

# Database Installation Guide

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Oracle FLEXCUBE Lending and Leasing

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Author:	Group: Banking Products Division	
Created on :	Revision No :	
Updated by : Pragna Thaker	Reviewed by :	Approved by:
Updated on :	Reviewed on :	Approved on :

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# 1. Setup and Configuration of the Database Server System

## 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. There are the Oracle processes, the Oracle external procedure processes, and the FLL home directory. Some of this information only applies to UNIX server installations. The typical Windows server installation of FLL does not make use of separate users and groups for the various processes and instead runs everything as the system user.

<u>Process Group</u>	<u>Description</u>
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 FLL processes use an internal Oracle PL/SQL utility called UTL_FILE to read and/or write to files in the FLL home directory. The UTL_FILE program will perform its functions as the oracle user, so make the oracle user a part of the same group as the FLL user.
Oracle External Procedures	FLL uses external procedures to perform tasks that it cannot (or does not want to) perform 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 just one listener that handles both types of requests. Regardless of what is done, keep in mind that the external procedures will be needing access to files and directories that are within the FLL home directory. It is recommended that the owner of the listener process handling external procedures be either the FLL user or be a part of the same group as the FLL user.
FLL home directory	The FLL home directory is a top-level directory below which some FLL application files are stored. Examples of these files are 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 FLL user, this is simply a central place for all server side FLL files to reside. A FLL administrator can log into the server and perform FLL administrative functions without needing any special system superuser or administrative privileges. A FLL home directory is needed for each FLL application instance (production, test, development) installed on the server.

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

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<u>User</u>	<u>Group(s)</u>	<u>Description</u>
OFLF	OFLF	Owns the FLL home directory. Set up the directory with group write privileges so that other FLL related processes can access the files and directories below it.
oracle	dba, ofll	Owns the Oracle database processes.
fllext	ofll	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.

## 1.2 Mount the Installation Media

The installation CD contains Oracle Flexcube Lending And Leasing software for both the database server and the application/web server. For each phase of the installation (i.e. the database phase and the application/web server phase), mount the CD onto the specific server hardware for which the software will be installed on. Do not attempt to mount the CD on a Windows server and then run the installation scripts while connecting via SQL\*Plus to a UNIX-based database server. If the CD cannot be mounted directly on the server machine, mount the CD on an available server and copy the contents of the CD (preserving the directory structure) into a directory on the server.

### ◆ Mounting CD-ROMs for HP

Follow these steps to manually mount the FLL installation CD-ROM:

1. Use the following command to determine the device\_file:

```
$ ioscand -fun -C disk
```

The output should be similar to the following:

```
disk      10  10/12/5.2.0  sdisk      CLAIMED    DEVICE      TOSHIBA CD-ROM XM-
5701TA /dev/dsk/c4t2d0  /dev/rdsk/c4t2d0
```

If there is not already an entry in the /etc/pfsfstab file for the CD-ROM device, add one. As the root user, use a system editor to add a line to the /etc/pfsfstab file following this format:

```
device_file mount_point filesystem_type translation_method
```

In the preceding example, the first entry is the CD-ROM device, the second entry is the mount point, and the third entry indicates that the CD-ROM to be mounted is in ISO9660 format with Rockridge extensions.

he device\_file in this example is /dev/dsk/c4t2d0. For a CD-ROM device with the path /dev/dsk/c4t2d0, enter the following:

```
/dev/dsk/c4t2d0 /cdrom pfs-rrip xlat=unix 1 0
```

Log in as the root user with the following command and enter the following commands:

```
# nohup /usr/sbin/pfs_mountd &
```

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```
# nohup /usr/sbin/pfsd &
```

Place the FLL installation CD in the CD-ROM drive and mount the CD-ROM by entering the following command:

```
# /usr/sbin/pfs_mount /cdrom
```

## ◆ Mounting CD-ROMs for Linux with Auto Mounting Software

If using auto mounting software, the CD-ROM is mounted automatically to the directory specified in the auto mount configuration when it is inserted into the CD-ROM drive.

1. Check for auto mounting software with the following command:

```
$ ps -aux | grep automount
```

If auto mounting software is available, the output must be similar to the following:

```
root 628 0.0 0.2 1148 588 ? S 17:32 0:00 /usr/sbin/automount /misc file  
/etc/auto.misc
```

In the preceding output, the `/etc/auto.misc` entry defines the directory under the `/misc` file where the CD-ROM will be mounted.

If the auto mounting software is running and configured properly, the CD-ROM is mounted automatically.

If no lines are returned, the auto mounting software is not running, and the CD-ROM needs to be mounted manually.

## ◆ Mounting CD-ROMs for Linux Manually

Follow these steps to manually mount the FLL installation CD-ROM:

1. Place the FLL installation CD in the CD-ROM drive.
2. Log in as the root user and, if necessary, create a CD-ROM mount point directory by using the following commands:

```
$ su root  
# mkdir cdrom_mount_point_directory
```

Mount the CD-ROM drive on the mount point directory by using the following commands:

```
# mount options device_name cdrom_mount_point_directory
```

Exit the root account.

```
# exit
```

If unsure of the correct `device_name` consult the system administrator. Typically, the `device_name` is `/dev/cdrom`. For example:

```
$ su root
# mkdir /cdrom
# mount -t iso9660 /dev/cdrom /cdrom
# exit
```

#### ◆ Mounting CD-ROMs for Solaris with Volume Management Software

Use the following command to check if Volume Management software is running:

```
$ ps -e | grep vold
```

If Volume Management software is running, the output must be similar to the following:

```
404 ? 16:03 vold
```

If the Volume Management software is running, the CD-ROM is mounted automatically and it will be available as `/cdrom/cdrom0`.

#### ◆ Mounting CD-ROMs for Solaris Manually

Follow these steps to mount the FLL installation CD manually:

1. Place the CD in the CD-ROM drive.
2. Log in as the root user and, if necessary, create a CD-ROM mount point directory by using the following commands:

```
$ su root
# mkdir cdrom_mount_point_directory
```

3. Mount the CD-ROM drive on the mount point directory, then exit the root account by using the following commands:

```
# mount options device_name cdrom_mount_point_directory
# exit
```

If unsure of the correct `device_name`, consult the system administrator. Typically, the `device_name` is `/dev/dsk/c0t6d0s0` or `/dev/dsk/c0t6d0/cdrom`. For example:

```
$ su root
# mkdir /cdrom
# mount -r -F hsfs /dev/dsk/c0t6d0s0 /cdrom
# exit
```

## ◆ Mounting CD-ROMs for Windows

### 1.3 On Windows servers, the CD-ROM is mounted automatically when it is inserted into the CD-ROM drive. Creating the Application Home Directory

Most of the Oracle Flexcube Lending And Leasing software resides in the Oracle database. The rest of it needs to be placed into a set of directories on the database server hardware that is called the **OFLI\_HOME**. The **OFLI\_HOME** will contain log files, some shared libraries, output files such as third-party vendor datafiles, correspondence files, and fax image storage (if using the fax features). This directory is typically the FLL user's (see previous section for information about creating the FLL user) home directory, but it does not have to be.

A script program has been provided that will create the proper directory structure for the FLL application below the **OFLI\_HOME**. This script requires an environment variable named **OFLI\_HOME** as well as the two Oracle environment variables ORACLE\_HOME and ORACLE\_SID. Set these environment variables to their appropriate values and run the installhomedir script provided at the top level of the installation media. Run the script as the FLL user.

---

**NOTE:** The shell scripts provided in the installation may not run on Linux servers because there may not be a Bourne shell program (*/bin/sh*) on the server. If the Linux server does not contain a */bin/sh* program, create a soft link from the */bin/bash* program to */bin/sh* (i.e. *ln -s /bin/bash /bin/sh*).

---

#### ◆ UNIX Example (ksh or sh)

```
$ ORACLE_SID=DBKLS
$ ORACLE_HOME=/u01/app/oracle/product/9.2.0
$ OFLI_HOME=/home/OFLI
$ export ORACLE_HOME ORACLE_SID OFLI_HOME
$ /cdrom/installhomedir
```

#### ◆ UNIX Example (csh)

```
$ setenv ORACLE_SID DBKLS
$ setenv ORACLE_HOME /u01/app/oracle/product/9.2.0
$ setenv OFLI_HOME /home/OFLI
$ /cdrom/installhomedir
```

#### ◆ Windows Example

```
C:\> set ORACLE_SID=DBKLS
C:\> set ORACLE_HOME=C:\oracle\ora9i
C:\> set OFLI_HOME=C:\OFLI
C:\> D:\installhomedir.bat
```

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

1. To create the directories manually, create a **OFLI\_HOME** with the following directory structure:

**/OFLI\_HOME**

/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
/input	repository for data files needed as input to FLL processes
/input/lockbox	
/input/lockbox/processed	
/lib	contains external procedure shared libraries
/logs	contains all FLL log files
/output	destination for FLL output data files
/output/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.

2. Make the directories owner and group writeable and force group ownership of the files to be the FLL group. This can be accomplished on the UNIX platform by performing a *chmod* command on the directories. For example:

```
$ cd /home/OFLI
$ find . -type d -exec chmod 775 {} \;
$ find . -type d -exec chmod g+s {} \;
```

3. For reasons unknown, Oracle's UTL\_FILE utility will not write to a directory for which it has only group level access. The directory must either be owned by the oracle user or have world write privileges. For this reason, either open up world access and write privileges to the logs and output directory, or change the ownership of the directories to be the oracle user.

```
$ cd /home/OFLI
$ chmod 777 logs output
```

---

**NOTE:** The *cor\_storage*, *fin\_storage*, and *rs\_archive* directories do not actually have to exist in the **OFLI\_HOME** directory, nor are they required to have those particular names. Depending on how the FLL application is used, the storage space used by the files within these directories may be quite large. The names and locations of these directories are controlled by FLL system parameters and Oracle directory objects. The directories can start out as part of the **OFLI\_HOME** directory and be moved later if desired.

---

## 1.4 Creating the Database

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

- Database Configuration Assistant (DBCA) templates have been provided within the extras folder at the top-level of the installation media to use when creating a database (recommended). Copy the supplied templates into your ORACLE\_HOME/assistants/dbca/templates directory before launching the DBCA utility. Much of what is listed in this section and the following section are provided within the templates.
- For Enterprise Edition users, the log\_archive\_dest parameter has been deprecated in favor of the log\_archive\_dest\_n parameters. If Oracle Enterprise Edition is not installed or it is installed, but you have not specified any log\_archive\_dest\_n parameters, the log\_archive\_dest parameter is valid. Log\_archive\_dest is incompatible with the log\_archive\_dest\_n parameters, and must be defined as the null string ("") or (' ') when any log\_archive\_dest\_n parameter has a value other than a null string. After loading the supplied templates files, please verify that the log\_archive\_dest and log\_archive\_dest\_n parameters are set properly.
- 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 Oracle Flexcube Lending And Leasing objects for a single FLL schema require approximately 1GB.
- Create a true temporary TEMP tablespace
- Set the java\_pool\_size to at least 64MB
- Use a remote authentication password file. This is not mandatory, but an installation script that relies on this feature may fail and will have to be run manually if the remote password file is not in use.
- The Oracle Flexcube Lending And Leasing table and index creation DDL allow for the use of up to 14 different tablespaces --7 for tables and 7 for indexes. The DDL commands reference a set of files that contain storage parameter information. These files allow for a mapping of logical tablespace names to physical tablespaces. Create as many of these tablespaces as are necessary depending on the storage resources. Use locally managed tablespaces with a uniform extent policy. The following table describes the different tablespaces, their content, and their expected growth pattern.

<u>Tablespace</u>	<u>Storage Parameter File</u>	<u>Default Tablespace Name</u>	<u>Data</u>	<u>Comment</u>
Admin	storage_parms_table_adm.sql storage_parms_index_adm.sql	OFLL_ADM_DATA OFLL_ADM_INDEX	setup data	low growth, low change.
Origination	storage_parms_table_org.sql storage_parms_index_org.sql	OFLL_ORG_DATA OFLL_ORG_INDEX	loan application data	growth varies by customer, few updates.
Servicing	storage_parms_table_svc.sql storage_parms_index_svc.sql	OFLL_SVC_DATA OFLL_SVC_INDEX	non transaction account data	growth varies by customer, few updates.
Transactions	storage_parms_table_txn.sql storage_parms_index_txn.sql	OFLL_TXN_DATA OFLL_TXN_INDEX	transaction data	high growth (relative to account and application data table spaces)
API	storage_parms_table_api.sql storage_parms_index_api.sql	OFLL_API_DATA OFLL_API_INDEX	application/account data used during imports/conversions	high growth, one time usage, data can be removed after loading
Archive	storage_parms_table_arc.sql storage_parms_index_arc.sql	OFLL_ARC_DATA OFLL_ARC_INDEX	Archived application/account data	steady growth, potentially very large
Common	storage_parms_table_cmn.sql storage_parms_index_cmn.sql	OFLL_CMN_DATA OFLL_CMN_INDEX	common non-admin data	generally low growth, some tables can be periodically truncated

- The default set of storage parameter files are contained within the sql directory on the installation media. The default set expects that all 14 tablespaces have been created. If fewer tablespaces are desired, or different names are needed other than the ones used by the default files, copy the files into **OFLL\_HOME/sql** and edit them. Any files in **OFLL\_HOME/sql** will be referenced instead of the files on the installation media.
- 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 Flexcube Lending And Leasing external procedure shared libraries. An example section from a *listener.ora* file and a *tnsnames.ora* file is shown below that 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.
- 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. An example showing how to set it in the *listener.ora* ENVS line is shown below.
- If running the Solaris operating system and a 64-bit Oracle database, substitute *extproc32* for *extproc* on the PROGRAM line in the listener.ora.

- If running the Windows 64-bit operating system, you must also install the Microsoft Visual C++ 2005 Redistributable Package (x86) –which is available from the Microsoft download center and you must also specify the PATH in the ENVS entry in the listener.ora (see example).

### listener.ora

```

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

SID_LIST_LEXT =
  (SID_LIST =
    (SID_DESC =
      (SID_NAME = PLSExtProc)
      (ORACLE_HOME = /opt/app/oracle/product/9.2.0)
      (PROGRAM = extproc)

      (ENVS="EXTPROC_DLLS=ANY,LD_LIBRARY_PATH=/opt/app/oracle/product/9.2.0/lib")
    )
  )

```

**Note: for 64-bit Windows, the ENVS line in the listener.ora file should look something like**

```
(ENVS="EXTPROC_DLLS=ANY,PATH=C:\oracle\product\10.2.0\db_1\bin;C:\windows\system32;C:\windows;C:\windows\system32\wbem; C:\oracle\product\10.2.0\db_1\lib")
```

### tnsnames.ora

```

EXTPROC_CONNECTION_DATA =
  (DESCRIPTION =
    (ADDRESS_LIST =
      (ADDRESS = (PROTOCOL = IPC)(KEY = EXTPROC))
    )
    (CONNECT_DATA = (SID = PLSExtProc)(PRESENTATION = RO))
  )

```



## 1.5 After Creating the Database

After the database has been created, some Oracle system parameters may have to be modified due to FLL application requirements. These parameters have already been included in the Database Configuration Assistant templates supplied in the *extras* directory on the installation media. See the previous section about *Creating the Database* for more details.

### ◆ Set the `utl_file_dir` system parameter

FLL 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 `OFLF_HOME/logs`, `OFLF_HOME/sql`, `OFLF_HOME/output`, `OFLF_HOME/input`, `OFLF_HOME/input/lockbox` and `OFLF_HOME/input/lockbox/processed/` (note the trailing slash). Over time this list may grow (or shrink) as new versions of FLL are released. This parameter cannot be set dynamically, **the database must be restarted for the value to take affect.**

---

**NOTE:** The asterisk (\*) can only be used alone as an argument to the `utl_file_dir` parameter. Setting `utl_file_dir` to `/home/OFLF/*` will not allow access to all directories below the `/home/OFLF` directory.

---

Example:

```
alter system set utl_file_dir='c:\OFLF\logs', 'c:\OFLF\sql',  
'c:\OFLF\output', 'c:\OFLF\input', 'c:\OFLF\input\lockbox',  
'c:\OFLF\input\lockbox\processed\' scope=spfile;
```

Example:

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

### ◆ Set the `job_queue_process` system parameter

The Oracle Flexcube Lending And Leasing 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 any one time. The various services that are required to be running just to make the Lending And Leasing software function will account for 6 job queue processes. Anything above 6 is so 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 should 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;
```

### ◆ Set the `remote_dependencies_mode` parameter to signature.

This refers to the method used by Oracle Forms to determine if the dependent database packages are valid.

Example:

```
alter system set remote_dependencies_mode='signature' scope=both;
```

## 1.6 Oracle users

There is one Oracle user (or schema) needed by the Oracle Flexcube Lending And Leasing application. 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.

### ◆ Create the application owner user

There is script named *crt\_ls\_user.sql* located in the *dba\_utils* directory on the installation media for creating the application user. Due to the grants in the script, log in as SYS when running this script.

1. Using SQL\*Plus as the SYS user or a user with the DBA role, run the *crt\_ls\_user* SQL script.

---

**NOTE** The *crt\_ls\_user* script assigns the application user to a default tablespace of USERS and a default temporary tablespace of TEMP. These tablespaces are created during database creation if the Database Configuration Assistant template files supplied on the installation media are used to create the database. For a standard FLL installation, the user's default tablespace will not contain any objects. All table and index creation scripts explicitly reference a tablespace name, so no tables or indexes will end up in the default tablespace by default. Edit the *crt\_ls\_user.sql* script if a different tablespace name is desired.

---

```
$ sqlplus

SQL*Plus: Release 9.2.0.4.0 - Production on Wed Jan 7 14:01:02 2004
Copyright (c) 1982, 2002, Oracle Corporation. All rights reserved.

Enter user-name: / as sysdba

Connected to:
Oracle9i Enterprise Edition Release 9.2.0.4.0 - Production
With the Partitioning, OLAP and Oracle Data Mining options
JServer Release 9.2.0.4.0 - Production

SQL> @crt_ls_user
Enter the name of the FLL Oracle user you want to create: ofll
Enter the password for this user: ofll

User created.

Grant succeeded.

Grant succeeded.

Grant succeeded.
```



```
Copyright (c) 1982, 2002, Oracle Corporation. All rights reserved.
```

```
Enter user-name: / as sysdba
```

```
Connected to:
```

```
Oracle9i Enterprise Edition Release 9.2.0.4.0 - Production
```

```
With the Partitioning, OLAP and Oracle Data Mining options
```

```
JServer Release 9.2.0.4.0 - Production
```

```
SQL> @alter_ls_user_quota
```

```
User altered.
```

```
SQL>
```

#### ◆ Install the Oracle XDK

FLL uses the XML parsing utilities that are provided in the Oracle XDK. Read the Oracle documentation for specific prerequisites, but if it is not already installed in your database, the basic installation procedure is to run the *initxml.sql* script from the ORACLE\_HOME/xdk/admin directory as follows:

---

**NOTE:** If you do not know if it is already installed, the FLL installation program will check for its existence and notify you if you have to stop the FLL installation and install the XDK.

---

1. Using SQL\*Plus as the SYS user or a user with the DBA role, run the *initxml.sql* script.

```
$ sqlplus
```

```
SQL*Plus: Release 9.2.0.4.0 - Production on Wed Jan 7 14:01:02 2004
```

```
Copyright (c) 1982, 2002, Oracle Corporation. All rights reserved.
```

```
Enter user-name: / as sysdba
```

```
Connected to:
Oracle9i Enterprise Edition Release 9.2.0.4.0 - Production
With the Partitioning, OLAP and Oracle Data Mining options
JServer Release 9.2.0.4.0 - Production

SQL> @initxml
```

◆ **Install the dependent Java JAR files.**

FLL uses a small amount of database-side Java code to implement some of the interfaces. The FLL java programs are dependent on a few Sun and Oracle supplied Java classes in order to function. These dependent Java classes have been supplied as JAR files in the *java* subdirectory on the installation media. The particular java classes needed and the method for installing them is dependent on the version of the database in use. Refer to the README file located within the *java/database\_version* directory for specific instructions on how to install the JAR files.

## **1.7 Installing the Oracle Flexcube Lending And Leasing Database Objects.**

The Oracle Flexcube Lending and Leasing database software consists of tables, indexes, types, directories, libraries, views, and packages. Due to dependencies among the objects, they must be installed in the proper order. A script program has been supplied on the installation media for this purpose. The *installinfra.bat* script is for Win NT/2000 installations and the *installinfra* is for UNIX installations.

◆ **Set up the installation environment.**

The installation script requires a properly set up environment in order to run.

1. Set ORACLE\_HOME to the top of the Oracle RDBMS tree.
2. Set TNS\_ADMIN to the SQL\*Net network administration directory where a properly configured tnsnames.ora file is located.
3. Set ORACLE\_SID to the name of the Oracle instance.
4. Set OFLL\_HOME to the path to **OFLL\_HOME** (as discussed earlier in this document).
5. Set PATH so that it includes \$ORACLE\_HOME/bin because the installation script will be using the SQL\*Plus utility.

Example for Win NT/2000:

```
C:\> set ORACLE_HOME=C:\ORA9iR2
C:\> set TNS_ADMIN=C:\ORA9iR2\NETWORK\ADMIN
C:\> set ORACLE_SID=PROD
C:\> set OFLL_HOME=C:\OFLL
```

```
C:\> PATH=%ORACLE_HOME%\bin;%PATH%
```

### Example for UNIX (sh or ksh)

```
$ ORACLE_HOME=/opt/app/oracle/product/9.2.0.4; export ORACLE_HOME
$ TNS_ADMIN=/opt/app/oracle/product/9.2.0.4/network/admin; export TNS_ADMIN
$ ORACLE_SID=PROD; export ORACLE_SID
$ OFLL_HOME=/home/OFLI; export OFLL_HOME
$ PATH=${ORACLE_HOME}/bin:${PATH}; export PATH
```

### ◆ Run the installation script.

Run the install script from a command window (Windows 2000) or a UNIX shell prompt and follow the onscreen prompts to install the FLL infrastructure database objects. For an initial installation of the objects into a schema, the steps must be run in the order that they are present on the screen.

```
E:\> installinfra
This will install infrastructure objects for the OFLL schema.
Here is a list of CRITICAL environment variables and their settings:

PATH=E://extras/unixutils/bin;E://extras/unixutils/usr/local/wbin;D:/ORA9IR2/
bin
ORACLE_HOME=D:\ORA9IR2
ORACLE_SID=DBKLS
TNS_ADMIN=D:\ORA9IR2\NETWORK\ADMIN
OFLI_HOME=D:\OFLI

With the above environment, you should be able start SQL*Plus and connect
to the database. Do not continue if you cannot. Correct the environment
and restart this script when it is correct

Also, you must have already created the FLL Oracle schema and
any and all tablespaces you will be using. The create table commands
used in this script will make use of a set of storage parameter SQL
files that are used to assign tables to tablespaces. The files are
in E://sql and they MUST be edited before you start.
The tables are grouped as follows:

  GROUP          DESCRIPTION
  -----
  org             origination
  svc             servicing
  cmn             common
  txn             transaction
  api             import/conversion
```

```
adm          setup/administration
arc          archive
```

Please make sure that you have entered in valid tablespace names in all of the storage\_parm files before you begin.

Okay to continue? (y/n): y

Log files will be located in D:\OFLI\logs\fl1\_install\_logs

.....

#### Database Object Installation

The following items are available for installation:

0. shutdown services
1. database types (164)
2. database libraries (12)
3. database tables (947)
4. common database views (3)
5. engine views (1008)
6. database package specs (2276)
7. form views (826)
8. database package bodies (2276)
9. database indexes (1390)
10. install version info
11. Quit

:

---

**NOTE:** Option #2 will ask for a directory where the FLL shared libraries are installed. The installinfra script will automatically copy the shared libraries into the **OFLI\_HOME/lib** directory. Unless they have been moved elsewhere, supply **OFLI\_HOME/lib** as the answer when prompted.

---

---

**NOTE:** Option #10 will ask for the name and password of the SYS user. This is used to create a SYS owned PL/SQL package that is used by the application to disconnect dormant and/or idle users. This step relies on Oracle's remote password authentication feature. If it is not in use, the step will fail and the SQL script will have to be run manually by an authorized user. The script is named *installsysobjects.sql* and it is located in the *sys\_objects* directory on the installation media.

---

## 1.8 Install the Application Seed Data and Set Passwords

### ◆ Load the application seed data.

The application requires a certain amount of seed data for basic operation. This seed data has been supplied in a SQL script located in the `seed_data` directory at the top level of the installation media. The seed data is contained in three files --`dml_combination_seed_data.sql`, `dml_sample_seed_data.sql`, and `dml_system_seed_data.sql`—located within a country specified subfolder of the `seed_data` folder. Only the combination and system seed data is required for a FLL installation. The sample data can be used to help put together training or demo installation. Do not use the sample data unless instructed to do so. Use SQL\*Plus to load the application seed data.

```
$ sqlplus

SQL*Plus: Release 9.2.0.4.0 - Production on Wed Jan 7 14:01:02 2004
Copyright (c) 1982, 2002, Oracle Corporation. All rights reserved.

Enter user-name: OFLL/OFLL

Connected to:
Oracle9i Enterprise Edition Release 9.2.0.4.0 - Production
With the Partitioning, OLAP and Oracle Data Mining options
JServer Release 9.2.0.4.0 - Production

SQL> @dml_combination_seed_data
(insert progress feedback messages omitted)
SQL> commit;
```

### ◆ Load ZIP code data

The application database contains a table of U.S. Postal Service ZIP codes and Netherland postal codes that are used to assist and validate applicant and customer addresses. The ZIP code data is separate from the application seed data because of its size. It is loaded using the Oracle SQL\*Loader utility. The data file and SQL\*Loader utility control file have been provided in the `zip_codes` directory on the installation media. Use the SQL\*Loader utility to load the zip code data.

Example:

```
$ sqlldr control=zip_ls.ctl log=/tmp/zip.log userid=OFLL/OFLL@dbkls

SQL*Loader: Release 9.2.0.4.0 - Production on Mon Jan 26 10:27:11 2004

Copyright (c) 1982, 2002, Oracle Corporation. All rights reserved.
```

```
Commit point reached - logical record count 937
Commit point reached - logical record count 1838
Commit point reached - logical record count 1947
Commit point reached - logical record count 2494
Commit point reached - logical record count 2892
Commit point reached - logical record count 2982
.
. (lines omitted)
.
Commit point reached - logical record count 77236
Commit point reached - logical record count 77301
Commit point reached - logical record count 77320
$
```

◆ **Update the application passwords.**

1. Update the Oracle Flexcube Lending And Leasing system parameter that contains the application schema owner password. After the seed data has been loaded, update the application schema owner password that was included in the seed data to the password chosen when the Oracle user was created. Use the *set\_ora\_schema\_password.sql* script located in the *dba\_utils* folder on the installation media to set the password.

Example:

```
$ sqlplus

SQL*Plus: Release 9.2.0.4.0 - Production on Wed Jan 7 14:01:02 2004
Copyright (c) 1982, 2002, Oracle Corporation. All rights reserved.

Enter user-name: OFLL/OFLL

Connected to:
Oracle9i Enterprise Edition Release 9.2.0.4.0 - Production
With the Partitioning, OLAP and Oracle Data Mining options
JServer Release 9.2.0.4.0 - Production

SQL> @set_ora_schema_password
Enter New Schema Password: OFLL

PL/SQL procedure successfully completed.
SQL> commit;

Commit complete.
```

## 1.9 Modify the External Program Environment File

Oracle Flexcube Lending And Leasing has the ability to run external (to the database) programs at the operating system level. These programs require a properly configured environment in order for them to start up and function properly. A sample environment file was created when the **OFLI\_HOME** directory was created by the *installhomedir* script program. The file is named *dbklsenv* and it is located in the **OFLI\_HOME** directory. Review this file and make changes as necessary to support running operating system commands. Examples of programs that may be run are the *gs* program (part of the GhostScript utility) and the Oracle Reports Runtime engine (*rwrn60*). The *gs* command will only be needed by the fax-out and email-out document interface and the *rwrn60* command will only be used if reports will be executed locally on the database server instead of by a reports server.

---

**NOTE:** The name and location of this file is a configurable FLL application parameter (CMN\_SER\_ENVIRONMENT\_FILE). See the Modify FLL System Parameters section for notes on setting this parameter.

---

## 1.10 Create the Oracle Flexcube Lending and Leasing Directory Objects

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

### ◆ Create the fax-in interface directory object(s).

Use SQL\*Plus to create the fax-in interface directory objects. Choose a name that identifies the usage, company, and branch for the directory object. The Oracle Flexcube Lending And Leasing abbreviation for the fax-in interface is FIN. Since directory objects are global to the entire database (not just the schema), it is also suggested that the schema name or identifier is also used in the name to set it apart from other directory objects. Choose a directory path with enough storage space to handle the expected volume of fax images. Plan on 30-50K of storage space per image. A suggested location is the *fin\_storage* directory that was created in the **OFLI\_HOME** directory when it was installed.

Example:

```
$ sqlplus

SQL*Plus: Release 9.2.0.4.0 - Production on Wed Jan 7 14:01:02 2004
Copyright (c) 1982, 2002, Oracle Corporation. All rights reserved.

Enter user-name: OFLI/OFLI

Connected to:

Oracle9i Enterprise Edition Release 9.2.0.4.0 - Production
With the Partitioning, OLAP and Oracle Data Mining options
JServer Release 9.2.0.4.0 - Production
```

```
SQL> create or replace directory FIN_OFLL_ALL_ALL as
'/home/OFLL/fin_storage';

Directory created.

SQL>
```

◆ **Create the correspondence interface directory object(s).**

Use SQL\*Plus to create the correspondence interface directory objects. Choose a name that identifies the usage, company, and branch for the directory object. The Oracle Flexcube Lending And Leasing abbreviation for the correspondence interface is COR. Since directory objects are global to the entire database (not just the schema), it is also suggested that the schema name or identifier is also used in the name to set it apart from other directory objects. Choose a directory path with enough storage space to handle the expected volume of correspondences. A suggested location is the *cor\_storage* directory that was created in the **OFLL\_HOME** directory when it was installed.

◆ **Create the account documents interface directory object(s).**

Use SQL\*Plus to create the account documents interface directory objects. Choose a name that identifies the usage, company, and branch for the directory object. The Oracle Flexcube Lending And Leasing abbreviation for the account documents interface is DOT. Since directory objects are global to the entire database (not just the schema), it is also suggested that the schema name or identifier is also used in the name to set it apart from other directory objects. Choose a directory path with enough storage space to handle the expected volume of account documents. A suggested location is the *dot\_storage* directory that was created in the **OFLL\_HOME** directory when it was installed.

◆ **Create the log directory object(s).**

Use SQL\*Plus to create the log directory objects. Choose a name that identifies the usage, company, and branch for the directory object. The Oracle Flexcube Lending and Leasing abbreviation for the logs is LOG. Since directory objects are global to the entire database (not just the schema), it is also suggested that the schema name or identifier is also used in the name to set it apart from other directory objects. Choose a directory path with enough storage space to handle the expected volume of logs. A suggested location is the logs directory that was created in the **OFLL\_HOME** directory when it was installed.

## 1.11 Modify Oracle Flexcube Lending and Leasing System Parameters

There are several system parameters supplied in the seed data that require modification to fit the local installation environment. Two of the parameters must be set manually (using SQL\*Plus), but the rest can wait until the 9iAS server is installed and configured so that they can be set by using the application system parameter setup screen (Setup→Administration→System→Parameters).

◆ **Set the CMN\_SCHEMA\_NAME and CMN\_SERVER\_HOME parameter values.**

As a minimum, the CMN\_SCHEMA\_NAME and CMN\_SERVER\_HOME parameters must be set manually before the application screens can be used to set the rest of the parameters.

CMN\_SCHEMA\_NAME

Set it to the username of the application owner schema.

CMN\_SERVER\_HOME

Set it to the **OFLI\_HOME** directory.

Example:

```
$ sqlplus

SQL*Plus: Release 9.2.0.4.0 - Production on Wed Jan 7 14:01:02 2004
Copyright (c) 1982, 2002, Oracle Corporation. All rights reserved.

Enter user-name: OFLL/OFLL

Connected to:
Oracle9i Enterprise Edition Release 9.2.0.4.0 - Production
With the Partitioning, OLAP and Oracle Data Mining options
JServer Release 9.2.0.4.0 - Production

SQL> update system_parameters set syp_value = 'OFLI' where syp_parameter_cd =
'CMN_SCHEMA_NAME';

1 row updated.

SQL> update system_parameters set syp_value = '/home/OFLI' where
syp_parameter_cd = 'CMN_SERVER_HOME';

1 row updated.

SQL> commit;
```

◆ **Set the remaining system parameters manually or from the setup screen.**

Set these parameters located on the Setup→Administration→System→Parameters screen. This is not a complete list of system parameters, this is a list of system parameters that relate to installation details. The other parameters relate to application business functionality. The values for many of these parameters may not be known until after the 9iAS server has been installed and configured.

**CMN\_SCHEMA\_ID**

Set it to the user\_id for the application owner schema.

i.e. `SELECT USER_ID from ALL_USERS WHERE USERNAME='application_owner';`

**CMN\_REGION\_ID**

Set it to the identifier for your geographic region. Set it to 1 for US and 2 for The Netherlands.

**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.

**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 **OFLI\_HOME** directory (i.e. `C:\OFLI\tmp` or `/home/OFLI/tmp`).

**JSV\_USE\_REPORTS\_SERVER**

Set to Yes if the reports server will be used when running reports from the job service (recommended). Generally, the reports server is used to run reports from the job service if the Oracle Reports product is not installed on the same machine as the Oracle Flexcube Lending And Leasing database (default implementation). If the Oracle Reports product is installed on the same server as the database, this parameter can be set to No to use the Reports Runtime Engine to run reports.

**JSV\_REPORT\_ARCHIVE\_DIRECTORY**

Set to a directory that will be used to store Oracle Flexcube Lending And Leasing report PDFs. 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 June 12, 2002, the PDF file will be located in:

`JSV_REPORT_ARCHIVE_DIRECTORY/reports/2002/06/12`

#### JSV\_REPORTS\_SERVER\_URL

If JSV\_USE\_REPORTS\_SERVER is set to Yes, set this to the URL to the CGI program that the job service should use when running a non-archived report. Non-archive 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 as chosen by the user or as configured in the job setup. The parameter value will generally have the form:

<http://hostname:port/FLL120/xmlpwebservlet>

#### JSV\_REPORTS\_SERVER\_CONFIG

If JSV\_USE\_REPORTS\_SERVER is set to Yes, set this to the configuration identifier from the reports server *dbkCGIcmd.dat* file that the job service should use when running a non-archived report.

#### JSV\_ARCHIVE\_SERVER\_CONFIG

If JSV\_USE\_REPORTS\_SERVER is set to Yes, set this to the configuration identifier from the reports server *dbkCGIcmd.dat* file that the job service should use when running an archived report. This can have the same value as the JSV\_REPORTS\_SERVER\_CONFIG 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.

#### UIX\_REPORTS\_SERVER\_URL

Set this to the URL of the CGI program that the user interface should use when running a report. This should be a relative URL (the <http://servername> part is not needed) and it will generally have the form:

<http://hostname:port/FLL120/xmlpwebservlet>

This can have the same value as the relative portion of the JSV\_REPORTS\_SERVER\_URL parameter. If a relative URL is used, the hostname portion of the URL will be automatically taken from the URL used by the FLL thin-client user interface applet. A non-relative URL can be used to direct report requests to a different server than the one used by the FLL user interface applet.

#### UIX\_REPORTS\_SERVER\_CONFIG

Set this to the configuration identifier from the reports server *dbkCGIcmd.dat* file that the user interface should use when running a report.

#### ◆ Set 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→Parameters screen. These parameters are company level parameters, which mean that a fax-in service can be configured for each company in Oracle Flexcube Lending And Leasing.

#### 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.

#### FIN\_POP\_USERNAME

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

#### 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.

#### FIN\_STORAGE\_DIRECTORY

Set to the name of the Oracle *directory object* that was created during installation that 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 out on the operating system 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.

#### 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 **OFL\_HOME/tmp**.

◆ **Set 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→Parameters screen. These parameters are company level parameters, which means that a correspondence interface can be configured for each company in Oracle Flexcube Lending And Leasing.

#### COR\_STORAGE\_DIRECTORY

Set to the name of the Oracle *directory object* that was created during installation that 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 out on the operating system 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.

◆ **Set 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→Parameters screen. These parameters are company level parameter, which means that an account documents interface can be configured for each company in Oracle Flexcube Lending and Leasing.

#### DOT\_STORAGE\_DIRECTORY

Set to the name of the Oracle *directory object* that was created during installation that 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 out on the operating system 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.

◆ **Set the log storage company parameters manually or from the setup screen.**

To view the logs, set the parameters located on the Setup→Administration→Company→Parameters screen.

## DOT\_STORAGE\_DIRECTORY

Set to the name of the Oracle *directory object* that was created during installation that defines where the logs will be stored. The log 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 out on the operating system 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.

### **1.12 Set the Oracle JVM File Permissions**

The FLL correspondence interface uses the built-in Oracle Java Virtual Machine (JVM) to create subdirectories below the top-level correspondence storage directory (defined by the FLL COR\_STORAGE\_DIRECTORY parameter). 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. 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 FLL COR\_STORAGE\_DIRECTORY parameters and give read, write, and delete privileges to the directory named by the directory object and all directories below it.

#### ◆ **Run the *set\_java\_perms.sql* script.**

After the COR\_STORAGE\_DIRECTORY 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.



Flexcube Lending and Leasing

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Oracle Corporation  
World Headquarters  
500 Oracle Parkway  
Redwood Shores, CA 94065  
U.S.A.

Worldwide Inquiries:

Phone: +1.650.506.7000

Fax: +1.650.506.7200

[www.oracle.com/financial\\_services/](http://www.oracle.com/financial_services/)

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