Oracle Real-Time Scheduler

Database Administrator's Guide

Release 2.1.0 Service Pack 6

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Oracle Real-Time Scheduler Database Administrator's Guide, Release 2.1.0 Service Pack 6

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Contents

Preface

This guide provides instructions for installing and maintaining the database for Oracle Real-Time Scheduler.

This preface contains these topics:

*   **Audience**

*   **Related Documents**

*   **Updates to this Documentation**

*   **Conventions**

Audience

Oracle Real-Time Scheduler Database Administrator's Guide is intended for database administrators who will be installing and maintaining the database for Oracle Real-Time Scheduler.

Related Documents

For more information, see these Oracle documents:

*   *Oracle Real-Time Scheduler Quick Install Guide*

*   *Oracle Real-Time Scheduler 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.

Convention	Meaning
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 chapter provides an overview of the database installation for Oracle Real-Time Scheduler.

> **Note:** This service pack is intended to be installed on top of an existing Oracle Real-Time Scheduler installation. Please refer to the chapter **Installing Service Packs** for information about installing the database for this service pack.

This section includes the following information:

*   **Supported Database Platforms**

*   **Database Maintenance Rules**

Supported Database Platforms

This section defines the platforms on which Oracle Real-Time Scheduler is verified to operate.

Supported Platforms Summary Table

Oracle Real-Time Scheduler is certified on the following platforms:

Platform	Database Version
AIX 7.1 TL0 (POWER 64-bit)	Oracle Database Server 11.2.0.3 (64-bit)
Oracle Linux 5.6, 5.8 or 6.2 (64-bit) x86_64 (64-bit)	Oracle Database Server 11.2.0.3 (64-bit)
Red Hat Enterprise Linux 5.6, 5.8 or 6.2 (64-bit) x86_64 (64-bit)	Oracle Database Server 11.2.0.3 (64-bit)
Solaris 10 (SPARC 64-bit)	Oracle Database Server 11.2.0.3 (64-bit)
Windows Server 2008 R2 (x86_64 64-bit)	Oracle Database Server 11.2.0.3 (64-bit)

Note: Oracle Real-Time Scheduler is tested on both Oracle Database Enterprise Edition and Standard Edition. Some features, such as Advanced Compression and Partitioning, require the Enterprise Edition.

Refer to My Oracle Support for additional details.

Support for Software Patches and Upgrades

Due to the ongoing nature of software improvement, vendors will periodically issue patches and service packs for the operating systems, application servers and database servers on top of specific versions that Oracle products have already been tested against.

If it is necessary to apply an upgrade, please do so in a test environment that is running on the same platform as your production environment prior to updating the production environment itself.

The exception from this rule is Hibernate software version 3.3.2 ga. This version should not be upgraded.

Always contact Oracle Utilities Support prior to applying vendor updates that do not guarantee backward compatibility.

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.

What Changes Are Permitted

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.

- 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.

What Changes Are Not Permitted

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

Database Installation

This section provides the steps required to install or upgrade the Oracle Real-Time Scheduler database, including:

- **Installation Overview**

- **Initial Install**

- **Upgrade Install**

- **Demo Install**

> **Note:** This is not a new installation. Please start by referring to the chapter **Installing Service Packs** for the steps required to upgrade the database to this service pack.

Installation Overview

Refer to **Supported Database Platforms** for information about the supported platforms on which Oracle Real-Time Scheduler is verified to operate.

The following types of installation are available for Oracle Real-Time Scheduler:

- **Initial Install** - a database with no demo data.

- **Upgrade Install** - a database upgrade.

- **Demo Install** - a database populated with demo data.

The database installation requires a supported version of the Java Development Kit Version 6.0 Update 20 or later and the Oracle 11.2.0.1 32-bit client installed on the Windows 64-bit or 32-bit desktop where the install package is staged and run from.

For an initial install or demo install, you will create an empty database on the Unix or Windows database server on which you operate the production instance of Oracle Real-Time Scheduler. For an upgrade install, you will upgrade your current Oracle Real-Time Scheduler database.

The Oracle Real-Time Scheduler installation package contains a script, **CDXDBA**, that creates an empty database with a default tablespace (CISTS_01) and the required users and roles. After creating the database, install the product specific database objects/data from the desktop mentioned above.

Review the Storage.xml file under FW\Install-Upgrade and ORS\Install-Upgrade folders prior to an initial install or an upgrade install. This file allocates all base tables and indexes to the default tablespace CISTS_01. Information in this file is used by CDXDBI while installing the Oracle Real-Time Scheduler database objects.

> **Note:** Even if you have created the database without using the CDXDBA script, you will still need to review the Storage.xml file, prior to an initial or

upgrade install, to update the default values to custom values (for example, TableSpace Name).

Also please make sure the Oracle Locator component is installed, and then execute "MWM_Geocoder_install.sql" with a DBA privileged user from the SQL prompt from the Pre-Installation folder under ORS.

If you decide to allocate some tables or indexes outside of the default tablespace, change the tablespace name from the default value to a custom value in the Storage.xml file.

For instance, if you decide to allocate table CI_ACCT in a tablespace MyTablespace, change Storage.xml as shown:

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

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 install and upgrade 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, secure file options, Advanced Compression, and parallel information are used only for new objects. Therefore, for initial installs, information for each object should be reviewed. Be careful while editing this 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 Real-Time Scheduler, including:

- **Copying and Decompressing Install Media**

- **Creating the Database**

- **Preinstallation Tasks**

- **Installing the ORS Schema**

- **Postinstallation Tasks**

- **Installing Service Packs and Patches**

Copying and Decompressing Install Media

To copy and decompress the Oracle Real-Time Scheduler database:

1. Download the Oracle Real-Time Scheduler v2.1.0 from the Oracle Software Delivery Cloud.

2. Unzip the ORS-V2.1.0-database.zip file to a temporary folder. This file contains the FW and ORS folders which contain the database components required to install the database.

3. Unzip the ORS-V2.1.0-FW-PREREQ-Multiplatform.zip to a temporary folder. This file contains the 'Database' folder which contains the Framework Prerequisite DB Single Fixes.

Creating the Database

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

You can create a database using the database creation tool (cdxdba.plx for UNIX or CDXDBA.exe for Windows) that is packaged with product.

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 Database on Unix**

• **Creating the Database on Windows**

Creating the Database on Unix

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

Follow these steps to create a database:

1. FTP the contents of the DatabaseCreation 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. Provide the following parameter values when prompted:

• 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 question:

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

Select N to exit the database utility.

Creating the Database on Windows

The files for creating the database are located in the ..\FW\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  schema from the database
R - Refresh  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, ORS_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. Select option Q to exit the utility after the database is created.

Preinstallation Tasks

If the Oracle database was created without using CDXDBA, follow these steps to enable the geocoder feature:

1. Make sure the Oracle Locator component is installed.

2. Execute "MWM_Geocoder_install.sql" with a DBA privileged user from the SQL prompt from the Pre-Installation folder under ORS.

Installing the ORS Schema

You will install Oracle Utilities Application Framework V4.1.0 prior to Oracle Real-Time Scheduler 2.1.0. The files for Oracle Utilities Application Framework installation are located in the FW folder. The installation process will prompt you to enter the following information:

   • A database user that will own the application schema (for example, CISADM).

   • A database user that has read-write (select/update/insert/delete) privileges to the objects in the application schema (for example, CISUSER). The application will access the database as this user.

   • A database 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_20)

Installing the CISADM Schema for Oracle Utilities Application Framework

To install the CISADM schema for Oracle Utilities Application Framework v4.1.0, follow these steps:

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

    Note: Be sure to run CdxDBI.exe from a Window 32-bit or 64-bit desktop that has the Oracle 11.2.0.1 32-bit client 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>

    • Password for the SYSTEM user account in the database (in silent mode)

    • Name of the owner of the Database Schema: <CISADM>

    • Location of Java Home: <..\jdk1.6.0_20>

    • Location of TUGBU Jar files: <..\ORS\jarfiles>

    • Password for the user (in silent mode)

    • 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>

2. Apply prerequisite Framework DB single fixes by running the CDXPatch.exe utility from the ..\ORS-V2.1.0-FW-PREREQ-Multiplatform\Database directory.

    The utility will prompt you for the value of the following parameters:

    • The target database type (O/M/D): [O]

    • The name of the user that owns the database objects

    • The password for the user (in silent mode)

    • The name of the Oracle database

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

Installing the Database for Oracle Real-Time Scheduler

The files for the Initial Install of Oracle Real-Time Scheduler 2.1.0 are located in the Install-Upgrade folder under ORS.

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)

To install the Oracle Real-Time Scheduler database, follow these steps:

1. Run CDXDBI.exe from under the ORS/Install-Upgrade folder. The utility prompts you to enter values for the following parameters:

   - The name of the target database.

   - The password for the SYSTEM user account in the database (in silent mode).

   - The name of the owner of the Database Schema.

   - The location of Java Home.

   - The location of TUGBU JAR files.

   - The password for the user (in silent mode).

   - The Oracle user with read-write privileges to the Database Schema.

   - The Oracle user with read-only privileges to the Database Schema.

   - The Oracle database role with read-write privileges to the Database Schema.

   - The Oracle database role with read-only privileges to the Database Schema.

2. If you chose to continue, CDXDBI first checks for the existence of each of the users specified and prompts for their password, default tablespace, and temporary tablespace, if they do not exist.

3. 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.

CDXDBI 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, password of the SYSTEM account in the database, 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 SYSTEM 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 CdxDBI###.log are created in the same folder as CdxDBI 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, CdxDBI 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

Importing Styles and Maps

To import styles and maps in the specified database, follow these steps:

1. Execute ImportSDOThemes.bat under the ORS/Post-Upgrade directory with the following parameters:

   ImportSDOThemes.bat -u CISADM -p <PASSWORD> -c <DATABASE NAME>

2. After importing themes/styles /GEOM Metadata (zz_user_sdo_themes/zz_user_sdo_styles, zz_user_sdo_metadata), postImport.sql is invoked from target main schema. This will:

   • Insert new styles/themes/sdo_geom_metadata in USER_SDO_THEMES/ USER_SDO_STYLES/USER_SDO_GEOM_METADATA

   • Drop ZZ_USER_SDO_THEMES, ZZ_USER_SDO_STYLES, ZZ_USER_SDO_GEOM_METADATA tables from target database.

   • Create domain key indexes

Populating Language Data

At this point, the Oracle Real-Time Scheduler database is ready for use. Please note that this database contains data in the ENGLISH language only. If you use any other supported language, 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 data packages (if available) into the database. Please contact your Oracle support representative to receive information on these packages.

Generating Database Statistics

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.

Installing Service Packs and Patches

Periodically, Oracle Utilities releases a service pack of single fixes for its products. A service pack is an update to an existing release that includes solutions to known problems and other product enhancements. A service pack is not a replacement for an installation, but a pack consisting of a collection of changes and additions for it. The service pack may include changes to be applied to the application server, the database, or both. The service pack includes all files necessary for installing the collection of changes, including installation instructions.

Between services packs, Oracle Utilities releases patches to fix individual bugs. For information on installing patches, see knowledge base article ID 974985.1 on My Oracle Support.

Service packs and patches can be downloaded from My Oracle Support (https:// support.oracle.com/).

Upgrade Install

Note: The new MCP version control enhancement requires that a certain upgrade process be followed. For details about this process, see Chapter 4, "Planning the Installation," in the Oracle Real-Time Scheduler *Installation Guide*.

This section describes how to upgrade the database components of Oracle Real-Time Scheduler, including:

- **Copying and Decompressing Install Media**

- **Upgrading the ORS Schema**

- **Postinstallation Tasks**

- **Installing Service Packs and Patches**

Copying and Decompressing Install Media

To copy and decompress the Oracle Real-Time Scheduler database:

1. Download the Oracle Real-Time Scheduler v2.1.0 from the Oracle Software Delivery Cloud.

2. Unzip the ORS-V2.1.0-database.zip file to a temporary folder. This file contains the FW and ORS folders that contain the database components required to install the database.

3. Unzip the ORS-V2.1.0-FW-PREREQ-Multiplatform.zip to a temporary folder. This file contains the 'Database' folder that contains Framework Prerequisite DB Single Fixes.

Upgrading the ORS Schema

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

The following section assumes an existing Oracle Real-Time Scheduler v2.0.1.5 installation on top of an Oracle Utilities Application Framework V4.0.2 installation. This section details the procedure to upgrade the Oracle Utilities Application Framework V4.0.2 database to V4.1.0.

Installing the CISADM Schema for Oracle Utilities Application Framework

To install the CISADM schema for Oracle Utilities Application Framework v4.1.0, follow these steps:

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

   > **Note:** Be sure to run CdxDBI.exe from a Window 32-bit or 64-bit desktop that has the Oracle 11.2.0.1 32-bit client 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>

   - Password for the SYSTEM user account in the database (in silent mode)

   - Name of the owner of the Database Schema: <CISADM>

   - Location of Java Home: <..\jdk1.6.0_20>

   - Location of TUGBU Jar files: <..\ORS\jarfiles>

   - Password for the user (in silent mode)

   - 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>

2. Apply prerequisite Framework DB single fixes by running the CDXPatch.exe utility from the ..\ORS-V2.1.0-FW-PREREQ-Multiplatform\Database directory.

The utility will prompt you for the value of the following parameters:

- The target database type (O/M/D) [O]:

- The name of the user that owns the database objects

- The password for the user (in silent mode)

- The name of the Oracle database

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

Installing the Database for Oracle Real-Time Scheduler

The files for the Upgrade Install of Oracle Real-Time Scheduler 2.1.0 are located in the Install-Upgrade folder under ORS.

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)

To upgrade the Oracle Real-Time Scheduler database, follow these steps:

1. Review and edit the Storage.xml file to set the various options discussed previously. The instructions for editing the file are included in the file itself.

2. Run CDXDBI.exe from under the ORS/Install-Upgrade folder. The utility prompts you to enter values for the following parameters:

- The name of the target database.

- The password for the SYSTEM user account in the database (in silent mode).

- The name of the owner of the Database Schema.

- The location of Java Home.

- The location of TUGBU JAR files.

- The password for the user (in silent mode).

- The Oracle user with read-write privileges to the Database Schema.

- The Oracle user with read-only privileges to the Database Schema.

- The Oracle database role with read-write privileges to the Database Schema.

- The Oracle database role with read-only privileges to the Database Schema.

The utility at this point is ready to perform the upgrade install and prompts you for permission to start the process.

3. If you chose to continue, CDXDBI first checks for the existence of each of the users specified and prompts for their password, default tablespace, and temporary tablespace, if they do not exist.

4. 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.

5. Run CDXDBI.exe from under the ORS/Install-Upgrade folder. The utility prompts you to enter values for the following parameters:

    •   The name of the target database.

    •   The password for the SYSTEM user account in the database (in silent mode).

    •   The name of the owner of the Database Schema.

    •   The location of Java Home.

    •   The location of TUGBU JAR files.

    •   The password for the user (in silent mode).

    •   The Oracle user with read-write privileges to the Database Schema.

    •   The Oracle user with read-only privileges to the Database Schema.

    •   The Oracle database role with read-write privileges to the Database Schema.

    •   The Oracle database role with read-only privileges to the Database Schema.

The utility at this point is ready to perform the upgrade install and prompts you for permission to start the process.

6. If you chose to continue, CDXDBI first checks for the existence of each of the users specified and prompts for their password, default tablespace, and temporary tablespace, if they do not exist.

7. 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.

CDXDBI 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, password of the SYSTEM account in the database, 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 SYSTEM 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 tablespace names already exist in the Storage.xml file (if not, the process will abort).

•   Upgrades 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 CdxDBI###.log are created in the same folder as CdxDBI 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, CdxDBI 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

Importing Styles and Maps

To import styles and maps in the specified database, follow these steps:

1. Execute ImportSDOThemes.bat under the ORS/Post-Upgrade directory with the following parameters:

   ImportSDOThemes.bat -u CISADM -p <PASSWORD> -c <DATABASE NAME>

2. After importing themes/styles /GEOM Metadata (zz_user_sdo_themes/zz_user_sdo_styles, zz_user_sdo_metadata), postImport.sql is invoked from target main schema. This will:

   - Insert new styles/themes/sdo_geom_metadata in USER_SDO_THEMES/ USER_SDO_STYLES/USER_SDO_GEOM_METADATA

   - Drop ZZ_USER_SDO_THEMES, ZZ_USER_SDO_STYLES, ZZ_USER_SDO_GEOM_METADATA tables from target database.

   - Create domain key indexes

Populating Language Data

At this point, the Oracle Real-Time Scheduler database is ready for use. Please note that this database contains data in the ENGLISH language only. If you use any other supported language, 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 data packages (if available) into the database. Please contact your Oracle support representative to receive information on these packages.

Installing Service Packs and Patches

Periodically, Oracle Utilities releases a service pack of single fixes for its products. A service pack is an update to an existing release that includes solutions to known problems and other product enhancements. A service pack is not a replacement for an installation, but a pack consisting of a collection of changes and additions for it. The service pack may include changes to be applied to the application server, the database, or both. The service pack includes all files necessary for installing the collection of changes, including installation instructions.

Between services packs, Oracle Utilities releases patches to fix individual bugs. For information on installing patches, see knowledge base article ID 974985.1 on My Oracle Support.

Service packs and patches can be downloaded from My Oracle Support (https://support.oracle.com/).

Demo Install

This section describes how to install the demo database components for Oracle Real-Time Scheduler, including:

- **Copying and Decompressing Install Media**
- **Creating the Database and Importing Dump File**
- **Postinstallation Tasks**
- **Installing Service Packs and Patches**

Copying and Decompressing Install Media

To copy and decompress the Oracle Real-Time Scheduler database:

1. Download the Oracle Real-Time Scheduler v2.1.0 Oracle database from the Oracle Software Delivery Cloud.

2. Unzip the ORS-V2.1.0-database.zip to a temporary folder. This file contains the FW and ORS folders that contain the database components required to install the database.

3. Unzip the ORS-V2.1.0-FW-PREREQ-Multiplatform.zip files to a temporary folder. This file contains the 'Database' folder that contains the Framework Prerequisite DB Single Fixes.

Creating the Database and Importing Dump File

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

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 ../FW/DatabaseCreation/Unix directory.

Follow these steps to create a database:

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. The exp_demo.dmp file is present in the ..\ORS\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.

> **NOTE:** 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 ..\FW\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  schema from the database
R - Refresh  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, ORS_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.

    > **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. The exp_demo.dmp file is present in the ..\ORS\Demo directory.

    *   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 (spladm): CISADM

    *   Enter password for SPLADM (spladm): 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 (expspladm.dmp):exp_demo.dmp

    *   Enter the name of the log file (impspldadm.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.

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

Postinstallation Tasks

Populating Language Data

At this point, the Oracle Real-Time Scheduler demo database is ready for use. 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.

Configuring Security

The configuration utility and scripts are located in the .\ORS\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 ..\ORS\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 64-bit or 32-bit desktop that has the Oracle 11.2.0.1 32-bit client installed. Your database should already be listed in the local file tnsnames.ora.

   The script will execute as follows:

   ```
   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

Installing Service Packs and Patches

Periodically, Oracle Utilities releases a service pack of single fixes for its products. A service pack is an update to an existing release that includes solutions to known problems and other product enhancements. A service pack is not a replacement for an installation, but a pack consisting of a collection of changes and additions for it. The service pack may include changes to be applied to the application server, the database, or both. The service pack includes all files necessary for installing the collection of changes, including installation instructions.

Between services packs, Oracle Utilities releases patches to fix individual bugs. For information on installing patches, see knowledge base article ID 974985.1 on My Oracle Support.

Service packs and patches can be downloaded from My Oracle Support (https://support.oracle.com/).

Chapter 3

Installing Service Packs

This section provides the steps required to upgrade the Oracle Real-Time Scheduler database to this service pack release v2.1.0.6.

Note: Throughout this document, Oracle Real-Time Scheduler v**2.1.0 Service Pack 6** is represented as v2.1.0.6.

This chapter includes:

*   **Package Contents**

*   **Upgrade Install**

Package Contents

The following directories are included in the 'Oracle Real-Time Scheduler v2.1.0.6 Oracle Database.zip' zip file:

1.   FW41020

2.   ORS

Upgrade Install

Supported Upgrade Paths

This service pack release of Oracle Real-Time Scheduler (v2.1.0.6) supports only the following upgrade path:

1.   Upgrading from v2.1.0.5 to v2.1.0.6

> **Note**: If your database was created manually without using CDXDBA and if Oracle Locator is enabled, you must execute the pre-installation script before proceeding with the steps below.
>
> To do this, go to ..\ORS\Pre-Installation and execute the "MWM_Geocoder_install.sql" script as a DBA-privileged user.

For instructions on performing this database upgrade applicable to your environment, please refer to the following section.

Upgrading Oracle Real-Time Scheduler from v2.1.0.5 to v2.1.0.6

This section describes the steps to be performed to upgrade your existing Oracle Real-Time Scheduler database from v2.1.0.5 to v2.1.0.6.

This section consists of:

- **Installing Oracle Utilities Application Framework v4.1.0.2**
- **Installing Oracle Real-Time Scheduler v2.1.0.6**

Installing Oracle Utilities Application Framework v4.1.0.2

Follow these instructions to install Oracle Utilities Application Framework v4.1.0.2:

1. Go to ..\FW41020\Install-Upgrade and run CdxDBI.exe

2. The utility prompts you for the following entries:

   - Enter the target database: <Target database name>

   - Enter the password for the SYSTEM user: <SYSTEM user's password>

   - Enter the owner of Database Schema: <Owner Of DatabaseSchema>

   - Enter the location for Java Home (jdk1.6.0_18): <Location for Java_Home>

   - Enter the jarfiles location: <Give the location of jarfiles directory under the ORS directory >

   - Enter the password for CISADM: <CISADM user's password>

   - Re-enter the password: <CISADM user's password>

   - Enter the Oracle user with read-write privileges to Database Schema: <DatabaseSchema>

   - Enter the Oracle user with read-only privileges to Database Schema: <DatabaseSchema>

   - Enter the database role with read-write privileges to Database Schema: <RoleName>

   - Enter the database role with read-only privileges to Database Schema: <RoleName>

Installing Oracle Real-Time Scheduler v2.1.0.6

Follow these instructions to install Oracle Real-Time Scheduler v2.1.0.6:

1. Unzip ORS-v2.1.0.6-FW-PREREQ-Multiplatform.zip, and refer to the "Readme.txt" under Database.zip file to install ORS FW Prereq DB Single Fixes.

2. Go to ..\ORS\Install-Upgrade and run CdxDBI.exe

3. The utility prompts you for the following entries:

   - Enter the target database: <Target database name>

   - Enter the password for the SYSTEM user: <SYSTEM user's password>

   - Enter the owner of Database Schema: <Owner Of DatabaseSchema>

   - Enter the location for Java Home (jdk1.6.0_18): <Location for Java_Home>

   - Enter the jarfiles location: <Give the location of jarfiles directory under the ORS directory >

   - Enter the password for CISADM: <CISADM user's password>

   - Re-enter the password: <CISADM user's password>

   - Enter the Oracle user with read-write privileges to Database Schema: <DatabaseSchema>

   - Enter the Oracle user with read-only privileges to Database Schema: <DatabaseSchema>

   - Enter the database role with read-write privileges to Database Schema: <RoleName>

•   Enter the database role with read-only privileges to Database Schema: <RoleName>

4.   Go to ..\ORS\Post-Upgrade and run ImportSDOThemes.bat using the command below:

```
ImportSDOThemes.bat -U <Dbusername> -c <connectionString> -p
<Password>
```

Chapter 4

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 4-3 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 cdxdbi 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.

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, for Framework its F1. Other examples are M1,C1,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 M1,C1,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, for framework is F1. Other examples are M1,C1,D1,D2, etc.

For Example: F1FKVALID_SEQ

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, supports 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.

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.

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 5

Database Implementation Guidelines

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

- **Configuration Guidelines**
- **Oracle Database Implementation Guidelines**.

> Note: Refer to My Oracle Support for more information.

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.

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.

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.

For Exadata hardware the compression recommendations are:

• For high volume tables, keep the current table partition uncompressed. All of the older partitions will be compressed based on QUERY HIGH compression.

• For high volume tables with CLOBs ensure to 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.

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.

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.

Advanced Data Compression Recommendations

Oracle Utilities supports Advanced Data Compression. This is available from Oracle 11gR1 onwards. As the compressed data goes into System Global Area (SGA) the potential IO is also reduced. Ensure that the hardware resources are sufficiently sized for this as it involves additional hardware utilization from the system.

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.

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. Please note that you can use COMPRESS option only and only if you have bought the Oracle Advanced Compression license.

• 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 5-5 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=3000

db_writer_processes=12

optimizer_index_cost_adj=1

optimizer_index_caching=100

session_cached_cursors=50

trace_enabled=FALSE

db_files=1024

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

sessions=4500

memory_target=0

memory_max_target=0

sec_case_sensitive_logon=FALSE

processes=1000

dml_locks=4860

_b_tree_bitmap_plans=FALSE

Appendix A

Upgrades to the Oracle Utilities Application Framework Database

This document describes the database upgrade process for the Oracle Utilities Application Framework database from last released blueprint version of V4.1.0 to V4.1.0 Service Pack 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 V4.1.0.2 Service Pack 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 V4.1.0 Service Pack 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 V4.1.0 Service Pack 2 User Guides. In the last section of this document you will find a list of the new tables that are added in V4.1.0 Service Pack 2.

This section includes:

- **Automatic Data Upgrade**
- **Schema Change**
- **New System Data**

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.

Nullable column support

Oracle Utilities Application Framework 4.1.0, Service Pack 2, supports 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 Service Pack 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.

Configurable Conversion of OUAF Datetime Format

To support different date time format for external system outbound, a new column date time format (DTTM_FORMAT_FLG) is added to the External System Outbound Message Type (F1_EXTSYS_OUTMSG_PROF) Table. The allowed values are F1OU and F1XS. The date time format (DTTM_FORMAT_FLG) would be populated as 'F1OU' (OUAF format) wherever it is not populated, as a part of the Upgrade Process.

Allow CM to Add Char Values to Base Owned Char Types

To support CM to add char values to product owned characteristic types, a new column custom switch (CUSTOM_SW) is added to char type (CI_CHAR_TYPE) table. The allowed values are customizable ('Y') and Non-customizable ('N'). As a part of upgrade process, CUSTOM_SW will be set as 'N' where this column is not populated.

Schema Change

New Tables

The following new tables are added to Oracle Utilities Application Framework V4.1.0.2.

Tables	Description
F1_ATTACHMENT	Attachment
F1_ATTACHMENT_CHAR	Attachment Characteristics
F1_GENERIC_GTT	Generic Global Temporary Table
F1_SVC_TASK	Service Task
F1_SVC_TASK_CHAR	Service Task Characteristics

Tables	Description
F1_SVC_TASK_K	Service Task Key
F1_SVC_TASK_LOG	Service Task Log
F1_SVC_TASK_LOG_PARM	Service Task Log Parameters
F1_SVC_TASK_REL_OBJ	Service Task Related Objects
F1_SVC_TASK_TYPE	Service Task Type
F1_SVC_TASK_TYPE_CHAR	Service Task Type Characteristics
F1_SVC_TASK_TYPE_L	Service Task Type Language
F1_SYNC_REQ_EXTRACT	Sync Request Extract

New Views

Tables	Description
F1_ATTACHMENT_VW	Attachment View

Dropped Tables

None

Unsupported Tables

None

Added Columns

The following Table Columns are added to Oracle Utilities Application Framework V4.1.0.2.

Table	Column	Required	Upgrade Note
CI_CHAR_TYPE	CUSTOM_SW	Y	
CI_SYSDATA_LOG	GROUP_FIX_NAME	N	
F1_EXTSYS_OUTMSG_PROF	DTTM_FORMAT_FLG	N	
F1_SYNC_REQ	BO_STATUS_REASON_CD	N	
F1_SYNC_REQ_IN	F1_COMPOSITE_SYNC_FLG	N	
F1_SYNC_REQ_LOG	BO_STATUS_REASON_CD	N	

Dropped Columns

None

Unsupported Table Columns

None

Column Format Change

Table Name	Column Name	From	To
F1_BNDL	EXT_REFERENCE_ID	CHAR:30	CHAR:36
F1_OBJ_REV	EXT_REFERENCE_ID	CHAR:30	CHAR:36

Table Name	Column Name	From	To
F1_SYNC_REQ_IN	EXT_REFERENCE_ID	CHAR:30	CHAR:36

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 V4.1.0.2.

Algorithm Type	Description
F1-ATCHM-INF	Attachment Information
F1-BOSTATFS	Take BO Status/Reason Final Snapshot
F1-CMPSNAPSR	Compare Initial and Final Snapshot. Populate Status Reason if discarded
F1-DECRT-INF	Decision Report Information
F1-EXTL-CDCP	Extendable Lookup Change Data Capture
F1-FINALSNAP	Take Final Snapshot
F1-INITSNAPS	Take Initial Snapshot
F1-LDAPIMPRT	Ldap Import callback after manipulating user, group, or membership
F1-PRPETDATA	Prepare Extract Data
F1-TRNDF-CS	Transition to Default Next State if Custom Snapshot is False
F1-WAITFRSRE	Wait for Finalized Related Sync Request to be Extracted

Algorithm

The following Algorithms are Framework Owned system data in V4.1.0.2.

Algorithm	Description
F1-ATCHM-INF	Attachment Information
F1-BOSTATFS	Take BO Status/Reason Final Snapshot
F1-CMPSNAPSR	Compare Sync Request Snapshots, populate status reason if discarded.
F1-DECRT-INF	Decision Report Information
F1-FINALSNAP	Take Final Snapshot
F1-INITSNAPS	Take Initial Snapshot
F1-LDAPIMPRT	LDAP Import Sample Algorithm
F1-PRPETDATA	Prepare Extract Data
F1-TRNDF-CS	Transition to Default Next State if Custom Snapshot is False

Algorithm	Description
F1-WAITFRSRE	Wait for Finalized Related Sync Request to be Extracted

Application Service

The following Application Services are new to V4.1.0.2.

Application Service	Description
F1-ATTACHMENTBOAS	Attachment Based BO
F1-DECRPTBOAS	Decision Report BO
F1-STASKTYPE	Service Task Type MO
F1-SVCTASK	Service Task MO
F1ATTACH	Attachment Information
F1ATTACHMENT	Attachment
F1CATTCH	Attachment Search Portal

Access Mode Added to Application Service

The following Access Mode is added to existing Application Services and is new to V4.1.0.2.

Application Service	Description	Access Mode
F1-DFLTS	Default Application Service	Execute (F1EX)

Batch Control

The following Batch Controls are new to V4.1.0.2.

Batch Control	Description
F1-LDAP	Ldap Import
F1-LKPIL	Standard Lookup Initial Load
F1-STKDF	Service Task Scheduled Monitor Process (Deferred)
F1-STKTR	Service Task Periodic Monitor Process
F1-SYNEF	Sync Request Extract
F1-SYNIL	Sync Request Initial Load
F1-XMLPG	Completed/in error XAI upload staging records cleanup

Batch Control	Description
LDAPIMP	ZZ Ldap Import Example
WX-NOTIF	Self-Service Notification Monitor

Business Object

The following Business Objects are Framework Owned system data in V4.1.0.2.

Business Object	Description
F1-BIGeneralMasterConfig	Generic BI Configuration
F1-DecRpt	Decision Report
F1-ExcelSpreadsheet	Excel Spreadsheet
F1-GenericBISyncRequest	Generic BI Sync Request
F1-JpegImage	Jpeg Image
F1-MicrosoftVideo	Microsoft Video
F1-Mp3Audio	MP3 Audio
F1-PDF	PDF Document
F1-ServiceTaskTypeBundlingAdd	Bundling Add BO for Service Task Type
F1-ServiceTaskTypePhysical	Physical BO for Service Task Type
F1-SyncRequestMO	Sync Request Determine MO
F1-Text	Text Document
F1-VideoMPEG	Video MPEG
F1-WavAudio	Wav Audio
F1-WordDocument	Word Document

FK Reference

The following FK References are new to V4.1.0.2.

FK Reference	Description
F1-ATCHB	Common Attachments Business Object
F1-ATCHI	Attachment Information
F1-ATHVW	Attachment View
F1-CHARV	Characteristic Value
F1-FKSRC	Foreign Key Reference with Search Zone
F1-STASK	Service Task

FK Reference	Description
F1-STKTY	Service Task Type
F1ATTACH	Attachment Information Display
F1BO-BO	BO Option - Business Object to Read
F1DA-BO	BO Options - Snapshot Data Area
F1ET-BO	BO Options - Batch Process for Extract
F1MC-BO	BO Option - Managed Content XSL
F1PS-BO	BO Option - Post Script For Extract
F1SR-BO	BO Option - Status Reason Business Object
F1SY-BO	BO Option - Star Schema Type

Lookups

The following Lookups are added to Oracle Utilities Application Framework V4.1.0.2.

Lookup Field Name	Field Value	Language	Description
ALG_ENTITY_FLG	F1LD	ENG	Installation - Ldap Import
ALG_ENTITY_FLG	F1SE	ENG	Sync Request - Initial Load Eligibility
ALG_ENTITY_FLG	F1SF	ENG	Sync Request - Initial Load Filter
BUS_OBJ_OPT_FLG	F1BI	ENG	Binary
BUS_OBJ_OPT_FLG	F1BO	ENG	Business Object to Read
BUS_OBJ_OPT_FLG	F1CT	ENG	Content Type
BUS_OBJ_OPT_FLG	F1DA	ENG	Snapshot Data Area
BUS_OBJ_OPT_FLG	F1EP	ENG	Element Population Rule
BUS_OBJ_OPT_FLG	F1ET	ENG	Batch Process for Extract
BUS_OBJ_OPT_FLG	F1MC	ENG	Managed Content XSL
BUS_OBJ_OPT_FLG	F1PS	ENG	Post Service Script For Extract
BUS_OBJ_OPT_FLG	F1SE	ENG	Supported File Extension
BUS_OBJ_OPT_FLG	F1SY	ENG	Star Schema Type
CHANGE_TYPE_FLG	D	ENG	Delete
CHANGE_TYPE_FLG	I	ENG	Update / Insert
CHAR_ENTITY_FLG	F1AT	ENG	Attachment
CHAR_ENTITY_FLG	F1SK	ENG	Service Task
CHAR_ENTITY_FLG	F1SL	ENG	Service Task Log

Lookup Field Name	Field Value	Langu age	Description
CHAR_ENTITY_FLG	F1ST	ENG	Service Task Type
DTTM_FORMAT_FLG	F1OU	ENG	OUAF
DTTM_FORMAT_FLG	F1XS	ENG	XSD
EXT_SYS_TYP_FLG	F1CF	ENG	Custom Format
EXT_SYS_TYP_FLG	F1EN	ENG	Encryption
F1CF_OPT_TYP_FLG	F1CR	ENG	Reader
F1CF_OPT_TYP_FLG	F1CW	ENG	Writer
F1EN_OPT_TYP_FLG	F1AI	ENG	Algorithm Info
F1EN_OPT_TYP_FLG	F1FE	ENG	Field Encryption
F1GC_OPT_TYP_FLG	F1BI	ENG	Data Source Indicator
F1LF_OPT_TYP_FLG	F1DO	ENG	Display XSL uiHint Override
F1LF_OPT_TYP_FLG	F1EO	ENG	Input XSL uiHint Override
F1QM_OPT_TYP_FLG	F1XR	ENG	Disable Role Validation On Completion
F1_COMPOSITE_SYNC_FLG	F1CS	ENG	Composite Sync Request
F1_COMPOSITE_SYNC_FLG	F1SS	ENG	Single Sync Request
F1_FLD_MERGE_TYPE_FLG	F1DE	ENG	Destructive
F1_FLD_MERGE_TYPE_FLG	F1KP	ENG	Keep
F1_FLD_MERGE_TYPE_FLG	F1ME	ENG	Merge
F1_LIST_MERGE_TYPE_FLG	F1DE	ENG	Destructive
F1_LIST_MERGE_TYPE_FLG	F1MD	ENG	Merge Delete Unreferenced
F1_LIST_MERGE_TYPE_FLG	F1ME	ENG	Merge
F1_RAW_MERGE_TYPE_FLG	F1DE	ENG	Destructive
F1_RAW_MERGE_TYPE_FLG	F1KP	ENG	Keep
F1_RAW_MERGE_TYPE_FLG	F1ME	ENG	Merge
F1_STAR_SCHEMA_TYPE_FL G	F1DM	ENG	Dimension
F1_STAR_SCHEMA_TYPE_FL G	F1FC	ENG	Fact
F1_STASK_TYPE_STATUS_FL G	F1AC	ENG	Active
F1_STASK_TYPE_STATUS_FL G	F1IN	ENG	Inactive
F1_SVC_TASK_CL_FLG	C1OC	ENG	Outage Call

Lookup Field Name	Field Value	Langu age	Description
F1_SVC_TASK_CL_FLG	F1DF	ENG	Default
F1_SVC_TASK_CL_FLG	WXSS	ENG	Self-service
INS_ALG_ENTITY_FLG	F1LD	ENG	Ldap Import
NAV_OPT_TYPE_FLG	F1AT	ENG	Attachment
NBR_GRP_SYMBOL	Z	ENG	South Asian
RCVR_CTXT_FLG	JMSP	ENG	JMS Password
RCVR_CTXT_FLG	JMSU	ENG	JMS User
SCR_ENGINE_VER_FLG	F130	ENG	3.0
SENDER_CTXT_FLG	JMSH	ENG	JMS Header
STEP_TYPE_FLG	DCBG	ENG	Declare Business Object With BO Group
STEP_TYPE_FLG	GBEM	ENG	Generate business object edit map
STEP_TYPE_FLG	GBSM	ENG	Generate business service edit map
STEP_TYPE_FLG	GDAM	ENG	Generate data area edit map
STEP_TYPE_FLG	GSSM	ENG	Generate service script edit map
UI_MAP_TYPE_FLG	F1XL	ENG	Complete XHTML Document
UI_MAP_TYPE_FLG	F1XR	ENG	XHTML Fragment
XAI_OPTION_FLG	ALOC	ENG	WSDL service address location

Maintenance Object

The following Maintenance Objects are new to V4.1.0.2.

MO code	Description
F1-ATCHMT	Attachment
F1-STASKTYPE	Service Task Type
F1-SVCTASK	Service Task

Script

The following Scripts are Framework-owned system data in V4.1.0.2.

Script	Description
F1-ATTACHGT	Go To Attachment

Script	Description
F1-ActShowZn	Generic Show or Hide Actions Zone
F1-AtchUplod	Attachment Upload BPA
F1-AttchDtls	Retrieve Attachment details for display
F1-AttchMain	Attachment Maintenance
F1-BOStatFS	Take BO Status/Reason Final Snapshot
F1-CFSCGP	Convert Final Snapshots of Sync Request and Create General Process
F1-CmpSnapSR	Compare Initial and Final Snapshot. Populate Status Reason if discarded
F1-DecRptInf	Decision Report - Information
F1-ExtLCDCP	Extendable Lookup Change Data Capture
F1-FinalSnap	Take Final Snapshot
F1-FltrSQL	Zone User Filters - SQL Condition
F1-InitSnaps	Take Initial Snapshot
F1-PrpEtData	Prepare Extract Data
F1-TrnDef-CS	Transition to Default Next State if Custom Snapshot is False
F1-VSyncBoOp	Validate Sync BO Options
F1-WaitFRSRE	Wait for Finalized Related Sync Request to be Extracted
F1-XMLSnapBO	Return XML Snapshot of a BO Instance

To do Type

The following To Do type is new to V4.1.0.2.

To Do Type	Description
F1-SYNTD	Sync Request Monitor Errors

Portal

The following Portals are new to V4.1.0.2.

Portal	Description
F1ATTACH	Attachment Information
F1CATTACH	Attachment Search Portal

Portal Zone

The following Portal Zones are added to V4.1.0.2.

Portal	Zone
F1ATTACH	F1-ATTCHDISP
F1CATTCH	F1-CATTCHMZ

UI Map

The following UI Maps are Framework Owned system data in V4.1.0.2.

Map	Description
F1-AttachmentDisplay	Attachment Information
F1-AttachmentMaintenance	Attachment Maintenance
F1-AttachmentUploadPopup	Attachment Upload
F1-AttachmentUploadStatus	Attachment Upload Status
F1-BIGeneralMasterConfigDisp	Master configuration for BI - Display
F1-BIGeneralMasterConfigMaint	Master configuration for BI - Maint
F1-CAttachmentSearch	Common Attachment Search
F1-CharAddDeleteButton	Characteristics Add/Delete Button
F1-CharValueDisplay	Characteristic Value Display
F1-CharValueMaint	Characteristic Value Maintenance
F1-CharacteristicTypeInfo	Characteristic Type Information
F1-CommonAttachmentSearch	Common Attachment Search
F1-ContextBOUIMap	Preview the UIMap from the Schema
F1-DeleteActionFusion	Delete XHTML Fragment
F1-DisplayBoStatusDescFusion	Fragment to include Bo Status Description
F1-DuplicateActionFusion	Duplicate XHTML Fragment
F1-Edit	Edit - no actions
F1-EditActionFusion	Edit Action XHTML Fragment
F1-EditActions	Edit and actions
F1-EditDelete	Edit, delete
F1-EditDeleteActions	Edit, delete, actions
F1-EditDeleteDuplicate	Edit, delete and duplicate - no actions
F1-EditDeleteDuplicateActions	Edit, delete, duplicate and actions
F1-ExtLkupInputHdr	Display banner in edit map - fragment
F1-MasterConfigInputHdr	Display banner in edit map - fragment

Map	Description
F1-RecordActionsFusion	Record Actions XHTML Fragment
F1-RecordInfoFusion	Fusion Record Information Fragment
F1-ReqTypeInputHdr	Display banner in edit map - fragment
F1-StatusReasonInputHdr	Display banner in edit map - fragment
F1-WebSvcDisplay	Web Service Adapter - Display
F1-WebSvcInputHdr	Display banner in edit map - fragment
F1-WebSvcOperationsFrag	Operation list fragment for web service BO
F1-WebSvcOperationsFragInput	Operation list frag for web svc BO - Input
F1-WebSvcWsdlSourceFrag	WSDL source fragment for web service BO
F1-WebSvcWsdlURLFrag	WSDL URL fragment for web service BO

XAI Inbound Service

The following XAI Inbound Service is new to V4.1.0.2.

XAI Inbound Service name	Description
F1-ORAGEOCD	Geocode Address XAI Inbound Service

Zone Type

The following Zone Types are new to V4.1.0.2.

None

Zone

The following new Zones are added to V4.1.0.2.

Zone	Zone Type	Description
F1-ATTCHDISP	F1-MAPDERV	Attachment Information
F1-ATTCHSCH	F1-DE-QUERY	Attachment Search-FileName/FileType/AttachId
F1-BOMOSRC	F1-DE-QUERY	Business Object Search for MO
F1-CATCHSCH	F1-DE-QUERY	Common Attachment - FileName/FileType(BO)
F1-CATTCHBOS	F1-DE-QUERY	Common Attachments Business Object Search
F1-CATTCHMZ	F1-DE-MULQRY	Attachments Search

Zone	Zone Type	Description
F1-CHVAL	F1-DE-QUERY	Predefined Characteristic Value/Description
F1-FKSRC	F1-DE-QUERY	Foreign Key Search
F1-GENBOMP	F1-MAPEXPL	View UI Rendering
F1-GETBOSTRS	F1-DE-SINGLE	Get BO statuses, conditions and reasons.
F1-GETFINLSR	F1-DE-SINGLE	Get Finalized Sync Request
F1-OUTMSGTYS	F1-DE-QUERY	Outbound Message Type Search
F1-RETFCONFG	F1-DE-SINGLE	Retrieve Feature Config from Feature Type

Appendix B

Oracle Real-Time Scheduler System Table Guide

This chapter lists the system tables owned by Oracle Real-Time Scheduler V2.1.0 and explains the data standards of the system tables. The data standards are required for Oracle Real-Time Scheduler installation, development within Oracle Real-Time Scheduler, configuration of Oracle Utilities products, and customization of the Oracle Utilities products. Adhering to the data standards is a prerequisite for a seamless upgrade to the next release of the product. For the general discussion of System Tables, refer to the System Table Guide for the Oracle Utilities Application Framework.

This section includes:

- **Development and Implementation System Tables**

Development and Implementation System Tables

Parameter Definition

Properties	Description
Tables	M1_PARM_DEF M1_PARM_DEF_L M1_DEPLOYMENT_PART M1_DEPLOYMENT_PART_L M1_DEPLOYMENT_ITEM
Standard Data Fields	Parameter Definition (PARM_DEF_CD).
Customer Modification	None

Appendix C

Oracle Utilities Application Framework System Table Guide

This section lists the system tables owned by the Oracle Utilities Application Framework V4.1.0 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 Table Standards**

*   **Guidelines for System Table Updates**

*   **System Table List**

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

Properties	Description
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 Customer Care and Billing 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)
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)
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)

Properties	Description
Customer Modification	Adhoc Characteristic Value Validation Rule (ADHOC_VAL_ALG_CD) on Characteristic Entity Table (CI_CHAR_ENTITY)

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

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)

Lookup

Properties	Description
Tables	CI_LOOKUP_FIELD, CI_LOOKUP_VAL, CI_LOOKUP_VAL_L, F1_EXT_LOOKUP_VAL, F1_EXT_LOOKUP_VAL_L

Properties	Description
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. Introduced in V 4.1.0: Value (F1_EXT_LOOKUP_VALUE) • This will allow storing longer value keys rather than the normal 4byte lookup values.
Customer Modification	Override Description (DESCR_OVRD) on Lookup Field Value Language Table (CI_LOOKUP_VAL_L)

A new Feature option is defined through adding a value to EXT_SYS_TYP_FLG. The field value for this look up field must be prefixed by the Owner flag value.

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

Properties	Description
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_REF, 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

Properties	Description
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)

Properties	Description
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
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	KP	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_CURRENCY_CD	KP	Currency Code
CI_CURRENCY_CD_L	KP	Currency Code Language
CI_DB_INSTR	KP	DB Process Instruction
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_ICON	MG	Display Icon
CI_DISP_ICON_L	MG	Display Icon Language
CI_DISP_PROF	KP	Display Profile
CI_DISP_PROF_L	KP	Display Profile 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_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_CONST	MG	Constraints
CI_MD_CONST_FLD	MG	Constraint Fields
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_FLD	MG	Field
CI_MD_FLD_L	MG	Field Language

Table Name	Upgrade Action	Description
CI_MD_LOOKUP	RF	MD Lookup Field Value
CI_MD_LOOKUP_F	RF	MD Lookup Field
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_MSG	RF	MD Message
CI_MD_MSG_L	RF	MD Message Language
CI_MD_NAV	MG	Navigation Key
CI_MD_PDF	RF	Predefined Fields
CI_MD_PDF_VAL	RF	Predefined Values
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
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

Table Name	Upgrade Action	Description
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_SRC_TYPE	RF	Source Type
CI_MD_SRC_TYPE_L	RF	Source Type Language
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_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_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

Table Name	Upgrade Action	Description
CI_MSG_CATEGORY_L	MG	Message Category Language
CI_MSG_L	MG	Message Language
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_USR_NAV_LINK	MG	User Favorite Links
CI_USR_PORTAL	KP	User Portal
CI_USR_ZONE	KP	User Zone
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

Table Name	Upgrade Action	Description
CI_XAI_ENV_HNDL	MG	XAI Envelope Handler
CI_XAI_ENV_HNDL_L	MG	XAI Envelope Handler Language
CI_XAI_EXECUTER	RF	XAI Executer
CI_XAI_EXECUTER_L	RF	XAI Executer Language
CI_XAI_FORMAT	RF	XAI Format
CI_XAI_FORMAT_L	RF	XAI Format Language
CI_XAI_IN_SVC	MG	XAI Inbound Service
CI_XAI_IN_SVC_L	MG	XAI Inbound Service 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_SENDER	KP	XAI Sender
CI_XAI_SENDER_L	KP	XAI Sender Language
CI_XAI_SNDR_CTX	KP	XAI Sender Context
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

Table Name	Upgrade Action	Description
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_CHAR	KP	Status Reason Characteristic
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
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_INSTALLATION	KP	Installation Option - Framework
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_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_USER	KP	User
SC_USER_GROUP	KP	User Group
SC_USER_GROUP_L	KP	User Group Language
SC_USR_GRP_PROF	MG	User Group Profile

Table Name	Upgrade Action	Description
SC_USR_GRP_USR	KP	User Group User

Appendix D

Partitioning Recommendations

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

* **Partitioning Recommendations**

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:

* M1_GPS_DATA table can be partitioned by CAP_DTTM (smaller partition better performance). Begin with bi-weekly partitions.

* The Indexes need to Global Indexes as the partitioning key CAP_DTTM is not a part of the Index.

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

* **M1_GPS_DATA**

M1_GPS_DATA

```
CREATE TABLE M1_GPS_DATA
  (
    GPS_DATA_ID CHAR(14 BYTE) NOT NULL ENABLE,
    CAP_DTTM DATE NOT NULL ENABLE,
    RESRC_ID        CHAR(12 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    EXT_SRC_TYPE_FLG CHAR(4 BYTE) DEFAULT ' ',
    EXT_SRC_ID       VARCHAR2(254 BYTE) DEFAULT ' ',
    USER_ID          CHAR(8 BYTE) DEFAULT ' ' NOT NULL ENABLE,
    GEO_LAT          NUMBER(9,6),
    GEO_LONG         NUMBER(9,6),
    GEO_ALT          NUMBER(9,6) DEFAULT 0 NOT NULL ENABLE,
    SPEED            NUMBER(9,6) DEFAULT 0 NOT NULL ENABLE,
    TRK_ANGLE        NUMBER(9,6) DEFAULT 0 NOT NULL ENABLE,
    VERSION          NUMBER(5,0) DEFAULT 1 NOT NULL ENABLE,
    M1_GEOM MDSYS.SDO_GEOMETRY
  )
PARTITION BY RANGE
  (CAP_DTTM )
 (PARTITION P1 VALUES LESS THAN(TO_DATE('01/01/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
```

```
 PARTITION P2 VALUES LESS THAN(TO_DATE('15/01/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
 PARTITION P3 VALUES LESS THAN(TO_DATE('01/02/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
 PARTITION P4 VALUES LESS THAN(TO_DATE('15/02/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
 PARTITION P5 VALUES LESS THAN(TO_DATE('01/03/2011 00:00:01','DD/MM/
YYYY HH24:MI:SS')),
    PARTITION P6 VALUES LESS THAN (MAXVALUE) )
/

CREATE UNIQUE INDEX "CISADM"."MT315P0" ON "CISADM"."M1_GPS_DATA"
  ( "GPS_DATA_ID" )
/

 CREATE INDEX "CISADM"."MT315S1_TEST" ON "CISADM"."M1_GPS_DATA"
    ( "RESRC_ID", "CAP_DTTM" )
/

CREATE INDEX "CISADM"."MT315S2" ON "CISADM"."M1_GPS_DATA"
    ( "CAP_DTTM" )
/
```

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