Oracle Utilities Smart Grid Gateway

Database Administrator's Guide

Release 2.1.0 Service Pack 2

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Oracle Utilities Smart Grid Gateway Database Administrator's Guide

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Preface

This guide provides instructions for installing and maintaining the database for Oracle Utilities Smart Grid Gateway.

This preface contains these topics:

Audience

Oracle Utilities Smart Grid Gateway Database Administrator's Guide is intended for database administrators who will be installing and maintaining the database for Oracle Utilities Smart Grid Gateway.

Related Documents

For more information, see these Oracle documents:

- *Oracle Utilities Smart Grid Gateway Quick Install Guide*
- *Oracle Utilities Smart Grid Gateway Installation Guide*

Updates to this Documentation

This documentation is provided with the version of the product indicated. Additional and updated information about the operations and configuration of the product is available from the Knowledge Base section of My Oracle Support (http://support.oracle.com). Please refer to My Oracle Support for more information.

Conventions

The following text conventions are used in this document:

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

Chapter 1

Database Overview

This section provides an overview of the Oracle Utilities Smart Grid Gateway database, including:

- Supported Database Platforms
- Database Maintenance Rules

Supported Database Platforms

This section defines the platforms on which Oracle Utilities Smart Grid Gateway is verified to operate.

Supported Platforms Summary Table

Oracle Utilities Smart Grid Gateway is certified on the following platforms:

Platform	Database Version
AIX 7.1 TL01 (POWER 64-bit)	Oracle Database Server 11.2.0.1+ (64-bit) Oracle Database Server 12.1.0.1+
Oracle Enterprise Linux 5.8/6.2/6.3/6.4/6.5 x86_64 (64-bit) (Based on Red Hat Enterprise Linux (64-bit))*	Oracle Database Server 11.2.0.1+ (64-bit) Oracle Database Server 12.1.0.1+
Oracle Solaris 10 or Oracle Solaris 11 (SPARC 64-bit)	Oracle Database Server 11.2.0.1+ (64-bit) Oracle Database Server 12.1.0.1+
Windows Server 2008 R2 and 2012 R2 (x86_64 64-bit)	Oracle Database Server 11.2.0.1+ (64-bit) Oracle Database Server 12.1.0.1+

* Oracle Utilities Smart Grid Gateway is tested and supported on the versions of Oracle Linux specified. Because Oracle Linux is 100% userspace-compatible with Red Hat Enterprise Linux, Oracle Utilities Smart Grid Gateway also is supported on Red Hat Enterprise Linux for this release.

The following Oracle Database Server Edition is supported:

- Oracle Database Enterprise Edition

  Note: Oracle Database Enterprise Edition and the Partitioning and Advanced Compression options are strongly recommended in all situations.

Refer to My Oracle Support for additional details.

Database Maintenance Rules

The database supplied with the product consists of the following elements:

- A set of users to administrate, execute and read the database schema provided.
- A set of database roles to implement security for each of the users provided.
- A tablespace and a schema containing the base database objects used by the product.

The installation of these components is outlined in the installation section of this document.

Permitted Database Changes

During and after installation of the product the following changes may be performed by the database administrator personnel on site:

- Users supplied by product may be changed according to the site standards.
- Database objects may be added to the schema according to database naming standards outlined later in this document.
- Database views and indexes may be created against base database objects. Please make sure to prefix new items with "CM" (for customer modification).
- Database storage attributes for base indexes and base tables may be changed according to site standards and hardware used.
- Tablespace names, attributes and locations may be changed according to site standards.
- Database topology (that is, base table/index to tablespace, tablespace to data file, data file to location) may be altered according to tuning and/or site standards.
- Database triggers may be created against base database objects unless they attempt to contravene base data integrity rules.
- Database initialization and parameter settings may be altered according to site standards unless otherwise advised by Oracle Support or outlined in this document.

Non-Permitted Database Changes

In order to maintain operability and upgradeability of the product, during and after the installation of the product the following changes may *not* be performed by the database administration personnel on site:

- Base objects must not be removed or altered in the following ways:
  - Columns in base tables must not be altered in anyway (altered, removed or added).
  - Columns in Indexes must not be altered or removed.
  - Tables must not be renamed or removed.
  - Base views must not be renamed or removed.
  - Base Triggers and Sequences must not be renamed or removed.
  - Base indexes must not be altered or removed.

Chapter 2

Installing the Version 2.1.0 Service Pack 2 Database

This section provides the instructions for installing the Oracle Utilities Smart Grid Gateway database.

This section includes:

Installation Overview

Refer to Supported Database Platforms for information about the supported platforms on which Oracle Utilities Smart Grid Gateway is verified to operate.

The following types of installation is available for Oracle Utilities Smart Grid Gateway:

- Initial Install — a database with no demo data.
- Upgrade Install — a database upgrade from version 2.0.0.9 or 2.1.0.1 to version 2.1.0.2.
- Demo Install — a database populated with demo data.

The database installation requires a supported version of the Java Development Kit to be installed on the Windows desktop where the install package is staged and run from. Refer to the Supported Platform section of the Oracle Utilities Smart Grid Gateway Installation Guide for the required version of Java.

For an Initial Install or Demo Install you will create an empty database on the Unix or Windows server and then populate the database with data. For a database Upgrade Install you will upgrade your current Oracle Utilities Smart Grid Gateway database.

Review the Storage.xml file prior to an Initial Install or Upgrade Install. Information in this file is used by ORADBI while installing and upgrading the Oracle Utilities Smart Grid Gateway database objects.

For optimum storage allocation, database administrators should create multiple tablespaces with extents sized to store different types of tables/indexes. They can then edit this file before each upgrade and install process, to spread tables and indexes across these tablespaces. Tables and indexes can be created in parallel by editing degree of parallelism.

Tablespace, storage options, securefile options, Advanced Compression, and parallel information are used only for new objects. Therefore, for initial installs, information for each object should be reviewed.For upgrades, only tablespace information for objects added in the current release needs to be reviewed. Be careful while editing the Storage.xml file. Make sure that tablespace names being used exist in the database. Do not change the basic format of this file.

> **Note:** Prior to the installation of the database schema for the product, please ensure that the Database Management System software is installed according to your site standards and the installation guide provided by the database vendor.

Initial Install

This section describes how to install the database components of Oracle Utilities Smart Grid Gateway, including:

- Copying and Decompressing Install Media
- Creating the Database
- Installing the CISADM Schema
- Postinstallation Tasks

Copying and Decompressing Install Media

To copy and decompress the Oracle Utilities Smart Grid Gateway database:

1. Download the Oracle Utilities Smart Grid Gateway V2.1.0.2.0 Oracle database from the Oracle Software Delivery Cloud for your adapter:
   - Oracle Utilities Smart Grid Gateway Adapter Development Kit
   - Oracle Utilities Smart Grid Gateway Adapter MV-90 Adapter for Itron
   - Oracle Utilities Smart Grid Gateway Adapter for Echelon
   - Oracle Utilities Smart Grid Gateway Adapter for Itron OpenWay
   - Oracle Utilities Smart Grid Gateway Adapter for Sensus
   - Oracle Utilities Smart Grid Gateway Adapter for Landis+Gyr
   - Oracle Utilities Smart Grid Gateway Adapter for Silver Spring Networks
2. Unzip the SGG-V2.1.0.2.0-Database.zip file to a temporary folder. This file contains the database components required to install the Oracle Utilities Smart Grid Gateway database.

Creating the Database

> **Note:** You must have Oracle Database Server 11.2.0.1 or a higher version installed on your machine in order to create the database.

The database can be created using either the Database Configuration Assistant (DBCA) or you can create a database using the database creation tool (cdxdba.plx for UNIX or CDXDBA.exe for Windows) that is packaged with the product.

Using DBCA to Create the Database

It is recommended that you use the Database Configuration Assistant (DBCA) for creating an Initial Install or production database. Once the database is created the instance configuration can be done according to the environment needs and based on your production recommendations.

The script for creating the product users is located under the relevant database version subdirectory of the DatabaseCreation directory. To create the product users:

1. You must create tablespace CISTS_01 before running the script for creating the product users.
2. To create the product users, execute the …\SGG\DatabaseCreation\Unix\11g\users.sql after logging into the database as sys user.

Installing the CISADM Schema

You will install the Oracle Utilities Application Framework V4.2.0.2 and then Oracle Utilities Service and Measurement Data Foundation 2.1.0.2 prior to Oracle Utilities Smart Grid Gateway 2.1.0.2. The files for Oracle Utilities Application Framework installation are located in the FW42020 folder.

Installing Oracle Utilities Application Framework 4.2.0 Service Pack 2

To install Oracle Utilities Application Framework Version 4.2.0 service pack 2, follow these steps:

1. Run OraDBI.exe from the ..\FW42020\Install-Upgrade directory. Please run the utility from the command prompt.

   Note: Be sure to run OraDBI.exe from a Window 32-bit or 64-bit desktop that has the Oracle Database 11g Release 2 Client (11.2.0.1), 32-bit and Java Development Kit Version 6.0 Update 20 or later installed. The database should already be listed in the local file tnsnames.ora

The utility prompts you to enter values for the following parameters:

- Name of the target database: <DB NAME>
- Name of the Database User Name: <CISADM>
- Password of the User Name: <Password for CISADM>
- Location of Java Home (e.g. C:\Java\jdk1.6.0_20): <Java Home>
- Location of TUGBU Jar files (e.g. C:\FW42020\JarFiles): <..\FW42020\jarfiles>
- Oracle User with read-write privileges to the Database Schema: <CISUSER>
- Oracle User with read-only privileges to the Database Schema: <CISREAD>
- Oracle database role with read-write privileges to the Database Schema: <CIS_USER>
- Oracle database role with read-only privileges to the Database Schema: <CIS_READ>
- Name of the owner of the Database Schema: <CISADM>
- Enter the password for the CISADM schema (or hit ENTER to quit): <CISADM user's password>
- Re-enter the password: <CISADM user's password>

After setting up roles and users, the utility continues upgrading schema and system data definitions. If an error occurs while executing an SQL or another utility, it logs and displays the error message and allows you to re-execute the current step.

Installing Prerequisite Database Hot Fixes

Before installing Oracle Utilities Smart Grid Gateway, you must install Oracle Utilities Framework Prerequisite database hot fixes as described below.

Apply prerequisite Framework DB single fixes. See the *Oracle Utilities Smart Grid Gateway Installation Guide* for more details.

Apply prerequisite Framework database hot fixes by running the CDXPatch.exe utility.

The utility prompts you for the value of the following parameters:

- The target database type (O/M/D) [O]: O
- The name of the user that owns the database objects: <CISADM>
- The password for the user (in silent mode): <Password for CISADM user>
- The name of the Oracle database: <DB Name>

CDXPatch.exe can be executed by selecting it from Windows explorer, or by using a command line from a DOS window. Use the option "-h" to see the help.

After the patches are processed, if the utility prompts you to create security for new objects, enter "N" because security for new objects is generated in subsequent steps during installation of Oracle Utilities Smart Grid Gateway Base.

Installing Oracle Utilities Service and Measurement Data Foundation Database Component

Before installing Oracle Utilities Smart Grid Gateway, you must install Oracle Utilities Service and Measurement Data Foundation. The following procedure described below to install the database component of Oracle Utilities Service and Measurement Data Foundation database.

1. Run OraDBI.exe from the ..\SMDF\Install-Upgrade directory. The utility prompts you to enter values for the following parameters:
    - Name of the target database: <DB NAME>
    - Name of the Database User Name: <CISADM>
    - Password of the User Name: <Password for CISADM>
    - Location of Java Home (e.g. C:\Java\jdk1.6.0_20): <Java Home>
    - Location of TUGBU Jar files (e.g. C:\FW42020\JarFiles): <..\FW42020\jarfiles>
    - Oracle User with read-write privileges to the Database Schema: <CISUSER>
    - Oracle User with read-only privileges to the Database Schema: <CISREAD>
    - Oracle database role with read-write privileges to the Database Schema: <CIS_USER>
    - Oracle database role with read-only privileges to the Database Schema: <CIS_READ>
    - Name of the owner of the Database Schema: <CISADM>
    - Enter the password for the CISADM schema (or hit ENTER to quit): <CISADM user's password>
    - Re-enter the password: <CISADM user's password

Installing Oracle Utilities Smart Grid Gateway Database Component

Follow the procedure below to install the database component of Oracle Utilities Smart Grid Gateway.

1. Run OraDBI.exe from the ..\SGG\Install-Upgrade directory. The utility prompts you to enter values for the following parameters:
    - Name of the target database: <DB NAME>
    - Name of the Database User Name: <CISADM>
    - Password of the User Name: <Password for CISADM>
    - Location of Java Home (e.g. C:\Java\jdk1.6.0_20): <Java Home>
    - Location of TUGBU Jar files (e.g. C:\FW42020\JarFiles): <..\FW42020\jarfiles>
    - Oracle User with read-write privileges to the Database Schema: <CISUSER>
    - Oracle User with read-only privileges to the Database Schema: <CISREAD>
    - Oracle database role with read-write privileges to the Database Schema: <CIS_USER>
    - Oracle database role with read-only privileges to the Database Schema: <CIS_READ>
    - Name of the owner of the Database Schema: <CISADM>
    - Enter the password for the CISADM schema (or hit ENTER to quit): <CISADM user's password>
    - Re-enter the password: <CISADM user's password>

If you chose to continue, OraDBI first checks for the existence of each of the users specified and prompts for their password, default tablespace, and temporary tablespace.

After setting up roles and users, the utility continues upgrading schema and system data definitions. If an error occurs while executing an SQL or another utility, it logs and displays the error message and allows you to re-execute the current step.

OraDBI Performs the Following Tasks

- Interacts with the user to collect information about the name of Oracle account that will own the application schema (for example, CISADM), password of this account, the name of the Oracle account that the application user will use (for example, CISUSER), and the name of the Oracle account that will be assigned read-only privileges to the application schema (for example, CISREAD).
- Connects to the database as CISADM account, checks whether the user already has the application schema installed to verify whether this is an initial installation.
- Verifies whether tablespace names already exist in the Storage.xml file (if not, the process will abort).
- Installs the schema, installs the system data, and configures security.
- Maintains upgrade log tables in the database.
- Updates release ID when the upgrade is completed successfully.
- If an error occurs while executing a SQL script or another utility, it logs and displays the error message and allows you to re-execute the current step. Log files OraDBI###.log are created in the same folder as OraDBI and contains all the SQL commands executed against the database along with the results. The log files are incremental so that the results are never overwritten. If warning messages are generated during the upgrade, OraDBI prompts the user at the end of the process. Users should check the log files to verify the warning messages. Warning messages are only alerts and do not necessary mean a problem exists.
- Stores the Schema owner and password in the feature configuration table. The password is stored in encrypted format.

Postinstallation Tasks

Database Statistics Generation

During an install process new database objects may be added to the target database. Before starting to use the database, generate the complete statistics for these new objects by using the DBMS_STATS package.

Enable USER_LOCK Package

For In-bound web services to work the USER_LOCK must be enabled at the database level. This is a one time step. If this is not already enabled please do so using the following steps.

1. Login as SYS user
2. On SQL prompt run:

   ```
   @?/rdbms/admin/userlock.sql
   ```

3. Grant permission by running following SQL:

   ```
   grant execute on USER_LOCK to public;
   ```

Please note that grant can also be made to the database user which the Application connects to only instead of to public. For example, cisuser.

Create Activity Statistics Materialized view

To improve the performance of drill down queries, use the following procedure to create the materialized view and then refresh the materialized view.

Go to ..SMDF\Post-Upgrade and run the scripts below.

1. Login as CISADM user.
2. On SQL prompt run:

```
@D1_ACTIVITY_STAT_MV.sql
@D1_MV_REFRESH_PROC.sql
```

Configuring Security

The configuration utility and scripts are located in the .\SGG\Security folder. To configure security, follow these steps to execute the OraGenSec.bat utility:

> **Note:** Database vault must be disabled before running this utility.

1. Navigate to the ..\SGG\Security folder.
2. Edit the OraGenSec.bat file and replace the parameter database-name with the name of your database. This file is provided for your convenience and executes the Oragensec.exe utility based on the parameters passed into it.

   > **Note:** Be sure to run OraGenSec.bat from a Windows 32-bit desktop that has the Oracle 11.2.0.1 client (or higher) installed. Your database should already be listed in the local file tnsnames.ora.

   The script will execute as the following:

   ```
   oragensec -d CISADM,CISADM,database-name -r CIS_READ,CIS_USER -a A
   -u CISUSER,CISREAD
   ```

3. Execute the edited OraGenSec.bat file. The utility configures security for the CISADM schema objects

Upgrade Install

This section describes how to upgrade the database components of Oracle Utilities Smart Grid Gateway, including:

- Supported Upgrade Paths
- Installing the CISADM Schema
- Postinstallation Tasks

Supported Upgrade Paths

Direct upgrade to Oracle Utilities Smart Grid Gateway V2.1.0.2 is supported from the following versions:

- Oracle Utilities Smart Grid Gateway V2.0.0.9
- Oracle Utilities Smart Grid Gateway V2.1.0.1

Installing the CISADM Schema

The following section assumes an existing Oracle Utilities Smart Grid Gateway version 2.0.0.9 installation on top of an Oracle Utilities Application Framework version 4.1.0.2 installation or an existing Oracle Utilities Smart Grid Gateway version 2.1.0.1 installation on top of an Oracle Utilities Application Framework version 4.2.0.1 installation.

Install Oracle Utilities Application Framework V4.2.0.2.0 and prerequisite single fixes prior to installing Oracle Utilities Smart Grid Gateway 2.1.0.2.0.

1. The files for Oracle Utilities Application Framework installation are located in the FW42020 folder.
2. Apply prerequisite Framework DB single fixes. See the *Oracle Utilities Smart Grid Gateway Installation Guide* for more details.

Install FW V4.2.0.2.0 by running the OraDBI.exe from under the FW42020/Install-Upgrade folder.

The files for the Install of Oracle Utilities Smart Grid Gateway 2.1.0.2.0 are located in the Install-Upgrade folder under SMDF and SGG.

The process prompts you for the names of three database users:

- A user that will own the application schema (for example, CISADM).
- A user that has read-write (select/update/insert/delete) privileges to the objects in the application schema. The application will access the database as this user. (for example, CISUSER).
- A user with read-only privileges to the objects in the application schema. (for example, CISREAD).
- A database role that has read-write (select/update/insert/delete) privileges to the objects in the application schema. The application will access the database as this user. (for example, CIS_USER).
- A database role with read-only privileges to the objects in the application schema. (for example, CIS_READ).
- Location for jar files. (The Jar files are bundled with the database package.)
- Java Home (For example, C:/Java/jdk1.6.0_18)

Install Oracle Utilities Application Framework V4.2.0.2.0

1. Run OraDBI.exe from the ..\FW42020\Install-Upgrade directory. Please run the utility from the command prompt.

   Note: Be sure to run OraDBI.exe from a Window 32-bit or 64-bit desktop that has the Oracle Database 11g Release 2 Client (11.2.0.1), 32-bit and Java Development Kit Version 6.0 Update 20 or later installed. The database should already be listed in the local file tnsnames.ora

2. The utility prompts you to enter values for the following parameters:

   - Name of the target database: <DB NAME>
   - Name of the Database User Name: <CISADM>
   - Password of the User Name: <Password for CISADM>
   - Location of Java Home (e.g. C:\Java\jdk1.6.0_20): <Java Home>
   - Location of TUGBU Jar files (e.g. C:\FW42020\JarFiles): <..\FW42020\jarfiles>
   - Oracle User with read-write privileges to the Database Schema: <CISUSER>
   - Oracle User with read-only privileges to the Database Schema: <CISREAD>
   - Oracle database role with read-write privileges to the Database Schema: <CIS_USER>
   - Oracle database role with read-only privileges to the Database Schema: <CIS_READ>
   - Name of the owner of the Database Schema: <CISADM>
   - Enter the password for the CISADM schema (or hit ENTER to quit): <CISADM user's password>
   - Re-enter the password: <CISADM user's password>

   After setting up roles and users, the utility continues upgrading schema and system data definitions. If an error occurs while executing an SQL or another utility, it logs and displays the error message and allows you to re-execute the current step.

Install Prerequisite Database Hot Fixes

Before installing Oracle Utilities Smart Grid Gateway, you must install Oracle Utilities Framework Prerequisite database hot fixes as described below. Apply prerequisite Framework DB single fixes. See the Oracle Utilities Smart Grid Gateway *Installation Guide* for more details.

Apply the prerequisite Framework database fixes by running the CDXPatch.exe.

The utility prompts you for the value of the following parameters:

- The target database type (O/M/D) [O]: O
- The name of the user that owns the database objects: <CISADM>
- The password for the user (in silent mode): <Password for CISADM user>
- The name of the Oracle database: <DB Name>

CDXPatch.exe can be executed by selecting it from Windows explorer, or by using a command line from a DOS window. Use the option "-h" to see the help.

After the patches are processed, if the utility prompts you to create security for new objects. enter "N" because security for new objects is generated in subsequent steps during installation of Oracle Utilities Smart Grid Gateway.

Install Oracle Utilities Service and Measurement Data Foundation Database Component

Before installing Oracle Utilities Smart Grid Gateway, you must install Oracle Utilities Service and Measurement Data Foundation.

The following procedure describes how to install the database component of Oracle Utilities Service and Measurement Data Foundation database.

1. Run OraDBI.exe from the ..\SMDF\Install-Upgrade directory. The utility prompts you to enter values for the following parameters:
    - Name of the target database: <DB NAME>
    - Name of the Database User Name: <CISADM>
    - Password of the User Name: <Password for CISADM>
    - Location of Java Home (e.g. C:\Java\jdk1.6.0_20): <Java Home>
    - Location of TUGBU Jar files (e.g. C:\FW42020\JarFiles): <..\FW42020\jarfiles>
    - Oracle User with read-write privileges to the Database Schema: <CISUSER>
    - Oracle User with read-only privileges to the Database Schema: <CISREAD>
    - Oracle database role with read-write privileges to the Database Schema: <CIS_USER>
    - Oracle database role with read-only privileges to the Database Schema: <CIS_READ>
    - Name of the owner of the Database Schema: <CISADM>
    - Enter the password for the CISADM schema (or hit ENTER to quit): <CISADM user's password>
    - Re-enter the password: <CISADM user's password>

Installing Oracle Utilities Smart Grid Gateway Database Component

Follow the procedure below to install the database component of Oracle Utilities Smart Grid Gateway.

1. Run OraDBI.exe from the ..\SGG\Install-Upgrade directory. The utility prompts you to enter values for the following parameters:
    - Name of the target database: <DB NAME>
    - Name of the Database User Name: <CISADM>
    - Password of the User Name: <Password for CISADM>
    - Location of Java Home (e.g. C:\Java\jdk1.6.0_20): <Java Home>
    - Location of TUGBU Jar files (e.g. C:\FW42020\JarFiles): <..\FW42020\jarfiles>
    - Oracle User with read-write privileges to the Database Schema: <CISUSER>
    - Oracle User with read-only privileges to the Database Schema: <CISREAD>
    - Oracle database role with read-write privileges to the Database Schema: <CIS_USER>
    - Oracle database role with read-only privileges to the Database Schema: <CIS_READ>
    - Name of the owner of the Database Schema: <CISADM>
    - Enter the password for the CISADM schema (or hit ENTER to quit): <CISADM user's password>
    - Re-enter the password: <CISADM user's password>

If you chose to continue, OraDBI first checks for the existence of each of the users specified and prompts for their password, default tablespace, and temporary tablespace.

After setting up roles and users, the utility continues upgrading schema and system data definitions. If an error occurs while executing an SQL or another utility, it logs and displays the error message and allows you to re-execute the current step.

OraDBI performs the following tasks:

- Interacts with the user to collect information about the name of Oracle account that will own the application schema (for example, CISADM), password of this account and the name of the Oracle account that the application user will use (for example, CISUSER), and the name of the Oracle account that will be assigned read-only privileges to the application schema (for example, CISREAD).
- Connects to the database as CISADM account, checks whether the user already has the application schema installed to verify whether this is an initial installation.
- Verifies whether the upgrade path from the current release id to the target release id is supported by the upgrade.
- Verifies whether the tablespace names already exist in Storage.xml file (the process aborts, if not).
- Upgrades the schema, upgrades the system data, and configures security.
- Maintains upgrade log tables in the database.
- Updates release id when the upgrade is completed successfully.
- If an error occurs while executing a SQL script or another utility, it logs and displays the error message and allows you to re-execute the current step. Log files OraDBI###.log are created in the same folder as OraDBI and contains all the SQL commands executed against the database along with the results. The log files are incremental so that the results are never overwritten. If warning messages are generated during the upgrade, OraDBI prompts the user at the end of the process. Users should check the log files to verify the warning messages. Warning messages are only alerts and do not necessary mean a problem exists.
- Stores the Schema owner and password in feature configuration table. The password will be stored in encrypted format.

Postinstallation Tasks

Database Statistics Generation

During an install process, new database objects may be added to the target database. Before starting to use the database, generate the complete statistics for these new objects using the DBMS_STATS package.

Enable USER_LOCK Package

For In-bound web services to work the USER_LOCK must be enabled at the database level. This is a one time step. If this is not already enabled please do so using the following steps.

1. Login as SYS user
2. On SQL prompt run:

   ```
   @?/rdbms/admin/userlock.sql
   ```

3. Grant permission by running following SQL:

   ```
   grant execute on USER_LOCK to public;
   ```

Please note that grant can also be made to the database user which the Application connects to only instead of to public. For example, cisuser.

Create Activity Statistics Materialized view

To improve the performance of drill down queries, use the following procedure to create the materialized view and then refresh the materialized view.

Go to ..SMDF\Post-Upgrade and run the scripts below.

1. Login as CISADM user.
2. On SQL prompt run:

```
@D1_ACTIVITY_STAT_MV.sql
@D1_MV_REFRESH_PROC.sql
```

Configuring Security

The configuration utility and scripts are located in the .\SGG\Security folder. To configure security, follow these steps to execute the OraGenSec.bat utility:

> **Note:** Database vault must be disabled before running this utility.

1. Navigate to the ..\SGG\Security folder.
2. Edit the OraGenSec.bat file and replace the parameter database-name with the name of your database. This file is provided for your convenience and executes the Oragensec.exe utility based on the parameters passed into it.

   > **Note:** Be sure to run OraGenSec.bat from a Windows 32-bit desktop that has the Oracle 11.2.0.1 client (or higher) installed. Your database should already be listed in the local file tnsnames.ora.

   The script will execute as the following:

   ```
   oragensec -d CISADM,CISADM,database-name -r CIS_READ,CIS_USER -a A
   -u CISUSER,CISREAD
   ```

3. Execute the edited OraGenSec.bat file. The utility configures security for the CISADM schema objects

Consideration for Upgrade from Framework Versions Prior to Version 4.2.0 Service Pack 2

Customers upgrading from Framework versions prior to 4.2.0.2 need to run an upgrade script to trim the SRCH_CHAR_VAL column on the char tables. The search char value column is so far being populated with trailing spaces for Java-based objects for char types which are pre-defined values as well as foreign key values with user defined keys. This will result in empty results during “exact string” searches on SRCH_CHAR_VAL column. As a part of patch 16745968, this is fixed in the application but the existing data needs to be cleaned up.

The upgrade script “FW4202_Trim_SRCH_CHAR_VAL.sql” that is available in FW420 SP2 database blueprint upgrade folder can be used to perform this cleanup. This SQL should be executed by a schema owner and it will create a SQL file named "TRIM_SRCH_CHAR_VAL.sql". This SQL file ("TRIM_SRCH_CHAR_VAL.sql") is going to trim SRCH_CHAR_VAL columns of all the characteristics tables and will do this update operation in multiple chunks of key ranges. Only char types with pre-defined values as well as foreign key values with user defined keys will be updated in those char tables. Once sql-“FW4202_Trim_SRCH_CHAR_VAL.sql” is executed it cannot be re-executed.

> **Note:** This is only needed during upgrades from FW versions below 420 SP2. It should NOT be run in an initial install environment.

Installing the upgrade script to trim the SRCH_CHAR_VAL column on the char tables

1. Login as CISADM user.
2. On SQL prompt, run FW4202_Trim_SRCH_CHAR_VAL.sql from the ..\FW42020\Install-Upgrade directory

```
@FW4202_Trim_SRCH_CHAR_VAL.sql
```

3. Run the generated TRIM_SRCH_CHAR_VAL.sql script

```
@TRIM_SRCH_CHAR_VAL.sql
```

Demo Install

This section describes how to install the demo database components for Oracle Utilities Smart Grid Gateway, including:

- Copying and Decompressing Install Media
- Creating the Database and Importing Dump File
- Configuring Security

Copying and Decompressing Install Media

To copy and decompress the Oracle Utilities Smart Grid Gateway database:

1. Download the Oracle Utilities Smart Grid Gateway V2.1.0.2.0 Oracle database from the Oracle Software Delivery Cloud for the following adapters:
   - Oracle Utilities Smart Grid Gateway Adapter Development Kit
   - Oracle Utilities Smart Grid Gateway Adapter for Echelon
   - Oracle Utilities Smart Grid Gateway Adapter for Itron OpenWay
   - Oracle Utilities Smart Grid Gateway Adapter for Landis+Gyr
   - Oracle Utilities Smart Grid Gateway Adapter for Sensus
   - Oracle Utilities Smart Grid Gateway Adapter for Silver Spring Networks
   - Oracle Utilities Smart Grid Gateway Adapter MV-90 Adapter for Itron
2. Unzip the SGG-V2.1.0.2.0-Database.zip file to a temporary folder. This file contains the database components required to install the Oracle Utilities Smart Grid Gateway database.

Creating the Database and Importing Dump File

You can use the database creation tool (cdxdba.plx for UNIX or CDXDBA.exe for Windows) to create the demo database with AL32UTF8 character set.

The UNIX and Windows database creation utilities create an empty database with AL32UTF8 character set and at least one tablespace for storing the application objects before running the installation. The default name of the application tablespace is CISTS_01.

- Creating the Demo Database on Unix
- Creating the Demo Database on Windows

Creating the Demo Database on Unix

The files for creating the database are located in ../SGG/DatabaseCreation/Unix directory.

Follow these steps to create a database:

> **Note:** For Oracle 12c (12.1.0.1), use the files under ../SGG/DatabaseCreation/Unix_12c.

1. FTP the contents of the Database Creation folder to a temporary directory on the UNIX server.
2. Set the ORACLE_HOME and ORACLE_BASE variables.
3. Run the utility cdxdba.plx by executing the following command:

   ```
   perl cdxdba.plx
   ```

4. When prompted, provide the following parameter values:
   - Instance name (DEMO):

- ORACLE_BASE: the directory where the setup files for the database will be created (/orasw/app/oracle):
- ORACLE_HOME: the folder where the current version of Oracle software is installed (/orasw/app/oracle/product/):
- ORACLE_DATA: the directory where the data files for the database will be created (/db05/oradata):
- Character set for the database (AL32UTF8):

Enter the parameter values based on the settings of your database server. You can also accept the default values displayed if they match your database server settings. You will be prompted to confirm the settings and then to select Y or N to create the database.

```
ORACLE_SID: DEMO
ORACLE_HOME: /orasw/app/oracle/product/
ORACLE_BASE: /orasw/app/oracle
ORACLE_DATA: /db05/oradata
Character Set: AL32UTF8
Do you want to continue (Y/N)?
```

5. When the database has been created, you will be prompted with the following questions:

```
Do you want to import a demo database dump into this database (Y/
N)?
```

Select Y to import the Demo Install data.

For the demo installation use the dump file exp_demo.dmp.

> **Note:** The data_pump_dir must exist in the database created above before continuing with the import. You should also copy the exp_demo.dmp file to the data_pump_dir. Decompress the exp_demo.dmp.gz file first to extract the exp_demo.dmp file. This file is in ..\SGG\Demo directory.

```
Do you want to import a demo database dump into this database (Y/
N)? Y

Enter the name of the dump file (exp_demo.dmp):
Enter the name of the dump file directory (data_pump_dir):
Enter the name of the log file (exp_demo.log):
```

6. Update the oratab file for the new database and then check the connectivity to this database from another server and from your desktop after updating local tnsnames.ora file.

After a successful database creation, demo data can also be imported by using by following these steps:

1. Set the correct ORACLE_SID and ORACLE_HOME.
2. Run following command to import demo dump:

```
impdp directory=data_pump_dir dumpfile=exp_demo.dmp
logfile=exp_demo.log schemas=CISADM
```

Creating the Demo Database on Windows

The files for creating the database are located in the ..\SGG\DatabaseCreation\Windows directory.

You should be logged in as a user who is a member of the local ORA_DBA group on that server. The ORA_DBA group should have "administrator" privileges assigned to it.

Follow these steps to create the database:

1. From a command prompt, run the utility CDXDBA.exe, located in the Windows folder.

The utility displays the following options:

```
E - Export a schema from the database
R - Refresh a schema with a database dump
C - Create/Recreate a local database
H - See help for the command line options
Q - Quit
```

2. Select option C to create an empty database on your machine.

   Provide the following values:

   - Provide the instance name (DEMO): <DB Name> For example, SGG_DB
   - Enter the character set of the database (AL32UTF8): AL32UTF8
   - Enter ORACLE_BASE: the directory where the setup files for the database will be created (c:\oracle): <Oracle_Base> For example, c:\app\oracle
   - Enter ORACLE_HOME: the folder where the current version of Oracle software is installed (c:\oracle\product\11.1.0.6\Db_1):< Oracle_Home> For example, c:\app\oracle\db_home
   - Enter ORACLE_DATA: the directory where the data files for the database will be created (c:\app\oracle\oradata): <Directory where data files will be created>

3. Once the database has been created, select the R - Refresh a schema option with a database dump file to load the Demo Install data.

   - Select an option: R
   - Enter the instance name (DEMO): <DB name>
   - Is it a LOCAL database (exists on the same machine) (Y/N): <Please provide Y or N>
   - Enter the name of the Oracle account that owns that application schema (cisadm): CISADM
   - Enter password for CISADM (cisadm): CISADM
   - Enter the character set of the database (AL32UTF8): AL32UTF8
   - Enter the name of data pump directory (DATA_PUMP_DIR): DATA_PUMP_DIR
   - Enter the name of the dump file (exp_demo.dmp):exp_demo.dmp
   - Enter the name of the log file (imp_demo.log):exp_demo.log

For the DB user **system**, the password is **manager**. Option R causes the utility to drop all the objects from the schema and import the schema from a database dump file. For the Demo Installation, use the dump file exp_demo.dmp.

> **Note:** The data_pump_dir must exist in the database created above before continuing with the import. You should also copy the exp_demo.dmp file to the data_pump_dir. Decompress the exp_demo.dmp.gz file to extract the exp_demo.dmp file. This file is in the ..\SGG\Demo directory.

Check the connectivity to this database from another server and from your desktop after updating local tnsnames.ora file

Configuring Security

The configuration utility and scripts are located in the .\SGG\Security folder. To configure security, follow these steps to execute the OraGenSec.bat utility:

> **Note:** Database vault must be disabled before running.

1. Navigate to the ..\SGG\Security folder.
2. Edit the OraGenSec.bat file and replace the parameter *database-name* with the name of your database.This file is provided for your convenience and executes the Oragensec.exe utility based on the parameters passed into it.

   Note: Be sure to run OraGenSec.bat from a Windows 32-bit desktop that has the Oracle 11.2.0.1 client installed . Your database should already be listed in the local file tnsnames.ora.

   The script will execute as the following:

   ```
   oragensec -d CISADM,CISADM,database-name -r
   CIS_READ,CIS_USER -a A -u
   CISUSER,CISREAD
   ```
3. Execute the edited OraGenSec.bat file.

   The utility configures security for the CISADM schema objects

Populating Language Data

Please note that this database contains data in the ENGLISH language only. If you use any other supported language, you can run the F1-LANG batch program to duplicate the entries for new language records. For more information on running this batch program, refer to the user documentation section "Defining Background Processes."

You can also install the language specific demo data packages (if available) into the database. Please contact your Oracle representative to receive information on these packages

Chapter 3

Database Design

This section provides a standard for database objects such as tables, columns, and indexes, for products using the Oracle Utilities Application Framework. This standard helps smooth integration and upgrade processes by ensuring clean database design, promoting communications, and reducing errors. Just as Oracle Utilities Application Framework goes through innovation in every release of the software, it is also inevitable that the product will take advantage of various database vendors' new features in each release. The recommendations in the database installation section include only the ones that have been proved by vigorous QA processes, field tests and benchmarks. This section includes:

- Database Object Standard
- Column Data Type and Constraints
- Standard Columns

Database Object Standard

This section discusses the rules applied to naming database objects and the attributes that are associated with these objects.

Categories of Data

A table can belong to one of the three categories:

- Control (admin)
- Master
- Transaction

For purposes of physical table space design, metadata and control tables can belong to the same category.

Example of tables in each category:

- **Control:** SC_USER, CI_ADJ_TYPE, F1_BUS_OBJ
- **Master:** CI_PER, CI_PREM,
- **Transaction:** F1_FACT, CI_FT

All tables have the category information in their index name. The second letter of the index carries this information. See "Indexes" on page 3 for more information.

Naming Standards

The following naming standards must be applied to database objects.

Table

Table names are prefixed with the owner flag value of the product. For customer modification **CM** must prefix the table name. The length of the table names must be less than or equal to 30 characters. A language table should be named by suffixing **_L** to the main table. The key table name should be named by suffixing **_K** to the main table.

It is recommended to start a table name with the 2-3 letter acronym of the subsystem name that the table belongs to. For example, **MD** stands for metadata subsystem and all metadata table names start with **CI_MD**.

Some examples are:

- CI_ADJ_TYPE
- CI_ADJ_TYPE_L

A language table stores language sensitive columns such as a description of a code. The primary key of a language table consists of the primary key of the code table plus language code (LANGAGUE_CD).

A key table accompanies a table with a surrogate key column. A key value is stored with the environment id that the key value resides in the key table.

The tables prior to V2.0.0 are prefixed with CI_ or SC_.

Columns

The length of a column name must be less than or equal to 30 characters. The following conventions apply when you define special types of columns in the database.

- Use the suffix **FLG** to define a lookup table field. Flag columns must be CHAR(4). Choose lookup field names carefully as these column names are defined in the lookup table (CI_LOOKUP_FLD) and must be prefixed by the product owner flag value.

- Use the suffix **CD** to define user-defined codes. User-defined codes are primarily found as the key column of the admin tables.
- Use the suffix **ID** to define system assigned key columns.
- Use the suffix **SW** to define Boolean columns. The valid values of the switches are 'Y' or 'N'. The switch columns must be CHAR(1)
- Use the suffix **DT** to define Date columns.
- Use the suffix **DTTM** to define Date Time columns.
- Use the suffix **TM** to define Time columns.

Some examples are:

- ADJ_STATUS_FLG
- CAN_RSN_CD

Indexes

Index names are composed of the following parts:

[OF][*application specific prefix***][C/M/T]NNN[P/S]n**

- **OF**- Owner Flag. Prior to Version 4.1.0 of the framework the leading character of the base Owner Flag was used. From 4.1.0 on the first two characters of product's owner flag value should be used. For client specific implementation of index, use CM for Owner Flag.
- Application specific prefix could be C, F, T or another letter.
- **C/M/T** - The second character can be either C or M or T. C is used for control tables (Admin tables). M is for the master tables. T is reserved for the transaction tables.
- **NNN** - A three-digit number that uniquely identifies the table on which the index is defined.
- **P/S** - P indicates that this index is the primary key index. S is used for indexes other than primary keys.
- **n** is the index number, unique across all indexes on a given table (0 for primary and 1, 2, etc., for the secondary indexes).

Some examples are:

- F1C066P0
- F1C066S1
- CMT206S2

> Warning! Do not use index names in the application as the names can change due to unforeseeable reasons.

Updating Storage.xml

The storage.xml file that comes with the product allocates all base tables and indexes to the default tablespace CISTS_01. If you decide to allocate some tables or indexes outside of the default tablespace, then this has to be reflected in the storage.xml file by changing the tablespace name from the default value to a custom value, according to the format shown below:

Format:

```
<Table_Name>
  <TABLESPACE>CISTS_01</TABLESPACE>
  <PARALLEL>1</PARALLEL>
- <LOB>
- <Column Name>
  <TABLESPACE>CISTS_01</TABLESPACE>
  <SECUREFILE>Y</SECUREFILE>
```

```
<CHUNK>8192</CHUNK>
<CACHE>N</CACHE>
<LOGGING>Y</LOGGING>
<INROW>Y</INROW>
<COMPRESS>N</COMPRESS>
</Column Name>
</LOB>
</Table_Name>
```

Where Parallel defines the number of threads, that Oracle DB Server will use to access a table or create an index.

For instance, if a DBA decided to allocate table CI_ACCT in a tablespace MyTablespace, then they would have to change the storage.xml as follows:

```
<CI_ACCT>
<TABLESPACE>MyTablespace</TABLESPACE>
</CI_ACCT>
```

The oradbi process uses the storage.xml file to place the new database objects into defined tablespaces. A tablespace referenced in the storage.xml file must exist in the database.

The storage.xml file has to be adjusted before each upgrade and/or new installation as required to allocate the tables and indexes across those tablespaces.

Table name is included as a comment for each of the indexes for clarity.

For initial installs, information for each object should be reviewed by a DBA. For upgrades, only tablespace information for the objects added in the new release needs to be reviewed by a DBA.

Be careful while editing this file. Make sure that the tablespace names being used exist in the database. Do not change the basic format of this file.

Sequence

The base sequence name must be prefixed with the owner flag value of the product. For customer modification **CM** must prefix the sequence name. The sequence numbers should be named as below

1. If the Sequence is used for a specific Table then use the following sequence name:

   [OF][C/M/T]NNN_SEQ

- OF stands for Owner Flag. For example, Framework its F1. Other examples are D1,D2, etc.
- C/M/T stands for Control (Admin)/Master/Transaction Tables.
- NNN is a three digit unique Identifier for a Table on which the Sequence is defined.

  For Example: F1T220_SEQ

2. If more than one Sequence is used for a specific Table then use the following Sequence Name:

   [OF][C/M/T]NNN_Column_Name_SEQ

- OF stands for Owner Flag. For example, the framework is F1. Other examples are D1,D2, etc.
- C/M/T stands for Control (Admin)/Master/Transaction tables.
- NNN is a three digit unique identifier for a table on which the sequence is defined.

  For Example: F1T220_BO_STATUS_CD_SEQ and F1T220_BUS_OBJ_CD_SEQ

3. If sequence is used for a generic requirement and not specific to a table, then use the following sequence name.

[OF]Column_Name_SEQ

- OF stands for Owner Flag. For example, the framework is F1. Other examples are D1,D2, etc.

  For Example: F1FKVALID_SEQ

- For a customer modification, CM must prefix the sequence name.

Trigger

The base trigger name must be prefixed with the owner flag value of the product.

When implementers add database objects, such as tables, triggers and sequences, the name of the objects should be prefixed by CM.

Column Data Type and Constraints

This section discusses the rules applied to column data type and constraints, and the attributes that are associated with these objects.

User Defined Code

User Defined Codes are defined as CHAR type. The length can vary by the business requirements but a minimum of eight characters is recommended. You will find columns defined in less than eight characters but with internationalization in mind new columns should be defined as CHAR(10) or CHAR(12). Also note that when the code is referenced in the application the descriptions are shown to users in most cases.

System Assigned Identifier

System assigned random numbers are defined as CHAR type. The length of the column varies to meet the business requirements. Number type key columns are used when a sequential key assignment is allowed or number type is required to interface with external software. For example, Notification Upload Staging ID is a Number type because most EDI software uses a sequential key assignment mechanism. For sequential key assignment implementation, the DBMS sequence generator is used in conjunction with Number Type ID columns.

Date/Time/Timestamp

Date, Time and Timestamp columns are defined physically as DATE in Oracle. Non-null constraints are implemented only for the required columns.

Number

Numeric columns are implemented as NUMBER type in Oracle. The precision of the number should always be defined. The scale of the number might be defined. Non-null constraints are implemented for all number columns.

Fixed Length/Variable Length Character Columns

When a character column is a part of the primary key of a table define the column in CHAR type. For the non-key character columns, the length should be the defining factor. If the column length should be greater than 10, use VARCHAR2 type in Oracle.

Null Column Support

Oracle Utilities Application Framework 4.1.0 Group Fix 2 and later versions support Nullable columns. This means that the application can write NULLs instead of a blank space or zero (for numeric columns) by using NULLABLE_SW on CI_MD_TBL_FLD. If REQUIRED_SW is set to 'N' and the NULLABLE_SW is set to 'Y', the application will write a NULL in that column. The artifact generator will create hibernate mapping files with appropriate parameters so that the framework hibernate mapping types will know if a given property supports a null value.

NULLABLE_SW is not new, but has previously been used for certain fields such as dates, and some string and number foreign-key columns. Because of this, there is the possibility that there is incorrect metadata for some columns, and that turning on this new feature could result in incorrect behavior when using that metadata. The upgrade script added to FW410 Group Fix 2 fixes the metadata to make sure that the existing tables will not be affected.

This new feature only supports tables maintained by Java. Thus, enhancing any existing tables to use null columns must be done only after making sure that the tables are maintained by Java, and not COBOL.

XML Type Support

Oracle Utilities Application Framework v4.2.0.0 onwards supports XML Type. XML Type provides following advantages

1. The ability to use XQuery for querying nodes in the XML document stored within a column defined as XMLType.
2. The option to use the XML engine, which is built into the Oracle Database, to create indexes using nodes within the XML document stored in the XMLType column.

Cache and Key Validation Flags

By default, the Cache Flag is set to NONE. For most of the admin tables the CACHE Flag should be 'Cached for Batch'. This specifies that the table is cached as L2 cache to reduce database trips.

By default the Key Validation Flag is set to ALL. For tables which have the user defined keys, the KEY_VALIDATION_FLG should be set as 'ALL'. This checks the existence of the key before inserting a new one.

Table Classification and Table Volume Flags

There are multiple types of tables in the application, namely Admin system tables, Admin non-system tables, master tables and transaction tables. The Table Classification flag (TBL_CLASSIFICATION_FLG) sets the appropriate value for this lookup field to give a better view of the table classification.

Table Volume flag (TBL_VOLUME_FLG) is a customer modifiable field which is initially populated by product, but can be overridden by implementation. The field gives an idea of the relative data volume (categorized as highVolume, lowVolume and mediumVolume) of the table to make informed decisions.

Default Value Setting

The rules for setting the database default values are as follows:

- When a predefined default value is not available, set the default value of Non-null CHAR or VARCHAR columns to blank except the primary key columns.
- When a predefined default value is not available, set the default value Non-null Number columns to 0 (zero) except the primary key columns.
- No database default values should be assigned to the Non Null Date, Time, and Timestamp columns.

Foreign Key Constraints

Referential integrity is enforced by the application. In the database do not define FK constraints. Indexes are created on most of Foreign Key columns to increase performance.

Standard Columns

This section discusses the rules applied to standard columns and the attributes that are associated with these objects.

Owner Flag

Owner Flag (OWNER_FLG) columns exist on the system tables that are shared by multiple products. Oracle Utilities Application Framework limits the data modification of the tables that have owner flag to the data owned by the product.

Version

The Version column is used to for optimistic concurrency control in the application code. Add the Version column to all tables that are maintained by a Row Maintenance program irrespective of the language used (COBOL or JAVA).

Chapter 4

Database Implementation Guidelines

The following section outlines the general implementation guidelines for the database components, including:

- Configuration Guidelines

  Note: Refer to My Oracle Support for more information.

See Appendix C: Partitioning Recommendations for Oracle Utilities Smart Grid Gateway for additional information about configuring the Oracle Utilities Smart Grid Gateway database.

Configuration Guidelines

This section includes general recommendations for configuring various database objects and includes a brief syntax overview. It covers the general aspects of the database objects and does not cover any specific implementation requirements. This section includes:

- Index
- Table Partitioning Recommendations
- Transparent Data Encryption Recommendations
- Data Compression Recommendations
- Database Vault Recommendations
- Oracle Fuzzy Search Support
- Information Lifecycle Management (ILM) and Data Archiving Support
- Storage Recommendations
- Database Configuration Recommendations
- Database Syntax
- Database Initialization Parameters

Index

Index recommendations specify points that need to be considered when creating indexes on a table.

1. Indexes on a table should be created according to the functional requirements of the table and not in order to perform SQL tuning.
2. The foreign keys on a table should be indexes.

In an Oracle Utilities Application Framework environment, always make sure that the optimization parameters are set as follows:

```
optimizer_index_cost_adj=1
optimizer_index_caching=100
```

This will make sure that the optimizer gives a higher priority to index scans.

Note: If the implementation creates a CM index on table-columns for which the product already provides an index, then the CM index will be overridden by the base index.

Table Partitioning Recommendations

Oracle Utilities recommends using a minimum of 'n' partitions for selective database objects, where 'n' is number of RAC nodes.

Transparent Data Encryption Recommendations

Oracle Utilities supports Oracle Transparent Data Encryption (TDE). Oracle 11gR1 supports tablespace level encryption. The application supports tablespace level encryption for all Application data. Make sure that the hardware resources are sufficiently sized for this as TDE uses additional hardware resources. The Oracle Advanced Security license is a prerequisite for using TDE.

Please consider the following when implementing TDE:

- Create a wallet folder to store the master key. By default, the wallet folder should be created under $ORACLE_BASE/admin/<sid>.
- The wallet containing the master key can be created using the following command:

  ```
  alter system set encryption key authenticated by "keypasswd"
  ```

- The wallet can be closed or opened using the following commands:

  ```
  alter system set wallet open identified by "keypasswd";
  alter system set wallet close;
  ```

- Column level encryption can be achieved using the following commands:

  ```
  create table <table_name>
  (name varchar2(200) default ' ' not null,
  bo_data_area CLOB encrypt using 'AES128',
  bo_status_cd char(12)    encrypt using 'AES128')
  lob (bo_data_area) store as securefile (cache compress)
  tablespace <tablespace_name>;
  ```

- AES128 is the default encryption algorithm.
- Tablespace level encryption is also supported using the following command:

  ```
  Create tablespace <tablespace_name> logging datafile '<datafile
  location>' size <initial size> reuse autoextend on next <next size>
  maxsize unlimited extent management local uniform size
  <uniform size> encryption using 'AES128' default storage(encrypt) ;
  ```

- Indexed columns can only be encrypted using the NO SALT Option. Salt is a way to strengthen the security of encrypted data. It is a random string added to the data before it is encrypted, causing repetition of text in the clear to appear different when encrypted.

Data Compression Recommendations

Oracle Utilities supports Advanced Data Compression, available with Oracle 11gR1 onwards, to reduce the database storage footprint. Make sure that your resources are sufficiently sized for this

as it uses additional system resources. Compression can be enabled at the Tablespace level or at the Table level.

Exadata Hardware

For Exadata hardware the compression recommendations are:

- For the Final Measurement table (D1_MSRMT), keep the current table partition uncompressed. All of the older partitions will be compressed based on QUERY HIGH compression.
- For the Initial Measurement Data table (D1_INIT_MSMRT_DATA), always keep CLOBs in securefile and medium compressed. Also keep the current table partition uncompressed. All of the older partitions will be compressed based on QUERY HIGH compression.
- Load data into the uncompressed table partitions using a conventional load and then, once data is loaded using a CTAS operation, load into a temporary heap table. Then truncate the original partition. Alter the original partition into HCC compressed and then partition exchange this with the temporary heap table.
- All multi column Indexes (primary as well as secondary) will be compressed using the default compression. HCC or OLTP compression is not applicable on the top of compressed Indexes.

Non- Exadata Hardware

For non-Exadata hardware the recommendations are the same as above, except that you cannot use HCC compression (it is only available in Exadata database machine). Instead of HCC you can use any other compression tool available to you for non-Exadata hardware.

CLOB Fields

All CLOB fields should be stored as SecureFiles and Medium compressed. This requires a separate license for Advanced Data Compression. As a part of the schema, we create the product-owned tables with compression turned OFF at the LOB level. If you have the license for Advanced Data Compression, you can enable compression by updating the storage.xml.

Database Vault Recommendations

We support Database Vault from the Oracle Utilities Application Framework 4.1.0. All non-application User IDs can be prevented from using DDL or DML statements against the application schema. So SYS and SYSTEM cannot issue DDL or DML statements against CISADM schema.

The application-specific administration account can issue DDL statements but should not be able to perform any DML or DCL statements.

Application user must be given DML only permissions.

Database Vault can be used to control access during patch process and Install/Upgrade process. Configuration is also supported beginning with the Oracle Utilities Application Framework 4.1.0 patch application with Database Vault.

Oracle Fuzzy Search Support

Oracle Utilities Application Framework version 4.2.0.0.0 onwards supports Oracle Fuzzy searches. To use this feature, Oracle Text must be installed. After Oracle Text is installed, an index must be created on the table where the fuzzy search needs to be performed from the application. This is only an Oracle database option and is not supported by other databases. Additionally, not all languages are supported. Refer to the Oracle database documentation for more information about fuzzy searching.

A typical syntax for implementation of fuzzy searching is as below. For the most updated syntax please refer to Oracle Fuzzy documentation.

```
GRANT CTXAPP TO <Application schema owner e.g CISADM>;
GRANT EXECUTE ON CTX_DDL TO <Application schema owner e.g CISADM>;
create index <Application schema owner e.g CISADM>.<Index_Name> on
Application schema owner e.g CISADM>.<Table_Name> (<column_name>)
indextype is ctxsys.context parameters ('sync (on commit)');
begin
ctx_ddl.sync_index('Application schema owner e.g
CISADM>.<Index_Name>');
end
/
```

Information Lifecycle Management (ILM) and Data Archiving Support

Oracle Utilities Application Framework version 4.2.0 service pack 2 provides support for Data Archiving based on Information Lifecycle Management (ILM).

Information Lifecycle Management is a methodology designed to manage data over its lifecycle. The implementation of ILM involves Oracle Utilities Application Framework based processes for high volume transactional objects. These processes evaluate eligible historical records and mark them eligible/not-eligible for archiving. Records marked eligible for archiving can then be migrated to lower cost storage or archived without compromising referential integrity in the production database. These processes are highly customizable in order to cater to an implementation's particular requirements.

Storage Recommendations

This section specifies recommended options for storing the database objects.

SecureFile for Storing LOBs

Beginning with Oracle 11g, tables having fields with data type of CLOB or BLOBS should have the LOB Columns stored as SecureFiles.

- The storage options with SecureFiles for Heap Tables should be ENABLE STORAGE IN ROW, CACHE and COMPRESS.
- For the IOT Table the PCTTHRESHOLD 50 OVERFLOW clause should be specified and the storage options with SecureFiles should be ENABLE STORAGE IN ROW, CACHE and COMPRESS.
- The PCTTHRESHOLD should be specified as a percentage of the block size. This value defines the maximum size of the portion of the row that is stored in the Index block when an overflow segment is used.
- The CHUNK option for storage, which is the data size used when accessing or modifying LOB values, can be set to higher than one database block size if big LOBs are used in the IO Operation.
- For SecureFiles, make sure that the initialization parameter db_securefile is set to ALWAYS.
- The Tablespace where you are creating the SecureFiles should be enabled with Automatic Segment Space Management (ASSM). In Oracle Database 11g, the default mode of Tablespace creation is ASSM so it may already be set for the Tablespace. If it's not, then you have to create the SecureFiles on a new ASSM Tablespace.

  Note: To enable compression on SecureFiles, you must have an Oracle Advanced Compression license in addition to Oracle Database Enterprise Edition. This feature is not available for the standard edition of the Oracle database.

  If you are using Oracle Database Enterprise Edition, please ensure that the "COMPRESS" flag is turned on by setting it to "Y" in Storage.xml.

See "Database Syntax" on page 5 for more information on SecureFiles.

Database Configuration Recommendations

This section specifies the recommended methods for configuring the database with a focus on specific functional area.

Large Redo Log File Sizes

The Redo Log files are written by the Log Writer Background process. These Log files are written in a serial manner. Once a Log File is full, a Log Switch occurs and the next Log file starts getting populated.

It is recommended that the size of the Redo Log files should be sufficiently high so that you do not see frequent Log Switches in the Alert logs of the database. Frequent Log Switches impact the IO performance and can be avoided by having a larger Redo log File size.

Frequent Log Switches impacts the IO performance and can be avoided by having a bigger Redo log File Size.

Database Syntax

SecureFile

```
CREATE TABLE <Table_Name>
     ( COLUMN1 ….,
       COLUMN2 (CLOB)
     )
LOB(COLUMN2) STORE AS SECUREFILE (CACHE COMPRESS);

CREATE TABLE <Table_Name>
     ( COLUMN1 ….,
       COLUMN2 (CLOB)
       CONTRAINT <> PRIMARY KEY(…)
     )
ORGANIZATION INDEX PCTTHRESHOLD 50 OVERFLOW
LOB(COLUMN2) STORE AS SECUREFILE (ENABLE STORAGE IN ROW CHUNK CACHE
COMPRESS);
```

Database Initialization Parameters

The recommended Initialization Parameters are given below. These parameters are a starting point for database tuning. An optimal value for a production environment may differ from one customer deployment to another.

db_block_size=8192

log_checkpoint_interval=0

db_file_multiblock_read_count=8

transactions=3000

open_cursors=30000

db_writer_processes=10

optimizer_index_cost_adj=1

optimizer_index_caching=100

db_files=1024

dbwr_io_slaves=10 (Only if Asynchronous IO is not Supported)

sessions=4500

memory_target=0

memory_max_target=0

processes=3000

dml_locks=48600

_b_tree_bitmap_plans=FALSE

Appendix A

Upgrades to the Oracle Utilities Application Framework Database

This section describes the database upgrade process for the Oracle Utilities Application Framework database from V4.2.0.1 to V4.2.0 Service Pack 2 (v4.2.0.2). It highlights changes made to the administrative tables and how those changes should be applied to the data in order for your current database to work with the V4.2.0.2 application, and to preserve the business logic implemented in the previous version of the application. The changes that do not require data upgrade are not described in this document. The tasks that need to be performed after running the upgrade scripts are included.

The added functionality of V4.2.0.2 is not the scope of this documentation. The upgrade scripts do not turn on the newly added functionality by default. For new functionality, refer the V4.2.0.2 User Guides. In the last section of this appendix, you will find a list of the new tables that are added in V4.2.0.2.

Automatic Data Upgrade

This section describes what the upgrade script will populate in new tables and columns to preserve the existing base product application functions of the previous version of Oracle Utilities Application Framework.

Long Context Value on XAI Receiver

A new field Context Value Long (F1_CTXT_VAL_LONG) is added to XAI Receiver Table (CI_XAI_RCVR_CTX). This new field is a longer version of the existing field CTXT_VAL. CTXT_VAL which supported only 50 characters. To accommodate long encryption key generated by the Java key generator for keystore, the new column is added on the XAI Receiver Table to store the encrypted key. The existing column CTXT_VAL on this table would be unsupported. For this to be possible, as a part of upgrade script, all the current data in CTXT_VAL column would be updated into F1_CTXT_VAL_LONG column. The CTXT_VAL is deprecated and will be dropped in subsequent release.

Schema Change

New Tables

The following new tables are added to Oracle Utilities Application Framework.

Tables	Description
F1_BKT_CONFIG	Bucket Configuration
F1_BKT_CONFIG_L	Bucket Configuration Language
F1_BKT_CONFIG_REL_OBJ	Bucket Configuration Related Object
F1_BKT_CONFIG_VAL	Bucket Configuration Value
F1_BKT_CONFIG_VAL_L	Bucket Configuration Value Language
F1_IWS_ANN	Inbound Web Service Annotation
F1_IWS_ANN_CHAR	Inbound Web Service Annotation Characteristics
F1_IWS_ANN_L	Inbound Web Service Annotation Language
F1_IWS_ANN_PARM	Inbound Web Service Annotation Parameter
F1_IWS_ANN_TYPE	Inbound Web Service Annotation Type
F1_IWS_ANN_TYPE_CHAR	Inbound Web Service Annotation Type Characteristics
F1_IWS_ANN_TYPE_L	Inbound Web Service Annotation Type Language
F1_IWS_ANN_TYPE_PARM	Inbound Web Service Annotation Type Parm
F1_IWS_ANN_TYPE_PARM_L	Inbound Web Service Annotation Type Parameter Language
F1_IWS_SVC	Inbound Web Service

Tables	Description
F1_IWS_SVC_ANN	Inbound Web Service Link to Annotation
F1_IWS_SVC_CHAR	Inbound Web Service Characteristics
F1_IWS_SVC_L	Inbound Web Service Language
F1_IWS_SVC_LOG	Inbound Web Service Log
F1_IWS_SVC_LOG_PARM	Inbound Web Service Log Parameter
F1_IWS_SVC_OPER	Inbound Web Service Operations
F1_IWS_SVC_OPER_L	Inbound Web Service Operations Language
F1_MAP_OVRD	UI Map Override

New Views

None

Dropped Tables

None

Unsupported Tables

None

Added Columns

The following table columns are added to Oracle Utilities Application Framework.

Table	Column	Required
CI_XAI_RCVR_CTX	F1_CTXT_VAL_LONG	Y

Dropped Columns

None

Unsupported Table Columns

These columns will be deprecated in a future release.

- CI_XAI_SNDR_CTX: CTXT_VAL column is not used.

Column Format Change

Table Name	Column Name	From	To
CI_XAI_JDBC_CON	DATABASE_PASSWORD	VARCHAR2:64	VARCHAR2:128

New System Data

This section lists the new system data that are added for business process configuration.

Algorithm Type

The following algorithm types are new to Oracle Utilities Application Framework V4.2.0.1.

Algorithm Type	Description
F1-ANPRMDFLT	Default required annotation parameters
F1-IWSACT	Mark Inbound Web Service for deployment/undeployment
F1-MIGBCI	Batch Control Import
F1-NOTRNLOG	Suppress Status Transition Messages

Algorithm

The following Algorithms are Oracle Utilities Application Framework owned system data in V4.2.0.1.

Algorithm	Description
F1-IWSDEPLOY	Mark for deployment
F1-IWSUNDEPL	Mark for undeployment
F1-MIGBCI	Batch Control Import
F1-NOTRNLOG	Suppress Status Transition Messages
F1-OVRDT-ALG	Date format (YYYY-MM-DD) validation for ad hoc Characteristic value

Application Service

The following application services are added after Oracle Utilities Application Framework v 4.2.0.1.

Application Service	Description
CILQTDCP	To Do Entry Creator for Business Service
F1-ANNTYPBOAS	Inbound Web Service Annotation Type BO
F1-BKTCONFIG	Bucket Configuration MO
F1ANN	Inbound Web Service Annotation MO
F1ANNBOAS	Inbound Web Service Annotation BO
F1ANNTPM	Inbound Web Service Annotation Type
F1ANNTPS	Inbound Web Service Annotation Type Query
F1ANNTYPS	Inbound Web Service Annotation Type Query

Application Service	Description
F1BKTCFG	Bucket Configuration
F1BKTCFQ	Bucket Configuration Query
F1IWSANM	Inbound Web Service Annotation
F1IWSDPL	Inbound Web Service Deployment
F1IWSDPLY	Inbound Web Service Deployment
F1IWSSVC	Inbound Web Service MO
F1IWSVCBOAS	Inbound Web Service BO
F1IWSVCP	Inbound Web Service
F1IWSVCS	Inbound Web Service Query

Access Mode Added to Application Service

None

Batch Control

The following batch controls are added.

Batch Control	Description
F1-NDPUR	Notification Download Purge
F1-TDPG	Purge Completed To Do Entries

Business Object

The following Business Objects are Oracle Utilities Application Framework owned system data in V4.2.0.1.

Business Object	Description
F1-BatchJob	Batch Job
F1-BooleanValues	Generic Boolean Values
F1-BucketConfigBundlingAddBO	Bundling Add BO for Bucket Configuration
F1-BucketConfigPhysicalBO	Physical BO for Bucket Configuration
F1-EnvironmentRefPhysicalBO	Physical BO for Environment Reference
F1-ExternalSystemPhysicalBO	Physical BO for External System
F1-InbWebSvcAnnotation	Inbound Web Service Annotation
F1-InbWebSvcAnnotationType	Inbound Web Service Annotation Type
F1-InboundWebService	Inbound Web Service
F1-LanguagePhysicalBO	Physical BO for Language

Business Object	Description
F1-MessageCategoryPhysicalBO	Physical BO for Message Category
F1-OutboundMsgTypePhysicalBO	Physical BO for Outbound Message Type
F1-RequestTypePhysicalBO	Physical BO for Request Type
F1-SchemaActionValues	Schema Action Values
F1-SchemaProtectKey	Schema Protect Key
F1-SeasonalTimeShiftPhysicalBO	Physical BO for Seasonal Time Shift
F1-SecurityTypePhysicalBO	Physical BO for Security Type
F1-ServiceProgramPhysicalBO	Physical BO for Service Program
F1-TabMenuPhysicalBO	Physical BO for Tab Menu
F1-UIPagePhysicalBO	Physical BO for UI Page
F1-WebServiceAdapterPhysicalBO	Physical BO for Web Service Adapter
F1-XAIAdapterPhysicalBO	Physical BO for XAI Adapter
F1-XAIFormatPhysicalBO	Physical BO for XAI Format
F1-XAIJMSConnectionPhysicalBO	Physical BO for XAI JMS Connection
F1-XAIReceiverPhysicalBO	Physical BO for XAI Receiver
F1-XAIRouteTypePhysicalBO	Physical Bo for XAI Route Type
F1-XAIRuleGroupPhysicalBO	Physical BO for XAI Rule Group
F1-XAISenderPhysicalBO	Physical BO for XAI Sender
F1-ZoneTypePhysicalBO	Physical BO for Zone Type

FK Reference

The following FK References are new to Oracle Utilities Application Framework V4.2.0.1.

FK Reference	Description
F1-BKCFG	Bucket Configuration
F1-IWSAN	Inbound Web Service Annotation
F1-IWSAT	Inbound Web Service Annotation Type
F1-IWSVC	Inbound Web Service
F1-IWSVS	cmw test schema info plugin
F1-LANG	Language
F1-MGO	Migration Object
F1-SEATM	Seasonal Time Shift
F1-SECTP	Security Type
F1-SSCSR	Service Script Search Zone

FK Reference	Description
F1ENVREF	Environment Reference
F1IG-MO	MO Option - Maintenance Object Tables
F1JMSCON	JMS Connection
F1MB-BO	BO Option - Maintenance BPA Script
F1XAIRG	XAI Rule Group
F1XAIRTT	XAI Route Type

Lookups

The following Lookups are added to Oracle Utilities Application Framework V4.2.0.1.

Lookup Field Name	Field Value	Language	Description
ANN_TYPE_STATUS_FLG	F1AC	ENG	Active
ANN_TYPE_STATUS_FLG	F1IN	ENG	Inactive
BUS_OBJ_OPT_FLG	F1MB	ENG	Maintenance BPA Script
CHAR_ENTITY_FLG	F1IL	ENG	Inbound Web Service Log
CHAR_ENTITY_FLG	F1IW	ENG	Inbound Web Service
F1_IWS_STATUS_FLG	F1DP	ENG	Deployed
F1_IWS_STATUS_FLG	F1ER	ENG	Error
F1_IWS_STATUS_FLG	F1ND	ENG	Needs Deploy
F1_IWS_STATUS_FLG	F1NU	ENG	Needs Undeploy
F1_IWS_STATUS_FLG	F1UD	ENG	Undeployed
MAINT_OBJ_OPT_FLG	F1IG	ENG	Non-Migrated Table
MANAG_CONTENT_TYPE_FLG	F1HT	ENG	HTML
TD_ALL_DELETE_FLG	N	ENG	No
TD_ALL_DELETE_FLG	Y	ENG	Yes
XAI_OPTION_FLG	XSDC	ENG	XSD Compliance

Maintenance Object

The following maintenance objects are added in this release.

MO code	Description
F1-BKTCONFIG	Bucket Configuration
F1-IWSANN	Inbound Web Service Annotation

MO code	Description
F1-IWSANNTYP	Inbound Web Service Annotation Type
F1-IWSSVC	Inbound Web Service

Script

The following scripts are owned by Oracle Utilities Application Framework and added in this release.

Script	Description
F1-AdRevCtrl	Revision Control
F1-BktCfgMnt	Bucket Configuration Maintenance
F1-ChkOut	Checked out object
F1-DflAnTPrm	Defaut required annotation parameters
F1-GetFkRef	Get foreign key reference information via a service script
F1-IwSvcMain	Inbound Web Service - Maintain
F1-IwsATMain	Inbound Web Service Annotation Type Maintenance
F1-IwsAct	Mark Inbound Webservice for deployment/undeployment
F1-IwsAnMain	Inbound Web Service Annotation Maintenance
F1-IwsSvcDtl	Popualate Service Staus
F1-IwsSvcPre	Populate Service Status
F1-NoTrnLog	Suppress logging of Maint Obj status transition messages
F1-NotifyUsr	Send Email Notification
F1-OVRD-VISI	Html Override Zone visibility script
F1-RevChkOut	Revision Control Check Out
F1-RevCtlFrc	Revision Control Fore Check-In
F1-RevCtrlSS	Revision Control Script
F1-SHOW-OVRD	Html Override Zone visibility script
F1-ValChkOut	Validate Check Out Query Filters
F1-VlChcFltr	Validate Check in Query Filters
F1-VlFrcFltr	Validate Force Check in / Restore Query Filters
F1LanchAtch	Launch Attachment

To do Type

None

Portal

The following portals are added in this release.

Portal	Description
F1ANNTPM	Inbound Web Service Annotation Type
F1ANNTPS	Inbound Web Service Annotation Type Query
F1BKTCFG	Bucket Configuration
F1BKTCFQ	Bucket Configuration Query
F1IWSANM	Inbound Web Service Annotation
F1IWSDPL	Inbound Web Service Deployment
F1IWSLP	Inbound Web Service Log
F1IWSVCP	Inbound Web Service
F1IWSVCS	Inbound Web Service Query

Portal Zone

The following Portal Zones are added in this release.

Portal	Zone
F1ANNTPM	F1-IWSANTDSP
F1ANNTPS	F1-ANNTYPEQ
F1BKTCFG	F1-BKTCFGDSP
F1BKTCFQ	F1-BKTCFQRY
F1IWSANM	F1-IWSANLST
F1IWSANM	F1-IWSANN
F1IWSDPL	F1-IWSDEPLOY
F1IWSDPL	F1-IWSDODPLY
F1IWSDPL	F1-IWSSVCM
F1IWSDPL	F1-IWSUNSYNC
F1IWSLP	F1IWSLG
F1IWSVCP	F1-IWSSVCM
F1IWSVCS	F1-IWSVCQ
F1_SCHEMA_MP	F1-HTML-OVRD

UI Map

The following UI Maps are Oracle Utilities Application Framework owned system data in this release.

Map	Description
F1-AttachmentFileSizeFormatter	Format the attachment file size
F1-BktCfgQueryByInformation	Bucket Configuration Info - Query Filter
F1-IWSDeploymentDetails	UIMAP to Display IWS Deployment Details
F1-InbWebServiceDeploymentZone	Inbound Web Service Deployment
F1-IwsAnnParametersDisplay	Inbound Web Service Annotation Parameters - Display
F1-IwsAnnParametersInput	Inbound Web Service Annotation Parameters - Input
F1-IwsOperationsDisplay	Inbound Web Service Operations - Display
F1-IwsOperationsInput	Inbound Web Service Operations - Input
F1-IwsSearchFilter	Inbound Web Service - Query Filters
F1-RevCntrlChkOutConfirm	Check out confirmation
F1-RevCntrlConfirm	Check in confirmation
F1-RevCntrlForceCheckinConfirm	Force Check in confirmation
F1-RevCntrlFrcChckInFilterMap	Revision Control Query Filter
F1-RevisionControlChkOutQryFlt	Revision Control Check Out - Query Filter
F1-RevisionControlQueryFilter	Revision Control Query Filter
F1-SE-RowFlatPropsDisplayMapFr	Row Flattening Attributes for Display
F1-SE-RowFlatPropsInputMapFr	Row Flattening Attributes for Input

XAI Inbound Service

There are no new XAI Inbound Services new to Oracle Utilities Application Framework V4.2.0.1.

Zone Type

None

Zone

The following new Zones are added to Oracle Utilities Application Framework V4.2.0.1.

Zone	Zone Type	Description
F1-ANNTPARMR	F1-DE-SINGLE	Retrieve Annotation Type Required Parameters
F1-ANNTPARMS	F1-DE-SINGLE	Retrieve Annotation Type Parameters

Zone	Zone Type	Description
F1-ANNTPARMV	F1-DE-QUERY	Retrieve Annotation Type Parameters and Values
F1-ANNTYPEQ	F1-DE-MULQRY	Inbound Web Service Annotation Type Search
F1-ANNTYPEQ1	F1-DE-QUERY	Name/Description/Status
F1-ANNTYPEQ2	F1-DE-QUERY	Annotation / Parent / Java Package
F1-BKTCFGDSP	F1-MAPDERV	Bucket Configuration
F1-BKTCFGQ1	F1-DE-QUERY	Bucket Configuration Information
F1-BKTCFQRY	F1-DE-MULQRY	Bucket Configuration Search
F1-HTML-OVRD	F1-XMLEDITOR	Override HTML Editor
F1-IWSANLG	F1-DE	Inbound Web Service Annotation Log
F1-IWSANLST	F1-DE-SINGLE	Inbound Web Service Annotation List
F1-IWSANN	F1-MAPDERV	Inbound Web Service Annotation
F1-IWSANTDSP	F1-MAPDERV	Inbound Web Service Annotation Type
F1-IWSDEPLOY	F1-DE-SINGLE	Deployment Status
F1-IWSDODPLY	F1-MAPEXPL	Deploy Inbound Web Services
F1-IWSSCHS	F1-DE-MULQRY	Search for Schema/Schema Type Supported by IWS
F1-IWSSCHS1	F1-DE-QUERY	Search by Business Service
F1-IWSSCHS2	F1-DE-QUERY	Search by Service Script
F1-IWSSCHS3	F1-DE-QUERY	Search by Business Object
F1-IWSSVCM	F1-MAPDERV	Inbound Web Service
F1-IWSUNSYNC	F1-MAPEXPL	Inbound Web Services
F1-IWSVCQ	F1-DE-MULQRY	Inbound Web Service Search
F1-IWSVCQ1	F1-DE-QUERY	Name/Description/Status
F1-REVCONQRY	F1-DE-MULQRY	Revision Control Search
F1-REVCTRLQ	F1-DE-QUERY	Check In
F1-REVCTRLQ2	F1-DE-QUERY	Force Check In
F1-REVCTRLQ3	F1-DE-QUERY	Check Out
F1-SSCSRCH	F1-DE-QUERY	Service Script Search

Zone	Zone Type	Description
F1-USREMAIL	F1-DE-SINGLE	Retrieve user's e-mail id

Appendix B

Oracle Application Framework System Table Guide

This section lists the system tables owned by the Oracle Utilities Application Framework V4.2.0.2 and explains the data standards of the system tables. The data standards are required for the installation of Oracle Utilities Application Framework, development within the Oracle Utilities Application Framework, and the configuration and customization of Oracle Utilities products. Adhering to the data standards is a prerequisite for seamless upgrade to future releases.

This section includes:

About the Application Framework System Tables

System tables are a subset of the tables that must be populated at the time the product is installed. They include Metadata and configuration tables. The data stored in the system tables are the information that Oracle Utilities Application Framework product operations are based on.

As the product adds more functionality, the list of system tables can grow. The complete list of the system tables can be found in the System Table List section.

System Table Standards

System table standards must be observed for the following reasons:

- The product installation and upgrade process and customer modification data extract processes depend on the data prefix and owner flag values to determine the system data owned by each product.
- The standards ensure that there will be no data conflict in the product being developed and the future Oracle Utilities Application Framework release.
- The standards ensure that there will be no data conflict between customer modifications and future Oracle Utilities product releases.
- The data prefix is used to prevent test data from being released to production.

  Developer's Note: All test data added to the system data tables must be prefixed by ZZ (all upper case) in order for the installation and upgrade utility to recognize them as test data.

Guidelines for System Table Updates

This section describes guidelines regarding the updating of the system table properties.

Business Configuration Tables

The majority of data in the tables in this group belongs to the customer. But these tables are shipped with some initial data in order for the customer to login to the system and begin configuring the product. Unless specified otherwise, the initial data is maintained by Oracle Utilities Application Framework and subject to subsequent upgrade.

Application Security and User Profile

These tables define the access rights of a User Group to Application Services and Application Users.

Properties	Description
Tables	SC_ACCESS_CNTL, SC USER, SC_USR_GRP_PROF, SC_USR_GRP_USR, SC_USER_GROUP, SC_USER_GROUP_L
Initial Data	User Group All SERVICES and default system user SYSUSER. Upon installation the system default User Group All SERVICES is given unrestricted accesses to all services defined in Oracle Utilities Application Framework.

Developer's Note: When a new service is added to the system, all actions defined for the service must be made available to the User Group All SERVICES.

Currency Code

The ISO 4217 three-letter codes are taken as the standard code for the representation of each currency.

Properties	Description
Tables	CI_CURRENCY_CD, CI_CURRENCY_CD_L
Initial Data	United States Dollar (USD).

DB Process

Properties	Description
Tables	CI_DB_PROC, CI_DB_PROC_L, CI_DB_INSTR, CI_DB_INSTR_L, L, CI_DB_INSTR_OVRD
Initial Data	Copy DB Process (CL-COPDB). This DB process allows users to copy a DB process from one database to another using Config Lab utility.

Display Profile

The Display Profile Code is referenced in the User (SC_USER) table.

Properties	Description
Tables	CI_DISP_PROF, CI_DISP_PROF_L
Initial Data	North America (NORTHAM) and Europe (EURO).

Installation Options

Installation Option has only one row that is shipped with the initial installation of the Oracle Utilities Application Framework. The updatable columns in these tables are customer data and will not be overridden by the upgrade process unless a special script is written and included in the upgrade process.

Properties	Description
Tables	F1_INSTALLATION, CI_INSTALL_ALG, CI_INSTALL_MSG, CI_INSTALL_MSG_L, CI_INSTALL_PROD
Initial Data	Option 11111.

Developer's Note: The system data owner of an environment is defined in the Installation Option. This Owner Flag value is stamped on all system data that is added to this environment. The installation default value is Customer Modification (CM). This value must be changed in the base product development environments.

Language Code

Language Code must be a valid code defined in ISO 639-2 Alpha-3. Adding a new language code to the table without translating all language dependent objects in the system can cause errors when a user chooses the language.

Properties	Description
Tables	CI_LANGUAGE
Initial Data	English (ENG).

To Do Priority and Role

New To Do Types released will be linked to the default To Do Role and set to the product assigned priority value initially. These initial settings can be overridden by the implementation.

Properties	Description
Tables	CI_ROLE(L), CI_TD_VAL_ROLE
Initial Data	F1_DFLT

Development and Implementation System Tables

This section defines the standards for the system tables that contain data for application development. The data in these tables implement business logic and UI functions shared by various products and product extensions in the same database.

Standards

When adding new data, the owner flag value of the environment must prefix certain fields of these tables. For example, when a developer adds a new algorithm type to an Oracle Utilities Smart Grid Gateway environment, C1 should prefix the new Algorithm Type code. The fields that are subject to this rule are listed in Standard Data Fields property.

The data that is already in these tables cannot be modified if the data owner is different than the environment owner. This prevents the developers from accidentally modifying system data that belongs to the Oracle Utilities Application Framework or the base products. However, some fields are exempt from this rule and can be modified by Customer Modification. These fields are listed in the Customer Modification Fields property.

Starting with version 2.2 of the framework a new system data upgrade rule was introduced - Override Owner flag. If duplicate data rows (data row with same primary key values) are found at the time of upgrade, the owner flag values will get overridden. The lower level application system data will override the upper level system data. For example, F1 overrides C1, F1&C1 override CM, and so on. This rule will be applied to the following tables: CI_CHAR_ENTITY, CI_MD_MO_ALG, F1_BUS_OBJ_ALG, F1_BUS_OBJ_STATUS_ALG, CI_MD_MO_OPT, F1_BUS_OBJ_OPT, F1_BUS_OBJ_STATUS_OPT, F1_BUS_OBJ_STATUS, F1_BUS_OBJ_STATUS_L

Algorithm Type

Properties	Description
Tables	CI_ALG_TYPE, CI_ALG_TYPE_L, CI_ALG_TYPE_PRM, CI_ALG_TYPE_PRM_L
Standard Data Fields	Algorithm Type (ALG_TYPE_CD)
Customer Modification	None

Algorithm

Properties	Description
Tables	CI_ALG, CI_ALG_L, CI_ALG_PARM, CI_ALG_VER
Standard Data Fields	Algorithm (ALG_CD)
Customer Modification	None

Application Security

Properties	Description
Tables	SC_APP_SERVICE, SC_APP_SERVICE_L, CI_APP_SVC_ACC
Standard Data Fields	Application Service ID (APP_SVC_ID). Customer care and billing products prior to version 2.0 will continue to use CI as a prefix for the application service.
Customer Modification	None

Batch Control

Properties	Description
Tables	CI_BATCH_CTRL, CI_BATCH_CTRL_L, CI_BATCH_CTRL_P, CI_BATCH_CTRL_P_L
Standard Data Fields	Batch Process (BATCH_CD), Program Name (PROGRAM_NAME)

Properties	Description
Customer Modification	Next Batch Number (NEXT_BATCH_NBR), Last Update Instance (LAST_UPDATE_INST), Last Update Date time (LAST_UPDATE_DTTM) and the batch process update these columns. Time Interval (TIMER_INTERVAL), Thread Count (BATCH_THREAD_CNT), Maximum Commit Records (MAX_COMMIT_RECS), User (USER_ID), Language (LANGUAGE_CD), Email Address (EMAILID), Start program debug tracing (TRC_PGM_STRT_SW), End Program Debug trace (TRC_PGM_END_SW), SQL debug tracing (TRC_SQL_SW) and Standard debug tracing (TRC_STD_SW) on CI_BATCH_CTRL Table. Batch Parameter Value (BATCH_PARM_VAL) on Batch Control Parameters Table (CI_BATCH_CTRL_P)

Business Object

Properties	Description
Tables	F1_BUS_OBJ, F1_BUS_OBJ_L, F1_BUS_OBJ_ALG, F1_BUS_OBJ_OPT, F1_BUS_OBJ_STATUS, F1_BUS_OBJ_STATUS_L, F1_BUS_OBJ_STATUS_ALG, F1_BUS_OBJ_STATUS_OPT, F1_BUS_OBJ_STATUS_RSN, F1_BUS_OBJ_STATUS_RSN_L, F1_BUS_OBJ_STATUS_RSN_CHAR F1_BUS_OBJ_TR_RULE, F1_BUS_OBJ_TR_RULE_L
Standard Data Fields	Business Object (BUS_OBJ_CD), Status Reason (BO_STATUS_REASON_CD)
Customer Modification	Batch Control (BATCH_CD), Alert (BO_ALERT_FLG), Sequence (SORT_SEQ5), Status Reason (STATUS_REASON_FLG) fields on Business Object Status Table (F1_BUS_OBJ_STATUS). Instance Control (INSTANCE_CTRL_FLG), Application Service (APP_SVC_ID) on Business Object Table (F1_BUS_OBJ). Status Reason Selection (STATUS_REASON_SELECT_FLG) on Status Reason Table (F1_BUS_OBJ_STATUS_RSN)

Business Service

Properties	Description
Tables	F1_BUS_SVC, F1_BUS_SVC_L
Standard Data Fields	Business Service (BUS_SVC_CD)
Customer Modification	Application Service (APP_SVC_ID)

Characteristics

Properties	Description
Tables	CI_CHAR_TYPE, CI_CHAR_TYPE_L, CI_CHAR_ENTITY, CI_CHAR_VAL, CI_CHAR_VAL_L
Standard Data Fields	Characteristic Type (CHAR_TYPE_CD)
Customer Modification	Adhoc Characteristic Value Validation Rule (ADHOC_VAL_ALG_CD) on Characteristic Entity Table (CI_CHAR_ENTITY)

Configuration Migration Assistant

Properties	Description
Tables	F1_MIGR_PLAN,F1_MIGR_PLAN_L,F1_MIGR_PLAN_INSTR,F1_MIGR_PLAN_INSTR_L, F1_MIGR_PLAN_INSTR_ALG, F1_MIGR_REQ, F1_MIGR_REQ_L, F1_MIGR_REQ_INSTR, F1_MIGR_REQ_INST R_L, F1_MIGR_REQ_INSTR_ENTITY
Standard Data Fields	Migration Plan Code (MIGR_PLAN_CD), Migration Request Code (MIGR_REQ_CD)
Customer Modification	None

Data Area

Properties	Description
Tables	F1_DATA_AREA, F1_DATA_AREA_L
Standard Data Fields	Data Area Code (DATA_AREA_CD)
Customer Modification	None

Display Icon

Properties	Description
Tables	CI_DISP_ICON, CI_DISP_ICON_L
Standard Data Fields	Display Icon Code (DISP_ICON_CD)
Customer Modification	None

Extendable Lookup

Properties	Description
Tables	F1_EXT_LOOKUP_VAL, F1_EXT_LOOKUP_VAL_L
Standard Data Fields	Business Object (BUS_OBJ_CD), Extendable Lookup Value (F1_EXT_LOOKUP_VALUE)
Customer Modification	Override Description (DESCR_OVRD) on Extendable Lookup Field Value Language Table (F1_EXT_LOOKUP_VAL_L)

Foreign Key Reference

Properties	Description
Tables	CI_FK_REF, CI_FK_REF_L
Standard Data Fields	FK reference code (FK_REF_CD)
Customer Modification	Info Program Name (INFO_PRG), Zone (ZONE_CD)

Inbound Web Service

Properties	Description
Tables	F1_IWS_SVC_L,F1_IWS_SVC,F1_IWS_SVC_OPER_L,F1_IWS_SVC_OPER, F1_IWS_ANN_L,F1_IWS_ANN_PARM, F1_IWS_ANN,F1_IWS_ANN_TYPE_L, F1_IWS_ANN_TYPE, F1_IWS_ANN_TYPE_PARM,F1_IWS_ANN_TYPE_PARM_L
Standard Data Fields	Webservice Name (IN_SVC_NAME), Annotation (ANN_CD), Annotation Type (ANN_TYPE_CD)
Customer Modification	Debug (DEBUG_SW), Active (ACTIVE_SW), Trace (TRACE_SW), Post Error (POST_ERROR_SW), Request XSL (REQUEST_XSL), Response XSL (RESPONSE_XSL)

Lookup

Properties	Description
Tables	CI_LOOKUP_FIELD, CI_LOOKUP_VAL, CI_LOOKUP_VAL_L,
Standard Data Fields	Field Name (FIELD_NAME) • A lookup field name must have corresponding field metadata. The name of the lookup field column must be assigned to avoid conflicts among different products. If you follow the standards for database field names, a Customer Modification lookup field name will be automatically Customer Modification prefixed. Field Value (FIELD_VALUE) • If a lookup field is customizable, Customer Modification can insert new lookup values. X or Y must prefix when implementers introduce a new lookup value. • Product development can extend the Oracle Utilities Application Framework owned lookup field's value with caution. When it needs to be extended, prefix the first letter of the Owner Flag to the value. For example, when adding a new value to the algorithm entity flag (ALG_ENTITY_FLG), prefix with C1 if you are developing an Oracle Utilities Customer Care and Billing product.
Customer Modification	Override Description (DESCR_OVRD) on Lookup Field Value Language Table (CI_LOOKUP_VAL_L)

Map

Properties	Description
Tables	F1_MAP, F1_MAP_L
Standard Data Fields	UI Map (MAP_CD)
Customer Modification	None

Managed Content

Properties	Description
Tables	F1_MANAG_CONTENT, F1_MANAG_CONTENT_L
Standard Data Fields	Managed Content (MANAG_CONTENT_CD)
Customer Modification	None

Messages

Properties	Description
Tables	CI_MSG_CATEGORY, CI_MSG_CATEGORY_L, CI_MSG, CI_MSG_L
Standard Data Fields	Message Category (MESSAGE_CAT_NBR) • Messages are grouped in categories and each category has message numbers between 1 and 99999. A range of message categories is assigned to a product. You must use only the assigned category for your product. • Oracle Utilities Customer Care and Billing and Oracle Utilities Business Intelligence - 00001 thru 00100 • Oracle Utilities Application Framework Java - 11001 thru 11100 • Oracle Utilities Customer Care and Billing Java - 11101 thru 11200 • Oracle Utilities Business Intelligence Java - 11201 thru 11300 • Implementer COBOL - 90000 • Implementer WSS - 90001 • Implementer Java - 90002 • Reserved for Tests - 99999 Message Number (MESSAGE_NBR) for COBOL message categories • Message numbers below 1000 are reserved for common messages. Implementers must not use message numbers below 1000. Message Number (MESSAGE_NBR) for Java message categories • Subsystem Standard Messages - 00001 thru 02000 • Reserved - 02001 thru 09999 • Published Messages - 10001 thru 11000 • Package Messages - 10001 thru 90000 • Reserved - 90001 thru 99999 • Each package is allocated 100 message numbers, each starting from 101. • Published Messages are messages that are special-interest messages that implementations need to know about and are therefore published in the user docs. Examples of these include messages that are highly likely to be changed for an implementation, or messages that are embedded into other texts/messages and therefore the message number is never shown • Reserved message number ranges are for future use and therefore must not be used by all products.

Properties	Description
Customer Modification	Override Description (DESCRLONG_OVRD), Message Text Override (MESSAGE_TEXT_OVRD)

Meta Data - Table and Field

Properties	Description
Tables	CI_MD_TBL, CI_MD_TBL_FLD, CI_MD_TBL_L, CI_MD_TBL_FLD_L, CI_MD_FLD, CI_MD_FLD_L, F1_DB_OBJECTS_REPO
Standard Data Fields	Table Name (TBL_NAME) • Table names must match with the physical table name or view name in the database. • Field Name (FLD_NAME) Field name must match with the physical column name in the database unless the field is a work field. Field name does not have to follow the prefixing standard unless the field is a work field or customer modification field. • F1_DB_OBJECTS_REPO Table stores information about Indexes, Sequences, Triggers and other database objects excluding Tables and Fields (as they are already stored in the other Metadata tables)
Customer Modification	Audit Switches (AUDIT_INSERT_SW, AUDIT_UPDATE_SW, AUDIT_DELETE_SW), Override label (OVRD_LABEL) on MD Table Field Table (CI_MD_TBL_FLD). Audit Program Name (AUDIT_PGM_NAME), Audit Table Name (AUDIT_TBL_NAME), Audit Program Type (AUDIT_PGM_TYPE_FLG), Key Validation (KEY_VALIDATION_FLG) and Caching strategy (CACHE_FLG) on MD Table (CI_MD_TBL). Override Label (OVRD_LABEL) and Customer Specific Description (DESCRLONG_OVRD) on Field Table.

Meta Data - Constraints

Properties	Description
Tables	CI_MD_CONST, CI_MD_CONST_FLD
Standard Data Fields	Constraint Id (CONST_ID) • Index Name for Primary Constraints • <Index Name>Rnn for Foreign Key Constraints Where • nn: integer, 01 through 99
Customer Modification	None

Meta Data - Menu

Menus can be extended to support multiple products by adding a new menu line to an existing menu. The sequence number on the menu line language table (CI_MD_MENU_LINE_L) determines the order the menu lines appear. Within the same sequence, alphabetic sorting is used.

Properties	Description
Tables	CI_MD_MENU, CI_MD_MENU_L, CI_MD_MENU_ITEM, CI_MD_MENU_ITEM_L, CI_MD_MENU_LINE, CI_MD_MENU_LINE_L
Standard Data Fields	Menu Name (MENU_NAME), Menu Item Id (MENU_ITEM_ID), Menu Line Id (MENU_LINE_ID)
Customer Modification	Override Label (OVRD_LABEL) on Menu Line Language Table (CI_MD_MENU_LINE_L)

Meta Data - Program, Location and Services

Properties	Description
Tables	CI_MD_PRG_COM, CI_MD_PRG_LOC, CI_MD_SVC, CI_MD_SVC_L, CI_MD_SVC_PRG, CI_MD_PRG_MOD, CI_MD_PRG_EL_AT, CI_MD_PRG_ELEM, CI_MD_PRG_SEC, CI_MD_PRG_SQL, CI_MD_PRG_VAR, CI_MD_PRG_TAB
Standard Data Fields	Program Component Id (PROG_COM_ID), Location Id (LOC_ID), Program Component Name (PROG_COM_NAME), Service Name (SVC_NAME), Navigation Key (NAVIGATION_KEY)
Customer Modification	User Exit Program Name (USER_EXIT_PGM_NAME) on Program Components Table (CI_MD_PRG_COM),

Meta Data - Maintenance Object

Properties	Description
Tables	CI_MD_MO, CI_MD_MO_L, CI_MD_MO_TBL, CI_MD_MO_OPT, CI_MD_MO_ALG
Standard Data Fields	Maintenance Object (MAINT_OBJ_CD)
Customer Modification	None

Meta Data - Work Tables

Properties	Description
Tables	CI_MD_WRK_TBL, CI_MD_WRK_TBL_L, CI_MD_WRK_TBLFLD, CI_MD_MO_WRK
Standard Data Fields	Work Table Name (WRK_TBL_NAME)
Customer Modification	None

Meta Data - Search Object

Properties	Description
Tables	CI_MD_SO, CI_MD_SO_L, CI_MD_SO_RSFLD, CI_MD_SO_RSFLDAT, CI_MD_SOCG, CI_MD_SOCG_FLD, CI_MD_SOCG_FLDAT, CI_MD_SOCG_L, CI_MD_SOCG_SORT
Standard Data Fields	Search Object (SO_CD)
Customer Modification	None

Navigation Option

Properties	Description
Tables	CI_NAV_OPT, CI_NAV_OPT_L, CI_NAV_OPT_CTXT, CI_NAV_OPT_USG, CI_MD_NAV
Standard Data Fields	Navigation Option Code (NAV_OPT_CD), Navigation Key (NAVIGATION_KEY)
Customer Modification	None

Portal and Zone

Properties	Description
Tables	CI_PORTAL, CI_PORTAL_L, CI_PORTAL_ZONE, CI_ZONE, CI_ZONE_L, CI_ZONE_PRM, CI_ZONE_HDL, CI_ZONE_HDL_L, CI_ZONE_HDL_PRM, CI_ZONE_HDL_PRM_L, CI_UI_ZONE

Properties	Description
Standard Data Fields	Portal Code (PORTAL_CD), Zone Code (ZONE_CD), Zone Type Code (ZONE_HDL_CD) • A new Zone can be added to the Product owned Portal Pages. • The existing Zones cannot be removed from the Product owned Portal Pages.
Customer Modification	Sort Sequence (SORT_SEQ) on Context Sensitive Zone Table (CI_UI_ZONE). Show on Portal Preferences (USER_CONFIG_FLG) on Portal Table (CI_PORTAL). Override Sequence (SORT_SEQ_OVRD) on Portal Zone Table (CI_PORTAL_ZONE). Customer Specific Description (DESCRLONG_OVRD) on Zone Language Table (CI_ZONE_L). Override Parameter Value (ZONE_HDL_PARM_OVRD) on Zone Type Parameters Table (CI_ZONE_HDL_PRM). Override Parameter Value (ZONE_PARM_VAL_OVRD) on Zone Parameters Table (CI_ZONE_PRM).

Sequence

Properties	Description
Tables	CI_SEQ
Standard Data Fields	Sequence Name (SEQ_NAME)
Customer Modification	Sequence Number (SEQ_NBR) This field is updated by the application process and must be set to 1 initially.

Schema

Properties	Description
Tables	F1_SCHEMA
Standard Data Fields	Schema Name (SCHEMA_NAME)
Customer Modification	None

Script

Properties	Description
Tables	CI_SCR, CI_SCR_L, CI_SCR_CRT, CI_SCR_CRT_GRP, CI_SCR_CRT_GRP_L, CI_SCR_DA, CI_SCR_FLD_MAP, CI_SCR_PRMPT, CI_SCR_PRMPT_L, CI_SCR_STEP, CI_SCR_STEP_L
Standard Data Fields	Script (SCR_CD)
Customer Modification	None

To Do Type

Properties	Description
Tables	CI_TD_TYPE, CI_TD_TYPE_L, CI_TD_SRTKEY_TY, CI_TD_DRLKEY_TY, CI_TD_SRTKEY_TY_L
Standard Data Fields	To Do Type Code (TD_TYPE_CD)
Customer Modification	Creation Batch Code (CRE_BATCH_CD), Route Batch Code (RTE_BATCH_CD), Priority Flag (TD_PRIORITY_FLG) on To Do Type Table (CI_TD_TYPE)

XAI Configuration

Properties	Description
Tables	CI_XAI_ADAPTER, CI_XAI_ADAPTER_L, CI_XAI_CLASS, CI_XAI_CLASS_L, CI_XAI_ENV_HNDL, CI_XAI_ENV_HNDL_L, CI_XAI_FORMAT, CI_XAI_FORMAT_L, CI_XAI_RCVR, CI_XAI_RCVR_L, CI_XAI_RCVR_CTX, CI_XAI_RCVR_RSP, CI_XAI_RCVR_RGRP, CI_XAI_SENDER, CI_XAI_SERNDER_L, CI_XAI_SNDR_CTX, CI_XAI_OPTION
Standard Data Fields	Adapter Id (XAI_ADAPTER_ID), Class Id (XAI_CLASS_ID), Envelope Handler Id (XAI_ENV_HNDL_ID), XAI Format Id (XAI_FORMAT_ID), Receiver Id (XAI_RCVR_ID), Sender Id (XAI_SENDER_ID)
Customer Modification	Option Value (OPTION_VALUE) on XAI Option Table (CI_XAI_OPTION)

The following XAI tables might have system data installed upon the initial installation but a subsequence system data upgrade process will not update the content of these table unless the change is documented in the database upgrade guide: CI_XAI_RCVR, CI_XAI_RCVR_L, CI_XAI_RCVR_CTX, CI_XAI_RCVR_RSP, CI_XAI_RCVR_RGRP, CI_XAI_SENDER, CI_XAI_SERNDER_L, CI_XAI_SNDR_CTX

XAI Services

Properties	Description
Tables	CI_XAI_IN_SVC, CI_XAI_IN_SVC_L, CI_XAI_SVC_PARM
Standard Data Fields	XAI Inbound Service Id (XAI_IN_SVC_ID), XAI Inbound Service Name (XAI_IN_SVC_NAME)
Customer Modification	XAI Version (XAI_VERSION_ID), Trace (TRACE_SW), Debug (DEBUG_SW), Request XSL (INPUT_XSL), Response XSL (RESPONSE_XSL), Record XSL (RECORD_XSL and Post Error (POST_ERROR_SW) on XAI Inbound Service Table (CI_XAI_IN_SVC)

Oracle Utilities Application Framework Only Tables

All data of the tables in this group belong to the Oracle Utilities Application Framework. No data modification or addition is allowed for these tables by base product development and customer modification. When an environment is upgraded to the next release of the Oracle Utilities Application Framework, the upgrade process will refresh the data in these tables.

- CI_MD_AT_DTL / CI_MD_AT_DTL_L
- CI_MD_ATT_TY
- CI_MD_CTL / CI_MD_CTL_L
- CI_MD_CTL_TMPL
- CI_MD_ELTY / CI_MD_ELTY_L
- CI_MD_ELTY_AT
- CI_MD_LOOKUP / CI_MD_LOOKUP_F
- CI_MD_PDF / CI_MD_PDF_VAL
- CI_MD_MSG / CI_MD_MSG_L
- CI_MD_SRC_TYPE / CI_MD_SRC_TYPE_L
- CI_MD_TMPL / CI_MD_TMPL_L
- CI_MD_TMPL_ELTY
- CI_MD_TMPL_VAR / CI_MD_TMPL_VAR_L
- CI_MD_VAR / CI_MD_VAR_DTL / CI_MD_VAR_DTL_L
- CI_XAI_EXECUTER / CI_XAI_EXECUTER_L

System Table List

This section contains names of system tables, upgrade actions, and a brief description of tables. The upgrade actions are explained below.

Keep (KP): The data in the table in the customer's database is kept untouched. No insert or delete is performed to this table by the upgrade process. The initial installation will add necessary data for the system

Merge (MG): The non-base product data in the table in the database is kept untouched. If the data belongs to the base product, any changes pertaining to the new version of the software are performed.

Refresh (RF): The existing data in the table is replaced with the data from the base product table.

> **Note.** New product data is also inserted into tables marked as 'Merge'. If implementers add rows for a customer specific enhancement, it can cause duplication when the system data gets upgraded to the next version. We strongly recommend following the guidelines on how to use designated range of values or prefixes to segregate the implementation data from the base product data.

Table Name	Upgrade Action	Description
CI_ALG	MG	Algorithm
CI_ALG_L	MG	Algorithm Language
CI_ALG_PARM	MG	Algorithm Parameters
CI_ALG_TYPE	MG	Algorithm Type
CI_ALG_TYPE_L	MG	Algorithm Type Language
CI_ALG_TYPE_PRM	MG	Algorithm Type Parameter
CI_ALG_TYPE_PRM_L	MG	Algorithm Type Parameter Language
CI_ALG_VER	MG	Algorithm Version
CI_APP_SVC_ACC	MG	Application Service Access Mode
CI_BATCH_CTRL	MG	Batch Control
CI_BATCH_CTRL_ALG	MG	Batch Control Algorithm
CI_BATCH_CTRL_L	MG	Batch Control Language
CI_BATCH_CTRL_P	MG	Batch Control Parameters
CI_BATCH_CTRL_P_L	MG	Batch Control Parameters Language
CI_CHAR_ENTITY	MG	Characteristic Type Entity
CI_CHAR_TYPE	MG	Characteristic Type
CI_CHAR_TYPE_L	MG	Characteristic Type Language
CI_CHAR_VAL	MG	Characteristic Type Value
CI_CHAR_VAL_L	MG	Characteristic Type Value Language

Table Name	Upgrade Action	Description
CI_DISP_ICON	MG	Display Icon
CI_DISP_ICON_L	MG	Display Icon Language
CI_FK_REF	MG	Foreign Key Reference
CI_FK_REF_L	MG	Foreign Key Reference Language
CI_LANGUAGE	MG	Language Code
CI_LOOKUP_FIELD	MG	Lookup Field
CI_LOOKUP_VAL	MG	Lookup Field Value
CI_LOOKUP_VAL_L	MG	Lookup Field Value Language
CI_MD_CONST	MG	Constraints
CI_MD_CONST_FLD	MG	Constraint Fields
CI_MD_FLD	MG	Field
CI_MD_FLD_L	MG	Field Language
CI_MD_MENU	MG	Menu Information
CI_MD_MENU_IMOD	MG	Menu Item Module Maint
CI_MD_MENU_ITEM	MG	Menu Item
CI_MD_MENU_ITEM_L	MG	Menu Item Language
CI_MD_MENU_L	MG	Menu Language
CI_MD_MENU_LINE	MG	Menu Line
CI_MD_MENU_LINE_L	MG	Menu Line Language
CI_MD_MENU_MOD	MG	Menu Product Components
CI_MD_MO	MG	Maintenance Object
CI_MD_MO_ALG	MG	Maintenance Object Algorithm
CI_MD_MO_L	MG	Maintenance Object Language
CI_MD_MO_OPT	MG	Maintenance Object Option
CI_MD_MO_TBL	MG	Maintenance Object Table
CI_MD_MO_WRK	MG	Maintenance Object Work Tables
CI_MD_NAV	MG	Navigation Key
CI_MD_PRG_COM	MG	Program Components
CI_MD_PRG_ELEM	MG	UI Page Elements
CI_MD_PRG_EL_AT	MG	UI Page Element Attributes

Table Name	Upgrade Action	Description
CI_MD_PRG_LOC	MG	Program Location
CI_MD_PRG_MOD	MG	Program Module
CI_MD_PRG_SEC	MG	UI Page Sections
CI_MD_PRG_SQL	MG	MD SQL Meta Data
CI_MD_PRG_TAB	MG	UI Tab Meta Data
CI_MD_PRG_VAR	MG	Program Variable
CI_MD_SO	MG	Search Object
CI_MD_SOCG	MG	Search Object Criteria Group
CI_MD_SOCG_FLD	MG	Search Object Criteria Group Field
CI_MD_SOCG_FLDAT	MG	Search Criteria Group Field Attribute
CI_MD_SOCG_L	MG	Search Object Criteria Group Language
CI_MD_SOCG_SORT	MG	Search Criteria Group Result Sort Order
CI_MD_SO_L	MG	Search Object Language
CI_MD_SO_RSFLD	MG	Search Object Result Field
CI_MD_SO_RSFLDAT	MG	Search Object Result Field Attribute
CI_MD_SVC	MG	MD Service
CI_MD_SVC_L	MG	MD Service Language
CI_MD_SVC_PRG	MG	MD Service Program
CI_MD_TAB_MOD	MG	UI Tab Module
CI_MD_TBL	MG	MD Table
CI_MD_TBL_FLD	MG	MD Table Field
CI_MD_TBL_FLD_L	MG	MD Table Field Language
CI_MD_TBL_L	MG	MD Table Language
CI_MD_WRK_TBL	MG	Work Table
CI_MD_WRK_TBLFLD	MG	Work Table Field
CI_MD_WRK_TBL_L	MG	Work Table Language
CI_MSG	MG	Message
CI_MSG_CATEGORY	MG	Message Category
CI_MSG_CATEGORY_L	MG	Message Category Language
CI_MSG_L	MG	Message Language

Table Name	Upgrade Action	Description
CI_NAV_OPT	MG	Navigation Option
CI_NAV_OPT_CTXT	MG	Navigation Option Context
CI_NAV_OPT_L	MG	Navigation Option Language
CI_NAV_OPT_USG	MG	Navigation Option Usage
CI_PORTAL	MG	Portal
CI_PORTAL_L	MG	Portal Language
CI_PORTAL_ZONE	MG	Portal Zone
CI_SCR	MG	Script
CI_SCR_CRT	MG	Script Criteria
CI_SCR_CRT_GRP	MG	Script Criteria Group
CI_SCR_CRT_GRP_L	MG	Script Criteria Group Language
CI_SCR_DA	MG	Script Data Area
CI_SCR_FLD_MAP	MG	Script Field Mapping
CI_SCR_L	MG	Script Language
CI_SCR_PRMPT	MG	Script Prompt
CI_SCR_PRMPT_L	MG	Script Prompt Language
CI_SCR_STEP	MG	Script Step
CI_SCR_STEP_L	MG	Script Step Language
CI_SEQ	MG	Sequence
CI_TD_DRLKEY_TY	MG	To Do Type Drill Key
CI_TD_SRTKEY_TY	MG	To Do Type Sort Key
CI_TD_SRTKEY_TY_L	MG	To Do Type Sort Key Language
CI_TD_TYPE	MG	To Do Type
CI_TD_TYPE_L	MG	To Do Type Language
CI_UI_ZONE	MG	Context Sensitive Zone
CI_USR_NAV_LINK	MG	User Favorite Links
CI_XAI_ADAPTER	MG	XAI Adapter
CI_XAI_ADAPTER_L	MG	XAI Adapter Lang
CI_XAI_CLASS	MG	XAI Class
CI_XAI_CLASS_L	MG	XAI Class Language
CI_XAI_ENV_HNDL	MG	XAI Envelope Handler

Table Name	Upgrade Action	Description
CI_XAI_ENV_HNDL_L	MG	XAI Envelope Handler Language
CI_XAI_IN_SVC	MG	XAI Inbound Service
CI_XAI_IN_SVC_L	MG	XAI Inbound Service Language
CI_XAI_SVC_PARM	MG	XAI Inbound Service Parameters
CI_ZONE	MG	Zone
CI_ZONE_HDL	MG	Zone Type
CI_ZONE_HDL_L	MG	Zone Type Language
CI_ZONE_HDL_PRM	MG	Zone Type Parameters
CI_ZONE_HDL_PRM_L	MG	Zone Type Parameters Language
CI_ZONE_L	MG	Zone Language
CI_ZONE_PRM	MG	Zone Parameters
F1_BUS_OBJ	MG	Business Object
F1_BUS_OBJ_ALG	MG	Business Object Algorithm
F1_BUS_OBJ_L	MG	Business Object Language
F1_BUS_OBJ_OPT	MG	Business Object Option
F1_BUS_OBJ_STATUS	MG	Business Object Status
F1_BUS_OBJ_STATUS_ALG	MG	Business Object Status Algorithm
F1_BUS_OBJ_STATUS_L	MG	Business Object Status Language
F1_BUS_OBJ_STATUS_OPT	MG	Business Object Status Option
F1_BUS_OBJ_STATUS_RSN	MG	Status Reason
F1_BUS_OBJ_STATUS_RSN_L	MG	Status Reason Language
F1_BUS_OBJ_TR_RULE	MG	Business Object Transition Rule
F1_BUS_OBJ_TR_RULE_L	MG	Business Object Transition Rule Language
F1_BUS_SVC	MG	Business Service
F1_BUS_SVC_L	MG	Business Service Language
F1_DATA_AREA	MG	Data Area

Table Name	Upgrade Action	Description
F1_DATA_AREA_L	MG	Data Area Language
F1_DB_OBJECTS_REPO	MG	Database Objects Repository
F1_EXT_LOOKUP_VAL	MG	Extendable Lookup
F1_EXT_LOOKUP_VAL_L	MG	Extendable Lookup Language
F1_IWS_ANN	MG	Inbound Web Service Annotation
F1_IWS_ANN_L	MG	Inbound Web Service Annotation Language
F1_IWS_ANN_PARM	MG	Inbound Web Service Annotation Parameter
F1_IWS_ANN_TYPE	MG	Inbound Web Service Annotation Type
F1_IWS_ANN_TYPE_L	MG	Inbound Web Service Annotation Type Language
F1_IWS_ANN_TYPE_PARM	MG	Inbound Web Service Annotation Type Parm
F1_IWS_ANN_TYPE_PARM_L	MG	Inbound Web Service Annotation Type Parameter Language
F1_IWS_SVC	MG	Inbound Web Service
F1_IWS_SVC_L	MG	Inbound Web Service Language
F1_IWS_SVC_OPER	MG	Inbound Web Service Operations
F1_IWS_SVC_OPER_L	MG	Inbound Web Service Operations Language
F1_MANAG_CONTENT	MG	Managed Content
F1_MANAG_CONTENT_L	MG	Managed Content Language
F1_MAP	MG	UI Map
F1_MAP_L	MG	UI Map Language
F1_MIGR_PLAN	MG	Migration Plan
F1_MIGR_PLAN_INSTR	MG	Migration Plan Instruction
F1_MIGR_PLAN_INSTR_ALG	MG	Migration Plan Instruction Algorithm
F1_MIGR_PLAN_INSTR_L	MG	Migration Plan Instruction Language
F1_MIGR_PLAN_L	MG	Migration Plan Language

Table Name	Upgrade Action	Description
F1_MIGR_REQ	MG	Migration Request
F1_MIGR_REQ_INSTR	MG	Migration Request Instruction
F1_MIGR_REQ_INSTR_ENTITY	MG	Migration Request Instruction Entity
F1_MIGR_REQ_INSTR_L	MG	Migration Request Instruction Language
F1_MIGR_REQ_L	MG	Migration Request Language
F1_SCHEMA	MG	Schema
SC_ACCESS_CNTL	MG	User Group Access Control
SC_APP_SERVICE	MG	Application Service
SC_APP_SERVICE_L	MG	Application Service Language
SC_USR_GRP_PROF	MG	User Group Profile
CI_ACC_GRP	KP	Access Group
CI_ACC_GRP_DAR	KP	Access Group / Data Access Group
CI_ACC_GRP_L	KP	Access Group Language
CI_APP_SVC_SCTY	KP	Security Type Application Service
CI_CAL_HOL	KP	Work Calendar Holidays
CI_CAL_HOL_L	KP	Work Calendar Holidays Language
CI_CAL_WORK	KP	Work Calendar
CI_CAL_WORK_L	KP	Work Calendar Language
CI_CHTY_TDTY	KP	To Do Type Template Characteristics
CI_COUNTRY	KP	Country
CI_COUNTRY_L	KP	Country Language
CI_CURRENCY_CD	KP	Currency Code
CI_CURRENCY_CD_L	KP	Currency Code Language
CI_DAR	KP	Data Access Role
CI_DAR_L	KP	Data Access Language
CI_DAR_USR	KP	Data Access User
CI_DB_INSTR	KP	DB Process Instruction

Table Name	Upgrade Action	Description
CI_DB_INSTR_ALG	KP	DB Process Instruction Algorithm
CI_DB_INSTR_L	KP	DB Process Instruction Language
CI_DB_INST_OVRD	KP	DB Process Instruction Override
CI_DB_PROC	KP	DB Process
CI_DB_PROC_L	KP	DB Process Language
CI_DISP_PROF	KP	Display Profile
CI_DISP_PROF_L	KP	Display Profile Language
CI_ENV_REF	KP	Environment Reference
CI_ENV_REF_L	KP	Environment Reference Language
CI_FUNC	KP	Function
CI_FUNC_FLD	KP	Function Field
CI_FUNC_FLD_L	KP	Function Field Language
CI_FUNC_L	KP	Function Language
CI_GEO_TYPE	KP	Geographic Type
CI_GEO_TYPE_L	KP	Geographic Type Language
CI_INSTALL_ALG	KP	Installation Algorithm
CI_INSTALL_MSG	KP	Installation Message
CI_INSTALL_MSG_L	KP	Installation Message Language
CI_INSTALL_PROD	KP	Installation Product
CI_MD_RPT	KP	Report Definition
CI_MD_RPT_L	KP	Report Language
CI_MD_RPT_LBL	KP	Report Labels
CI_MD_RPT_PARM	KP	Report Parameters
CI_MD_RPT_PARM_L	KP	Report Parameters Language
CI_MD_TOOLREP_XML	KP	MD Tool Reference XML
CI_MD_TOOL_REP	KP	MD Tool Reference
CI_NT_DNTY_CTXT	KP	Notification Download Type Context
CI_NT_DWN_FORM	KP	Notification Download Format

Table Name	Upgrade Action	Description
CI_NT_DWN_FORM_L	KP	Notification Download Format Language
CI_NT_DWN_PROF	KP	Notification Download Profile
CI_NT_DWN_PROF_L	KP	Notification Download Profile Language
CI_NT_DWN_TYPE	KP	Notification Download Type
CI_NT_DWN_TYPE_L	KP	Notification Download Type Language
CI_NT_UP_XTYPE	KP	Notification Upload Type
CI_NT_UP_XTYPE_L	KP	Notification Upload Type Language
CI_NT_XID	KP	External System
CI_NT_XID_L	KP	External System Language
CI_PHONE_TYPE	KP	Phone Type
CI_PHONE_TYPE_L	KP	Phone Type Language
CI_ROLE	KP	Role
CI_ROLE_L	KP	Role Language
CI_ROLE_USER	KP	Role User
CI_RPT_OPTION	KP	Report Options
CI_SC_AUTH_LVL	KP	Security Type Auth Level
CI_SC_AUTH_LVL_L	KP	Security Type Auth Level Language
CI_SC_TYPE	KP	Security Type
CI_SC_TYPE_L	KP	Security Type Language
CI_SEAS_SHIFT	KP	Seasonal Time Shift Schedule
CI_SEAS_TM_SHIFT	KP	Seasonal Time Shift
CI_SEAS_TM_SHIFT_L	KP	Seasonal Shift Language
CI_STATE	KP	State
CI_STATE_L	KP	State Language
CI_TD_EX_LIST	KP	To Do Type Message Overrides
CI_TD_TYPE_ALG	KP	To Do Type Algorithms
CI_TD_TYPE_CHAR	KP	To Do Type Characteristic
CI_TD_VAL_ROLE	KP	To Do Type Role

Table Name	Upgrade Action	Description
CI_TIME_ZONE	KP	Time Zone
CI_TIME_ZONE_L	KP	Time Zone Language
CI_USR_GRP_SC	KP	User Group Security Type
CI_USR_PORTAL	KP	User Portal
CI_USR_SCR	KP	User Scripts
CI_USR_ZONE	KP	User Zone
CI_WFM	KP	Feature Configuration
CI_WFM_L	KP	Feature Configuration Language
CI_WFM_MSG	KP	Feature Configuration Message
CI_WFM_OPT	KP	Feature Configuration Options
CI_WF_EVT_TYPE	KP	WF Event Type
CI_WF_EVT_TYPE_L	KP	WF Event Type Language
CI_WF_PP	KP	WF Process Profile
CI_WF_PP_L	KP	WF Process Profile Language
CI_WF_PP_NT	KP	WF Process Notification
CI_WF_PP_NT_CRT	KP	WF Process Notification Criteria
CI_WF_PROC_SCHED	KP	WF Process Creation Schedule
CI_WF_PROC_SCHED_K	KP	WF Process Creation Schedule Key
CI_WF_PROC_TMPL	KP	WF Process Template
CI_WF_PROC_TMPL_L	KP	WF Process Template Language
CI_WF_RESP	KP	WF Response
CI_WF_RESP_DEP	KP	WF Response Dependency
CI_XAI_JDBC_CON	KP	XAI JDBC Connection
CI_XAI_JDBC_CON_L	KP	XAI JDBC Connection Language
CI_XAI_JMS_CON	KP	XAI JMS Connection
CI_XAI_JMS_CON_L	KP	XAI JMS Connection Language
CI_XAI_JMS_Q	KP	XAI JMS Queue

Table Name	Upgrade Action	Description
CI_XAI_JMS_Q_L	KP	XAI JMS Queue Language
CI_XAI_JMS_TPC	KP	XAI JMS Topic
CI_XAI_JMS_TPC_L	KP	XAI JMS Topic Language
CI_XAI_JNDI_SVR	KP	XAI JNDI Server
CI_XAI_JNDI_SVR_L	KP	XAI JNDI Server Language
CI_XAI_OPTION	KP	XAI Option
CI_XAI_RCVR	KP	XAI Receiver
CI_XAI_RCVR_CTX	KP	XAI Receiver Context
CI_XAI_RCVR_L	KP	XAI Receiver Language
CI_XAI_RCVR_RGRP	KP	XAI Receiver Rule Group
CI_XAI_RCVR_RSP	KP	XAI Receiver Response
CI_XAI_RGRP	KP	XAI Rule Group
CI_XAI_RGRP_ATT	KP	XAI Rule Group Attachment
CI_XAI_RGRP_L	KP	XAI Rule Group Language
CI_XAI_ROUTING	KP	XAI Routing
CI_XAI_RT_TYPE	KP	XAI Route Type
CI_XAI_RT_TYPE_L	KP	XAI Route Type Language
CI_XAI_RULE	KP	XAI Rule
CI_XAI_SENDER	KP	XAI Sender
CI_XAI_SENDER_L	KP	XAI Sender Language
CI_XAI_SNDR_CTX	KP	XAI Sender Context
F1_BKT_CONFIG	KP	Bucket Configuration
F1_BKT_CONFIG_L	KP	Bucket Configuration Language
F1_BKT_CONFIG_REL_OBJ	KP	Bucket Configuration Related Object
F1_BKT_CONFIG_VAL	KP	Bucket Configuration Value
F1_BKT_CONFIG_VAL_L	KP	Bucket Configuration Value Language
F1_BUS_OBJ_STATUS_RSN_CHAR	KP	Status Reason Characteristic
F1_EXTSYS_OUTMSG_PROF	KP	External System Outbound Message Type
F1_INSTALLATION	KP	Installation Option - Framework

Table Name	Upgrade Action	Description
F1_IWS_ANN_CHAR	KP	Inbound Web Service Annotation Characteristics
F1_IWS_ANN_TYPE_CHAR	KP	Inbound Web Service Annotation Type Characteristics
F1_IWS_SVC_ANN	KP	Inbound Web Service Link to Annotation
F1_IWS_SVC_CHAR	KP	Inbound Web Service Characteristics
F1_IWS_SVC_LOG	KP	Inbound Web Service Log
F1_IWS_SVC_LOG_PARM	KP	Inbound Web Service Log Parameter
F1_MAP_OVRD	KP	UI Map Override
F1_MD_DB_OBJ	KP	MD Database Object
F1_MST_CONFIG	KP	Master Configuration
F1_OUTMSG_TYPE	KP	Outbound Message Type
F1_OUTMSG_TYPE_L	KP	Outbound Message Type Language
F1_REQ_TYPE	KP	Request Type
F1_REQ_TYPE_L	KP	Request Type Language
F1_REQ_TYPE_LOG	KP	Request Type Log
F1_REQ_TYPE_LOG_PARM	KP	Request Type Log Parameters
F1_SVC_TASK_TYPE	KP	Service Task Type
F1_SVC_TASK_TYPE_CHAR	KP	Service Task Type Characteristics
F1_SVC_TASK_TYPE_L	KP	Service Task Type Language
F1_WEB_SVC	KP	Web Service Adapter
F1_WEB_SVC_CHAR	KP	Web Service Adapter Characteristics
F1_WEB_SVC_L	KP	Web Service Adapter Language
F1_WEB_SVC_LOG	KP	Web Service Adapter Log
F1_WEB_SVC_LOG_PARM	KP	Web Service Adapter Log Parameter
F1_WEB_SVC_OPERATIONS	KP	Web Service Adapter Operations
SC_USER	KP	User

Table Name	Upgrade Action	Description
SC_USER_CHAR	KP	User Characteristic
SC_USER_GROUP	KP	User Group
SC_USER_GROUP_L	KP	User Group Language
SC_USR_GRP_USR	KP	User Group User
CI_MD_ATT_TY	RF	MD Element Attribute Type
CI_MD_AT_DTL	RF	MD Element Attribute Type Detail
CI_MD_AT_DTL_L	RF	MD Element Attribute Type Detail Language
CI_MD_CTL	RF	Generator Control
CI_MD_CTL_L	RF	Generator Control Language
CI_MD_CTL_TMPL	RF	Generator Control Template
CI_MD_ELTY	RF	MD Element Type
CI_MD_ELTY_AT	RF	Element Type Attributes
CI_MD_ELTY_L	RF	Element Type Language
CI_MD_LOOKUP_F	RF	MD Lookup Field
CI_MD_MSG	RF	MD Message
CI_MD_MSG_L	RF	MD Message Language
CI_MD_PDF	RF	Predefined Fields
CI_MD_PDF_VAL	RF	Predefined Values
CI_MD_SRC_TYPE	RF	Source Type
CI_MD_SRC_TYPE_L	RF	Source Type Language
CI_MD_TMPL	RF	Template
CI_MD_TMPL_ELTY	RF	Template Element Types
CI_MD_TMPL_L	RF	Template Language
CI_MD_TMPL_VAR	RF	Template Variable
CI_MD_TMPL_VAR_L	RF	Template Variable Language
CI_MD_VAR	RF	Variable
CI_MD_VAR_DTL	RF	Variable Detail
CI_MD_VAR_DTL_L	RF	Variable Detail Language
CI_XAI_EXECUTER	RF	XAI Executer
CI_XAI_EXECUTER_L	RF	XAI Executer Language

Appendix C

Partitioning Recommendations for Oracle Utilities Smart Grid Gateway

This section specifies the partitioning and compression strategies recommended for an initial Oracle Utilities Smart Grid Gateway database configuration. It includes the following topics:

Partitioning Recommendations

In general, the recommendation is for a minimum of 'n' partitions for selective database objects, where 'n' is number of RAC nodes. The specific table level partitioning recommendations are as follows:

- The Table Partitioning scheme for Transaction tables is focused primarily on tables associated with Measurement MO, Measurement Log MO and Initial-Measurement-Data MO.
- D1_MSRMT, D1_MSRMT_CHAR, D1_MSRMT_LOG, D1_MSRMT_LOG_PARM tables can be partitioned by MSRMT_DTTM (smaller partition better performance). Begin with 60-days partitions. Subpartition these tables by MEASR_COMP_ID (8 subpartitions should be a good number to start with).
- D1_INIT_MSRMT_DATA table can be partitioned by D1_TO_DTTM (smaller partitions lead to better performance). 60-days partitions is a good start. Subpartition D1_INIT_MSRMT_DATA table by MEASR_COMP_ID (8 subpartitions should be a good number to start with).
- D1_INIT_MSRMT_DATA_CHAR,D1_INIT_MSRMT_DATA_K,D1_INIT_MSRMT_DATA_LOG,D1_INIT_MSRMT_DATA_LOG_PARM tables can be partitioned by INIT_MSRMT_DATA_ID (8 sub partitions should be a good number to start with).

The following sections gives partition recommendation and can be used as reference. It includes the following:

- D1_INIT_MSRMT_DATA_K
- D1_INIT_MSRMT_DATA_LOG
- D1_INIT_MSRMT_DATA_LOG_PARM

D1_MSRMT

```
CREATE TABLE D1_MSRMT
  (
    MEASR_COMP_ID CHAR(12 BYTE) NOT NULL ENABLE,
    MSRMT_DTTM DATE NOT NULL ENABLE,
    BO_STATUS_CD   CHAR(12 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    MSRMT_COND_FLG CHAR(6 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    MSRMT_USE_FLG  CHAR(4 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    MSRMT_LOCAL_DTTM DATE NOT NULL ENABLE,
    MSRMT_VAL          NUMBER(16,6) DEFAULT 0 NOT NULL ENABLE,
    ORIG_INIT_MSRMT_ID CHAR(14 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    PREV_MSRMT_DTTM DATE,
    MSRMT_VAL1  NUMBER(16,6) DEFAULT 0 NOT NULL ENABLE,
    MSRMT_VAL2  NUMBER(16,6) DEFAULT 0 NOT NULL ENABLE,
    MSRMT_VAL3  NUMBER(16,6) DEFAULT 0 NOT NULL ENABLE,
    MSRMT_VAL4  NUMBER(16,6) DEFAULT 0 NOT NULL ENABLE,
    MSRMT_VAL5  NUMBER(16,6) DEFAULT 0 NOT NULL ENABLE,
    MSRMT_VAL6  NUMBER(16,6) DEFAULT 0 NOT NULL ENABLE,
    MSRMT_VAL7  NUMBER(16,6) DEFAULT 0 NOT NULL ENABLE,
    MSRMT_VAL8  NUMBER(16,6) DEFAULT 0 NOT NULL ENABLE,
    MSRMT_VAL9  NUMBER(16,6) DEFAULT 0 NOT NULL ENABLE,
    MSRMT_VAL10 NUMBER(16,6) DEFAULT 0 NOT NULL ENABLE,
    BUS_OBJ_CD  CHAR(30 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CRE_DTTM DATE NOT NULL ENABLE,
    STATUS_UPD_DTTM DATE NOT NULL ENABLE,
    USER_EDITED_FLG CHAR(4 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    VERSION         NUMBER(5,0) DEFAULT 1 NOT NULL ENABLE
  ) TABLESPACE <Tablespace_Name>
ENABLE ROW MOVEMENT
  PARTITION BY RANGE (MSRMT_DTTM)
SUBPARTITION BY range (MEASR_COMP_ID)
SUBPARTITION TEMPLATE(
subpartition SUB1 values less than (124999999999),
subpartition SUB2 values less than (249999999999),
subpartition SUB3 values less than (374999999999),
subpartition SUB4 values less than (499999999999),
subpartition SUB5 values less than (624999999999),
subpartition SUB6 values less than (744999999999),
subpartition SUB7 values less than (874999999999),
subpartition SUB8 values less than (maxvalue)
)
(PARTITION P1 VALUES LESS THAN(TO_DATE('15/12/2010 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P2 VALUES LESS THAN(TO_DATE('13/02/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P3 VALUES LESS THAN(TO_DATE('14/04/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P4 VALUES LESS THAN(TO_DATE('13/06/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P5 VALUES LESS THAN(TO_DATE('12/08/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P6 VALUES LESS THAN(TO_DATE('11/10/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P7 VALUES LESS THAN(TO_DATE('10/12/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
```

```
PARTITION P8 VALUES LESS THAN(MAXVALUE)
```

Note: For implementations on Exadata the following D1T298S1 Index is not required:

```
CREATE UNIQUE INDEX D1T298S1 on D1_MSRMT  (MEASR_COMP_ID, MSRMT_DTTM,
MSRMT_COND_FLG, MSRMT_USE_FLG, MSRMT_LOCAL_DTTM, MSRMT_VAL,
MSRMT_VAL1, MSRMT_VAL2, USER_EDITED_FLG) TABLESPACE <Tablespace_Name>
local COMPRESS 1;
```

D1_MSRMT_CHAR

```
CREATE TABLE D1_MSRMT_CHAR
  (
    MEASR_COMP_ID CHAR(12 BYTE) NOT NULL ENABLE,
    MSRMT_DTTM DATE NOT NULL ENABLE,
    CHAR_TYPE_CD   CHAR(8 BYTE) NOT NULL ENABLE,
    SEQ_NUM        NUMBER(3,0) NOT NULL ENABLE,
    CHAR_VAL       CHAR(16 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    ADHOC_CHAR_VAL VARCHAR2(254 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL_FK1   VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL_FK2   VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL_FK3   VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL_FK4   VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL_FK5   VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    SRCH_CHAR_VAL  VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    VERSION        NUMBER(5,0) DEFAULT 1 NOT NULL ENABLE
    )  TABLESPACE <Tablespace_Name>
ENABLE ROW MOVEMENT
  PARTITION BY RANGE (MSRMT_DTTM)
SUBPARTITION BY range (MEASR_COMP_ID)
SUBPARTITION TEMPLATE(
subpartition SUB1 values less than (124999999999),
subpartition SUB2 values less than (249999999999),
subpartition SUB3 values less than (374999999999),
subpartition SUB4 values less than (499999999999),
subpartition SUB5 values less than (624999999999),
subpartition SUB6 values less than (744999999999),
subpartition SUB7 values less than (874999999999),
subpartition SUB8 values less than (maxvalue)
)
(PARTITION P1 VALUES LESS THAN(TO_DATE('15/12/2010 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P2 VALUES LESS THAN(TO_DATE('13/02/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P3 VALUES LESS THAN(TO_DATE('14/04/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P4 VALUES LESS THAN(TO_DATE('13/06/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P5 VALUES LESS THAN(TO_DATE('12/08/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P6 VALUES LESS THAN(TO_DATE('11/10/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P7 VALUES LESS THAN(TO_DATE('10/12/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P8 VALUES LESS THAN(MAXVALUE)
);



CREATE UNIQUE INDEX  D1T299P0 ON D1_MSRMT_CHAR
  (
    MEASR_COMP_ID, MSRMT_DTTM, CHAR_TYPE_CD, SEQ_NUM
  ) TABLESPACE <Tablespace_Name>  local COMPRESS 1;

ALTER TABLE D1_MSRMT_CHAR  ADD CONSTRAINT D1T299P0 PRIMARY KEY
(MEASR_COMP_ID, MSRMT_DTTM, CHAR_TYPE_CD, SEQ_NUM) USING INDEX
TABLESPACE <Tablespace_Name>;

CREATE INDEX D1T299S1 ON D1_MSRMT_CHAR (SRCH_CHAR_VAL) TABLESPACE
<Tablespace_Name>  COMPRESS 1;
```

D1_MSRMT_LOG

```
CREATE TABLE D1_MSRMT_LOG
  (
    MEASR_COMP_ID CHAR(12 BYTE),
    MSRMT_DTTM DATE,
    SEQNO              NUMBER(5,0),
    ORIG_INIT_MSRMT_ID CHAR(14 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    BUS_OBJ_CD         CHAR(30 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    BO_DATA_AREA CLOB,
    CHAR_TYPE_CD   CHAR(8 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL       CHAR(16 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    ADHOC_CHAR_VAL VARCHAR2(254 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL_FK1   VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL_FK2   VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL_FK3   VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL_FK4   VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL_FK5   VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    DESCRLONG      VARCHAR2(4000 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    LOG_DTTM DATE NOT NULL ENABLE,
    MESSAGE_CAT_NBR          NUMBER(5,0) DEFAULT 0 NOT NULL ENABLE,
    MESSAGE_NBR                 NUMBER(5,0) DEFAULT 0 NOT NULL ENABLE,
    USER_ID                              CHAR(8 BYTE) DEFAULT ' ' NOT
NULL ENABLE,
    VERSION                           NUMBER(5,0) DEFAULT 1 NOT NULL
ENABLE,
    MSRMT_LOG_ENTRY_TYPE_FLG CHAR(4 BYTE) DEFAULT ' ' NOT NULL ENABLE
    )
TABLESPACE <Tablespace_Name>
ENABLE ROW MOVEMENT
  PARTITION BY RANGE (MSRMT_DTTM)
SUBPARTITION BY range (MEASR_COMP_ID)
SUBPARTITION TEMPLATE(
subpartition SUB1 values less than (124999999999),
subpartition SUB2 values less than (249999999999),
subpartition SUB3 values less than (374999999999),
subpartition SUB4 values less than (499999999999),
subpartition SUB5 values less than (624999999999),
subpartition SUB6 values less than (744999999999),
subpartition SUB7 values less than (874999999999),
subpartition SUB8 values less than (maxvalue)
)
(PARTITION P1 VALUES LESS THAN(TO_DATE('15/12/2010 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P2 VALUES LESS THAN(TO_DATE('13/02/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P3 VALUES LESS THAN(TO_DATE('14/04/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P4 VALUES LESS THAN(TO_DATE('13/06/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P5 VALUES LESS THAN(TO_DATE('12/08/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P6 VALUES LESS THAN(TO_DATE('11/10/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P7 VALUES LESS THAN(TO_DATE('10/12/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P8 VALUES LESS THAN(MAXVALUE)
);

CREATE UNIQUE INDEX D1T300P0 ON D1_MSRMT_LOG
(
    MEASR_COMP_ID, MSRMT_DTTM, SEQNO
```

```
)  TABLESPACE <Tablespace_Name> local COMPRESS 1;

ALTER TABLE D1_MSRMT_LOG ADD CONSTRAINT D1T300P0 PRIMARY KEY
(MEASR_COMP_ID, MSRMT_DTTM, SEQNO) USING INDEX  TABLESPACE
<Tablespace_Name>;
```

D1_MSRMT_LOG_PARM

```
CREATE TABLE D1_MSRMT_LOG_PARM
  (
    MEASR_COMP_ID CHAR(12 BYTE),
    MSRMT_DTTM DATE,
    SEQNO                NUMBER(5,0),
    PARM_SEQ         NUMBER(3,0),
    MSG_PARM_VAL     VARCHAR2(30 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    MSG_PARM_TYP_FLG CHAR(4 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    VERSION                  NUMBER(5,0) DEFAULT 1 NOT NULL ENABLE
    )
TABLESPACE <Tablespace_Name>
ENABLE ROW MOVEMENT
  PARTITION BY RANGE (MSRMT_DTTM)
SUBPARTITION BY range (MEASR_COMP_ID)
SUBPARTITION TEMPLATE(
subpartition SUB1 values less than (124999999999),
subpartition SUB2 values less than (249999999999),
subpartition SUB3 values less than (374999999999),
subpartition SUB4 values less than (499999999999),
subpartition SUB5 values less than (624999999999),
subpartition SUB6 values less than (744999999999),
subpartition SUB7 values less than (874999999999),
subpartition SUB8 values less than (maxvalue)
)
(PARTITION P1 VALUES LESS THAN(TO_DATE('15/12/2010 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P2 VALUES LESS THAN(TO_DATE('13/02/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P3 VALUES LESS THAN(TO_DATE('14/04/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P4 VALUES LESS THAN(TO_DATE('13/06/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P5 VALUES LESS THAN(TO_DATE('12/08/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P6 VALUES LESS THAN(TO_DATE('11/10/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P7 VALUES LESS THAN(TO_DATE('10/12/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P8 VALUES LESS THAN(MAXVALUE)
);
CREATE UNIQUE INDEX D1T301P0 ON D1_MSRMT_LOG_PARM
(
    MEASR_COMP_ID, MSRMT_DTTM, SEQNO, PARM_SEQ
)  INDEX  TABLESPACE <Tablespace_Name> local COMPRESS 1;

ALTER TABLE D1_MSRMT_LOG_PARM ADD CONSTRAINT D1T301P0 PRIMARY KEY
(MEASR_COMP_ID, MSRMT_DTTM, SEQNO, PARM_SEQ) USING INDEX  TABLESPACE
<Tablespace_Name>;
```

D1_INIT_MSRMT_DATA

```
CREATE TABLE D1_INIT_MSRMT_DATA
  (
    INIT_MSRMT_DATA_ID CHAR(14 BYTE) NOT NULL ENABLE,
    MEASR_COMP_ID      CHAR(12 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    D1_FROM_DTTM DATE,
    D1_TO_DTTM DATE,
    DATA_SRC_FLG        CHAR(4 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    TIME_ZONE_CD        CHAR(10 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    BUS_OBJ_CD          CHAR(30 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    BO_STATUS_CD        CHAR(12 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    BO_STATUS_REASON_CD VARCHAR2(30 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    STATUS_UPD_DTTM DATE NOT NULL ENABLE,
    CRE_DTTM DATE NOT NULL ENABLE,
    VERSION    NUMBER(5,0) DEFAULT 1 NOT NULL ENABLE,
    IMD_EXT_ID VARCHAR2(120 BYTE),
    IMD_BO_DATA_AREA CLOB,
    PREVEE_BO_DATA_AREA CLOB,
    POSTVEE_BO_DATA_AREA CLOB,
    TRACE_BO_DATA_AREA CLOB,
    RAW_BO_DATA_AREA CLOB
  ) TABLESPACE  <Tablespace_Name>
ENABLE ROW MOVEMENT
  LOB  (PREVEE_BO_DATA_AREA)
  STORE AS SECUREFILE (ENABLE STORAGE IN ROW COMPRESS CACHE)
  LOB  ( POSTVEE_BO_DATA_AREA )
  STORE AS SECUREFILE (ENABLE STORAGE IN ROW COMPRESS CACHE)
  LOB (TRACE_BO_DATA_AREA)
  STORE AS SECUREFILE (ENABLE STORAGE IN ROW COMPRESS CACHE)
  LOB (RAW_BO_DATA_AREA)
  STORE AS SECUREFILE (ENABLE STORAGE IN ROW COMPRESS CACHE)
  LOB (IMD_BO_DATA_AREA)
  STORE AS SECUREFILE (ENABLE STORAGE IN ROW COMPRESS CACHE)
PARTITION BY RANGE (D1_TO_DTTM)
SUBPARTITION BY range (MEASR_COMP_ID)
SUBPARTITION TEMPLATE(
subpartition SUB1 values less than (124999999999),
subpartition SUB2 values less than (249999999999),
subpartition SUB3 values less than (374999999999),
subpartition SUB4 values less than (499999999999),
subpartition SUB5 values less than (624999999999),
subpartition SUB6 values less than (744999999999),
subpartition SUB7 values less than (874999999999),
subpartition SUB8 values less than (maxvalue)
)
(PARTITION P1 VALUES LESS THAN(TO_DATE('15/12/2010 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P2 VALUES LESS THAN(TO_DATE('13/02/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P3 VALUES LESS THAN(TO_DATE('14/04/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P4 VALUES LESS THAN(TO_DATE('13/06/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P5 VALUES LESS THAN(TO_DATE('12/08/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P6 VALUES LESS THAN(TO_DATE('11/10/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
PARTITION P7 VALUES LESS THAN(TO_DATE('10/12/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
```

```
 PARTITION P8  VALUES LESS THAN (maxvalue)
);
CREATE UNIQUE INDEX D1T304P0 ON D1_INIT_MSRMT_DATA
  (
    INIT_MSRMT_DATA_ID
  ) TABLESPACE <Tablespace_Name>
 GLOBAL PARTITION BY RANGE (INIT_MSRMT_DATA_ID)
  (PARTITION PART1 values less than (12499999999999),
  PARTITION PART2 values less than (24999999999999),
  PARTITION PART3 values less than (37499999999999),
  PARTITION PART4 values less than (49999999999999),
  PARTITION PART5 values less than (62499999999999),
  PARTITION PART6 values less than (74499999999999),
  PARTITION PART7 values less than (87499999999999),
  PARTITION PART8 values less than (maxvalue));

ALTER TABLE D1_INIT_MSRMT_DATA ADD CONSTRAINT D1T304P0 PRIMARY KEY
(INIT_MSRMT_DATA_ID) USING INDEX TABLESPACE <Tablespace_Name>;

CREATE INDEX D1T304S1 ON D1_INIT_MSRMT_DATA
  ( MEASR_COMP_ID
    ,BO_STATUS_CD
    ,BUS_OBJ_CD
    ,D1_TO_DTTM
    ,D1_FROM_DTTM
   ) TABLESPACE <Tablespace_Name> LOCAL COMPRESS 1;

CREATE UNIQUE INDEX D1T304S2 ON D1_INIT_MSRMT_DATA
 (INIT_MSRMT_DATA_ID,
BO_STATUS_CD,
BUS_OBJ_CD  ) TABLESPACE <Tablespace_Name> COMPRESS 1;

CREATE UNIQUE INDEX D1T304S3 ON D1_INIT_MSRMT_DATA
 (IMD_EXT_ID,
   INIT_MSRMT_DATA_ID
  ) TABLESPACE <Tablespace_Name> COMPRESS 1;
```

D1_INIT_MSRMT_DATA_CHAR

```
CREATE TABLE D1_INIT_MSRMT_DATA_CHAR
  (
    INIT_MSRMT_DATA_ID CHAR(14 BYTE),
    CHAR_TYPE_CD       CHAR(8 BYTE),
    SEQ_NUM            NUMBER(3,0),
    CHAR_VAL           CHAR(16 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    ADHOC_CHAR_VAL     VARCHAR2(254 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL_FK1       VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL_FK2       VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL_FK3       VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL_FK4       VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL_FK5       VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    SRCH_CHAR_VAL      VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    VERSION            NUMBER(5,0) DEFAULT 1 NOT NULL ENABLE)
   TABLESPACE <Tablespace_Name>
ENABLE ROW MOVEMENT
  PARTITION BY RANGE (INIT_MSRMT_DATA_ID)
  (PARTITION PART1 values less than (12499999999999),
  PARTITION PART2 values less than (24999999999999),
```

```
  PARTITION PART3 values less than (37499999999999),
  PARTITION PART4 values less than (49999999999999),
  PARTITION PART5 values less than (62499999999999),
  PARTITION PART6 values less than (74499999999999),
  PARTITION PART7 values less than (87499999999999),
  PARTITION PART8 values less than (maxvalue));

CREATE UNIQUE INDEX D1T305P0 ON D1_INIT_MSRMT_DATA_CHAR
  (
    INIT_MSRMT_DATA_ID, CHAR_TYPE_CD, SEQ_NUM
  ) TABLESPACE <Tablespace_Name> LOCAL COMPRESS 1;

ALTER TABLE D1_INIT_MSRMT_DATA_CHAR ADD CONSTRAINT D1T305P0 PRIMARY
KEY (INIT_MSRMT_DATA_ID, CHAR_TYPE_CD, SEQ_NUM) USING INDEX
TABLESPACE <Tablespace_Name>;

CREATE INDEX D1T305S1 ON D1_INIT_MSRMT_DATA_CHAR
    (
      SRCH_CHAR_VAL
    ) TABLESPACE <Tablespace_Name> COMPRESS 1;
```

D1_INIT_MSRMT_DATA_K

```
CREATE TABLE D1_INIT_MSRMT_DATA_K
  (
    INIT_MSRMT_DATA_ID CHAR(14 BYTE),
    ENV_ID             NUMBER(6,0) NOT NULL ENABLE,
   CONSTRAINT D1T314P0 PRIMARY KEY (INIT_MSRMT_DATA_ID, ENV_ID) ENABLE
  )
  ORGANIZATION INDEX  TABLESPACE <Tablespace_Name>
ENABLE ROW MOVEMENT
  PARTITION BY RANGE (INIT_MSRMT_DATA_ID)
  (PARTITION PART1 values less than (12499999999999),
  PARTITION PART2 values less than (24999999999999),
  PARTITION PART3 values less than (37499999999999),
  PARTITION PART4 values less than (49999999999999),
  PARTITION PART5 values less than (62499999999999),
  PARTITION PART6 values less than (74499999999999),
  PARTITION PART7 values less than (87499999999999),
  PARTITION PART8 values less than (maxvalue)) compress 1;
```

D1_INIT_MSRMT_DATA_LOG

```
CREATE TABLE D1_INIT_MSRMT_DATA_LOG
  (
    INIT_MSRMT_DATA_ID  CHAR(14 BYTE),
    SEQNO               NUMBER(5,0),
    BO_STATUS_CD        CHAR(12 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    BO_STATUS_REASON_CD VARCHAR2(30 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_TYPE_CD        CHAR(8 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL            CHAR(16 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    ADHOC_CHAR_VAL      VARCHAR2(254 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL_FK1        VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL_FK2        VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL_FK3        VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL_FK4        VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    CHAR_VAL_FK5        VARCHAR2(50 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    DESCRLONG          VARCHAR2(4000 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    LOG_DTTM DATE NOT NULL ENABLE,
    LOG_ENTRY_TYPE_FLG CHAR(4 BYTE) DEFAULT ' ' NOT NULL ENABLE,
```

```
    MESSAGE_CAT_NBR    NUMBER(5,0) DEFAULT 0 NOT NULL ENABLE,
    MESSAGE_NBR        NUMBER(5,0) DEFAULT 0 NOT NULL ENABLE,
    USER_ID            CHAR(8 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    VERSION            NUMBER(5,0) DEFAULT 1 NOT NULL ENABLE
)  TABLESPACE <Tablespace_Name>
ENABLE ROW MOVEMENT
  PARTITION BY RANGE (INIT_MSRMT_DATA_ID)
  (PARTITION PART1 values less than (12499999999999),
  PARTITION PART2 values less than (24999999999999),
  PARTITION PART3 values less than (37499999999999),
  PARTITION PART4 values less than (49999999999999),
  PARTITION PART5 values less than (62499999999999),
  PARTITION PART6 values less than (74499999999999),
  PARTITION PART7 values less than (87499999999999),
  PARTITION PART8 values less than (maxvalue)) ;

CREATE UNIQUE INDEX D1T306P0 ON D1_INIT_MSRMT_DATA_LOG
(
    INIT_MSRMT_DATA_ID, SEQNO
)  TABLESPACE <Tablespace_Name>LOCAL COMPRESS 1;


ALTER TABLE D1_INIT_MSRMT_DATA_LOG ADD CONSTRAINT D1T306P0 PRIMARY KEY
(INIT_MSRMT_DATA_ID, SEQNO) USING INDEX  TABLESPACE <Tablespace_Name>;
```

D1_INIT_MSRMT_DATA_LOG_PARM

```
CREATE TABLE D1_INIT_MSRMT_DATA_LOG_PARM
  (
    INIT_MSRMT_DATA_ID CHAR(14 BYTE),
    SEQNO              NUMBER(5,0),
    PARM_SEQ           NUMBER(3,0),
    MSG_PARM_VAL       VARCHAR2(30 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    MSG_PARM_TYP_FLG   CHAR(4 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    VERSION            NUMBER(5,0) DEFAULT 1 NOT NULL ENABLE
    )  TABLESPACE <Tablespace_Name>
ENABLE ROW MOVEMENT
  PARTITION BY RANGE (INIT_MSRMT_DATA_ID)
  (PARTITION PART1 values less than (12499999999999),
  PARTITION PART2 values less than (24999999999999),
  PARTITION PART3 values less than (37499999999999),
  PARTITION PART4 values less than (49999999999999),
  PARTITION PART5 values less than (62499999999999),
  PARTITION PART6 values less than (74499999999999),
  PARTITION PART7 values less than (87499999999999),
  PARTITION PART8 values less than (maxvalue)) ;

CREATE UNIQUE INDEX D1T307P0 ON D1_INIT_MSRMT_DATA_LOG_PARM
(   INIT_MSRMT_DATA_ID, SEQNO, PARM_SEQ)  TABLESPACE <Tablespace_Name>
LOCAL COMPRESS 1;

ALTER TABLE D1_INIT_MSRMT_DATA_LOG_PARM ADD CONSTRAINT D1T307P0
PRIMARY KEY (INIT_MSRMT_DATA_ID, SEQNO, PARM_SEQ) USING INDEX
TABLESPACE <Tablespace_Name>;
```

Compression Recommendations for Exadata

In general the recommendation is to do QUERY HIGH compression (a part of hybrid columnar compression) on Exadata.

For the Final Measurement table (D1_MSRMT), keep the current table partition uncompressed. The rest of the older partitions will be compressed based on QUERY HIGH compression.

For the Initial Measurement Data table (D1_INIT_MSMRT_DATA), keep CLOBs always in securefile and Medium Compressed. In addition, keep current table partition uncompressed. the rest of the older partitions will be compressed based on QUERY HIGH compression.

All multi-column Indexes (primary as well as secondary) will be compressed using the default compression. HCC or OLTP compression is not applicable on the top of compressed Indexes.

On an ongoing basis data will get loaded into uncompressed subpartitions. To compress these subpartitions, use CTAS operation on particular historic subpartitions and load its data using a direct path insert into a temporary heap table which is HCC compressed. Thereafter, truncate the original subpartition and then partition exchange this with the temporary heap table. You need to rebuild only the portion of the local index for those subpartitions.

Compression Recommendations for Non-Exadata

In general the recommendation is to do OLTP Compression.

For the Final Measurement table (D1_MSRMT), keep the current table partition uncompressed. The rest of the older partitions will be compressed based on OLTP compression.

For the Initial Measurement Data table (D1_INIT_MSMRT_DATA) keep CLOBs always in securefile and Medium Compressed. In addition, keep current table partition uncompressed. the rest of the older partitions will be compressed based on OLTP compression.

All multi-column Indexes (primary as well as secondary) will be compressed using the default compression.

On an ongoing basis data will get loaded into uncompressed subpartitions. To compress these subpartitions use CTAS operation on particular historic subpartitions and load its data using a direct path insert into a temporary heap table which is OLTP compressed. Thereafter truncate the original subpartition and then partition exchange this with the temporary heap table. You need to rebuild only the portion of the local index for those subpartitions.

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