

DOCUBOT Integration with OFSLL
Overview and Developer Guide
Oracle Financial Services Lending and Leasing
Release 14.12.0.0.0
Part No. F53373-01
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ORACLE[®]
Financial Services

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1. OFSLL DOCUBOT Overview and Developer Guide

OFSLL has an extended out of the box support for CHATBOT integration. This provides a new framework for direct user interaction with the system. However, since OFSLL is a back-office system there are additional external components required to be integrated to host and utilize the CHATBOT functionality.

For latest version of this document, refer to https://docs.oracle.com/cd/F53373_01/pdf/refdocs/ofsl_docubot_overview_and_developer_guide.pdf

This document consists of following chapters:

- [OFSLL DOCUBOT Overview](#)
- [Developer Guide for BOT Customization](#)

Following topics are discussed in OFSLL DOCUBOT Overview chapter:

- [Introduction](#)
- [Indexing Workflow](#)
- [How does search work?](#)
- [Third Party Licenses](#)
- [Features of BOT](#)
- [Launch OFSLL BOT](#)

1.1 Introduction

Currently, OFSLL integration with CHATBOT is supported with some of the functionalities such that end users can search for documentation and / or query and fetch the account related information and/or perform other actions on an account with options presented in CHATBOT menu.

This document outlines the integrated framework and procedures required to implement certain features, but it is not a general-purpose configuration manual.

1.1.1 DocuBot Overview

OFSLL integrated Docubot (Documentation searchable Chabot) is a functionality for guiding product end-users to navigate through release documentation with dynamic search capability along with other key features like access to latest release documents, module specific documentation, index glossary and so on.

This serves as knowledge repository and one point reference for information related to product usability, process workflow, installation, administration of all product release till date.

The Documentation ChatBot or DocuBot - hereafter is referred to as 'BOT' in the document.

1.1.2 **About**

The documentation search engine adapted in BOT facilitates for all types of data search including textual, alphanumeric, numeric, keyword, phrases, and sentences. This is an 'Elastic Search' and uses a data structure called 'Inverted Index' which is designed for fast and full-text searches. An inverted index lists every unique word that appears in any document and identifies all of the documents in which the word is present.

The advantage of using elastic search is the speed, scalability and its ability to index most format of content.

1.1.3 **Purpose**

The purpose of this document is to demonstrate the capability of OFSLL BOT in handling documentation search requirements by integrating with Oracle Digital Assistant (ODA). This document is intended to detail the usability features and also to serve as a developer guide to understand the configuration procedures. However, the features and options presented are provided only as a sample and needs further customization based on requirements.

1.1.4 **Audience**

In general, this document is intended to all those parties and decision makers who are interested to know about OFSLL BOT integrated framework. The configuration sections are intended for system administrators, consulting and implementation teams who deploy customized solutions for customer.

1.1.5 **Accessibility**

The OFSLL BOT integrated framework is supported from OFSLL 14.12.0.0.0 release.

BOT is agnostic of which self-service site / portal is used to provide access and interface to the users for help documentation.

1.1.6 **Access**

Currently the framework supports basic authentication (not OAUTH). User Management and authentication needs to be handled as part of the implementation.

1.1.7 **Pre-requisites**

Following are the pre-requisites:

- The BOT is designed to work in ODA framework (platform version 21.02). The configuration is to be done as detailed in [Developer Guide for BOT Customization](#) section.
- Also the ODA Server Environment has to be licensed separately. For more information, refer to <https://www.oracle.com/in/chatbots/digital-assistant-platform/>
- Need to have release specific pre-indexed file for elastic search to work.
- Adequate space to store the indexed file directories in the respective folders.
- WebLogic server for deployment of war file (OracleFSSLChatBot.war).
- The parameters in 'Channel.Properties' file are to be configured before creating and deploying the .war file (OracleFSSLChatBot.war). For details, refer to '[BOT Configuration](#)' section.

1.2 Indexing Workflow

The elastic search for OFSLL BOT requires pre-indexing of content. Hence, indexing is done for 14.12.0.0 release documents. The indexing process is done automatically using the third-party plugins such as Apache Lucene and Jsoup to identify unique keywords in HTML files. This generates indexed files which serves as common directory for searched keyword and the file instance where it exists.

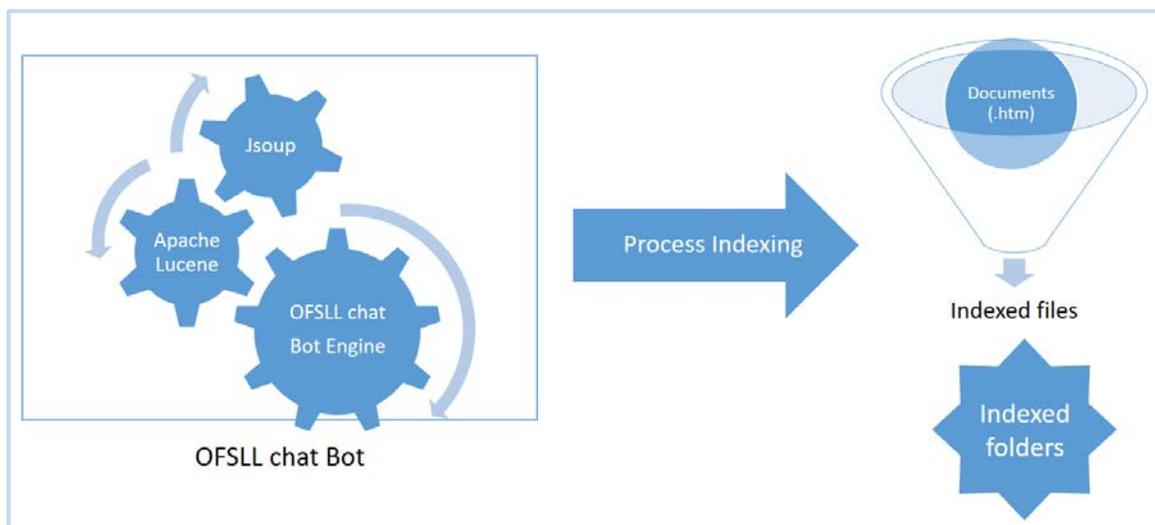
For more information on third-party plugins used, refer to '[Third Party Licenses](#)' section.

1.2.1 How is Indexing Done?

Apache Lucene manages an index over a dynamic collection of documents and provides very rapid updates to the index as and when documents are either added or removed from the collection. An index may store a heterogeneous set of documents.

Index in OFSLL BOT is handled by feeding all the release related html files. These htmls files are indexed both as single page reference and as well as at topic level using the hash tag to which it is mapped.

The workflow indicated below illustrates on how 3rd party Apache Lucene engine creates indexed files and stores in respective release specific folder.



1.2.2 Release Specific Indexing

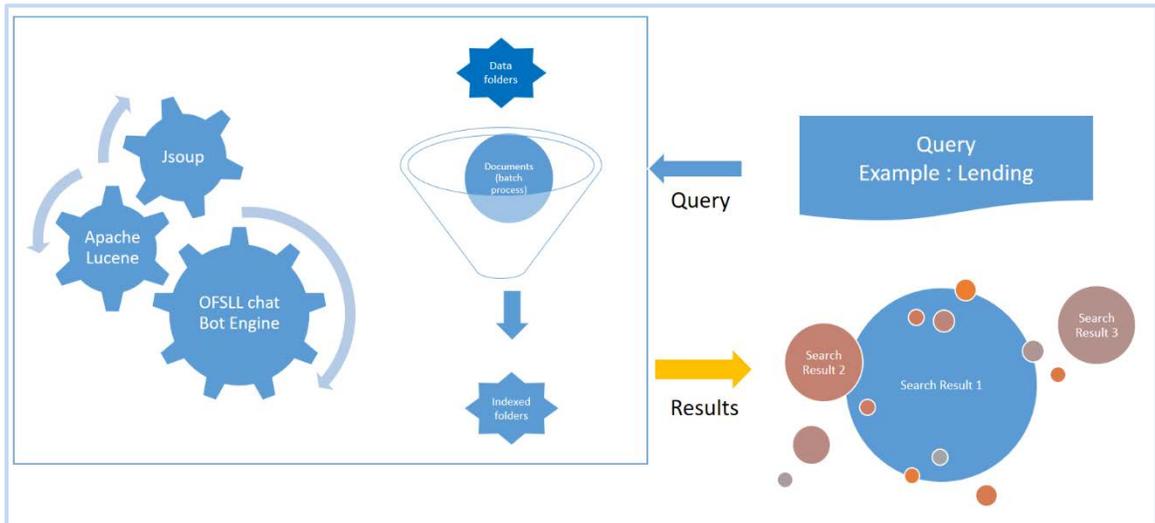
Indexing is done for the following release of OFSLL and indexed files are provided in respective folder. The mapping of Release number v/s Folder name and Part Number is indicated below:

Release No	Folder Name	Part Number
14.12.0.0.0	14.12	F53373_01

1.3 How does Search Work?

On initiating the Search, the keyword is searched in the index directory and a URL link is returned in two ways for the specific release number mapped. The search results are provided in both the below combinations:

- Page(s) link in which the Search keyword is present
- Direct heading link in which the Search keyword is present. This is fetched using hash tag reference for the topic.



1.4 Third Party Licenses

OFSLL BOT uses the following third party licenses:

- Apache Lucene, Version: 8.10.1
The Apache Software Foundation, Technology: Lucene, Version: 8.10.1
Files used (below are part of Apache Lucene 8.10.1)
Lucene Core (8.10.1)
Lucene query parser (8.10.1)
- JSOUP 1.14.3
Jsoup is a Java library for working with real-world HTML.
It provides a very convenient API for fetching URLs and extracting and manipulating data, using the best of HTML5 DOM methods and CSS selectors.
jsoup implements the WHATWG HTML5 specification, and parses HTML to the same DOM as modern browsers do.
scrape and parse HTML from a URL, file, or string
find and extract data, using DOM traversal or CSS selectors
manipulate the HTML elements, attributes, and text
The purpose of using Jsoup in chatbot is to read the html elements <tags> <href> and use it as a added part of indexing
Link : <https://jsoup.org>

For detailed information, refer to product licensing guide.

1.5 **Features of BOT**

Following are the unique features of OFSLL BOT:

- Readily available navigation links to the following:
 - Link to all Release documentation
 - Dynamic Document Search option
 - Link to currently mapped Product Release notes
 - Listing of Product Module / Classified Guides
 - Link to list of indexed Keywords
 - Link to Getting Started Video gallery
 - Link to Release Highlights
- Intuitive Menu options:
 - Option to clear chat data
 - Speech Conversion – Voice based Input
 - Personalization of BOT interface

1.5.1 **Support of Text and Voice Based inputs**

The BOT can support both Text and Voice based inputs to find information. This attempts to comply with multiple accessibility options.

The BOT is enabled with voice based inputs where in voice commands are accepted as input equivalent to typing or clicks. This option works on clicking the Mic button.

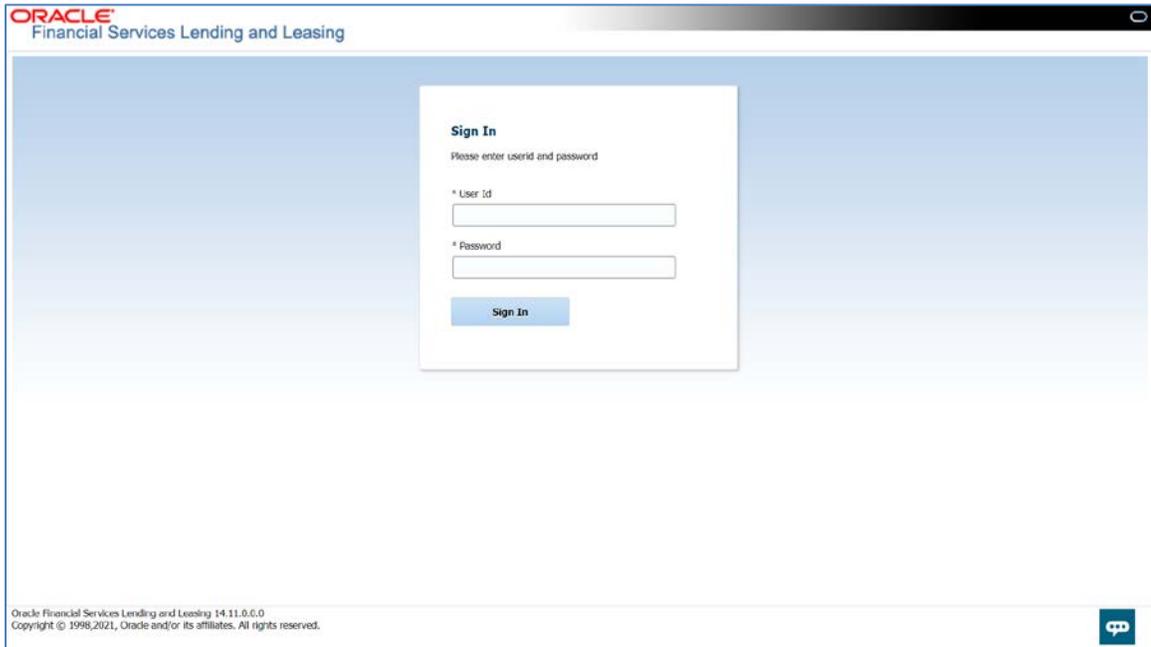
During text based input, the response is provided in the BOT interface. In a voice based input, the response is provided in both voice based response and BOT response simultaneously.

However, note that voice based input does not support to open a URL (link) reference.

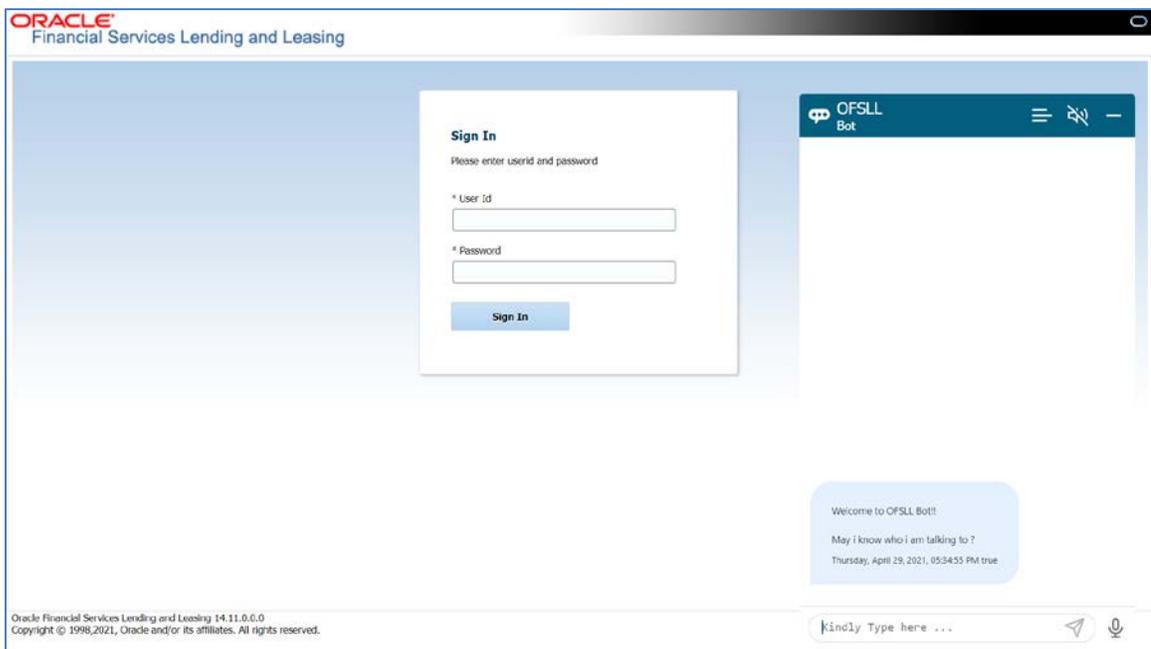
1.6 Launch OFSLL BOT

OFSLL BOT can either be in enabled or disabled status by default depending on the weblogic csf configuration (refer section 2.5 in this document). If enabled, on launch of OFSLL application the BOT is available at right bottom corner.

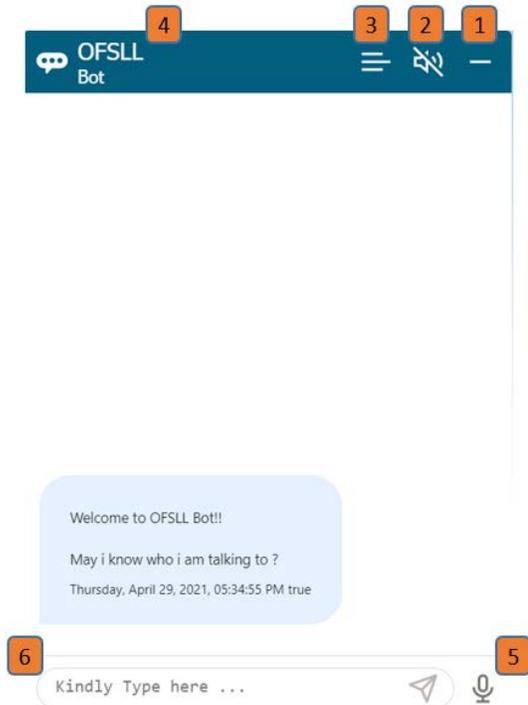
Note: Before you being, ensure to perform the required configuration as detailed in '[Developer Guide for BOT Customization](#)' chapter.



On clicking the BOT icon, the welcome message is as displayed:



1.6.1 BOT UI Elements

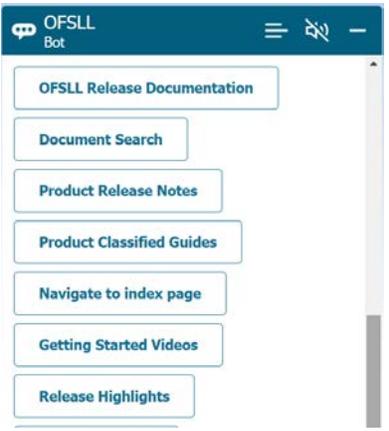
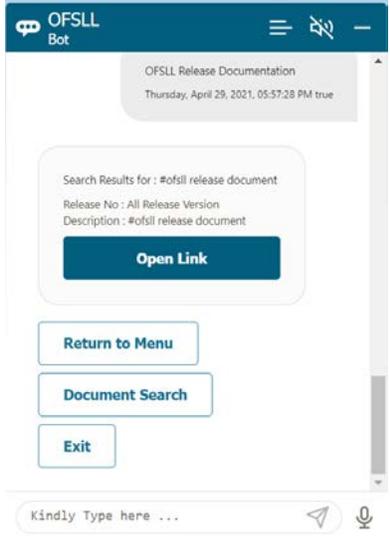


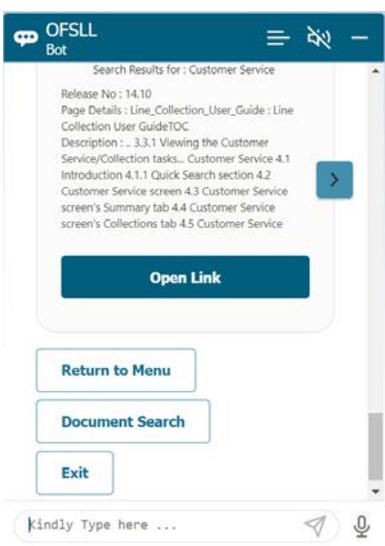
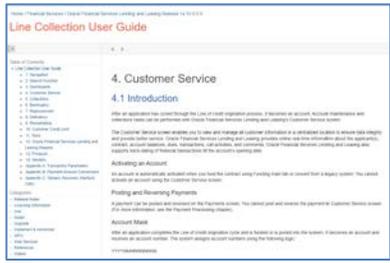
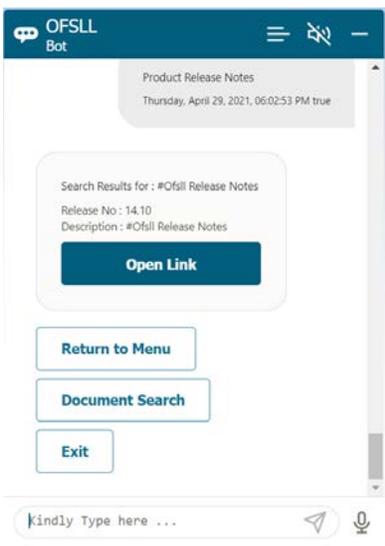
Sl.No	Option	View / Action
1	Minimize	Minimize BOT window
2	Speaker output	Enable BOT in speaker mode
3	Clear chat	Clear all messages in the BOT
4	Customized label	Customization for title label is detailed in Bot Customization section.
5	Mic Input	Enable Mic for voice based input
6	Text Input	Enter search string using keyboard

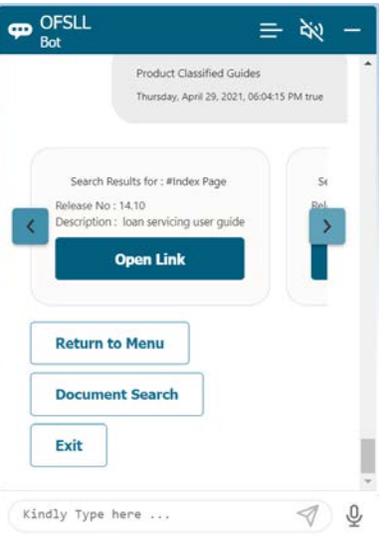
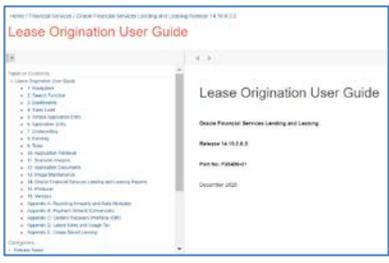
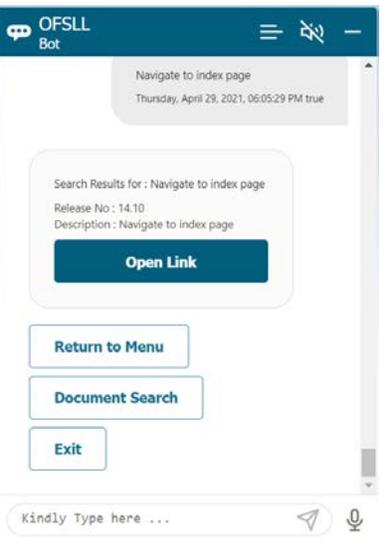
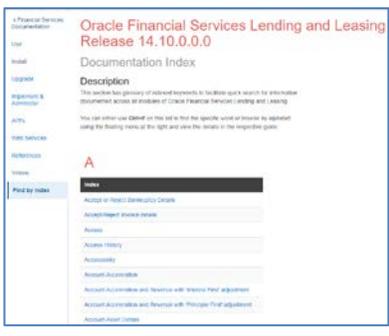
1.6.2 BOT Usability Workflow

Below is a simple sequence of user interaction with OFSLL BOT.

Sl.No	Action	BOT response	
1	Enter your name	BOT registers and provides a confirmation message to continue.	

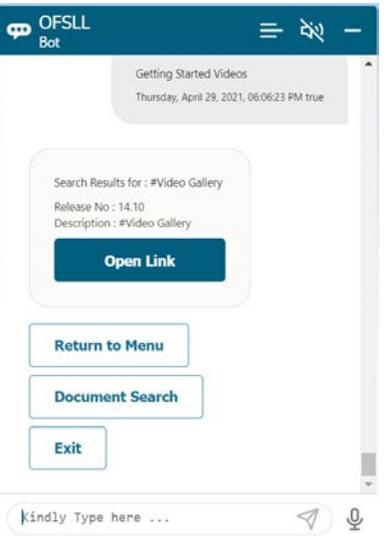
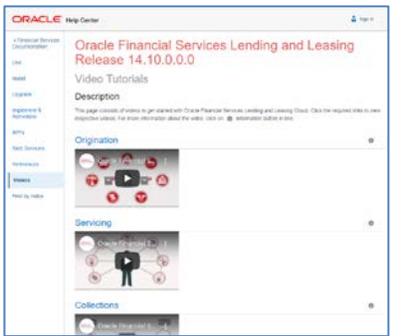
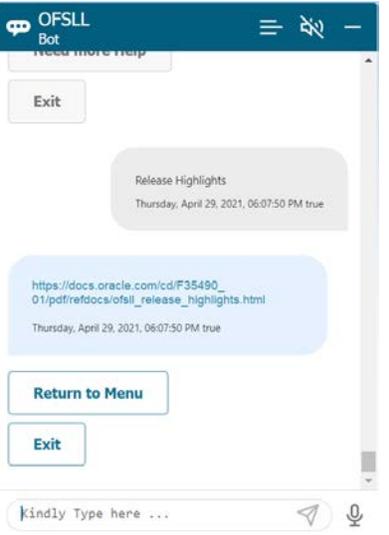
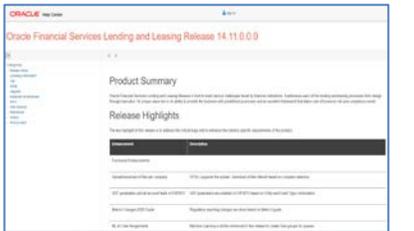
2	Clicking on 'Yes'	BOT presents list of documentation resorces for selection.																															
	Clicking on 'No'	Docubot displays an exit message. However, there is option to start again.																															
3	Clicking on OFSLL Release Documentation	 <p>Clicking on the Open Link, BOT displays the home screen with access to all release documenation libraries.</p>	 <table border="1"> <thead> <tr> <th>Release</th> <th>Part #</th> <th>Link</th> <th>Download</th> <th>Patch Release</th> </tr> </thead> <tbody> <tr> <td>14.0.0.0</td> <td>12700-01</td> <td>View</td> <td>Download</td> <td>NA</td> </tr> <tr> <td>14.0.0.0</td> <td>14210-01</td> <td>View</td> <td>Download</td> <td>14.0.0.0-Release</td> </tr> <tr> <td>14.0.0.0</td> <td>14030-01</td> <td>View</td> <td>Download</td> <td>14.0.0.0-Release</td> </tr> <tr> <td>14.0.0.0</td> <td>14050-01</td> <td>View</td> <td>Download</td> <td>14.0.0.0-Release</td> </tr> <tr> <td>14.0.0.0</td> <td>14060-01</td> <td>View</td> <td>Download</td> <td>14.0.0.0-Release</td> </tr> </tbody> </table>	Release	Part #	Link	Download	Patch Release	14.0.0.0	12700-01	View	Download	NA	14.0.0.0	14210-01	View	Download	14.0.0.0-Release	14.0.0.0	14030-01	View	Download	14.0.0.0-Release	14.0.0.0	14050-01	View	Download	14.0.0.0-Release	14.0.0.0	14060-01	View	Download	14.0.0.0-Release
Release	Part #	Link	Download	Patch Release																													
14.0.0.0	12700-01	View	Download	NA																													
14.0.0.0	14210-01	View	Download	14.0.0.0-Release																													
14.0.0.0	14030-01	View	Download	14.0.0.0-Release																													
14.0.0.0	14050-01	View	Download	14.0.0.0-Release																													
14.0.0.0	14060-01	View	Download	14.0.0.0-Release																													

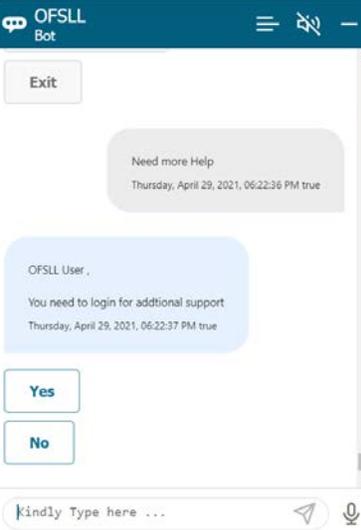
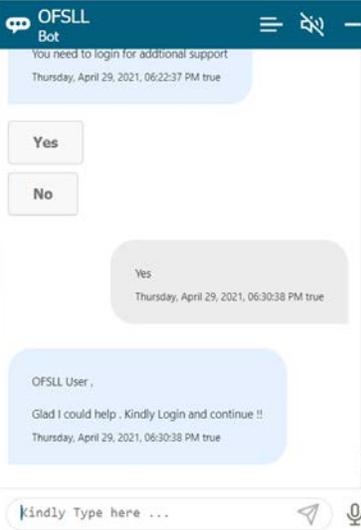
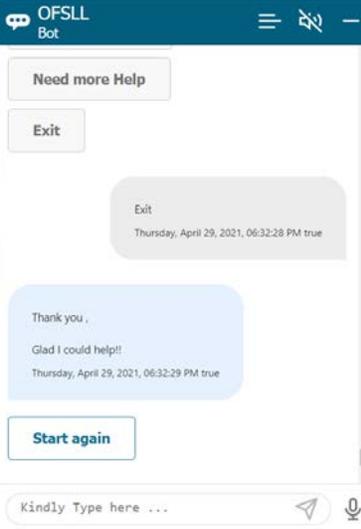
<p>4</p>	<p>Clicking on Documentation Search</p>	 <p>Search Results for : Customer Service</p> <p>Release No : 14.10 Page Details : Line_Collection_User_Guide : Line Collection User GuideTOC Description : - 3.3.1 Viewing the Customer Service/Collection tasks... Customer Service 4.1 Introduction 4.1.1 Quick Search section 4.2 Customer Service screen 4.3 Customer Service screen's Summary tab 4.4 Customer Service screen's Collections tab 4.5 Customer Service</p> <p>Open Link</p> <p>Return to Menu</p> <p>Document Search</p> <p>Exit</p> <p>Kindly Type here ...</p> <p>BOT displays dynamic results in horizontal navigating cards based on ranks from the list of documents which were indexed.</p> <p>Clicking on the Open Link, BOT displays the result page which contains the search keyword.</p>	 <p>Line Collection User Guide</p> <p>4. Customer Service</p> <p>4.1 Introduction</p> <p>Use an application to connect through the use of cloud capabilities. It enables an account administrator to connect with the customer and create Customer Service using the OFSLL Customer Service screen.</p> <p>The Customer Service screen enables you to take any change of customer information or a particular action to view data related to the customer. You can manage the data related to the customer and create a new customer. You can also view the customer details and create a new customer. You can also view the customer details and create a new customer. You can also view the customer details and create a new customer. You can also view the customer details and create a new customer.</p> <p>Activating an Account</p> <p>Account is automatically activated when you log the system using existing login details from a legacy system. You can also activate an account using the Customer Service screen.</p> <p>Posting and Reversing Payments</p> <p>A payment can be posted to the account in the Payments screen. You can also post and reverse the payment in Customer Service screen. You can also post and reverse the payment in Customer Service screen.</p> <p>Account Status</p> <p>Use an application to view the list of open accounts and to take an action on the system. It displays an account per account in account status. The system displays account status using the following logic:</p>
<p>5</p>	<p>Clicking on Product Release Notes</p>	 <p>Product Release Notes</p> <p>Thursday, April 29, 2021, 06:02:53 PM true</p> <p>Search Results for : #OFSLL Release Notes</p> <p>Release No : 14.10 Description : #OFSLL Release Notes</p> <p>Open Link</p> <p>Return to Menu</p> <p>Document Search</p> <p>Exit</p> <p>Kindly Type here ...</p> <p>Clicking on the Open Link, BOT displays the release notes of current release.</p>	 <p>Release Notes</p> <p>Oracle Financial Services Lending and Leasing</p> <p>Release 14.x.0.0.0</p> <p>Part No. F27106-01</p> <p>ORACLE Financial Services</p>

<p>6</p> <p>Clicking on Product Classified Guides</p>	 <p>Product Classified Guides Thursday, April 29, 2021, 06:04:15 PM true</p> <p>Search Results for : #Index Page Release No : 14.10 Description : loan servicing user guide</p> <p>Open Link</p> <p>Return to Menu Document Search Exit</p> <p>Kindly Type here ...</p>	 <p>Oracle Financial Services - Oracle Financial Services Lending and Leasing Release 14.10.0.0</p> <p>Lease Origination User Guide</p> <p>Oracle Financial Services Lending and Leasing Release 14.10.0.0 Part No: F14100-01 December 2020</p>
<p>7</p> <p>Clicking on Navigate to index page</p>	 <p>Navigate to index page Thursday, April 29, 2021, 06:05:29 PM true</p> <p>Search Results for : Navigate to index page Release No : 14.10 Description : Navigate to index page</p> <p>Open Link</p> <p>Return to Menu Document Search Exit</p> <p>Kindly Type here ...</p>	 <p>Oracle Financial Services Lending and Leasing Release 14.10.0.0</p> <p>Documentation Index</p> <p>Description This section has a gateway of indexed keywords to facilitate quick search for searchable document content as modules of Oracle Financial Services Lending and Leasing.</p> <p>You can either use Client on this site to find the specific word or browse by application using the floating links at the right and view the details in the respective pages.</p> <p>Find by Index</p> <p>INDEX</p> <p>ADDED TO INDEX DOCUMENTS CATEGORIES</p> <p>Account Agent shared profile Account Account History Accountability Account Accessible Account Accessibility and Review with Interest Rate Adjustment Account Accessibility and Review with Principal Profit Adjustment Account Agent Contact</p>

Clicking on the Open Link, BOT displays the module specific guide.

Clicking on the Open Link, BOT displays the Find by Index page which consists of all indexed keywords in documentation.

<p>8</p> <p>Clicking on Getting Started Videos</p>	 <p>Search Results for : #Video Gallery Release No : 14.10 Description : #Video Gallery</p> <p>Open Link</p> <p>Return to Menu Document Search Exit</p> <p>Kindly Type here ...</p>	<p>Clicking on the Open Link, BOT displays the video gallery link with getting started videos.</p>	 <p>ORACLE Help Center</p> <p>Oracle Financial Services Lending and Leasing Release 14.10.0.0.0 Video Tutorials</p> <p>Description This page consists of videos to get started with Oracle Financial Services Lending and Leasing (OFSLL). Click the required links to view respective videos. For more information about the video, click on Information about the video.</p> <p>Origination Servicing Collections</p>
<p>9</p> <p>Clicking on Release Highlights</p>	 <p>Release Highlights Thursday, April 29, 2021, 06:07:50 PM true</p> <p>https://docs.oracle.com/cd/F35490_01/pdf/refdocs/ofsl_release_highlights.html Thursday, April 29, 2021, 06:07:50 PM true</p> <p>Return to Menu Exit</p> <p>Kindly Type here ...</p>	<p>Clicking on the link, BOT displays the Release Highlights page which consists of new developments made to the current version of the product.</p>	 <p>ORACLE Help Center</p> <p>Oracle Financial Services Lending and Leasing Release 14.11.0.0.0</p> <p>Product Summary Release Highlights</p>

<p>10</p>	<p>Clicking on Need More Help</p>	 <p>The screenshot shows a chatbot interface with a dark blue header containing 'OFSLL Bot' and navigation icons. A grey message bubble says 'Need more Help' with a timestamp. Below it, a blue message bubble says 'OFSLL User, You need to login for additional support' with a timestamp. At the bottom, there are two buttons: 'Yes' and 'No'. A text input field at the very bottom contains 'Kindly Type here ...'.</p>	 <p>The screenshot shows the chatbot interface after a user click. A blue message bubble says 'OFSLL Bot, You need to login for additional support' with a timestamp. Below it are two buttons: 'Yes' and 'No'. A grey message bubble says 'Yes' with a timestamp. Below that, a blue message bubble says 'OFSLL User, Glad I could help. Kindly Login and continue !!' with a timestamp. A text input field at the bottom contains 'Kindly Type here ...'.</p>
<p>11</p>	<p>Clicking on Exit</p>	<p>BOT displays an exit message. However, there is option to start again.</p>	 <p>The screenshot shows the chatbot interface after a user click. A grey message bubble says 'Exit' with a timestamp. Below it, a blue message bubble says 'Thank you, Glad I could help!!' with a timestamp. At the bottom, there is a 'Start again' button. A text input field at the very bottom contains 'Kindly Type here ...'.</p>

2. Developer Guide for BOT Customization

This section of the document intends to help you to set up and configure Oracle Digital Assistant (ODA) 'ASK' with the sample OFSLL wrapper. However, the instructions are provided in brief and for any additional information, contact Oracle Financial Services Lending and Leasing Product Engineering team.

Note: Currently this framework supports basic authentication provided by OFSLL REST service. OAUTH authentication is not supported. Additionally, OBDX (Oracle Banking Digital Experience) can be integrated for user authentication purpose. For more information, refer to documentation at https://docs.oracle.com/cd/E97825_01/webhelp/Content/obdx/core/authentn/authntctn.htm

Following topics are discussed in this section:

- [Pre-requisites](#)
- [OFSLL Wrapper customization](#)
- [ODA – Dialog Flow Development](#)
- [Deploying war file on WebLogic Server](#)
- [Web application UI for Accessing BOT](#)
- [Configure CSF Mapping in Weblogic](#)
- [BOT Configuration](#)
- [BOT Customization](#)

2.1 Pre-requisites

Following are the mandatory pre-requisites:

- OFSLL being a back-office system with limited capability, the following external components are to be integrated in a single framework:
 - ODA or Oracle Digital Assistant is a platform that allows to create and deploy digital assistants, which are AI-driven interfaces that help users accomplish a variety of tasks in natural language conversations.
 - OBDX or Oracle Banking Digital Experience as a Application Launching portal and for multi-factor authentication.
--or--
 - Any 3rd party web application or customer self-service portal or lenders/financial services website to launch OFSLL BOT. In this case user authentication related integration needs to be handled as part of the implementation activity.
- Users need to have a capability to develop customized workflows using ODA development framework. A brief introduction is explained in '[ODA – Dialog Flow Development](#)' section.
- User need to have a good understanding of OFSLL REST services and should be able to customize it accordingly.
- User needs to be well versed with OFSLL wrapper customization as explained in '[OFSLL Wrapper customization](#)' section.

2.2 OFSLL Wrapper customization

Note: From the current release onwards, no additional jar file needs to be added since 'Maven – Pom.xml' based model has been implemented.

Follow the below steps for OFSLL wrapper customization:

1. Import project into eclipse and modify channel.Properties to update below properties

```
ofsll.baseURL = <OFSLL REST service base URL  
<http://<host>:<port>/OFSllRestWS/service/api/resources>>  
ofsll.username = <OFSLL username>  
ofsll.password = <OFSLL pass>  
ofsll.suffix = htm  
ofsll.otmHttpUrl=https://docs.oracle.com/cd/  
ofsll.fIndex=/findex.htm  
ofsll.index=index.htm  
ofsll.video=/videos.htm  
ofsll.ofsllReleaseNotes=/pdf/refdocs/ofsll_release_notes.pdf  
ofsll.ofsllReleaseDoc=https://docs.oracle.com/en/industries/financial-  
services/financial-lending-leasing/index.html  
ofsll.splitSeperator==  
ofsll.maxHitsResults=<max number of results returned>  
ofsll.indexDir = <Release index directory path of server >  
ofsll.releaseVersionUrl= <Release Part number>  
ofsll.releaseNo=<Release No>  
ofsll.releaseHighlights=/pdf/refdocs/release_highlights.htm
```

2. To add any new service modify com.ofss.ofsll.chatbot.restclient.ChatRestClient.java file.

- Inside ChatRestClient Class add a new method with required actions
- Add supporting JAXB files
- Use the available supporting methods -- readInputStream, setChatBotResponse, createConnection, stringToJaxb etc.

Example for document search functionality is indicated below:

```

@Consumes(MediaType.APPLICATION_JSON)
    @Produces(MediaType.APPLICATION_JSON)
    @POST
    @Path("/lucenesearch")
    public Response lucenesearch(ODARRequestDTO ibcsRequest) throws
IOException {
        final IChatbotAssembler chatbotAssembler =
ChatbotAssemblerFactory.getInstance().getChatbotAssembler("ODA");
        final HashMap < String,
Object > map = (HashMap < String, Object > ) ibcsRequest.getProperties();
        String searchQuery = "";
        Properties prop = new Properties();
        try (InputStream propertiesFile =
this.getClass().getClassLoader().getResourceAsStream("channel.properties")) {
            prop.load(propertiesFile);
        }
        if (map != null && map.containsKey("query")) {
            searchQuery = (String) map.get("query");
        }
        ResponseDTO ibcsResponse = null;
        try {

            ChatbotResponseDTO chatbotResponse = new ChatbotResponseDTO();
            String indexDirPath =
prop.getProperty("ofssl.indexDir")+prop.getProperty("ofssl.releaseNo");
            String releaseVersionUrl = prop.getProperty("ofssl.releaseVersionUrl");
            String urlPrefix = prop.getProperty("ofssl.otmHttpUrl");
            String splitSeperator = prop.getProperty("ofssl.splitSeperator");
            String releaseNo = prop.getProperty("ofssl.releaseNo");
            String urlPrefixPath = urlPrefix + releaseVersionUrl;
            String findIndexPath = prop.getProperty("ofssl.findIndex");
            String indexPath = prop.getProperty("ofssl.index");
            String videoPath = prop.getProperty("ofssl.video");
            String ofsslReleaseNotesPath = prop.getProperty("ofssl.ofsslReleaseNotes");
            String ofsslReleaseDocPath = prop.getProperty("ofssl.ofsslReleaseDoc");
            Integer maxHitsResults =
Integer.parseInt(prop.getProperty("ofssl.maxHitsResults"));
            File fileIndexDirPath = new File(indexDirPath);
            LuceneSearchHighlighter luceneSearchHighlighter = new
LuceneSearchHighlighter();
            List<String> fileList = new ArrayList <> ();

            if ((searchQuery.toLowerCase().trim().contains("#ofssl release document")) ||
(searchQuery.toLowerCase().trim().contains("navigate to index page")) ||
(searchQuery.toLowerCase().trim().contains("#video gallery")) ||
(searchQuery.toLowerCase().trim().contains("#ofssl release notes")) ||
(searchQuery.toLowerCase().trim().contains("#index page"))) {

```

```

        if ((searchQuery.toLowerCase().trim().contains("#ofsl release document")))
    {
        releaseNo="All Release Version";
        fileList.add(searchQuery + splitSeperator + ofslReleaseDocPath +
splitSeperator+searchQuery+ splitSeperator+releaseNo);
    }
    if ((searchQuery.toLowerCase().trim().contains("navigate to index page"))) {
        fileList.add(searchQuery + splitSeperator + urlPrefixPath + indexPath +
splitSeperator+searchQuery+ splitSeperator+releaseNo);
    }
    if ((searchQuery.toLowerCase().trim().contains("#index page"))) {
        searchQuery = indexPath;
        fileList = luceneSearchHighlighter.searchsinglepage(fileIndexDirPath,
searchQuery, maxHitsResults, splitSeperator);
    }
    if ((searchQuery.toLowerCase().trim().contains("#video gallery"))) {
        fileList.add(searchQuery + splitSeperator + urlPrefixPath + videoPath +
splitSeperator+searchQuery+ splitSeperator+releaseNo);
    }
    if ((searchQuery.toLowerCase().trim().contains("#ofsl release notes"))) {
        fileList.add(searchQuery + splitSeperator + urlPrefixPath +
ofslReleaseNotesPath + splitSeperator+searchQuery+ splitSeperator+releaseNo);
    }
    } else {
        searchQuery = searchQuery.replaceAll("#", "");
        fileList = luceneSearchHighlighter.search(fileIndexDirPath, searchQuery,
maxHitsResults, splitSeperator);
    }
    String serviceOutputForChatBot = "";
    for (String obj: fileList) {
        if (serviceOutputForChatBot == "") {
            serviceOutputForChatBot = obj.replace("\\", "/");
        } else {
            serviceOutputForChatBot = serviceOutputForChatBot + "\n---\n" +
obj.replace("\\", "/");
        }
    }
    if (fileList.isEmpty()) {
        String errorOutputForChatBot = "Search is not found for : " + searchQuery;
        setChatBotResponse("failure", errorOutputForChatBot, chatbotResponse,
"response", "request");
    } else {
        List < String > srhchoices = new ArrayList < >();
        for (String obj: fileList) {
            srhchoices.add(obj.replace("\\", "/"));
        }
        setChatBotResponse("success", srhchoices, chatbotResponse, "acc_srh",
"acc_srh");
    }

```

```

        }
        ibcsResponse =
chatbotAssembler.fromChatbotResponseDTO((RequestDTO) ibcsRequest,
chatbotResponse);
    } catch(Exception e) {
        LOGGER.log(Level.SEVERE, e.getMessage());
    }
    return Response.status(Response.Status.OK).entity((Object)
this.buildResponse((Object) ibcsResponse)).build();
}

```

3. Export project as war file.
4. Deploy <WL_Home>/wlsserver/common/deployable-libraries/jax-rs-2.0.war as Library on weblogic.
5. Deploy generated WAR (OracleFSLLChatBot.war) in step 3 onto weblogic server.
6. Note down base service URL that is required while publishing in ODA.
Example : http://<host>:<port>/ofssl/v1/fulfillment

2.3 ODA – Dialog Flow Development

Each menu option displayed in BOT are configured as an 'Intent' which is configured to perform a specific function or otherwise call a REST service in OFSSL.

In-order to achieve a sequence of menu options, dialog flow development is required to be performed in ODA Oracle Digital Assistant. Following is a quick overview of steps involved:

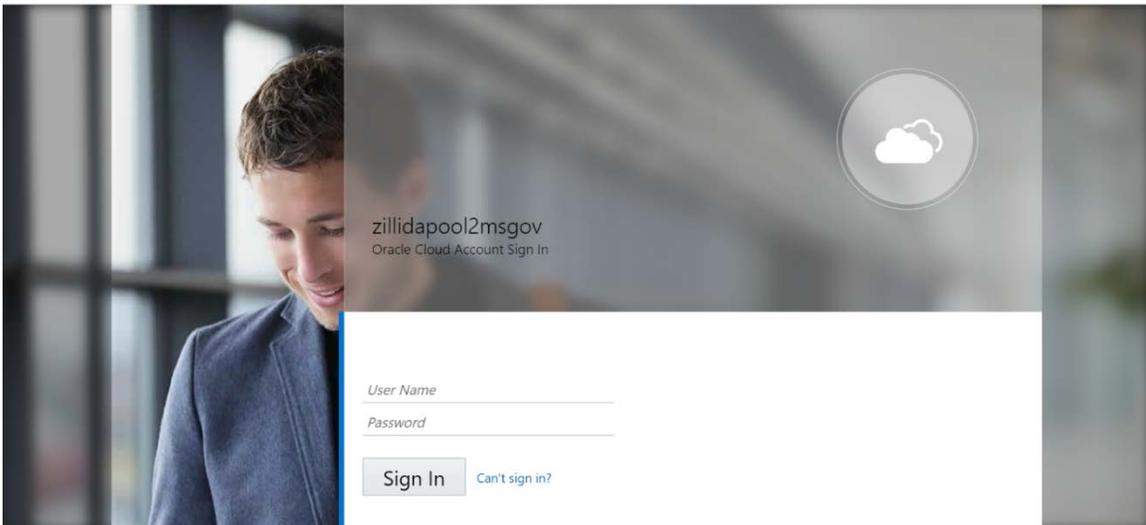
- Login
- Creating Skill / Digital Assistant
- Defining Entity
- Adding Intents
- Updating Bot flow using Yaml
- Adding OFSSL REST service
- Configuring Channel for Publishing
- Publishing

It is recommended to refer to ODA documentation for detailed information - <https://docs.oracle.com/en/cloud/paas/digital-assistant/index.html>

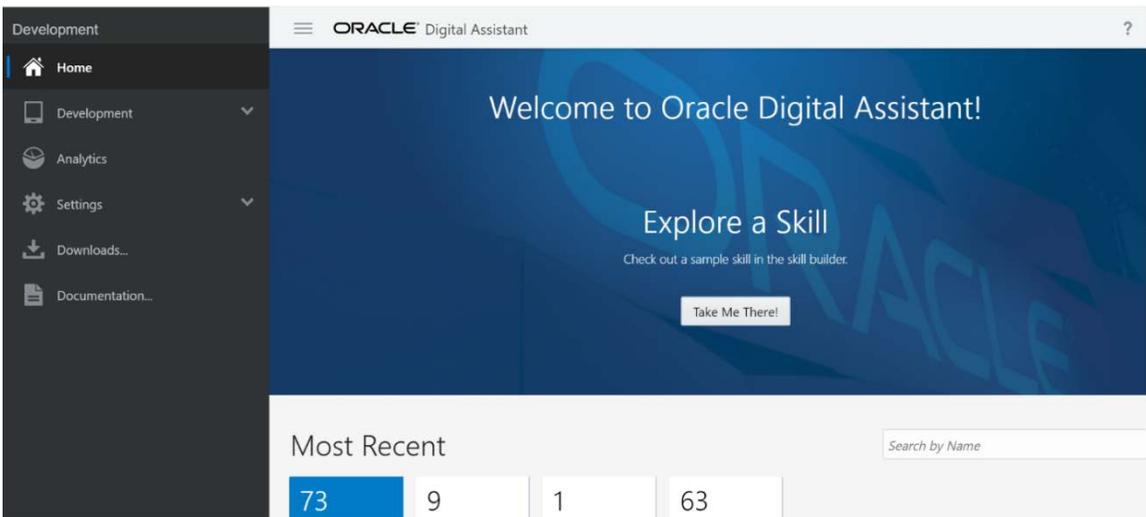
In the ODA - dialog flow development, you can either create new or import the given sample available in path – <release.zip>\LL\release\14_x_0_0_0\ws_as\ChatBot\documentation-bot

The sequence of flow in creating a sample BOT in ODA is indicated below with illustration:

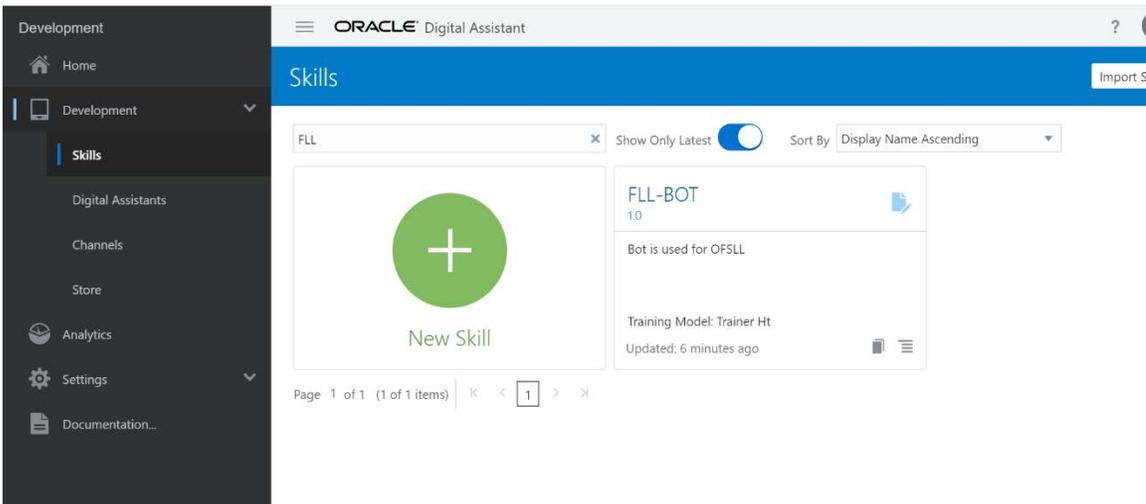
1. Login to ODA UI



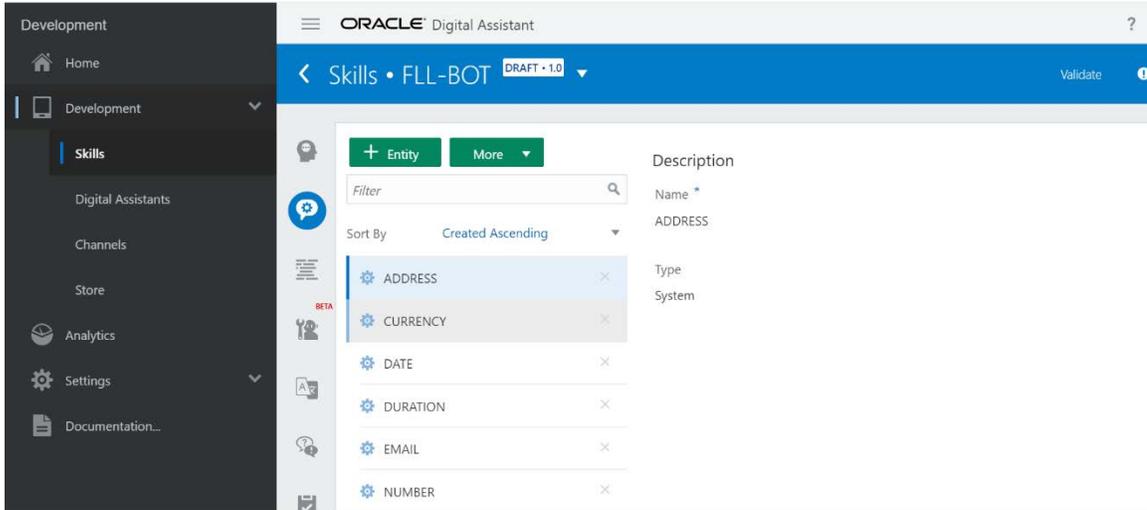
2. Go to Home



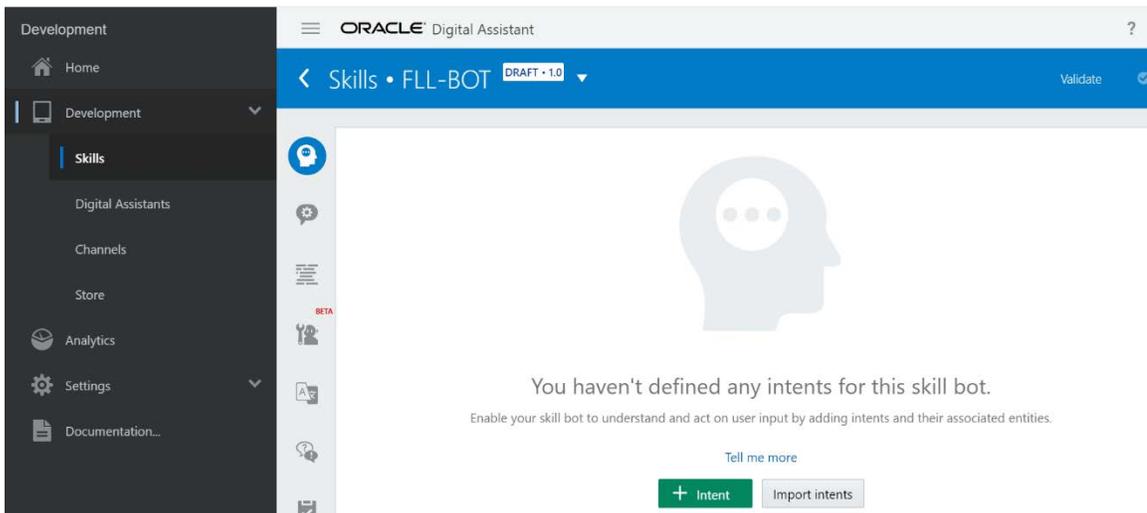
3. Create Skill/Digital Assistant.



4. Add Entities



5. Add Intents. This involves defining Activity, Available option, Next level, Breakpoint, intermediate steps.



6. Add Bot flow using Yaml

The screenshot shows the Oracle Digital Assistant interface. On the left is a navigation menu with options like Home, Development, Skills, Digital Assistants, Channels, Store, Analytics, Settings, and Documentation. The main area displays the configuration for a skill named 'FLL-BOT' in 'DRAFT' mode. A '+ Components' button is visible at the top. The configuration is shown in a code editor with the following YAML content:

```
1
2 metadata:
3   platformVersion: "1.0"
4   main: true
5   name: TestLease1
6   context:
7     variables:
8       temp: string
9
10 #variables for common purpose
11 iResult: nIresult
12 response: string
13 acc_nbr: string
14 transactiontype: string
15 acc_list: list
16 asset: string
17 oldAsset: string
18 serviceType: string
19 phoneNumber: string
20
21
22
23 #variables for fetch accounts
```

A 'Saving changes...' indicator is visible at the bottom right of the editor.

7. Add OFSLL REST Service

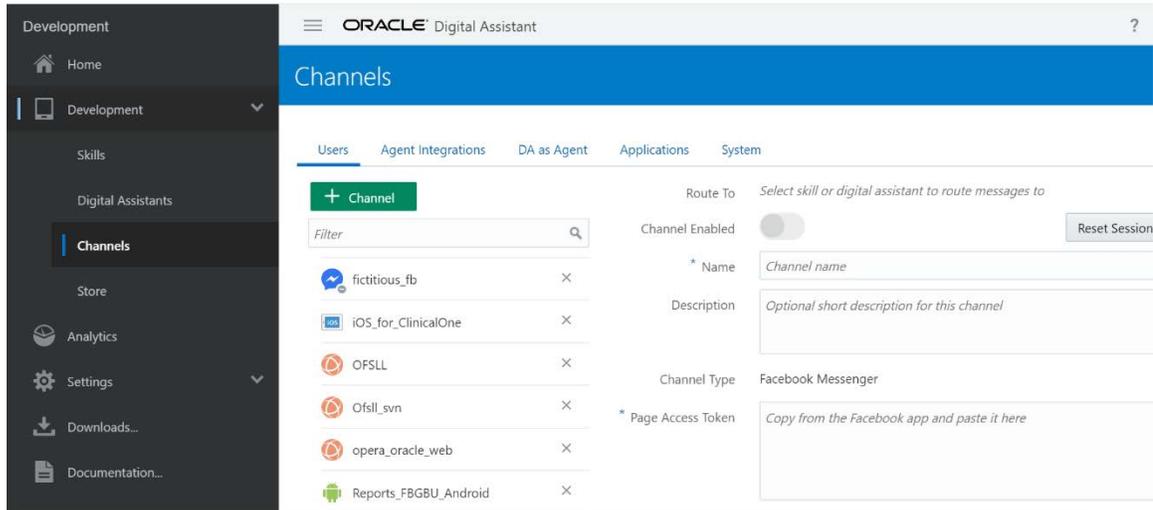
The screenshot shows the Oracle Digital Assistant interface with a message indicating that no services are configured for the custom components used by the skill bot. The message reads: "You haven't configured any services for the custom components used by this skill bot." Below the message, it says: "Add the names, URLs, and authentication settings for the services that implement each of the custom components that you've used in a flow." There is a "Tell me more" link and a green "+ Service" button.

The screenshot shows the Oracle Digital Assistant interface with the configuration for a REST service named 'Operations'. The service is enabled and ready. The configuration details are as follows:

- Service Enabled:
- Name: Operations
- Description: Operations
- Status: Ready
- Platform Version: 1.0
- Metadata URL: `http://<server name>:<port #>/ofsl/v1/fulfillment`
- User Name: [Empty field]
- Password: [Masked field]

There is an "Optional HTTP Headers" section with a note: "You can include HTTP headers here, if needed by your hosting service." and an "Add HTTP Header" button.

8. Add Channel. This indicates where it has to be published and in this sample application, only web channel is supported.
9. Enter the published URL as generated in step 2.6



10. After completion of Skill, publish. On publishing, the draft is converted to final non-editable version and only final published version is accessible in bot.
11. Additional security layer is available to allow chatbot to work for specific registered domains. To do so, select the channel, navigate to 'Allowed Domains' and add the domain name in the field. For example, adding *in.oracle.com* allows chatbot to work only from Oracle domain.
12. There is also an option to define the session time-out for chatbot which by default is set to maximum of 1440 minutes. You can enter the required time in minutes.

Note: The 'ofsl-documentation-bot' is the sample ODA FLL application designed for the demo purpose. The same can be imported in any ODA environment tested, modified for new features.

2.4 Deploying war file on WebLogic Server

Before you begin, ensure to use the war file for deployment of OFSLL BOT available in the path – release\<14_x.0.0.0>\ws_as\ChatBot\OracleFSLChatBot.war.

1. Login to Web Logic application server enterprise manager (e.g.:http://hostname:port/em). For example, <http://host01.example.com:8001/console>

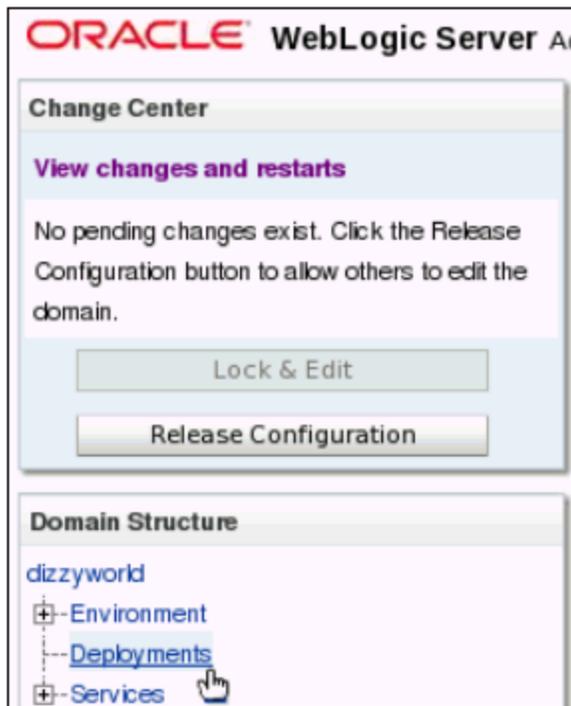
Note: Use the host name and port of the administration server of your domain.



2. Enter valid login credentials.
3. Deploying an application is a change to the domain's configuration, so it must first be locked. In the Change Center. Click 'Lock & Edit'.



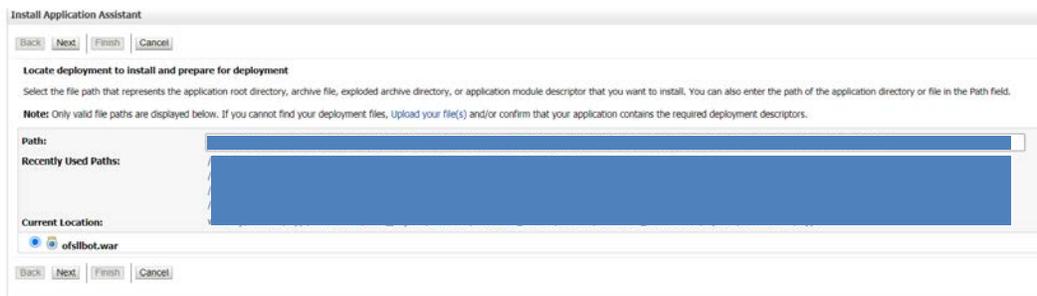
4. Under Domain Structure, click 'Deployments'.



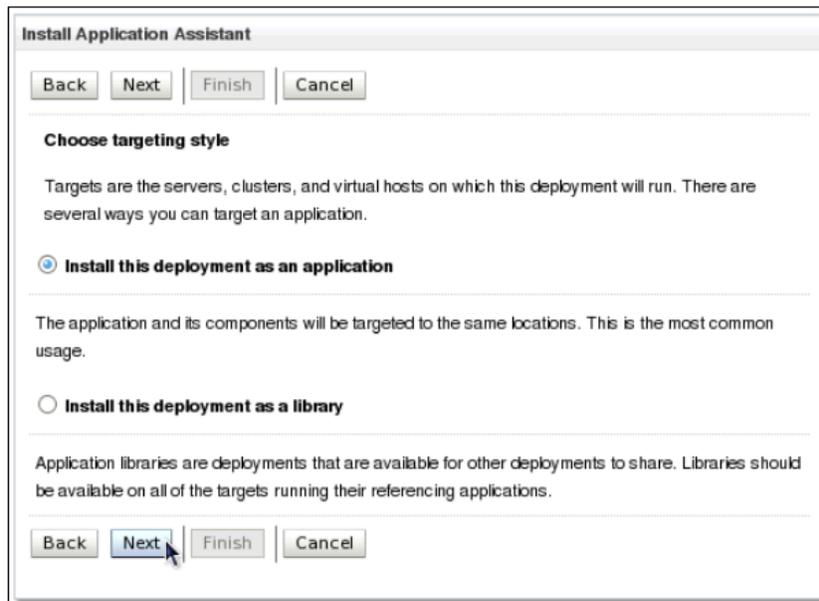
5. On the right, under Deployments, click 'Install'.



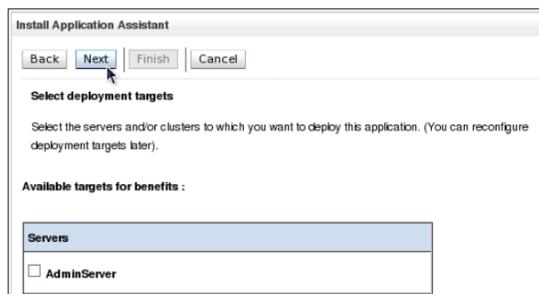
6. Find the Current Location field. Use the links to browse to the location in which you placed the downloaded OracleFSLLChatBot.war file.
7. The .war file is available in the path -
 release\<14_x.0.0.0>\ws_as\ChatBot\OracleFSLLChatBot.war. Select the .war file from the given path and click the radio button next to it. Using the links and the radio button, the console auto populates the Path fields. Alternatively, you can type in the path and file name in the Path field yourself. Click 'Next'.



8. Ensure that 'Install this deployment as an application' option is selected. Click 'Next'.



9. In the below window, click 'Next'.



10. Retain the default values and click 'Next'.

The screenshot shows the 'Install Application Assistant' dialog box. At the top, there are four buttons: 'Back', 'Next', 'Finish', and 'Cancel'. Below the buttons is the 'Optional Settings' section. The first sub-section is 'General', which asks 'What do you want to name this deployment?' and has a text input field labeled 'Name:'. The second sub-section is 'Security', which asks 'What security model do you want to use with this application?' and has three radio button options: 'DD Only: Use only roles and policies that are defined in the deployment descriptors.' (which is selected), 'Custom Roles: Use roles that are defined in the Administration Console; use policies that are defined in the deployment descriptor.', and 'Custom Roles and Policies: Use only roles and policies that are defined in the Administration Console.'. The third sub-section is 'Source accessibility', which asks 'How should the source files be made accessible?' and has one radio button option: 'Use the defaults defined by the deployment's targets' (which is selected).

11. In the below window, select the option 'No, I will review the configuration later' and click 'Finish'.

The screenshot shows the 'Install Application Assistant' dialog box. At the top, there are four buttons: 'Back', 'Next', 'Finish', and 'Cancel'. Below the buttons is the 'Review your choices and click Finish' section. The text says 'Click Finish to complete the deployment. This may take a few moments to complete.'. Below this is the 'Additional configuration' section, which asks 'In order to work successfully, this application may require additional configuration. Do you want to review this application's configuration after completing this assistant?' and has two radio button options: 'Yes, take me to the deployment's configuration screen.' and 'No, I will review the configuration later.' (which is selected).

Once done view the messages indicating that the deployment was installed, but changes must be activated. In addition, notice the benefits application listed in the Deployments table.

The screenshot shows the Oracle J2EE Administration Console interface. At the top, under the 'Messages' section, there are two green checkmark messages: 'The deployment has been successfully installed.' and 'You must also activate the pending changes to commit this, and other updates, to the active system.' Below this is the 'Summary of Deployments' section with 'Control' and 'Monitoring' tabs. The 'Control' tab is active, showing a text block explaining that the page displays a list of Java EE applications and stand-alone application modules that have been installed to this domain. It also provides instructions on how to start, stop, update, or delete applications. Below the text is a 'Customize this table' link. The 'Deployments' section features a table with columns for Name, State, Health, Type, and Deployment Order. A single deployment is listed with a state of 'distribute' and health of 'Initializing'. The table is surrounded by control buttons like 'Install', 'Update', 'Delete', 'Start', and 'Stop'.

Messages

- ✔ The deployment has been successfully installed.
- ✔ You must also activate the pending changes to commit this, and other updates, to the active system.

Summary of Deployments

Control | Monitoring

This page displays a list of Java EE applications and stand-alone application modules that have been installed to this domain. Installed applications and modules can be started, stopped, updated (redeployed), or deleted from the domain by first selecting the application name and using the controls on this page.

To install a new application or module for deployment to targets in this domain, click the Install button.

[Customize this table](#)

Deployments

Install | Update | Delete | Start ▾ | Stop ▾ | Showing 1 to 1 of 1 | Previous | Next

<input type="checkbox"/>	Name ^	State	Health	Type	Deployment Order
<input type="checkbox"/>	+	distribute	Initializing	Web Application	100

Install | Update | Delete | Start ▾ | Stop ▾ | Showing 1 to 1 of 1 | Previous | Next

12. In the Change Center, click the Activate Changes button.

The screenshot shows the Oracle Change Center interface. It has a title 'Change Center' and a sub-section 'View changes and restarts'. Below this, a message states 'Pending changes exist. They must be activated to take effect.' There are two buttons: 'Activate Changes' with a green checkmark icon and a mouse cursor pointing to it, and 'Undo All Changes'.

Change Center

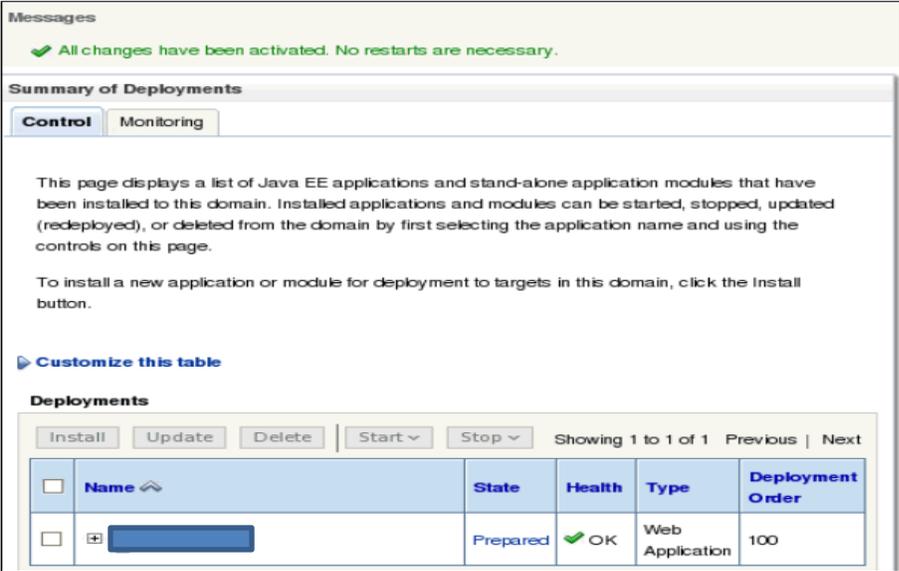
View changes and restarts

Pending changes exist. They must be activated to take effect.

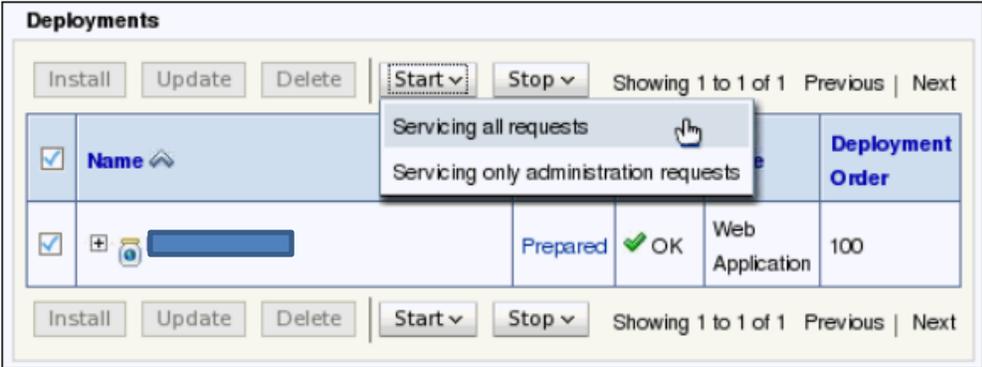
✔ Activate Changes

Undo All Changes

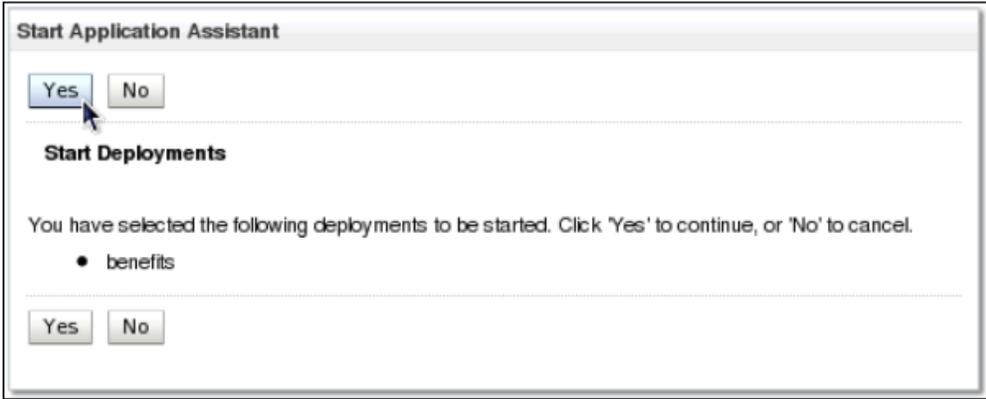
Notice the message indicating that the changes have been activated. In addition, notice the benefits application listed in the Deployments table is now in the "Prepared" state.



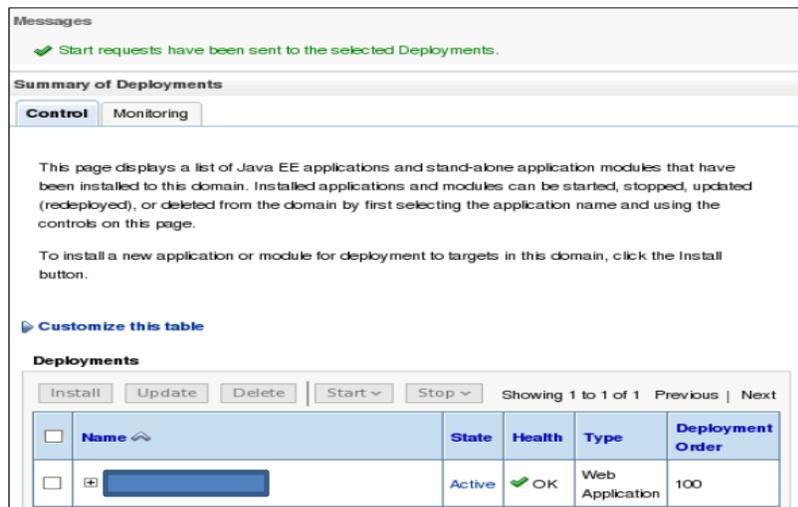
13. Select the checkbox against the left of the benefits application in the Deployments table. In the Start drop-down list, select 'Servicing all requests' option.



14. Click 'Yes' to continue.



15. A message is displayed indicating a start request was sent. Subsequently Notice that the state of application is 'Active' indicating that the application is accessible.



2.5 Web application UI for Accessing BOT

Web Application is User Interface where you can access the BOT functionality. The same can be integrated with OFSLL UI or any other front-end application such as customer support portal or financial institution website.

To configure WebApp, do one of the following:

- In case you wish to launch BOT as separate application, Modify **index.html** in OracleFSSLChatBot.war (or OracleFSSLChatBot.war) and update the following 2 fields with required details:
 - URI: '<ODA host>',
 - channelId: 'published bot channel ID'
- In case you wish to integrate BOT in an existing front-end application, use the provided **index.html** with the modified value and **web-sdk.js**

The BOT needs to be published on the login page and the only way it come be done is by adding the above properties in the Weblogic

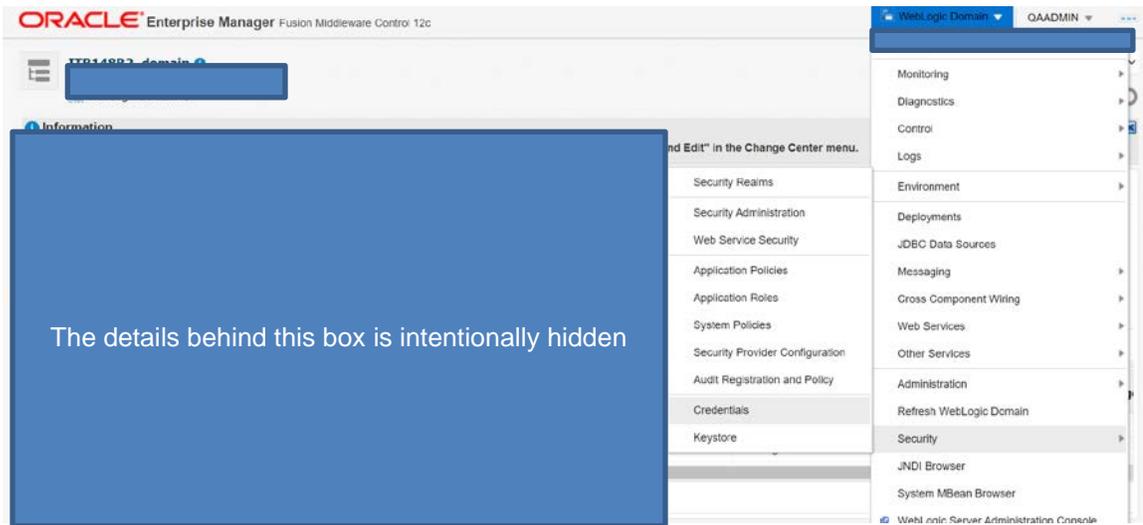
For additional information, contact Oracle Financial Services Lending and Leasing Product Engineering team.

2.6 Configure CSF Mapping in Weblogic

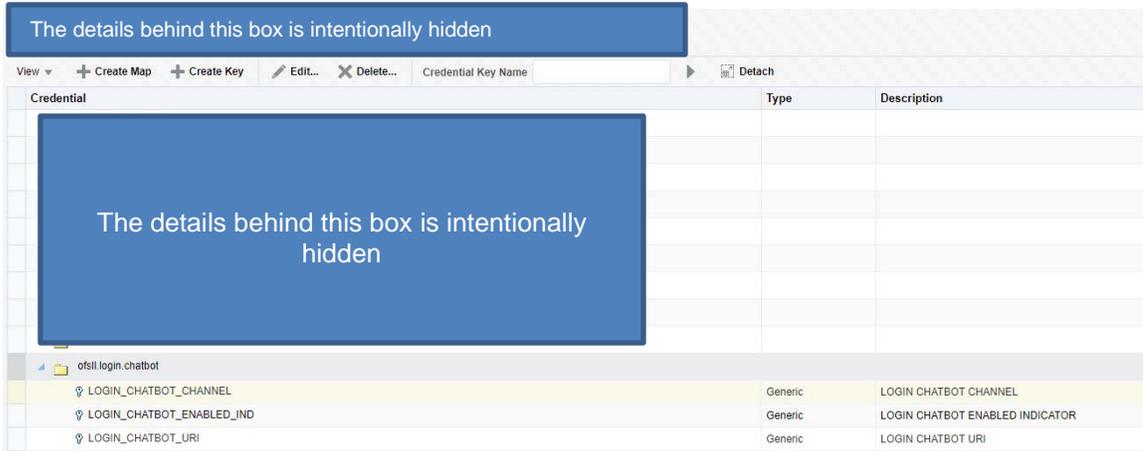
The below section details the process of CSF configuration for BOT to appear on OFSLL home page.

Following are the Parameters:

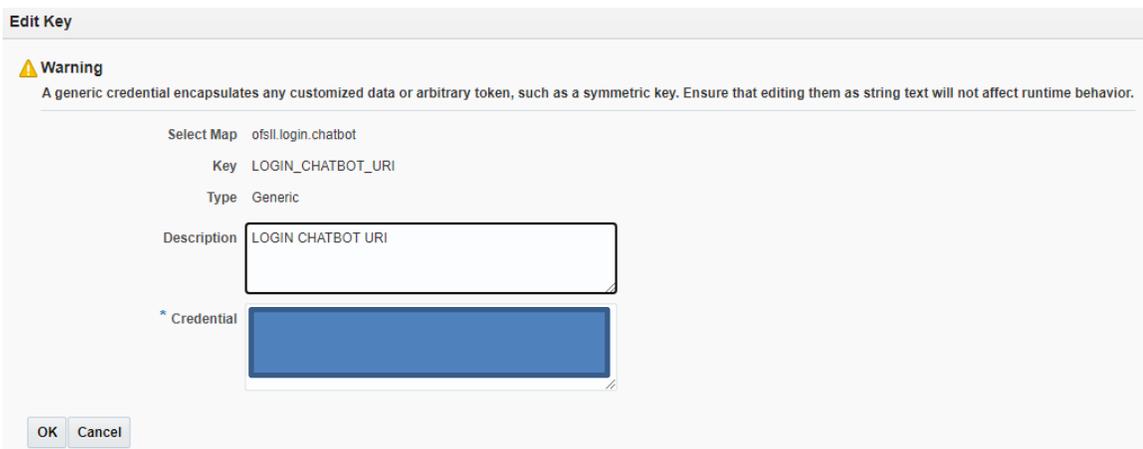
- Create a map called LOGIN_CHATBOT_MAP_NAME = ofsl.login.chatbot
 - Channel ID
 - URI
 - BOT enabled – Y/N
1. Login to the Weblogic server.



2. In the following screen, click 'NEW MAP';



3. Add URI



4. Enter BOT INDICATOR.

Edit Key

Warning
A generic credential encapsulates any customized data or arbitrary token, such as a symmetric key. Ensure that editing them as string text will not affect runtime behavior.

Select Map ofssl.login.chatbot
Key LOGIN_CHATBOT_ENABLED_IND
Type Generic

Description LOGIN CHATBOT ENABLED INDICATOR

* Credential Y

OK Cancel

5. Enter BOT CHANNEL ID

Edit Key

Warning
A generic credential encapsulates any customized data or arbitrary token, such as a symmetric key. Ensure that editing them as string text will not affect runtime behavior.

Select Map ofssl.login.chatbot
Key LOGIN_CHATBOT_CHANNEL
Type Generic

Description LOGIN CHATBOT CHANNEL

* Credential

OK Cancel

6. Configure the chatbot.js on the login page. Refer to the below image and .js code for reference.

The screenshot shows the Oracle Financial Services Lending and Leasing login page on the left. The page has a 'Sign In' form with fields for 'User Id' and 'Password', and a 'Sign In' button. On the right, the developer console shows the 'Sources' tab with the 'chatbot.js' file open. The code in the console includes functions for handling login events and initializing the chatbot SDK.

```

1 function onLoginPageLoad(event) {
2   var source = event.getSource();
3   AdfCustomEvent.queue(source, "LoginChatbotEvent",
4     {
5       'someArg': 'true'
6     },
7     true);
8 }
9
10 function onHomePageLoad(evt) {
11   var eventSource = evt.getSource();
12   AdfCustomEvent.queue(eventSource, "HomeChatbotEvent",
13     {
14       'someArg': 'true'
15     },
16     true);
17 }
18
19 function initSdk(name, url, channel) {
20   var chatidgsetSettings = {
21     initUserHiddenMessage: 'Hi', openChatOnLoad: false, URI
22     font: '12px Helvetica Neue, Helvetica, Arial, sans-serif',
23     locale: 'en-US',
24     enableClearMessage: true,
25     enableAutoComplete: false,
26     setSize: ('400px', '766px'),
27     showConnectionStatus: true,
28     showTypingIndicator: true,
29     displayActionsAsPills: true,
30     enableSpeech: true,
31     enableAttachment: false,
32     enableBotAudioResponse: true,
33     skillVoices: [{
34       lang: 'en-US',
35     }],
36   };

```

Ensure that no changes are done to the following js code:

```
function onLoginPageLoad(event) {
    var source = event.getSource();
    AdfCustomEvent.queue(source, "LoginChatbotEvent",
    {
        'someArg' : 'true'
    },
    true);
}

function onHomePageLoad(evt) {
    var eventSource = evt.getSource();
    AdfCustomEvent.queue(eventSource, "HomeChatbotEvent",
    {
        'someArg' : 'true'
    },
    true);
}

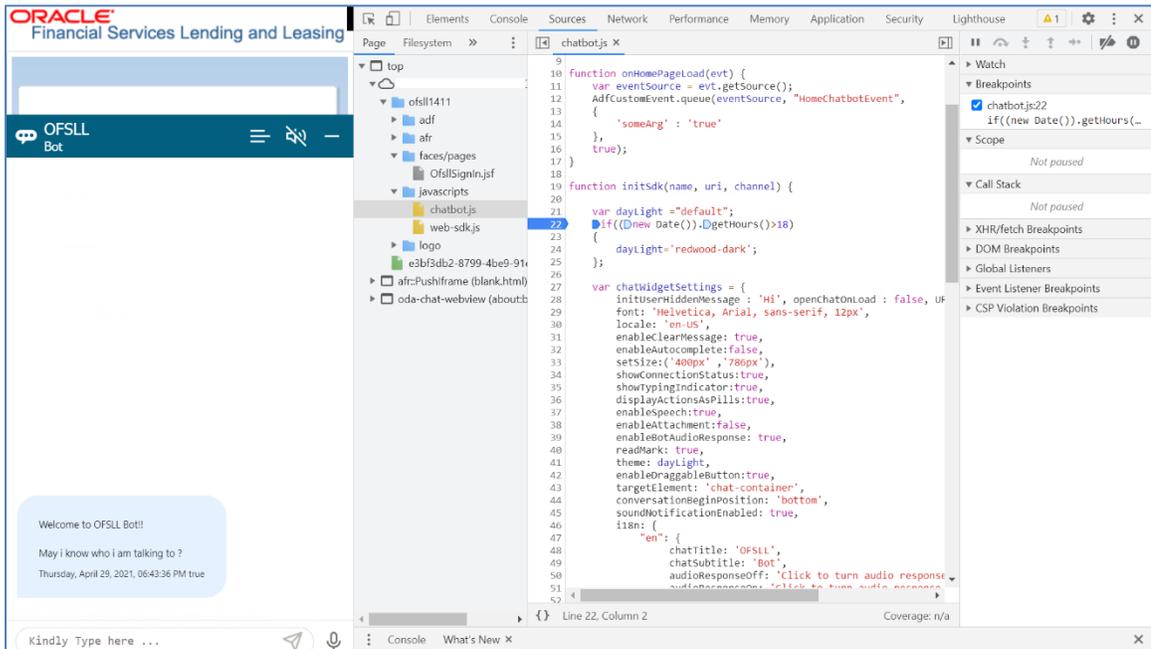
function initSdk(name, uri, channel) {
    var chatWidgetSettings = {
        initUserHiddenMessage : 'Hi', openChatOnLoad : false, URI : uri, channelId :
channel,
        font: '12px "Helvetica Neue", Helvetica, Arial, sans-serif',
        locale: 'en-US',
        enableClearMessage: true,
        enableAutocomplete:false,
        setSize:( '400px' , '786px'),
        showConnectionStatus:true,
        showTypingIndicator:true,
        displayActionsAsPills:true,
        enableSpeech:true,
        enableAttachment:false,
        enableBotAudioResponse: true,
        skillVoices: [{
            lang: 'en-US',
            name: 'Samantha'
        }, {
            lang: 'en-US',
            name: 'Alex'
        }, {
            lang: 'en-UK'
        }
    ]
    };
    if (!name) {
```

```

    name = 'Bots';
  }
  setTimeout(function () {
    const Bots = new WebSDK(chatWidgetSettings);// Initiate library with configuration
    Bots.connect();// Connect to server
  }.then(function () {
    })
    window[name] = Bots;
  });
}

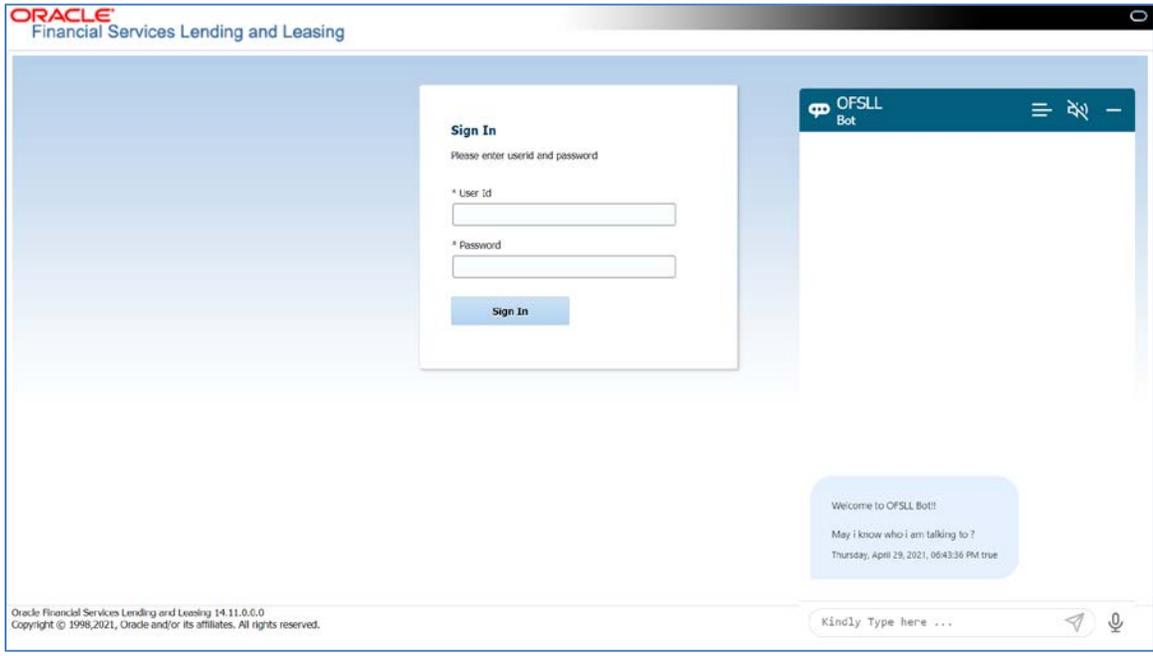
```

The above code needs to be implemented in the chatbot.js file as shown below:



7. Web-sdk.js needs to be added from the << OFSLL Installed Directory >>/ /web_interface/ofslbot/WebApp/scripts.

The BOT when launched form Web Application is as shown below:



2.7 **BOT Configuration**

For the BOT to function, the following parameters are to be defined in the application.properties file available in the .war in the path indicated below.

<OFSLL Installed Directory path>LL\release\<release version>\ws_as\ChatBot\OracleFSSLChatBot.war\WEB-INF\classes\

The below tables lists all the parameters of the properties file. However, only those fields marked as 'Y' in Update required (Y/N) column are to be updated.

Sl. No	Parameter Name	Fields	Description	Update required (Y/N)	Sample
1	paymentPurposeRequired=Y	Boolean	Captures the Payment purpose Required	N	Y
2	accessToken=	String	Captures the access token	N	
3	proxyIP=	String	Captures the Proxy	N	
4	proxyPort=	Integer	Captures the Proxy Port	N	
5	googleAPIKey=	String	Captures the Google API key	N	
6	imageUrl=	Path	Captures the Image URL	N	

SI. No	Parameter Name	Fields	Description	Update required (Y/N)	Sample
7	defaultHomeEntity=	String	Captures the home entity	N	
8	stockCode =	String	Captures the Stock Code	N	
9	moneyTransferPay=	String	Captures the Money Transfer Pay	N	
10	defaultBaseContext=	String	Captures the default base content	N	
11	sessionExpiryInMinutes = 15	Integer	Captures the Session timeout value	N	
12	ofssl.suffix = htm	String	Suffix of the files	N	Keep as .htm
13	ofssl.otmHttpUrl=https://docs.oracle.com/cd/	String	Captures the suffix for OTM Url	N	Keep as https://docs.oracle.com/cd/
14	ofssl.findex=/findex.htm	String	Captures the Findex path	N	Keep as /findex.htm
15	ofssl.index=index.htm	String	Captures the index.htm	N	Keep as index.htm
16	ofssl.video=/videos.htm	String	Captures the video file path	N	Keep as /video.htm
17	ofssl.ofsllReleaseNotes=/pdf/refdocs/ofssl_release_notes.pdf	String	Captures the OFSLL release notes suffix	N	Do not change
18	ofssl.ofsllReleaseDoc=https://docs.oracle.com/en/industries/financial-services/financial-lending-leasing/index.html	String	Captures the OFSLL release doc URL	N	Do not change

SI. No	Parameter Name	Fields	Description	Update required (Y/N)	Sample
19	ofssl.splitSeparator==	String	Captures the Split separator	N	Do not change
20	ofssl.maxHitsResults=100	String	Captures the Max no of its results of the document query	Y (optional)	Change depending upon search results
21	ofssl.baseURL =	String	Captures the Service API URL	Y	Keep this blank for documentation bot
22	ofssl.username =	String	Captures the username of weblogic server	Y	Keep this blank for documentation bot
23	ofssl.pasd =	String	Captures the Password of weblogic server	Y	Keep this blank for documentation bot
24	ofssl.indexDir =/folder path	Path	Captures the complete folder path where index files are placed (In this location, copy the index files from respective release folder. The index dir specific files are available in the below location: LL\release\14_x_0_0_0\ws_as\ChatBot\14.x)	Y	Change as per server indexed folder. Note: Ensure to use the same dir file indicated the path.
25	ofssl.releaseVersionUrl =	Path	Captures the Part Number	Y	Refer Release Specific Indexing table.
26	ofssl.releaseNo=	Decimal	Captures the Release Number	Y	Refer 'Folder Name' column Release Specific Indexing table.
27	ofssl.releaseHighlights =/pdf/refdocs/release_highlights.htm	String	Captures the release highlights file path	N	Keep as /pdf/refdocs/release_highlights.htm

2.8 Bot Customization

The Bot interface supports some of quick customization options as detailed below:

2.8.1.1 Label Customization

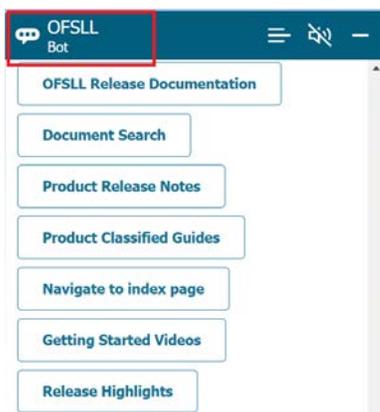
To have a customized label for BOT interface do the following:

1. Open the chatbot.js file available in below location.
<Installation Director >\javascripts\chatbots.js
2. Locate 'OFSLL' and edit the following code property as required.

```
i18n: {  
  "en": {  
    chatTitle: 'OFSLL', // Tool tip for title  
    chatSubtitle: 'Documentation Bot', // Tool tip for Sub Title  
    audioResponseOff: 'Click to turn audio response on', // Tool tip for the speaker off  
      button  
    audioResponseOn: 'Click to turn audio response off', // Tool tip for the speaker on  
      button  
    inputPlaceholder: 'Kindly Type here ... ', // Replaces Type a message  
    send: 'Send (Enter)' // Replaces Send tool tip  
  }  
}
```

3. Save the chatbots.js file and redeploy the application.

Once done, the BOT interface displays the customized label.



2.8.1.2 Bot Day/Night Theme Settings

The Bot interface can be customized to display in dark theme based on Day/Night time defined. Do the following:

1. Open the chatbot.js file available in below location.
<Installation Director >\javascripts\chatbots.js
2. Locate and edit the pre-defined variable 'daylight' property as required.

```

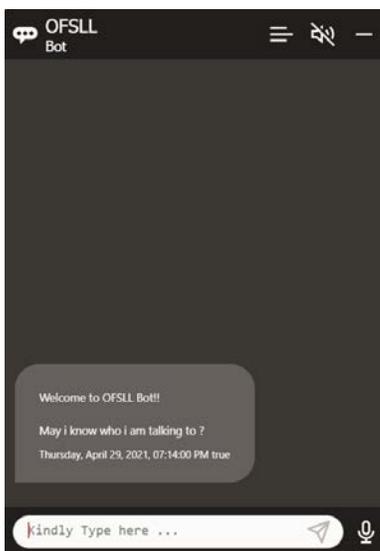
var dayLight ="default";
if((new Date()).getHours(>18)
{
    dayLight='redwood-dark';
};

```

Note the following:

- Here, 'default' is the generic theme provided by ODA based Chabot.
- The number 18 represents 6PM, and Chabot theme changes after this time has elapsed in hours. The same can be changed as required.
- Ensure not to change the variable since the same is called in the chat Widget Settings assigned to attribute theme - Widget Settings : theme: dayLight,

Once done, the daylight theme is as displayed based on time zone:



2.8.1.3 Floating Icon

The Bot icon when minimized can be used as floating icon and moved over the screen area. However, on maximizing the Bot window is displayed in its native position.

To have the Bot icon floating, do the following:

1. Open the chatbot.js file available in below location.
 <Installation Director >\javascripts\chatbots.js
2. Locate the below attribute and change the value to true.
 enableDraggableButton:true,

Note: When set to 'true', floating icon property is enabled and if set to 'false', floating icon property is disabled.

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Sign In
Please enter userid and password

* User Id

* Password

Sign In

OFSLL
Bot

Welcome to OFSLL Bot!!
May i know who i am talking to ?
Thursday, April 29, 2021, 06:36:04 PM true

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Kindly Type here ...

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CHATBOT Integration with OFSLL
Oracle Financial Services Lending and Leasing Release 14.12.0.0.0
March 2022

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