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Oracle Financial Services Model Management and Governance Installation and Configuration Guide

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Preface

This section provides information about the Oracle Financial Services Model Management and Governance (OFS MMG) Installation and Configuration Guide.

Topics:

Related Topics

- Audience
- Additional Resources
- Conventions
- Abbreviations

1.1 Audience

OFS MMG Installation and Configuration Guide is intended for Administrators and Implementation Consultants who handle installing and maintaining the Application Pack Components.

This document assumes that you have experience in installing Enterprise Components and basic knowledge about the following:

- OFS AAI Components
- OFSAA Architecture
- UNIX Commands
- Database Concepts
- Web Server or Web Application Server

1.2 Additional Resources

This section identifies additional resources to the OFS MMG Application. You can access the following documents from the Oracle Help Center:

- OFS Model Management and Governance Release Notes
- OFS Model Management and Governance User Guide

Additional related documents are as follows:

- OFS Analytical Applications 8.1.2.0.0 Technology Matrix

1.3 Conventions

The following text conventions are used in this document:

Table 1-1   Document Conventions

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action or terms defined in text or the glossary.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, file names, text that appears on the screen, or text that you enter.
Hyperlink	Hyperlink type indicates the links to external websites, internal document links to sections.

1.4 Abbreviations

The following table lists the Abbreviations used in this document:

Table 1-2   Abbreviations

Abbreviation	Meaning
BDP	Big Data Processing
DBA	Database Administrator
DDL	Data Definition Language
DEFQ	Data Entry Forms and Queries
DML	Data Manipulation Language
EAR	Enterprise Archive
EJB	Enterprise JavaBean
ERM	Enterprise Resource Management
FTP	File Transfer Protocol
HDFS	Hadoop Distributed File System
HTTPS	Hypertext Transfer Protocol Secure
J2C	J2EE Connector
J2EE	Java 2 Enterprise Edition
JCE	Java Cryptography Extension
JDBC	Java Database Connectivity
JDK	Java Development Kit
JNDI	Java Naming and Directory Interface
JRE	Java Runtime Environment
JVM	Java Virtual Machine
LDAP	Lightweight Directory Access Protocol
LHS	Left Hand Side
MFA	Multi-Factor Authentication
MOS	My Oracle Support
OFSAA	Oracle Financial Services Analytical Applications

Table 1-2   (Cont.) Abbreviations

Abbreviation	Meaning
OFS AAI	Oracle Financial Services Analytical Application Infrastructure
OFS MMG	Oracle Financial Services Model Management and Governance Application
OHC	Oracle Help Center
OLAP	On-Line Analytical Processing
OLH	Oracle Loader for Hadoop
ORAAH	Oracle R Advanced Analytics for Hadoop
OS	Operating System
RAM	Random Access Memory
RDBMS	Relational Database Management System
RHEL	Red Hat Enterprise Linux
SFTP	Secure File Transfer Protocol
SID	System Identifier
SSL	Secure Sockets Layer
TNS	Transparent Network Substrate
URL	Uniform Resource Locator
VM	Virtual Machine
WAR	Web Archive
XML	Extensible Markup Language
PGX	Parallel Graph AnalytiX
FQDN	Fully Qualified Domain Name

2

Introduction

Financial Institutions require models that work on traditional statistical techniques, modern machine-learning methods, computational and simulation models. Oracle Financial Services Model Management and Governance leverage the Data Studio environment to develop, deploy, and manage models at the enterprise level.

The OFS Model Management and Governance Application enables institutions to implement their IT policies while providing flexibility and freedom that Data Scientists and Statistical Modelers desire. OFS MMG's design facilitates financial institutions to manage external regulatory and internal governance policies by building testing models in a workspace environment. A workspace is provisioned and authorized for use (usually by an Administrator) before making it available to modelers. Administrative users grant analysts and modelers access to workspaces along with a subset of production data to build models. Validated and approved models can then be promoted from workspaces to the enterprise model repository. Models in the repository can then be woven into analytical application flows crafted by mixing data management tasks, model execution, and deterministic business logic.

Topics:

Related Topics

- Deployment Topology

- Components of Oracle Financial Services Model Management Governance

2.1 Deployment Topology

Figure 2-1   The logical architecture implemented for OFS MMG Application Pack
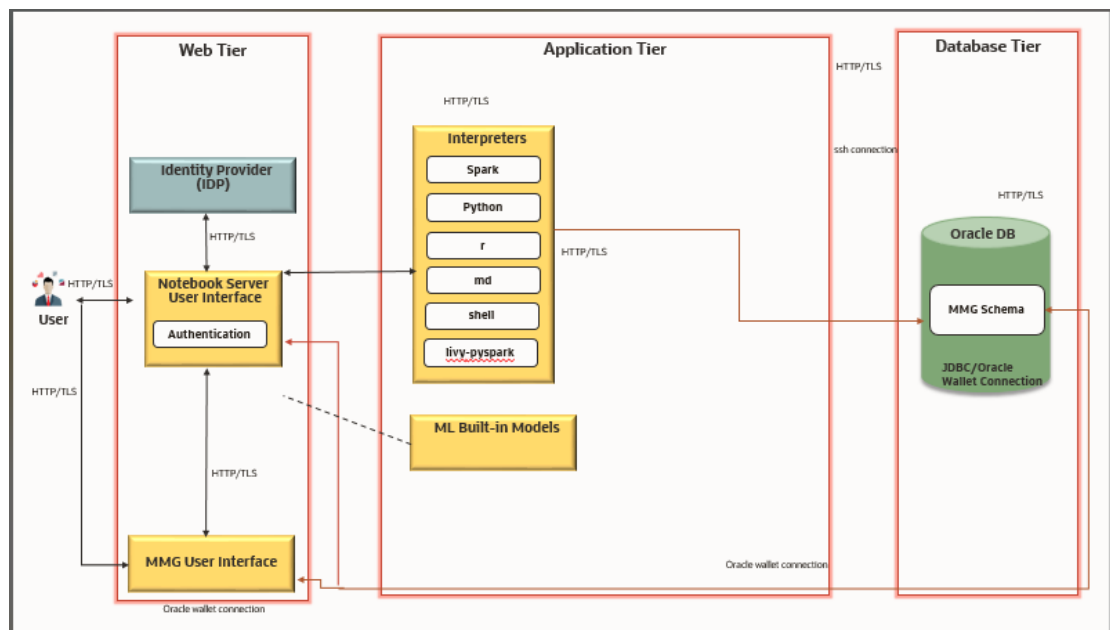
2.2 Components of Oracle Financial Services Model Management Governance

The following are the components of Oracle Financial Services Model Management Governance Application:

- Workspace Management
- Model Management
- Dataset
- Model Pipelines
- Model Actions
- Graphs
- Scheduler Service
- Audit Trail
- Data Studio Options
- Object Migration
- Model Training

For more information on how to use the application, see the OFS Model Management and Governance User Guide.

2.3 Installation Check List

To complete the installation process, you must perform the following steps listed in the Pre-install Checklist. Use this checklist to verify whether these steps are completed or not.

Table 2-1   Installation Checklist

Sl. No.	Activity
Pre-installation Steps	
1	Install all the prerequisite *hardware and software* as per the OFS Analytical Applications 8.1.2.0.0 Technology Matrix.
2	Configure the Database Instance Settings.
3	Create the Installation, Download, and Metadata Repository Directories: • Installation Directory • Temporary Directory • Staging Area/Metadata Repository • Download Directory

Table 2-1   (Cont.) Installation Checklist

Sl. No.	Activity
4	Configure the following Operating System and File System Settings: • File Descriptor • Total number of processes • Port(s) • .profile file permissions • Add FTP or SFTP Configuration for file transfer (to access Staging Area and Metadata Directory)

5	Update the following Environment Settings as required for the installation in the .profile file:
	
	• Java Settings
	  – Oracle Database Server and Client Settings
	  – Add TNS entries in the TNSNAMES.ORA file
	  – Time Zone Settings

Installation Steps	
6	Download the Installer Kit.
7	Extract the Installer Kit.
8	Configure the config.sh file.
9	Trigger the Application Installation.
Post-Installation Steps	
10	Access the MMG Application.
11	Create Application Users.
12	Map Application User(s) to User Groups.

3

Hardware and Software Requirements

See the Oracle Financial Services Analytical Applications 8.1.2.0.0 Technology Matrix for the hardware and software required for OFS MMG Release 8.1.2.0.0.

3.1 License Information

For details on the third-party software tools used, see the OFSAA Licensing Information User Manual Release 8.1.2.0.0.

4
Pre-installation

This section contains the Pre-installation requirements to install the OFS MMG Application.

4.1 Oracle Database Instance Settings

Ensure that the following database instance settings are configured:

- NLS_CHARACTERSET to AL32UTF8
- NLS_LENGTH_SEMANTICS to BYTE
- OPEN CURSORS limit to greater than 1000

4.2 Create the Database Schema on Oracle Database

You need to create the following Database Schemas:

- MMG Application Schema
- MMG Studio Schema
- Graph Schema

Tablespace

You can either use the existing Tablespace or can create a new Tablespace during schema creation using the following script:

Permanent Tablespace

```
CREATE TABLESPACE <tablespace_name >

DATAFILE '<tablespace_name >.dat'

SIZE 1G

ONLINE;
```

Temporary Tablespace

```
CREATE TEMPORARY TABLESPACE <tablespace_name >

TEMPFILE '<tablespace_name >.dbf'

SIZE 100M;
```

4.2.1 Creating an Oracle User

You can create an Oracle user using the following script:

```
CREATE USER <oracle_user_name> IDENTIFIED BY <password> DEFAULT TABLESPACE USERS
TEMPORARY TABLESPACE TEMP QUOTA <quota_size>|UNLIMITED ON USERS
```

4.2.2 Create the MMG Application Schema

You must create an Oracle User to create the MMG Application Schema. For more details, see Creating an Oracle User section.

Assign the Grants

This section discusses the various grants required for the Oracle Database User.

Assign the following grants:

```
grant create SESSION to <oracle_database_user>;

grant create PROCEDURE to <oracle_database_user>;

grant create SEQUENCE to <oracle_database_user>;

grant create TABLE to <oracle_database_user>;

grant create TRIGGER to <oracle_database_user>;

grant create VIEW to <oracle_database_user>;

grant create MATERIALIZED VIEW to <oracle_database_user>;

grant select on SYS.V_$PARAMETER to <oracle_database_user>;

grant create SYNONYM to <oracle_database_user>;

grant select on sys.v_$parameter to <oracle_database_user>;

grant select on sys.dba_free_space to <oracle_database_user>;

grant select on sys.dba_tables to <oracle_database_user>;

grant select on sys.Dba_tab_columns to <oracle_database_user>;

grant create RULE to <oracle_database_user>;

grant create any trigger to <oracle_database_user>;

grant drop any trigger to <oracle_database_user>;

grant select on SYS.DBA_RECYCLEBIN to <oracle_database_user>;
```

> **Note:**
>
> This is required for MMG Config Schema and the Workspace Schemas.

4.2.3 Create the MMG Studio Schema

You must create an Oracle User to create the MMG Studio Schema. For more details, see Creating an Oracle User section.

Assign the following grants:

```
GRANT CONNECT, CREATE TABLE, CREATE VIEW, CREATE SEQUENCE TO
<mmgstudio_schema_name>;
```

4.2.4 Create the Graph Schema

You must create an Oracle User to create the Graph Schema. For more details, see Creating an Oracle User section.

Assign Grants

This section discusses the various grants required for the Graph Schemas.

Assign the following grants for the schema:

1. Pre-installation grants for Graph Schema:

GRANT CREATE SESSION TO <GRAPH_SCHEMA>;

GRANT CREATE TABLE TO <GRAPH_SCHEMA>;

GRANT CREATE VIEW TO <GRAPH_SCHEMA>;

GRANT CREATE ANY PROCEDURE TO <GRAPH_SCHEMA>;

GRANT CREATE SEQUENCE TO <GRAPH_SCHEMA>;

GRANT CREATE JOB TO <GRAPH_SCHEMA>;

GRANT CREATE MATERIALIZED VIEW TO <GRAPH_SCHEMA>;

GRANT EXECUTE ON DBMS_SCHEDULER to <GRAPH_SCHEMA>;

GRANT EXECUTE ON DBMS_COMPARISON TO <GRAPH_SCHEMA>;

GRANT EXECUTE ON DBMS_RLS TO <GRAPH_SCHEMA>;

GRANT EXECUTE ON SYS.DBMS_SESSION TO <GRAPH_SCHEMA>;

GRANT EXECUTE ON DBMS_REDEFINITION TO <GRAPH_SCHEMA>;

GRANT REDEFINE ANY TABLE TO <GRAPH_SCHEMA>;

GRANT SELECT ON SYS.V_$PARAMETER TO <GRAPH_SCHEMA>;

GRANT SELECT ON <DATA_SOURCE_SCHEMA>.<TABLE_NAME> TO <GRAPH_SCHEMA>;

Example:

Change the <DATA_SOURCE_SCHEMA> to the schema used in the Graph pipeline.

> ✏️ **Note:**
>
> If the user has to execute the custom graph, the same permissions have to be provided for the input tables referred in Custom Graph Pipeline.

4.3 Create the Installation, Download, and Metadata Repository Directories

To install OFS MMG, create the following directories:

- **OFS MMG Download Directory (Optional):** This is the directory where the downloaded installer or patches can be copied. Create a download directory and copy the OFS MMG Application Pack Installer File (archive). Assign 755 permission to this directory.

- **Temporary Directory:** Default temporary directory where the installation files are stored for a short time to support faster installation. Configure adequate space on the /tmp directory. It is recommended that you allocate more than 10 GB of space. Assign 755 permission to this directory with NOEXEC Option disabled.

> **Note:**
>
> If NOEXEC Option is enabled, the extraction of files by the installer into the /tmp directory is prevented and the binaries will not execute in the directory, which will fail the installation.

- **OFS MMG Installation Directory (Mandatory):** Create an installation directory where the product binaries are installed. Assign 755-user permission to the Installation Directory.

- **OFS MMG Staging/Metadata Directory (Mandatory):** A directory to hold the application metadata artifacts and additionally, act as the staging area for the flat files. This directory is also referred to as "FTPSHARE". Create a Staging/Metadata Repository Directory to copy data files, save data extracts, and so on.
  The directory must exist on the same system as the OFS MMG Installation. This directory can be configured on a different mount or under a different user profile.

> **Note:**
>
> Ensure the OFS MMG Staging Directory is not set to the same path as the OFS MMG Installation Directory and is not a sub-directory inside the OFS MMG Installation Directory.

4.4 Configure the OS File System Settings and Environment Settings in the .profile File

A `.profile` file is a start-up file of a UNIX User. Create the `.profile` file at the home directory of the logged-in user if it is not already available. The user must have 755 permission on the file to execute it. This file consists of various parameters for Environment Settings, OS, and File System Settings.

To set the parameters for the `.profile` file, login as a non-root user, and configure the environment settings.

> **WARNING:**
>
> Do not modify any other parameters other than the parameters mentioned in the following subsections.

4.4.1 Configure Operating System and File System Settings

To configure the Operating System and File System settings refer the parameters and configuration actions that must be performed to install the OFS MMG Application.

Table 4-1   Configure Operating System and File System Settings

Parameter	Configuration Action
File Descriptor Settings	In the `sysctl.conf` file, to change the number of file descriptors, do the following as the root user:

1. Edit the following line in the /etc/ `sysctl.conf` file:

fs.file-max = <value>

where <value> is greater than 15000

• Apply the change by running the following command:

/sbin/ sysctl -p

> **✎ Note:**
>
> The value specified here is the minimum value to be set for the installation process to go forward. For other modules, this value may depend on the available resources and the number of processes executed in parallel.

Table 4-1   (Cont.) Configure Operating System and File System Settings

Parameter	Configuration Action
Total Number of Process Settings	In the `sysctl.conf` file, set the value to greater than 4096.

> **Note:**
>
> The value specified here is the minimum value to be set for the installation process to go forward. For other modules, this value may depend on the available resources and the number of processes executed in parallel.

4.4.2 Configure the Environment Settings

Environment Settings refers to values related to the current environment, like the Operating System or user sessions. To configure the environment settings refer the following topics.

4.4.2.1 Java Settings

To configure the Java Settings, refer the following table:

Table 4-2   Java Settings

Description	Example Value

In the `.profile` file, set the Java tool options for all versions JDK 11.0.20 and above updates.
Ensure that SYMBOLIC links to JAVA installation are not set in the PATH variable.
	`JAVA_TOOL_OPTIONS=" -Djdk.util.zip.disableZip64ExtraField Validation=true"`
	
	`export JAVA_TOOL_OPTIONS`

> **Note:**
>
> OFS MMG does not support OpenJDK.

Table 4-2   (Cont.) Java Settings

Description	Example Value
In the `.profile` file, set JAVA_BIN to include the JDK absolute path.	For example: JAVA_BIN =/usr/java/ jdk-11.0.20/bin
	export JAVA_BIN

4.4.2.2 Oracle Database Server and Client Settings

To configure the Oracle Database Server and Client Settings, refer to the following table:

Table 4-3   Oracle Database Server and Client Settings

Description	Example Value
In the `.profile` file, set TNS_ADMIN pointing to the appropriate tnsnames.ora file.	TNS_ADMIN=$HOME/tns
In the `.profile` file, set ORACLE_HOME pointing to the appropriate Oracle Client installation.	ORACLE_HOME=/scratch/oraofss/ app_client19c/product/ 19.0.0/client_1
In the `.profile` file, set PATH to include the appropriate $ORACLE_HOME/bin path.	PATH=$JAVA_HOME/bin:$ORACLE_HOME/bin

4.4.2.3 TNS entries in the tnsnames.ora file for Non-TCPS

You must configure the TNS entries in the tnsnames.ora file for Non-TCPS.

4.4.2.3.1 Non-TCPS

To configure the TNS entries in the `tnsnames.ora` file for Non-TCPS, refer to the following table:

Table 4-4   TNS entries in the TNSNAMES.ORA file for Non-TCPS

Description	Example Value
Ensure that an entry (with SID or SERVICE NAME) is added in the tnsnames.ora file on the OFSAA server.	<SID_NAME> = DESCRIPTION =(ADDRESS_LIST = (ADDRESS = (PROTOCOL = TCP)(HOST = <HOST_NAME>.in.oracle.com)(PORT = 1521)))(CONNECT_DATA = (SERVICE_NAME = <SID_NAME>)))<ATOMIC_SCHEMA_NAME> = (DESCRIPTION =(ADDRESS_LIST = (ADDRESS = (PROTOCOL = TCP)(HOST = <HOST_NAME>.in.oracle.com)(PORT = 1521)))(CONNECT_DATA = (SERVICE_NAME = <SID_NAME>)))

```
<SID NAME> =

(DESCRIPTION =

(ADDRESS_LIST =
```

```
(ADDRESS = (PROTOCOL = TCP)(HOST = <HOST NAME>)(PORT = <PORT NUMBER>))

) (CONNECT_DATA =

(SERVICE_NAME = <SID NAME>)

)

)

<ATOMICSCHEMANAME> =

(DESCRIPTION =

(ADDRESS_LIST =

(ADDRESS = (PROTOCOL = TCP)(HOST = <HOST NAME>)(PORT = <PORT NUMBER>))

)

(CONNECT_DATA =

(SERVICE_NAME = <SID NAME>)

)

)
```

4.4.2.4 Time Zone Settings

In the `.profile` file, set the Time Zone Parameter to indicate the time zone of your region or location.

For more information, see *MMG User Guide*.

Table 4-5   Time Zone Settings

Description	Example Value
Time Zone	TZ=Asia/Calcutta

4.5 Setup Password Stores with Oracle Wallet

This section describes the steps to create a wallet and the aliases for the database user accounts. For more information on configuring authentication and password stores, see theOracle Database Security Guide.

As part of an Application Installation, Administrators must set up password stores for Database User Accounts using Oracle Wallet. These password stores must be installed on the Application Database side. The Installer handles much of this process. The Administrators must perform some additional steps.

A password store for the application and Application Server User Accounts must also be installed. However, the installer takes care of this entire process.

4.5.1 Setup the Password Stores for Database User Accounts

After the database is installed and the default Database User Accounts are set up, Administrators must set up a password store using the Oracle Wallet. This involves

assigning an alias for the username and associated password for each Database User Account. The alias is used later during the application installation. This password store must be created on the system where the Application Server and database client are installed.

> **Note:**
>
> In this section, `<wallet_location>` is a placeholder text for illustration purposes. Before running the command, ensure that you have already created the <wallet_location> directory where you want to create and store the wallet.

The wallet is created in the <wallet_location> directory with the auto-login feature enabled. This feature enables the database client to access the wallet contents without using the password. For more information, see Oracle Database Security Guide.

To create a wallet, follow these steps:

1. Login to the server as a Linux user.

2. Create a wallet in the `<wallet_location> using the following command:`
   `mkstore -wrl <wallet_location> -create`

> **Note:**
>
> The mkstore utility is included in the Oracle Database Client Installation.

3. After you run the command, a prompt appears. Enter a password for the Oracle Wallet in the prompt.
   A prompt appears to re-enter the password. Re-enter the password.

Figure 4-1   Wallet Creation

4. Create the database connection credentials for the MMG Schema using the following command:

```
mkstore -wrl <wallet_location> -createCredential <alias-
name> <mmg-schema-name>
```

Here, MMG Schema is the same as explained in Create the MMG Schema section.

After you run the command, a prompt appears. Enter the password associated with the Database User Account in the prompt. You are prompted to re-enter the password. You are prompted for the wallet password used in Step 1.

> **Note:**
>
> In this manner, create a wallet and associated database connection credentials for all the Database User Accounts including Graph and Studio Schema.

After the wallet is created, go to the `<wallet_location>` directory and click Refresh to view the created wallet folder.

The wallet folder contains two files: **ewallet.p12** and **cwallet.sso**.

5. In the `<wallet_location>` directory, configure the tnsnames.ora file to include the entry for each alias name to be set up. Alias name can be renamed as wallet db alias name.

> **Note:**
>
> • You can either update the existing tnsnames.ora file with the above details or create new tnsnames.ora file and add the required entries.
>
> • <alias-name> is a user-defined value.

6. Create a sqlnet.ora file in the wallet directory using the following content:

```
WALLET_LOCATION = (SOURCE = (METHOD = FILE) (METHOD_DATA =
(DIRECTORY = <Wallet_Location>)) )
SQLNET.WALLET_OVERRIDE=TRUE SSL_CLIENT_AUTHENTICATION=FALSE
```

Here, `<Wallet_Location>` should be in below format:

```
WALLET_LOCATION = (SOURCE = (METHOD = FILE) (METHOD_DATA =
(DIRECTORY = <WALLET_PATH>) ) )
```

4.5.2 Verify the Connectivity of the Wallet

To verify the connectivity of the wallet, follow these steps:

1. Test the connectivity using the following command:

> **✎ Note:**
>
> The ORACLE_HOME used with the wallet must be the same version or higher than the wallet created.

```
$ export WALLET_LOCATION=<wallet_location>
```

```
$ export TNS_ADMIN=<tnsnames.ora_location>. If you have created a new
tnsnames.ora file, provide the location of the new file.
```

```
$ sqlplus /@<alias_name>
```

The output is similar to:

```
SQL*Plus: Release 11
```

```
Connected to:
```

```
Oracle Database 12c
```

To verify if you are connected to the correct user:

```
SQL> show user
```

```
The output is similar to:
```

```
USER is "<database-user-name>"
```

5

Installation

This section provides detailed steps to install the OFS MMG Application.

5.1 Prerequisites

Below is the list of prerequisites:

- Port Details
  MMG Studio uses the following ports by default, so make sure these are free:

  graph service: 7059

  Server: 7008

  markdown-interpreter: 7009, 7029

  python-interpreter: 7012, 7032, 6012

  shell-interpreter: 7013, 7033

  plainr-interpreter 7019, 7039, 6311 (Rserve port- configurable in plainr.Json)

  pgx server: 7007

  pgx-interpreter: 7022, 7042

  jdbc-interpreter : 7011, 7031

  coherence cluster : 7574

- For Solaris Operating System, the MMG Studio has to be configured in Linux machine remotely. And the studio URL must be the same as that of the remote studio during MMG Application installation. To configure Remote MMG Studio, see the Remote MMG Studio Configuration.

5.2 Download the OFS MMG Installer Kit

To download the software as a .zip folder, download the mandatory minor release patch **36336349** from My Oracle Support (MOS).

Download the installer archive and copy (in Binary Mode) to the download directory that exists in the OFS MMG Installation Setup.

5.3 Extract the Software

You must be logged in to the UNIX Operating System as a Non-Root User to perform the following steps. To extract the software, follow these steps:

1. Download the unzip (OS-specific) unzip_<os>.zip and copy it in Binary Mode to the directory that is included in your PATH variable.

   If you already have an unzip utility to extract the contents of the downloaded archive, skip this step. Uncompress the unzip installer file with the command:

```
uncompress unzip_<os>.Z
```

> **Note:**
>
> If an error message "uncompress: not found [No such file or directory]" is displayed, contact your UNIX Administrator.

2. Assign execute (751) to the file with the following command:

    ```
    chmod 751 unzip_<OS>
    ```

    For example: `chmod 751 unzip_sparc`

3. Extract the contents of the OFS MMG Application Pack Release 8.1.2.6.0 installer archive file in the download directory with the following command:

    ```
    unzip OFS_MMG_8.1.2.6.0_<OS>.zip
    ```

    After unzipping the OFS_MMG_8.1.2.6.0 folder, following zip folders are displayed under OFS MMG folder.

    *   mmg-installer.zip
    *   mmg-metadata-manager.zip
    *   mmg-pgx.zip
    *   OFSMMG_8.1.2.6.0_Readme.html

    Unzip mmg-installer.zip and the following components are available under / OFS_MMG/mmg-`installer.zip`:

    *   mmg-ui
    *   mmg-studio
    *   mmg-service
    *   mmg-schema-creator
    *   mmg-pipeline
    *   mmg-load-to-graph
    *   lib
    *   bin
    *   conf

4. Navigate to the download directory and assign execute permission to the installer directory with the following command:

    ```
    chmod -R 750 OFS_MMG
    ```

5.4 Configure the config.sh file

To configure the `config.sh` file for installing MMG, follow these steps:

1. Log in to the server as a Non-root user.

2. Navigate to the `<MMG_PACK>OFS_MMG/bin` directory.

3. Configure the applicable `config.sh` attributes as shown here.

Sample config.sh file

```
#!/bin/sh

## Common properties

export APPLICATION_NAME=##APPLICATION_NAME##

export WALLET_LOCATION=##WALLET_LOCATION##

export TNS_ADMIN_PATH=##TNS_ADMIN_PATH##

export WALLET_ALIAS=##WALLET_ALIAS##

export LOG_HOME=##LOG_HOME##

export FTPSHARE=##FTPSHARE##
```

##By default, Data Studio is assumed to run on the same server. If it's running on a different host, uncomment the line below and provide the appropriate URL.

```
#export DATASTUDIO_URL=##DATASTUDIO_URL##

export BE_HOSTNAME=##BE_HOSTNAME##

export BE_PORT=##BE_PORT##

export UI_PORT=##UI_PORT##

export SCHEMA_PORT=##SCHEMA_PORT##

export CONTEXT_PATH=##CONTEXT_PATH##

export STUDIO_AUTH_TYPE=##STUDIO_AUTH_TYPE##

export SSO_TOKEN=##SSO_TOKEN##

export SSL_ENABLED=##SSL_ENABLED##

export SSL_KEYSTORE=##SSL_KEYSTORE##

export SSL_KS_SECRET=##SSL_KS_SECRET##

export SSL_KS_TYPE=##SSL_KS_TYPE##

export SSL_KS_ALIAS=##SSL_KS_ALIAS##

export SESSION_TOKEN_CREDENTIALS=##SESSION_TOKEN_CREDENTIALS##

export FCC_API_USER=##FCC_API_USER##

export MMG_DATASOURCE_MAX_POOL_SIZE=10

export MMG_DATASOURCE_IDLE_TIMEOUT=30000

export MMG_DATASOURCE_CONN_TIMEOUT=80000

export EXT_DATASOURCE_MAX_POOL_SIZE=10

export EXT_DATASOURCE_IDLE_TIMEOUT=30000

export EXT_DATASOURCE_CONN_TIMEOUT=80000

export MMG_HTTP_MAX_CONN=20

export MMG_HTTP_MAX_CONN_PER_ROUTE=2

export MMG_HTTP_CONNECT_TIMEOUT=30000

export MMG_HTTP_READ_TIMEOUT=120000

export APPLICATION_ID=##APPLICATION_ID##
```

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Properties for mmg-ui

```
export APPLICATION_FAVICON_PATH=##APPLICATION_FAVICON_PATH##

export UI_AUTH_TYPE=##AUTH_TYPE##

export AAI_AUTH_URL=##AAI_AUTH_URL##

export SAML_IDP_URL=##SAML_IDP_URL##

export SAML_SP_ENTITY=##SAML_SP_ENTITY##

export SAML_SRV_URL=##SAML_SRV_URL##

export SAML_LOGOUT_URL=##SAML_LOGOUT_URL##

export LDAP_URL=##LDAP_URL##

export LDAP_SEARCH_BASE=##LDAP_SEARCH_BASE##

export LDAP_USER_FILTER=##LDAP_USER_FILTER##

export LDAP_USER_SEARCH_FILTER=##LDAP_USER_SEARCH_FILTER##

export LDAP_GROUP_SEARCH_FILTER=##LDAP_GROUP_SEARCH_FILTER##

export LDAP_GROUP_SEARCH_BASE=##LDAP_GROUP_SEARCH_BASE##

export LDAP_GROUP_MEMBER=##LDAP_GROUP_MEMBER##

export SERVER_COOKIE_DOMAIN=##SERVER_COOKIE_DOMAIN##

export SERVER_COOKIE_NAME=##SERVER_COOKIE_NAME##

export SERVER_COOKIE_TIMEOUT=##SERVER_COOKIE_TIMEOUT##

export SERVER_COOKIE_IS_SECURE=##SERVER_COOKIE_IS_SECURE##
```

Properties for mmg-service

```
export BE_AUTH_TYPE=public

export MMG_PYTHON_INTERPRETER=##MMG_PYTHON_INTERPRETER##
```

Properties for mmg-studio

```
export STUDIO_WALLET_ENABLED=##STUDIO_WALLET_ENABLED##

export LOGIN_SHOW=##LOGIN_SHOW##

export SESSION_MODE=##SESSION_MODE##

export STUDIO_REALM=##STUDIO_REALM##

export OFSAA_URL=##OFSAA_URL##

export API_USERS=##API_USERS##

export VALID_ROLES=##VALID_ROLES##

export DATASOURCE_URL=##DATASOURCE_URL##

export DATASOURCE_USERNAME=##DATASOURCE_USERNAME##

export DATASOURCE_PASSWORD=##DATASOURCE_PASSWORD##

export DATASOURCE_DRIVER=##DATASOURCE_DRIVER##

export JPA_DB_PLATFORM=##JPA_DB_PLATFORM##

export STUDIO_LOG_LEVEL=##STUDIO_LOG_LEVEL##

export PYTHON_HOME=##PYTHON_HOME##
```

```
export SPARK_HOME=##SPARK_HOME##

export R_ENABLED=##R_ENABLED##

export RS_CONF_PATH=##RS_CONF_PATH##

export RS_KEYSTORE=##RS_KEYSTORE##

export RS_KS_SECRET=##RS_KS_SECRET##
```

Following are fcc services specific configurations, Leave as it is if not applicable

```
export TEMPLATE_CONFIG_PATH=##TEMPLATE_CONFIG_PATH##

export TEMPLATE_DEFAULT_LINK=##TEMPLATE_DEFAULT_LINK##

export AUTH_SERVICE_URL=##AUTH_SERVICE_URL##

export META_SERVICE_URL=##META_SERVICE_URL##

export ER_SERVICE_URL=##ER_SERVICE_URL##

export BATCH_SERVICE_URL=##BATCH_SERVICE_URL##

export SAML_ISSUER=##SAML_ISSUER##

export SAML_DESTINATION=##SAML_DESTINATION##

export SAML_ASSERTION=##SAML_ASSERTION##

export SAML_ROLE_ATTRIBUTE=##SAML_ROLE_ATTRIBUTE##

export SAML_STUDIO_LOGOUT_URL=##SAML_STUDIO_LOGOUT_URL##

export SAML_COOKIE_DOMAIN=##SAML_COOKIE_DOMAIN##
```

Following are pipeline services specific configurations, Leave as it is if not applicable

```
export DATAPIPELINE_SERVICE_PORT1=##DATAPIPELINE_SERVICE_PORT1##

export DATAPIPELINE_SERVICE_PORT2=##DATAPIPELINE_SERVICE_PORT2##

export
DATAPIPELINE_METADATA_ARCHIVE_PATH=##DATAPIPELINE_METADATA_ARCHIVE_PATH##

export
DATAPIPELINE_METADATA_IMPORT_SERVICE_PORT=##DATAPIPELINE_METADATA_IMPORT_SER
VICE_PORT##

export DATAPIPELINE_ERXMLPATH=##DATAPIPELINE_ERXMLPATH##

export
DATAPIPELINE_GATEWAY_SERVICE_PORT=##DATAPIPELINE_GATEWAY_SERVICE_PORT##

export PIPELINE_UI_SERVICE_PORT=##PIPELINE_UI_SERVICE_PORT##

export DATA_PIPELINE_UI_SERVICE_PORT=##DATA_PIPELINE_UI_SERVICE_PORT##
```

#URLS for pipeline,ER and matching service. Leave as it is if not applicable. Will impact the pipeline that could be added to a graph

```
export MATCHRULE_BASE_URL=##MATCHRULE_BASE_URL##

export LOADGRAPH_BASE_URL=##LOADGRAPH_BASE_URL##

export MATCHSRVC_UI_URL=##MATCHSRVC_UI_URL##
```

#URLS for index service. Leave as it is if not applicable. Will impact the pipeline that could be added to a graph

```
export GRAPH_INDEX_BASE_URL=##GRAPH_INDEX_BASE_URL##

export LOADINDEX_UI_URL=##LOADINDEX_UI_URL##

#Changes for auth services + mmg keys

export AAI_COOKIE_DOMAIN=##AAI_COOKIE_DOMAIN##

export MMG_KEYS_LOC=##MMG_KEYS_LOC## #Properties to package Load to
Graph (L2G) service inside MMG ## Start of L2G Properties

## export GRAPH_INSTALLATION_PATH=##GRAPH_INSTALLATION_PATH##

export GRAPH_KEYSTORE_PASSWORD=##GRAPH_KEYSTORE_PASSWORD##

export GRAPH_SERVICE_PORT=##GRAPH_SERVICE_PORT##

## Graph Schema Configurations

Export MMG_DB_SERVER_NAME=##MMG_DB_SERVER_NAME##

export MMG_DB_PORT=##MMG_DB_PORT##

export MMG_DB_SERVICE_NAME=##MMG_DB_SERVICE_NAME##

export PGX_SERVER_URLS=##PGX_SERVER_URLS## #### PGX data memory limits
configurations

## Overall Configuration

export
MAX_TOTAL_SHARED_DATA_MEMORY_SIZE=##MAX_TOTAL_SHARED_DATA_MEMORY_SIZE#
#

export
MAX_TOTAL_PRIVATE_DATA_MEMORY_SIZE=##MAX_TOTAL_PRIVATE_DATA_MEMORY_SIZ
E##

export
MAX_PER_SESSION_DATA_MEMORY_SIZE=##MAX_PER_SESSION_DATA_MEMORY_SIZE##

## Role wise data memory limits export
MAX_DATA_MEMORY_SIZE_DSUSRGRP=##MAX_DATA_MEMORY_SIZE_DSUSRGRP##

export

MAX_DATA_MEMORY_SIZE_DSBATCH=##MAX_DATA_MEMORY_SIZE_DSBATCH## export
MAX_DATA_MEMORY_SIZE_DSINTER=##MAX_DATA_MEMORY_SIZE_DSINTER##

export
MAX_DATA_MEMORY_SIZE_DSAPPROVER=##MAX_DATA_MEMORY_SIZE_DSAPPROVER##

export MAX_DATA_MEMORY_SIZE_DSUSER=##MAX_DATA_MEMORY_SIZE_DSUSER##

#end of Properties configurations for L2G

##Schema details for graph service. This is configured as a temporary/
target space for DP to create target tables which will act as input to
L2G

export GRAPH_SCHEMA_WALLET_ALIAS=##GRAPH_SCHEMA_WALLET_ALIAS##

export GRAPH_SCHEMA_DB_SCHEMA_NAME=##GRAPH_SCHEMA_DB_SCHEMA_NAME## #
```

#Additional MMG Features

```
export
MMG_MODEL_PIPELINE_SANDBOX_DEFAULT_VIEW=##MMG_MODEL_PIPELINE_SANDBOX_D
EFAULT_VIEW##
```

The following properties are optional and enabled by default. If needed, you can uncomment them and set them to false.

```
#export MMG_HTTP2_ENABLED=##MMG_HTTP2_ENABLED##
```

```
#export MMG_SERVER_ACCESS_LOG_ENABLED=##MMG_SERVER_ACCESS_LOG_ENABLED##
```

The following properties are optional and disabled by default. If needed, you can uncomment them and set them to true.

```
#export OJET_CDN_ENABLED=##OJET_CDN_ENABLED##
```

##The Following Properties are related to EST

```
export EST_ENABLED=##EST_ENABLED##
```

```
export EST_UI_URL=##EST_UI_URL##
```

##Data Studio Ports

Following are the default ports 7008, 7009, 7012, -1. If needed, you can change the port numbers other than the default values.

```
export DATASTUDIO_SERVER_PORT=##DATASTUDIO_SERVER_PORT##
```

```
export
DATASTUDIO_MARKDOWN_INTERPRETER_PORT=##DATASTUDIO_MARKDOWN_INTERPRETER_PORT#
#
```

```
export
DATASTUDIO_PYTHON_INTERPRETER_PORT=##DATASTUDIO_PYTHON_INTERPRETER_PORT##
```

```
export DATASTUDIO_JDBC_INTERPRETER_PORT=##DATASTUDIO_JDBC_INTERPRETER_PORT##
```

```
export
DATASTUDIO_PYTHON_INTERPRETER_REST_SERVER_PORT=##DATASTUDIO_PYTHON_INTERPRET
ER_REST_SERVER_PORT##
```

```
export
DATASTUDIO_PGX_PYTHON_INTERPRETER_REST_SERVER_PORT=##DATASTUDIO_PGX_PYTHON_I
NTERPRETER_REST_SERVER_PORT##
```

```
export
DATASTUDIO_THRIFT_EVENT_HANDLER_PORT=##DATASTUDIO_THRIFT_EVENT_HANDLER_PORT#
#
```

```
export DATASTUDIO_PGX_INTERPRETER_PORT=##DATASTUDIO_PGX_INTERPRETER_PORT##
```

```
#ENDOFFILE#
```

Table 5-1   config.sh file

Parameter	Description	Is Mandatory	Comments
Common Properties			
##APPLICATION_NAME##	Title of the application; if not replaced, default is : Model Management and Governance.	YES	It defaults to "Model Management and Governance." NOTE: Provide double quotes for the application name if it is long or contains spaces.

Table 5-1   (Cont.) config.sh file

Parameter	Description	Is Mandatory	Comments
##WALLET_LOCATION##	The wallet is the folder containing the sqlnet.ora, wallet.sso, and .p12 files.	YES	/scratch/users/wallet
##TNS_ADMIN_PATH##	The folder that contains the tnsnames.ora file.	YES	/scratch/users/tns
##WALLET_ALIAS##	The wallet alias name configured for the MMG application config schema.	YES	MMG_CONFIG
##LOG_HOME##	A writable folder designated for storing application and MMG Studio logs.	YES	/scratch/users/logs NOTE: Ensure that log folder is created before installation.
##FTPSHARE##	This can be any writable folder accessible to the process owner.	YES	/scratch/users/ftpshare Ensure that ftpshare folder is created before installation. This should be same as the metadata directory mentioned above.
##DATASTUDIO_URL##	URL for MMG Studio.	YES	By default, Data Studio is assumed to run on the same server. If it is running on a different host, uncomment the line below and provide the appropriate URL. https://<hostname/IP>:7008/<contextpath> NOTE: The default port for MMG Studio is 7008 and should not be modified.
##BE_HOSTNAME##	Hostname on which the backend service (mmg-service) runs. Use the same hostname wherever applicable.	YES	HostIP or FQDN
##BE_PORT##	Port on which the backend service (mmg-service) needs to run.	YES	7002
##UI_PORT##	Port on which UI service(mmg-ui) needs to run.	YES	7001
##SCHEMA_PORT##	Port on which Schema Creator service needs to run.	YES	7003

Table 5-1   (Cont.) config.sh file

Parameter	Description	Is Mandatory	Comments
##CONTEXT_PATH##	Context path of the application.	YES	mmg
##STUDIO_AUTH_TYPE##	• FCC_SSO – for SAMLRealm based authentication in FCC Studio Note: Direct log in to Data studio using the Studio URL `<https: {host name: 7008/context path}` is not supported. • MMG_AAI- AAI Based authentication for MMG Studio	YES	Can be either MMG_AAI or FCC_SSO

Table 5-1   (Cont.) config.sh file

Parameter	Description	Is Mandatory	Comments
##SSO_TOKEN##	SSO Token value for Studio authentication.	YES	Note: SSO token value needs to be regenerated whenever new keys are generated.
	Applicable only when STUDIO_AUTH_TYPE is FCC_SSO and MMG_AAI.		
	For FCC_SSO, refer to the Oracle Financial Services Compliance Studio Installation Guide.		
	For MMG_AAI, to create the SSO Token, follow these steps.		
	a. Locate <MMG_INSTALLATION_PATH>/OFS_MMG/bin / key-generator.sh and execute it.		
	b. After successful execution, public key and private key are generated at the following paths:		
	<MMG_INSTALLATION_PATH>/OFS_MMG/conf		
	and		
	<MMG_INSTALLATION_PATH>/OFS_MMG/mmg-studio/conf/		
	Execute the token-generator.sh file by passing <API_USER> as an argument value. This file is located at the following path: <MMG_INSTALLATION_PATH>/ OFS_MMG/bin		
	Example: ./token-generator.sh MMG_API_USER		
	a. After successful execution, a file named token.out is created inside the same bin directory. The token.out file contains the following content:		

Table 5-1 (Cont.) config.sh file

Parameter	Description	Is Mandatory	Comments
	"Generated JWT Token for MMG_API_USER: <some-long-random-token-value>" • Copy the <some-long-random-token-value> part mentioned above and paste it into ##SSO_TOKEN## in the config.sh file. Ensure that there is no space or end line at either the start or end while copying this value into ##SSO_TOKEN##.		
##SSL_ENABLED##	Flag to enable the SSL for the MMG application. **NOTE:** SSL is enabled for MMG Studio by default.	YES	Can be either true or false.
##SSL_KEYSTORE##	Absolute path for the keystore file. NOTE: Run the following command to create a keystore: keytool -genkey -v -alias demoalias -keyalg RSA -keysize 2048 -keystore server.keystore -validity 3650 -keypass secret -storepass secret -storetype PKCS12	YES	../conf/server.keystore. Include the file name in the path. **NOTE:** If ##SSL_ENABLED## is set to false, you must configure keystore for mmg-studio, as it is SSL-enabled by default. MMG application and MMG Studio can share the same SSL configuration if set up on the same server.
##SSL_KS_SECRET##	Keystore secret The value passed in the aforementioned command for -keypass	YES	Example: secret
##SSL_KS_TYPE##	Keystore type The value passed in the aforementioned command for -storetype Can be either JKS or PKCS12	YES	Example: PKCS12

Table 5-1   (Cont.) config.sh file

Parameter	Description	Is Mandatory	Comments
##SSL_KS_ALIAS##	Keystore alias The value passed in the aforementioned command for -alias	YES	Example: demoalias
Properties required if STUDIO_AUTH_TYPE is FCC_SSO			
##SESSION_TOKEN_ CREDENTIALS##	The password used to generate the Authorization header token to communicate with mmg-services.	YES	**NOTE:** If not applicable, enter NA
##FCC_API_USER##	API user for FCC Studio.	YES	**NOTE**: If not applicable, enter NA
Properties for MMG Connection			
##MMG_DATASOURC E_MAX_POOL_SIZE# #	Maximum connection pool size allowed for Config Datasource.	YES	It defaults to 10. You can edit it if required.
##MMG_DATASOURC E_IDLE_TIMEOUT##	Idle timeout for config Datasource.	YES	It defaults to 30000. You can edit it if required.
##MMG_DATASOURC E_CONN_TIMEOUT##	Connection timeout for Config Datasource.	YES	It defaults to 80000. You can edit it if required.
##EXT_DATASOURCE _MAX_POOL_SIZE##	Maximum connection pool size allowed for meta/data schemas.	YES	It defaults to 10. You can edit it if required.
##EXT_DATASOURCE _IDLE_TIMEOUT##	Idle timeout for meta/ data schemas.	YES	It defaults to 30000. You can edit it if required.
##EXT_DATASOURCE _CONN_TIMEOUT##	Connection timeout for meta/data schemas.	YES	It defaults to 80000. You can edit it if required.
##MMG_HTTP_MAX_ CONN##	The maximum number of connections allowed across all routes.	YES	It defaults to 20.
## MMG_HTTP_MAX_CO NN_PER_ROUTE##	The maximum number of HTTP connections allowed for a route.	YES	It defaults to 2.
##MMG_HTTP_CONN ECT_TIMEOUT##	The connection timeout for HTTP connection. A timeout value of 0 specifies an infinite timeout.	YES	It defaults to 30000.
##MMG_HTTP_READ _TIMEOUT##	The socket read timeout for HTTP connection. A timeout value of 0 specifies an infinite timeout.	YES	It defaults to 120000.

Table 5-1   (Cont.) config.sh file

Parameter	Description	Is Mandatory	Comments
##APPLICATION_ID##	The id will be stored as app_id and must be the same as mentioned in the APP_ID column of MMG_PATCHES table. Currently the UI displays the MMG Version <version number of application> and last applied MMG version.	YES	The APPLICATION_ID should be without spaces.
Properties for mmg-ui			
##APPLICATION_FAVICON_PATH##	Icon for the application. If not specified, it will default to the icon at the following location: css/images/favicon.ico	NO	css/images/favicon.ico
##UI_AUTH_TYPE##	aai – if using an existing AAI instance as the identity provider. saml – for saml based authentication ldap – for ldap based authentication NOTE: This is case sensitive.	YES	Can be one of the following: aai, or saml or ldap.
Properties required if ##UI_AUTH_TYPE## = aai			
##AAI_AUTH_URL##	Base URL of the AAI instance. Will be used for ##UI_AUTH_TYPE## = aai **NOTE:** If the target AAI is https, then it is necessary to import the AAI host certificate into the MMG server Java keystore. Refer Import Server Certificate to Java Keystore for more details.	YES	http(s):// whfxxxxx.in.oracle.com :7110/mmg
Properties required if ##UI_AUTH_TYPE## = saml			
##SAML_IDP_URL##	This is the endpoint on the IDP side where SAML requests are posted. The Service Provider (SP) needs to obtain this information from the Identity Provider (IdP).	YES	http(s)://idcs-xxxx.com/fed/v1/idp/sso This is used only if ##UI_AUTH_TYPE## is SAML.

Table 5-1   (Cont.) config.sh file

Parameter	Description	Is Mandatory	Comments
##SAML_SP_ENTITY##	Enter a globally unique name for SAML entity. It typically takes the URL of an identity provider or a service provider as a value.	YES	http(s):// <UI_HOST>:<UI_POR T>/mmg This is used only if ##UI_AUTH_TYPE## is SAML.
##SAML_SRV_URL##	UI Landing Page URL.	YES	http(s):// <UI_HOST>:<UI_POR T>/mmg/home This is used only if ##UI_AUTH_TYPE## is SAML.
##SAML_LOGOUT_U RL##	Initiated SAML Single Logout URL.	YES	http(s)://idcs- xxxx.com/sso/v1/user/ logout This is used only if ##UI_AUTH_TYPE## is SAML.
Properties required if ##UI_AUTH_TYPE## = ldap			
##LDAP_URL##	LDAP URL Will be used for ##UI_AUTH_TYPE## = LDAP	YES	ldap://whf00xyz:3060/
##LDAP_SEARCH_BA SE##	LDAP Search Base Will be used for ##UI_AUTH_TYPE## = LDAP	YES	"cn=Users,dc=oracle,d c=com"
##LDAP_USER_FILTE R##	LDAP User Filter Will be used for ##UI_AUTH_TYPE## = LDAP	YES	"cn={0}"
#LDAP_USER_SEAR CH_FILTER##	LDAP User Search Filter Will be used for ##UI_AUTH_TYPE## = LDAP	YES	
##LDAP_GROUP_SEA RCH_FILTER##	LDAP Group Search Filter Will be used for ##UI_AUTH_TYPE## = LDAP	YES	
##LDAP_GROUP_SEA RCH_BASE##	LDAP Group Search Base Will be used for ##UI_AUTH_TYPE## = LDAP	YES	

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Table 5-1   (Cont.) config.sh file

Parameter	Description	Is Mandatory	Comments
##LDAP_GROUP_ME MBER#	LDAP Group Member Will be used for ##UI_AUTH_TYPE## = LDAP	YES	
Properties for Cookie settings			
##SERVER_COOKIE_ DOMAIN##	The domain name.	YES	This should be the domain name of the host server. Example: .in.xyz.com Note: If the MMG application is configured with the IP address, then provide the same.
##SERVER_COOKIE_ NAME##	The name for the cookie.	YES	If not set it will default to ORA_OLDS_SESSIO N
##SERVER_COOKIE_ TIMEOUT##	Timeout/expiry duration in seconds.	YES	If not set, it defaults to 999999
##SERVER_COOKIE_ IS_SECURE##	Specifies if we are using cookies to add an additional security layer to prevent cross-origin requests. Can be either **true** or **false**	YES	If not set, it defaults to true.
##Properties for mmg-service			
##BE_AUTH_TYPE##	Auth Type on which the backend service (mmg-service) runs.	YES	It defaults to public.
##MMG_PYTHON_IN TERPRETER##	A comma separated value without whitespaces that specifies python interpreter python,fcc-ml4aml	YES	If not set, it defaults to python.
##DATACATALOG_SE RVICE_URL##	Only used when EST application is integrated with MMG.	NO	
##Properties for mmg-studio			
##STUDIO_WALLET_ ENABLED##	Set as true when using a wallet for the MMG Studio Schema. Can be either **true/ TRUE** or **false/FALSE (all caps or all small)**	YES	true/TRUE

Table 5-1   (Cont.) config.sh file

Parameter	Description	Is Mandatory	Comments
##LOGIN_SHOW##	Can be either **true/ TRUE** or **false/FALSE (all caps or all small)** **NOTE:** Set as true when the login screen of Studio is required. This property should be set as true if MMG application is non-SSL.	YES	It defaults to true.
##SESSION_MODE##	Can be either NOTEBOOK or NOTEBOOK_USER.	YES	If not set, it defaults to NOTEBOOK.
##STUDIO_REALM##	Can be either OFSAARealm or saml.OFSAASamlRealm	YES	OFSAARealm – the default realm for studio auth type FCC_AAI, MMG_AAI. .auth.saml.OFSAASamlRealm – for SAML specific studio authentication
##OFSAA_URL##	AAI login IDM Service URL. This is applicable only if ## STUDIO_AUTH_TYPE ## is " MMG_AAI ".	YES	Format: http://<ofsa-web-host>:<port>/ <context>/rest-api For example, http:// ABC00abc:4325/LLFP/ rest-api The /rest-api is mandatory for OFSAA URL.
##API_USERS##	This is the API user with which the token is generated; if not set, it defaults to MMG_API_USER. NOTE: Use the same <API_USER> as given in the ##SSO_TOKEN##	YES	MMG_API_USER
##VALID_ROLES##	MDLUSR,MDLREV,MDLAPPR The comma separated values for Studio-related roles in USER-ROLE mapping.	YES	MDLBATCHUSR, DSUSRGRP, DSREDACTGRP

Table 5-1   (Cont.) config.sh file

Parameter	Description	Is Mandatory	Comments
##DATASOURCE_URL ##	The connection address to the database where the MMG Studio Schema is created. When ##WALLET_ENABLED ## is false- jdbc:oracle:thin:@<Host>:<Port>/ <Service_Name> When ##WALLET_ENABLED ## is true- jdbc:oracle:thin:@<DS ALIAS> where <DS_ALIAS> is the wallet alias configured for the MMG Studio Schema.	YES	
##DATASOURCE_USE RNAME##	MMG Studio Schema/ User name; required only when ##WALLET_ENABLED ## is false	YES	dsschema
##DATASOURCE_PAS SWORD##	MMG Studio Schema/ User Password; required only when ##WALLET_ENABLED ## is false	YES	password
##DATASOURCE_DRI VER##	Database Driver used in connection	YES	oracle.jdbc.OracleDrive r
##JPA_DB_PLATFOR M##	Hibernate Class or SQL Dialect used in Database	YES	org.hibernate.dialect.O racle12cDialect
##STUDIO_LOG_LEV EL##	Logging level for logs.	YES	info, warn, debug or error logs
##PYTHON_HOME##	Home Path of Python Library. It defaults to python3 during installation. For a custom installation of python3 where the soft link is not configured, you can mention the complete path up to python3.	YES	python3
##SPARK_HOME##	Absolute path of Apache Spark Library.	NO	

Properties for R Interpreter

Table 5-1   (Cont.) config.sh file

Parameter	Description	Is Mandatory	Comments
##R_ENABLED##	This can be set to TRUE/true or FALSE/false depending on which R interpreter will be started and will be present in the interpreters list. NOTE: If you are using an older Studio schema with an R-interpreter already present and then install with R_ENABLED set as FALSE; the R-interpreter will remain in the interpreter's menu of Studio and must be deleted from there.	YES	The default is False.
Properties for if ##R_ENABLED## is set to true			
##RS_CONF_PATH##	Absolute path to Rserve.conf file for running Rserve.	YES	/scratch/users/datastudio/conf/Rserve.conf
##RS_KEYSTORE##	Absolute path for the Keystore file made for Rserve.conf.	YES	/scratch/users/datastudio/conf/rinterpreterkeystore
##RS_KS_SECRET##	Keypass for rinterpreterkeystore.	YES	Example: changeit
# Following are fcc services specific configurations, leave as it is if not applicable			
##TEMPLATE_CONFIG_PATH##	Configuration path of the Template.	NO	
##TEMPLATE_DEFAULT_LINK##	Default link of the template.	NO	
##AUTH_SERVICE_URL##	The AUTH service URL that is activated after the fccstudio.sh file runs.	NO	Example: https://<hostname>:7041/authservice
##META_SERVICE_URL##	The metaservice URL that is activated after the fccstudio.sh file runs.	NO	Example: https://<hostname>:7045/metaservice
##ER_SERVICE_URL##	Used for the entity resolution service.	NO	Example: https://<hostname>:<port>
##BATCH_SERVICE_URL##	Used for the batch service.	NO	Example: https://<hostname>:<port>/batchservice
Properties required if STUDIO_REALM is OFSAASamlRealm and STUDIO_AUTH_TYPE is FCC_SSO			
##SAML_ISSUER##	The SAML entity ID (Studio URL) configured in the IDP.	YES	https://<hostname>.xyz.com:7008

Table 5-1   (Cont.) config.sh file

Parameter	Description	Is Mandatory	Comments
##SAML_DESTINATION##	The SAML IDP URL that the Identity Provider provides after creating the SAML application.	YES	https://idcs-xyzgvh.com/fed/v1/idp/sso
##SAML_ASSERTION##	The SAML Consume URL (Studio/URL/saml/consume) that is configured in IDP.	YES	https://<hostname>.xyz.com:7008/saml/consume
##SAML_ROLE_ATTRIBUTE##	The SAML client identifier provided by the SAML Administrator for the role and attributes information while creating the SAML application for MMG Studio. The attribute will contain the role required for the application.	YES	Example: group
##SAML_STUDIO_LOGOUT_URL##	The SAML client identifier provided by the SAML Administrator for the Logout URL information, while creating the SAML application for MMG Studio.	YES	https://idcs-xyzgvh.com/sso/v1/user/logout
##SAML_COOKIE_DOMAIN##	Domain of the server.	YES	Example: in.xyz.com
# Following are pipeline services specific configurations, leave as it is if not applicable.			
##DATAPIPELINE_SERVICE_PORT1##	The port where the pipeline service resides.	YES	By default, it is set as 18005.
##DATAPIPELINE_SERVICE_PORT2##	The port where the data pipeline service resides.	YES	By default, it is set as 18006.
##DATAPIPELINE_METADATA_ARCHIVE_PATH##	The dump path for the pipeline service.	YES	/OFS_MMG/mmg-pipeline/pipeline/pipeline-service-x.x.x.x.
##DATAPIPELINE_METADATA_IMPORT_SERVICE_PORT##	Meta data import service port.	YES	By default, it is set as 18007.
##DATAPIPELINE_ERXMLPATH##	The XML path in which the schema details are stored.	NO	

Table 5-1   (Cont.) config.sh file

Parameter	Description	Is Mandatory	Comments
##DATAPIPELINE_GATEWAY_SERVICE_PORT##	Data pipeline gateway service port.	YES	
##PIPELINE_UI_SERVICE_PORT##	Pipeline UI service port.	YES	
##DATA_PIPELINE_UI_SERVICE_PORT##	Data pipeline UI service port	YES	
URLs for ER and matching service. Leave as is if not applicable. Will impact the pipeline that could be added to a graph.			
ER and Matching services are available as part of Studio. If the services are deployed, the following properties must be configured.			
##MATCHRULE_BASE_URL##	The host and port where the match rule service resides.	NO	http(s):// abc.in.xyz.com:7051
##MATCHSRVC_UI_URL##	Matching Service UI resource path.	NO	
Properties for LoadGraph			
##LOADGRAPH_BASE_URL##	The host and port where the load graph service resides.	YES	http(s):// abc.in.xyz.com: 7059/ graph-service
URLs for index service. Leave as is if not applicable. Will impact the pipeline that could be added to a graph if Graph and Index services are available as part of Studio. If the services are deployed, the following properties must be configured.			
##GRAPH_INDEX_BASE_URL##	Indicates the Graph Index resource path.		http(s):// \<hostname>xyz.com:7053/load-to-elastic-search
##LOADINDEX_UI_URL##	Indicates the Graph Load Index UI resource path.		
Changes for auth services and mmg keys			
##AAI_COOKIE_DOMAIN##	The domain of the server.	YES	Example: in.xyz.com
##MMG_KEYS_LOC##	Indicates public and private key location.	YES	Example:< MMG Installation Path> / OFS_MMG/conf
Additional MMG features			
##MMG_MODEL_PIPELINE_SANDBOX_DEFAULT_VIEW##	You can configure the view that needs to be displayed in the UI.	NO	By default, it is set as Canvas. You can change to 'Notebook' if required.
#Properties to package Load to Graph (L2G) service inside MMG			
## Start of L2G Properties ##			
##GRAPH_INSTALLATION_PATH##	The installation path of the Graph.	YES	\<MMG Installation Path>/ OFS_MMG/ mmg-load-to-graph/ graph-service
##GRAPH_KEYSTORE_PASSWORD##	Graph Keystore Password.	YES	Password

Table 5-1   (Cont.) config.sh file

Parameter	Description	Is Mandatory	Comments
##GRAPH_SERVICE_ PORT##	Graph service port.	YES	By default, it is set as 7059.
## Graph schema configurations			
##MMG_DB_SERVER _NAME##	Name of the MMG Database Server.	YES	
##MMG_DB_PORT##	The port of the MMG database server.	YES	
##MMG_DB_SERVICE _NAME##	Name of the MMG Database Service.	YES	
##PGX_SERVER_URL S##	Indicates the pgx server resource path. NOTE : Refer to the PGX Installation section for more details. Skip this if not installing pgx.	YES	http(s):// <hostname>.xyz.com:< pgx port>/<pgx context name>
#PGX data memory limits configurations			
## Overall Configuration			
##MAX_TOTAL_SHAR ED_DATA_MEMORY_ SIZE##	Maximum total shared data memory size.	YES	Edit if required; default value is 20 GB.
##MAX_TOTAL_PRIVA TE_DATA_MEMORY_ SIZE##	Maximum total private data memory size.	YES	Edit if required; default value is 8 GB.
##MAX_PER_SESSIO N_DATA_MEMORY_SI ZE##	Maximum per session data memory size.	YES	Edit if required; default value is 700 MB.
## Role wise data memory limits			
##MAX_DATA_MEMO RY_SIZE_DSUSRGRP ##	Maximum data memory size allowed for DSUSRGRP.	YES	Edit if required; default value is 10 GB.
##MAX_DATA_MEMO RY_SIZE_DSBATCH##	Maximum data memory size allowed for DSBATCH.	YES	Edit if required; default value is 10 GB.
##MAX_DATA_MEMO RY_SIZE_DSINTER##	Maximum data memory size allowed for DSINTER.	YES	Edit if required; default value is 5 GB.
##MAX_DATA_MEMO RY_SIZE_DSAPPROV ER##	Maximum data memory size allowed for DSAPPROVER.	YES	Edit if required; default value is 5 GB.
##MAX_DATA_MEMO RY_SIZE_DSUSER##	Maximum data memory size allowed for DSUSER.	YES	Edit if required; default value is 5 GB.
#end of Properties configurations for L2G			
##Schema details for graph service. This is configured as a temporary/target space for DP to create target tables which will act as input to L2G			
##GRAPH_SCHEMA_ WALLET_ALIAS##	Wallet alias created for the Graph Schema.	YES	

Table 5-1   (Cont.) config.sh file

Parameter	Description	Is Mandatory	Comments
##GRAPH_SCHEMA_ DB_SCHEMA_NAME# #	Name of the Graph schema.	YES	
## The following properties are optional and enabled by default. If needed, you can uncomment them and set them to false.			
##MMG_HTTP2_ENA BLED##	Required for enabling or disabling the HTTP2 feature. TRUE or FALSE.	YES	The default value is TRUE
##MMG_SERVER_AC CESS_LOG_ENABLE D##	Required for enabling or disabling the server access logs TRUE or FALSE.	YES	The default value is TRUE
## The following properties are optional and disabled by default. If needed, you can uncomment them and set them to true.			
##OJET_CDN_ENABL ED##	Required for enabling or disabling the OJET CDN feature. TRUE or FALSE.	YES	The default value is FALSE,
##The Following Properties are related to EST			
##EST_ENABLED##	Only used when EST application is integrated with MMG.	YES	The default value is FALSE.
##EST_UI_URL##	The URL of EST application. This is set based on ##EST_ENABLED## property.	NO	
##Data Studio Ports If needed, you can change the port numbers other than the default set values.			
##DATASTUDIO_SER VER_PORT##	The port of the Data Studio server.	NO	The default value is 7008.
##DATASTUDIO_MAR KDOWN_INTERPRET ER_PORT##	The port of the Data Studio Markdown Interpreter.	NO	The default values are 7009, 7029.
##DATASTUDIO_PYT HON_INTERPRETER_ PORT##	The port of the Data Studio Python Interpreter.	NO	The default values are 7012, 7032, 6012.
##DATASTUDIO_JDBC _INTERPRETER_POR T##	The port of the Data Studio JDBC Interpreter.	NO	The default values are 7011, 7031.
##DATASTUDIO_PYT HON_INTERPRETER_ REST_SERVER_POR T##	The port of the Data Studio Python Interpreter Rest server.	NO	The default value is 6012
##DATASTUDIO_PGX _PYTHON_INTERPRE TER_REST_SERVER_ PORT##	The port of the Data Studio PGX Python Interpreter Rest server.	NO	The default value is 6022

Table 5-1   (Cont.) config.sh file

Parameter	Description	Is Mandatory	Comments
##DATASTUDIO_THRIFT_EVENT_HANDLER_PORT##	The port of the Data Studio Thrift Event handler.	NO	The default value is 8432
##DATASTUDIO_PGX_INTERPRETER_PORT##	The port of the Data Studio PGX Interpreter.	NO	The default value is 7022.

> **Note:**
>
> - In case of ##OFSAA_URL## and ##MMG_SVC_URL##, don't add any ending '/' in the URLs
>
> - If pool size, connection timeout and idle timeout are not configured, then it will proceed with default Hikari Configurations.
>
> - The default session timeout is 3600 seconds (60 mins). You can configure timeout using server.servlet.session.timeout property.
>
> - If the AUTH type specified is AAI, make sure the AAI System has appropriate user groups mapped for the users. WKSPADMIN, IDNTYADMN, IDNTYAUTH need minimally to be present for a successful subsequent logins.
>
> - The name for MMG Studio cookie is ORA_OLDS_SESSION.
>
> - If the ##SSL_ENABLED## is set to false, keystore configuration must be done for mmg-studio as it is SSL enabled by default. MMG application and MMG Studio can use the same SSL configuration if configured in the same server.
>
> - The wallet is same for all the MMG services including MMG Studio. So, if you want to use the MMG Studio with wallet configurations, then configure in the same wallet.
>
> - If the MMG Studio is remotely configured, then the MMG Application Config Schema wallet alias and `tnsnames.ora` file entries need to be added to the MMG Studio configured wallet and `tnsnames.ora` file.
>
> - If MMG application is Non SSL, set the below property to "false" in the `application.yml` file inside the MMG Studio and restart the services.
>   ```
>   security:
>
>   cookies:
>
>   secure: false
>   ```

5.4.1 Import Server Certificate to Java Keystore

You must import the server certificate (`.cer`) file to the Java keystore.

To import the server certificate, perform the following steps:

1. Create a `.cer` file from the `server.keystore`.

```
keytool -export -alias <alias>-file <filename>.cer -keystore
<path_to_Keystore>/server.keystore -storepass secret
```

Example:

```
keytool -export -alias demo_alias -file server.cer -keystore OFS_MMG/
config/server.keystore -storepass secret
```

2. Import `.cer` file generated from the above step to java keystore.

```
keytool -import -file "<path_to_Keystore>/<filename>.cer" -alias
<alias>-keystore "<java_home>/lib/security/cacerts" -storepass
"changeit"
```

> **Note:**
>
> The above step should be performed by the Root user.

5.5 Run the MMG Installer

To run the MMG Installer, follow these steps:

1. Navigate to following path:

   Go to `<MMG_INSTALLATION_PATH>/bin` directory.

2. Run the following command:

   ```
   ./install.sh
   ```

> **Note:**
>
> When ./install.sh command is triggered, pre-installation utility validates install configurations such as availability of ports, ftpshare/log folders, database connections, and so on.

This step will install the configurations and has to be executed only once per deployment. This will also bring up the Schema Creator Service in nohup mode.

A message similar to following means a successful startup:

<MMG_INSTALLATION_PATH>/OFS_MMG/bin>./install.sh

PIPELINE_HOME: <MMG_INSTALLATION_PATH>/OFS_MMG/mmg-pipeline/pipeline

<MMG_INSTALLATION_PATH>/OFS_MMG/mmg-pipeline/pipeline

PIPELINE_HOME: <MMG_INSTALLATION_PATH>/OFS_MMG/mmg-pipeline/pipeline

Installing Pipeline Data Model. Please Wait ...

Pipeline Data Model installation finished.

Starting Gateway ...

Starting Pipeline UI Service ...

Starting Pipeline Service ...

Starting Data Pipeline UI Service ...

Starting Data pipeline services ...

Inserting DataMeta Data ...

****************** Data Pipeline Deployment Done *****************

Stopping Graph-Service service...

Graph-Service stopped.

Schema Creator executed successfully for config schema

Schema Creator for config executed successfully.

If Graph Schema is configured, the below message is displayed.

Now triggering for graph-schema

./../mmg-schema-creator/bin/startup.sh: line 70: 126438 Killed nohup java -jar -Doracle.net.tns_admin=/scratch/ofsaadb -Doracle.net.wallet_location=/scratch/ofsaadb/wallet -Dspring.config.location=../conf/ -Dspring.datasource.url=jdbc:oracle:thin:@conf_als -Dspring.liquibase.change-log=file:../scripts/changelog-master.xml $JAVA_OPTS ../lib/mmg-schema-creator.war > nohup.out 2>&1

Schema Creator executed successfully for graph schema

nohup: ignoring input and redirecting stderr to stdout

Stopping Graph-Service service...

Graph-Service stopped.

nohup: ignoring input and redirecting stderr to stdout

You can check mmg-schema-creator/bin/nohup.out to check if the service comes up properly.
Started BuildSchemaCreatorApplication in 20.317 seconds (JVM running for 21.26)

> ⚠ **WARNING:**
>
> If you notice any errors, do not proceed further. Contact My Oracle Support (MOS) and provide the applicable error code and log files.

3. Execute `shutdown.sh` and trigger `startup.sh` for the services to come up. For more details, refer to the below sections.

> ✎ **Note:**
>
> The MMG Application is installed with or without OFSAA, depending on the configuration provided in the `config.sh` file.

5.6 Starting MMG Services

To start the MMG service, run the following command:

- Navigate to `<MMG_INSTALLATION_PATH>/bin` directory. `./startup.sh`

  A message similar to following means a successful startup:

  Starting MMG UI...

  MMG UI started successfully.

  Starting MMG Service...

  MMG Service started successfully.

  Starting Data Studio...

  Data Studio started successfully.

  Starting Gateway ...

  Starting Pipeline UI Service ...

  Starting Pipeline Service ...

  Starting Data Pipeline UI Service ...

  Starting Data pipeline services ...

  You may check `<MMG_INSTALLATION_PATH>/mmg-ui/bin/nohup.out` to check if the UI service comes up properly.

  A message similar to following means a successful startup:

  ```
  Started BuildUIServiceApplication in 27.981 seconds (JVM running for
  29.365)
  ```

  You can check `<MMG_INSTALLATION_PATH>/mmg-service/bin/nohup.out` to check if the backend service comes up properly.

  A message similar to following means a successful startup:

  ```
  Started BuildServiceBuildApplication in 20.317 seconds (JVM running
  for 21.26)
  ```

  You can check `<MMG_INSTALLATION_PATH>/mmg-studio/bin/nohup.out` to check if the backend service comes up properly.

  A message similar to following means a successful startup:

  ```
  05:06:02.155 Thread-9] INFO oracle.datastudio.starter.App - Data
  Studio Server is ready to use
  ```

  This will start the successful installation of application.

  > **WARNING:**
  >
  > If you notice any errors, do not proceed further. Contact My Oracle Support (MOS) and provide the applicable error code and log files.

> **Note:**
>
> Unset the https/http proxy details before starting the services.
> OR
>
> Add the relevant entries in no_proxy with mmg hosted server details.

5.7 Stopping MMG Services

To stop the MMG services, run the following command: `./shutdown.sh`

A message similar to following means a successful shutdown:

Stopping Graph-Service service...

Graph-Service stopped.

MMG UI shutdown is complete.

MMG Service shutdown is complete.

MMG Schema Creator shutdown is complete.

Data Studio shutdown is complete.

Data Pipeline Service shutdown is complete.

5.8 Generate GRAPH-KEYSTORE.P12

Graph services should be up and running.
To generate GRAPH-KEYSTORE.P12 file, perform the below steps:

> **Note:**
>
> The Keystore generation fails if graph service is down.

1. Execute `graph-keystore-generator.sh` using PUTTY.

2. Enter the values as below when prompted.

   Enter Wallet Alias : <GRAPH_SCHEMA_WALLET_ALIAS> as given in the `config.sh` file.

   Enter Password: <GRAPH_SCHEMA_DB_SCHEMA> password

   Enter Keystore alias: <GRAPH_SCHEMA_DB_SCHEMA_NAME> as given in the `config.sh` file.

   Check the below location for the graph-keystore.p12

   <mmg installation path>/OFS MMG/mmg-load-to-graph/graph-service/conf/

5.9 Install MMG Python Library

This section provides detailed steps to install the MMG Python Library.

5.9.1 Prerequisites

- Python 3.8.x and above

> **Note:**
>
> : Ensure the libraries, bzip2-devel, sqlite-devel, ncurses-devel, and xz-devel, libffi-devel are installed before you install the Python package.

For Example:

> **Note:**
>
> Install the below libraries as a root user.
>
> - **bzip2-devel:** Execute the command `yum install bzip2-devel`
>
> - **sqlite-devel:** Install as a root user using the command `yum install sqlite-devel`
>
> - **ncurses-devel:** Install as a root user using the command `yum install ncurses-devel`
>
> - **xz-devel:** Install as a root user using the command `yum install xz-devel`
>
> - **libffi-devel:** Install as a root user using the command `yum install libffi-devel`

5.9.2 Procedure

1. Set system python3 to the one that is to be used. Navigate to bin folder.

2. To install the mmg library with dependencies from `conf/requirements.txt`, execute the following command:

   ```
   ./python-env-install.sh
   ```

3. To install the mmg library with flexible dependencies or using already installed dependent packages, execute the following command:

   ```
   ./python-env-install.sh -S
   ```

   OR

   ```
   ./python-env-install.sh --skip
   ```

   This will skip the installation of dependency based on the version mentioned in the conf/requirements.txt. The installation will be with whatever version available in the pypi server.

4. To install the Apache Flink packages, execute the following command:

   ```
   ./python-env-install.sh --include-flink
   ```

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> **Note:**
>
> Ignore the below error message during Apache Flink package installation.
>
> ```
> ERROR: pip's dependency resolver does not currently take into
> account all the
> ```
>
> packages that are installed. This behavior is the source of the following dependency conflicts.
>
> modin 0.19.0 requires pandas==1.5.3, but you have pandas 1.3.5 which is incompatible.
>
> Successfully installed numpy-1.21.4 pandas-1.3.5 python-dateutil-2.8.0
>
> Installing with dependencies
>
> ERROR: pip's dependency resolver does not currently take into account all the
>
> packages that are installed. This behavior is the source of the following dependency conflicts.
>
> pemja 0.2.6 requires numpy==1.21.4, but you have numpy 1.24.2 which is incompatible.
>
> apache-flink 1.16.1 requires numpy<1.22.0,>=1.21.4; python_full_version >=
>
> "3.7", but you have numpy 1.24.2 which is incompatible.
>
> apache-flink 1.16.1 requires pandas<1.4.0,>=1.3.0; python_full_version >=
>
> "3.7", but you have pandas 1.5.3 which is incompatible.
>
> apache-flink 1.16.1 requires python-dateutil==2.8.0, but you have
>
> python-dateutil 2.8.2 which is incompatible.
>
> apache-beam 2.38.0 requires
>
> numpy<1.23.0,>=1.14.3, but you have numpy
>
> 1.24.2 which is incompatible.

5.10 Setting up the Environment for Hive Data Sourcing

This section is applicable if you want to use Hive Data Source.

In the MMG Home directory, a lib folder is available for the Hive specific jars and a conf folder is available for the Kerberos configuration and Keytab files.

Hive source connection requirements

MMG_HOME/conf : kbank.keytab and krb5.conf files

MMG_HOME/lib : hive-jdbc-uber-2.6.3.0-235.jar

mmg-studio/conf : kbank.keytab, krb5.conf and hive-jdbc-driver.jar

> **✎ Note:**
>
> The datastudio placement of jars are for creating a connection from python lib and the other is from java for data sourcing.

Configure the Hive jars and configuration files.

For Hadoop version 3.1.1 and hive version 3.1.2, below is the list of jar files that needs to be copied into the `OFS_MMG/lib location`:

zookeeper-3.4.9.jar

woodstox-core-5.0.3.jar

stax2-api-3.1.4.jar

slf4j-log4j12-1.7.25.jar

slf4j-api-1.7.25.jar

re2j-1.1.jar

log4j-1.2.17.jar

libthrift-0.9.3.jar

libfb303-0.9.3.jar

httpcore-4.4.4.jar

httpclient-4.5.2.jar

htrace-core4-4.1.0-incubating.jar

hive-service-3.1.2.jar

hive-metastore-3.1.2.jar

hive-jdbc-3.1.2.jar

hive-exec-3.1.2.jar

hadoop-hdfs-client-3.1.1.jar

hadoop-common-3.1.1.jar

hadoop-auth-3.1.1.jar

curator-client-2.12.0.jar

commons-logging-1.0.4.jar

commons-io-2.4.jar

commons-configuration2-2.1.1.jar

commons-collections-3.2.2.jar

commons-cli-1.2.jar

The mmg-service requires a restart after copying the Hive jars and configuration files. For more information, see the MMG User Guide.

5.11 Remote MMG Studio Configuration

For Solaris Operating System, the MMG Studio has to be configured in Linux machine remotely. The MMG Studio URL must be the same as that of the remote studio during MMG Application Installation.

In the `OFS_MMG/bin/config.sh`, update the following properties with the remote server where the MMG Studio will be running:

Copy the mmg-studio folder to the remote machine where you want to configure the same.

Navigate to `mmg-studio/bin` and update the config.sh file with respect to studio server values. For more details, see the Configure the config.sh file section.

```
export DATASTUDIO_URL=##DATASTUDIO_URL##

export SSL_KEYSTORE=##SSL_KEYSTORE##

export SSL_KS_SECRET=##SSL_KS_SECRET##

export SSL_KS_TYPE=##SSL_KS_TYPE##

export SSL_KS_ALIAS=##SSL_KS_ALIAS##
```

> **Note:**
>
> The keystore must be generated for the remote machine and the path must be present in the remote server.

```
export DS_TNS_ADMIN_PATH=##DS_TNS_ADMIN_PATH##

export DS_WALLET_LOCATION=##DS_WALLET_LOCATION##
```

TNS admin and wallet must be configured in the remote server and the wallet must contain the mmg config schema wallet configurations.

```
export MMG_TNS_ADMIN_PATH=##MMG_TNS_ADMIN_PATH##

export MMG_LIB_WALLET_ALIAS=##MMG_LIB_WALLET_ALIAS##
```

> **Note:**
>
> The Self signed certificate needs to be generated and imported to the java keystore. In case self-signed certificate is being used, perform the below step:
>
> • Import MMG studio server certificate to MMG application server java keystore and vice versa.
>
> For more details, see Import Server Certificate to Java Keystore section.

> **Note:**
>
> Once the token is generated, ignore '-e' character present in the `token.out` file.

5.12 PGX Installation

> **Note:**
>
> PGX Installation is recommended to be installed in a different server other than the MMG Installation Server.

To install the PGX, follow these steps:

1. Copy the mmg-pgx.zip file from MMG Server and copy it to the target server where PGX has to be installed remotely to MMG.

2. Unzip the mmg-pgx.zip file.

   For Example: unzip -a mmg-pgx.zip.

   The below files will be displayed:

   - bin

   - conf

   - pgx-23.4.6

3. Give 0755 permission to mmg-pgx folder.

4. Configure the config.sh of pgx. For more details, see Configure the config.sh File of PGX section.

5. Copy the graph-keystore.p12 from MMG Installation server to <pgx installation path>/mmg-pgx/conf. For more details, see Generate GRAPH-KEYSTORE.P12 section.

6. Copy the below key files from <MMG Installation path>/OFS_MMG/conf to <pgx installation path>/mmg-pgx/conf.

   - public.key

   - private.key

7. Run the install.sh from <pgx installation path>/mmg-pgx/bin

8. Update the pgx-server URL in config.sh for ##PGX_SERVER_URLS## in the <MMG Installation path>/bin and run the install.sh -u command and restart the MMG services. For more details, see Configure the config.sh File of PGX section.

9. Start the Server. For more details, see Starting PGX Server section.

10. Stop the Server. For more details, see Stopping PGX Server section.

5.12.1 Configure the config.sh File of PGX

To configure the config.sh file for installing PGX with MMG, follow these steps:

1. Login to the server as a non-root user.

2. Navigate to the <OFS_MMG>/mmg-pgx/bin directory.

3. Configure the applicable config.sh attributes as shown in the following table:

Sample Config.sh file

```
#!/bin/sh

export PGX_PORT=##PGX_PORT##

export PGX_CONTEXT_PATH=##PGX_CONTEXT_PATH##

export PGX_SSL_ENABLED=##PGX_SSL_ENABLED##

export PGX_SSL_KEYSTORE=##PGX_SSL_KEYSTORE##

export PGX_SSL_KS_SECRET=##MMG_SSL_KS_SECRET##

export PGX_SSL_KS_TYPE=## PGX_SSL_KS_TYPE ##

export PGX_SSL_KS_ALIAS=## PGX_SSL_KS_ALIAS##

export GRAPH_SERVICE_URL=## GRAPH_SERVICE_URL##

export GRAPH_KEYSTORE_PASSWORD=## GRAPH_KEYSTORE_PASSWORD##

export LOG_HOME=##LOG_HOME##

export LOG_LEVEL=##LOG_LEVEL##
```

Table 5-2   config.sh file of pgx

Parameter	Description	Is Mandatory	Comments
##PGX_PORT##	Port on which pgx server needs to be run.	YES	If not set, Port defaults to 7007.
##PGX_CONTEXT_PATH##	Context path of pgx server	YES	If not set, Context path defaults to pgx.
##PGX_SSL_ENABLED##	The values can be true /false. If true, follow the below steps if Self Signed is being used: • Import pgx server.cer file to MMG server java keystore • Import MMGserver.cer file to pgx server java keystore For more details, see Import Server Certificate to Java Keystore section.	YES	

Properties if ##PGX_SSL_ENABLED## is set to true.

Table 5-2   (Cont.) config.sh file of pgx

Parameter	Description	Is Mandatory	Comments
##PGX_SSL_KEYSTO RE##	Absolute path for the keystore file. This is applicable only if ##PGX_SSL_ENABLE D## is set to true. NOTE: Run the following command to create a keystore: keytool -genkey -v -alias demoalias -keyalg RSA -keysize 2048 -keystore server.keystore -validity 3650 -keypass secret -storepass secret -storetype PKCS12	YES	../conf/server.keystore. Include the file name in the path.
##PGX_SSL_KS_SEC RET##	Value passed in above command for keypass. This is applicable only if ##PGX_SSL_ENABLE D## is set to true.	YES	Keystore password
##PGX_SSL_KS_TYP E##	The type of the pgx keystore. This is applicable only if ##PGX_SSL_ENABLE D## is set to true.	YES	PKCS12
##PGX_SSL_KS_ALIA S##	The Alias of the pgx keystore. This is applicable only if ##PGX_SSL_ENABLE D## is set to true.	YES	password123
Properties for graph service			
## GRAPH_SERVICE_U RL ##	Graph Service URL. The value is same as ##LOADGRAPH_BAS E_URL## in the MMG.config.sh	YES	http(s)://<MMG Host>:<Graph service port>/graph-service
## GRAPH_KEYSTORE_ PASSWORD ##	Graph Keystore password. The value is same as ##GRAPH_KEYSTOR E_PASSWORD## in the MMG.config.sh	YES	password123
Properties for setting log path			

Table 5-2   (Cont.) config.sh file of pgx

Parameter	Description	Is Mandatory	Comments
##LOG_HOME##	A writable folder that stores pgx logs.		/scratch/users/logs
##LOG_LEVEL##			The values can be DEBUG/INFO/WARN

5.12.2 Starting PGX Server

To start the PGX Server, run the following command:

- Navigate to `<MMG_INSTALLATION_PATH>/bin` directory. ./startup.sh

  You may check `<mmg-pgx/pgx-<pgx-version/bin/nohup.out` to check if the UI service comes up properly.

  A message similar to following means a successful startup:

  ```
  INFO: Starting ProtocolHandler ["http-nio-7007"]
  ```

  This will start the successful installation of PGX Server.

5.12.3 Stopping PGX Server

To stop the PGX Server, run the following command:

```
./shutdown.sh
```

A message similar to following means a successful shutdown:

PGX Server shutdown is complete.

5.13 R Interpreter

You can configure the R Interpreter support either with ORD-3.6.1 or R 4.1.2.

5.13.1 ORD-3.6.1 Installation

To install ORD-3.6.1, follow the steps mentioned in the below guides:

- https://www.oracle.com/database/technologies/r-distribution.html
- https://docs.oracle.com/en/database/oracle/machine-learning/oml4r/1.5.1/oread/installing-oracle-R-distribution-on-linux.html#GUID-A73BA0EB-507C-4678-9AD7-CE2CB6CE0251

1. Check installation:
   a. R-version
2. Installing other packages:

   Set proxy:

   a. R-e "install.packages('Rserve', repos='https://www.rforge.net/')"
   b. R-e "install.packages(c('knitr', 'ggplot2', 'backports'), repos='https://mirror.las.iastate.edu/CRAN/')"

5.13.2 R 4.1.2 Installation

> **Note:**
>
> This setup might update some of the older root level files and using Non-Oracle Yum Repository for getting R rpm files.

To install R 4.1.2, follow these steps:

1. Set Proxy, (pseudo user):

    a. curl- O https://dl.fedoraproject.org/pub/epel/epel-release-latest-7.noarch.rpm

    b. yum install epel-release-latest-7.noarch.rpm

    c. curl- O https://cdn.rstudio.com/r/centos-7/pkgs/R-${R_VERSION}-1-1.x86_64.rpm

    d. sudo yum install R-${R_VERSION}-1-1.x86_64.rpm

    e. sudo ln -s /opt/R/${R_VERSION}/bin/R /usr/bin/R

2. Check installation:

    a. R-version

3. Installing other packages:

    a. R-e "install.packages('Rserve', repos='https://www.rforge.net/')"

    b. R-e "install.packages(c('knitr', 'ggplot2', 'backports'), repos='https://mirror.las.iastate.edu/CRAN/')"

5.13.3 Configuring R Interpreter

1. Configure Rserve

```
nano /scratch/software/R/Rserve.conf (sample file)

>

auth required

plaintext disabled

pwdfile /scratch/software/R/creds/Rserve.pwd

remote enable

switch.qap.tls enable

tls.port 6311

qap disable

interactive no

rsa.key /scratch/software/R/creds/server.key

tls.key /scratch/software/R/creds/server.key

tls.cert /scratch/software/R/creds/server.crt
```

2. password file Rserve.pwd:

```
>

oml $5baa61e4c9b93f3f0682250b6cf8331b7ee68fd8
```

The file contains one line per user, where the first part is the username, and the second part is the password.

The password can either be plain text or a MD5/SHA1 hash. In this example the password `password` is hashed with SHA1.

If you use hashed passwords, the password string needs to start with a `$` sign.

3. SSL Key:

```
openssl genrsa -out server.key 2048

openssl req -new -key server.key -out server.csr # password 1234

openssl x509 -req -days 365 -in server.csr -signkey server.key -out
server.crt
```

4. Creating Keystore:

```
keytool -import -alias <keystore-alias> -file <path-to-server.crt>/
server.crt -keystore <output-path-to-keystore/rinterpreterkeystore -
storepass <keystore-secret> -noprompt

eg. keytool -import -alias rserve -file /scratch/software/R/creds/server.crt
-keystore /scratch/software/R/creds/rinterpreterkeystore -storepass changeit
-noprompt
```

5.13.4 MMG Connection Objects Library Setup

This section describes the MMG Connection Objects Library Setup.

5.13.4.1 Installing ROracle Library

Prerequisites

DBI is one of the dependencies for using this library.

- Installing DBI
    1. curl- O https://cran.r-project.org/src/contrib/DBI_1.1.1.tar.gz
    2. R CMD INSTALL DBI_1.1.1.tar.gz

Procedure

To install ROracle Library, follow these steps:

- For ORD 3.6.1/R 4.1.2
    1. curl- O https://cran.r-project.org/src/contrib/ROracle_1.3-1.1.tar.gz
    2. Install Oracle Instant Client Sdk Package. This is required for additional header files and an example makefile for developing Oracle Applications with Instant Client.
    3. Oracle client lib must be present in PATH. In the .profile file, set PATH to include the appropriate `$ORACLE_HOME/bin` path.
       For example:
       ```
       PATH=$JAVA_HOME/bin:$ORACLE_HOME/bin
       ```

4. R CMD INSTALL `--configure-args='--with-oci-lib=<absolute-path-to-oracle-client-lib> `**`--with`**`-oci-inc=<absolute path to instantclient_21_5>/include' ROracle_1.3-1.1.tar.gz`
   For example:

   R CMD INSTALL --configure-args='--with-oci-lib=/scratch/users/oracle/app/oracle/product/19.3.0/client_1/lib --with-oci-inc=/scratch/users/oracle/instantclient-sdk/instantclient_21_5/sdk/include' ROracle_1.3-1.1.tar.gz

5.13.4.2 Installing RODBC Library

- **For ORD 3.6.1**

  1. curl- O https://cran.r-project.org/src/contrib/Archive/RODBC/RODBC_1.3-16.tar.gz

  2. R CMD INSTALL RODBC_1.3-16.tar.gz

  > **Note:**
  >
  > It needs write permission to `'/usr/lib64/R/library'` or similar root directory for system installation.

- **For R 4.1.2**

  1. curl- O https://cran.r-project.org/src/contrib/RODBC_1.3-19.tar.gz

  2. R CMD INSTALL RODBC_1.3-19.tar.gz

> **Note:**
>
> LD_LIBRARY_PATH should contain path to $ORACLE_HOME/lib and check that file 'libsqora.so.19.1' exists in $ORACLE_HOME/lib. Now, set an environment variable named RODBC_DRIVER with value 'libsqora.so.19.1' whichever is present in $ORACLE_HOME/lib/ directory based on the Oracle Client Version Installation.
> Now for RODBC Connection to work for Sandbox, check the TNS_ADMIN path set, and then in tnsnames.ora, add the connection string details with alias as Sandbox Name. For example, if Sandbox Name is SAND1 for which the datasource is on host abc.in.oracle.com , port 1234 and service name – ABCXYZ, then in tnsnames.ora file add the following entry-
>
> SAND1 =
>
> (DESCRIPTION =
>
> (ADDRESS_LIST =
>
> (ADDRESS = (PROTOCOL =
>
> TCP)(HOST=abc.in.oracle.com)(PORT=1234))
>
>)
>
> (CONNECT_DATA =
>
> (SERVICE_NAME = ABCXYZ)
>
>)
>
>)
>
> If this only does not resolve the connections, then configure odbcinst.ini. / odbc.ini files as well as mentioned in Oracle Client Installation and Setup (figured by: > odbcinst -j)

5.13.5 Using MMG Studio to Oracle Connection Objects

This section describes the Using MMG Studio to Oracle Connection Objects.

5.13.5.1 Workspaces

1. `mmg.list_workspaces()`: Used to fetch a vector of all workspaces.
   For example: `vec <- mmg.list_workspaces() vec will be vector object`

2. `mmg.attach_workspace("workspace_name ")`: A method used to set workspace.
   Sets a global `mmg_attached_`WS variable with value of `workspace_name`

   Sets a `mmg_DS_Vec` Vector Object with name and order of all datasources for attached workspace.

   Sets a `mmg_WL_Vec` Vector Object with name and wallet of all datasources for attached workspace.

   For example:

   `mmg.attach_workspace("SB1")`

5.13.5.2 Connections

Following is the list of datasources related to workspace using:

- `mmg.list_datasources("SB1", 1):` will list datasources related to SB1 workspace with order 1 as passed in second argument `mmg.list_datasources("workspace_name",order)` order is integer for specific order or null for all datasources.

  For example:

  df <- mmg.list_datasources("workspace_name",order) df will be Data.Frame Object.

  From the datasource name or order for the attached workspace, we can get the **ROracle** or **RODBC** Connection Object.

- `mmg.get_connection():`
  datasource_name is the string name of the datasource, order is integer, library is one of **"RODBC" or "ROracle"**

  conn <- mmg.get_connection(datasource=order,conn_type="library");

  conn <- mmg.get_connection(datasource="datasource_name",conn_type="library");

  conn <- mmg.get_connection(datasource="datasource_name","library");

  conn <- mmg.get_connection(datasource=order,"library");

  conn <- mmg.get_connection("datasource_name",conn_type="library");

  conn <- mmg.get_connection(order,conn_type="library");

  conn <- mmg.get_connection("datasource_name","library");

  conn <- mmg.get_connection(order,"library");

  sets the conn variable to connection object of relevant library

5.14 Conda

Conda as a package manager helps you to find and install packages. With the capability of environment manager, you can set up a totally separate environment to run different versions of Python. In addition, you can continue to run your usual version of Python in your normal environment.

> **Note:**
>
> The supported version is 4.14.0.

To install the Conda, perform the following:

1. Download the miniconda.

2. Copy it to your server where the Conda needs to be installed.

3. Grant execute permission to the Conda folder.

4. Execute the following command: `$ ./Miniconda3-latest-Linux-x86_64.sh`

5. Update the PATH variable with miniconda installation path:

```
<install_path>/miniconda3/bin
```

> **✎ Note:**
>
> In the current release, the Conda feature is not supported in Solaris Operating System.

For more details on the Roles and privileges, see *MMG User Guide*.

5.15 Multi Level Approval

Model Pipeline deployment process by default requires one level of approval for every stage including model pipeline acceptance, promotion to production, and so on.
The requestor is allowed to select Reviewer and Approver user groups. All the user groups with MDLREVIEW function mapped to them are displayed in the Reviewers selector field. Similarly, the user groups with the MDLAPPROVE function mapped to them are displayed in the Approvers selector field. Applicable Pending requests are shown in the Reviewer/ Approver tabs.

To add multi level approvers or reviewers, perform the following:

1. Navigate to `<mmg-home>/conf/workflow/model-pipeline/default.yml`

   Following are the default values:
   workflow:

   workflow-name: Default Workflow

   num-approver-levels: 1

   levels:

   - level: 1

   approvers:

   escalation-approvers:

   escalation-trigger-time: 0

   lock-approver-selection: false

   enable-approver-notification: true

2. Modify the approver levels based on your requirements as shown below.

Figure 5-1   Multi level approval

```
workflow:
   workflow-name: Default Workflow
   num-approver-levels: 2
   levels:
      - level: 1
        approvers: APPROVER1
        escalation-approvers: MDLAPPR
      - level: 2
        approvers: APPROVER2
        escalation-approvers: MDLAPPR
   escalation-trigger-time: 12
   enable-approver-notification: true
   lock-approver-selection: true
```

6
Post Installation Steps

On successful installation of the OFS MMG Application, refer to the below topics for Post Installation procedures.

> **Note:**
>
> These Post Installation steps are applicable for both when MMG Installation is performed with or without OFSAA instance.

6.1 Access the Application

To access the application, follow these steps:
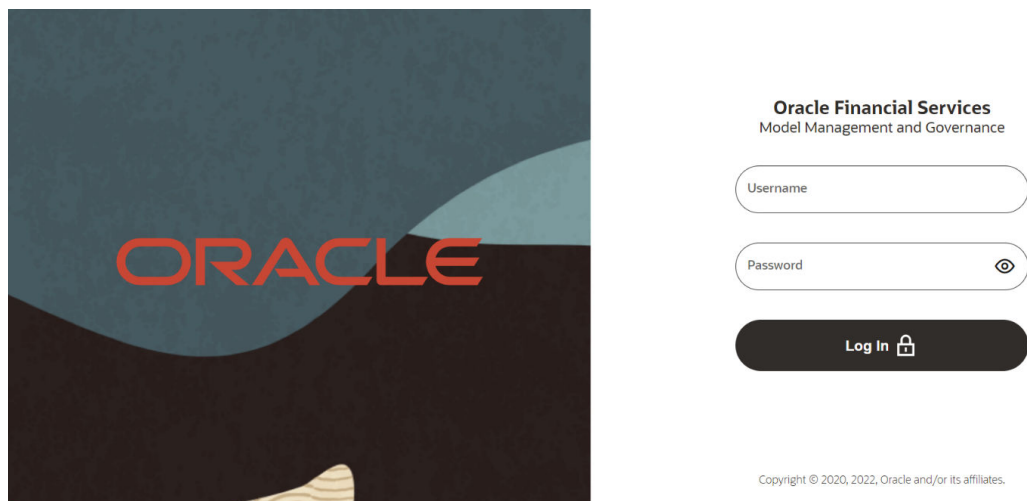
- Open a browser and enter the URL in the following format:

  `http(s)://<MMG UI service host name>:<UI_PORT>/mmg/home`

  For example:

  `https://xyz.com:4155/mmg/home`

  The MMG Login window is displayed.

Figure 6-1   MMG Login window – AAI Authentication

For more information, see the User Access and Permissioning Management section.

6.2 Create Application Users

Create the application users in the MMG setup before use. For more information, see the User Access and Permissioning Management section.

6.3 Map Application User(s) to User Group

User Groups seeded with the OFS MMG Application Pack are listed in the Seeded User Groups table.

Table 6-1   Seeded User Groups

User Group Name	User Group Description
MDLREV	The Modeling Reviewer Group. Users mapped to this group have access to the menu items in the OFS MMG Application that are related to model review activities.
MDLAPPR	The Modeling Approver Group. Users mapped to this group have the rights to approve models created by the users.
MDLBATCHUSR	The Modeling Batch User. Scheduler can use this Group for executing batches.
WKSPADMIN	The Workspace Administrator Group. Users mapped to this group have access to all the menu items in the OFS MMG Application. Additionally, they have authorization rights to create and populate workspaces.
MDLUSR	The Modeling User Group. Users mapped to this group have access to all the menu items in the OFS MMG Application that is related to model creation.
DSUSRGRP	General Role Users mapped to this group have permission to access/modify MMG Studio Interpreter Configurations.
DSREDACTGRP	Roles for applying redaction in graph. This group will be applicable to only those users for whom graph redaction is required.
OBJMIGADMIN	Users mapped to this group have access to Object Migration links and UI to perform import or export of objects.
GRPADMIN	The Graph Administrator Group. Users mapped to this group have access to all the menu items in the OFS MMG Application related to graph and Pipeline/Refresh graphs related health services.

Table 6-1   (Cont.) Seeded User Groups

User Group Name	User Group Description
GRPUSR	The Graph User Group. Users mapped to this group have access to all the menu items in the OFS MMG Application related to graph and Pipeline/Refresh graphs related health services.

> **Note:**
>
> Admin link in MMG Application Home page will only be accessible if the below seeded groups are mapped to the user:
>
> - IDNTYADMN
> - IDNTYAUTH

6.4 Model Techniques/ Model Library

Following are the prerequisites to use the model techniques from the older version when you upgrade to 8.1.2.4.0 version.

> **Note:**
>
> MMG_TECHNIQUE_MASTER table had no V_WORKSPACE_ID column, which has been added in this release and then the primary key is updated to (V_TECHNIQUE_ID, V_WORKSPACE_ID).

To use the existing Techniques in the upgraded setup, perform the below:

The V_WORKSPACE_ID column will have the value set as ##WORKSPACE## for the existing records by default. If the same records has to be used in the latest version of MMG, you must update the table MMG_TECHNIQUE_MASTER with relevant Workspace ID.

6.5 .PEM file creation for Model Service

You must create **server.pem** file from **server.keystore** in the same path where server.keystore file is present using the below command:

```
openssl pkcs12 -in <Path_To_server.keystore> -out <Path_To_Server.pem> -nodes
```

For Example:

```
openssl pkcs12 -in

/scratch/users/ofsaa/dev_home/config/server.keystore -out

/scratch/users/ofsaa/dev_home/config/server.pem -nodes
```

6.6 Access and Permissioning Management

MMG uses a realm based on unique authentication and authorization for its users. Realm indicates the functional grouping of Database Schemas and roles that must be secured for an application. Realms protect data from access through system privileges and do not provide its owner or participants additional privileges. Realm based authorization establishes a set of database accounts and roles that can manage, or access objects protected in realms and are authorized to use its system privileges. It provides a runtime mechanism to check logically if a user's command can access objects specified in the command and proceed with its execution. Realms (AAIRealm, SAMLRealm) are selected based on the Identity Provider (IDP) during the installation. For more information, see the OFS MMG Installation Guide. After you select the realms, you can register a set of schema objects or roles (secured objects) for realm protection and authorize a set of users or roles to access the secured objects. The MMG Application is accessed using the following realms that you have selected during the installation of the MMG Application:

- **AAIRealm:** This uses Oracle Financial Services Analytical Applications Infrastructure (OFSAAI) Identity Management System for User Authentication. Users, Roles, and Groups are created in the OFSAAI. The OFSAAI facilitates System Administrators to provide access, monitor, and administer users along with the infrastructure metadata operations. The required permissions to roles or groups are authorized in the MMG applications using the Permission feature.

- **SAMLRealm:** The SAMLRealm uses an identity provider (IDP) Identity Management System for User Authentication. Security Assertion Markup Language (SAML) is an open standard that allows Identity Providers (IDP) to pass authorization credentials to Service Providers (SP). IDP acts as the Single Sign-On (SSO) service. Users and Roles are created in the IDP. The required permissions to Users and Roles are authorized in the MMG Applications using the Permission feature.

Figure 6-2   Authentication and Authorization process in MMG
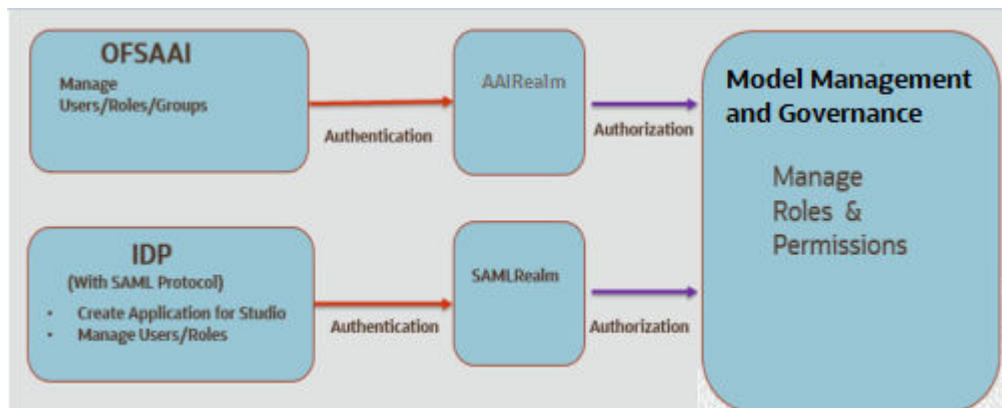
6.6.1 Access MMG Using AAI Realm

This section provides information on creating users who can access MMG using the AAIRealm Method of authentication through Oracle Financial Services Analytical

Applications Infrastructure (OFSAAI). The users with SYSADMN and SYSAUTH roles in OFSAAI can create and authorize users, respectively.

Identity Management in the OFSAAI facilitates System Administrators to provide access, monitor, and administer users along with the infrastructure metadata operations. The Security Management System (SMS) component is incorporated with Password Encryption, Single Logon, Role and DataBased Security, Access Control, and Audit Trail feature to provide a highly flexible security envelope. Administrators can create, map, and authorize users defining a security framework that can restrict access to the data and meta-data in the warehouse, based on a fine-grained access control mechanism. These activities are done at the initial stage and then on a required basis. For more information on creating and authorizing users in OFSAAI, see the Oracle Financial Services Analytical Applications Infrastructure User Guide. The following table describes the ready-to-use roles and the corresponding user groups who can access MMG using AAIRealm. NOTE Only in AAIRealm, users are mapped to user groups. The default permissions mapped to these users and user groups are available in the Permission section. However, these permissions can be added or modified.

6.6.1.1 Prerequisites

1. Configuring WebLogic for REST Services Authorization.

    To enable REST API authorization by OFSAA in WebLogic server, perform the following steps:

    a. Open the config.xml file located in the domain where OFSAA is deployed that is:
        `<domain_home>/config/config.xml`.

    b. Add the following in the security-configuration tag:
        `<enforce-valid-basic-auth-credentials>false</enforce-valid-basic-authcredentials>`.

2. If MMG is SSL enabled, then the SSL certificate for MMG application should be imported in AAI.

3. In OFSAA Application, **Allow user to log in from multiple machines** option should be enabled.

6.6.2 Access MMG Using SAMLRealm

This section provides information on managing users who can access MMG with Identity Provider (IdP or IDP). The IdP acts as the Single Sign-On (SSO) service provider for implementations between MMG, and Compliance Studio. This configuration prevents separate login for each application. An Identity Provider (IdP) is a service that stores and verifies user identity. IdPs are cloud-hosted services, and they often work with single sign-on (SSO) providers to authenticate users. An Identity Provider (IdP or IDP) stores and manages users' digital identities. An IdP checks user identities via username-password combinations and other factors, or it may simply provide a list of user identities that another Service Provider (like an SSO) checks. The following are the ready-to-use roles that can access MMG using SAMLRealm. To integrate MMG with IdP as the SSO Provider, follow these steps:

1. Create the following roles in the IDP System:

    •   IDNTYADMN

    •   IDNTYAUTH

    •   MDLREV

- MDLAPPR
- MDLBATCHUSR
- WKSPADMIN
- MDLUSR
- DSUSRGRP
- DSREDACTGRP
- GRPADMIN
- GRPUSR

> **Note:**
>
> IDNTYADMN role is required only if you need the Admin Access.

2. Map the user groups to the respective user based on the user roles. The default permissions mapped to these users are available in the Permission section. However, these permissions can be added or modified.

> **Note:**
>
> It is recommended to use AAIRealm or SAMLRealm.

6.7 AAI User Provisioning SQL Scripts Generator Utility

This utility allows you to use AAI for authN in MMG. Identity administrators can create new user groups/roles, perform appropriate roles, usergroup and domain mapping, and so on.

This is provided as a SQL generator utility. This SQL scripts is executed in the AAI's config schema to create the required metadata.

You must execute this script multiple times against each username. Additionally, generate the merge scripts accordingly.

Execute the following command from `<mmg-home>/bin` folder

```
./userprovisioning-script-generator.sh <user> <comma separated listof user
groups or ALL> <infodom> <segment>
```

Sample Commands:

```
./userprovisioning-script-generator.sh SCRIPTUSER ALL OFSAAAIINFO EMFLD
```

```
./userprovisioning-script-generator.sh SCRIPTUSER
MDLREV,MDLUSR,IDENTITY_ADMIN
```

```
OFSAAAIINFO EMFLD
```

6.8 IDCS Server Configuration

To perform IDCS Server Configuration, follow these steps:

1. Navigate to SAML IDCS Admin.

2. Navigate to Details section and add the app details in IDCS Server as shown below:

Figure 6-3   IDCS Server

3. Navigate to SSO Configuration section and add the app details in IDCS Server as shown below:

Figure 6-4   SSO Configuration section

Figure 6-5   IDCS Server

> **Note:**
>
> The following attributes such as username, email, and ofs_mapped_groups needs to configure as shown in the above image.

4. Navigate to Group section and Configure User Groups.

Figure 6-6   Configure User Groups in Group section

7
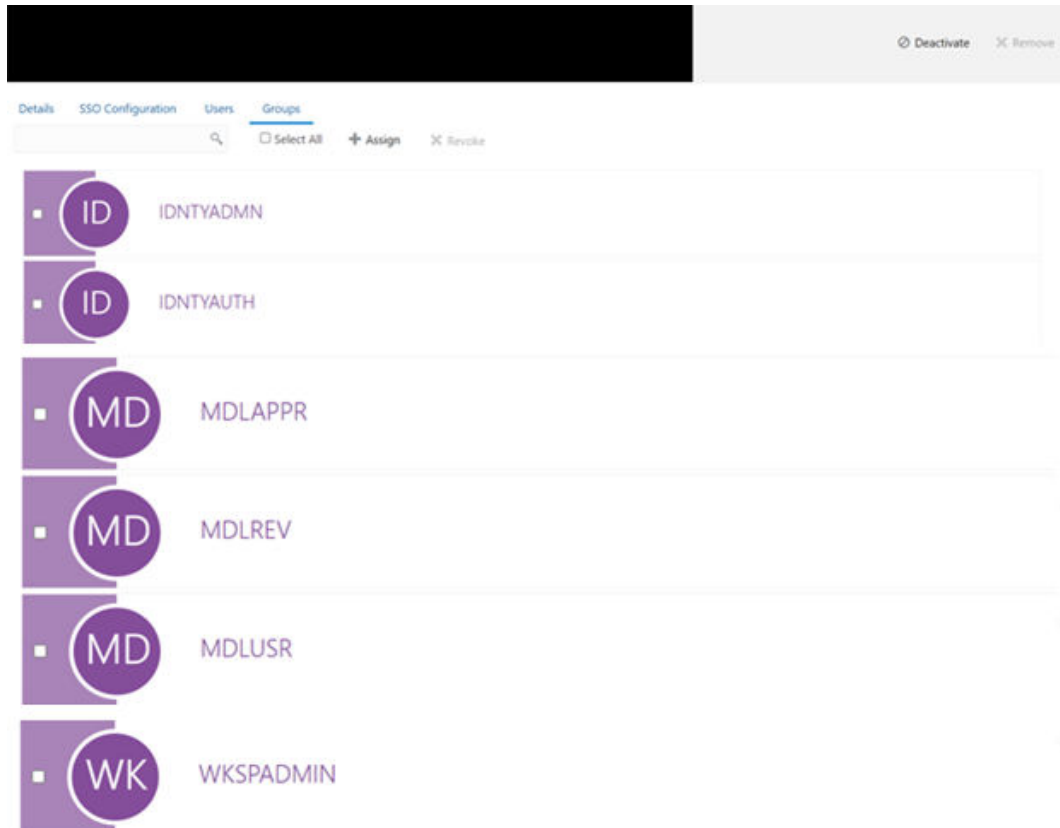
Upgrade Installation

This chapter describes the Upgrade Installation.

7.1 Upgrading to 8.1.2.6.0

To update an already installed MMG Application, perform the following steps:

Prerequisite:

- A valid working setup should be available before performing the upgrade.
- Use the MMG Config and MMG Datastudio Schema from the existing version along with the wallet configurations.
- Create a new Graph Schema. For more details, see Create the Graph Schema section.

> **Note:**
>
> If upgrading the MMG Application from 8.1.2.3.0 and above versions, skip the above step.

- Shutdown all the services of the existing installation using shutdown.sh.
- Backup the existing MMG Installation to a backup folder.

Upgrade:

Follow steps mentioned in the Installation section.

> **Note:**
>
> Compare and copy the placeholder values from the existing installed MMG.config.sh to the new MMG.config.sh mentioned in the Installation section.

8
Update Utility to Reconfigure Installation Parameters

If you need to update any of the existing configuration related values, perform the following steps:

> **Note:**
>
> This Utility is applicable from 8.1.2.3.0 version onwards.

Procedure:

1. Shut down all the services using shutdown.sh command.

2. Reconfigure the config.sh file with the required changes.

3. Execute the command `install.sh -u` from the following path: <mmg installation path>/OFS MMG/bin
   A successful update message as follows:

   ```
   nohup: ignoring input and redirecting stderr to stdout

   PIPELINE_HOME: /scratch/ofsaaapp/OFS_MMG/mmg-pipeline/pipeline

   /scratch/ofsaaapp/OFS_MMG/mmg-pipeline/pipeline

   PIPELINE_HOME: /scratch/ofsaaapp/OFS_MMG/mmg-pipeline/pipeline

   Installing Pipeline Data Model. Please Wait ...

   Pipeline Data Model installation finished.

   Starting Pipeline Service...

   Starting Data pipeline services...

   Inserting DataMeta Data...

   ***************** Data Pipeline Deployment Done *****************

   Stopping Graph-Service service...

   Graph-Service stopped.

   Stopping Graph-Service service...

   Graph-Service stopped.

   nohup: ignoring input and redirecting stderr to stdout
   ```

4. Start all the MMG services using `startup.sh` command.

9

Cloning the MMG Instance

There is a consistent requirement for a faster and effective approach of replicating an existing MMG Instance for further project developments. The approach is to set up the MMG Instances that are exact copies of the current MMG Instance.

9.1 Copying the Directories

The Installation Directory structure in the base environment has to be replicated in the clone environment.

- Copy the MMG base directory (OFS_MMG, by default) in the base environment with all of its contents to the clone environment.
  The base directory in the clone environment will have the following folders upon copying:

  – mmg-ui

  – mmg-studio

  – mmg-service

  – mmg-schema-creator

  – mmg-pipeline

  – lib

  – bin

  – conf

> **✎ Note:**
>
> You need to copy LOG and FTPSHARE directories to the cloned environment.

9.2 Copying the Database Schemas

To copy the Database Schemas:

1. Create a copy each of the MMG Config Schema and the Data Studio Schema.
   You may use Oracle Data Pump Export/Import or the Database Copy feature of Oracle SQL Developer. For more details, see Database Copy using Oracle SQL Developer.

   The Cloned Schemas can be created either in the same database instance or in a different one.

2. Similarly, create copies of Workspace Schemas or other Data Source Schemas as required.

9.3 Configuring Password Store with Oracle Wallet

To configure the password store with Oracle Wallet:

- Setup an Oracle wallet in the clone environment. For more details, see Setup Password Stores with Oracle Wallet.

> **Note:**
>
> It is recommended to use the same wallet aliases used in the base environment.

Updating the WALLET_LOCATION and TNS_ADMIN_PATH

Update the WALLET_LOCATION and TNS_ADMIN_PATH values in config.sh file present in the following path: `OFS_MMG/bin` with configured corresponding values of the cloned environment.

9.4 Updating the Host Details

Update the HOST and PORT values in `config.sh` file present in the following path: `OFS_MMG/bin` with configured corresponding values of the cloned environment.

> **Note:**
>
> It is recommended to use the same ports and context used in the base environment.

Replace the placeholders and update the host name in the MMG Config schema using the following command:

```
update NEXTGENEMF_CONFIG set V_VALUE =

'http(s)://##HOST_NAME##:##BE_PORT##/##CONTEXT##' where V_NAME in ( '

BASE_URL', 'EMFSTUDIO_SERVICE_URL')

/

update NEXTGENEMF_CONFIG set V_VALUE =

'http(s)://##HOST_NAME##:7008/##CONTEXT##' where V_NAME = 'DATASTUDIO_URL'

/

update AAICL_SS_BATCH_URL set V_URL =

'http(s)://##HOST_NAME##:##BE_PORT##/##CONTEXT##' whereV_URL_NAME in

('CS_SERVICE_URL', 'MMG_SERVICE_URL', 'WORKSPACE_URL')

/
```

9.5 Update LOG_HOME and FTPSHARE

Update the LOG_HOME and FTPSHARE values in `config.sh` file present in the following path:

`OFS_MMG/bin` with configured corresponding values of the cloned environment.

Replace the ##LOG_HOME## and ##FTPSHARE## placeholders and update the LOG_HOME and FTPSHARE values in the MMG Config Schema using the following command:

```
update NEXTGENEMF_CONFIG set V_VALUE = '##LOG_HOME##' where V_NAME = 'LOG_HOME'

/

update NEXTGENEMF_CONFIG set V_VALUE = '##FTPSHARE##' where V_NAME = 'FTPSHARE'

/
```

9.6 Setting up the SSL Keystore

To run on HTTPS, you must create a Keystore for MMG Application. For more details, see the SSL Keystore in the Configure the config.sh File.

Update the Keystore path, Password and Storetype values in config.sh file present in the following path: `OFS_MMG/bin` with configured corresponding values of the cloned environment.

9.7 Updating Wallet Aliases for Oracle Schemas

> **Note:**
>
> It is recommended to use the same wallet aliases used in the base environment.

In case if the same wallet aliases cannot be used, perform the following:

1. Update the MMG Config Schema Wallet Alias values in `config.sh` file present in the following path: `OFS_MMG/bin` with configured corresponding values of the cloned environment.

2. Replace the placeholders and update the wallet alias for Workspace Schemas or other Oracle datasources using the following command:

```
update MMG_DB_MASTER set V_PROPERTY_VALUE = '##WALLET_ALIAS##' where
V_PROPERTY_NAME = 'WALLET_ALIAS' and V_DB_NAME = '##DATASOURCE NAME##'

/
```

9.8 Updating Context and Ports

> **✏️ Note:**
>
> It is recommended to use the same context and ports used in the base environment.

In case if the same context and ports aliases cannot be used, perform the following:

1. Update the references of context path and port values in config.sh file present in the following path: `OFS_MMG/bin` with configured corresponding values of the cloned environment.

2. Replace the ##CONTEXT## and ##BE_PORT## placeholders.

   For more details, see Updating the Host Details.

9.9 Starting MMG Services

Post updating all the required parameters in the new `config.sh.` file, start the services by using the following command: `./install.sh -u`

10

Frequently Asked Questions (FAQs) and Error Dictionary

This section consists of resolution to the Frequently Asked Questions and Error Codes noticed during OFS MMG Installation.

Topics:

Related Topics

- Frequently Asked Questions
- Frequently Asked Questions (FAQs) and Error Dictionary

10.1 Frequently Asked Questions

You can refer to the Frequently Asked Questions, which is developed with the interest to help you resolve some of the OFS MMG Installation and Configuration Issues. This intends to share the knowledge of problem resolution to a few of the Known Issues. This is not an official support document and just attempts to share the knowledge of problem resolution to a few of the Known Issues.

10.1.1 Frequently Asked Questions in MMG

1. Why does my console show an unsuccessful message during wallet creation?
   Please check if you have run the following commands correctly. For more information on wallet creation, see Setup Password Stores with Oracle Wallet.

   a. `mkstore -wrl <wallet_location> -create` //creates a wallet in the specified location.

   b. `mkstore -wrl <wallet_location> -createCredential <alias-name> <database-user-name>` //creates an alias in the Studio Schema.

   c. `mkstore -wrl <wallet_location> -createCredential <alias-name> <database-user-name>` //creates an alias in the Atomic Schema.

   d. `mkstore -wrl <wallet_location> -createCredential <alias-name> <database-user-name>` //creates an alias in the Config Schema.

   If your issue is still not resolved, contact My Oracle Support (MOS).

2. Where can I find my created wallet?
   Your wallet will be in the directory you have set as your wallet location.

   If your issue is still not resolved, contact My Oracle Support (MOS).

3. When should I create a Database link, and if yes, how do I do it?
   Create a Database link to connect the Atomic and Config Database Schemas to the Studio Database Schema if the databases are different. You must create the link in the Studio Database.

In the following example, a link has been created from the Config Schema to the Atomic Schema by running the following script:

```
create public database link <studio database link> connect to <Config
Schema> identified by password using ' (DESCRIPTION = ADDRESS_LIST =
(ADDRESS = (PROTOCOL = TCP) (HOST =<host name> (PORT = <port number>))
(CONNECT_DATA = (SERVICE_NAME = <service name>))) ';
```

```
Config Schema : <Config Schema>/password ' (DESCRIPTION = ADDRESS_LIST
= (ADDRESS = (PROTOCOL = TCP) (HOST =<host name> (PORT = <port
number>)) (CONNECT_DATA = (SERVICE_NAME = <service name>))) ';
```

After running the script, run the FCDM Connector and ICIJ Connector jobs.

4. Why does my installed studio setup not have any notebooks?
   Some default notebooks are ready to use when you install Compliance Studio. If you do not see any notebooks when you log in to the application, you may not be assigned any roles. Check the <COMPLIANCE_STUDIO_INSTALLATION_PATH>/deployed/logs directory to see if you have been assigned any roles, and if not, contact your Administrator. If your issue is still not resolved, contact My Oracle Support (MOS).

5. What can I do if the Schema Creation fails?
   If the Atomic Schema creation fails, login to the BD and ECM Atomic Schemas and run the following query: select * from fcc_orahive_datatypemapping; The fcc_orahive_datatypemapping table must not have duplicate data types. If the Studio schema creation fails, login as a Studio user and run the following query: select * from fcc_datastudio_schemaobjects Run the following query to replace all Y values with '': update fcc_datastudio_schemaobjects set SCHEMA_OBJ_GENERATED='' After the schema creation is successful, the value of the SCHEMA_OBJ_GENERATED attribute changes to Y. You can also check for errors in the application log file in the <COMPLIANCE_STUDIO_INSTALLATION_PATH>/deployed/logs directory. If your issue is still not resolved, contact My Oracle Support (MOS).

6. What can I do if the Import_training_model batch execution fails?
   Batch Execution Status always displays success in case of success or failure.

   You can also check for errors in the application log file in the <COMPLIANCE_STUDIO_INSTALLATION_PATH>/deployed/logs directory. You can fix the failure according to the log details and run the same batch again.

7. Why is the sqoop job not successful?
   The Sqoop job may fail if some of the applicable values are null or if the service name or SID value is not provided. Do one of the following:

   • Check if there are any null values for the applicable configurations in the config.sh and FCC_DATASTUDIO_CONFIG tables. If there are any null values, add the required value.

   • Check for any errors in the application log file in the <COMPLIANCE_STUDIO_INSTALLATION_PATH>/deployed/logs directory. If your issue is still not resolved, contact My Oracle Support (MOS).

8. Why am I getting the following error when I run the sqoop job:
   ```
   Error: Could not find or load main class
   com.oracle.ofss.fccm.studio.batchclient.client.BatchExecute
   ```

   Set the `FIC_DB_HOME` path in the `<COMPLIANCE_STUDIO_INSTALLATION_PATH>/deployed/ficdb` directory.

You can also check for any errors in the application log file in the `<COMPLIANCE_STUDIO_INSTALLATION_PATH>/deployed/logs` directory.

9. 11. Why is the PGX server is not starting even though the graph service is up and running?
   Grant execution rights to the PGX folder to start the PGX server.

10. Why is the PGX Server not starting?
    The PGX server starts only after the FCDM tables are created after the FCDM Connector Job is run. Check if all FCDM tables are created and then start the PGX Server. You can also check for any errors in the application log file in the <COMPLIANCE_STUDIO_INSTALLATION_PATH>/deployed/logs directory. If your issue is still not resolved, contact My Oracle Support (MOS).

11. Why is the ICIJ Connector job failing?
    This can happen because of a missing `csv` file path in the FCC_STUDIO_ETL_FILES table. Add the `CSV` file path. You can also check for any errors in the application log file in the `<COMPLIANCE_STUDIO_INSTALLATION_PATH>/deployed/logs` directory. If your issue is still not resolved, contact My Oracle Support (MOS).

12. What should I do if there is a below Error while selecting edges in manual Decision UI?
    ```
    java.lang.IllegalStateException: Unable to create
    PgxSessionWrapperjava.lang.IllegalStateException: Unable to create
    PgxSessionWrapper at
    oracle.datastudio.interpreter.pgx.CombinedPgxDriver.getOrCreateSession(Combi
    nedPgxDriver.java:147) at
    oracle.pgx.graphviz.driver.PgxDriver.getGraph(PgxDriver.java:334) at
    oracle.pgx.graphviz.library.QueryEnhancer.createEnhancer(QueryEnhancer.java:
    223) at
    oracle.pgx.graphviz.library.QueryEnhancer.createEnhancer(QueryEnhancer.java:
    209) at
    oracle.pgx.graphviz.library.QueryEnhancer.query(QueryEnhancer.java:150) at
    oracle.pgx.graphviz.library.QueryEnhancer.execute(QueryEnhancer.java:136) at
    oracle.pgx.graphviz.interpreter.PgqlInterpreter.interpret(PgqlInterpreter.ja
    va:131) at
    oracle.datastudio.interpreter.pgx.PgxInterpreter.interpret(PgxInterpreter.ja
    va:120) at
    org.apache.zeppelin.interpreter.LazyOpenInterpreter.interpret(LazyOpenInterp
    reter.java:103) at
    org.apache.zeppelin.interpreter.remote.RemoteInterpreterServer$InterpretJob.
    jobRun(RemoteInterpreterServer.java:632) at
    org.apache.zeppelin.scheduler.Job.run(Job.java:188) at
    org.apache.zeppelin.scheduler.FIFOScheduler$1.run(FIFOScheduler.java:140) at
    java.base/
    java.util.concurrent.Executors$RunnableAdapter.call(Executors.java:515) at
    java.base/java.util.concurrent.FutureTask.run(FutureTask.java:264) at
    java.base/
    java.util.concurrent.ScheduledThreadPoolExecutor$ScheduledFutureTask.run(Sch
    eduledThreadPoolExecutor.java:304) at java.base/
    java.util.concurrent.ThreadPoolExecutor.runWorker(ThreadPoolExecutor.java:11
    28) at java.base/
    java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.java:6
    28) at java.base/java.lang.Thread.run(Thread.java:834)Caused by:
    java.util.concurrent.ExecutionException:
    oracle.pgx.common.auth.AuthorizationException: PgxUser(FCCMDSADMIN) does not
    own session 6007f00a-8305-4576-9a56-9fa0f061586f or the session does not
    exist code: PGX-ERROR-CQAZPV67UM4H at java.base/
    ```

```
java.util.concurrent.CompletableFuture.reportGet(CompletableFuture.jav
a:395) at java.base/
java.util.concurrent.CompletableFuture.get(CompletableFuture.java:1999
) at oracle.pgx.api.PgxFuture.get(PgxFuture.java:99) at
oracle.pgx.api.ServerInstance.getSession(ServerInstance.java:670)
oracle.datastudio.interpreter.pgx.CombinedPgxDriver.getOrCreateSessio
n(CombinedPgxDriver.java:145) ... 17 moreCaused by:
oracle.pgx.common.auth.AuthorizationException: PgxUser(FCCMDSADMIN)
does not own session 6007f00a-8305-4576-9a56-9fa0f061586f or the
session does not exist code: PGX-ERROR-CQAZPV67UM4H at
oracle.pgx.common.marshalers.ExceptionMarshaler.toUnserializedExceptio
n(ExceptionMarshaler.java:107) at
oracle.pgx.common.marshalers.ExceptionMarshaler.unmarshal(ExceptionMar
shaler.java:123) at
oracle.pgx.client.RemoteUtils.parseExceptionalResponse(RemoteUtils.jav
a:130) at
oracle.pgx.client.HttpRequestExecutor.executeRequest(HttpRequestExecut
or.java:198) at
oracle.pgx.client.HttpRequestExecutor.get(HttpRequestExecutor.java:165
) at
oracle.pgx.client.RemoteControlImpl$10.request(RemoteControlImpl.java:
313) at
oracle.pgx.client.RemoteControlImpl$ControlRequest.request(RemoteContr
olImpl.java:119) at
oracle.pgx.client.RemoteControlImpl$ControlRequest.request(RemoteContr
olImpl.java:110) at
oracle.pgx.client.AbstractAsyncRequest.execute(AbstractAsyncRequest.ja
va:47) at
oracle.pgx.client.RemoteControlImpl.request(RemoteControlImpl.java:107
) at
oracle.pgx.client.RemoteControlImpl.getSessionInfo(RemoteControlImpl.j
ava:296) at
oracle.pgx.api.ServerInstance.lambda$getSessionInfoAsync$14(ServerInst
ance.java:490) at java.base/
java.util.concurrent.CompletableFuture.uniComposeStage(CompletableFutu
re.java:1106) at java.base/
java.util.concurrent.CompletableFuture.thenCompose(CompletableFuture.j
ava:2235) at oracle.pgx.api.PgxFuture.thenCompose(PgxFuture.java:158)
```

Then, perform the below steps as a workaround -

Export the "Manual Decision" Notebook

Add the link parameter just below Description

for Ex - "link": "manualDecision",

Figure 10-1   Manual Decision

```
[ {
   "name" : "manual Decision",
   "description" : null,
   "link": "manualDecision",
   "tags" : null,
   "version" : "5",
   "layout" : "zeppelin",
   "type" : "Default",
   "readOnly" : false,
```

Truncate the table "fcc_er_paragraph_manual" in Studio Schema. Import the modified notebook again.

13. What should I do when the result set is truncated if the size goes above '102400' bytes? Perform the following steps:

    a. Login to Compliance Studio.

    b. Navigate to interpreter zeppelin.interpreter.output.limit.

    Figure 10-2   Zeppelin Interpreter

    zeppelin.interpreter.output.limit

    102,400

    c. Set the value to the required size.

    d. Restart the Studio Application.

14. What should I do if there is a below KubernetesClientException in load-to-elastic-search.log, matching-service.log files after Compliance Studio installation?
    ```
    configServicePropertySourceLocator - Could not locate PropertySource: I/O
    error on GET request for "http://localhost:8888/<Service Name>/default":
    Connection refused (Connection refused); nested exception is
    java.net.ConnectException: Connection refused (Connection
    refused)onfigServicePropertySourceLocator - Could not locate PropertySource:
    I/O error on GET request for "http://localhost:8888/<Service Name>/default":
    Connection refused (Connection refused); nested exception is
    java.net.ConnectException: Connection refused (Connection
    refused)20:04:55.686 [ main]
    WARN .cloud.kubernetes.config.ConfigMapPropertySource - Can't read configMap
    with name: [<Service Name>] in namespace:[null].
    Ignoring.io.fabric8.kubernetes.client.KubernetesClientException: Operation:
    [get] for kind: [ConfigMap] with name: [<Service Name>] in namespace: [null]
    failed. at
    io.fabric8.kubernetes.client.KubernetesClientException.launderThrowable(Kube
    rnetesClientException.java:64) ~[kubernetes-client-4.4.1.jar!/:?] at
    io.fabric8.kubernetes.client.KubernetesClientException.launderThrowable(Kube
    rnetesClientException.java:72) ~[kubernetes-client-4.4.1.jar!/:?] at
    ```

```
io.fabric8.kubernetes.client.dsl.base.BaseOperation.getMandatory(BaseO
peration.java:229) ~[kubernetes-client-4.4.1.jar!/:?] at
io.fabric8.kubernetes.client.dsl.base.BaseOperation.get(BaseOperation.
java:162) ~[kubernetes-client-4.4.1.jar!/:?] at
org.springframework.cloud.kubernetes.config.ConfigMapPropertySource.ge
tData(ConfigMapPropertySource.java:96) ~[spring-cloud-kubernetes-
config-1.1.3.RELEASE.jar!/:1.1.3.
```

You can ignore the error when the following message is displayed at the end of the log; if you do not see this message, contact My Oracle Support (MOS) and provide the applicable error code and log:

```
13:52:57.698 [main] INFO org.apache.catalina.core.StandardService -
Starting service [Tomcat] 13:52:57.699 [ main] INFO
org.apache.catalina.core.StandardEngine - Starting Servlet engine:
[Apache Tomcat/9.0.43]
```

15. What happens if a new sandbox workspace is created?
When a new sandbox workspace is created, the folders of the older workspace are by default being copied into the new workspace. Here, folder means the Model Objectives. The Model Objectives are global objects and will be visible across the workspaces. However, the models created within those objectives will be private. This has been done purposely as you expect multiple modelers working on the common objective in their private workspaces.

16. Not able to access any models in the copied folders in the new workspace – the folders are being copied as empty folders?
Yes, you should not be able to access other workspace's private models. Also, as long as other users are working on the objective and have their models in there, you will not be able to delete the objectives.

17. What are the Workspace parameters used in MMG Python Scripts?
The following parameters are used:

- **workspace.list_workspaces():** Used to fetch a list of all workspaces. This list is populated in the dropdown menu of datastudio.

- **workspace.check_aif():** A method used to check if AIF is enabled or not

- **workspace.attach_workspace("SANDBOX123"):** A method used to set workspace

- **workspace.get_workspace():** Used to fetch the selected workspace (for example, SB1)

- **get_mmg_studio_service_url():** Used to fetch the base URL (for example, http://whf999yyy:0000/mmg)

- **get_user():** Used to fetch current user (for example, mmguser)

18. How to take connections for Data access?
You need access to the data to work on it. For the workspace, there are some underlying Data Schemas. You can also create a workspace that allows to select multiple underlying Data Schemas. You can use or remove multiple Data Schemas like multi combo box, where 1, 2, 3, and 4, 5 are schemas underlying. When you work with the models, you can access the notebook to fetch data for all these Data Schemas and create some data frames out of it. That can be used for model reading or other purposes.

This happens in workspace of the sandbox where you are building a Notebook. The same Notebooks gets promoted to production workspace. Therefore, the workspace production has its own set of underlying Data Schemas. When you

build the model with getting connection for the underlying Schema 1 and 2, and getting the data and building, it makes rules work and will not be affected if the same Notebooks gets promoted to production or deployment is cloned.

Therefore, the Notebook needs to run which should not be fetching this data because it will be working on any 1 and 2 Schemas.

To avoid this issue, you can use connection feature to connect with a schema. This is a wrapper function where you can specify which workspace you are connecting to.

You can enter the workspace details to get the connection and that starts fetching the data.

When you create the Notebook to production, a script runs to not to connect the workspace. This also uses overloaded methods. This method tells how to get the connection. Simple get connection gets the primary connection as first Data Schema which you are using without any overload.

The second connection gets an ID as the name the Data Source which you are using and for the current one will passes as get connection 1.

In the sandbox, this script looks for 1 and it creates a connection and moves to production.

It will again look for an equivalent 1 and tries to get a connection.

Therefore, whatever you select first, becomes the first Data Schema, Second Schema, Third Schema, therefore, Primary, Secondary, Tertiary and so on. You can also pass the number while getting the connection to get the first primary Data Schema as a secondary Data Schema. Therefore, when it runs in sandbox, it gets the Secondary Schema. When it runs in the production, it fetches a Secondary Data Schema of production.

19. What are parameters to establish the Connection for data access?
The following section lists the connection details such as the Data Sources and so on: workspace.get_connection(): fetches connection object for the Primary Data Source of the workspace. This is equivalent to executing workspace.get_connection(1). workspace.get_connection('id'): fetches connection for the Data Source by name. For example, workspace.getconnection ('ws_data_1') – here 'ws_data_1' is one of the underlying Data Source for the workspace. workspace.get_connection(n): fetches connection for the Data Source by order. For example, workspace.getconnection(2) – this will fetch connection for the Secondary Data Source. The following section lists the workspace details: After a workspace is attached, we can list Data Sources related to that using: workspace.list_datasources(): will list Data Sources related to attached workspace with default order 1 For example, {'Data Source': [{'name': 'newdatasource1', 'order': '1'}]} workspace.list_datasources("SB1"): will list Data Sources related to SB1 workspace with default order 1 For example, {'Data Source': [{'name': 'ds1', 'order': '1'}]} workspace.list_datasources("SB1", 1): will list Data Sources related to SB1 workspace with order 1 as passed in second argument For example, {'Data Source': [{'name': 'ds1', 'order': '1'}]} Note: This is applicable for Python and Python variants interpreters, and not on any other interpreters.

20. What should I do if the Python installation displays the following error message, " If ModuleNotFoundError: No module named '_lzma'"?
You must install xz-devel library before installing the Python. For more details, see Install MMG Python Library section.

To install, perform the following step:

```
$yum install -y xz-devel.
```

21. What should I do to reconfigure DS Studio server port and its interpreter's default port to available ports?

To reconfigure port numbers:

a. Run the command `install.sh -u` to change the current studio port to the desired port number in the configuration files/tables.

b. Run the t `startup.sh` script of Studio at the location: OFS_MMG/mmg-studio/bin/ and modify the line numbers 24/25 of OFS-MMG/mmg-studio/bin/startup.sh to specify the interpreter name and port number.
DS version 22.4.3

****

nohup "$DIR"/datastudio --jdbc -1 --eventjdbc -1 --shell -1 --eventshell -1 --graalvm -1 --eventgraalvm -1 --pgx -1 --eventpgx -1 --external --port 8008 --jdbc 3011 --eventjdbc 3031 --python 3012 --eventpython 3032 --markdown 3009 --eventmarkdown 3029 --spark 3014 --eventspark 3034 &> "$DIR"/nohup.out &

For pgx interpreter, modify: OFS_MMG/mmg-studio/interpreter-server/pgx-interpreter-22.4.3/bin/pgx-interpreter file "${1:-7022}" "${2:-7042}" values to "${1:-3022}" "${2:-3042}"

DS version 23.3.5

****

nohup "$DIR"/datastudio --jdbc -1 --shell -1 --external --port 8008 --jdbc 3011 --python 3012 --markdown 3009 --spark 3014 --pgx 3022 &> "$DIR"/nohup.out &

For event ports in DS 23.3.5

Set the environment variables DS_EVENT_HANDLER_HOST and DS_EVENT_HANDLER_PORT before launching the interpreters, else, default values will be used. You can modify these ports in the startup.sh of the Studio.

Example:

export DS_EVENT_HANDLER_HOST=localhost

export DS_EVENT_HANDLER_PORT=3432

To change the ports configured for events in the Data Studio server, modify the following server configuration:

studio-server:

thrift-server:

enabled: true

port: <desired port -defaulted to 8432>

mode: TCP

NOTE:

****

Python Interpreter

Beginning with Data Studio 21.4.0, 6012 is default port on which the REST server for the Python interpreter listens. To overwrite this, set the STUDIO_INTERPRETER_PYTHON_INTERPRETER_REST_SERVER_PORT environment variable.

PGX-Python Interpreter

Beginning with Data Studio 23.1.0, 6022 is the default port on which the REST server for the PGX-Python interpreter listens. To overwrite this, set the STUDIO_INTERPRETER_PGX_PYTHON_INTERPRETER_REST_SERVER_PORT environment variable.

Modify the `startup.sh` to:

export STUDIO_INTERPRETER_PYTHON_INTERPRETER_REST_SERVER_PORT=3038

export STUDIO_INTERPRETER_PGX_PYTHON_INTERPRETER_REST_SERVER_PORT=3039

This configuration changes the default interpreter ports to new ports.

c. Ports mentioned in the interpreter json files should be reconfigured. The interpreter file location is: "OFS_MMG/mmg-studio/server/builtin/interpreters/<interpreter>.json" file.

d. Execute startup.sh and check the studio/interpreter ports.

e. Similarly, execute ./datastudio.sh –help from OFS_MMG/mmg-studio/bin/ for all available options.

10.1.2 OFS AAI FAQs

1. **What are the different components that get installed during OFS AAI?**
The different components of OFS AAI are illustrated in Components of OFS AAI.

2. **What are the different modes of OFS AAI Installation?**
OFS AAI can be installed only in Silent Mode.

3. **Can the OFSAA Infrastructure components be installed on multi-tier?**
No. OFSAA Infrastructure Components (ficapp, ficweb, ficdb) cannot be installed on multi-tier. By default, they are installed on a single-tier. However, OFSAA Infrastructure can be deployed within the n-Tier architecture where the Database, Web Server, and Web Application Server is installed on separate tiers.

4. **Is the JDK (Java Development Kit) required during the installation of OFSAA?**
Can it be uninstalled after the OFSAA installation? JDK is not required during the installation of OFSAA and only a runtime is needed. For details, see Hardware and Software Requirements. Only JRE (Java Runtime Environment) is required during the installation of OFSAA and cannot be uninstalled as the JRE is used by the OFSAA System to work.

5. **How do I know what are the Operating System, Web Servers, and other software versions that OFSAA supports?**
See the Oracle Financial Services Analytical Applications 8.1.2.0.0 Technology Matrix.

6. **What are the different files required to install OFS AAI?**
The following files are required:

- setup.sh.

- envCheck.sh

- preinstallcheck.sh

- VerInfo.txt

- OFSAAInfrastructure.bin

- validatedXMLinputs.jar

- MyResources_en_US.properties

- log4j.xml

- OFSAAI_InstallConfig.xml

- privileges_config_user.sqlprivileges_atomic_user.sql

7. **What should I do if I get the following error message during installation: "Execute Permission denied"?**
Check whether all the files provided for OFS AAI Installation has execute permissions. To give execute permissions, navigate to the directory path where the Installation files are extracted and execute the following command: chmod –R 755 OFS_AAI_PACK.

8. "No Java virtual machine could be…"
If the error message reads, "No Java virtual machine could be found from your PATH environment variable. You must install a VM before running this program", then:

- Check whether the "java path" is set in the PATH variable. See the Hardware and Software Requirements Section in this document.

- Check whether sufficient temporary space is available.

- Ensure that the movement of OFS AAI Installer text files to the target system is done in the Text mode so that the setup.sh file does not contain control line feed characters (^M).

9. **What should I do if I get the following error message during installation, "OracleDriver Files Not Found, Please Choose the Right Path To Continue"?**
Check whether the provided path for Oracle Driver files is correct and whether the user has permission to access the files.

10. **The installation of OFS AAI was completed successfully! What next?**
Post the successful completion of the OFS AAI Installation, one has to perform the Post Installation steps. See Post-installation section.

11. **What is to be done when OFS AAI Installation is unsuccessful?**
OFS AAI Installer generates the log file OFSAA Infrastructure_Install.log in the Infrastructure Installation Directory. There are also other log files created in the directories:

- `< directory path where the Installation files are extracted >/ OFS_AAI_PACK/logs`

- `< directory path where the Installation files are extracted >/ OFS_AAI_PACK/OFS_AAI/logs`
If the logs of any of these reported Warnings, Non-Fatal Errors, Fatal Errors, or Exceptions, they must be brought to the notice of the OFS AAI My Oracle Support. It is recommended not to proceed until the reported problems are adequately addressed.

12. **How do I completely uninstall OFS AAI?**
OFS AAI can be completely uninstalled by performing the steps provided in the Uninstall OFSAA Infrastructure section in this guide.

13. **Can OFS AAI Config and Atomic Schemas be on different databases?**
OFS AAI requires both Config and Atomic Schemas to be present on the same database instance.

14. **How do I grant privileges if a new information domain is created?**
    If you are creating a new information domain, provide a set of privileges (database permissions) to the new Atomic Schema.

    a. Log into the database as sys and connect as Sysdba User.

    b. Execute the `privileges_atomic_user.sql` file available under the $FIC_HOME directory.

    c. Enter the Database Schema for which you want to grant privileges.

15. **When should I run the MLS utility?**
    See the Multiple Language Support (MLS) Utility section in the OFS Analytical Applications Infrastructure Administration Guide.

16. **What should I do if I get the following error message on the UNIX System terminal while executing ./setup.sh, "Insert New Media. Please insert Disk1 or type its location"?**

    a. Log in as root user on the UNIX machine where OFS AAI is getting installed.

    b. Navigate to the `/etc/security/` directory.

    c. Edit the file limits.conf to add/edit a row for the UNIX User installing OFSAA:
       `<Unix User> soft nofile 15000`

    d. After saving the changes, log in as UNIX User with which OFS AAI is getting installed and execute the command:
       `ulimit -n`

    e. The command must return the value 15000.

17. **How do I verify if the system environment is ready for OFS AAI Installation?**
    To verify if the system environment meets the minimum requirements for the installation, use the Pre-Install Check utility available within the Install Kit Archive file. This utility can also be obtained separately by contacting My Oracle Support.

    See the Verifying System Environment section for additional information.

18. **How do I know if the installation is completed successfully?**
    The OFSAA Infrastructure Installation performs a post-install health check automatically on the successful installation of the product.

19. **What should I do if there are any exceptions or errors in installation and how to proceed?**

    a. See the Verify the Log File Information section for log file information.

    b. Backup the installation logs.

    c. Share the backup logs with My Oracle Support.

20. **What should I do if the installation process is abruptly terminated or aborted?**
    If the installation process is abruptly terminated, then the installation is incomplete. To recover from this, follow these steps:

    a. Drop the DB Objects in the Config and Atomic Schemas created by OFS AAI Installation.

    b. Open the .profile and remove the entries made by the OFS AAI installation, which are made between the comment statements, #Beginning of entries by OFSAA Infrastructure Installation, and #End of entries by OFSAA Infrastructure Installation.

    c. Delete the OFSAA install, and FTP Share Directories created by the OFS AAI Installer.

    d. Perform the OFS AAI Installation again. See Pre-installation section.

21. **Does OFSAA support any other web server types, other than the ones stated in the Oracle Financial Services Analytical Applications 8.1.2.0.0 Technology Matrix and Installation Guide?**
No. All the supported software and versions are stated in the Oracle Financial Services Analytical Applications 8.1.2.0.0 Technology Matrix.

22. **What should I do if the database connection from the connection pool displays the following error message, "java.sql.SQLRecoverableException: IO Error: Connection reset"?**
This happens while running several database intensive tasks in parallel. To correct this error, add the line securerandom.source=file:/dev/./urandom in the java.security configuration file available in $JAVA_HOME/jre/lib/security/ path.

> **✎ Note:**
>
> This must be configured on all the machines or VMs where the OFS AAI components are installed.

If the issue is not resolved even with the preceding settings, check the Maximum Transmission Unit (MTU) settings on the Linux box. For details on MTU Settings and updating them, contact your System Administrator.

23. **What should I do when I get syntax errors or file not found error messages while invoking setup.sh file from my install archive?**
This can mostly happen due to the following reasons:

   - When the installer is not extracted correctly or corrupted during the Unzip Utility Process.

   - setup.sh file which resides within the install archive is not transferred in ASCII or Text Mode, which can corrupt the file.
   To correct this, follow the steps:

     a. Copy the installer (in BINARY Mode) to the system on which the OFSAA Infrastructure Components will be installed.

     b. Unzip the installer using the command: unzip <OFSAAI_Installer>.zip The corrupted setup.sh file would have introduced certain ^M characters into the file.

   You can remove ^M characters from the setup.sh file by following these steps:

     a. Log in to the server where the installer is copied.

     b. Navigate to the directory < directory path where the Installation files are extracted >/OFS_AAI_PACK/bin.

     c. Open the setup.sh file in the vi editor using the command: vi setup.sh.

     d. Inside vi editor in Esc mode, type: %s/^M//g

   > **✎ Note:**
   >
   > To enter ^M, hold the CTRL key then press V and M in succession. e. Save the setup.sh file by typing: wq!

24. **What should I do if I get the following error message while executing ./ startofsaai.sh file on the UNIX System terminal "./startofsaai.sh: /java: Execute permission denied"?**

    - Ensure the JAVA_BIN Environment variable path is set on the "UNIX user" terminal from where the `startofsaai.sh` file is invoked.

    - Ensure that the `.profile` file, where the environment/ path settings are made, is executed successfully.

25. **What should I do if the OFS AAI Application Server does not proceed even after providing the system password?**
    Ensure that, the System Password provided when prompted during installation is correct. Additionally, check whether the connection to the "Configuration Schema" can be established through sqlplus.

26. **Although the OFS AAI installation has completed successfully, when OFS AAI servers are started, and the application URL is accessed, it gives an error message "the page cannot be found or displayed" or "Could not retrieve the list of languages from Server. Please contact the System Administrator". What should one do?**
    Ensure OFS AAI Servers are started and are running successfully. For details on startup parameter options, see Start the Infrastructure Services section.

    For more details on the issue, refer to the logs under `$FIC_HOME /logs` directory.

27. **Is it necessary to provide the specified grants to the Oracle schema user before installation? If yes, can it be revoked after completing the installation?**
    The "Oracle Schema" user requires the necessary grants specified before, during, and after the Installation Process. Grants provided must never be revoked as the application makes use of these grants all the time.

28. **Can we have a distributed OFS AAI Application Server for load balancing?**
    OFS AAI Application Server can be scaled out/distributed across different JVM's (machines) based on the various services and Information Domains, in other words, Load balancing can be achieved with the distribution of services.

29. **Why do we need FTPSHARE on all the layers? Can we have ftpshare on another server other than the server where OFS AAI is installed?**
    FTPSHARE is a Metadata Repository Directory. All the metadata related files used in Infrastructure are stored in the FTPSHARE Directory. The ftpshare contains directories for each Information Domain, with each Information Domain Directories holding Erwin, log, and Scripts Directory. The transfer of data among the Web, Application, and Database Servers in Infrastructure takes place through FTP/SFTP.

    You must configure FTP/SFTP and enable communication between the servers by providing App server's FTP/SFTP credentials to the Web server and DB Server Users.

    Yes, you can have FTPSHARE as a common local storage mount point, which can be mounted where OFS AAI is installed.

30. **Is it mandatory to provide the FTP/SFTP password?**
    Yes, OFS AAI needs credentials of the user who has complete permissions on the FTPSHARE Directory, and the user must be able to independently log in to the UNIX Server. For more information, see the Configure OFSAAI_InstallConfig.xml File section.

31. **What are the permissions required for FTPSHARE and when should I give them?**
    It is recommended to provide permissions on FTPSHARE in case of installations done across different machines or VMs (Multitier Installation). In the case of a Single-Tier Installation, 770 permissions can be provided if the UNIX Users of OFS AAI and Web Servers belong to the same UNIX Group. Additionally, any new file that is created in the

FTPSHARE Directory of any Installation Layer must be granted specific/explicit permission.

32. **How to modify the port number currently being used by the Infrastructure application?**
Port Changer utility can be used to have the Port number modified, which is currently being used by the Infrastructure Application. For more information, refer to the Change IP Address or Hostname, Ports, Deployed Paths of the OFSAA Instance section in the OFS Analytical Applications Infrastructure Administration User Guide.

33. **Are there any in-built system administration users within OFS AAI Application?**
The following two in-built System Administration users are provided to configure and setup OFS AAI:

   • SYSADMN

   • SYSAUTH

34. **Does OFS AAI Application support both FTP and SFTP?**
OFS AAI supports both FTP and SFTP Configuration.

35. **Is it necessary to enable the FTP/SFTP services to use the OFS AAI?**
Yes, enabling of FTP/SFTP Services and its ports is a prerequisite step towards using the OFS AAI.

36. OFS AAI Configuration: Unable to save the server details?

   • Ensure the input User ID, Password, and Share Name are correct.

   • Ensure FTP/SFTP Services are enabled.

   • Have a test FTP/SFTP Connection made and confirm if they are successful.

37. **What should I do if I get the following message while creating Information Domain, "Please create a database and then create the information domain"?**
Information Domain is mapped to only one Database; and thus before the creation of Information Domain, at least one database details must exist.

38. **What should I do if I get the following message during the startup of the backend engine message server, "ConnectToDatabase: FatalError, could not connect to the DB server"?**

   • Verify whether a connection to the Configuration Schema can be established through SQL*PLUS.

   • Verify the Configuration Schema Password is modified post-installation.

   • Ensure Oracle Database Alias Name created for Oracle Instance and Oracle Service Name are the same.

39. **What should I do if I get the following message during the startup of the backend engine message server, "Fatal Error, failed to get the user ID from LibSmsConnect"?**
Ensure the `Reveleus.SEC` file exists under the `$FIC_HOME/conf` directory where the Database Components are installed.

40. **Does OFS AAI Application support LDAP authentication?**
OFS AAI supports LDAP Configuration and Authentication.

41. **Does OFS AAI support multiple languages?**
Yes, OFS AAI supports multiple languages.

42. **Does OFS AAI provide any data back-up features?**
OFS AAI does not have a built-in backup facility. External Storage Infrastructure is recommended for back-up.

43. **What kind of security features does the OFS AAI provide?**
See the Security Guide for more information.

44. **Does OFS AAI have the ability to enforce periodic password change?**
OFS AAI provides configurable parameters to define the number of days after which the user password must expire and then the user is forced to change the password after the expiration period.

45. **What is the password policy followed in OFS AAI?**
OFS AAI enforces a minimum password length with a combination of Upper- and Lower-case Characters and Alphanumeric Strings.

46. Which version of Erwin Data Modeller does OFS AAI support?
See the Hardware and Software Requirements section for more information.

47. **Does OFS AAI provide the mechanism to upload Business Data Model?**
OFS AAI provides two mechanisms for Business Data Model Upload:

- Easy to use GUI based Model upload mechanism to upload the Business Data Model through Data Model Management, select **Data Model Maintenance** and then select **Import Model**.

- OFS AAI also provides a Model Upload Utility "`upload.sh`" for uploading the business data model through the command line parameter by executing this Shell Script file under the path `<FIC_HOME>/ficapp/common/FICServer/bin`.
  For more details, see the Model Upload Utility section of the OFS Analytical Applications Infrastructure User Guide.

48. **How do I apply the incremental change to the existing model when the Business Data Model changes?**
The modified data model can be uploaded into the system and OFS AAI can compare the changes within the data model concerning the one already present in the system and enables propagation of incremental changes in a consistent manner.

49. **What are the different types of uploading a Business Data Model?**
OFS AAI supports uploading of the Business Data Model from Client Desktop and also by picking up the Data Model from the server location.

50. **Can the OFS AAI Configuration Schema Password be modified post-installation?**
The OFS AAI Configuration Schema Password can be modified post-installation. OFS AAI Application Stores the password in the database and few configuration files, thus any changes to the Configuration Schema Password will require updating in those files. For more information, see Modify OFSAA Infrastructure Config Schema Password.

51. Can the OFS AAI Atomic Schema password be modified?
Yes. You can do this by modifying the the atomic schema password and other configuration files stored in the database. To change the Atomic Schema password:

   a. Log in to OFSAA.

   b. Navigate to System Configuration and select Database Details Window. Select the appropriate connection, provide the modified password, and save the details.

   c. Based on the Web Server installed, follow these steps:

      - **For Apache:**

- – Update the <Context> and select the Resource tag details in the server.xml file from the $CATALINA_HOME/conf directory. (In case of Tomcat only Atomic <Resource> will exist).

- • **For WebSphere:**

  - – Log in to the WebSphere Administration Console from the left side menu.

  - – Navigate to Resources, and select JDBC, and then select Data Sources. A list of data sources is populated on the right side.

  - – Select the appropriate Data Source and edit the connection details. (In this case, both Config and Atomic Data Sources must be modified).

- • **For WebLogic:**

  - – Log in to the WebLogic Administration Console from the left side menu.

  - – Under Domain Structure list box, expand the appropriate Domain and navigate to **Services**, and select **JDBC**, and then select **Data Sources**. A list of data sources is populated on the right side.

  - – Select the appropriate Data Source and edit the connection details. (In this case, both Config and Atomic Data Sources must be modified).

d. **Restart the OFS AAI Services**

> **Note:**
>
> If the modified passwords are not updated, OFS AAI logs display the message ORA-28000: the account is locked.

52. **Does the upload of the Business Data Model depend on Java Memory?**
    Business Data Model upload through OFS AAI depends on the Java memory settings on the client and server machines. Java memory setting varies with the Data Model size and the available RAM. Contact My Oracle Support for more details.

53. **Why do the Business Metadata Management Screens (Business Processors Screen) in User Interface take more time to load than other screens?**
    The Log file in DynamicServices.xml which resides in the $FIC_HOME/conf directory is continuously being updated or refreshed to cache metadata. This can be observed when you are starting startofsaai.sh and if any of the log files (for example, SMSService.log) in DynamicServices.xml is being continuously refreshed for a longer time. By default, the Metadata Logfile cache size is set to 1000. If in case the log is being updated beyond this limit, retrospectively the preceding entries are overwritten. For example, the 1001st entry is overwritten by deleting the first entry. This results in the Application window taking a longer time to load. Increase the cache size limit in Dynamicservices.xml located at <FIC_HOME>/conf, depending on the currently logged count for the specific metadata. a. Generate the Log report by executing the following query in the Config Schema. select count(1), t.metadata_name, m.dsn_id from metadata_master m, metadata_type_master t where m.metadata_type = t.metadata_type group by t.metadata_name, m.dsn_id b. The preceding query returns a list of codes with their respective metadata count. You can refer to the "metadata_type_master" table to identify the Metadata Name. c. View the log report to identify the metadata, which is being updated/refreshed beyond the

specified cache size limit. Accordingly, increase the cache size limit in Dynamicservices.xml depending on the currently logged count for the specific metadata. For example, if the "MEASURE_CACHE_SIZE" is set to 1000 and the total measure reported in the log is 1022, increase the limit to 2000 (approximately). d. Restart Reveleus or OFS AAI Servers (Web and APP) and check the issue.

54. **What should I do if I get OutOfMemoryError while deploying the EAR file in the WebSphere Application Server?**
The Java memory must be increased in the `ejbdeploy.sh` file, which is present under `<WebSphere Install directory>/AppServer/deploytool/itp`. For example, `$JAVA_CMD \ -Xbootclasspath/a:$ejbd_bootpath \ Xms256m -Xmx1024m\`

55. **What is the default memory setting configured by the Installer?**
During OFS AAI Installation, the X_ARGS_APP Parameter in the `.profile` file is set as given:

```
X_ARGS_APP="-Xms200m -Xmx8g -XX:+UseAdaptiveSizePolicy -XX:MaxPermSize=1024M
-XX:+UseParallelOldGC -XX:+DisableExplicitGC
```

During the Application Installation, if 10 times the Data Model Size (data model size*10) is greater than the default Xmx value of 8g (8GB), the installer automatically updates the Xmx value to 10 times the Data Model size.

56. **What configurations should I ensure if my Data Model size is greater than 2GB?**
Ensure the Xmx value in the X_ARGS_APP Parameter in the `.profile` file is set as 10 times the Data Model size.

For example, if it is 2GB, set it as:

```
X_ARGS_APP="-Xms200m –Xmx20g -XX:+UseAdaptiveSizePolicy -
XX:MaxPermSize=1024M -XX:+UseParallelOldGC -XX:+DisableExplicitGC
```

Then execute the `.profile` file.

57. **What should I do if my Hierarchy filter is not reflecting correctly after I make changes to the underlying Hierarchy?**
In some cases, the Hierarchy Filters do not save the edits correctly if the underlying Hierarchy is changed. This can occur in Hierarchy Maintenance, where you have moved a member to another Hierarchy Branch, and that member is explicitly selected in the Filter and is now a Child of a node that is already selected in the Filter. See the Support Note1586342.1 for the workaround.

58. **Can I install an Application Pack on an existing Atomic Schema/ Information Domain created manually?**
No, you cannot install an Application Pack on existing Atomic Schema or Information Domain created manually. Application Packs can be installed only on Atomic Schemas or Information Domain created using Schema Creator Utility and (or) the Application Pack Installer.

59. **What should I do if I get the following exception while trying to view the model outputs in Model Outputs Screen, "Exception, and select, Local Path/STAGE/ Output file name (No such file or directory)"?**
Ensure you have created a directory "STAGE" under the path mentioned as "Local Path" in the Web Server Details window. This directory must be created under the local path on every node, in case of Web Application Server clustering.

60. **What should I do if I get the following exception during OFSAA services startup, "Exception in thread "main" java.lang.UnsatisfiedLinkError: net (Not a directory)"?**
Ensure the JRE referred in .profile is not a symbolic link. Correct the path reference to point to a physical JRE installed.

61. **How do you turn off unused Information Domains (Infodoms) from caching?**
Follow these steps to turn off unused Infodoms from caching:

   a. Navigate to $FIC_HOME/conf in the APP layer of your OFS AAI Installation.

   b. In the DynamicServices.xml file, identify the section for <Service code="20">.

   c. Modify the value of parameter CACHE_ON_STARTUP to 0 (default is 1).

   d. Update the same details in the table Aai_Dyn_Svcs_Params of Config Schema for the parameter CACHE_ON_STARTUP. Set the value as 0 and commit the change.

   e. Restart the OFS AAI Services (APP and WEB).
   For more information, see the Start the Infrastructure Services section.

> **Note:**
>
> This setting helps cache the Infodom Metadata only for the Infodoms that are accessed after the user login. Infodoms that are not accessed are not cached.

Sample Code is as follows:

```
<SERVICE CODE="20"
CLASS="com.iflex.fic.metadata.services.MetadataServiceProvider"
NAME="BMD" SERVERID="DEFAULT" PATH=" " LOGGERNAME="UMMLOGGER"
LOGGERLEVEL="10"> <PARAMETERS> <PARAMETER NAME="CACHE_ON_STARTUP"
VALUE="0" /> <PARAMETER NAME="BACKUP_XML" VALUE="1" /> <PARAMETER
NAME="MAX_BACKUP_XML" VALUE="2" /> <PARAMETER
NAME="PC_NONBI_BI_SWITCH" VALUE="2048" /> <PARAMETER
NAME="HIERARCHY_NODE_LIMIT" VALUE="2000" /> <PARAMETER
NAME="ALIAS_CACHE_SIZE" VALUE="1000" /> <PARAMETER
NAME="DATASET_CACHE_SIZE" VALUE="2000" /> <PARAMETER
NAME="MEASURE_CACHE_SIZE" VALUE="2000" /> <PARAMETER
NAME="HIERARCHY_CACHE_SIZE" VALUE="2000" /> <PARAMETER
NAME="DIMENSION_CACHE_SIZE" VALUE="2000" /> <PARAMETER
NAME="HIERARCHYATTRIBUTE_CACHE_SIZE" VALUE="1000" /> <PARAMETER
NAME="CUBE_CACHE_SIZE" VALUE="1000" /> <PARAMETER
NAME="RDM_CACHE_SIZE" VALUE="1000" /> <PARAMETER
NAME="BUSINESSPROCESSOR_CACHE_SIZE" VALUE="2000" /> <PARAMETER
NAME="DERIVEDENTITY_CACHE_SIZE" VALUE="1000" /> <PARAMETER
NAME="LOG_GET_METADATA" VALUE="false" /> <PARAMETER
NAME="METADATA_PARALLEL_CACHING" VALUE="0" /> </PARAMETERS>

</SERVICE>
```

62. **While creating an Excel Mapping, after specifying the Excel Worksheet, the Target Table, and mapping each column in the worksheet to a Target Table, I click Save and nothing happens. But when I click Cancel, a message pops up informing me that all changes will be discarded", what is to be done.**
Check if the version of the browser and JRE Plugin are as mentioned in the Hardware and Software Requirements section of this manual. If not, use the qualified versions as mentioned.

63. **Can multiple OFSAA Infrastructure instances share the same Config Schema?**
No, only one OFSAA Environment can be installed using one Config Schema.

64. Can Atomic Schema be shared?
Yes, it can be shared between two OFSAA Instances. While setting a firewall, which ports must be opened for communication between the Web Server (Apache HTTP Server or Oracle HTTP Server or IBM HTTP Server) and the Web Application Server (WebSphere or WebLogic or Tomcat) for OFS AAI to operate properly? The OFSAA Servlet port, which is the same as the Web server port, must be open. In addition, the Web Application Port must be open.

65. Can I install an already installed application in a different Infodom?
No, it is not possible to install the same application in two different Infodoms.

66. How can I configure the OFSAA Application for High Availability?
OFSAA can have active-passive high availability. For more details, see Configuration for High Availability- Best Practices Guide.

67. During OFSAA Installation, should I provide a Web Application Server's IP Address or Hostname and Port or Web Server's IP or Hostname and Port, if the Apache HTTP Server or Oracle HTTP Server or IBM HTTP Server are configured?
In case the Web Server is configured, you must enter the Web Server IP Address or Hostname and Port details during OFSAA installation. Here the Servlet port must be the same as the Web Server Port. If Web Server is not configured, the Web Application Server's IP Address or Hostname and Port are required during the installation process. Here the Servlet Port must be the same as the Web Application Server Port.

68. Is "ReveleusAdminConsoleAgent" applicable for OFS AAI 8.1.2.0.0 and higher versions?
No, ReveleusAdminConsoleAgent is not applicable starting OFS AAI 7.3.3.0.0. There is a change in the way agentservers are managed through `agentstartup.sh` and `agentshutdown.sh`.

69. What should I do when the message server process does not open and I get the following error message, "CI18NProvider::CI18NProvider, Error, unable to connect to the Config Database"?
This error is displayed due to the following reasons:

- The Config Schema Password is already expired.

- If the Config Schema Password is going to expire soon and the message like "ORA-28002: the password will expire within 6 days" displays while connecting to Config Schema through SQLPlus.

- The Config Schema Password is modified. To resolve the error, re-set the Config Schema Password to the old password.
  Otherwise, if the Config Schema password is modified to something else then follow these steps:

  a. Delete the $FIC_HOME/conf/Reveleus.SEC file.

  b. Shutdown the OFSAAI App service: cd $FIC_APP_ HOME/common/ FICServer/bin ./stopofsaai.sh

  c. Start the Infrastructure Server in foreground directly on the server or through XWindows Software using the command: ./startofsaai.sh

  d. Enter System Password.

  e. Enter the new Config Schema Password. The service starts and initializes if it can successfully connect to the DB and generates the Reveleus.SEC file.

  f. Post successful startup of the service, if required, the Infrastructure server may be shut down and restarted in the background using Nohup Mode.

70. **What is the mechanism of log file sizing, changing the log file path, and creating backups of the log files?**
OFS AAI Log files created under `$FIC_APP_HOME/common/FICServer/logs` and `<OFSAAI_DEPLOYED_AREA>/<CONTEXT.war>/logs` is configurable in `RevLog4jConfig.xml`.

The default size of the log files (MaxFileSize) is set to 5000kb, and the number of maximum backup log files (MaxBackupIndex) retained is set to 5, both of which are configurable. Increasing these parameters to a higher value must depend on the Server Hardware Configurations and may reduce the performance.

To configure the Logs file size on the OFSAA Application Server, follow these steps:

a. Navigate to `$FIC_HOME/conf` where OFSAA is installed.

b. Edit the following parameters in the `RevLog4jConfig.xml` file:

- param name="fileName" : Enter the path where the Logs are to be generated.

- param name="size" : Provide the required file size.

- param name="max" : Provide the required number of backup files to be created.
Example:

```
<RollingFile name="REVSERVERAPPENDER" fileName="<Path_exists>/
logs/RevAppserver.log" filePattern="<Path_exists>/logs/
RevAppserver-%i.log" > <PatternLayout> <Pattern> [%d{dd-MM-yy
HH:mm:ss,SSS zzz aa}{GMT}] [%-5level] [APP] [REVELEUS] %m%n</
Pattern> </PatternLayout> <Policies> <SizeBasedTriggeringPolicy
size="5000 KB" /> </Policies> <DefaultRolloverStrategy max="5">
<!-- number of backup files --> </DefaultRolloverStrategy> </
RollingFile>
```

c. Navigate to `$FIC_HOME/ficweb/webroot/conf` and configure the deployed Area Logs. Edit the following parameters in the `RevLog4jConfig.xml` file:

- param name="file": Do not change this value.

- param name="MaxFileSize" : Provide the required file size.

- param name="MaxBackupIndex" : Provide the required number of backup files to be created.
Example:

```
<RollingFile name="REVSERVERAPPENDER" fileName="$
{sys:LOG_HOME}/logs/RevAppserver.log" filePattern="$
{sys:LOG_HOME}/logs/RevAppserver-%i.log" > <PatternLayout>
<Pattern> [%d{dd-MM-yy HH:mm:ss,SSS zzz aa}{GMT}] [%-5level]
[WEB] [REVELEUS] %m%n</Pattern> </PatternLayout> <Policies>
<SizeBasedTriggeringPolicy size="5000 KB" /> </Policies>
<DefaultRolloverStrategy max="5"> <!-- number of backup files
--> </DefaultRolloverStrategy> </RollingFile>
```

To configure the deployed Area Log File Path, modify the value in the **LOG_HOME_PATH** parameter in the **aai_setup_props** table.

71. **Can I point the environment with HTTP enabled to HTTPS after installation and vice versa?**
Follow these steps:

a. Create SSL related certificates and import to respective servers.

b. Enable SSL on a desired Port (example 9443) on your existing and already deployed Web Application Servers.

c. Replace the protocol as https and new SSL Port (FIC_SERVLET_PORT) configured and in all the URLs specified on the following files:

- `$FIC_HOME/ficapp/common/FICServer/conf/FICWeb.cfg and $FIC_ HOME/ ficweb/webroot/conf/FICWeb.cfg`

- `$FIC_HOME/ficapp/icc/conf/WSMREService.properties`

- `$FIC_HOME/ficweb/webroot/conf/ModelExecution.properties`

- `$FIC_HOME/ficdb/conf/MDBPublishExecution.properties`

- `$FIC_HOME/ficdb/conf/ObjAppMap.properties`

- `$FIC_HOME/utility/Migration/conf/WSMigration.properties`

- `$FIC_HOME/utility/WSExecution/conf/WSExecution.properties`

- `$FIC_HOME/EXEWebService/WebSphere/ROOT/WEB-INF/wsdl/EXEWebSe rviceImpl.wsdl`

- `$FIC_HOME/EXEWebService/Tomcat/ROOT/WEB-INF/wsdl/EXEWebServic eImpl.wsdl`

- `$FIC_HOME/EXEWebService/weblogic/ROOT/WEB-INF/wsdl/EXEWebServiceIm pl.wsdl`

d. Replace XML attribute or Node Values as specified on the following files:

- `$FIC_HOME/ficweb/webroot/WEB-INF/web.xml`

- `FIC_WEBSERVER_PORT=9443`

- `FIC_WEBPROTOCOL=https`

- `$FIC_HOME/conf/LookUpServices.xml and $FIC_ HOME/ficweb/webroot/conf/ LookUpServices.xml`

- `PORT="9443" PROTOCOL="https:"`

e. Log in to Config Schema and execute the following SQL Command to replace protocol and SSL Port. `SQL> update configuration cn set cn.paramvalue='9443' where cn.paramname='SERVLET_ENGINE_PORT'; SQL> update configuration cn set cn.paramvalue=replace(cn.paramvalue,'http:','https:') where cn.paramname='FormsManagerCacheReload'; SQL> update web_server_info ws set ws.servletport='9443',ws.servletprotocol='https';`

f. Create EAR or WAR file and redeploy.

72. **What should I do if my HIVE connection fails with the following exception:** java.sql.SQLException: [Cloudera][HiveJDBCDriver](500164) Error initialized or created transport for authentication: [Cloudera][HiveJDBCDriver](500168) Unable to connect to server: GSS initiate failed. com.ibm.security.krb5.KrbException, status code: 37 message: PROCESS_TGS at com.ibm.security.krb5.KrbTgsRep.<init>(KrbTgsRep.java:20)

This happens if there is clock skew between the Client and the KDC Server. To resolve this, there are two solutions:

Solution 1:

Synchronize the clocks between the servers.

For more information, visit http://docs.oracle.com/cd/E19253-01/816-4557/setup-192/index.html

Solution 2:

a. Set clock skew parameter on the server side (KDC) krb5.conf file and replace the same file in the `HIVE_LIBRARY_PATH` directory. Parameter Value must be decided based on the time difference between the two machines.

b. Get the epoch time on the two servers by firing "date +%s" on the command line.

c. Clock SKEW Param Value must be chosen as a value sufficiently larger than the difference of the preceding two calculated values.

d. Set "clock skew = <value>" in the `/etc/krb5.conf` file on the KDC server.

e. Restart Kerberos Services.

73. **What should I do if my Schema Creator log has the following exception:**
```
Failed to detect a valid hadoop home directory java.io.IOException:
HADOOP_HOME or hadoop.home.dir are not set. at
org.apache.hadoop.util.Shell.checkHadoopHome(Shell.java:302) at
org.apache.hadoop.util.Shell.<clinit>(Shell.java:327) at
org.apache.hadoop.util.StringUtils.<clinit>(StringUtils.java:79) at
org.apache.hadoop.security.Groups.parseStaticMapping(Groups.java:130)
at org.apache.hadoop.security.Groups.<init>(Groups.java:94) at
org.apache.hadoop.security.Groups.<init>(Groups.java:74) at
org.apache.hadoop.security.Groups.getUserToGroupsMappingService(Groups
.java:30 3) at
org.apache.hadoop.security.UserGroupInformation.initialize(UserGroupIn
formation.ja va:283) at
org.apache.hadoop.security.UserGroupInformation.setConfiguration(UserG
roupInfor mation.java:311) at HdfsDbUtil.connect(HdfsDbUtil.java:162)
at SchemaParserUtil.validateHiveConnection(SchemaParserUtil.java:1359)
at SchemaParserUtil.checkAllPreChecks(SchemaParserUtil.java:1011) at
Main.execute(Main.java:317) at Main.main(Main.java:145) This occurs
when HADOOP_HOME environment variable is not set.
```

You can ignore this exception since we do not mandate to install HIVE where OFSAA is installed.

74. **What should I do if the Sliced Data Model Upload takes a long time to complete?**
If the Metadata Cache size is set to a lower value than the actual count of each Metadata Type (Hierarchy, Dataset, Dimension, and so on), then it gets into performance degrade issues. Increase the cache size for each Metadata Type according to the count in the environment.

Following are the parameters in DynamicServices.xml to be configured depends on the metadata count in your environment.

```
<PARAMETER NAME="HIERARCHY_NODE_LIMIT" VALUE="2000"/> <PARAMETER
NAME="ALIAS_CACHE_SIZE" VALUE="1000"/> <PARAMETER
NAME="DATASET_CACHE_SIZE" VALUE="2000"/> <PARAMETER
NAME="MEASURE_CACHE_SIZE" VALUE="3000"/> <PARAMETER
NAME="HIERARCHY_CACHE_SIZE" VALUE="2000"/> <PARAMETER
NAME="DIMENSION_CACHE_SIZE" VALUE="2000"/> <PARAMETER
NAME="CUBE_CACHE_SIZE" VALUE="1000"/> <PARAMETER
```

```
NAME="BUSINESSPROCESSOR_CACHE_SIZE" VALUE="2000"/> <PARAMETER
NAME="DERIVEDENTITY_CACHE_SIZE" VALUE="1000"/>
```

```
Metadata count can be derived based on the following queries: select
count(1) from metadata_master where metadata_version=0 --- for all metadata
select count(1) from metadata_master where metadata_version=0 and
metadata_type=1 --- for measure select count(1) from metadata_master where
metadata_version=0 and metadata_type=2 --- for Dimension select count(1)
from metadata_master where metadata_version=0 and metadata_type=3 --- for
HCY select count(1) from metadata_master where metadata_version=0 and
metadata_type=4 --- for DATASET select count(1) from metadata_master where
metadata_version=0 and metadata_type=59 --- for BP's select count(1) from
metadata_master where metadata_version=0 and metadata_type=54 --- for Alias
select count(1) from metadata_master where metadata_version=0 and
metadata_type=5 --- for CUBES select count(1) from metadata_master where
metadata_version=0 and metadata_type=856 --- for Derived Entity
```

75. **For LDAP authentication, which server connects with the LDAP Server, the Application Server (where OFS AAI is installed), or Web Application Server (where EAR is deployed)?**
For LDAP Authentication, the Application Server (ficapp) connects with the LDAP Server.

76. **The LDAP Server in the setup listens on Secure Protocol ldaps (Port 636). I have the root certificate of the LDAP Server for SSL, and would like to know where to offload this certificate?**
You must import the certificate into the JDK or JVM used by Reveleus Server in Ficapp Layer.

77. **How to relocate FTPSHARE directory, change IP HOST name, and deployed area in OFSAA?**
You can run the `PortC.jar` utility. For more details, refer Change IP or Hostname, Ports, Deployed Paths of the OFSAA Instance section in the OFS Analytical Applications Infrastructure Administration Guide.

78. **How do we identify the list of ports that are used by or configured in an OFSAA Environment?**

   a. Navigate to `$FIC_HOME` directory on Target.

   b. Refer to the `PortsDef.log` file.

79. **What should I do if I get the following error message, "Error while fetching open cursor value Status: FAIL"?**
This error occurs while executing `envCheck.sh` because the user does not have access to the V$parameter. This error does not occur due to sysdba or non sysdba privileges provided they have access or grants to the V$parameter.

80. W**hat should I do when an entity containing many attributes (>100 columns) is selected as a Source entity and the Data Mapping (T2T Definition) save operation takes longer than expected with the hourglass in the UI continuously rotating?**

   a. Locate the `webserver deployed area webroot/conf/excludeURLList.cfg` file.

   b. Modify the following entries: `[SQLIA]./dataIntegrator/` to `[ALL]./ dataIntegrator/ [SQLIA]./ETLExtractionServlet to [ALL]./ ETLExtractionServlet`

   c. Save the changes and restart the webserver.

   d. Resave the definition.

81. **What should I do if I get the following error message when I try to start the OLAP Server:**
    ```
    ./olapdataserver: error while loading shared libraries:
    libessapinu.so: cannot open shared object file: No such file or
    directory FATAL ERROR :- OLAP DATA SERVER start up failed.
    ```

    This error occurs when the OLAP component is not configured and the OLAP feature in OFSAA is not used. However, this error can be ignored.

82. **What should I do if I get the error "FATAL ERROR-Problem with OFSAA Service" during the OFS_AAI_PACK Installation?**
    Increase the sleep counter (default value is 80) to a higher value in the following section of the `OFS_AAI_PACK/OFSAAIUpdate.sh file: if [ $count -eq 0 ] ; then sleep 80; count=` grep -i "FICServer Initialization Complete" $FIC_HOME/ficapp/common/FICServer/bin/nohup.out|wc -l ` fi if [[ $count -gt 0 ]] ; then echo OFSAA Service - OK else fi echo FATAL ERROR-Problem with OFSAA Service exit 1`

83. **What should I do to increase the notebook execution timeout?**
    Navigate to the following path:

    ```
    $FIC_HOME/utility/mmgstudio/datastudio_distribution/datastudio/conf
    and open the mmg datastudio application.yml file.
    ```

    Add the following parameter under `studio-server`:

    ```
    synchronous-execution-timeout-ms: 1200000.
    ```

10.1.3 Application Pack 8.1.2.0.0 FAQs

1. **If the cx_Oracle connection is failing in DS with below error in OEL 8.**
   Fail to execute line 4: cx_Oracle.connect(dsn=dsn_alias)\nTraceback (most recent call last):\n File "/tmp/1638454321889-0/zeppelin_python.py", line 163, in <module>\n exec(code, _zcUserQueryNameSpace)\n File "<stdin>", line 4, in <module>\ncx_Oracle.DatabaseError: DPI-1047: Cannot locate a 64-bit Oracle Client library: "libnsl.so.1: cannot open shared object file: No such file or directory". Install the libnsl package as below: yum install libnsl or sudo yum install libnsl

2. **Incase of Python Interpreter fails With `py4j` Error**
   When running interpreters locally, they assume all the dependencies to be already installed and available. Python Interpreter needs `py4j` Package, exact steps to install it depend on the Operating System. If you use `pip`, it can be done with ```bash pip install --user py4j ``` Install the package for all users, root user can run this command without `--user`.

3. **What is the reason for the http error code 401 when I successfully log in to the MMG application while MMG Studio is down?**
   If MMG Studio is not up during the MMG application login, the mmg-ui logs capture the http error code : 401 . Since the cookie creation is done during MMG application login, the user must re login to the MMG application once the Studio is up and running.

4. **What should I do when the following error message is displayed, and the SSL module is unavailable for Linux 8?**
   urllib3.exceptions.SSLError: Can't connect to HTTPS URL because the SSL module is not available. During handling of the above expectation, another exception occurred:

   a. Install the compat-openssl10 module on Linux 8.

b. Log in to the server as a root user where MMG Application is installed.

c. Run the following Shell command: yum -y install compat-openssl10.