

DB Installation Guide

# **Oracle Financial Services Lending and Leasing**

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# 1. Preface

This document contains notes and installation steps involved in installation and setup of Oracle Financial Services Lending and Leasing. Oracle Financial Services Lending and Leasing relies on several pieces of Oracle software in order to run and this document is in no way meant to replace Oracle documentation supplied with these Oracle products or available via Oracle technical support. The purpose of this document is only meant to supplement the Oracle documentation and to provide Oracle Financial Services Lending and Leasing specific installation instructions.

*For recommendations on security configuration, refer Security Configuration Guide.*

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## Note

It is assumed that anyone installing Oracle Financial Services Lending and Leasing will have a thorough knowledge and understanding of Oracle Database Administration12cR1.

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## 1.1 Pre-requisites

The following software is required to install Oracle Financial Services Lending and Leasing application database. They are available from the following source:

- Oracle Software Delivery Cloud
  - <http://edelivery.oracle.com/>
- Oracle Technology Network (OTN)
  - Oracle 12c R1(version 12.1.0.2.0) RDBMS Enterprise Edition can be downloaded from <http://www.oracle.com/technetwork/database/enterprise-edition/downloads/index.html>
- Oracle Fusion Middleware requires that the database used to store its metadata must support the AL32UTF8 character set.

### **Database installation is a two step process:**

1. [Creating Database](#)
2. [Installing the Application Database](#)

### **After installing the application database, you need to:**

3. [Modifying Application System Parameters](#)
4. [Set the Oracle JVM File Permissions](#)
5. [Fine-Grained Access to Network Services in Oracle Database](#)

## 1.2 Audience

This document is intended for system administrators or application developers who install Oracle Financial Services Lending and Leasing Application.

## 1.3 Conventions Used

| Term                            | Refers to                                                    |
|---------------------------------|--------------------------------------------------------------|
| Home Directory/<br>\$OFSSL_HOME | Oracle Financial Services Lending and Leasing Home Directory |
| Application                     | Oracle Financial Services Lending and Leasing                |

---

## 2. Setup and Configuration of the Database Server

### 2.1 Creating Database

The first step in the database creation is the creation of Database Server Users and Groups. The below sections are a guide to:

1. Creating the Database Server Users and Groups
2. Creating Database
3. Modifying the Oracle system parameters after creating Database

#### 2.1.1 Creating the Database Server Users and Groups

The software and processes on the database server can be broken into three groups of ownership. These are; the Oracle processes, the Oracle external procedure processes, and the home directory. Some of this information applies only to UNIX server installations. The typical Windows server Application installation does not make use of separate users and groups, for the various processes and instead runs everything as the system user.

| Process Group              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Oracle                     | The Oracle processes are the database processes (excluding the listener process) responsible for database operations. Normally, the Oracle processes are owned by a user named oracle and a group called dba. Some of the processes use an internal Oracle PL/SQL utility called UTL_FILE to read and/or write to files in the home directory. The UTL_FILE program will perform its functions as the oracle user, hence, add the oracle user to the Oracle Financial Services Lending and Leasing user's group.                                                                                                                                                                                                                                                                                                 |
| Oracle External Procedures | Oracle Financial Services Lending and Leasing uses external procedures to perform tasks that cannot (or does not want to) be performed inside the database. Such as, interfacing with the credit bureaus, writing files, or converting images. Oracle implements external procedures through its listener process. Multiple listeners can be defined (one for "normal" database connections and one for external procedures) or run a single listener that handles both types of requests. Regardless of what is done, the external procedures will need access to files and directories that are within the home directory. It is recommended that the owner of the listener process handling external procedures is either the Oracle Financial Services Lending and Leasing user or a part of the same group. |

| Process Group                                                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Oracle Financial Services Lending and Leasing home directory | The home directory is a top-level directory under which some application files are stored. For example, log files, document templates, email templates, temporary files, and output files. There are no processes or programs that run (outside of the Oracle external procedure processes) as the Oracle Financial Services Lending and Leasing user, this is the location where the server side application files reside. Oracle Financial Services Lending and Leasing administrator can log into the server and perform the administrative functions without needing any special system superuser or administrative privileges. The home directory is needed for each application instance (production, test, development) installed on the server. |

Keeping this information in mind, here are the recommended users and groups for the server:

| User    | Group(s)  | Description                                                                                                                                                           |
|---------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ofsl    | ofsl      | Owns the home directory. Set up the directory with, group write privileges so that other application related processes can access the files and directories below it. |
| oracle  | dba, ofsl | Owns the Oracle database processes.                                                                                                                                   |
| ofsllex | ofsl      | Owns the Oracle listener process or just the external procedure listener process. If the latter, run the "normal" SQL*Net listener process as the oracle user.        |

## 2.1.2 Creating the Database

Create a database as per corporate standards and/or Oracle best practices with the following recommendations/guidelines.

- Use an undo tablespace, not rollback segments. Size accordingly for expected number of users and retention period.
- Use system managed undo
- Create a SYSTEM tablespace of at least 2GB. The application objects require approximately 1GB.
- Create a true temporary TEMP tablespace
- Set the java\_pool\_size to at least 64MB
- Ensure that the external procedure listener has been configured. Set the EXTPROC\_DLLS environment variable so that the external procedure listener can access the Oracle Financial Services Lending and Leasing external procedure shared libraries. A section from a *listener.ora* file and a *tnsnames.ora* file is given below as an example. This sets up the external procedure listener as a separate listener named LEXT. See the Oracle Net Services documentation for more information on setting up an external procedure listener.

## listener.ora

For Unix

```
LEXT =
  (DESCRIPTION_LIST =
    (DESCRIPTION =
      (ADDRESS = (PROTOCOL = IPC)(KEY = EXTPROC0))
      (PROTOCOL_STACK =
        (PRESENTATION = TTC)
        (SESSION = NS)
      )
    )
  )

SID_LIST_LEXT =
  (SID_LIST =
    (SID_DESC =
      (SID_NAME = PLSExtProc)
      (ORACLE_HOME = /opt/app/oracle/product/12.1.0)
      (PROGRAM = extproc)
    )

    (ENVS="EXTPROC_DLLS=ANY,LD_LIBRARY_PATH=/opt/app/oracle/product/12.1.0/lib")
  )
)
```

---

### Note

Values of the following parameters in the above example, differ for different servers on which the database is run:

- For UNIX servers, ensure that the LD\_LIBRARY\_PATH environment variable is set in the external procedure listener's environment. LD\_LIBRARY\_PATH must include the database ORACLE\_HOME/lib directory (ORACLE\_HOME/lib32 for 64-bit Solaris installations). Set the environment variable in the user environment responsible for starting the external procedure listener (where it will be inherited by the listener process), or set it in the *listener.ora* file in the ENVS line. If running the Solaris operating system and a 64-bit Oracle database, then substitute *extproc32* for *extproc* on the PROGRAM line in the listener.ora.
- 

## 2.2 Installing the Application Database

Download and unzip the Application Database file to a staging folder.

The application database software consists of tables, indexes, types, directories, libraries, views, and packages. A script program creates the application home directory structure, database user, the required tablespaces, database objects and loads the seed data. Snap shots of the script are provided after each step, to enable easy understanding. The steps involved in installing the application database are:

1. [Running the installation script](#)
2. [Selecting the Install Type](#)
3. [Setting up the Installation Environment](#)
4. [Creating Application Home directory](#)
5. [Creating Application Tablespaces](#)
6. [Creating the Application Owner User and Grant Tablespace Quotas](#)
7. [Installing Database Objects and Seed Data](#)
8. [Installing Library Objects](#)
9. [Installing Directory Objects](#)

## 2.2.1 Running the installation script

Run the install script from a UNIX shell prompt and follow the on screen prompts to install the Oracle Financial Services Lending and Leasing infrastructure database objects.

**On Unix:**

```
$ ./instalofslldb.sh
```

```
Oracle Financial Services Lending and Leasing DB Installer

Important Note:
-----

It is recommended to have a OS level user id created on DB server (say ofsl1)
before running the installer.

The installer will create the required Tablespace and application schema user.

The default set of subdirectories underneath the home directory creates a couple
of command files needed by the application.

The tables are grouped as follows:

GROUP          DESCRIPTION
-----
org            origination
svc            servicing
cmn            common
txn            transaction
api            import/conversion
adm            setup/administration
arc            archive

Continue? [y/n]: y
```

When the script prompts for confirmation, enter 'y' to continue.

## 2.2.2 Selecting the Install Type

The script displays install option..

```
Oracle Financial Services Lending and Leasing DB Installer

Important Note:
-----

It is recommended to have a OS level user id created on DB server (say ofsl1)
before running the installer.

The installer will create the required Tablespace and application schema user.

The default set of subdirectories underneath the home directory creates a couple
of command files needed by the application.

The tables are grouped as follows:

GROUP          DESCRIPTION
-----
org            origination
svc            servicing
cmn            common
txn            transaction
api            import/conversion
adm            setup/administration
arc            archive

Continue? [y/n]: y

Installer Options      Description
-----
1. New Installation   Full installation of OFSL Product
2. Upgrade Installation Upgrade existing installation of OFSL Product
3. Install DB Objects only Already the DB Schema and tablespaces are available install only DB Objects

Choose an installer option? [1-3]: 1
```

The script prompts to 'Choose an installer option? [1-3]'.

- Enter '1' for complete installation of Product. When entered, the script runs installer for the complete installation of the product. The below sections guide you on the process, in detail.
- Enter '2' for upgrade installation. When entered, the script runs installer to upgrade the existing version of the product. [Installing Upgrade](#) section guides you on the upgrade installation.
- Enter '3' for only DB Object installation

The script displays the product integration option. This is in case of OFSLL product being integrated with any core banking solution. Enter the values 'y' or 'n'.

```
Will OFSLL be integrated with Core Banking product ?
Okay [y/n]?: n
```

## 2.2.3 Setting up the Installation Environment

The installation script requires a properly set up environment in order to run. The script requests for few details. Enter the values as listed below. The script requests confirmation after each entry, enter 'y' to confirm.

```
Enter the Oracle Financial Services Lending and Leasing
Home Path? (usually /home/ofsl1): /scratch/work_area/DEV/OFSLLREL
```

```
OFSLLHOME=/scratch/work_area/DEV/OFSLLREL
Okay? [y/n]: y
```

```
Enter the Oracle DB Home Path? /scratch/app/db12c/product/12.1.0/dbhome_1
```

```
ORAHOME=/scratch/app/db12c/product/12.1.0/dbhome_1
Okay? [y/n]: y
```

```
Enter the Oracle SID? ORCL
INSTANCENAME=ORCL
Okay? [y/n]: y
```

Important Note:

Here is a list of CRITICAL environment variables and their settings:

```
PATH=/usr/lib64/qt-3.3/bin:/usr/kerberos/sbin:/usr/kerberos/bin:/bin:/usr/bin:/usr/dev_infra/platform/bin:/usr/dev_infra/generic/bin
11R6/bin:/usr/local/ade/bin:/scratch/app/db12c/product/12.1.0/dbhome_1/bin
ORACLE_HOME=/scratch/app/db12c/product/12.1.0/dbhome_1
ORACLE_SID=ORCL
OFSLL_HOME=/scratch/work_area/DEV/OFSLLREL
```

If the above environment variables are not correct, correct the environment and restart the script to continue.

```
Continue? [y/n]: y
```

| Script Prompts                                          | Description and Action Required                                                            |
|---------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Oracle Financial Services Lending and Leasing Home Path | Enter the path to the application home directory. This is referred to as \$OFSLL_HOME.     |
| Oracle DB Home Path                                     | Enter the path to the Oracle DB home directory. This is referred to as \$ORACLE_HOME       |
| Oracle SID                                              | Enter the Name of Oracle Instance. In case of multitenant environment, enter the PDB name' |

| Script Prompts | Description and Action Required                                                                    |
|----------------|----------------------------------------------------------------------------------------------------|
| Path           | Sets the path that includes \$ORACLE_HOME/bin as the installation script requires SQL*Plus utility |

When the script prompts for the confirmation, enter 'y' to continue.

## 2.2.4 Creating Application Home directory

The *install* script will create a proper directory structure for the application below the user's home directory and will set the proper permissions on the directories.

### **\$OFSLL\_HOME**

| Variable                 | Description                                                                                                                    |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| /api                     | Stores the captured Applications/Account data from any third party Origination/Servicing System and setup the account in OFSLL |
| /acct_doc_load           | Input load directory for account documents                                                                                     |
| /bin                     | Contains executable scripts                                                                                                    |
| /cor_storage             | Top level directory for generated correspondences                                                                              |
| /doc_templates           | Correspondence document template load directory                                                                                |
| /email_templates         | Contains email message templates                                                                                               |
| /fin_storage             | Top level directory for faxed-in images                                                                                        |
| /dot_storage             | Top level directory for account documents                                                                                      |
| /images                  | Contains fax / document images uploaded to OFSLL screen                                                                        |
| /input                   | Repository for data files needed as input to Oracle Financial Services Lending and Leasing processes                           |
| /input/lockbox           | Contains files for lockbox processing.                                                                                         |
| /input/lockbox/processed | Contains files that are already processed.                                                                                     |
| /lib                     | Contains external procedure shared libraries                                                                                   |
| /logs                    | Contains all Oracle Financial Services Lending and Leasing log files                                                           |
| /output                  | Destination for Oracle Financial Services Lending and Leasing output data files.                                               |
| /output/processed        | Contains files that are already processed.                                                                                     |
| /rs_archive              | Top level directory for archived reports                                                                                       |
| /sql                     | Directory contain SQL scripts used for creating database objects, recompiling packages, and various utility functions.         |
| /tmp                     | Temporary directory used by some external procedures.                                                                          |

| Variable             | Description                                       |
|----------------------|---------------------------------------------------|
| /input/adr           | Contains incoming adr files.                      |
| /input/adr/processed | Contains files that are already processed.        |
| /input/cac           | Contains incoming call activity files.            |
| /input/cac/processed | Contains files that are already processed.        |
| /input/ifd           | Contains incoming lien title tracking files.      |
| /input/ifd/processed | Contains files that are already processed.        |
| /input/itu           | Contains incoming ITU files.                      |
| /input/itu/processed | Contains files that are already processed.        |
| /input/ivr           | Contains incoming IVR files.                      |
| /input/ivr/processed | Contains files that are already processed.        |
| /input/wfp           | Contains incoming wholesale floor planning files. |
| /input/wfp/processed | Contains files that are already processed.        |
| /input/ibn           | Contains incoming BANKO_NEW files.                |
| /input/ibn/processed | Contains files that are already processed.        |
| /input/ibu           | Contains incoming BANKO_UPDATE files.             |
| /input/ibu/processed | Contains files that are already processed.        |
| /input/ice           | Contains currency exchange files.                 |
| /input/ice/processed | Contains files that are already processed.        |
| /input/icl           | Contains cure letter files.                       |
| /input/icl/processed | Contains files that are already processed.        |
| /input/ipr           | Contains AP Transaction History files.            |
| /input/ipr/processed | Contains files that are already processed.        |

### 2.2.5 Creating Application Tablespaces

The Oracle Financial Services Lending and Leasing table and index creation DDL allow for the use of up to 20 different tablespaces --10 for tables and 10 for indexes. The DDL commands reference a set of files that contain storage parameter information. These files allow mapping of logical tablespace names to physical tablespaces. Create as many of these tablespaces as necessary depending on the storage resources. Use locally managed

tablespaces with a uniform extent policy. The following table describes different tablespaces, their content, and their expected growth pattern.

| Tablespace       | Storage Parameter File                                             | Default Tablespace Name           | Data                                                                      | Comment                                                                            |
|------------------|--------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Admin            | storage_parms_<br>table_adm.sql<br>storage_parms_<br>index_adm.sql | OFSLL_ADM_DATA<br>OFSLL_ADM_INDEX | setup data                                                                | low growth,<br>low change.                                                         |
| Origination      | storage_parms_<br>table_org.sql<br>storage_parms_<br>index_org.sql | OFSLL_ORG_DATA<br>OFSLL_ORG_INDEX | loan<br>application<br>data                                               | growth varies<br>by customer,<br>few updates.                                      |
| Servicing        | storage_parms_<br>table_svc.sql<br>storage_parms_<br>index_svc.sql | OFSLL_SVC_DATA<br>OFSLL_SVC_INDEX | non<br>transaction<br>account<br>data                                     | growth varies<br>by customer,<br>few updates.                                      |
| Transactions     | storage_parms_<br>table_txn.sql<br>storage_parms_<br>index_txn.sql | OFSLL_TXN_DATA<br>OFSLL_TXN_INDEX | transaction<br>data                                                       | high growth<br>(relative to<br>account and<br>application<br>data table<br>spaces) |
| API              | storage_parms_<br>table_api.sql<br>storage_parms_<br>index_api.sql | OFSLL_API_DATA<br>OFSLL_API_INDEX | application/<br>account<br>data used<br>during<br>imports/<br>conversions | high growth,<br>one time<br>usage, data<br>can be<br>removed<br>after loading      |
| Archive          | storage_parms_<br>table_arc.sql<br>storage_parms_<br>index_arc.sql | OFSLL_ARC_DATA<br>OFSLL_ARC_INDEX | Archived<br>application/<br>account<br>data                               | steady<br>growth,<br>potentially<br>very large                                     |
| Common           | storage_parms_<br>table_cmn.sql<br>storage_parms_<br>index_cmn.sql | OFSLL_CMN_DATA<br>OFSLL_CMN_INDEX | common<br>non-admin<br>data                                               | generally low<br>growth, some<br>tables can be<br>periodically<br>truncated        |
| Input<br>Process | storage_parms_<br>index_ipf.sql<br>storage_parms_<br>table_ipf.sql | OFSLL_IPF_DATA<br>OFSLL_IPF_INDEX | Input<br>processing<br>file                                               | steady<br>growth,<br>potentially<br>very large                                     |

| Tablespace     | Storage Parameter File                                     | Default Tablespace Name           | Data                   | Comment                               |
|----------------|------------------------------------------------------------|-----------------------------------|------------------------|---------------------------------------|
| Output Process | storage_parms_index_opf.sql<br>storage_parms_table_opf.sql | OFSLL_OPF_DATA<br>OFSLL_OPF_INDEX | Output processing file | steady growth, potentially very large |
| Logging        | storage_parms_index_log.sql<br>storage_parms_table_log.sql | OFSLL_LOG_DATA<br>OFSLL_LOG_INDEX | Error Logging          | steady growth                         |

Important Note:

Here is a list of CRITICAL environment variables and their settings:

```
PATH=/usr/lib64/qt-3.3/bin:/usr/kerberos/sbin:/usr/kerberos/bin:/bin:/usr/bin:/usr/dev_infra/platform/bin
11R6/bin:/usr/local/ade/bin:/scratch/app/db12c/product/12.1.0/dbhome_1/bin
ORACLE_HOME=/scratch/app/db12c/product/12.1.0/dbhome_1
ORACLE_SID=ORCL
OFSLL_HOME=/scratch/work_area/DEV/OFSLLREL
```

If the above environment variables are not correct, correct the environment and restart the script to continue.

Continue? [y/n]: y

find: '/scratch/work\_area/DEV/OFSLLREL': No such file or directory

Data already exists in /scratch/work\_area/DEV/OFSLLREL,

Continue with override data? [y/n]: y

Oracle Financial Services Lending and Leasing Default Tablespace Name and Size (default 300MB)

| Default Tablespace Name       | Description                        | New Name | Size (MB) |
|-------------------------------|------------------------------------|----------|-----------|
| 1. OFSLL_ADM_DATA             | setup data                         |          |           |
| 2. OFSLL_ADM_INDEX            | setup data index                   |          |           |
| 3. OFSLL_ORG_DATA             | loan application data              |          |           |
| 4. OFSLL_ORG_INDEX            | loan application data index        |          |           |
| 5. OFSLL_SVC_DATA             | non transaction account data       |          |           |
| 6. OFSLL_SVC_INDEX            | non transaction account data index |          |           |
| 7. OFSLL_TXN_DATA             | transaction data                   |          |           |
| 8. OFSLL_TXN_INDEX            | transaction data index             |          |           |
| 9. OFSLL_API_DATA             | api data                           |          |           |
| 10. OFSLL_API_INDEX           | api data index                     |          |           |
| 11. OFSLL_ARC_DATA            | archive data                       |          |           |
| 12. OFSLL_ARC_INDEX           | archive data index                 |          |           |
| 13. OFSLL_CMN_DATA            | common non-admin data              |          |           |
| 14. OFSLL_CMN_INDEX           | common non-admin data index        |          |           |
| 15. OFSLL_IPF_DATA            | incoming process file data         |          |           |
| 16. OFSLL_IPF_INDEX           | incoming process file index        |          |           |
| 17. OFSLL_OPF_DATA            | outgoing process file data         |          |           |
| 18. OFSLL_OPF_INDEX           | outgoing process file index        |          |           |
| 19. OFSLL_LOG_DATA            | log files header data              |          |           |
| 20. OFSLL_LOG_INDEX           | log files header index             |          |           |
| 21. Confirm Tablespace Values |                                    |          |           |

Note:

To Change the Default Tablespace Name and Size  
a. Select a number from 1 to 20 to redefine each tablespace name and its size  
b. Select number 21 to confirm the redefined tablespace values

To Accept the Default Tablespace Name and Size  
a. Select number 21 to confirm the default tablespace values

Redefine the tablespace name?

select a number [1-21]: 21

When prompted to 'Select a number' to redefine the tablespace name, you have 2 options:

Accept default Tablespace Name and Size: Select # 21

```
Redefine the tablespace name?  
select a number [1-21]: 21
```

10. Modify the default Tablespace Name and Size: Select the number of the tablespace, between 1–20, you need to modify

```
Oracle Financial Services Lending and Leasing Default Tablespace Name and Size (default 300MB)  
-----  
Default Tablespace Name  Description  New Name  Size (MB)  
-----  
1. OFSLL_ADM_DATA        setup data  
2. OFSLL_ADM_INDEX       setup data index  
3. OFSLL_ORG_DATA        loan application data  
4. OFSLL_ORG_INDEX       loan application data index  
5. OFSLL_SVC_DATA        non transaction account data  
6. OFSLL_SVC_INDEX       non transaction account data index  
7. OFSLL_TXN_DATA        transaction data  
8. OFSLL_TXN_INDEX       transaction data index  
9. OFSLL_API_DATA        api data  
10. OFSLL_API_INDEX      api data index  
11. OFSLL_ARC_DATA        archive data  
12. OFSLL_ARC_INDEX      archive data index  
13. OFSLL_CMN_DATA        common non-admin data  
14. OFSLL_CMN_INDEX      common non-admin data index  
15. OFSLL_IPF_DATA        incoming process file data  
16. OFSLL_IPF_INDEX      incoming process file index  
17. OFSLL_OPF_DATA        outgoing process file data  
18. OFSLL_OPF_INDEX      outgoing process file index  
19. OFSLL_LOG_DATA        log files header data  
20. OFSLL_LOG_INDEX      log files header index  
21. Confirm Tablespace Values  
-----  
Note:  
-----  
To Change the Default Tablespace Name and Size  
a. Select a number from 1 to 20 to redefine each tablespace name and its size  
b. Select number 21 to confirm the redefined tablespace values  
  
To Accept the Default Tablespace Name and Size  
a. Select number 21 to confirm the default tablespace values  
  
Redefine the tablespace name?  
select a number [1-21]: 21
```

| Script Prompts                | Description and Action Required                                                       |
|-------------------------------|---------------------------------------------------------------------------------------|
| Enter new tablespace name     | Enter tablespace name you need to assign to the default tablespace you have selected. |
| Enter tablespace size (in MB) | Enter the size (in MB) you need to assign to the new tablespace name you have entered |

Repeat this process for all the tablespace names you need to modify

```
Oracle Financial Services Lending and Leasing Default Tablespace Name and Size (default 300MB)  
-----  
Default Tablespace Name  Description  New Name  Size (MB)  
-----  
1. OFSLL_ADM_DATA        setup data  
2. OFSLL_ADM_INDEX       setup data index  
3. OFSLL_ORG_DATA        loan application data  
4. OFSLL_ORG_INDEX       loan application data index  
5. OFSLL_SVC_DATA        non transaction account data  
6. OFSLL_SVC_INDEX       non transaction account data index  
7. OFSLL_TXN_DATA        transaction data  
8. OFSLL_TXN_INDEX       transaction data index  
9. OFSLL_API_DATA        api data  
10. OFSLL_API_INDEX      api data index  
11. OFSLL_ARC_DATA        archive data  
12. OFSLL_ARC_INDEX      archive data index  
13. OFSLL_CMN_DATA        common non-admin data  
14. OFSLL_CMN_INDEX      common non-admin data index  
15. OFSLL_IPF_DATA        incoming process file data  
16. OFSLL_IPF_INDEX      incoming process file index  
17. OFSLL_OPF_DATA        outgoing process file data  
18. OFSLL_OPF_INDEX      outgoing process file index  
19. OFSLL_LOG_DATA        log files header data  
20. OFSLL_LOG_INDEX      log files header index  
21. Confirm Tablespace Values  
-----  
Note:  
-----  
To Change the Default Tablespace Name and Size  
a. Select a number from 1 to 20 to redefine each tablespace name and its size  
b. Select number 21 to confirm the redefined tablespace values  
  
To Accept the Default Tablespace Name and Size  
a. Select number 21 to confirm the default tablespace values  
  
Redefine the tablespace name?  
select a number [1-21]: 21  
  
Enter Oracle datafile path : /scratch/app/db12c/oradata/ORCL
```

Enter # 21 to redefine and to apply changes for the tablespaces you modified.

Enter Oracle datafile path : /scratch/app/db12c/oradata/ORCL

Oracle datafile path: /scratch/app/db12c/oradata/ORCL

Okay? [y/n]: y

Enter the Oracle userid (schema name) that will own the Oracle Financial Services Lending and Leasing objects? (usually ofsl1prd): OFSL1REL

Enter the password for this userid:

Enter the Oracle sysdba  
userid? (usually sys): sys

Enter the password for this userid: XXXXXXXXXX

| Script Prompts                                                                         | Description and Action Required                                                                                         |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Oracle tablespace path                                                                 | Installed Database path that stores DBF files. Once entered the script prompts for confirmation. Enter 'y', if it is ok |
| Oracle User ID that will own the Oracle Financial Services Lending and Leasing objects | Valid User ID                                                                                                           |
| Password for this User ID                                                              | Valid Password                                                                                                          |
| Oracle sysdba User ID                                                                  | Valid User ID                                                                                                           |
| Password for sysdba User ID                                                            | Valid Password                                                                                                          |

## 2.2.6 Creating the Application Owner User and Grant Tablespace Quotas

Oracle Financial Services Lending and Leasing application requires a single Oracle user (or schema) and this user is the application owner. The application owner user owns all of the tables, indexes, views, sequences, packages, etc. that make up the application.

The user is then granted access to the application tablespaces.

## 2.2.7 Installing Database Objects and Seed Data

Once the User ID is created, the script initiates the database object installation and lists the objects available for installation.

```
Oracle Financial Services Lending and Leasing Database Object Installation
```

```
The following items are available for installation:
```

- |                             |         |
|-----------------------------|---------|
| 1. database libraries       | (6)     |
| 2. database directories     | (4)     |
| 3. database tables          | (1205)  |
| 4. common database views    | (3)     |
| 5. engine views             | (1336)  |
| 6. form views               | (1276)  |
| 7. java views               | (397)   |
| 8. database types           | (321)   |
| 9. database package specs   | (3156)  |
| 10. database package bodies | (3135)  |
| 11. database indexes        | (1916)  |
| 12. System Seed Data        | (58254) |

```
Continue with Installation? [y/n] : y
```

When the script prompts for the confirmation, enter 'y' to continue.

```
The Oracle Financial Services Lending and Leasing shared libraries are normally installed in a lib directory
below where the $OFSLL home directory is. For example:
/home/ofsell/lib OR D:\ofsell\lib

Enter name of Oracle Financial Services Lending and Leasing shared library directory: /home/oracle/scratch/OFSLL/OFSLL143/lib

PL/SQL procedure successfully completed.
```

## 2.2.8 Installing Library Objects

Once the confirmation is received, the script initiates installation of library objects. A sample of the script is given below.

```
The Oracle Financial Services Lending and Leasing shared libraries are normally installed in a lib directory
below where the $OFSLL home directory is. For example:
/home/ofsell/lib OR D:\ofsell\lib

Enter name of Oracle Financial Services Lending and Leasing shared library directory: /scratch/work_area/DEV/OFSLLREL/lib

PL/SQL procedure successfully completed.

Installing Directory objects...
crt_cordir_cmn.sql

The Oracle Financial Services Lending and Leasing schema owner owns all of the objects.

Enter name of Oracle Financial Services Lending and Leasing schema owner: OFSLLREL

This script will create an Oracle directory object that will be
used by the correspondence engine to determine where to store
document files. A separate storage directory can be set up for
each company that is configured in Oracle Financial Services Lending and Leasing. Enter the
company code for the company that you are configuring. If you
don't know at this time, enter HQ

Enter the company code: HQ
```

```
Enter name of Oracle Financial Services Lending and Leasing shared library directory: /export/home/ofsl/lib

PL/SQL procedure successfully completed.
```

| Script Prompts           | Description and Action Required                                           |
|--------------------------|---------------------------------------------------------------------------|
| Shared Library Directory | The path for the library directory. The default value is \$OFSLL_HOME/lib |

## 2.2.9 Installing Directory Objects

The fax images, correspondence documents, and the account document images are stored as BFILE objects. With BFILE, the image or document is physically stored outside the database on a file system available either on the database server or to the database server. A pointer to the file consisting an Oracle directory object and a file name is stored in the database. Application programs that create the BFILEs use application parameters to determine the specific directory object name. The application parameters are company level parameters, hence, a different directory object can be created for each defined company and branch.

```
The Oracle Financial Services Lending and Leasing shared libraries are normally installed in a lib directory
below where the $OFSLL home directory is. For example:
/home/ofsl/lib OR D:\ofsl\lib

Enter name of Oracle Financial Services Lending and Leasing shared library directory: /scratch/work_area/DEV/OFSLLREL/lib

PL/SQL procedure successfully completed.

Installing Directory objects...
crt_cordir_cm.sql

The Oracle Financial Services Lending and Leasing schema owner owns all of the objects.

Enter name of Oracle Financial Services Lending and Leasing schema owner: OFSLLREL

This script will create an Oracle directory object that will be
used by the correspondence engine to determine where to store
document files. A separate storage directory can be set up for
each company that is configured in Oracle Financial Services Lending and Leasing. Enter the
company code for the company that you are configuring. If you
don't know at this time, enter HQ

Enter the company code: HQ

The COR_STORAGE_DIRECTORY is the top-level directory below which
the document files will be stored.
For example: /home/ofsl/cor_storage or d:\ofsl\cor_storage

Enter name of COR_STORAGE_DIRECTORY: /scratch/work_area/DEV/OFSLLREL/cor_storage

Directory created.
crt_dotdir_cm.sql

The Oracle Financial Services Lending and Leasing schema owner owns all of the objects.

Enter name of Oracle Financial Services Lending and Leasing schema owner: OFSLLREL

This script will create an Oracle directory object that will be
used by the account document load batch job to determine where to
account document files. Enter the company code for
company that you are configuring. If you don't know at this
time, enter HQ

Enter the company code: HQ

The DOT_STORAGE_DIRECTORY is the top-level directory below which
the account document files will be stored.
For example: /home/ofsl/dot_storage or d:\ofsl\dot_storage

Enter name of DOT_STORAGE_DIRECTORY: /scratch/work_area/DEV/OFSLLREL/dot_storage

The DOT_STORAGE_DIRECTORY is the top-level directory below which
the account document files will be stored.
For example: /home/ofsl/dot_storage or d:\ofsl\dot_storage

Enter name of DOT_STORAGE_DIRECTORY: /scratch/work_area/DEV/OFSLLREL/dot_storage

Directory created.
crt_findir_cm.sql

The Oracle Financial Services Lending and Leasing schema owner owns all of the objects.

Enter name of Oracle Financial Services Lending and Leasing schema owner: OFSLLREL

The FIN_STORAGE_DIRECTORY is the top-level directory below which
the faxed-in image GIF files will be stored.
For example: /home/ofsl/fin_storage or d:\ofsl\fin_storage

Enter name of FIN_STORAGE_DIRECTORY: /scratch/work_area/DEV/OFSLLREL/fin_storage

Directory created.
crt_utldir_cm.sql

The Oracle Financial Services Lending and Leasing schema owner owns all of the objects.

Enter name of Oracle Financial Services Lending and Leasing schema owner: OFSLLREL

This script will create a number of Oracle directory objects that will be
used to grant the UTL_FILE package read and write access to application
directories.

The OFSLL HOME is the top-level directory below which
all application input and output files will be stored.
For example: /home/ofsl

Enter directory path for OFSLL HOME : /scratch/work_area/DEV/OFSLLREL
```

Choose a name that identifies the usage, company, and branch for the directory object. Since directory objects are for the entire database and not just for the application, it is suggested that the schema name or identifier is used in the name to identify it from other directory objects. Choose a directory path with enough storage space to handle the expected volume of correspondences.

| Directory Object Types                        | Abbreviation for Object Types | Suggested installation Location in \$OFSLL_HOME |
|-----------------------------------------------|-------------------------------|-------------------------------------------------|
| Correspondence interface directory objects    | COR                           | <i>cor_storage</i>                              |
| Account documents interface directory objects | DOT                           | <i>dot_storage</i>                              |
| Fax-in interface directory objects            | FIN                           | <i>fin_storage</i>                              |

## 2.3 Modifying Application System Parameters

Several system parameters in the seed data require modification to fit the local installation environment. One such parameter must be set manually. You can modify the rest using the application system parameter setup screen (Setup→Administration→System→Parameters).

### Setting the CMN\_SERVER\_HOME parameter values

As mentioned, the CMN\_SERVER\_HOME parameters must be set manually before the application screens can be used to set other parameters.

CMN\_SERVER\_HOME

Set it to the \$OFSLL\_HOME directory.

### Setting the remaining system parameters manually or from the setup screen

```
$ sqlplus

SQL*Plus: Release 12.1.0.2.0 Production on Fri Feb 12 15:28:17 2016
Copyright (c) 1982, 2014, Oracle. All rights reserved.

Enter user-name: OFSLL/OFSLL

Connected to:
Oracle Database 12c Enterprise Edition Release 12.1.0.2.0 - 64bit Production
With the Partitioning, OLAP, Advanced Analytics and Real Application Testing
options

SQL> update system_parameters set syp_value = '$OFSLL_HOME' where
syp_parameter_cd = 'CMN_SERVER_HOME';

1 row updated.
SQL> commit;
```

### Creating the user 'INTERNAL'

This user is required for batch job process, webservices and to start services.

A script is provided in the distribution media in the dba\_utils folder to create an user. Run the script "crt\_app\_user.sql script" as a OFSLL application owner user.

```
SQL> @crt_app_user.sql;
Enter the name of the OFSLL App user Id you
Want to create user: INTERNAL
Enter the First Name for this user: OFSLL
Enter the Last Name for this user: RELEASE
Enter the Phone Number for this user: 1234567891
Enter the Fax Number for this user: 1234567891

1 row created.

1 row created.

1 row created.
```

Set the below parameters which are located on the Setup→Administration→System→System Parameters screen. This is not a complete list of system parameters, but is a list of system parameters related to installation details. The other parameters are related to application business functionality. The values for many of these parameters are known only after the installation and configuration of application server.

1. CMN\_SER\_ENVIRONMENT\_FILE
  - Set it to the full path of the text file that contains environment settings that will be used when running external commands from the job service. For example, \$OFSLL\_HOME/OFSLLENV
2. CMN\_SERVER\_TEMP\_DIR
  - Set it to the full path of a directory that will be used to store temporary files needed during certain procedures. This is typically a directory named “tmp” underneath the \$OFSLL\_HOME directory (ex. \$OFSLL\_HOME\tmp or \$OFSLL\_HOME/tmp).
3. ADMIN\_SERVER\_URL
  - This parameter is used to enable changing the user-level passwords. The default parameter value will generally have the form:  
Set the t3://hostname:port/console (Host name and Port) where application is installed
4. UNIX\_DEFAULT\_IMAGE\_PATH
  - Set the path to the fax / document images that are uploaded to OFSLL screen. Typically, it is \$OFSLL\_HOME/images.
5. Update system parameters with Oracle directory objects used by the application.
  - Login as an application schema owner and execute the following sql file from the dba\_utils folder - SQL>@update\_sys\_params.sql

### **Modifying BI Publisher Parameters**

1. JSV\_REPORTS\_SERVER\_URL

Set this to the URL to the job service should use when running a report. Reports are all submitted as a background job (either by a user or by the job scheduler). These reports will be sent to a printer/file system as chosen by the user or as configured in the job setup. The parameter value will generally have the form: <http://hostname:port/> (Host name and Port where BIP is installed)

2. JSV\_USE\_REPORTS\_SERVER

Set to ‘Yes

3. JSV\_REPORT\_ARCHIVE\_DIRECTORY

Set to a directory that will be used to store OFSLL report PDFs. Typically it is \$OFSLL\_HOME/rs\_archive

Batch reports can be configured to print to a special “archive” printer that will create a PDF of the report and store it below the JSV\_REPORT\_ARCHIVE\_DIRECTORY. This directory must be accessible to the database server machine. All archived reports are stored by a process running on the database server machine and not by a process running on the report server machine.

The report PDFs are stored below the JSV\_REPORT\_ARCHIVE\_DIRECTORY in a subdirectory representing the type of report (report or correspondence), the year, the month, and the day that the report was printed. For example, if a report was printed on December 15, 2013, the PDF file will be located in: JSV\_REPORT\_ARCHIVE\_DIRECTORY/reports/2013/12/15

#### 4. JSV\_ARCHIVE\_SERVER\_URL

Set this to the URL that the job service should use when running an archived report. Archive reports are all reports submitted as a background job (either by a user or by the job scheduler) to a special printer named ARCHIVE. The parameter value will generally have the form: <http://hostname:port/> (Host name and Port where BIP is installed)

This can have the same value as the JSV\_REPORTS\_SERVER\_URL parameter. This additional parameter is supplied in case there are multiple report servers and it is desirable to send archive requests to a different server than the other report requests.

5. JSV\_SMTP\_SERVER - smtp mail router of organization
6. JSV\_USE\_BI\_PUBLISHER - Set to YES (Y)
7. JSV\_BI\_USER - set as the BI Publisher Admin User Name
8. JSV\_BI\_PASSWORD - set as the BI Publisher Admin Password
9. UIX\_REPORTS\_SERVER\_URL

Set this to the URL that user interface should use when running a report. The parameter value will generally have the form: <http://hostname:port/> (Host name and Port where BIP is installed). This can have the same value as the JSV\_REPORTS\_SERVER\_URL parameter.

### **Setting the fax-in interface company parameters manually or from the setup screen.**

If the fax-in service will be used, set these parameters located on the Setup→Administration→Company→System Parameters screen. These parameters are company level parameters, which mean that a fax-in service can be configured for each company in Oracle Financial Services Lending and Leasing.

#### 1. FIN\_POP\_SERVER

Set to the name of the POP server that the fax-in service will communicate with to retrieve email messages containing faxed in images.

#### 2. FIN\_POP\_USERNAME

Set to the username/account on the POP server that the fax-in service will retrieve the email messages from.

#### 3. FIN\_POP\_PASSWORD

Set to the password for the FIN\_POP\_USERNAME on the POP server that the fax-in service will retrieve the email messages from.

#### 4. FIN\_STORAGE\_DIRECTORY

Set to the name of the Oracle *directory object*, created during installation, which defines where the faxed-in images will be stored. The image files are stored in the database as a BFILE which means that only a reference to an external file is stored in the database and the actual file is stored outside on the operating system's file system in a path defined by an Oracle directory object. This parameter is the name of the Oracle object, not the actual directory path. Typical naming convention used for FIN directory objects is - FIN\_DIR\_<application owner name>\_company\_branch. For example:  
FIN\_DIR\_OFSLL142\_HQ

#### 5. FIN\_TEMP\_DIRECTORY

Set to the name of a directory that the fax-in service can use during conversion of the email attachment TIF file into a GIF file. This is typically set to \$OFSLL\_HOME/tmp.

#### **Setting the correspondence interface company parameters manually or from the setup screen.**

If using the correspondence interface, set these additional parameters located on the Setup→Administration→Company→System Parameters screen. These parameters are company level parameters, which means that a correspondence interface can be configured for each company in Oracle Financial Services Lending and Leasing.

#### COR\_STORAGE\_DIRECTORY

Set to the name of the Oracle *directory object*, created during installation, which defines where the generated correspondences will be stored. The correspondence files are stored in the database as a BFILE which means that only a reference to an external file is stored in the database and the actual file is stored outside on the operating system's file system in a path defined by an Oracle directory object. This parameter is the name of the Oracle object, not the actual directory path. Typical naming convention used for COR directory objects is - COR\_DIR\_<application owner name>\_company\_branch. For example:  
COR\_DIR\_OFSLL142\_HQ

#### **Setting the account documents interface company parameters manually or from the setup screen.**

If using the account documents interface, set these additional parameters located on the Setup→Administration→Company→System Parameters screen. These parameters are company level parameter, which means that an account documents interface can be configured for each company in Oracle Financial Services Lending and Leasing.

#### DOT\_STORAGE\_DIRECTORY

Set to the name of the Oracle *directory object*, created during installation, which defines where the account documents will be stored. The account document files are stored in the database as a BFILE which means that only a reference to an external file is stored in the database and the actual file is stored on the operating system's file system in a path defined by an Oracle directory object. This parameter is the name of the Oracle object, not the actual directory path. Typical naming convention used for DOT directory objects is - DOT\_DIR\_<application owner name>\_company\_branch. For example:  
DOT\_DIR\_OFSLL142\_HQ

## 2.4 After Creating the Database

After the database has been created, some Oracle system parameters may have to be modified due to application requirements. See the previous section about *Creating the Database* for more details.

### Set the utl\_file\_dir system parameter

Application uses the Oracle UTL\_FILE utility for reading from and writing to files for some of the datafile interfaces, as well as when log files and debugging files are written. The UTL\_FILE utility uses an Oracle system parameter to restrict the directories that can be written to or read from. Set this parameter to \* (meaning all directories on the server), or set it to a list of directories. At this time, those directories are \$OFSLL\_HOME/logs, \$OFSLL\_HOME/sql, \$OFSLL\_HOME/output, \$OFSLL\_HOME/input, \$OFSLL\_HOME/input/lockbox and \$OFSLL\_HOME/input/lockbox/processed/ (note the trailing slash). Over time this list may grow (or shrink) as new versions of Oracle Financial Services Lending and Leasing are released. This parameter cannot be set dynamically.

The database must be restarted for the above values to take effect.

#### **Example 1**

```
alter system set utl_file_dir='*' scope=spfile;
```

#### **Example 2**

```
alter system set utl_file_dir='$OFSLL_HOME\logs', '$OFSLL_HOME\sql',  
'$OFSLL_HOME\output', '$OFSLL_HOME\input', '$OFSLL_HOME\input\lockbox',  
'$OFSLL_HOME\input\lockbox\processed' scope=spfile;
```

### Set the job\_queue\_process system parameter

The application job service and job scheduler make heavy use of the DBMS\_JOB facility. This value will represent the number of simultaneous jobs that can be running on the server at a point of time. The various services that are required to be running to make the Oracle Financial Services Lending and Leasing software function, will account for 6 job queue processes. Anything above 6 is such that the online and nightly batch jobs can run in parallel. This parameter can be set again at any time without having to restart the database, if there be a need to add to or cut back on the number of running processes.

#### **Example**

```
alter system set job_queue_processes=10 scope=both;
```

## 2.5 Set the Oracle JVM File Permissions

The application correspondence interface uses the built-in Oracle Java Virtual Machine (JVM) to create subdirectories below the top-level correspondence/document storage directory (defined by the application's COR\_STORAGE\_DIRECTORY, DOT\_STORAGE\_DIRECTORY parameters). In order to do this, the JVM's security policy needs to be updated by the Oracle built-in DBMS\_JAVA package to allow directories to be created and accessed. A SQL script named *set\_java\_perms.sql* has been supplied on the installation media in the *dba\_utils* directory for this purpose. The script will select all directory object names defined for the application COR\_STORAGE\_DIRECTORY and DOT\_STORAGE\_DIRECTORY parameters and will provide read, write, and delete privileges to the directory named by the directory object and all directories below it.

## **Running the set\_java\_perms.sql script.**

After the system and company parameters have been set up, run SQL\*Plus as the SYS user and run the *set\_java\_perms.sql* script to set the file permissions.

Similarly, in case of any java permission access issues to directories, provide the required read, write or delete privileges.

## **2.6 Advanced Queues**

Queuing feature is used in OFSLL for writing debugs into the XMLTYPE column of LOG\_FILES\_HEADER table instead of writing into the file system.

Also, in OFSLL, Outbound database calls are routed through application server through AQ JMS bridge. The MDB deployed in Middleware, reads the AQ message remotely which has all information required to make the call to Bureau or RO /DT.

To enable alert and debug message queue:

1. Set the system parameter "CMN\_DEBUG\_METHOD" with syp\_value = 4.
  - SQL> update system\_parameters set syp\_value = '4' where syp\_parameter\_cd = 'CMN\_DEBUG\_METHOD';

To enable MDB EJB queue:

2. Set the system parameter and credit bureau parameter in "OUTBOUND\_CALL\_Q" with syp\_value = Y.
  - UPDATE SYSTEM\_PARAMETERS SET SYP\_VALUE='Y' WHERE SYP\_PARAMETER\_CD='OUTBOUND\_CALL\_Q' AND SYP\_ENABLED\_IND='Y'
  - UPDATE CREDIT\_BUREAU\_PARAMETERS SET CRP\_VALUE='Y' WHERE CRP\_PARAMETER\_CD='OUTBOUND\_CALL\_Q'
3. Start the queue services by the following commands:
  - SQL> EXECUTE dbms\_aqadm.start\_queue('OFSLL\_DEBUG\_MSG\_QUEUE',TRUE,TRUE);
  - SQL> EXECUTE dbms\_aqadm.start\_queue('OFSLL\_ALERT\_MSG\_QUEUE', TRUE,TRUE);
  - SQL> EXECUTE dbms\_aqadm.start\_queue('OFSLL\_OUTBOUND\_Q',TRUE,TRUE);
4. Once the queue services are started, subscribe and register the queue for a notification so that whenever a data inserted into the queue it will notify the system.
  - SQL>setup\_AQ\_subscribe.sql

To switch back to the existing file system mechanism:

1. To un subscribe and register the queue for a notification
  - SQL>setup\_AQ\_unsubscribe.sql
2. Stop the queue services by the following commands:
  - SQL> EXECUTE dbms\_aqadm.stop\_queue('OFSLL\_DEBUG\_MSG\_QUEUE',TRUE,TRUE, FALSE);
  - SQL> EXECUTE dbms\_aqadm.stop\_queue ('OFSLL\_ALERT\_MSG\_QUEUE', TRUE, TRUE, FALSE);
  - SQL> EXECUTE dbms\_aqadm.stop\_queue('OFSLL\_OUTBOUND\_Q',TRUE,TRUE,FALSE);

3. Set the system parameter "CMN\_DEBUG\_METHOD" with syp\_value= 1.
  - SQL> update system\_parameters set syp\_value = '1' where syp\_parameter\_cd = 'CMN\_DEBUG\_METHOD';

---

**Note**

- Please do not delete any queue or queue table from the schema.
  - When you unsubscribe the queue, MDB queue is also stopped. You need to start 'OFSLL\_OUTBOUND\_Q' to continue with MDB flow.
  - Ensure that you have granted 'dbms\_aqin' privileges to the schema user.
- 

## 2.7 Fine-Grained Access to Network Services in Oracle Database

Oracle allows access to external network services using several PL/SQL APIs (UTL\_TCP, UTL\_SMTP, UTL\_MAIL, UTL\_HTTP and UTL\_INADDR), all of which are implemented using the TCP protocol.

An Access Control Entry can be limited to specific PL/SQL APIs (UTL\_TCP, UTL\_INADDR, UTL\_HTTP, UTL\_SMTP, and UTL\_MAIL).

In a multitenant environment, Access Control Entries (ACEs) can be created at the CDB or PDB level. For the examples in this article, all the host ACLs and host ACEs will be created at the PDB level. The following code creates two test users in a PDB.

### Append an Access Control List (ACE)

Host ACL are never created directly. Instead, they are implicitly created when we append a host Access Control Entry (ACE) using the DBMS\_NETWORK\_ACL\_ADMIN.APPEND\_HOST\_ACE procedure. If we append a new ACE to a host that has no existing host ACL, a new host ACL is implicitly created. If the host already has an ACL, the new host ACE will be appended to the existing host ACL.

Login to SQL\*Plus as the SYS user.

```
BEGIN
  DBMS_NETWORK_ACL_ADMIN.append_host_ace (
    host      => '192.168.2.3',
    lower_port => 80,
    upper_port => 80,
    ace       => xs$ace_type(privilege_list => xs$name_list('http', 'connect'),
                             principal_name => 'OFSLL',
                             principal_type => xs_acl.ptype_db));
END;
```

## Append a second host to the existing ACL

```
BEGIN
  DBMS_NETWORK_ACL_ADMIN.APPEND_HOST_ACL (
    host      => '192.168.2.3',
    lower_port => 80,
    upper_port => 80,
    acl       => 'NETWORK_ACL_02B9BC669CA6110CE0536638A8C05D8A');
END;
```

## Parameter Definitions

The parameters used in the procedures and functions above

| Parameters | Description                                                                   |
|------------|-------------------------------------------------------------------------------|
| host       | Any valid host name or IP address. Wildcards are allowed.                     |
| lower_port | Specific port number, or lower part of a range of ports.                      |
| upper_port | Upper part of a range of ports. If NULL, it defaults to the lower_port value. |
| ace        | The access control entry, defined using the XS\$ACE_TYPE type.                |

The XS\$ACE\_TYPE type has the following definition.

```
xs$ace_type(privilege_list => xs$name_list('privilege1', 'privilege2'),
            principal_name => 'user-or-role',
            principal_type => xs_acl.ptype_db)
```

| Parameters     | Description                                                                                  |
|----------------|----------------------------------------------------------------------------------------------|
| privilege_list | The list of privileges available to the ACE.                                                 |
| principal_name | The database user the ACE applies to.                                                        |
| principal_type | You will always use XS_ACL.PTYPE_DB for these network ACEs as they apply to users and roles. |

The privilege\_list specifies one or more privileges in a comma separated list. The available privileges are shown below.

| Parameters | Description                                                                                                 |
|------------|-------------------------------------------------------------------------------------------------------------|
| http       | Access restricted to the UTL_HTTP package and the HttpUriType type.                                         |
| http_proxy | Needed in conjunction with http if HTTP access is via a proxy.                                              |
| smtp       | Access restricted to the UTL_SMTP and UTL_MAIL packages.                                                    |
| resolve    | Access restricted to the UTL_INADDR packages.                                                               |
| connect    | Opens access to the UTL_TCP, UTL_SMTP, UTL_MAIL, UTL_HTTP, and DBMS_LDAP packages and the HttpUriType type. |
| jdwp       | Enables Java Debug Wire Protocol debugging operations.                                                      |

## 2.8 Installing Upgrade

An upgrade is a process of updating an existing version to its higher version. For example, upgrading from Oracle Financial Services Lending and Leasing 14.2 to 14.3.

The following upgrade path is recommended for existing Daybreak customers:

DLS 11.6.0.0.23 > OFSLL 14.0.0.0.0 > OFSLL 14.1.0.0.0 > OFSLL 14.2.0.0.0 > OFSLL 14.3.0.0.0

If you choose '2' as the installer option at the 'Selecting the Install Type' stage, then the script runs the upgrade installer.

```
Oracle Financial Services Lending and Leasing DB Upgrade
It is recommended to run this upgrade by logging to "ofsl1" user created
Continue? [y/n]: y

Enter the Oracle Financial Services Lending and Leasing
Home Path? (This is usually /home/ofsl1): /scratch/work_area/DEV/OFSLLREL
OFSLLHOME=/scratch/work_area/DEV/OFSLLREL
Okay [y/n]?: y

Enter the Oracle DB Home Path? /scratch/app/db12c/product/12.1.0/dbhome_1
ORAHOME=/scratch/app/db12c/product/12.1.0/dbhome_1
Okay [y/n]?: y

Enter the Oracle SID? ORCL
INSTANCENAME=ORCL
Okay [y/n]?: y

Important Note:
-----
This will install database objects used by Oracle Financial Services Lending and Leasing.
Here is a list of CRITICAL environment variables and their settings:
PATH=/usr/lib64/qt-3.3/bin:/usr/kerberos/sbin:/usr/kerberos/bin:/bin:/usr/bin:/usr/dev_infra/platform/bin:/usr/d
ev_infra/generic/bin:/usr/local/bin:/usr/X11R6/bin:/usr/local/ade/bin:/scratch/app/db12c/product/12.1.0/dbhome_1
/bin
ORACLE_HOME=/scratch/app/db12c/product/12.1.0/dbhome_1
ORACLE_SID=ORCL
OFSLL_HOME=/scratch/work_area/DEV/OFSLLREL

If the above environment variables are not correct, correct the environment and restart
the script to continue.

Okay to continue? [y/n]: y
.....
Oracle Financial Services Lending and Leasing Database Object Patch

The following items are available for installation:

1. database libraries
2. database directories
3. database tables
4. common database views
5. engine views
6. form views
7. java views
8. database types
9. database package specs
10. database package bodies
11. database indexes
12. System Seed Data

Continue with Installation? [y/n] : █

Enter the Oracle SID? ORCL
INSTANCENAME=ORCL
Okay? [y/n]: Y

Important Note:
-----
Here is a list of CRITICAL environment variables and their settings:
PATH=/usr/lib64/qt-3.3/bin:/usr/kerberos/sbin:/usr/kerberos/bin:/bin:/usr/bin:/usr/dev_infra/platform/bin:/usr/dev_infra/generic/bin:/usr/local/bin:/usr/X
11R6/bin:/usr/local/ade/bin:/scratch/app/db12c/product/12.1.0/dbhome_1/bin
ORACLE_HOME=/scratch/app/db12c/product/12.1.0/dbhome_1
ORACLE_SID=ORCL
OFSLL_HOME=/scratch/work_area/DEV/OFSLL142

If the above environment variables are not correct, correct the environment
and restart the script to continue.

Continue? [y/n]: Y

Data already exists in /scratch/work_area/DEV/OFSLL142
Continue with override data? [y/n]: Y
.....
Oracle Financial Services Lending and Leasing Database Object Installation

The following items are available for installation:

1. database libraries (6)
2. database directories (4)
3. database tables (157)
4. common database views (3)
5. engine Views (1336)
6. form views (1276)
7. java views (397)
8. database types (321)
9. database package specs (3156)
10. database package bodies (3135)
11. database indexes (197)
12. System Seed Data (58255)

Continue with Installation? [y/n] : Y

Enter the Oracle userid (schema name) that will own the Oracle Financial Services Lending and Leasing
objects? (usually ofsl1prd): █
```

**Respond to the prompts and continue (For details, refer sections [Setting up the Installation Environment](#) to [Installing Directory Objects](#)).**

While installing the upgrade, the installer performs the following tasks:

1. Stop the running services, if any.

```
Enter the Oracle userid (schema name) that will own the Oracle Financial Services Lending and Leasing
objects? (This is usually ofsl1prd): ofsl1126

Enter the password for this userid:

Services are still running, cannot load objects.
Stop the Services? [y/n]y

Shutdown the Job Services...

Installing Type objects...
crt_type_cmn.sql

Type dropped.
```

2. Install the upgrade

```
PL/SQL procedure successfully completed.

PL/SQL procedure successfully completed.

Commit complete.

Commit complete.

Inserting Version Details...

1 row created.

Commit complete.
```

3. Recompile the invalid objects and complete installation.

```
mv: cannot stat '/tmp/recomp_obj..21809.log': No such file or directory

Oracle Financial Services Lending and Leasing DB Object Upgrade Complete.
Log files are located in /scratch/work_area/DEV/OFSLREL/logs/ofsl1_patch_logs
-bash-4.1$
```

## 2.9 Enabling Transparent Data Encryption to Secure Stored Data

Oracle Database uses authentication, authorization, and auditing mechanisms to secure data in the database. The operating system data files where data is stored is not used. To protect these data files, Oracle Database provides Transparent Data Encryption (TDE). TDE encrypts sensitive data stored in data files. Encrypted data is transparently decrypted for a database user or application that has access to data.

OFSL application processes sensitive data. Hence, it is recommended to use a TDE to protect confidential data, such as credit card and social security numbers, stored in table columns.

A script is provided along with the distribution media to encrypt the sensitive columns in the table. You can follow the steps below to enable TDE for column encryption:

To start using TDE, the security administrator must create a wallet and set a master key. The wallet can be the default database wallet shared with other Oracle Database components, or

a separate wallet specifically used by TDE. Oracle strongly recommends that you use a separate wallet to store the master encryption key.

### **Specifying a Wallet Location for Transparent Data Encryption**

If you wish to use a wallet specifically for TDE, then you must specify a wallet location in the sqlnet.ora file by using the ENCRYPTION\_WALLET\_LOCATION parameter. Oracle recommends that you use the ENCRYPTION\_WALLET\_LOCATION parameter to specify a wallet location for TDE.

```
ENCRYPTION_WALLET_LOCATION = (SOURCE =  
  
(METHOD = FILE)  
  
(METHOD_DATA =  
  
(DIRECTORY =  
  
/etc/ORACLE/WALLETS/oracle)))
```

If no wallet location is specified in the sqlnet.ora file, then the default database wallet location is used. The default database wallet location is ORACLE\_BASE/admin/DB\_UNIQUE\_NAME/wallet or ORACLE\_HOME/admin/DB\_UNIQUE\_NAME/wallet. Here, DB\_UNIQUE\_NAME is the unique name of the database specified in the initialization parameter file.

### **Setting the Master Encryption Key**

The master encryption key is stored in an external security module, and is used to protect the table keys and tablespace encryption keys. By default, the master encryption key is a random key generated by Transparent Data Encryption (TDE). It can also be an existing key pair from a PKI certificate designated for encryption. To use TDE with PKI key pairs, the issuing certificate authority must be able to issue X.509v3 certificates with the key usage field marked for encryption.

To set the master encryption key, use the following command:

```
SQL> ALTER SYSTEM SET ENCRYPTION KEY IDENTIFIED BY 'password'
```

where,

- password is the mandatory wallet password for the security module, with no default setting. It is case sensitive. Enclose the password string in double quotation marks (" ").
- The wallet location specified by the ENCRYPTION\_WALLET\_LOCATION parameter, in the sqlnet.ora parameter file, is used to create the master encryption key. If the ENCRYPTION\_WALLET\_LOCATION parameter is not present in the sqlnet.ora file, then the WALLET\_LOCATION value is used. A new wallet is created in case of no wallet.
- If no wallet location is specified in the sqlnet.ora file, then the default database wallet location is used. The default database wallet location is ORACLE\_BASE/admin/DB\_UNIQUE\_NAME/wallet or ORACLE\_HOME/admin/DB\_UNIQUE\_NAME/wallet. Here, DB\_UNIQUE\_NAME is the unique name of the database specified in the initialization parameter file.
- If an existing auto login wallet is present at the expected wallet location, then a new wallet is not created.

## **Resetting the Master Encryption Key**

Reset/Regenerate the master encryption key only if it has been compromised or as per the security policies of the organization. You should back up the wallet before resetting the master encryption key.

Use the ALTER SYSTEM command to set or reset (rekey) the master encryption key.

## **Opening and Closing the Encrypted Wallet**

The database must load the master encryption key into memory before it can encrypt or decrypt columns/tablespaces. Opening the wallet allows the database to access the master encryption key. Use the following ALTER SYSTEM command to explicitly open the wallet:

```
SQL> ALTER SYSTEM SET ENCRYPTION WALLET OPEN IDENTIFIED BY "password";
```

where password is the password to open the wallet. You should enclose the password string in double quotation marks (" ").

Once the wallet has been opened, it remains open until you shut down the database instance, or close it explicitly by issuing the following command:

```
SQL> ALTER SYSTEM SET ENCRYPTION WALLET CLOSE IDENTIFIED BY "password"
```

## **Encrypting Columns in Existing Tables**

To add an encrypted column to an existing table, or to encrypt or decrypt an existing column, you use the ALTER TABLE SQL command with the ADD or MODIFY clause.

```
SQL> ALTER TABLE applicants MODIFY (apl_gender_cd ENCRYPT USING 'AES256');
```

Encrypting the indexed columns:

```
SQL> ALTER TABLE applicants MODIFY (apl_ssn ENCRYPT USING 'AES256' NO SALT);
```

## **Disabling Encryption on a Column**

You may want to disable encryption for reasons of compatibility or performance. To disable column encryption, use the ALTER TABLE MODIFY command with the DECRYPT clause.

Example 7-11 Turning Off Column Encryption:

```
SQL> ALTER TABLE applicants MODIFY (apl_gender_cd DECRYPT);
```

A Set of scripts are provided on the installation media in the dba\_utils directory to encrypt the recommended columns in OFSLL.

upgrade\_tb\_tde\_enable\_ofsll.sql to encrypt base table columns.

upgrade\_tb\_opur\_tde\_enable\_ofsll.sql to encrypt archive table columns.

upgrade\_tb\_api\_tde\_enable\_ofsll.sql to encrypt api table columns.

Login as an OFSLL user and execute the scripts to encrypt the columns.

---

**Note**

Refer Oracle® Database Advanced Security Administrator's Guide, section on Securing Stored Data Using Transparent Data Encryption for details.

---

## **2.10 Data Redaction**

Data Redaction is one of the new features available in 12c. Data Redaction is in Advanced Security option of enterprise edition.

Oracle Advanced Security Data Redaction provides selective, on-the-fly redaction of sensitive data in SQL query results prior to display by applications so that unauthorized users cannot view the sensitive data.

OFSSL application processes sensitive data. Hence, it is recommended to use a Data Redaction to protect confidential data, such as credit card and social security numbers, stored in table columns.

There are different types of redaction; full, partial, regexp, random and none. Please refer Oracle® Database Advanced Security Administrator's Guide, section on Configuring Oracle Data Redaction Policies for details.

## **2.11 Optimize PS\_TXN**

Oracle Fusion Applications use the PS\_TXN table to store the intermediate processing state. When there are many concurrent users, this table receives a high number of inserts and could suffer from concurrency issues.

Follow the steps outlined in note ID 1444959.1 in My Oracle Support to alleviate the contention.