name, which can be the default name or a custom name that you assign. When you assign a custom name, the control flow editor retains the default name for internal use and displays it in smaller grey text.

- **Comments**

You can add a short, optional comment to describe the Activity.

- **Parameters**

An Activity can require a set of parameters for which you need to provide appropriate values.

All required parameters must be provided with values for the control flow to compile successfully.

- **Exits**

Except for End, each Activity has one or more exits, which you must connect to the next logical action. All exits must have a connection for the control flow to compile successfully.

You can define dynamic exits for the Wait for Events Activity. A dynamic exit is one that you add to the Activity at the time you include the Activity in the control flow.

About the Activities Set

[Table 2–1](#) lists the set of Activities available for use in creating or modifying a control flow.

Table 2–1 Activities Set

Activity Name	Description
Adjust Media	Adjust conference media stream for user equipment parameter.
Add EDR Field Value	Add field and value to EDR.
Alarm	Log an occurrence of the configured Alarm.
Array Index	Store the current array index.
Compare	Compare values derived from source parameter locations.
Compare Date Time	Compares a specified Date and Time, Date, or Time of Day, relative to Date and Time, Date, or Time of Day from an external concept.
Compare Day Of Week	Compares a specified day of the week to the value from an external concept.
Compare List and Value	Compares a list of values against a specified value or regular expression to determine whether the value occurs in the list.
Copy Value	Copy value derived from source parameter into destination parameter.
Date Time Offset	Offset a date time value.
End	Terminates the flow for this branch of logic.
End Charging Session	End the charging function with the Charging (Diameter) function.
Event Charge	Send an event charge to the charging data function (CDF).
Extract and Store String	Extract and store a string.
Find And Replace And Store Value	Find and replace value in data.

Table 2–1 (Cont.) Activities Set

Activity Name	Description
Generate Document And Store	Generate document derived from template parameter and store into destination parameter.
Increment Statistic	Increment statistic derived from statistic parameter.
Load Service Definition	Run the derived service retrieved by name from the user database repository. This Activity has only one exit to address the issue when the service cannot be loaded. If the service loads successfully, the normal logic flow continues.
Notes	Graphical note on control flow.
Prefix Tree Lookup	Look up a value in a Prefix Tree.
Release	Release the specified endpoint.
Remote Copy	Copy a value from a different session context to the local context.
Retrieve Session List	Retrieve a list of session IDs for the specified session key.
Route	Route to the original endpoint.
Route Changed	Route to the specified destination endpoint.
Run Control Flow	Run the specified control flow.
Run Service Definition	Run the specified service.
Run Web Service	Run a Web (SOAP or REST) service.
Send Message	Send SIP message.
Start	Start processing for control flow.
Start Back to Back Session	Start back-to-back session between starting endpoint and destination endpoint.
Start Charging Session	Start charging session with the charging data function (CDF).
Start Collecting Digits	Start collecting digits derived from prompt and store digits to parameters to user equipment parameter.
Start Conference Session	Start a conference session.
Start Playing Media	Start playing media derived from media template parameter to user equipment parameter.
Start Recording Message	Start recording media derived from prompt and record to parameters to user equipment parameter.
Statistic Branching	Branch on statistic value.
Stop Media	Stop playing media to user equipment parameter.
Store	Set a context value.
Start Session Key	Store key in current session from specified context path.
Sync Statistic	Sync the Statistics cache with the server.
Telemetry	Start or stop a telemetry record.
Translate And Store Value	Compare if value derived from source parameter is present in list derived from source list parameter and store in destination parameter.

Table 2–1 (Cont.) Activities Set

Activity Name	Description
Update Charging Session	Update the charging session with the charging data function (CDF).
Update Profile	Updates a subscriber UDR profile data.
Wait For Event	<p>The WaitForEvent Activity suspends the control flow until a specified event occurs. The event can be a SIP-session event such as Answer, No Answer, or Hang Up or it could be an event associated with call hold and resume, for example, or a Diameter event such as Abort Session Request (ASR) or Reauthorize Session Request (RAR).</p> <p>This activity supports dynamic exits, which allow you to create exits when you add the Activity to the control flow. A dynamic exit allows you to branch appropriately based on the specified event.</p>

About Using Control Flows

To define new services and behaviors for subscribers, you make changes to the VoLTE and VoWiFi application by creating or modifying control flows. A control flow consists of logically-linked actions (Activities) and decisions that specify how to process a voice call or multimedia session.

To understand the basic concepts of control flows, see "About the Session Design Center" in *Oracle Communications Evolved Communications Application Server Concepts*.

About the Control Flow Editor

When you open an existing control flow or create a new one, you open the control flow editor and the editing canvas. The editing canvas is the work area on which you create or edit the control flow logic. The canvas has vertical and horizontal scroll bars

The editing canvas also includes the following parts:

- The Editing Toolbar
- The Information panel
- The Changes panel

About the Editing Toolbar

Table 2–2 lists the tool icons that can be found on the editing toolbar, which appears on the left side of the canvas:

Table 2–2 Editing Toolbar Icons

Icon	Function
Spyglass (search)	Search the control flow. Clicking it opens an adjoining panel with a Search field followed by a list of control flows contained in the changed set.
Pencil (edits)	Shows control flow differences. Clicking opens a panel that details the differences between the current change set and the baseline change set.
Circled Red Exclamation Point (warning)	Shows issues found in this control flow. Clicking it opens a list of control flows having errors, along with descriptions of each of the errors found.

Table 2–2 (Cont.) Editing Toolbar Icons

Icon	Function
Save	Manually saves the control flow.
Undo	Undoes (reverts) the last change. Greyed out if no changes have been made.
Redo	Restores the last change that was undone. Greyed out if nothing has changed.
Scissors	Cuts (removes) an item from the canvas and saves it to the clipboard.
Copy	Copies an item from the canvas and saves it to the clipboard. See " "Reusing Control Flow Logic" .
Paste	Pastes an item from the clipboard to the canvas. See " "Reusing Control Flow Logic" .

Note: For a read-only control flow, only the Spyglass and Copy icons are available. The Copy icon is inactive until you select something to copy.

About the Information Panel

The Information panel is adjacent to the right side of the editing toolbar. The Information panel opens when you click the Spyglass icon, the Pencil icon, or the Warning icon in the editing toolbar.

When you click the Spyglass (search) icon in the editing toolbar, the Information panel displays a search field that allows you to search for an Activity in the control flow. Enter a string of characters to be matched against an Activity name. The control flow editor tries to match the string against both the original name of the Activity and its assigned name, if the name has been changed. If an Activity occurs more than once, the panel displays all occurrences of that Activity. When you click an entry in the list, the Activity is highlighted on the canvas.

When you click the Pencil (edits) icon, the Information panel shows the differences between the current control flow and the control flow in the baseline change set. For a new control flow that you created in this change set, the panel shows no differences. If you are modifying a control flow that was created in an earlier change set, the panel shows the differences between the current and original control flows.

When you click the Warning icon in the editing toolbar, this panel displays the Activities in the control flow that have issues and require corrections.

About the Changes Panel

The Changes panel is the right-most panel on the editing canvas. It shows the changes in the change set. If a control flow is created in a change set, no differences are shown. If a control flow is inherited from the base change set and is modified in the current change set, the Changes panel shows the differences. If a control flow is inherited from the base change set and is deleted in the current change set, the Changes panel displays the control with a retract symbol, allowing you to restore it to the change set. The control flow appears in the All Control Flows tab with a line through it and a retract symbol next to it. See "["Working with Change Sets"](#) for more information.

Click the arrow next to a category to expand the list of changes to it.

The Changes panel shows any changes, including creations, modifications, or deletions to the entities in the following list.

- Control Flows
- Concepts
- Charging Templates
- EDRs
- Import WSDL
- Locales
- Media Resources
- Media Servers
- Notifications
- Prefix Trees
- Schemas
- Statistics
- Unclassified Service Data
- Web Services

For **CONTROL FLOWS**, the Changes panel displays the following alert for unconnected exits:

Unconnected exit (N)

where N is the total number of unconnected exits in the control flow.

Creating a Control Flow

You must create or modify a control flow within a change set. A change set is a logical grouping of configuration and control flow changes that makes it easier to organize and deploy changes.

Note: You cannot create a control flow for a change set whose deployment status is **Active**.

For an understanding of change set concepts, see "About Change Management" in *Oracle Communications Evolved Communications Application Server Concepts*.

Creating a New Control Flow

To create a new control flow for a change set:

1. Open the change set. See "[Locating and Viewing Details for a Change Set](#)".
2. Click **All Control Flows**.
3. Click **New**.
4. In the New Control Flow dialog box, enter the following.
 - a. In the **Name** field, a unique name for the control flow.
 - b. In the **Description** field, a short description.

5. Click **Create**.

The control flow editor places the **Start Activity** icon on the canvas.

Constructing the Control Flow

Constructing a control flow consists primarily of two operations: connecting and configuring Activities.

Connecting Activities

You construct control flow logic by connecting Activities to create a logical processing sequence for a call or multimedia session. You can create multiple branches in a control flow based on Activity outcomes such as Success, Error, Busy, No Answer, Waiting for Event, and so on.

To connect Activities:

1. Place your cursor on an unconnected exit for an Activity.

Tip: All unconnected exits are displayed in red at the bottom of the Activity icon.

2. Drag your cursor to the location where you want to place the next Activity and release it.

The Activities selection window displays.

3. Select the next Activity in the logic flow in one of the following ways:

- Use the vertical scroll bar of the Activities selection window to scroll to the Activity you want.
- Enter a search string in the Search field to filter the available Activities to those that have matching text in either their name or description.

4. Click the desired Activity to select it.

The selected Activity is placed on the control flow canvas with a line connecting it to the selected exit of the preceding Activity. The line represents the path that will be taken when that exit condition occurs.

Note: You can connect multiple exits to the selected Activity.

Note: You must terminate each branch in the control flow with an End Activity.

Tip: When you add an Activity:

- The Search display panel display is updated.
- The Changes panel updates its counter of undefined values.

5. Configure the Activity, if necessary. See "[Configuring an Activity](#)" for more information.
6. Repeat steps 1 through 5 to add additional Activities until the control flow is complete.

-
7. Click **Save**.

Configuring an Activity

To configure an Activity, you can assign it a different name, add comments to it, and specify values for the Activity's parameters.

To configure an Activity:

1. Double-click the Activity to display the Activity detail panel.
2. To change the name of the Activity:
 - a. Click the pencil icon next to the name.
 - b. Enter a unique name.
 - c. Click the check mark.

Note: OCECAS also retains the original name of the Activity for internal use.

3. To add comments or notes to the Activity:
 - a. Click the pencil icon next to **Add comments**.
 - b. Enter your comments.
 - c. Click the check mark.
4. In the **Parameters** section, provide values for each entry. See "[Configuring an Activity](#)" for more information.
5. In the **Exits** section, ensure that all exits for this Activity are connected.

About Compiling Control Flows

An editable control flow is automatically saved, validated and compiled whenever you make a change to the flow in the control flow editor. For a control flow to compile successfully, all the Activities in the control flow must contain valid configuration data and all Activity exits must be connected.

Checking for Errors

The most common causes of errors in a control flow are Activity parameters that have not been set and Activity exits that have not been connected. For more information about errors, see "[About the Changes Panel](#)" and "[About the Information Panel](#)".

The control flow editor also writes information to event detail records when a control flow is compiled. For more information, see "Understanding EDRs" in *Oracle Communications Evolved Communications Application Server*.

Reusing Control Flow Logic

You can reuse control flow logic in more than one location by using the copy and paste tools in the editing tool bar.

Important:

- The target location can be in the same control flow, in another control flow of the same change set, or in another change set.
To paste control flow logic into another change set, the target change set must be editable.
 - Configure each Activity after you paste in the target location. Ensure that all parameters and exits are defined.
-

Copying an Activity

To create a copy of an Activity:

1. In the source control flow, locate the Activity group.
2. Click the Activity to select it.
3. Right-click and select **Copy**.
4. Go to the target location.

As stated earlier, the target location for the Activity should be an editable change set.

5. Right click and select **Paste**.
6. Configure the Activity in the target location.

Copying a Group of Activities

To copy a group of connected Activities:

1. In the source control flow, locate the Activity group.
2. Move the cursor to the Activity that is the starting Activity for this group.
3. Left-click on the mouse and drag it to include the set of connected Activities.
4. Stop and release the cursor.

The set of connected Activities are selected.

5. Right-click and select **Copy**.
6. Go to the target location.

The target location for the Activity group must be an editable change set.

7. Right-click the mouse and select **Paste**.
8. In the target location, configure each Activity in the copied set.

Modifying a Control Flow

You must modify a control flow within a change set. You can either create a new change set or locate an existing change set to modify.

Note: If a change set has been deployed to the staging or production environment, you cannot modify its control flows.

Locating a Control Flow

To locate a control flow within a change set:

1. Select the change set. See "[Locating and Viewing Details for a Change Set](#)".

2. Locate the control flow in one of the following ways:

- **Click All Control Flows.**

A table displays the current set of control flows in the change set. To sort the list, click a column heading. Locate the flow.

- In the Changes panel to the right, click **Control Flows** to expand the section. Locate the flow.

3. Click the control flow entry.

The control flow opens on the editing canvas.

Modifying a Control Flow

To modify a control flow:

1. Locate the control flow in the change set. See "[Locating a Control Flow](#)".

2. Update the control flow as required. See "[Constructing the Control Flow](#)" for more information.

3. Check for errors:

- In the Differences panel to the left, review the entries under the this control flow.
- In the Changes panel, review the changes to the control flow.

4. Click **Save**.

Reverting Changes in a Control Flow

You can revert any changes that you have made to a control flow in a change set.

If you have created a new control flow in a change set, you will actually delete it—or, undo its creation.

If you have made changes to a control flow that is derived from the base change set, you discard or undo the changes. The control flow is then as it is in the base change set.

To revert changes to a control flow:

1. Locate the change set and open it. See "[Locating and Viewing Details for a Change Set](#)" for more information.

2. Do one of the following:

- Select the **All Control Flows** tab
- Click the **Control Flows** item in the Changes panel

3. Locate the control flow in the list.

Note: In the **All Control Flows** tab, control flows that display the eye icon to the far right side of the line are read-only. You cannot revert them.

4. Click the revert icon  to the right side of the control flow name to undo the changes to it.

If you are reverting a new control flow, a confirmation query displays to ask if you want to discard the control flow.

- Click **Discard** to delete the control flow.

Deleting a Control Flow

If you have not made any changes to a control flow, you will see a trash-bin icon beside it under the **All Control Flows** tab. You can click this icon to delete the control flow from the current change set. In this case, you have made a change to the control flow so you will see the revert icon beside it, which gives you a chance to revert or undo your deletion.

To delete a control flow:

1. Locate the change set containing the control flow and open it. See "[Locating and Viewing Details for a Change Set](#)" for more information.
2. Select the **All Control Flows** tab.
3. Locate the control flow in the list.
4. Click the trash-bin icon  to the right side of the control flow name.

A confirmation query displays to ask if you are sure that you want to delete the control flow.

5. Click **Delete** to delete the control flow.

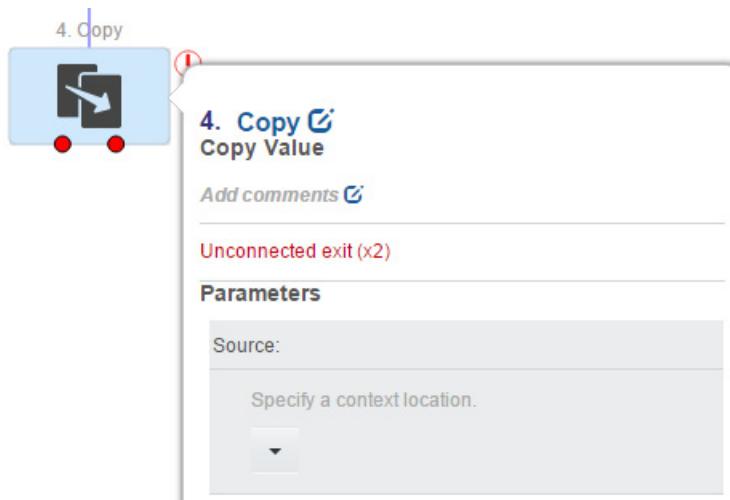
The control flow name displays with a line through it and the revert symbol appears next to it, giving you the option to restore the control flow to the change set.

If you have created a new control flow in a change set, you can delete it by reverting it. See "[Reverting Changes in a Control Flow](#)" for more information.

Working with External Concepts

External concepts consist of various data sources that you can access through Activity parameters in a control flow. For example, you could access data from the inbound or outbound message headers of a call session.

[Figure 2–1](#) illustrates how to access external concepts to set parameter values for an Activity. Double-click the Activity icon to open the configuration panel. See "[Configuring an Activity](#)" for more information on setting Activity parameters.

Figure 2–1

Click the parameter that you want to set and then click the down-arrow to open a list of context locations that reference the external concepts.

[Figure 2–2](#) illustrates the groupings and the list of external concepts.

Figure 2–2 List of Groups and External Concepts

Context Location	Type
Called-Party-Country	(String)
Called-Party-Domain	(String)
Called-Party-Global	(Boolean)
Called-Party-URI	(String)
Called-Party-User	(String)
Calling-Party-Anonymous	(Boolean)
Calling-Party-Country	(String)
Calling-Party-Domain	(String)
Calling-Party-Global	(Boolean)

Select a particular group to filter external concepts to only those that belong to the group.

Enter a keyword in the Search field to narrow the list to those entries that contain the keyword in either the concept name or the context location.

[Table 2–3](#) describes the groupings into which OCECAS organizes external concepts:

Table 2–3 External Concepts Groupings

External Concept Group	Description
Call Info	Information derived from the call, for example, the calling party and the called party.

Table 2–3 (Cont.) External Concepts Groupings

External Concept Group	Description
Chassis	Data required for chassis.
Compiled Data	Control flow data derived from compilation.
Configuration Data	Data related to the configuration. Includes, for example, the ATU-STI url, the conference factory URI, whether charging is enabled, and so on.
Diameter Field Group	Incoming and outgoing credit control messages.
EDR Field Group	Data from an Event Detail Record.
Incoming Request	Data that is presented in an incoming request, including Call-ID, Timestamp, Request-URI, and so on.
Initial Request	Data presented in the initial request in an SIP header, for example the From, Call ID, P-Asserted-Service, and so on.
Local Context	Data that has been defined in the control flow.
Notified Field Group	Data from the fields of a notification message.
Outgoing Request	Data presented in an outgoing request, for example Contact, Expires, SDP video streams, and so on.
SDP Data	Data from the Session Description Protocol.
Service Data	Data used by services or applications, including service-specific data and general data, for example, the home network ID list for VoLTE and VoWiFi service, the T-ADS preferences for SRVCC service, country-code mapping for all services, and so on.
Service Loader	External concepts that are used by bootstrap control flows such as SIP INVITE, SIP OPTIONS, and so on, to decide which sub-application or service to run.
SIP Application Session Data	Data from the SIP Application session.
User Profile	Data from the user's profile, such as HomeCountry, TimeZone, the control flow names of registered services, Language, MSISDN, STN-SR, and so on.

OCECAS uses context locations to locate information associated with a session. For example, outgoing credit control messages that are created during a session are located with the information about Multiple Services Credit Control (MSCC) at /Diameter/Outgoing/MSCC.

You can also add a local context external concept to a control flow.

Adding an External Concept

You can add a local context external concept when you configure an Activity that accepts an external concept as a parameter value.

To add an external concept to a control flow:

1. Open the control flow.

See "[Locating a Control Flow](#)" for more information.

2. Double click the Activity whose parameter requires the external concept.

The configuration panel opens.

3. Click the parameter you want to set.

- A dialog box displays the groups and a list of the external concepts.
4. Click **Add....** See [Figure 2–2](#) for an example.
The Add External Concept dialog box displays.
 5. Enter the information to describe the external concept.
 - a. In the **Name** field, enter a unique name for the concept. Name must be alphanumeric characters plus -, _, and space.
 - b. In the **Path** field, specify the location of the runtime data, beginning with **/Local/**. For example:
`/Local/new_concept_name`
Path must be alphanumeric characters plus -, _, and /.
 - c. For the **Data Type** field, select from **String**, **Integer**, **Float**, **Boolean**, **Date**, **MapArray**, **StringArray**, **Integer Array**, and **FloatArray**.
 6. Click **Confirm**.
The external concept is added and displays as a selection in the Local group.

About Charging Concepts

Charging concepts consist of data that results from some calculation such as the number of used units since the last request, or data that the Activities need to know explicitly, such as the validity time of the granted quota. OCECAS generates this information when it is required for an outgoing message or a message receipt. You normally use the request or response message template to copy these values to or from the context map for the session.

Working with Charging Templates

You need to reference the appropriate values for the **Request Template** and **Answer Template** parameter when you define the following Activities:

- **Start Charging Session**
- **Event Charge**
- **Update Charging Session**
- **End Charging Session**

For the template parameters, OCECAS provides four Charging templates called **ACAnswer**, **ACRequest**, **CCAnswer**, and **CCRequest**. Select a corresponding template for the Activity.

3

Working with Resources

This chapter describes how to use Session Design Center (SDC) resources in Oracle Communications Evolved Communications Application Server (OCECAS).

For an overview of OCECAS resources, see "About Resources" in *Oracle Communications Evolved Communications Application Server Concepts*.

About Working with Resources

OCECAS resources consist of data that you can use in control flows. These resources consist of data sets, announcements, notifications, and web services. [Table 3–1](#) describes the four categories into which resources are divided:

Table 3–1 OCECAS Resource Categories

Resource Category	Description
General	The General resource category consists of the Locales data set. Locales serve to identify the location and language for originating and terminating endpoints in a call. See " Working with Locales " for more information.
Media	The Media resource category consists of media resources, which are announcements, and the servers where they reside. See " Working with Media Resources and Servers " for more information.
Numbers	The Numbers category consists of prefix trees, including the default CountryCodePrefixTree, which maps global prefixes and country codes. See " Working with Prefix Trees " for more information.
Templates	The Templates category consists of the following types of templates: <ul style="list-style-type: none">▪ Notifications<ul style="list-style-type: none">A template that you can use in a control flow to generate a runtime notification.▪ Web Services<ul style="list-style-type: none">A template to describe how to access a web service.▪ Import WSDL<ul style="list-style-type: none">The Web Service Description Language import template enables you to create web services templates from content that has been imported from WSDL files. See " Working with Templates " for more information.

Working with Locales

Locales are used to specify the language used in media resources such as announcements. A locale consists of a country code and a language code and also identifies the originating or terminating location in a voice call or multimedia session.

About the Default Locale Data

The VoLTE and VoWiFi application supports a default set of locales. To access the default locales, select **View Application Configuration** on the SDC home screen, then click the **Resources** tab and select Locales in the General category.

Each locale consists of the following data elements:

- **Name**

The name of the language, such as Japanese. The name also allows for regional differentiation, such as Spanish (Mexico), Spanish (Guatemala), Spanish (Colombia) and so on.

- **Description**

The description entry allows for a more detailed description of the locale.

- **Language code**

The two letter language code that specifies the language, regardless of region. For example, es is the language code for Spanish, including Spanish (Mexico), Spanish (Guatemala), Spanish (Colombia) and so on. The language code is based on the ISO 639 standard.

- **Country code**

The two letter country code, for example, MX for Mexico, GT for Guatemala, JP for Japan, and so on. The country code is based on the ISO 3166 standard.

Adding a Locale

You can add a locale to a change set that is not yet deployed.

To add a locale to a change set:

1. Select the change set. See "[Locating and Viewing Details for a Change Set](#)".
2. On the page for the change set, click **All Resources**.
3. In the General category, click **Locales**.

This displays the set of existing locales.

4. Click **New**.

A dialog box opens, containing the fields Name, Description, Language Code, and Country Code.

5. Enter the information required to define the locale.
6. Click **Save**.

Working with Media Resources and Servers

OCECAS requires a media server from which it can access media resources, such as the announcements it must play to the parties in a call session. The VoLTE and VoWiFi application provides sample media resources that are associated with a sample media

server named VoLTE. To use these samples you must first configure them for your site. For example, you must update the driver of the example media server to match what you have. You must also update the .wav file locations of the sample media resources to match your actual media server configuration.

To add a media server, see "[Adding a Media Server to a Change Set](#)" for more information.

To add needed announcements and store them on a media server, see "[Adding a Media Resource to a Change Set](#)" for more information.

About Using Media Resources

A media resource is used when the control flow for a call session initiates it.

To initiate the use of a media resource in a control flow, add either the **Start Playing Media** or **Start Recording Media** Activity. These Activities require you to specify a session endpoint, which is one of the following: Initiating Endpoint, Destination Endpoint, Event Source or Conference Endpoint. To play an announcement to the caller who started the session, for example, select Initiating Endpoint. You must also specify a language by entering it, or by requesting the program to select it from context. In the latter case, OCECAS uses the language parameter that is configured in the user profile under **/UserData/Subscriber/Profile** in the user database repository. Additionally, you select a media resource from the list of available media resources and specify how long the resource must play.

At run-time the request that is sent to the media server is constructed from the selected endpoint, the user's chosen language, and the configuration of the selected media resource. The list of .wav files specified for the user's language (locale) is sent to the media server in the request. The media server responds by playing the specified .wav files to the user.

As for recording a message, you might want to record a greeting message when your are unable to answer a call. You could also want to record a notification when you start a conference to tell callers what the conference is about?

About the Sample Media Resources

OCECAS provides the following sample media resources:

- **HoldMusic**
VoLTE Hold Music announcement
- **ICBMessage**
VoLTE Incoming Call Barred Message announcement
- **OCBMessage**
VoLTE Outgoing Call Barred Message announcement
- **SessionEndedMessage**
VoLTE Session Ended Message announcement

To use these sample resources, you must update the definitions to apply to your site. See "[About the Media Resource Data](#)" for more information.

Adding a Media Resource to a Change Set

To add a media resource to a change set:

1. Select the change set. See "[Locating and Viewing Details for a Change Set](#)".
2. On the page for the change set, click **All Resources**.
3. In the displayed selection, click **Media Resource**.
The page displays the set of default media resources that are available.
4. Click **New**.
A dialog box opens.
5. Enter the required information in the dialog box. See "[About the Media Resource Data](#)".
6. Click **Save**.

About the Media Resource Data

[Table 3–2](#) lists the data required to define a media resource.

Table 3–2 Media Resource File Data

Entry	Description
Name	A required field. Enter a unique name.
Description	Enter a description of the media resource.
Resource Type	Specify the resource type as one of the following: <ul style="list-style-type: none"> ▪ Play ▪ Record ▪ Collect
Media Server	The name of the media server. See " Adding a Media Server to a Change Set " for information on adding a media server. OCECAS includes a sample media server called VoLTE that you can use as an example.

Each media resource has zero or more parameters that you populate when you use the resource in a control flow. Consequently, when you create the resource, each parameter is a placeholder so you only need to specify its name and type, along with an optional description. The control flow editor allows you to specify a value for each parameter when you select the resource within a control flow.

[Table 3–3](#) lists the entries to define a media resource parameter:

Table 3–3 Media Resource Parameters

Entry	Description
Name	A unique parameter name.
Data Type	The parameter's data type. Select one of the following types: <ul style="list-style-type: none"> ▪ String ▪ Integer ▪ Float ▪ Boolean ▪ Date
Description	A description of the parameter.

You must also specify the locales that the media resource supports. For each locale you specify an ordered list of media files that will be played to the user when the media resource is used. The locale is selected at run-time based on user preference; if not known, the Default locale is selected. See "Media Files for Media Resources" for more information.

Media Files for Media Resources

For each locale, you specify a list of URIs. The media server uses the URI to locate a file or resource to play. Each URI is configured as a combination of a protocol that you select from a drop-down list and a body that you enter, which names the file.

The supported protocols associated with the retrieval of the resource are:

- **file://**, to use with a resource on the file system of the media server.
- **http://**, to use with a resource to be retrieved over HTTP by the media server.
- **https://**, to use with a resource to be retrieved over HTTPS by the media server.
- **data://**, to use data URI encoding scheme to include snippets of data directly. For information about the URI data encoding scheme, see
<https://tools.ietf.org/html/rfc2397>
- **other://**, to use when you specify the entire URI, including the protocol.

OCECAS forms the URI by combining the selected protocol with the text that you enter in the body (which names the file). For example, selecting **file://** and entering `//hello/there.wav`, results in the URI: `file:///hello/there.wav`. For **other://**, if you specify text in the body as `xyz://joe@bloggs.com/foo`, then the uri will be `xyz://joe@bloggs.com/foo`.

At run-time the locale is selected based on user preference; if not known the Default locale is selected.

Specifying the Default Locale

To specify the Default locale:

1. Click Default.
2. Click New.
3. Select a protocol from the drop-down list.
4. Enter a body to specify the location and name of the media file.
5. Repeat steps 2 through 4 to add URIs for additional media files.

Specifying Other Locales

To specify other locales:

1. Click the plus sign (+) next to Locales.
2. Select a locale from the drop-down list.
3. Click Add.

To add media files for this locale:

1. Click New.
2. Select a protocol from the drop-down list.
3. Enter a body to specify the location and name of the media file.

4. Repeat steps 1through 3 to add URIs for additional media files.

Updating the Setup for a Media Resource

To view the setup for a media resource:

1. Select the change set. See "[Locating and Viewing Details for a Change Set](#)".
 2. On the page for the change set, click **All Resources**.
 3. In the displayed selection, click **Media Resource**.
- The page displays the set of available media resources.
4. Click the entry for the resource.
- A dialog box opens.
5. Update the data in the dialog box. See "[About the Media Resource Data](#)".
 6. Click **Save**.

Working with Media Servers

OCECAS does not deliver a media server. However, it organizes the media servers you configure into groups.

About the Sample Media Server

In order to enable media resources to be played to users, you need to integrate the media servers you want to use with OCECAS. To do so, determine the appropriate driver string and URI from your media server vendor. OCECAS provides a sample media server named VoLTE with a sample configuration consisting of Jsr309TestDriver as the driver and a sample environment with URI configured as file:test/driver. It uses the following context map to specify the location:

domain_home/MediaServer/Production/VoLTE

where, *domain_home* specifies the runtime domain in your installation.

About the Media Server Data [Table 3–4](#) lists the data required to define a media server.

Table 3–4 Media Server Data

Field	Entry	Description
Details	Name	A required field. Enter a unique name.
Details	Description	Enter a description.
Driver	Interface type	Select: <ul style="list-style-type: none"> ▪ name: to enter the driver name. ▪ jndi: to enter Java Naming and Directory Interface (JNDI).

Table 3–4 (Cont.) Media Server Data

Field	Entry	Description
Environments	All (Default)	<p>The list of environments specified for this server.</p> <p>To add an environment:</p> <ol style="list-style-type: none"> 1. Click New. 2. Enter the name of the environment. For example, Default, Testing, Staging, Production. 3. For the media server URI: Select the type of media server from file://, http://, https://, data:, and other:. In the adjoining field enter the path name to the location of the media server file. <p>Use the trash can icon to delete a row entry.</p>
Parameters	Collect	<p>To add a Collect parameter:</p> <ol style="list-style-type: none"> 1. Click New. 2. In the Name field, enter the name of the parameter. 3. In the Data Type field, select from String, Integer, Float, Boolean, and Date. <p>Use the trash can icon to delete a row entry.</p> <p>OCECAS provides the following Collect parameters:</p> <ul style="list-style-type: none"> ■ Max Duration: Integer ■ Initial Digit Timeout: Integer ■ Buffer Digit Collection: Boolean ■ Barge In: Boolean

Table 3–4 (Cont.) Media Server Data

Field	Entry	Description
Parameters	Play	<p>To add a Play parameter:</p> <ol style="list-style-type: none"> 1. Click New. 2. In the Name field, enter the name of the parameter. 3. In the Data Type field, select from String, Integer, Float, Boolean, and Date. <p>Use the trash can icon to delete a row entry.</p> <p>OCECAS provides the following Play parameters:</p> <ul style="list-style-type: none"> ▪ Max Duration: Integer ▪ Repeat Count: Integer ▪ Repeat Interval: Integer ▪ Queue Announcement: Boolean
Parameters	Record	<p>To add a Record parameter:</p> <ol style="list-style-type: none"> 1. Click New. 2. In the Name field, enter the name of the parameter. 3. In the Data Type field, select from String, Integer, Float, Boolean, and Date. <p>Use the trash can icon to delete a row entry.</p> <p>OCECAS provides the following Record parameters:</p> <ul style="list-style-type: none"> ▪ Max Duration: Integer ▪ Min Duration: Integer ▪ Append Recording: Boolean ▪ Start Beep: Boolean ▪ Start in Paused Mode: Boolean ▪ Stop on Silence: Boolean ▪ Initial Timeout: Integer ▪ Final Timeout: Integer
Parameters	Conference	<p>To add a Conference parameter:</p> <ol style="list-style-type: none"> 1. Click New. 2. In the Name field, enter the name of the parameter. 3. In the Data Type field, select from String, Integer, Float, Boolean, and Date. <p>Use the trash can icon to delete a row entry.</p> <p>OCECAS provides the following Conference parameters:</p> <ul style="list-style-type: none"> ▪ Max Ports: Integer ▪ Max Active Inputs: Integer

Adding a Media Server to a Change Set

To add a media server to a change set:

1. Select the change set. See "[Locating and Viewing Details for a Change Set](#)".
2. On the page for the change set, click **All Resources**.
3. In the displayed selection, click **Media Server**.

The page displays the set of default locales.

4. Click **New**.

A dialog box opens.

5. In the dialog box configure the media server data. See "[About the Media Server Data](#)".
6. Click **Save**.

Updating the Setup for a Media Server

To view the setup of a media server for a change set:

1. Select the change set. See "[Locating and Viewing Details for a Change Set](#)".
2. On the page for the change set, click **All Resources**.
3. In the displayed selection, click **Media Server**.
The page displays the set of default locales.
4. In the **Name** column, locate the entry for the resource. Click the entry.
A dialog box opens.
5. In the dialog box update the media server configuration. See "[About the Media Server Data](#)".
6. Click **Save**.

Working with Prefix Trees

Prefix trees in OCECAS contain mappings between global prefixes and country codes.

About the Default Prefix Tree

OCECAS provides a default prefix tree, **CountryCodePrefixTree**. This tree is located at **/PrefixTree/Global/CountryCodePrefixTree**. Each branch in this tree consists of a three-letter country code and its dialing code prefix. For example, ALB: 355 represents the country calling code for Albania.

Prefix tree data is stored in the **sdc_service_data** table in the management domain (the Session Design Center domain).

A prefix can include multiple countries. For example, the prefix 1 includes the USA, Canada, Puerto Rico, and the Dominican Republic. **CountryCodePrefixTree** displays the following for Puerto Rico.

- **PRI** : No prefix
 - **Eastern** : 1787
 - **Western** : 1939

In this case, the prefix 1 is built into the full prefixes for the children **Eastern** and **Western**.

About the Prefix Tree Data

[Table 3-5](#) lists the data required to define a prefix tree.

Table 3–5 Prefix Tree Data

Entry	Description
Name	Required. Enter a unique name for the prefix tree.
Key	Enter the key. The default entry is /PrefixTree/Global . This is the service data key. An entry with the same key value is also stored in the sdc_external_concept table and is accessible when you reference the prefix tree in an Activity.
Description	Enter a description for the prefix tree.
Prefix Tree	The prefix tree with its branches. You can add branches to the prefix tree. See " Adding to a Prefix Tree ".

Creating a Custom Prefix Tree

To create a custom prefix tree for a change set:

1. Select the change set. See "[Locating and Viewing Details for a Change Set](#)".
2. On the page for the change set, click **All Resources**.
3. In the Numbers category, click **Prefix Trees**.
The page displays the defined prefix trees.
4. Click **New**.
A dialog box opens.
5. In the dialog box enter the prefix tree information as described in "[About the Prefix Tree Data](#)".
6. Click **Save**.

Adding to a Prefix Tree

You can create a new branch for a prefix tree and you can append a new child to a branch.

To append a new branch to prefix tree:

1. Select the change set. See "[Locating and Viewing Details for a Change Set](#)".
2. On the page for the change set, click **All Resources**.
3. In the Numbers category, click **Prefix Trees**.
The page displays the defined prefix trees.
4. To access a specific prefix tree, click on its name under **Name**.
5. Click the + sign next to the Prefix Tree icon at the top of the tree.

Tip: You must move the cursor over the Prefix Tree icon for + and - signs to appear.

The Append a New Branch dialog box opens.

- a. In the **Branch Name** field, enter the name for the new branch.
- b. Do one of the following:

Leave **Prefix Digits** empty to create a branch with no prefix. Do this if you want to add children with unique new prefixes to the new branch.

Or

Enter a prefix for the branch in the **Prefix Digits** field.

- c. Click **Append**.
6. Click **Save**.

To append a new child to an existing prefix branch:

1. Select the change set. See "[Locating and Viewing Details for a Change Set](#)".
 2. On the page for the change set, click **All Resources**.
 3. In the Numbers category, click **Prefix Trees**.
- The page displays the defined prefix trees.
4. To access a specific prefix tree, click on its name under **Name**.
 5. In the prefix tree, locate the branch to which you want to append a child.
 6. Click the + sign next to the branch.

Tip: You must move the cursor over the branch for + and - signs to appear.

The Append a New Branch dialog box opens.

- a. In the **Branch Name** field, enter the name for the new child branch.
- b. Do one of the following:

Leave **Prefix Digits** empty to create a branch with no prefix. Do this if you want to add one or more children with unique prefixes to the new branch.

Or

Enter a prefix for the branch in the **Prefix Digits** field.

Note: If the parent has a prefix, the child prefix is appended. For example, if the parent has a prefix of 3 and you enter 16, the prefix for the child will be 316.

- c. Click **Append**.
7. Click **Save**.

Removing a Branch from the Prefix Tree

You can remove a branch from a prefix tree. When you do so, OCECAS removes all the children of that branch.

To remove a branch and all of its children from a prefix tree:

1. Select the change set. See "[Locating and Viewing Details for a Change Set](#)".
 2. On the page for the change set, click **All Resources**.
 3. In the displayed selection, click **Prefix Trees**.
- The page displays the defined prefix trees.
4. To access a specific prefix tree, click on its name under **Name**.
 5. In the prefix tree, locate the branch that you want to remove.
 6. Click the - icon next to the branch.

Tip: You must move the cursor over the branch for + and - signs to appear.

A dialog box opens to confirm that you want to remove the specified branch.

7. Click Remove.

Working with Templates

OCECAS supports the use of templates to build the message bodies of outgoing messages. All Activities associated with an outgoing message reference a message template. You can create templates to generate the message structure, and use the Activities in the control flow to determine when messages are sent.

A web service is treated as template because a web service location is closely tied to the message content. The template, therefore, defines the message body, but also aspects of the message destination.

Message templates are stored as service data. OCECAS groups templates in logical sets in an hierarchy, making them easy to locate. Each template describes a single message. The data includes the user-friendly name given to the template, the parent template set, the message body determined by the locale, and the message type such as plain text, or XML.

You can configure an Activity by update the templates it uses at runtime. The variable parts inserted at runtime are identified by name and type, such as string and a description. A runtime check verifies the content of the message body. Use the control flow editor to create them at the point of use.

About the Default Notification Template

OCECAS provides a default notification template called **AccessTransferInformation**. [Example 3-1](#) shows the template definition.

Example 3-1 Default Notification Template Syntax

```
<?xml version="1.0" encoding="UTF-8"?>
<SRVCC-infos>
<SRVCC-info ATCF-Path-URI="${ATCFPathUri}">
<ATU-STI>${AtuSti}</ATU-STI>
<C-MSISDN>${CMsisdn}</C-MSISDN>
</SRVCC-info>
</SRVCC-infos>
```

Here:

- ATCF-Path-URI is the ATCF path URI
- ATU-STI is the address of the SCC application server
- C-MSISDN is the correlation Mobile Station International Subscriber Directory Number (MSISDN) for the sessions associated with this user.

In runtime, the access transfer information sent from an example SRVCC application server to the access transfer control function (ATCF) contains the following:

Example 3-2 RunTime Example Notification Data

```
<?xml version="1.0" encoding="UTF-8"?>
<SRVCC-infos>
```

```

<SRVCC-info ATCF-Path-URI="sip:termsdgfdfwe@actf.visited2.net">
  <ATU-STI>sip:sccas1.home1.net</ATU-STI>
  <C-MSISDN>tel:+1-237-555-1111</C-MSISDN>
</SRVCC-info>
</SRVCC-infos>

```

Working with Notification Templates

All Activities associated with an outgoing message reference a message template. You can create a Notification template through the All Resources menu

About the Notification Template Data

[Table 3–6](#) lists the data required to define a notification.

Table 3–6 Notification Template Data

Field	Entry	Data
Details	Name	A required field. Enter a unique name.
Details	Description	Enter a description.
Parameters	Name	Each notification definition may have zero or more parameters that will be used by a control flow to populate a locale specific template Enter a unique name.
Parameters	Data Type	Select the data type for this resource from String , Integer , Float , Boolean , Date , MapArray , StringArray , Integer Array , and FloatArray .
Parameters	Description	Enter a description for the parameter.
Locales	Locales that the resource supports	The list of locales. The first entry in the list is Default . Each locale is configured with a template that is used by a control flow to generate the contents of an end user notification. Click on a locale listed under Locales . Update the template definition. To add another locale: <ol style="list-style-type: none"> 1. Click +. 2. Select another locale from the displayed list. 3. Click Add. 4. Repeat, to add another locale. 5. Click Save.

Adding a Notification Template

To add a notification template to a change set:

1. Select the change set. See "[Locating and Viewing Details for a Change Set](#)".
 2. On the page for the change set, click **All Resources**.
 3. In the displayed selection, click **Notifications**.
- The page displays the set of notification templates.
4. Click **New**.
- A dialog box opens.
5. In the dialog box configure the notification template data. See "[About the Notification Template Data](#)".

6. Click **Save**.

Updating a Notification Template

To update a notification template to a change set:

1. Select the change set. See "[Locating and Viewing Details for a Change Set](#)".
2. On the page for the change set, click **All Resources**.
3. In the displayed selection, click **Notifications**.
The page displays the set of notification templates.
4. Click on the notification template.
A dialog box opens.
5. In the dialog box update the notification template data. See "[About the Notification Template Data](#)".
6. Click **Save**.

Working with Web Services Templates

The need to query external data sources using standard methods of exchanging information, such as SOAP or JSON, is fairly common. For example, you might need to affect session flow by querying for information on another system regarding products or subscribers. You might, for example, have a service that requires you to securely authenticate a credit card payment. Or you might have a location server that you can query to find out where a call originated and you want to use that to determine the location where the call should be terminated.

By creating web service templates, you can access services that are implemented on external servers and map data to and from a session. When you successfully create a web service template, it becomes available as a selection for an Activity that requires a web service template, such as the Run Web Service Activity.

You can create a Web Service template either by creating the template manually or by importing a WSDL file.

Creating a Web Service Template Manually

To create a Web Service template manually:

1. Select the change set. See "[Locating and Viewing Details for a Change Set](#)".
2. Click the **All Resources** tab.
3. On the **All Resources** menu, click **Web Services**.
4. On the Web Services templates page, click **New** to create a new template.
A dialog displays with links for three pages: Details, Parameters, and Template.
5. On the first page, Details, enter a name for the template and, optionally, a description.
6. Click **Parameters** to enter any template parameters.

These parameters specify the variable parts to be completed when the Run Web Service Activity is selected and configured in a control flow.

7. Click **New** and then enter a name, data type, and description for the parameter.
For example:

- Name: key
 - Data Type: String
 - Description: The value to search for
8. Repeat step 7 for each template parameter that you need to enter.

Note: To delete a parameter, click the trash-can icon next to that row.

9. Click Template to enter the web service template. For example:

```
<myService>
  <key xsi:type='xsd:string'>{$key}</key>
  <text xsi:type='xsd:string'>{$text}</text>
</myService>
```

10. Click Save to save the template.

Note: You can click Save at any time while creating a template to save what you have defined.

You can also create a Web Service template by importing a WSDL file to the server.

Importing a WSDL File

To import a WSDL file to create a Web Service template:

1. Select the change set. See "[Locating and Viewing Details for a Change Set](#)".
2. Click the **All Resources** tab.
3. On the All Resources menu, click **Import WSDL**.
4. In your file system, locate the **.wsdl** file that you want to import and click **Import WSDL**.

The name of the imported WSDL file, along with its size, status and time of day are listed on the page.

The names of the services made available are displayed under the WEB SERVICES category in the Changes panel.

4

Working with Change Sets

This chapter describes how to create, manage, and deploy change sets in Oracle Communications Evolved Communications Application Server (OCECAS).

See “About Control Flows” and “About Change Management” in *Evolved Communications Application Server Concepts* for an overview of change sets and the change management process.

Managing Change Sets

Change sets are collections of configuration and control flow changes. You create them using the **Open Projects** section of the Session Design Center home page. Change sets are also known as *projects*.

To activate a change set, you first deploy it to the **Testing** environment for testing and make any changes required. Once satisfied that it does what you intend, you then deploy the change set to the **Staging** and **Production** environments. The change set can not be modified after you deploy it to **Staging** or **Production**. If there are errors in a change set deployed in the **Staging** or **Production** environments, you can retract it, create a new corrected change set, and deploy the corrected change set in its place.

When you create a change set, you specify a baseline change set to which you are making the changes. The original baseline change set for OCECAS is the **VoLTE, VoWiFi and eSRVCC** change set, which consists of the VoLTE and VoWiFi application. As you continue to create change sets over time, you correspondingly increase the number of potential baseline change sets. The baseline change set is referred to as the *parent* and the new change set is the *child*.

This chapter assumes that you have an OCECAS Session Design Center GUI running.

Creating a Change Set

To create a change set:

1. On the **Home** page of Session Design Center, click **View All Projects**.
2. Click **New**.
The New Change Set dialog box displays.
3. In the **Name** field, enter a unique name.
4. In the **Description** field, enter a short description.
5. To provide a base line for the change set, click the list for **Baseline**. Select a base line.
6. Click **Create**.

Session Design Center creates a change set ID for the new change set and displays it and the name of the change set at the top of the page.

To add a control flow to the change set, or to modify a control flow, see "[Working with Control Flows](#)".

To deploy the change set to the production pipeline, see "[Deploying Change Sets](#)."

Locating and Viewing Details for a Change Set

To locate a change set, do one of the following:

- If the change set is not yet deployed to a runtime environment, Session Design Center displays the change set below **Open Projects**.
- If the change set is not among the recent entries:

Click **View All Projects**.

To search for a change set, enter its ID in the **Search** field, or start entering a string. As you type, the string filters the display to show only the change sets with a matching string in either the name or the description.

You also filter the display using the **Filter:All/Open/Deployed** buttons.

Click the change set.

If a change set is in **Open Projects**, or deployed to the **Testing** environment, a pencil icon displayed to the right side of a change set indicating that the change can be edited. An eye icon indicates that the change set is deployed and is available only to view.

Click a change set row to view its details. The row expands to display any description of the change set, the date and time the change set was created, and the name of the baseline change set. Click **Edit Details** to change this information.

Modifying a Change Set

You can modify a change set if its deployment status is **open** or it is deployed to **Testing**, and it has not yet been deployed to staging or production. Some of the ways in which you can modify a change set are:

- Modifying the baseline for a change set. See "[Modifying the Baseline for a Change Set](#)".
- Modifying a control flow in the change set. See "[Modifying a Control Flow](#)".
- Adding a control flow to the change set. See "[Creating a Control Flow](#)".
- Removing a control flow from the change set. See "[Reverting Changes in a Control Flow](#)".

You can also modify a change set in other ways, such as adding media resources, media servers, and notification templates.

Modifying the Baseline for a Change Set

To modify the baseline for a change set:

1. On the **Home** page, click **View All Projects**.
2. Locate the change set. See "[Locating and Viewing Details for a Change Set](#)".
3. Click the arrow to the left of the change set name to expand the details.

4. Click **Edit Details**.
5. For the **Baseline** field, select a different entry.
6. Click **Save**.

Viewing the Changes to a Change Set

To view the changes to a change set:

1. On the **Home** page, click **View All Projects**.
2. Locate the change set. See "[Locating and Viewing Details for a Change Set](#)".
3. Click on the icon in the last column of the row containing the change set.

Tip: A view icon is displayed for a deployed change set and an edit icon for an open change set.

Deploying Change Sets

The **View Environment Configuration** link in the **Environments** section of the landing page displays the runtime environments configured for your OECAS installation.

About the Deploying to the Production Pipeline

For an overview of the OECAS pipeline, see "About Change Management and the Production Pipeline" in *Evolved Communications Application Server Concepts*.

The production pipeline includes the runtime environments in this order:

1. Testing
2. Staging
3. Production

Change sets become active in an environment when they are deployed in the environment. [Table 4-1](#) shows the possible actions you can take on change sets in a runtime environment.

Table 4-1 Actions Available in the Environments

Action	Testing	Staging	Production
Edit	Available, if it has not been deployed. Retracted change sets are also not available for editing.	Not Available	Not Available
Deploy	Available. You can deploy a change set to the staging environment.	Available. You can deploy a change set to the production environment.	Not Available

Table 4–1 (Cont.) Actions Available in the Environments

Action	Testing	Staging	Production
Retract	Available. A change set can be retracted from the testing environment.	Available. A change set can be retracted from the staging environment.	Available. A change set can be retracted from the production environment.
Redeploy	Available. A retracted change set can be redeployed into the testing environment.	Available. A retracted change set can be redeployed into the staging environment.	Available A retracted change set can be redeployed into the production environment.
Remove	Available, if it has not been deployed.	Not available	Not available

Deploying a Change Set

This section assumes that you have a Session Design Center GUI up and running with a change set created but not deployed. See "[Creating a Change Set](#)" for details.

Before you can deploy a change set, review it to ensure that the change set compiles correctly. The **Changes** panel for the change set should not display any error messages.

When you deploy a change set, you can choose to deploy it immediately or specify a later date and time. Once a change set is deployed to the staging or production environment the contents cannot be edited. See "[Correcting Problems in Deployed Change Sets](#)".

Deploying a Change Set to the Testing Environment

To deploy a change set to the **Testing** environment:

1. In the **Home** page, click on **Environment Configurations**.

The Environments page displays the **Open Projects** panel, the **Testing**, **Staging** and **Production** environment entries.

2. In the **Open Projects** panel, locate the change set.
3. Place your cursor on the change set. The arrow changes to a cross to indicate you have selected it.
4. Select and drag the change set to the **Staging** environment. Release the cursor.

The **Deploying CS-** dialog box opens.

5. Specify when to activate the change set. Select one of:
 - **Activate immediately**
 - **Schedule for activation** on

Enter the date as *YYYY-MM-DD*. use the up and down arrows to provide the hour and minute as *HH:SS*.

6. Click **Confirm**.

When the change set becomes active it is automatically checked for compile errors. It must be error-free before you deploy it to the **Staging** environment.

Deploying a Change Set to the Staging or Production Environment

Before you deploy a change set to staging or production environments, test and confirm that it performs correctly. Once deployed to the staging or production environments you can not edit the change set, only retract it.

To deploy a change set into the next runtime environment in a pipeline:

1. In the **Home** page, click **View Environment Configurations**.

The **Environments** page displays the **Open Projects** panel, and the **Testing, Staging and Production** environments.

2. Select the change set to deploy.
3. Click on the arrow on the right side of the change set.
4. Do one of the following.
 - If you are in the testing environment, select **Deploy to Staging**.
 - If you are in the staging environment, select **Deploy to Production**.

The **Deploying CS-** dialog box opens.

5. Specify when to activate the change set. Select one of:
 - **Activate immediately**
 - **Schedule for activation on**
Enter the date as *YYYY-MM-DD*. use the up and down arrows to provide the hour and minute as *HH:SS*.
6. Click **Confirm**.

Correcting Problems in Deployed Change Sets

This section explains how to correct a changes set if it is not working as expected. You have these choices for correcting change sets:

- For minor issues, create a new change set that fixes the problem, then retract the bad change set and deploy the new one. See "[Correcting a Change Set Without Stopping Service](#)".
- If you want to disable the service immediately, *retract* the bad change set first, and then replace it with a corrected version. See "[Correcting a Change Set by Removing the Service Immediately](#)".

A parent change set must be deployed in the testing, staging or production environment in order for the child change set to de deployed in that environment.

Correcting a Change Set Without Stopping Service

You can fix minor change set problems in the background without deactivating that change set. This method applies to issues that are not causing major problems.

To fix a problem without disrupting service:

1. In **Open Projects**, create a new change to replace the one with the problem. See "[Modifying a Change Set](#)."
2. Retract the change set with the problem.
3. Deploy the corrected change set into the staging environment, and then into the production environment. See "[Deploying a Change Set](#)."

Correcting a Change Set by Removing the Service Immediately

To fix a problems that must be resolved by removing the service immediately, retract the change set from the production environment. Then create a replacement change set and deploy it. The idea is to have a replacement ready, or nearly in time to maintain quality of service.

To disable a change set immediately and replace it:

1. From the **Home** page, click **View Environment Configuration**.
1. The **Environments** page displays the **Open Projects** panel with the **Testing**, **Staging**, and **Production** entries.
1. Retract the change set. See "[Retracting a Change Set](#)" for details.
2. In **Open Projects**, create a new change to replace the one with the problem. See "[Modifying a Change Set](#)."
3. Test the change set.
4. Deploy the corrected change set to the staging, and then production environments. See "[Deploying a Change Set](#)".

Retracting a Change Set

To retract a change set from the appropriate runtime environment:

1. From the **Home** page, click **View Environment Configuration**.
The **Environments** page displays the **Open Projects** panel with the **Testing**, **Staging**, and **Production** entries.
2. Locate the change set to retract. See "[Locating and Viewing Details for a Change Set](#)."
3. Click the arrow on the right side of the change set.
4. Select **Retract**.

The change set is no longer active in that environment. OCECAS displays the retraction date and time.

Redeploying a Change Set

If you decide that a retracted change set should be returned to service, you can redeploy it. Redeploying uses the same mechanism as deploying.

Note: before you redeploy a change set, verify that the base line for such a change set is one that is deployed in that environment and does not have issues.

To redeploy a change set into an environment:

1. In the **Home** page, click on **Environment Configurations**.
The Environments page displays the **Open Projects** panel, the **Testing**, **Staging** and **Production** environment entries.
2. Select the change set to redeploy.
3. Click on the arrow to the right of the change set.
4. Select **Redeploy**.

5

Working with Subscriber Data

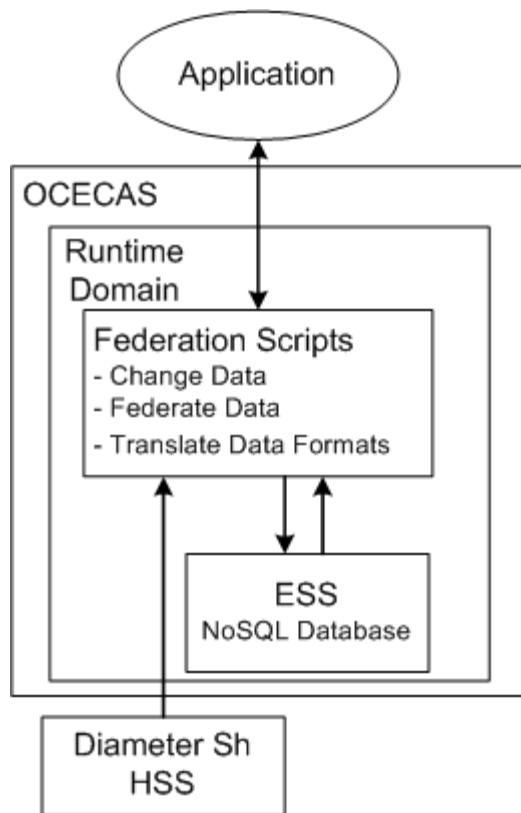
This chapter explains how Oracle Communications Evolved Communications Application Server (OCECAS) stores subscriber information and how applications retrieve that data. It includes a description of the default subscriber data store configuration, and explains how you can customize it for your implementation.

See “About Managing Subscribers and Subscriber Data” for an overview of how OCECAS stores subscriber data records.

Understanding Configuring Subscriber Data Stores

OCECAS uses a configurable *view* to federate various data stores. The view is aware of the data storage location and format, the format expected by the application, and uses federation scripts to translate between the two. If you use subscriber data from multiple data sources, you use the view to adjust for the different data formats and translate it into a format that the calling application can use.

[Figure 5–1](#) shows how OCECAS uses data stores in a single view. OCECAS accepts subscriber data from an external HSS and an internal ESS NoSQL database.

Figure 5–1 OCECAS Data Stores

If you use the default ESS inside an OCECAS runtime domain, the views and their Groovy federation scripts are loaded each time you start the runtime domain. If you locate the ESS inside the runtime domain using the dedicated UDR domain, the views and their federation scripts are loaded each time you start the runtime domain.

If you need to, you can also change the federation instructions during runtime. See ["Updating Federation Script Behavior During Runtime"](#) for details.

Accessing SRVCC Data from the Data Stores

OCECAS generally accesses these subscriber date fields to support Single Radio Voice Call Continuity (SRVCC) features:

- To obtain the IMS Voice Over Packet-Switched-Session Support indicator, which indicates whether the subscriber is currently waiting on an IMS Voice over packet-switched-capable access.
- To obtain or update the Session Transfer Number.

About Configuring OCECAS Data Stores

The procedures in this chapter assume that you have already installed OCECAS and your ESS NoSQL database and completed the post-installation tasks in these sections of *Oracle Communications Evolved Communications Application Server Installation Guide*:

- Setting up OCECAS for Subscriber Data
- Post-Configuration Tasks for your UDR Domain

If the applications that your OCECAS serves only need to read data, use the instructions in "[Adding an HSS Subscriber Data Store](#)" to configure your data stores.

The ESS NoSQL database you installed during installation requires more configuration. See "[Advanced Configuration of Your ESS Subscriber Data Store](#)" to set up the ESS.

If your OCECAS implementation requires that you use a different ESS than the default, see "[Replacing the ESS NoSQL Database](#)" for instructions.

If your OCECAS implementation requires that you make changes to the ESS schema, see "[Changing the Default ESS NoSQL Schema](#)" for details.

The "[Updating Federation Script Behavior During Runtime](#)" explains how to update your federation scripts without shutting down the runtime environments.

The "[Configuring Subscriber Data Quickly for a Test or Demonstration System](#)" and "[Provisioning the ESS with Subscriber Data](#)" sections explain how to provision the ESS with Subscriber data using the RESTful interface.

See [Appendix A, "The Default ESS Subscriber Store Schema"](#) for details on the default schema for the OCECAS subscriber UDR.

Adding an HSS Subscriber Data Store

If you have an existing HSS that you use for subscriber data, use the instructions in this section to make it available to OCECAS. You can skip this section if your OCECAS implementation only uses the ESS for subscriber data.

Configuring OCECAS to Accept Data from a Diameter Sh HSS

You configure your Diameter Sh HSS using the OCECAS Administration Console, and in the `csp.xml` file in each runtime environment as described in this section.

See "Managing Diameter Interfaces" in *Evolved Communications Application Server Administrator's Guide* for instructions on how to configure the Diameter interface.

To configure a Diameter Sh HSS:

1. Open the OCECAS Administration Console.

See "About the OCECAS Administration Console" in *Evolved Communications Application Server Administrator's Guide* instructions.

2. Click **Lock & Edit**.

3. In the **Domain Structure** pane, navigate to `domain_name` then **Diameter**.

The **General** tab appears.

4. Fill in this tab to meet the needs of your implementation.

5. Click **Save**.

6. Navigate to **Applications**.

7. Click **New**.

8. Fill in the **Application Name**, **Class Name**, and any optional parameters for the new Diameter application.

9. Click **Finish**.

10. Finish configuring Diameter using the **Peers**, **Routes**, and **Message Debug** tabs as necessary for your implementation.

- 11.** Click **Release Configuration**.
- 12.** Open the *domain_home/config/custom/csp.xml* file for editing.
- 13.** If needed, change the data-source parameters in the `<provider>` element to specify the HSS to use for read-request data source, read-response data source, update-request data source, and update response data source.
- 14.** Edit the `script_HSS` federation script as necessary to manipulate the HSS data to satisfy the calling application:
 - Translate the HSS date into a format that the calling application requires.
 - Federates the data with any other HSSs that your implementation uses.
 - Any other data manipulation that your implementation requires.
- 15.** Save and close `csp.xml`.

WARNING: After updating the `csp.xml` file, if you update the configuration through the WebLogic administration console, the changes made in `csp.xml` will be lost.

- 16.** Restart the servers in the runtime environment.
- 17.** Repeat this procedure for all runtime environments that use the HSS.

Advanced Configuration of Your ESS Subscriber Data Store

This section assumes that you have already followed the instructions in *Oracle Communications Evolved Communications Application Server Installation Guide* and installed your ESS and specified where it should connect to a runtime domain. This section takes up where that one left off.

This section requires that you know what format your calling applications require data in, and knowledge of Groovy/Java to modify the federation scripts.

By default, the `csp.xml` file includes an ESS, defined as `udr1` of type `NoSQLProvicerFactory`:

Also by default, an adapter is defined that specifies the ESS `nosql1` connection information:

```

<adapters>
  <no-sql-adapter>
    <name>nosql1</name>
    <helper-host>localhost:5000</helper-host>
    <store-name>spr.data</store-name>
  </no-sql-adapter>
</adapters>

```

You can use these default values, or change them to meet the needs of your implementation.

To finish configuring your ESS:

- 1.** In a runtime domain, open the *domain_home/config/custom/csp.xml* file for editing.
- 2.** Optional. Edit the `<provider>` element for the ESS, specifying the type of traffic it will be used for. The default ESS `nosql1` is designated for all of the read, update, request, and response messages:

```

<name>udr1</name>
  <provider>
    <name>p1</name>
    <type>NoSQLProviderFactory</type>
    <adapter>nosql1</adapter>
    <read-request-data-source>source_Initial</read-request-data-source>
    <read-response-data-source>source_Initial</read-response-data-source>
    <update-request-data-source>source_Initial</update-request-data-source>
    <update-response-data-source>source_Initial</update-response-data-source>
  </provider>

```

Change this as necessary for your implementation.

3. Change the federation scripts as necessary to modify the data from the ESS so that the calling application can accept the data. The exact configuration will be unique to your implementation.
4. Save and close the **csp1.xml** file.
5. Restart the domain that contains the ESS.

Adding Additional Data Sources and Formats to the View

This section explains how to change the default subscriber store configuration.

Replacing the ESS NoSQL Database

The default OCECAS subscriber data storage paradigm retrieves data stored in an HSS that you specify, and if the data changes, it is stored in the ESS NoSQL database. You replace the ESS with a different database if your implementation requires it. However this requires a strong knowledge of the database you wish to use, and significant work to change the Groovy federation scripts in the **csp.xml** file.

See "[The Default ESS Subscriber Store Schema](#)" for details on the default ESS data schema.

Adding a New UDR Using a New Data Type

To add a new UDR provider using a completely different data type, edit the **csp.xml** file, adding a new provider and adapter to specify the UDR name and location and the types of messages that can access them. Then create a new view, data-source, and federation script to translate the data.

Using Different Types of Data from the Same Data Provider

You can obtain different data types from a single data store. In a single pipeline, define one provider and adapter to reference the data store. Then define different view / data source/federation scripts for each of the data types.

Changing the Default ESS NoSQL Schema

You can modify some part of the OCECAS default ESS schema if your implementation requires it. However you have these restrictions:

- Some properties can not be changed because they are specified in the UDR MBean. These include the top level property names:
 - **userIdentifier**

- **mapData**
 - **JsonData**
- You must correct any references to properties that you change in the data federation scripts in the **csp.xml** file. After correcting this file, restart the domain administration servers that use the **csp.xml** file to make your changes take effect.

Changing the Default ESS Schema

To change the default UDR Schema for a production pipeline:

1. Create a new change set in the test domain for changing the **UdrSubscriberSchema** and record the new change set ID.
2. Use the **SchemaResource** class operations in the RESTful API to change **UdrSubscriberSchema** for the new change set:

/api/change-sets/changeset_ID/schemas/UdrSubscriberSchema

Where *changeset_ID* is the ID of the change set you created in Step 1.

See the **SchemaResource** class in *Evolved Communications Application Server RESTful API Reference* for details on the RESTful APIs.

3. Open the *domain_home/config/custom/csp.xml* file for editing.
4. Search the Groovy data federation script in **csp.xml** for any of the properties that you changed in the **UdrSubscriberSchema** table, and replace them with the new values you created.
5. Save and close the file.
6. Restart the domain servers.
7. Propagate the changes you made to the staging and production environments in your pipeline.

Updating Federation Script Behavior During Runtime

You can change the federation script behavior at runtime by using this WebLogic Scripting (WLST) command from the default script location in *domain_name/bin*:

```
java weblogic.WLST ./csp.py -u admin_username addsrc federation_scriptname  
federation_script_filename
```

Where:

admin_username is a WebLogic user with administration privileges.

federation_scriptname is the name of the federation script to change. The default is **script_initialProfile**.

federation_script_filename is the replacement script with the instructions you want to use.

For details on WLST, see “Using the WebLogic Scripting Tool” in *Oracle Fusion Middleware WebLogic Scripting Tool*.

About the OCECAS Diameter Sh Interface

See “3GPP_TS_29.328” in *Evolved Communications Application Server Compliance Guide* for a list of the supported Diameter Sh messages. If your implementation uses custom

AVPs, add them to the Groovy scripts in `csp.xml`. See "[Configuring OCECAS to Accept Data from a Diameter Sh HSS](#)" for instructions on editing this file.

Configuring Subscriber Data Quickly for a Test or Demonstration System

If you are just creating a test and evaluation system, the fastest and easiest way to add subscriber data to OCECAS is to provision the ESS NoSQL database using the REST interface. This does not make any subscriber information from an HSS available, but it is faster. See "[Provisioning the ESS with Subscriber Data](#)" for instructions.

Provisioning the ESS with Subscriber Data

You create and manage subscribers by writing provisioning tools that use RESTful HTTP commands to interact with RESTful APIs. This allows for easy integration with external systems.

For a complete description of the OCECAS RESTful APIs, see *Oracle Communications Evolved Communications Application Server RESTful API Reference*.

This section explains how to provision and manage subscriber data in your ESS, including the following tasks:

- [Connecting to the ESS Server](#)
- [Creating a New Subscriber](#)
- [Getting Subscriber Data](#)
- [Amending Subscriber Data](#)
- [Deleting a Subscriber](#)
- [Getting Subscriber Aliases](#)
- [Updating a Subscriber Alias](#)
- [Getting jsonData for a Subscriber](#)
- [Adding jsonData for a Subscriber](#)

When creating or modifying subscriber data, the data must adhere to the ESS subscriber schema. See "[Understanding the Default ESS Objects](#)" for a description of the schema.

Connecting to the ESS Server

To log in to the ESS server, issue a POST command like the following one, replacing `hostname` and `port` with the host name and port number of the ESS server, and `authorization_value` with user credentials. The default port number of the ESS server is 6052.

```
POST /api/session HTTP/1.1
Host: hostname:port
Authorization: Basic authorization_value==
Cache-Control: no-cache
```

See "[Logging In to the Management Domain](#)" for information on how to obtain an authorization pass code.

Creating a New Subscriber

To create a new subscriber, issue a POST command like the one in this example, replacing *hostname* and *port* with the host name and port number of the ESS server:

```
POST /api/subscriber HTTP/1.1
Host: hostname:port
Content-Type: application/json
Cache-Control: no-cache
```

Include content to describe the subscriber, as shown in this example:

```
{
    "userIdentifiers": [
        {
            "id": "sip:6175551002@oracle.com",
            "type": "END_USER_SIP_URI"
        },
        {
            "id": "tel:6175551002",
            "type": "END_USER_SIP_URI"
        },
        {
            "id": "sip:+6175551002@oracle.com",
            "type": "END_USER_SIP_URI"
        }
    ],
    "jsonData": {
        "oracle.occas.csp.app.sdc.OCECASUser": {
            "Description": "subscriber: sip:6175551002@oracle.com",
            "ServiceProviders": {
                "MVNO1": {
                    "profile_data": {
                        "CallCount": 0,
                        "CallFwdCompany": "",
                        "Language": "en_GB",
                        "ToNumber": "",
                        "Translations": {},
                        "VMRedirect": ""
                    },
                    "services": {
                        "REGISTRATION": "VoLTE and VoWiFi",
                        "VOICE": "VoLTE and VoWiFi"
                    }
                }
            }
        }
    }
}
```

In this example, the subscriber is given three IDs of type END_USER_SIP_URI and a basic profile that specifies the user's language as Great Britain English. The example also registers the user for VoLTE and VoWiFi services.

Getting Subscriber Data

To get subscriber data, issue a GET request like the one in this example, replacing *hostname* and *port* with the host name and port number of the ESS server:

```
GET /api/subscriber?user_id=sip:6175551002@oracle.com&type=END_USER_SIP_URI
HTTP/1.1
```

```
Host: hostname:port
Cache-Control: no-cache
```

This example request retrieves a globally unique identifier (GUID) for the subscriber with a **user_id** value of **sip:6175551002@oracle.com**, the same subscriber created in ["Creating a New Subscriber"](#).

The request returns these fields:

- **id** (example: dWRyMQAAAuht5PxqzIelnGoEY81150AAAAH)
- **userIdentifiers**
- **mapData** (optional)
- **jsonData**

The details of **userIdentifiers** and **jsonData** depend on the schema defined for the **UdrSubscriberSchema** record in the **SDC_SCHEMA** database table. If the **mapData** field has no data, it is not returned.

Amending Subscriber Data

To amend subscriber data, issue a PUT command identifying the subscriber with a GUID. See ["Getting Subscriber Data"](#) for information on obtaining a GUID.

This example changes the subscriber's **jsonData** field. To use this example, replace *hostname* and *port* with the host name and port number of the ESS server. Replace dWRyMQAAAuht5PxqzIelnGoEY81150AAAAH with the subscriber's GUID

```
PUT
/api/subscriber/dWRyMQAAAuht5PxqzIelnGoEY81150AAAAH/json/oracle.occas.csp.app.sdc
.OCSDCUserDataSetSchema HTTP/1.1
Host: hostname:port
Content-Type: application/json
Cache-Control: no-cache
```

This command writes a specific **jsonData** field to the subscriber's service data. For example:

```
{
  "ServiceProviders": {
    "MVNO1": {
      "profile_data": {
        "TIR": {
          "Active": true,
          "Mode": "Permanent",
          "Default": "Restricted",
          "Restriction": "AssertedIdentity"
        }
      }
    }
  }
}
```

Deleting a Subscriber

To delete a subscriber, issue a DELETE command like the one in the following example, replacing *hostname* and *port* with the host name and port number of the ESS server and identifying the subscriber with a GUID. See ["Getting Subscriber Data"](#) for information on getting a subscriber's GUID.

```
DELETE /api/subscriber/dWRyMQAAAUuht5PxqzIelnGoEY81150AAAAH HTTP/1.1
Host: hostname:port
Cache-Control: no-cache
```

This example deletes the subscriber created in "[Creating a New Subscriber](#)."

Getting Subscriber Aliases

To get all aliases for a subscriber, issue a GET command like the one shown in the following example, specifying the subscriber with a GUID. Replace *hostname* and *port* with the host name and port number of the ESS server and replace dWRyMQAAAUuht5PxqzIelnGoEY81150AAAAH with the subscriber's GUID.

```
GET /api/subscriber/dWRyMQAAAUuht5PxqzIelnGoEY81150AAAAH/alias HTTP/1.1
Host: hostname:port
Cache-Control: no-cache
```

This example returns all aliases for the subscriber in an array of userIdentifiers:

```
{
  "userIdentifiers": [
    {
      "id": "sip:6175551002@oracle.com",
      "type": "END_USER_SIP_URI"
    },
    {
      "id": "tel:6175551002",
      "type": "END_USER_SIP_URI"
    },
    {
      "id": "sip:+6175551002@oracle.com",
      "type": "END_USER_SIP_URI"
    }
  ]
}
```

Updating a Subscriber Alias

To update the alias of a subscriber, issue a PUT command like the one shown in the following example, specifying the subscriber with a GUID. Replace *hostname* and *port* with the host name and port number of the ESS server and replace dWRyMQAAAU6pL51CsE9QWg4Z3LXrX3sAAAAM with the subscriber's GUID.

```
PUT /api/subscriber/dWRyMQAAAU6pL51CsE9QWg4Z3LXrX3sAAAAM/alias
Host: hostname:port
Content-Type: application/json
Cache-Control: no-cache
```

Attach content to specify the subscriber's alias in a userIdentifiers array, as shown in this example:

```
{
  "userIdentifiers" : [
    {
      "id" : "sip:subA@192.168.0.1:50640",
      "type" : "END_USER_SIP_URI"
    }
  ]
}
```

Note: JSON data other than userIdentifiers is ignored.

A subsequent GET of the subscriber's data returns:

```
{
  "id": "dWRyMQAAU6pL51CsE9QWg4Z3LXrX3sAAAAAM",
  "userIdentifiers": [
    {
      "id": "sip:subA@192.168.0.1:50640",      <--- updated
      "type": "END_USER_SIP_URI"
    }
  ],
  "jsonData": {
    "oracle.occas.csp.app.sdc.OCECASUser": {
      "Description": "subscriber: sip:subscriberA024652@192.168.0.1",
      "ServiceProviders": {
        "MVNO1": {
          "profile_data": {
            "CallCount": 0,
            "CallFwdCompany": "",
            "Language": "en_GB",
            "ToNumber": "",
            "Translations": {},
            "VMRedirect": ""
          },
          "services": {
            "VOICE": "ExtractStringProfileTagOk"
          }
        }
      }
    }
  }
}
```

Getting jsonData for a Subscriber

To retrieve specific **jsonData** for a subscriber, for instance the `oracle.occas.csp.app.sdc.OCECASUser` **jsonData**, issue a GET command like the one shown in the following example, specifying the subscriber with a GUID. Replace *hostname* and *port* with the host name and port number of the ESS server and replace `dWRyMQAAU6pL51CsE9QWg4Z3LXrX3sAAAAAM` with the subscriber's GUID.

```
GET
/api/subscriber/dWRyMQAAU6pL51CsE9QWg4Z3LXrX3sAAAAAM/json/oracle.occas.csp.app.sdc
.OCECASUser
Host: hostname:port
Cache-Control: no-cache
```

The response returns the following JSON data:

```
{
  "Description": "subscriber: sip:subscriberA024652@192.168.0.1",
  "ServiceProviders": {
    "MVNO1": {
      "profile_data": {
        "CallCount": 0,
        "CallFwdCompany": "",
        "Language": "en_GB",
        "ToNumber": "",
        "Translations": {},
        "VMRedirect": ""
      },
      "services": {
        ...
      }
    }
  }
}
```

```
        "VOICE": "ExtractStringProfileTagOk"
    }
}
}
}
```

Adding jsonData for a Subscriber

To add specific jsonData to a field for a subscriber, issue a PUT command like the one shown in the following example, specifying the subscriber with a GUID, and attaching content in JSON format. Replace *hostname* and *port* with the host name and port number of the ESS server and replace dWRyMQAAAU6pL51CsE9QWg4Z3LXrX3sAAAAM with the subscriber's GUID.

```
PUT  
/api/subscriber/dWRyMQAAAU6pL51CsE9QWg4Z3LXrX3sAAAAM/json/oracle.occas.csp.app.sdc  
.OCECASUser  
Host: hostname:port  
Content-Type: application/json  
Cache-Control: no-cache
```

Content:

```
{  
    "Description": "subscriber: sip:subscriberA024652@192.168.0.1",  
    "ServiceProviders": {  
        "MVNO1": {  
            "profile_data": {  
                "CallCount": 0,  
                "CallFwdCompany": "",  
                "Language": "Chinese",  
                "ToNumber": "",  
                "Translations": {},  
                "VMRedirect": ""  
            },  
            "services": {  
                "VOICE": "ExtractStringProfileTagOk"  
            }  
        }  
    }  
}
```

A subsequent GET of subscriber data then returns the following data, in which the subscriber's language has been changed to Chinese.

```
{
  "id": "dWRyMQAAAU6pL51CsE9QWg4Z3LXrX3sAAAAM",
  "userIdentifiers": [
    {
      "id": "sip:subA@192.168.0.1:50640",
      "type": "END_USER_SIP_URI"
    }
  ],
  "jsonData": {
    "oracle.occas.csp.app.sdc.OCECASUser": {
      "Description": "subscriber: sip:subscriberA024652@192.168.0.1",
      "ServiceProviders": {
        "MVNO1": {
          "profile_data": {
            "CallCount": 0,
            "CallFwdCompany": ""
          }
        }
      }
    }
  }
}
```

```
        "Language": "Chinese",           <--- updated
        "ToNumber": "",
        "Translations": {},
        "VMRedirect": ""
    },
    "services": {
        "VOICE": "ExtractStringProfileTagOk"
    }
}
}
}
}
```


6

Accessing Service Data with the RESTful API

This chapter describes how to use the Oracle Communications Evolved Communications Application Server (OCECAS) RESTful APIs to create and access service data.

For a complete description of the OCECAS RESTful API, see *Oracle Communications Evolved Communications Application Server RESTful API Reference*.

About Accessing Service Data

You can create and access OCECAS service data by using HTTP RESTful API commands.

Note: You must first log in to the Management domain before you can use the other APIs.

This section provides examples for performing the following operations on the OCECAS Management domain:

- [Logging In to the Management Domain](#)
- [Creating a Change Set](#)
- [Getting Change Set Details](#)
- [Getting a Change Set](#)
- [Getting Change Set Differences](#)
- [Getting a List of Environments](#)
- [Getting a List of Pipelines](#)
- [Deploying a Change Set](#)
- [Getting Telemetry Records](#)
- [Getting Statistics Definitions](#)
- [Getting a Named Telemetry Record](#)
- [Getting Statistics](#)
- [Getting a Control Flow](#)
- [Adding a Control Flow](#)

Logging In to the Management Domain

To log in to the OCECAS Management domain, issue a POST command like the one in the following example, replacing *hostname* and *port* with the host name and port number of the management domain server. Replace the encoded authorization code with the encoded authorization code for your username and password:

```
POST /api/session HTTP/1.1
Host: hostname:port
Authorization: Basic dXNlcjp1c2VyNHNkYw==
Cache-Control: no-cache
```

The response indicates the outcome of the login attempt.

The following example uses a Python script to obtain the encoded authorization pass code. Replace *name* and *password* with an actual username and password.

```
$ cat pass.py
import base64

username="name";
password="password"
base64string = base64.encodestring('%s:%s' % (username, password)).replace('\n',
 '')
print base64string
```

The following command displays the pass code:

```
$ python pass.py
```

Obtaining a CSRF Token

A Cross Site Request Forgery (CSRF) token is used to prevent cross site request forgeries. A CSRF token is required in all PUT and POST operations in the service-related RESTful APIs.

To obtain a CSRF token, issue the following GET command after logging into the management domain. Replace *hostname* and *port* with the host name and port number of the OCECAS management domain:

```
GET /api/session HTTP/1.1
Host: hostname:port
Authorization: Basic dXNlcjp1c2VyNHNkYw==
Cache-Control: no-cache
```

The CSRF token is returned in the response:

```
{
    "name": "user",
    "fullName": "user",
    "userSession": {
        "name": null,
        "attributes": [
            {
                "key": "csrfToken",
                "value": "2c3890b3bb4431a1b47465fbfc58a7d6830c3dbf03b80630767b44225c184ae5"
            }
        ]
    }
}
```

Note: You must submit the CSRF token for all POST and PUT commands in service-related APIs. Otherwise you will receive a '403 Forbidden' error.

Submitting the CSRF Token

For a description of the CSRF token and information on how to obtain it, see ["Obtaining a CSRF Token"](#).

You can submit the CSRF token in a POST or PUT command either in an X-ORA-OCECAS-csrfToken header, as shown here, or in attached JSON content.

```
POST /api/pipelines/{pipe}/environments/{env}/deployments/ HTTP/1.1
Host: hostname:port
Content-Type: application/json
X-ORA-OCECAS-csrfToken:
2c3890b3bb4431a1b47465fbfc58a7d6830c3dbf03b80630767b44225c184ae5
Cache-Control: no-cache
```

Submit the CSRF token in JSON content as shown in the following example:

```
POST /api/pipelines/{pipe}/environments/{env}/deployments/ HTTP/1.1
Host: hostname:port
Content-Type: application/json
Cache-Control: no-cache
```

Content:

```
{
  "csrfToken": "2c3890b3bb4431a1b47465fbfc58a7d6830c3dbf03b80630767b44225c184ae5",
  "name": "Test",
  "description": "A new test change set"
}
```

Creating a Change Set

To create a change set, issue a POST command like the one in the following example, replacing *hostname* and *port* with the host name and port number of the OCECAS management domain:

```
POST /api/change-sets HTTP/1.1
Host: hostname:port
Content-Type: application/json
Cache-Control: no-cache
```

Attach JSON content like that shown in the following example to specify the name of the change set and a description. Replace the csrfToken value with the value for your authorization credentials. See ["Obtaining a CSRF Token"](#) for more information.

```
{
  "csrfToken": "2c3890b3bb4431a1b47465fbfc58a7d6830c3dbf03b80630767b44225c184ae5",
  "name": "Test",
  "description": "A new test change set"
}
```

Getting Change Set Details

To retrieve change-set details, including the change set ID, issue a GET command like the one in the following example, replacing *hostname* and *port* with the host name and port number of the OCECAS management domain:

```
GET /api/change-sets HTTP/1.1
Host: hostname:port
Cache-Control: no-cache
```

Returns a `changeSets` object that contains a list of currently available change sets.

Getting a Change Set

To retrieve a change set, issue a GET command like the one in the following example, replacing *hostname* and *port* with the host name and port number of the OCECAS management domain, and replacing `{ChangeSetID}` with the ID of the target change set. See "["Getting Change Set Details"](#)" for information about finding a change set ID.

```
GET /api/change-sets/{ChangeSetID} HTTP/1.1
Host: hostname:port
Cache-Control: no-cache
```

The response returns a `changeSet` object for the named change set.

Getting Change Set Differences

To get a list of differences for a change set, compared with its base change set, issue a GET command like the one in the following example. Replace *hostname* and *port* with the host name and port number of the OCECAS management domain, and replace `{ChangeSetID}` with the ID of the target change set. See "["Getting Change Set Details"](#)" for information about finding a change set ID.

```
GET /api/change-sets/{ChangeSetID}/diffs HTTP/1.1
Host: hostname:port
Cache-Control: no-cache
```

The response returns the differences for the specified change set, a list of the control flows and resources either added or changed as part of that change set.

Getting a List of Environments

To retrieve a list of environment details, including environment IDs, issue a GET command like the one in the following example, replacing *hostname* and *port* with the host name and port number of the OCECAS management domain:

```
GET /api/environments HTTP/1.1
Host: hostname:port
Cache-Control: no-cache
```

Returns a list of all environments.

Getting a List of Pipelines

To retrieve a list of all pipelines, including IDs, issue a GET command like the one in the following example, replacing *hostname* and *port* with the host name and port number of the OCECAS management domain:

```
GET /api/pipelines HTTP/1.1
Host: hostname:port
```

Cache-Control: no-cache

Returns a list of all pipelines.

Deploying a Change Set

To deploy a change set, issue a POST command like the one in the following example, replacing *hostname* and *port* with the host name and port number of the OCECAS management domain. Replace *{pipe}* with the pipeline ID and *{env}* with the environment ID in the pipeline to which you want to deploy the change set. See "[Getting a List of Pipelines](#)" for information on finding a pipeline ID and "[Getting a List of Environments](#)" for information on finding an environment ID.

```
POST /api/pipelines/{pipe}/environments/{env}/deployments/ HTTP/1.1
Host: hostname:port
Content-Type: application/json
Cache-Control: no-cache
```

Attach JSON content that describes the deployment object. For example the following lines define the deployment object for the OCECAS "VoLTE, VoWiFi, and eSRVCC" change set. Replace the csrfToken value with the value for your authorization credentials. See "[Obtaining a CSRF Token](#)" for more information.

```
{
    "csrfToken": "2c3890b3bb4431a1b47465fbfc58a7d6830c3dbf03b80630767b44225c184ae5",
    "id": 41,
    "changeSet": {
        "csrfToken": null,
        "id": 2,
        "name": "VoLTE, VoWiFi and eSRVCC",
        "description": "VoLTE, VoWiFi and eSRVCC change set",
        "serviceProviderId": 1,
        "baselineId": 1,
        "pipelineId": null,
        "creationDate": 1437615562000,
        "lastUpdated": 1437615562000,
        "deleted": false,
        "editable": false,
        "inactive": false,
        "active": true,
        "scheduled": false,
        "retracted": false,
        "open": false,
        "erroredObjects": [],
        "username": "VoLTE Installer"
    },
    "baselineId": 1,
    "state": "A",
    "creationDate": 1437615744000,
    "scheduledDate": 1437615744000,
    "lastUpdated": 1437615744000,
    "environment": 1,
    "productionEnvironment": false,
    "pipeline": 1,
    "conflictPotential": null,
    "active": true,
    "scheduled": false,
    "editable": true
}
```

The response returns the deployment object for the specified change set.

Getting Telemetry Records

To retrieve telemetry records, including the record names, issue a GET command like the one in the following example. Replace *hostname* and *port* with the host name and port number of the OCECAS management domain:

```
GET /api/telemetry/records HTTP/1.1
Host: hostname:port
Cache-Control: no-cache
```

Returns a `telemetrys` object that contains a list of telemetry records.

Getting a Named Telemetry Record

To get the details of a telemetry record for a given name, issue a GET command like the one in the following example, replacing *hostname* and *port* with the host name and port number of the OCECAS management domain, and replacing `{name}` with the telemetry name. See "["Getting Telemetry Records"](#)" for information about finding a telemetry name.

```
GET /api/telemetry/records/name/{name} HTTP/1.1
Host: hostname:port
Cache-Control: no-cache
```

The response returns the details of the telemetry record of the given name.

Getting Statistics Definitions

To retrieve statistics definitions for a change set, including the names of statistics, issue a GET command like the one in the following example. Replace *hostname* and *port* with the host name and port number of the OCECAS management domain, and replace `{changeSetID}` with the ID of the change set for which you want statistics definitions. See "["Getting Change Set Details"](#)" for information on finding a change set ID.

```
GET /api/statistics/definitions/{changeSetID} HTTP/1.1
Host: hostname:port
Cache-Control: no-cache
```

Returns a `Statistics` object that contains the statistics definitions.

Getting Statistics

To get statistics, issue a GET command like the one in the following example, replacing *hostname* and *port* with the host name and port number of the OCECAS management domain, and replacing `{name}` with the statistic name. See "["Getting Statistics Definitions"](#)" for information on finding a statistic name.

```
GET /api/statistics/records/name/{name} HTTP/1.1
Host: hostname:port
Cache-Control: no-cache
```

The response returns a `Statistics` object containing all of the statistics records matching the given name.

Getting a Control Flow

To retrieve a control flow, issue a GET command like the one in the following example, replacing *hostname* and *port* with the host name and port number of the OCECAS management domain. Replace *{changeSetID}* in the header with the change set ID and *{name}* with the name of the control flow. You can obtain the control flow name from the response returned in "[Getting Change Set Differences](#)".

```
GET /api/change-sets/{changeSetID}/access-control-flows/{name} HTTP/1.1
Host: hostname:port
Accept: text/xml
Cache-Control: no-cache
```

The response returns a `controlFlow` instance that represents the latest version of the control flow.

Adding a Control Flow

To add a control flow, issue a POST command like the one in the following example. Replace *hostname* and *port* with the host name and port number of the OCECAS management domain. Replace *{ChangeSetID}* with the ID of the target change set and attach XML content like that shown in the example to describe the control flow:

```
POST /api/change-sets/{ChangeSetID}/access-control-flows HTTP/1.1
Host: hostname:port
Content-Type: text/json
Cache-Control: no-cache
```

The following JSON content describes a simple control flow with Start, Release, and End Activities. Replace the `csrfToken` value with the value for your authorization credentials. See "[Obtaining a CSRF Token](#)" for more information.

```
{
  "csrfToken": "2c3890b3bb4431a1b47465fbfc58a7d6830c3dbf03b80630767b44225c184ae5",
  "name": "example",
  "description": null,
  "loopsAllowed": false,
  "allowedAsLinkedControlFlow": true,
  "activities": [
    {
      "version": 1,
      "activityNumber": 1,
      "name": "Start",
      "activityType": "Start",
      "fastKey": "ST",
      "location": "420,98,100,60",
      "comments": null,
      "parameterList": [
        {
          "key": null,
          "attributeList": []
        },
        {
          "key": "Loop Limit",
          "attributeList": [
            {
              "name": "int",
              "value": "100"
            }
          ]
        }
      ]
    }
  ]
}
```

```
        },
        {
            "key": "Loop Limit External",
            "attributeList": [
                {
                    "name": "int",
                    "value": "100"
                }
            ]
        },
        {
            "key": "Loops Allowed",
            "attributeList": [
                {
                    "name": "check",
                    "value": "false"
                }
            ]
        }
    ],
    "linkedFlowName": null,
    "serviceName": null,
    "exit": [
        {
            "branchNumber": 0,
            "branchName": null,
            "linkedControlFlowExitActivityNumber": "",
            "linkedControlFlowExitActivityName": null,
            "connection": [
                2
            ]
        }
    ]
},
{
    "version": 1,
    "activityNumber": 2,
    "name": "Release",
    "activityType": "Release",
    "fastKey": "REL",
    "location": "421,196,100,60",
    "comments": null,
    "parameterList": [
        {
            "key": null,
            "attributeList": []
        },
        {
            "key": "Session Endpoint",
            "attributeList": [
                {
                    "name": "Entries",
                    "value": "IE:DE"
                },
                {
                    "name": "EntriesType",
                    "value": "EventSource"
                },
                {
                    "name": "string",

```

```

                "value": "IE"
            }
        ]
    },
{
    "key": "Code",
    "attributeList": [
        {
            "name": "int",
            "value": "480"
        },
        {
            "name": "MIN",
            "value": "100"
        },
        {
            "name": "MAX",
            "value": "699"
        },
        {
            "name": "CORRECTING",
            "value": "1"
        }
    ]
},
"linkedFlowName": null,
"serviceName": null,
"exit": [
    {
        "branchNumber": 0,
        "branchName": null,
        "linkedControlFlowExitActivityNumber": null,
        "linkedControlFlowExitActivityName": null,
        "connection": [
            3
        ]
    },
    {
        "branchNumber": 0,
        "branchName": null,
        "linkedControlFlowExitActivityNumber": null,
        "linkedControlFlowExitActivityName": null,
        "connection": [
            3
        ]
    }
],
{
    "version": 1,
    "activityNumber": 3,
    "name": "End",
    "activityType": "End",
    "fastKey": "END",
    "location": "426,315,100,60",
    "comments": null,
    "parameterList": [
        {
            "key": null,

```

```
        "attributeList": [],
    }
],
"linkedFlowName": null,
"serviceName": null,
"exit": []
}
]
```

A

The Default ESS Subscriber Store Schema

This appendix explains the default schema for the Oracle Communications Evolved Application Server (OCECAS) subscriber server (ESS).

Understanding the Default ESS Objects

This section explains the structure of the ESS schema that OCECAS uses to specify and store subscriber data. [Figure A-1](#) shows the top level schema objects. All of the objects in bold font are required, except for the referenced objects in the `profile_data` object.

Elements in the schema relate to data that is accessible from the control flow editor. For example, the `$ref` notation is a key, whose corresponding value indicates the name of the related external concept item.

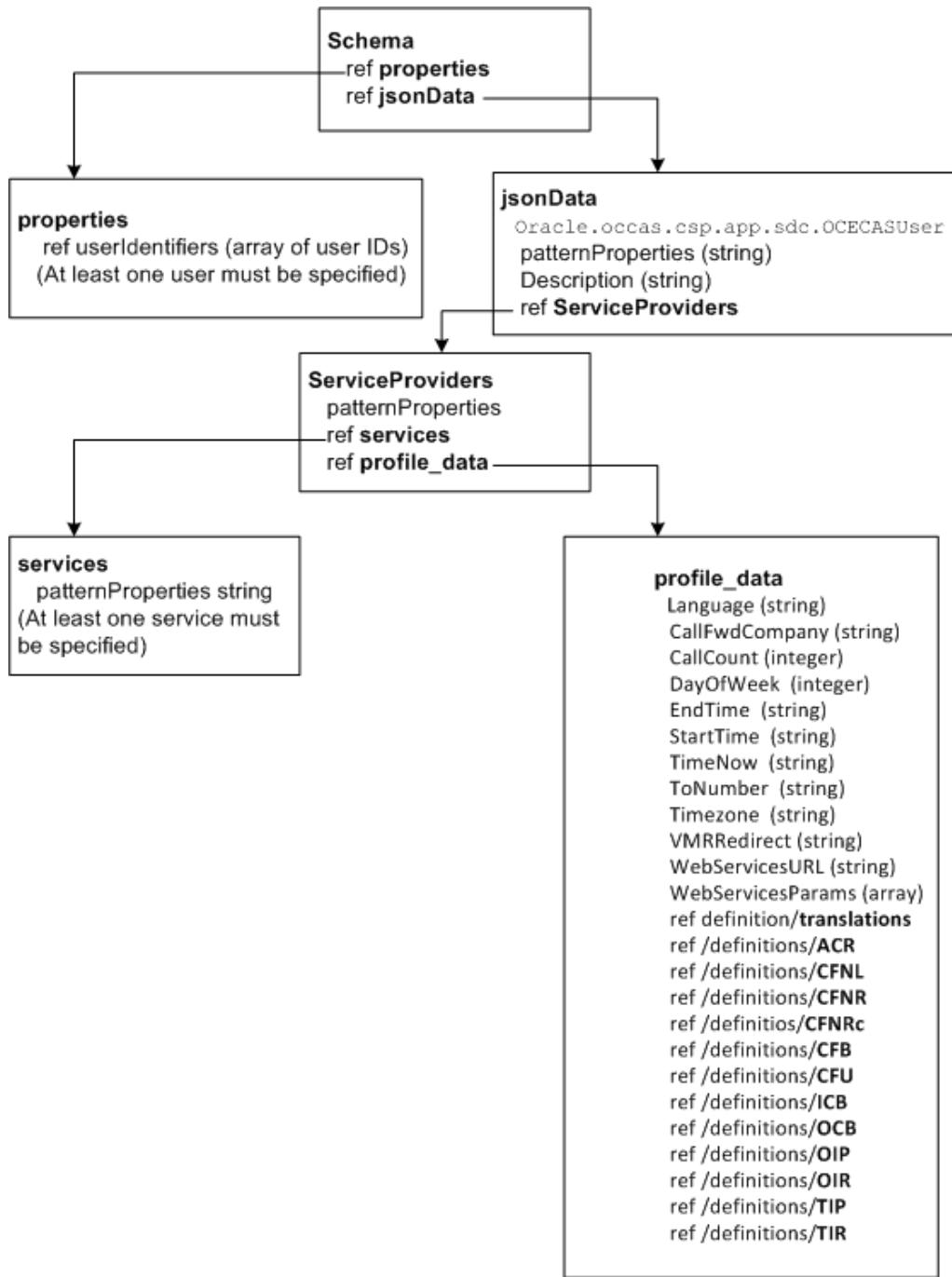
Figure A-1 LSS Top Level Schema Objects

Figure A-2 shows a detail view of the LSS schema **profile_data** object and the objects that it references.

The referenced objects include these supplementary services objects:

- **ACR** - Anonymous Communication Rejection
- **CFNL** - Communication Forwarding Not Logged In
- **CFNR** - Communication Forwarding No Reply
- **CFNRC** - Communication Forwarding Not Reachable

- CFB - Communication Forwarding on Busy
- CFU - Communication Forwarding Unconditional
- ICB - Incoming Call Barring
- OCB - Outgoing Call Barring
- OIP - Originating Identification Presentation
- OIR - Originating Identification Restriction
- TIP - Terminating Identification Presentation
- TIR - Terminating Identification Restriction

Figure A–2 LSS Schema profile_data Object

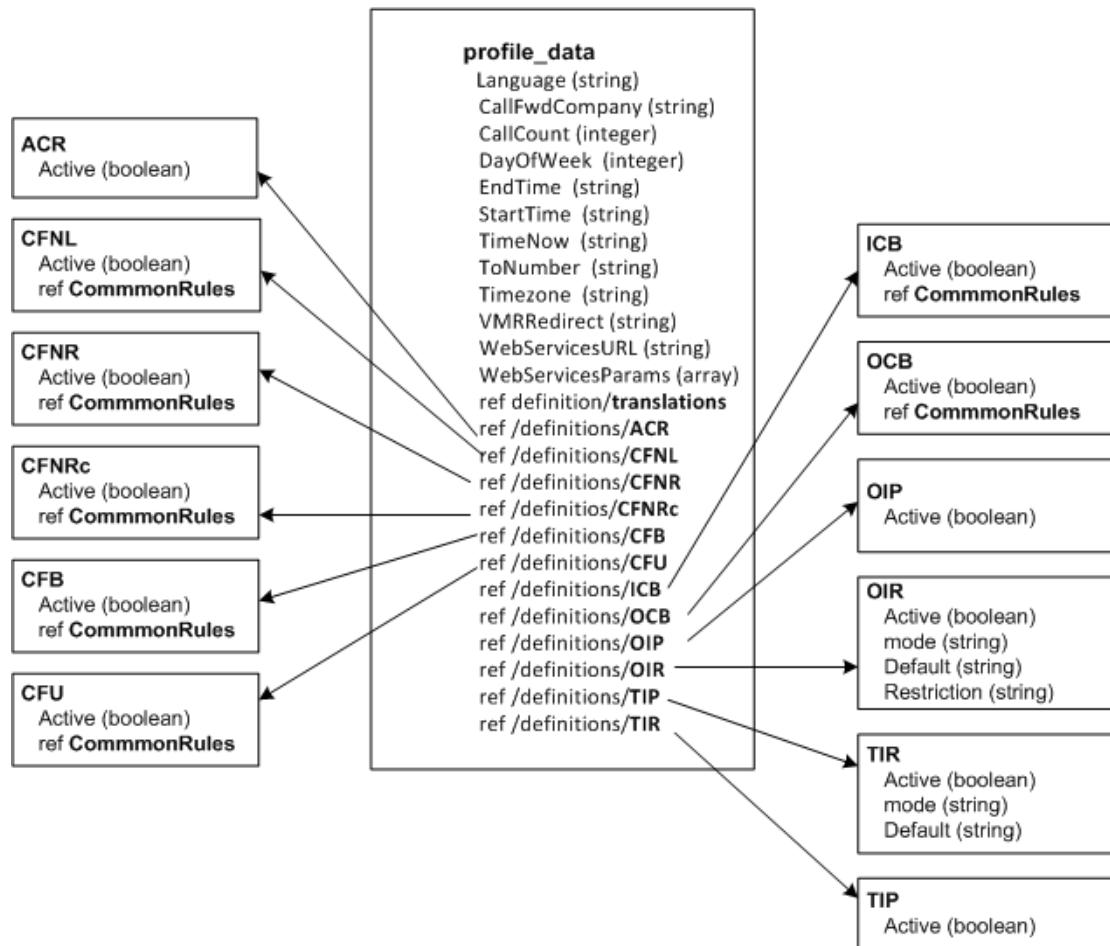


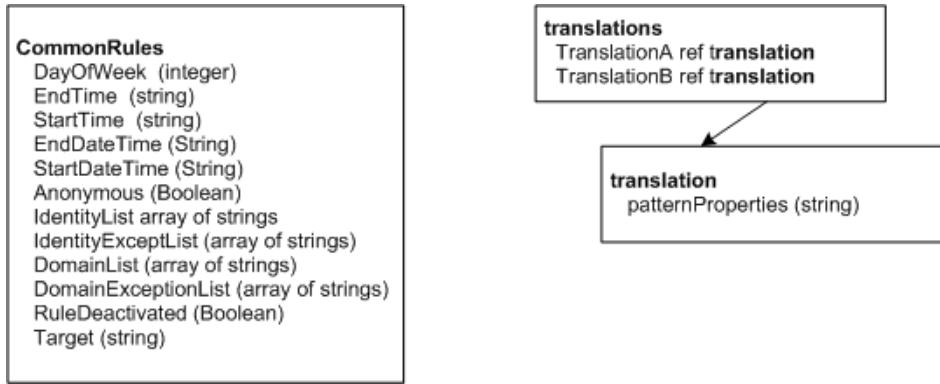
Figure A–3 shows a detail view of the **CommonRules** and **Translations** objects. The **CommonRules** object specifies parameters for using supplementary services that require them. For example start and stop times for the service to take effect.

You use the **Translations** object to change subscriber IDs. This object translates IDs from the **TranslationA** block of name-value pairs, to the different values in the **TranlationB** block of name-value pairs. The change can be a simple number switch, or you could change the number value, or format, or both. In this example, only one name matches (**tel:901**), so that is the only ID translated. It changes from **tel:+133455601001** to **tel:+133455601002**:

```

    "Translations": {
        "TranslationA": {
            "tel:901;phone-context=shortcode": "tel:+133455601007",
            "tel:901;noa=unknown;phone-context=oracle.occas.csp": "tel:+133455601001",
            "sip:c1@personal.redirect.com": "sip:called@full.address.com"
        },
        "TranslationB": {
            "tel:902;phone-context=shortcode": "tel:+133455601008",
            "tel:901;noa=unknown;phone-context=oracle.occas.csp": "tel:+133455601002",
            "sip:c2@personal.redirect.com": "sip:called2@full.address.com"
        }
    }
}

```

Figure A-3 LSS Schema CommonRules and translations Objects

See "[The Default ESS Subscriber Store Schema](#)" for the complete ESS schema JSON file.

Default Subscriber Record

```

{
    "$schema": "http://json-schema.org/draft-04/schema#",
    "description": "Schema for Udr Subscriber data",
    "type": "object",
    "properties": {
        "userIdentifiers": { "$ref": "#/definitions/userIdentifiers" },
        "jsonData": {
            "type": "object",
            "properties": {
                "oracle.occas.csp.app.sdc.OCECASUser": {
                    "type": "object",
                    "properties": {
                        "Description": { "type": "string" },
                        "ServiceProviders": { "$ref": "#/definitions/ServiceProviders" }
                    },
                    "required": ["ServiceProviders"],
                    "additionalProperties": false
                }
            }
        }
    },
    "required": ["userIdentifiers", "jsonData"],
    "additionalProperties": false,
    "definitions": {

```

```

"userIdentifiers": {
    "type": "array",
    "items": {
        "type": "object",
        "properties": {
            "id": { "type": "string" },
            "type": { "enum": [
                "END_USER_E164", "END_USER_IMSI", "END_USER_SIP_URI",
                "END_USER_NAI", "END_USER_PRIVATE", "END_USER_GLOBAL_UID"
            ] }
        },
        "required": ["id", "type"],
        "additionalProperties": false
    },
    "additionalItems": false,
    "minItems": 1
},

"ServiceProviders": {
    "type": "object",
    "patternProperties": {
        "^[a-zA-Z0-9][a-zA-Z0-9_]*$": {
            "type": "object",
            "properties": {
                "services": { "$ref": "#/definitions/services" },
                "profile_data": { "$ref": "#/definitions/profile_data" }
            },
            "required": ["services", "profile_data"],
            "additionalProperties": false
        }
    },
    "minProperties": 1,
    "additionalProperties": false
},

"services": {
    "type": "object",
    "patternProperties": {
        "^[a-zA-Z0-9][a-zA-Z0-9_]*$": {
            "type": "string"
        }
    },
    "additionalProperties": false,
    "minProperties": 1
},

"profile_data": {
    "type": "object",
    "properties": {
        "Language": { "type": "string" },
        "CallFwdCompany": { "type": "string" },
        "CallCount": { "type": "integer" },
        "DayOfWeek": { "type": "integer" },
        "EndTime": { "type": "string" },
        "StartTime": { "type": "string" },
        "TimeNow": { "type": "string" },
        "ToNumber": { "type": "string" },
        "Timezone": { "type": "string" },
        "VMRedirect": { "type": "string" },
    }
}

```

```
    "WebServicesURL": { "type": "string" },
    "WebServicesParams": { "type": "array" },
    "Translations": { "$ref": "#/definitions/translations" },
    "ACR": { "$ref": "#/definitions/ACR" },
    "CFNL": { "$ref": "#/definitions/CFNL" },
    "CFNR": { "$ref": "#/definitions/CFNR" },
    "CFNRC": { "$ref": "#/definitions/CFNRC" },
    "CFB": { "$ref": "#/definitions/CFB" },
    "CFU": { "$ref": "#/definitions/CFU" },
    "ICB": { "$ref": "#/definitions/ICB" },
    "OCB": { "$ref": "#/definitions/OCB" },
    "OIP": { "$ref": "#/definitions/OIP" },
    "OIR": { "$ref": "#/definitions/OIR" },
    "TIP": { "$ref": "#/definitions/TIP" },
    "TIR": { "$ref": "#/definitions/TIR" }
},
"additionalProperties": false
},
"translations": {
  "type": "object",
  "properties": {
    "TranslationA": { "$ref": "#/definitions/translation" },
    "TranslationB": { "$ref": "#/definitions/translation" }
  },
  "additionalProperties": false
},
"translation": {
  "type": "object",
  "patternProperties": {
    "^[a-zA-Z0-9][a-zA-Z0-9_@:.;=-]*$": {
      "type": "string"
    }
  },
  "additionalProperties": false
},
"OIR": {
  "type": "object",
  "properties": {
    "Active": { "type": "boolean" },
    "Mode": { "type": "string" },
    "Default": { "type": "string" },
    "Restriction": { "type": "string" }
  },
  "additionalProperties": false
},
"OIP": {
  "type": "object",
  "properties": {
    "Active": { "type": "boolean" }
  },
  "additionalProperties": false
},
"ACR": {
  "type": "object",
  "properties": {
```

```

        "Active": { "type": "boolean" }
    },
    "additionalProperties": false
} ,

    "TIR": {
        "type": "object",
        "properties": {
            "Active": { "type": "boolean" },
            "Mode": { "type": "string" },
            "Default": { "type": "string" }
        },
        "additionalProperties": false
} ,

    "TIP": {
        "type": "object",
        "properties": {
            "Active": { "type": "boolean" }
        },
        "additionalProperties": false
} ,

    "CFU": {
        "type": "object",
        "properties": {
            "Active": { "type": "boolean" },
            "Rules": {
                "type": "array",
                "items": { "$ref": "#/definitions/CommonRules" }
            }
        },
        "additionalProperties": false
} ,

    "CFB": {
        "type": "object",
        "properties": {
            "Active": { "type": "boolean" },
            "Rules": {
                "type": "array",
                "items": { "$ref": "#/definitions/CommonRules" }
            }
        },
        "additionalProperties": false
} ,

    "CFNR": {
        "type": "object",
        "properties": {
            "Active": { "type": "boolean" },
            "Rules": {
                "type": "array",
                "items": { "$ref": "#/definitions/CommonRules" }
            }
        },
        "additionalProperties": false
} ,

    "CFNRC": {

```

```
"type": "object",
"properties": {
  "Active": { "type": "boolean" },
  "Rules": {
    "type": "array",
    "items": { "$ref": "#/definitions/CommonRules" }
  }
},
"additionalProperties": false
},

"CFNL": {
  "type": "object",
  "properties": {
    "Active": { "type": "boolean" },
    "Rules": {
      "type": "array",
      "items": { "$ref": "#/definitions/CommonRules" }
    }
},
"additionalProperties": false
},

"ICB": {
  "type": "object",
  "properties": {
    "Active": { "type": "boolean" },
    "Rules": {
      "type": "array",
      "items": { "$ref": "#/definitions/ICBRules" }
    }
},
"additionalProperties": false
},

"OCB": {
  "type": "object",
  "properties": {
    "Active": { "type": "boolean" },
    "Rules": {
      "type": "array",
      "items": { "$ref": "#/definitions/OCBRules" }
    }
},
"additionalProperties": false
},

"CommonRules": {
  "type": "object",
  "properties": {
    "DayOfWeek": { "type": "integer" },
    "EndTime": { "type": "string" },
    "StartTime": { "type": "string" },
    "EndDateTime": { "type": "string" },
    "StartDateTime": { "type": "string" },
    "Anonymous": { "type": "boolean" },
    "IdentityList": { "type": "array", "items": { "type": "string" } },
    "IdentityExceptList": { "type": "array", "items": { "type": "string" } },
    "DomainList": { "type": "array", "items": { "type": "string" } },
    "DomainExceptList": { "type": "array", "items": { "type": "string" } },
  }
}
```

```

        "RuleDeactivated": { "type": "boolean" },
        "Target": { "type": "string" }
    },
    "additionalProperties": false
),

"ICBRules": {
    "type": "object",
    "properties": {
        "DayOfWeek": { "type": "integer" },
        "EndTime": { "type": "string" },
        "StartTime": { "type": "string" },
        "EndDateTime": { "type": "string" },
        "StartDateTime": { "type": "string" },
        "Anonymous": { "type": "boolean" },
        "IdentityList": { "type": "array", "items": { "type": "string" } },
        "IdentityExceptList": { "type": "array", "items": { "type": "string" } },
        "DomainList": { "type": "array", "items": { "type": "string" } },
        "DomainExceptList": { "type": "array", "items": { "type": "string" } },
        "CommunicationDiverted": { "type": "boolean" },
        "Roaming": { "type": "boolean" },
        "RuleDeactivated": { "type": "boolean" },
        "Allow": { "type": "boolean" }
    },
    "additionalProperties": false
),

"OCBRules": {
    "type": "object",
    "properties": {
        "DayOfWeek": { "type": "integer" },
        "EndTime": { "type": "string" },
        "StartTime": { "type": "string" },
        "EndDateTime": { "type": "string" },
        "StartDateTime": { "type": "string" },
        "IdentityList": { "type": "array", "items": { "type": "string" } },
        "IdentityExceptList": { "type": "array", "items": { "type": "string" } },
        "DomainList": { "type": "array", "items": { "type": "string" } },
        "DomainExceptList": { "type": "array", "items": { "type": "string" } },
        "International": { "type": "boolean" },
        "InternationalExHC": { "type": "boolean" },
        "Roaming": { "type": "boolean" },
        "RuleDeactivated": { "type": "boolean" },
        "Allow": { "type": "boolean" }
    },
    "additionalProperties": false
}
}

```


B

External References for Supported Interactions

This appendix describes scenarios and corresponding call-session flows that OCECAS supports.

Table B-1 Redirection - Single PMN

Scenario	Reference
Redirection to alternative DE: Call Forward Unconditional	3GPP TS 24.604 A.1.1
Redirection to alternative DE: Call Forward Not Logged In	3GPP TS 24.604 A.1.5
Redirection to alternative DE: Call Forward on Busy	3GPP TS 24.604 A.1.4
Redirection to alternative DE: Call Forward on No Answer	3GPP TS 24.604 A.1.3
Redirection to alternative DE: Call Forward on Not Reachable	3GPP TS 24.604 A.1.5

Table B-2 VoLTE - Single PMN

Scenario	Reference to Call Flows
VoLTE UE Attachment and IMS Registration,	GSMA FCM.01 3.2.2 & 3GPP TS 24.229 5.7.1.1
VoLTE UE Initiated Detach and IMS Deregistration,	GSMA FCM.01 3.2.2
Basic VoLTE UE to VoLTE UE Voice Call Establishment, Originating Side	GSMA FCM.01 3.2.3
Basic VoLTE UE to VoLTE UE Voice Call Establishment - Terminating Side	GSMA FCM.01 3.2.4
Basic VoLTE UE to VoLTE UE Voice Call Clearing - Initiated	GSMA FCM.01 3.2.5
Basic VoLTE UE to VoLTE UE Voice Call Clearing - Received	GSMA FCM.01 3.2.6
Basic VoLTE UE to VoLTE UE Multimedia (Voice/Video) Call Establishment, Originating Side	GSMA FCM.01 3.2.7
Basic VoLTE UE to VoLTE UE Multimedia (Voice/Video) Call Establishment, Terminating Side	GSMA FCM.01 3.2.8
Basic VoLTE UE to VoLTE UE Multimedia (Voice/Video) Call Clearing - Initiated	GSMA FCM.01 3.2.9
Basic VoLTE UE to VoLTE UE Multimedia (Voice/Video) Call Clearing - Received	GSMA FCM.01 3.2.10
Basic VoLTE UE to VoLTE UE - Adding a video media stream - Originating Side	GSMA FCM.01 3.2.11

Table B-2 (Cont.) VoLTE - Single PMN

Scenario	Reference to Call Flows
Basic VoLTE UE to VoLTE UE - Adding a video media stream - Terminating Side	GSMA FCM.01 3.2.12
Basic VoLTE UE to VoLTE UE - Removing a video media stream - Originating Side	GSMA FCM.01 3.2.13
Basic VoLTE UE to VoLTE UE - Removing a video media stream - Terminating Side	GSMA FCM.01 3.2.14

Table B-3 VoLTE- Single PMN (Failures)

Scenario	Reference to Call Flows
No Answer from DE	RFC 3665
Busy indicator from DE	RFC 3665
No route to DE	RFC 3665
- IE detaches before session establishment with DE	
- Dereigstration during call	

Table B-4 VoLTE - Roaming

Scenario	Reference to Call Flows
Roaming VoLTE UE Attachment and IMS Registration	GSMA FCM.01 5.2.1
Roaming VoLTE UE Initiated Detach and IMS Deregistration	GSMA FCM.01 5.2.2
Roaming VoLTE UE to VoLTE Voice Call Establishment, Originating Side	GSMA FCM.01 5.2.3
Roaming VoLTE UE to VoLTE UE Voice Call Establishment, Terminating Side	GSMA FCM.01 5.2.4
Roaming VoLTE UE to VoLTE UE Voice Call Clearing - Initiated	GSMA FCM.01 5.2.5
Roaming VoLTE UE to VoLTE Voice Call Clearing - Received	GSMA FCM.01 5.2.6
Roaming VoLTE UE to VoLTE UE Multimedia (Voice/Video) Call Establishment, Originating Side	GSMA FCM.01 5.2.7
Roaming VoLTE UE to VoLTE UE Multimedia (Voice/Video) Call Establishment, Terminating Side	GSMA FCM.01 5.2.8
Roaming VoLTE UE to VoLTE UE Multimedia (Voice/Video) Call Clearing - Initiated	GSMA FCM.01 5.2.9
Roaming VoLTE UE to VoLTE UE Multimedia (Voice/Video) Call Clearing - Received	GSMA FCM.01 5.2.10
Roaming VoLTE UE to VoLTE, Adding a video media stream	See following list
- Video Stream added by the roaming UE	GSMA FCM.01 5.2.11
- Video Stream added by the other party	GSMA FCM.01 5.2.11
Roaming VoLTE UE to VoLTE, Removing a video media stream	See following list
- Video Stream removed by roaming UE	GSMA FCM.01 5.2.12
- Video Stream removed by other party	GSMA FCM.01 5.2.12

Table B-5 SRVCC - Enhanced

Scenario	Reference To Call Flows
eSRVCC Attachment and IMS Registration	GSMA FCM.01 7.4.1 & 3GPP TS 24.237 A.3.3
UE Voice Call Establishment - Originating Side	GSMA FCM.01 7.4.2 & 3GPP TS 24.237 A.4.2
UE Voice Call Establishment - Terminating Side	GSMA FCM.01 7.4.3
PS-CS SRVCC - PS-CS Handover Cancellation - PS-CS Handover Terminating Leg	GSMA FCM.01 7.4.4 & 3GPP TS 24.237 A.6.1
PS-CS SRVCC enhancements using ATCF and with media anchored	3GPP TS 24.237 A.18.3
PS-CS SRVCC enhancements using ATCF and session traverses IBCF	GSMA FCM.01 7.4.4 & 3GPP TS 24.237 A.18.6
PS-CS SRVCC for active call with speech and video using vSRVCC procedure	3GPP TS 24.237 A.19.2

Table B-6 Terminating Access Domain Selection

Scenario	Reference
Call termination in IM CN	3GPP TS 24.292 10.4.3
Call termination to CS network via MSC Server enhanced for ICS	3GPP TS 24.292 10.4.5
Call termination over CS	3GPP TS 24.292 10.4.7

Table B-7 Supplementary Services

Scenario	Reference to Call Flows or Specification
Originating Identification Presentation	See following list
- no subscription tests	3GPP TS 24.607 4.5.2.9
- Privacy "id" tests	3GPP TS 24.607 4.5.2.9
- Privacy "header" tests	3GPP TS 24.607 4.5.2.9
- Privacy "user" tests	3GPP TS 24.607 4.5.2.9
Originating Identification Restriction	See following list
- "permanent mode" subscription tests	3GPP TS 24.607 4.5.2.4
- "temporary mode" subscription tests	3GPP TS 24.607 4.5.2.4
- no subscription tests	3GPP TS 24.607 4.5.2.4
Terminating Identification Presentation	See following list
- no subscription tests	3GPP TS 24.608 4.5.2.4
- subscription tests	3GPP TS 24.608 4.5.2.4
Terminating Identification Restriction	See following list
- "permanent mode" subscription tests	3GPP TS 24.608 4.5.2.9

Table B-7 (Cont.) Supplementary Services

Scenario	Reference to Call Flows or Specification
- "temporary mode - default restricted" subscription tests	3GPP TS 24.608 4.5.2.9
- "temporary mode - default not restricted" subscription tests	3GPP TS 24.608 4.5.2.9
- no subscription tests	3GPP TS 24.608 4.5.2.9
Communication Forwarding	See following list
- Unconditional (CFU)	3GPP TS 24.604 4.5.2.6 A.1.1
- on Not Logged-in (CFNL)	3GPP TS 24.604 4.5.2.6 A.1.5
- on Busy (CFB)	3GPP TS 24.604 4.5.2.6 A.1.4
- on Not reachable (CFNRC)	3GPP TS 24.604 4.5.2.6
- on No Reply (CFNR)	3GPP TS 24.604 4.5.2.6 A.1.3
- media condition	3GPP TS 24.604 4.9.1.3
- NoReplyTimer	3GPP TS 24.604 4.9.1.1A
Communication Deflection	3GPP TS 24.604 A.1.2
Incoming Call Barring (ICB)	See following list
- barring of all incoming calls	3GPP TS 24.611 4.5.2.6.1
- barring of incoming calls when roaming	3GPP TS 24.611 4.5.2.6.1
- barring of anonymous calls (ACR)	3GPP TS 24.611 4.5.2.6.2
Outgoing Call Barring (OCB)	See following list
- barring of all outgoing calls	3GPP TS 24.611 4.5.2.4.1
- barring of outgoing international calls	3GPP TS 24.611 4.5.2.4.1
- barring of outgoing international calls excl. home country	3GPP TS 24.611 4.5.2.4.1
Communication Hold (HOLD)	See following list
- hold without announcement	3GPP TS 24.610 A.1.1
- hold with announcement	3GPP TS 24.610 A.1.2
- resume without announcement	3GPP TS 24.610 A.2.1
- resume with announcement	3GPP TS 24.610 A.2.2
Ad-Hoc Multi Party Conference	GSMA IR.92 2.3.3
- create a conference with a conference factory URI	3GPP TS 24.147 A.3.2
- user requesting IMS to join another user	3GPP TS 24.147 A.4.4.1
- user leaving the conference	3GPP TS 24.147 A.6.2.1
- user subscribing to the conference event package	3GPP TS 24.147 A.5.2.1