

# **Oracle Real-Time Scheduler**

Database Administrator's Guide

Release 2.2.0 Service Pack 3

**E60107-03**

June 2015

(Updated August 2015)

Oracle Real-Time Scheduler Database Administrator's Guide, Release 2.2.0 Service Pack 3

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# 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:

### Installation, Configuration, and Release Notes

- *Oracle Real-Time Scheduler Release Notes*
- *Oracle Real-Time Scheduler Quick Install Guide*
- *Oracle Real-Time Scheduler Server Application Installation Guide*
- *Oracle Real-Time Scheduler Mobile Application Installation and Deployment Guide (HTML5-based)*
- *Oracle Real-Time Scheduler DBA Guide*
- *Oracle Real-Time Scheduler Configuration Guide*

### User Guides

- *Oracle Real-Time Scheduler Server Application User's Guide*
- *Oracle Real-Time Scheduler Mobile Application User's Guide (Java-based)*
- *Oracle Real-Time Scheduler Mobile Application User's Guide (HTML5-based)*

### Implementation and Development

- *Oracle Real-Time Scheduler Mobile Application Implementation and Development Guide (HTML5-based)*

### Map Editor Installation and User Guides

- *Oracle Real-Time Scheduler Map Editor User's Guide*
- *Oracle Real-Time Scheduler Map Editor Installation Guide*

### Framework Guides

- *Oracle Utilities Application Framework v4.2.0.2 Business Process Guide*
- *Oracle Utilities Application Framework v4.2.0.2 Administration Guide*
- *Oracle Utilities Application Framework v4.2.0.2 Release Notes*

### Supplemental Documents

- *Oracle Real-Time Scheduler Server Administration Guide*
- *Oracle Real-Time Scheduler Batch Server Administration Guide*
- *Oracle Real-Time Scheduler Security 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
<b>boldface</b>	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	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

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## Database Overview

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

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 TL00 (POWER 64-bit)	Oracle Database Server 11.2.0.1+ (64-bit) Oracle Database Server 12.1.0.1+ (64-bit)
Oracle Linux 5.8, 6.2, 6.4, 6.5 (64-bit) x86_64 (64-bit)	Oracle Database Server 11.2.0.1+ (64-bit) Oracle Database Server 12.1.0.1+ (64-bit)
Red Hat Enterprise Linux 5.8, 6.2, 6.4, 6.5 (64-bit) x86_64 (64-bit)	Oracle Database Server 11.2.0.1+ (64-bit) Oracle Database Server 12.1.0.1+ (64-bit)
Sun Solaris 10/11 (SPARC 64-bit)	Oracle Database Server 11.2.0.1+ (64-bit) Oracle Database Server 12.1.0.1+ (64-bit)
Windows Server 2008 R2 Windows Server 2012 R2 (x86_64 64-bit)	Oracle Database Server 11.2.0.1+ (64-bit) Oracle Database Server 12.1.0.1+ (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 4.1.0. This version should not be upgraded.

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

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## Database Maintenance Rules

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

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

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

### Permitted Database Changes

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

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

### Non-Permitted Database Changes

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

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

# Chapter 2

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## 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](#)

## 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 to version 2.2.0.3
- **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 FW42020\Install-Upgrade and ORS\Install-Upgrade folders prior to an upgrade install or an initial install. This file allocates all base tables and indexes to the default tablespace CISTS\_01. Information in this file is used by ORADBI while installing the Oracle Real-Time Scheduler database objects.

**Note:** The utility **CDXDBA** is provided to create the demo database and import the demo data into the database. It is recommended that **CDXDBA** should be used only for creating the **demo** database and not for creating an Initial Install database or a production database. See section “Demo Install” for more information about installing the demo database.

It is recommended that the Database Configuration Assistant (**DBCA**) be used to create an Initial Install or production database and to configure the instance parameters according to the environment needs. **DBCA** is used for creating 12c databases.

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](#)
- [Pre-Installation 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 v2.2.0.3 from the Oracle Software Delivery Cloud.
2. Unzip the ORS-V2.2.0.3.0-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.

## Creating the Database

**Note:** This step is not required if you are performing a database upgrade from a previous version of the product.

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

This section consists of instructions to create the database based on your requirement.

This section consists of:

- [Creating a Production Database](#)
- [Creating a Non- Production Database](#)

### Creating a Production Database

For creating a production database, it is recommended that you use the Database Configuration Assistant (DBCA). Once the database is created, you can configure the instance parameters, according to the environment needs and based on your production recommendations.

After creating the database, to create product specific users (e.g. CISADM), follow the steps below:

1. Create a tablespace CISTS\_01.
2. Log in to the database as sys user.
3. Execute `\FW\FW42020\DatabaseCreation\UNIX\11g\users.sql`

Note: You can also edit the script (users.sql) to rename the users or default tablespace as per your production recommendations. It is mandatory to review Storage.XML as explained in section [Installation Overview](#) above, before you proceed further.

### Enabling the Geocoder Feature

To enable the geocoder feature:

1. Make sure the Oracle Locator component is installed.

- Execute "MWM\_Geocoder\_install.sql" with a DBA privileged user from the SQL prompt from the Pre-Installation folder under ORS.

## Creating a Non- Production Database

The CDXDBA utility provided in the \FW\FW42020\DatabaseCreation folder can be used to automate the Database Creation process for non-production databases. This utility can be used only for creating 11g databases. For 12c databases, please use DBCA.

CDXDBA creates an empty database with AL32UTF8 character set and at least one tablespace for storing the DB objects before running the installation. The default name of the application tablespace is CISTS\_01. CDXDBA also creates product-specific users and enables the geocode feature.

This section consists of:

- [Creating the Database on Unix using CDXDBA](#)
- [Creating the Database on Windows using CDXDBA](#)

## Creating the Database on Unix using CDXDBA

The files for creating the database are located in the ../FW/FW42020/DatabaseCreation/Unix directory.

Follow these steps to create a database:

- FTP the contents of the DatabaseCreation folder to a temporary directory on the UNIX server.
- Set the ORACLE\_HOME and ORACLE\_BASE variables.
- Run the utility cdxdba.plx by executing the following command:

```
perl cdxdba.plx
```

- 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)?
```

- 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 using CDXDBA

The files for creating the database are located in the  
 ..\FW\FW42020\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.

## Pre-Installation Tasks

If the initial install (production) 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 V4.2.0.2 prior to Oracle Real-Time Scheduler 2.2.0.3. The files for Oracle Utilities Application Framework installation are located in the FW folder for the specific versions. The installation process will prompt you to enter the following information:

- The target database name in which the product is to be installed.
- 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 v4.2.0.2, follow these steps:

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

**Note:** Be sure to run OraDBI.exe from a Window 32-bit or 64-bit desktop that has the Oracle 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>
  - Name of the owner of the Database Schema: <CISADM>
  - Password for the user (in silent mode)
  - Location of Java Home: <..\jdk1.6.0\_20>
  - Location of UGBU Jar files: <..\FW42020\jarfiles>
  - Oracle user with read-write privileges to the Database Schema: <CISUSER>
  - Oracle user with read-only privileges to the Database Schema: <CISREAD>
  - Oracle database role with read-write privileges to the Database Schema: <CIS\_USER>
  - Oracle database role with read-only privileges to the Database Schema: <CIS\_READ>
  - Name of the owner of the Database Schema: <CISADM>
  - Password for the user (in silent mode)
  - Password for the user (in silent mode)
2. Apply prerequisite Framework DB single fixes by running the CDXPatch.exe utility from the FW\FW42020-Rollup\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. After the patches are processed, the utility may prompt you to create security for new objects.

When prompted as shown below, Press Enter without any input, since security for new objects is generated in subsequent steps during installation of Oracle Real-Time Scheduler.



- Enter a comma-separated list of Oracle users in which synonyms need to be created (e.g. CISUSER,CISREAD):
- Enter a database role which has a read-write privilege (e.g. CIS\_USER):
- Enter a database role which has a read only privilege (e.g. CIS\_READ):

## Installing the Oracle Real-Time Scheduler Database Component

The installation process will prompt you to enter the following information:

- The target database name in which the product is to be installed.
- 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 Real-Time Scheduler

To install the CISADM schema for Oracle Real-Time Scheduler 2.2.0.3, follow these steps:

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

**Note:** Be sure to run OraDBI.exe from a Window 32-bit or 64-bit desktop that has the Oracle 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>
- Name of the owner of the Database Schema: <CISADM>
- Password for the user (in silent mode)
- Location of Java Home: <..\jdk1.6.0\_20>
- Location of UGBU Jar files: <..\ORS\jarfiles>
- Oracle user with read-write privileges to the Database Schema: <CISUSER>
- Oracle user with read-only privileges to the Database Schema: <CISREAD>
- Oracle database role with read-write privileges to the Database Schema: <CIS\_USER>
- Oracle database role with read-only privileges to the Database Schema: <CIS\_READ>
- Name of the owner of the Database Schema: <CISADM>
- Password for the user (in silent mode)
- Password for the user (in silent mode)

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

## ORADBI Performs the Following Tasks

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

## Postinstallation Tasks

### 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 tables), 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\_GEOG\_METADATA
  - Drop ZZ\_USER\_SDO\_THEMES, ZZ\_USER\_SDO\_STYLES, ZZ\_USER\_SDO\_GEOG\_METADATA tables from target database.
  - Create domain key indexes

### Enable USER\_LOCK Package

For inbound web services to work the USER\_LOCK must be enabled at the database level. This is a one time step. If this is not already enabled please do so using the following steps.

1. Login as SYS user

2. On SQL prompt run:  

```
@?/rdbms/admin/userlock.sql
```
3. Grant permission by running the following SQL:  

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

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

## 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 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 the installation. 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, “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**
- [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 v2.2.0.3 from the Oracle Software Delivery Cloud.
2. Unzip the ORS-V2.2.0.3.0-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.

### Upgrading the ORS Schema

The following upgrade paths are supported. Choose the procedure applicable to your existing environment:

- [Upgrading from v2.1.0.6 to v2.2.0.3](#)
- [Upgrading from v2.2.0.1.5 to v2.2.0.3](#)
- [Upgrading from v2.2.0.1.6 to v2.2.0.3](#)
- [Upgrading from v2.2.0.2 to v2.2.0.3](#)

## Upgrading from v2.1.0.6 to v2.2.0.3

If you are at v2.1.0.6, follow the instructions in this section to upgrade to v2.2.0.3.

You must install Oracle Utilities Application Framework version v4.2.0.2 prior to upgrading to Oracle Real-Time Scheduler v2.2.0.3. The files for Oracle Utilities Application Framework installation are located in the FW/FW42020 folder.

To install the CISADM schema for Oracle Utilities Application Framework v4.2.0.2, follow these steps:

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

**Note:** Be sure to run OraDBI.exe from a Window 32-bit or 64-bit desktop that has the Oracle 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>
  - Name of the owner of the Database Schema: <CISADM>
  - Password for the user (in silent mode)
  - Location of Java Home: <..\jdk1.6.0\_20>
  - Location of UGBU Jar files: <..\FW42020\jarfiles>
  - Oracle user with read-write privileges to the Database Schema: <CISUSER>
  - Oracle user with read-only privileges to the Database Schema: <CISREAD>
  - Oracle database role with read-write privileges to the Database Schema: <CIS\_USER>
  - Oracle database role with read-only privileges to the Database Schema: <CIS\_READ>
  - Name of the owner of the Database Schema: <CISADM>
  - Password for the user (in silent mode)
  - Password for the user (in silent mode)
2. Apply prerequisite Framework DB single fixes by running the CDXPatch.exe utility from the FW\FW42020-Rollup\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.

After the patches are processed, the utility may prompt you to create security for new objects.

When prompted as shown below, Press Enter without any input, since security for new objects is generated in subsequent steps during installation of Oracle Real-Time Scheduler.

- Enter a comma-separated list of Oracle users in which synonyms need to be created (e.g. CISUSER,CISREAD):
- Enter a database role which has a read-write privilege (e.g. CIS\_USER):
- Enter a database role which has a read only privilege (e.g. CIS\_READ):

## Installing the CISADM Schema of Oracle Real-Time Scheduler

The files for the Upgrade Install of Oracle Real-Time Scheduler 2.2.0.3 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\_20)

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 ORADBI.exe from under the ORS\Install-Upgrade folder. The utility prompts you to enter values for the following parameters:
  - Name of the target database: <DB NAME>
  - Name of the owner of the Database Schema: <CISADM>
  - Password for the user (in silent mode)
  - Location of Java Home: <..\jdk1.6.0\_20>
  - Location of UGBU Jar files: <..\ORS\jarfiles>
  - Oracle user with read-write privileges to the Database Schema: <CISUSER>
  - Oracle user with read-only privileges to the Database Schema: <CISREAD>
  - Oracle database role with read-write privileges to the Database Schema: <CIS\_USER>
  - Oracle database role with read-only privileges to the Database Schema: <CIS\_READ>
  - Name of the owner of the Database Schema: <CISADM>
  - Password for the user (in silent mode)
  - Password for the user (in silent mode)

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, ORADBI 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.

## ORADBI Performs the Following Tasks

- Interacts with the user to collect information about the name of Oracle account that will own the application schema (for example, CISADM), password of this account and the name of the Oracle account that the application user will use (for example, CISUSER), and the name of the Oracle account that will be assigned read-only privileges to the application schema (for example, CISREAD).
- Verifies whether tablespace names already exist in the Storage.xml file (if not, the process will abort).
- Verifies whether the upgrade path from the current release ID to the target release ID is supported by the upgrade.
- 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\_GEOG\_METADATA
  - Drop ZZ\_USER\_SDO\_THEMES, ZZ\_USER\_SDO\_STYLES, ZZ\_USER\_SDO\_GEOG\_METADATA tables from target database.
  - Create domain key indexes

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

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

The upgrade script “FW4202\_Trim\_SRCH\_CHAR\_VAL.sql” that is available in FW420 SP2 database blueprint upgrade folder can be used to perform this cleanup. This SQL should be executed by a schema owner and it will create a SQL file named “TRIM\_SRCH\_CHAR\_VAL.sql”. This SQL file (“TRIM\_SRCH\_CHAR\_VAL.sql”) is going to

trim SRCH\_CHAR\_VAL columns of all the characteristics tables and will do this update operation in multiple chunks of key ranges. Only char types with pre-defined values as well as foreign key values with user defined keys will be updated in those char tables. Once sql-“FW4202\_Trim\_SRCH\_CHAR\_VAL.sql” is executed it cannot be re-executed.

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

### Installing the upgrade script to trim the SRCH\_CHAR\_VAL column on the char tables

1. Login as CISADM user.
2. On SQL prompt, run FW4202\_Trim\_SRCH\_CHAR\_VAL.sql from the ..\FW4202\Install-Upgrade directory

```
@FW4202_Trim_SRCH_CHAR_VAL.sql
```

3. Run the generated TRIM\_SRCH\_CHAR\_VAL.sql script

```
@TRIM_SRCH_CHAR_VAL.sql
```

### Enable USER\_LOCK Package

For inbound web services to work the USER\_LOCK must be enabled at the database level. This is a one time step. If this is not already enabled please do so using the following steps.

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

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

3. Grant permission by running the following SQL:

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

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

### 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.



## Upgrading from v2.2.0.1.5 to v2.2.0.3

You must be at either at v2.2.0.1.5 (v2.2.0 Service Pack 1 Patch Set 5) or at v2.2.0.1.6 (v2.2.0 Service Pack 1 Patch Set 6) before upgrading to v2.2.0.3.

This section contains instructions for upgrading from v2.2.0.1.5. To upgrade from v2.2.0.1.6, please refer to [Upgrading from v2.2.0.1.6 to v2.2.0.3](#).

**Note:** If you are currently at version v2.2.0.1.x, upgrade to v2.2.0.1.5. Additional information on this patch set upgrade is available at My Oracle Support (<http://support.oracle.com>) as Bug 21052840 - ORACLE REAL-TIME SCHEDULER V2.2.0.1.5 PACKAGE IN ARU.

1. Apply prerequisite Framework DB single fixes by running the CDXPatch.exe utility from the FW\FW42020-Rollup\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.

After the patches are processed, the utility may prompt you to create security for new objects. When prompted as shown below, Press Enter without any input, since security for new objects is generated in subsequent steps during installation of Oracle Real-Time Scheduler.

- Enter a comma-separated list of Oracle users in which synonyms need to be created (e.g.CISUSER,CISREAD):
- Enter a database role which has a read-write privilege (e.g. CIS\_USER):
- Enter a database role which has a read only privilege (e.g. CIS\_READ):

## Installing the CISADM Schema of Oracle Real-Time Scheduler

The files for the Upgrade Install of Oracle Real-Time Scheduler 2.2.0.3 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\_20)

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 ORADBI.exe from under the ORS\Install-Upgrade folder. The utility prompts you to enter values for the following parameters:
  - Name of the target database: <DB NAME>
  - Name of the owner of the Database Schema: <CISADM>
  - Password for the user (in silent mode)
  - Location of Java Home: <..\jdk1.6.0\_20>
  - Location of UGBU Jar files: <..\ORS\jarfiles>
  - Oracle user with read-write privileges to the Database Schema: <CISUSER>
  - Oracle user with read-only privileges to the Database Schema: <CISREAD>
  - Oracle database role with read-write privileges to the Database Schema: <CIS\_USER>
  - Oracle database role with read-only privileges to the Database Schema: <CIS\_READ>
  - Name of the owner of the Database Schema: <CISADM>
  - Password for the user (in silent mode)
  - Password for the user (in silent mode)

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, ORADBI 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.

### ORADBI Performs the Following Tasks

- Interacts with the user to collect information about the name of Oracle account that will own the application schema (for example, CISADM), password of this account and the name of the Oracle account that the application user will use (for example, CISUSER), and the name of the Oracle account that will be assigned read-only privileges to the application schema (for example, CISREAD).
- Verifies whether tablespace names already exist in the Storage.xml file (if not, the process will abort).
- Verifies whether the upgrade path from the current release ID to the target release ID is supported by the upgrade.
- 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.

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## 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

### Enable USER\_LOCK Package

For inbound web services to work the USER\_LOCK must be enabled at the database level. This is a one time step. If this is not already enabled please do so using the following steps.

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

```
@?/rdbms/admin/userlock.sql
```
3. Grant permission by running the following SQL:
 

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

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

### 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 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 the installation. 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/>).

## Upgrading from v2.2.0.1.6 to v2.2.0.3

You must be at v2.2.0.1.6 (v2.2.0 Service Pack 1 Patch Set 6) before upgrading to v2.2.0.3.

**Note:** If you are currently at version v2.2.0.1.x, upgrade to v2.2.0.1.6. Additional information on this patch set upgrade is available at My Oracle Support (<http://support.oracle.com>) as Bug 21380864 - ORACLE REAL-TIME SCHEDULER V2.2.0.1.6 PACKAGE IN ARU.

1. Apply prerequisite Framework DB single fixes by running the CDXPatch.exe utility from the FW\FW42020-Rollup\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.

After the patches are processed, the utility may prompt you to create security for new objects. When prompted as shown below, Press Enter without any input, since security for new objects is generated in subsequent steps during installation of Oracle Real-Time Scheduler.

- Enter a comma-separated list of Oracle users in which synonyms need to be created (e.g.CISUSER,CISREAD):
- Enter a database role which has a read-write privilege (e.g. CIS\_USER):
- Enter a database role which has a read only privilege (e.g. CIS\_READ):

## Installing the CISADM Schema of Oracle Real-Time Scheduler

The files for the Upgrade Install of Oracle Real-Time Scheduler 2.2.0.3 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\_20)

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 ORADBI.exe from under the ORS\Install-Upgrade folder. The utility prompts you to enter values for the following parameters:

- Name of the target database: <DB NAME>
- Name of the owner of the Database Schema: <CISADM>
- Password for the user (in silent mode)
- Location of Java Home: <..\jdk1.6.0\_20>
- Location of UGBU Jar files: <..\ORS\jarfiles>
- Oracle user with read-write privileges to the Database Schema: <CISUSER>
- Oracle user with read-only privileges to the Database Schema: <CISREAD>
- Oracle database role with read-write privileges to the Database Schema: <CIS\_USER>
- Oracle database role with read-only privileges to the Database Schema: <CIS\_READ>
- Name of the owner of the Database Schema: <CISADM>
- Password for the user (in silent mode)
- Password for the user (in silent mode)

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, ORADBI 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.

### **ORADBI Performs the Following Tasks**

- Interacts with the user to collect information about the name of Oracle account that will own the application schema (for example, CISADM), password of this account and the name of the Oracle account that the application user will use (for example, CISUSER), and the name of the Oracle account that will be assigned read-only privileges to the application schema (for example, CISREAD).
- Verifies whether tablespace names already exist in the Storage.xml file (if not, the process will abort).
- Verifies whether the upgrade path from the current release ID to the target release ID is supported by the upgrade.
- 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

### Enable USER\_LOCK Package

For inbound web services to work the USER\_LOCK must be enabled at the database level. This is a one time step. If this is not already enabled please do so using the following steps.

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

```
@?/rdbms/admin/userlock.sql
```
3. Grant permission by running the following SQL:  

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

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

### 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 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 the installation. 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/>).

## Upgrading from v2.2.0.2 to v2.2.0.3

You must be at v2.2.0.2 (v2.2.0 Service Pack 2) before upgrading to v2.2.0.3.

**Note:** Additional information on installing 2.2.0 Service Pack 2 is available at My Oracle Support (<http://support.oracle.com>) as BUG 20811537 - ORACLE REAL-TIME SCHEDULER V2.2.0.2.0 PACKAGE IN ARU.

1. Apply prerequisite Framework DB single fixes by running the CDXPatch.exe utility from the FW\FW42020-Rollup\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.

After the patches are processed, the utility may prompt you to create security for new objects. When prompted as shown below, Press Enter without any input, since security for new objects is generated in subsequent steps during installation of Oracle Real-Time Scheduler.

- Enter a comma-separated list of Oracle users in which synonyms need to be created (e.g.CISUSER,CISREAD):
- Enter a database role which has a read-write privilege (e.g. CIS\_USER):
- Enter a database role which has a read only privilege (e.g. CIS\_READ):

## Installing the CISADM Schema of Oracle Real-Time Scheduler

The files for the Upgrade Install of Oracle Real-Time Scheduler 2.2.0.3 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\_20)

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 ORADBI.exe from under the ORS\Install-Upgrade folder. The utility prompts you to enter values for the following parameters:
  - Name of the target database: <DB NAME>

- Name of the owner of the Database Schema: <CISADM>
- Password for the user (in silent mode)
- Location of Java Home: <..\jdk1.6.0\_20>
- Location of UGBU Jar files: <..\ORS\jarfiles>
- Oracle user with read-write privileges to the Database Schema: <CISUSER>
- Oracle user with read-only privileges to the Database Schema: <CISREAD>
- Oracle database role with read-write privileges to the Database Schema: <CIS\_USER>
- Oracle database role with read-only privileges to the Database Schema: <CIS\_READ>
- Name of the owner of the Database Schema: <CISADM>
- Password for the user (in silent mode)
- Password for the user (in silent mode)

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, ORADBI 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.

### ORADBI Performs the Following Tasks

- Interacts with the user to collect information about the name of Oracle account that will own the application schema (for example, CISADM), password of this account and the name of the Oracle account that the application user will use (for example, CISUSER), and the name of the Oracle account that will be assigned read-only privileges to the application schema (for example, CISREAD).
- Verifies whether tablespace names already exist in the Storage.xml file (if not, the process will abort).
- Verifies whether the upgrade path from the current release ID to the target release ID is supported by the upgrade.
- 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.
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- 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

### Enable USER\_LOCK Package

For inbound web services to work the USER\_LOCK must be enabled at the database level. This is a one time step. If this is not already enabled please do so using the following steps.

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

```
@?/rdbms/admin/userlock.sql
```
3. Grant permission by running the following SQL:  

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

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

### 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 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 the installation. 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 Demo Database](#)
- [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 v2.2.0.3 from the Oracle Software Delivery Cloud.
2. Unzip the ORS-V2.2.0.3.0-database.zip to a temporary folder. This file contains the FW and ORS folders that contain the database components required to install the database.

### Creating the Demo Database

**Note:** You must have Oracle Database Server 11.2.0.1 or higher 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 for 11g databases. For 12c databases, please create the databases using DBCA.

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/FW42020/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 expdp\_demo.dmp.

**Note:** The data\_pump\_dir directory object must exist in the database created above before continuing with the import. You should also copy the expdp\_demo.dmp file to the data\_pump\_dir. Decompress the expdp\_demo.dmp.gz file first to extract the expdp\_demo.dmp file. This file is in ..\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= expdp_demo.dmp
logfile=expdp_demo.log schemas=CISADM
```

## Creating the Demo Database on Windows

The files for creating the database are located in the ..\FW\FW42020\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 expdp\_demo.dmp file to the data\_pump\_dir. Decompress the expdp\_demo.dmp.gz file first to extract the expdp\_demo.dmp file. This file is in ..\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):expdp\_demo.dmp
- Enter the name of the log file (impspladm.log):expdp\_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 expdp\_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. Execute the `OraGenSec.exe` utility.

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

The script will prompt you for parameter values:

- Enter the application read-only user or Schema Owner in the database (e.g. CISADM or CISREAD): CISADM
- Enter the password for the user: CISADM
- Enter the name of the Oracle Database: database name
- Enter a comma-separated list of Oracle users in which synonyms need to be created (e.g. cisuser,cisread): cisuser,cisread
- Select the following options: A
  - (A/a): Generate security for All objects in the Database (e.g. A or a for all objects)
  - (O/o): Generate security for specific Objects inputted in this terminal (e.g. CI\_ACCT,CI\_ACCT\_K)
  - Generate security for specific objects generated from an input File (e.g. Security\_Objects.txt)

The utility configures security for the application owner schema objects.

If you run `Oragensec` in Interactive Mode (without using the command line options), it will by default grant permissions to `CIS_USER` and `CIS_READ` Role. If you prefer to use site-specific roles then execute `Oragensec` after providing command line options

For example:

```
(Oragensec.exe -d [Schema Owner],[Schema Owner's Password],[Database Name] -u [Read/Write User],[Read Only User] -r [Read Only Role],[Read Write Role] -a A -l [Logfile Name])
```

## Installing Service Packs and Patches

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# Chapter 3

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## Database Design

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

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

# Database Object Standard

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

## Categories of Data

A table can belong to one of the three categories:

- Control (admin)
- Master
- Transaction

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

Example of tables in each category:

- **Control:** SC\_USER, CI\_ADJ\_TYPE, F1\_BUS\_OBJ
- **Master:** CI\_PER, CI\_PREM,
- **Transaction:** F1\_FACT, CI\_FT

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

## Naming Standards

The following naming standards must be applied to database objects.

### Table

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

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

Some examples are:

- CI\_ADJ\_TYPE
- CI\_ADJ\_TYPE\_L

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

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

The tables prior to V2.0.0 are prefixed with CI\_ or SC\_.

### Columns

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

- Use the suffix **FLG** to define a lookup table field. Flag columns must be CHAR(4). Choose lookup field names carefully as these column names are defined in the lookup table (CI\_LOOKUP\_FLD) and must be prefixed by the product owner flag value.
- Use the suffix **CD** to define user-defined codes. User-defined codes are primarily found as the key column of the admin tables.
- Use the suffix **ID** to define system assigned key columns.
- Use the suffix **SW** to define Boolean columns. The valid values of the switches are 'Y' or 'N'. The switch columns must be CHAR(1)
- Use the suffix **DT** to define Date columns.
- Use the suffix **DTTM** to define Date Time columns.
- Use the suffix **TM** to define Time columns.

Some examples are:

- ADJ\_STATUS\_FLG
- CAN\_RSN\_CD

## Indexes

Index names are composed of the following parts:

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

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

Some examples are:

- F1C066P0
- F1C066S1
- CMT206S2

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

## Updating Storage.xml

The storage.xml file that comes with the product allocates all base tables and indexes to the default tablespace CISTS\_01. If you decide to allocate some tables or indexes outside of the default tablespace, then this has to be reflected in the storage.xml file by changing the tablespace name from the default value to a custom value, according to the format shown below:

**Format:**

<Table\_Name>



```

        <TABLESPACE>CISTS_01</TABLESPACE>
        <PARALLEL>1</PARALLEL>
-   <LOB>
-   <Column Name>
        <TABLESPACE>CISTS_01</TABLESPACE>
        <SECUREFILE>Y</SECUREFILE>
        <CHUNK>8192</CHUNK>
        <CACHE>N</CACHE>
        <LOGGING>Y</LOGGING>
        <INROW>Y</INROW>
        <COMPRESS>N</COMPRESS>
        </Column Name>
    </LOB>
</Table_Name>

```

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

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

```

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

```

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

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

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

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

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

## Sequence

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

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

```
[OF][C/M/T]NNN_SEQ
```

- OF stands for Owner Flag. For example, Framework its F1. Other examples are M1 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 etc.
- C/M/T stands for Control (Admin)/Master/Transaction tables.

- NNN is a three digit unique identifier for a table on which the sequence is defined.  
For Example: F1T220\_BO\_STATUS\_CD\_SEQ and F1T220\_BUS\_OBJ\_CD\_SEQ
3. If sequence is used for a generic requirement and not specific to a table, then use the following sequence name.
- [OF]Column\_Name\_SEQ
- OF stands for Owner Flag. For example, the framework is F1. Other examples are M1 etc.
- For Example: F1FKVALID\_SEQ
- For a customer modification, CM must prefix the sequence name.

## Trigger

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

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

---

# Column Data Type and Constraints

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

## User Defined Code

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

## System Assigned Identifier

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

## Date/Time/Timestamp

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

## Number

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

## Fixed Length/Variable Length Character Columns

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

## Null Column Support

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

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

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

---

## XML Type Support

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

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

## Cache and Key Validation Flags

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

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

## Default Value Setting

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

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

## Foreign Key Constraints

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

## Standard Columns

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

### Owner Flag

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

### Version

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

# Chapter 4

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## 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. This section includes:

- **Index**
- **Table Partitioning Recommendations**
- **Transparent Data Encryption Recommendations**
- **Data Compression Recommendations**
- **Database Vault Recommendations**
- **Oracle Fuzzy Search Support**
- **Information Lifecycle Management Support**
- **Storage Recommendations**
- **Database Configuration Recommendations**
- **Database Syntax**
- **Database Initialization Parameters**

## Index

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

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

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

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

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

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

## Table Partitioning Recommendations

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

## Transparent Data Encryption Recommendations

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

Please consider the following when implementing TDE:

- Create a wallet folder to store the master key. By default, the wallet folder should be created under \$ORACLE\_BASE/admin/<sid>.

- The wallet containing the master key can be created using the following command:
 

```
alter system set encryption key authenticated by "keypasswd"
```
- The wallet can be closed or opened using the following commands:
 

```
alter system set wallet open identified by "keypasswd";
alter system set wallet close;
```
- Column level encryption can be achieved using the following commands:
 

```
create table <table_name>
(name varchar2(200) default ' ' not null,
bo_data_area CLOB encrypt using 'AES128',
bo_status_cd char(12) encrypt using 'AES128')
lob (bo_data_area) store as securefile (cache compress)
tablespace <tablespace_name>;
```
- AES128 is the default encryption algorithm.
- Tablespace level encryption is also supported using the following command:
 

```
Create tablespace <tablespace_name> logging datafile '<datafile
location>' size <initial size> reuse autoextend on next <next size>
maxsize unlimited extent management local uniform size
<uniform size> encryption using 'AES128' default storage(encrypt) ;
```
- Indexed columns can only be encrypted using the NO SALT Option. Salt is a way to strengthen the security of encrypted data. It is a random string added to the data before it is encrypted, causing repetition of text in the clear to appear different when encrypted.

## Data Compression Recommendations

Oracle Utilities supports Advanced Data Compression, available with Oracle 11gR1 onwards, to reduce the database storage footprint. Make sure that your resources are sufficiently sized for this as it uses additional system resources. Compression can be enabled at the Tablespace level or at the Table level.

### Exadata Hardware

For Exadata hardware the compression recommendations are:

- For 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.

### Non- Exadata Hardware

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

## CLOB Fields

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

## Database Vault Recommendations

The product supports Database Vault. 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.

## Oracle Fuzzy Search Support

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

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

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

## Information Lifecycle Management Support

The product supports Information Lifecycle Management (ILM). ILM provides policies, processes, practices, and tools to align the business value of information with the most appropriate and cost effective IT infrastructure from the time information is conceived through its final disposition. Implementing ILM also helps in data archiving once data is managed effectively.

## Storage Recommendations

This section specifies recommended options for storing the database objects.

### SecureFile for Storing LOBs

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

- The storage options with SecureFiles for Heap Tables should be ENABLE STORAGE IN ROW, CACHE and COMPRESS.



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

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

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

See “Database Syntax” on page 5 for more information on SecureFiles.

## Database Configuration Recommendations

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

### Large Redo Log File Sizes

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

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

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

## Database Syntax

### SecureFile

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

CREATE TABLE <Table_Name>
  ( COLUMN1 ...,
    COLUMN2 (CLOB)
    CONSTRAINT <> PRIMARY KEY(...)
  )
ORGANIZATION INDEX PCTTHRESHOLD 50 OVERFLOW
```

```
LOB(COLUMN2) STORE AS SECUREFILE (ENABLE STORAGE IN ROW CHUNK CACHE  
COMPRESS);
```

## Database Initialization Parameters

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

```
db_block_size=8192  
log_checkpoint_interval=0  
db_file_multiblock_read_count=8  
transactions=3000  
open_cursors=30000  
db_writer_processes=10  
optimizer_index_cost_adj=1  
optimizer_index_caching=100  
db_files=1024  
dbwr_io_slaves=10 (Only if Asynchronous IO is not Supported)  
sessions=4500  
memory_target=0  
memory_max_target=0  
processes=3000  
dml_locks=48600  
_b_tree_bitmap_plans=FALSE
```

---

# Oracle Database Implementation Guidelines

This section provides specific guidelines for implementing the Oracle database.

## Oracle Partitioning

If you use a base index for the partitioning key, rename the index to CM\*\*.

If you use the primary key index of the table as the partitioning key:

- Make the index non-unique.
- Primary constraints should still exist.

The upgrade on the partitioned table will work the best if the partitioning key is not unique. This allows the upgrade tool to drop the PK constraints if the primary key columns are modified and recreate the PK constraints without dropping the index.

## 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. You should gather statistics periodically for objects where the statistics become stale over time because of changing data volumes or changes in column values. New statistics should be gathered after a schema object's data or structure are modified in ways that make the previous statistics inaccurate.

For example, after loading a significant number of rows into a table, collect new statistics on the number of rows. After updating data in a table, you do not need to collect new statistics on the number of rows, but you might need new statistics on the average row length.

A sample syntax that can be used is as following.

```
BEGIN
SYS.DBMS_STATS.GATHER_SCHEMA_STATS (
OwnName => 'CISADM'
,Degree => 16
,Cascade => TRUE
,Method_opt => 'FOR ALL COLUMNS SIZE AUTO'
,Granularity => 'ALL');
END;
/
```

# Appendix A

---

## Upgrades to the Oracle Utilities Application Framework Database

### Upgrading from Oracle Utilities Application Framework V4.2.0.1 to V4.2.0.2

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

The added functionality of V4.2.0.2 is not the scope of this documentation. The upgrade scripts do not turn on the newly added functionality by default. For new functionality, refer the V4.2.0.2 User Guides.

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.

### Long Context Value on XAI Receiver

A new field Context Value Long (F1\_CTXT\_VAL\_LONG) is added to XAI Receiver Table (CI\_XAI\_RCVR\_CTX). This new field is a longer version of the existing field CTXT\_VAL. CTXT\_VAL which supported only 50 characters. To accommodate long encryption key generated by the Java key generator for keystore, the new column is added on the XAI Receiver Table to store the encrypted key. The existing column CTXT\_VAL on this table would be unsupported. For this to be possible, as a part of upgrade script, all the current data in CTXT\_VAL column would be updated into F1\_CTXT\_VAL\_LONG column. The CTXT\_VAL is deprecated and will be dropped in subsequent release.

## Schema Change

### New Tables

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

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

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

## New Views

None

## Dropped Tables

None

## Unsupported Tables

None

## Added Columns

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

Table	Column	Required
CI_XAI_RCVR_CTX	F1_CTXT_VAL_LONG	Y

## Dropped Columns

None

## Unsupported Table Columns

These columns will be deprecated in a future release.

- CI\_XAI\_SNDR\_CTX: CTXT\_VAL column is not used.

## Column Format Change

Table Name	Column Name	From	To
CI_XAI_JDBC_CON	DATABASE_PASSW ORD	VARCHAR2:64	VARCHAR2:128

## New System Data

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

### Application Service

The following application services are added after Oracle Utilities Application Framework v 4.2.0.1.0.

Application Service	Description
CILQTDPCP	To Do Entry Creator for Business Service
F1-ANNTYPBOAS	Inbound Web Service Annotation Type BO
F1-BKTCONFIG	Bucket Configuration MO
F1ANN	Inbound Web Service Annotation MO
F1ANNBOAS	Inbound Web Service Annotation BO
F1ANNTPM	Inbound Web Service Annotation Type
F1ANNTPS	Inbound Web Service Annotation Type Query
F1ANNTYPS	Inbound Web Service Annotation Type Query
F1BKTCFG	Bucket Configuration
F1BKTCFQ	Bucket Configuration Query
F1IWSANM	Inbound Web Service Annotation
F1IWSDDL	Inbound Web Service Deployment
F1IWSDDL	Inbound Web Service Deployment
F1IWSVVC	Inbound Web Service MO
F1IWSVCBOAS	Inbound Web Service BO
F1IWSVCP	Inbound Web Service
F1IWSVCS	Inbound Web Service Query

### Access Mode Added to Application Service

None

### Batch Control

The following batch controls are added.

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

## **XAI Inbound Service**

There are no new XAI Inbound Services new to Oracle Utilities Application Framework  
V4.2.0.1.0



# Upgrading from Oracle Utilities Application Framework V4.2.0.0 to V4.2.0.1

This section describes the database upgrade process for the Oracle Utilities Application Framework database from V4.2.0.0 to V4.2.0.1. It highlights changes made to the administrative tables and how those changes should be applied to the data in order for your current database to work with the V4.2.0.1 application, and to preserve the business logic implemented in the previous version of the application. The changes that do not require data upgrade are not described in this document. The tasks that need to be performed after running the upgrade scripts are included.

The added functionality of V4.2.0.1 is not the scope of this documentation. The upgrade scripts do not turn on the newly added functionality by default. For new functionality, refer the V4.2.0.1 User Guides. In the last section of this document you will find a list of the new tables that are added in V4.2.0.1.

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.

### Java Class Generation for Lookups

From Oracle Utilities Application Framework 4.2.0 Service Pack 1 (v4.2.0.1) onwards, the system generates Java classes for all lookups. This requires that the Java names ("Java Field Name" and "Java Value Name") should be populated for all lookup fields and its values must be valid values. If this is not done, the generated classes would result in compile errors.

Oracle Utilities Application Framework has fixed all lookup field and its values so that no compilation errors occur when Artifact Generator generates these classes.

Oracle Utilities Application Framework delivers a set of SQLs, which when executed, populate the Java names on the fields and their values, if the field names and values were earlier missing.

### New User-Friendly Schema Editor

From Oracle Utilities Application Framework 4.2.0 Service Pack 1 (v4.2.0.1) onwards, Oracle Utilities introduces a new schema editor called Schema Designer. The Schema Designer is a graphical tool used to maintain a schema. It is available for use on the Business Object, UI Map, Service Script and Data Area maintenance pages. It helps the user in defining a schema without the need for typing an XML document, and provides easy reference to schema element attributes and their default values.

## Schema Change

### New Tables

None

### New Views

None

### Dropped Tables

None

### Unsupported Tables

None

### Added Columns

None

### Dropped Columns

None

### Unsupported Table Columns

None

## **Column Format Change**

None

## **New System Data**

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

## **Application Service**

None

## **Access Mode Added to Application Service**

None

## **Batch Control**

None

## **XAI Inbound Service**

There are no new XAI Inbound Services new to Oracle Utilities Application Framework V4.2.0.1.0.

# Appendix B

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## Oracle Real-Time Scheduler System Table Guide

This chapter lists the system tables owned by Oracle Real-Time Scheduler 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.

### 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

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## Oracle Utilities Application Framework System Table Guide

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

This section includes:

- **About the Application Framework System Tables**
- **System 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_CNTRL, SC_USER, SC_USR_GRP_PROF, SC_USR_GRP_USR, SC_USER_GROUP, SC_USER_GROUP_L
Initial Data	User Group All SERVICES and default system user SYSUSER. Upon installation the system default User Group All SERVICES is given unrestricted accesses to all services defined in Oracle Utilities Application Framework.

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

### Currency Code

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

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

### DB Process

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

## Display Profile

The Display Profile Code is referenced in the User (SC\_USER) table.

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

## Installation Options

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

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

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

## Language Code

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

Properties	Description
Tables	CI_LANGUAGE
Initial Data	English (ENG).

## To Do Priority and Role

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

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

## Development and Implementation System Tables

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



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## 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 <Product Name> 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 Modification	None

## Batch Control

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

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

## Business Object

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

## Business Service

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

## Characteristics

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

## Configuration Migration Assistant

Properties	Description
Tables	F1_MIGR_PLAN, F1_MIGR_PLAN_L, F1_MIGR_PLAN_INSTR, F1_MIGR_PLAN_INSTR_L, F1_MIGR_PLAN_INSTR_ALG, F1_MIGR_REQ, F1_MIGR_REQ_L, F1_MIGR_REQ_INSTR, F1_MIGR_REQ_INSTR_L, F1_MIGR_REQ_INSTR_ENTITY
Standard Data Fields	Migration Plan Code (MIGR_PLAN_CD), Migration Request Code (MIGR_REQ_CD)
Customer Modification	None

## Data Area

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

## Display Icon

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

## Extendable Lookup

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

## Foreign Key Reference

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

## Inbound Web Service

Properties	Description
Tables	F1_IWS_SVC_L,F1_IWS_SVC,F1_IWS_SVC_OPER_L,F1_IWS_SVC_OPER, F1_IWS_ANN_L,F1_IWS_ANN_PARM, F1_IWS_ANN,F1_IWS_ANN_TYPE_L, F1_IWS_ANN_TYPE, F1_IWS_ANN_TYPE_PARM,F1_IWS_ANN_TYPE_PARM_L
Standard Data Fields	Webservice Name (IN_SVC_NAME), Annotation (ANN_CD), Annotation Type (ANN_TYPE_CD)

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Properties	Description
Customer Modification	Debug (DEBUG_SW), Active (ACTIVE_SW), Trace (TRACE_SW), Post Error (POST_ERROR_SW), Request XSL (REQUEST_XSL), Response XSL (RESPONSE_XSL)

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## Lookup

Properties	Description
Tables	CI_LOOKUP_FIELD, CI_LOOKUP_VAL, CI_LOOKUP_VAL_L,
Standard Data Fields	<p>Field Name (FIELD_NAME)</p> <ul style="list-style-type: none"> <li>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.</li> </ul> <p>Field Value (FIELD_VALUE)</p> <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>
Customer Modification	Override Description (DESCR_OVRD) on Lookup Field Value Language Table (CI_LOOKUP_VAL_L)

## Map

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

## Managed Content

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

## Messages

Properties	Description
Tables	CI_MSG_CATEGORY, CI_MSG_CATEGORY_L, CI_MSG, CI_MSG_L
Standard Data Fields	<p>Message Category (MESSAGE_CAT_NBR)</p> <ul style="list-style-type: none"> <li>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.</li> <li>Oracle Utilities Customer Care and Billing and Oracle Utilities Business Intelligence - 00001 thru 00100</li> <li>Oracle Utilities Application Framework Java - 11001 thru 11100</li> <li>Oracle Utilities Customer Care and Billing Java - 11101 thru 11200</li> <li>Oracle Utilities Business Intelligence Java - 11201 thru 11300</li> <li>Implementer COBOL - 90000</li> <li>Implementer WSS - 90001</li> <li>Implementer Java - 90002</li> <li>Reserved for Tests - 99999</li> </ul> <p>Message Number (MESSAGE_NBR) for COBOL message categories</p> <ul style="list-style-type: none"> <li>Message numbers below 1000 are reserved for common messages. Implementers must not use message numbers below 1000.</li> </ul> <p>Message Number (MESSAGE_NBR) for Java message categories</p> <ul style="list-style-type: none"> <li>Subsystem Standard Messages - 00001 thru 02000</li> <li>Reserved - 02001 thru 09999</li> <li>Published Messages - 10001 thru 11000</li> <li>Package Messages - 10001 thru 90000</li> <li>Reserved - 90001 thru 99999</li> <li>Each package is allocated 100 message numbers, each starting from 101.</li> <li>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</li> <li>Reserved message number ranges are for future use and therefore must not be used by all products.</li> </ul>



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_I, CI_MD_TBL_FLD_I, CI_MD_FLD, CI_MD_FLD_I, F1_DB_OBJECTS_REPO
Standard Data Fields	<p>Table Name (TBL_NAME)</p> <ul style="list-style-type: none"> <li>Table names must match with the physical table name or view name in the database.</li> <li>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.</li> <li>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)</li> </ul>
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) <ul style="list-style-type: none"> <li>Index Name for Primary Constraints</li> <li>&lt;Index Name&gt;Rnn for Foreign Key Constraints Where               <ul style="list-style-type: none"> <li>nn: integer, 01 through 99</li> </ul> </li> </ul>
Customer Modification	None

## Meta Data - Menu

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

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

## Meta Data - Program, Location and Services

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

## Meta Data - Maintenance Object

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

## Meta Data - Work Tables

Properties	Description
Tables	CI_MD_WRK_TBL, CI_MD_WRK_TBL_I, 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_I, CI_MD_SO_RSFLD, CI_MD_SO_RSFLDAT, CI_MD_SOCG, CI_MD_SOCG_FLD, CI_MD_SOCG_FLDAT, CI_MD_SOCG_I, CI_MD_SOCG_SORT
Standard Data Fields	Search Object (SO_CD)
Customer Modification	None

## Navigation Option

Properties	Description
Tables	CI_NAV_OPT, CI_NAV_OPT_I, 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_I, CI_PORTAL_ZONE, CI_ZONE, CI_ZONE_I, CI_ZONE_PRM, CI_ZONE_HDL, CI_ZONE_HDL_I, CI_ZONE_HDL_PRM, CI_ZONE_HDL_PRM_I, CI_UI_ZONE

Properties	Description
Standard Data Fields	Portal Code (PORTAL_CD), Zone Code (ZONE_CD), Zone Type Code (ZONE_HDL_CD) <ul style="list-style-type: none"> <li>A new Zone can be added to the Product owned Portal Pages.</li> <li>The existing Zones cannot be removed from the Product owned Portal Pages.</li> </ul>
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**

<b>Properties</b>	<b>Description</b>
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_PRMPPT, CI_SCR_PRMPPT_L, CI_SCR_STEP, CI_SCR_STEP_L
Standard Data Fields	Script (SCR_CD)
Customer Modification	None

**To Do Type**

<b>Properties</b>	<b>Description</b>
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 subsequent 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)

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## Oracle Utilities Application Framework Only Tables

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

- CI\_MD\_AT\_DTL / CI\_MD\_AT\_DTL\_L
- CI\_MD\_ATT\_TY
- CI\_MD\_CTL / CI\_MD\_CTL\_L
- CI\_MD\_CTL\_TMPL
- CI\_MD\_ELTY / CI\_MD\_ELTY\_L
- CI\_MD\_ELTY\_AT
- CI\_MD\_LOOKUP / CI\_MD\_LOOKUP\_F
- CI\_MD\_PDF / CI\_MD\_PDF\_VAL
- CI\_MD\_MSG / CI\_MD\_MSG\_L
- CI\_MD\_SRC\_TYPE / CI\_MD\_SRC\_TYPE\_L
- CI\_MD\_TMPL / CI\_MD\_TMPL\_L
- CI\_MD\_TMPL\_ELTY
- CI\_MD\_TMPL\_VAR / CI\_MD\_TMPL\_VAR\_L
- CI\_MD\_VAR / CI\_MD\_VAR\_DTL / CI\_MD\_VAR\_DTL\_L
- CI\_XAI\_EXECUTER / CI\_XAI\_EXECUTER\_L



## System Table List

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

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

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

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

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

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

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

<b>Table Name</b>	<b>Upgrade Action</b>	<b>Description</b>
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_SO CG	MG	Search Object Criteria Group
CI_MD_SO CG_FLD	MG	Search Object Criteria Group Field
CI_MD_SO CG_FLDAT	MG	Search Criteria Group Field Attribute
CI_MD_SO CG_L	MG	Search Object Criteria Group Language
CI_MD_SO CG_SORT	MG	Search Criteria Group Result Sort Order
CI_MD_SO_L	MG	Search Object Language
CI_MD_SO_RSFLD	MG	Search Object Result Field
CI_MD_SO_RSFLDAT	MG	Search Object Result Field Attribute
CI_MD_SVC	MG	MD Service
CI_MD_SVC_L	MG	MD Service Language
CI_MD_SVC_PRG	MG	MD Service Program
CI_MD_TAB_MOD	MG	UI Tab Module
CI_MD_TBL	MG	MD Table
CI_MD_TBL_FLD	MG	MD Table Field
CI_MD_TBL_FLD_L	MG	MD Table Field Language
CI_MD_TBL_L	MG	MD Table Language
CI_MD_WRK_TBL	MG	Work Table
CI_MD_WRK_TBLFLD	MG	Work Table Field
CI_MD_WRK_TBL_L	MG	Work Table Language
CI_MSG	MG	Message
CI_MSG_CATEGORY	MG	Message Category

<b>Table Name</b>	<b>Upgrade Action</b>	<b>Description</b>
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_PRMPPT	MG	Script Prompt
CI_SCR_PRMPPT_L	MG	Script Prompt Language
CI_SCR_STEP	MG	Script Step
CI_SCR_STEP_L	MG	Script Step Language
CI_SEQ	MG	Sequence
CI_TD_DRLKEY_TY	MG	To Do Type Drill Key
CI_TD_SRTKEY_TY	MG	To Do Type Sort Key
CI_TD_SRTKEY_TY_L	MG	To Do Type Sort Key Language
CI_TD_TYPE	MG	To Do Type
CI_TD_TYPE_L	MG	To Do Type Language
CI_UI_ZONE	MG	Context Sensitive Zone
CI_USR_NAV_LINK	MG	User Favorite Links
CI_XAI_ADAPTER	MG	XAI Adapter
CI_XAI_ADAPTER_L	MG	XAI Adapter Lang
CI_XAI_CLASS	MG	XAI Class

<b>Table Name</b>	<b>Upgrade Action</b>	<b>Description</b>
CI_XAI_CLASS_L	MG	XAI Class Language
CI_XAI_ENV_HNDL	MG	XAI Envelope Handler
CI_XAI_ENV_HNDL_L	MG	XAI Envelope Handler Language
CI_XAI_IN_SVC	MG	XAI Inbound Service
CI_XAI_IN_SVC_L	MG	XAI Inbound Service Language
CI_XAI_SVC_PARM	MG	XAI Inbound Service Parameters
CI_ZONE	MG	Zone
CI_ZONE_HDL	MG	Zone Type
CI_ZONE_HDL_L	MG	Zone Type Language
CI_ZONE_HDL_PRM	MG	Zone Type Parameters
CI_ZONE_HDL_PRM_L	MG	Zone Type Parameters Language
CI_ZONE_L	MG	Zone Language
CI_ZONE_PRM	MG	Zone Parameters
F1_BUS_OBJ	MG	Business Object
F1_BUS_OBJ_ALG	MG	Business Object Algorithm
F1_BUS_OBJ_L	MG	Business Object Language
F1_BUS_OBJ_OPT	MG	Business Object Option
F1_BUS_OBJ_STATUS	MG	Business Object Status
F1_BUS_OBJ_STATUS_ALG	MG	Business Object Status Algorithm
F1_BUS_OBJ_STATUS_L	MG	Business Object Status Language
F1_BUS_OBJ_STATUS_OPT	MG	Business Object Status Option
F1_BUS_OBJ_STATUS_REASON	MG	Status Reason
F1_BUS_OBJ_STATUS_REASON_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

<b>Table Name</b>	<b>Upgrade Action</b>	<b>Description</b>
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_IWS_ANN	MG	Inbound Web Service Annotation
F1_IWS_ANN_L	MG	Inbound Web Service Annotation Language
F1_IWS_ANN_PARM	MG	Inbound Web Service Annotation Parameter
F1_IWS_ANN_TYPE	MG	Inbound Web Service Annotation Type
F1_IWS_ANN_TYPE_L	MG	Inbound Web Service Annotation Type Language
F1_IWS_ANN_TYPE_PARM	MG	Inbound Web Service Annotation Type Parm
F1_IWS_ANN_TYPE_PARM_L	MG	Inbound Web Service Annotation Type Parameter Language
F1_IWS_SVC	MG	Inbound Web Service
F1_IWS_SVC_L	MG	Inbound Web Service Language
F1_IWS_SVC_OPER	MG	Inbound Web Service Operations
F1_IWS_SVC_OPER_L	MG	Inbound Web Service Operations Language
F1_MANAG_CONTENT	MG	Managed Content
F1_MANAG_CONTENT_L	MG	Managed Content Language
F1_MAP	MG	UI Map
F1_MAP_L	MG	UI Map Language
F1_MIGR_PLAN	MG	Migration Plan
F1_MIGR_PLAN_INSTR	MG	Migration Plan Instruction
F1_MIGR_PLAN_INSTR_ALG	MG	Migration Plan Instruction Algorithm

<b>Table Name</b>	<b>Upgrade Action</b>	<b>Description</b>
F1_MIGR_PLAN_INSTR_L	MG	Migration Plan Instruction Language
F1_MIGR_PLAN_L	MG	Migration Plan Language
F1_MIGR_REQ	MG	Migration Request
F1_MIGR_REQ_INSTR	MG	Migration Request Instruction
F1_MIGR_REQ_INSTR_ENTITY	MG	Migration Request Instruction Entity
F1_MIGR_REQ_INSTR_L	MG	Migration Request Instruction Language
F1_MIGR_REQ_L	MG	Migration Request Language
F1_SCHEMA	MG	Schema
SC_ACCESS_CNTL	MG	User Group Access Control
SC_APP_SERVICE	MG	Application Service
SC_APP_SERVICE_L	MG	Application Service Language
SC_USR_GRP_PROF	MG	User Group Profile
CI_ACC_GRP	KP	Access Group
CI_ACC_GRP_DAR	KP	Access Group / Data Access Group
CI_ACC_GRP_L	KP	Access Group Language
CI_APP_SVC_SCTY	KP	Security Type Application Service
CI_CAL_HOL	KP	Work Calendar Holidays
CI_CAL_HOL_L	KP	Work Calendar Holidays Language
CI_CAL_WORK	KP	Work Calendar
CI_CAL_WORK_L	KP	Work Calendar Language
CI_CHTY_TDTY	KP	To Do Type Template Characteristics
CI_COUNTRY	KP	Country
CI_COUNTRY_L	KP	Country Language
CI_CURRENCY_CD	KP	Currency Code
CI_CURRENCY_CD_L	KP	Currency Code Language
CI_DAR	KP	Data Access Role
CI_DAR_L	KP	Data Access Language

<b>Table Name</b>	<b>Upgrade Action</b>	<b>Description</b>
CI_DAR_USR	KP	Data Access User
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_PROF	KP	Display Profile
CI_DISP_PROF_L	KP	Display Profile Language
CI_ENV_REF	KP	Environment Reference
CI_ENV_REF_L	KP	Environment Reference Language
CI_FUNC	KP	Function
CI_FUNC_FLD	KP	Function Field
CI_FUNC_FLD_L	KP	Function Field Language
CI_FUNC_L	KP	Function Language
CI_GEO_TYPE	KP	Geographic Type
CI_GEO_TYPE_L	KP	Geographic Type Language
CI_INSTALL_ALG	KP	Installation Algorithm
CI_INSTALL_MSG	KP	Installation Message
CI_INSTALL_MSG_L	KP	Installation Message Language
CI_INSTALL_PROD	KP	Installation Product
CI_MD_RPT	KP	Report Definition
CI_MD_RPT_L	KP	Report Language
CI_MD_RPT_LBL	KP	Report Labels
CI_MD_RPT_PARM	KP	Report Parameters
CI_MD_RPT_PARM_L	KP	Report Parameters Language
CI_MD_TOOLREP_XML	KP	MD Tool Reference XML
CI_MD_TOOL_REP	KP	MD Tool Reference
CI_NT_DNTY_CTXT	KP	Notification Download Type Context



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

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

Table Name	Upgrade Action	Description
CI_XAI_JMS_Q	KP	XAI JMS Queue
CI_XAI_JMS_Q_L	KP	XAI JMS Queue Language
CI_XAI_JMS_TPC	KP	XAI JMS Topic
CI_XAI_JMS_TPC_L	KP	XAI JMS Topic Language
CI_XAI_JNDI_SVR	KP	XAI JNDI Server
CI_XAI_JNDI_SVR_L	KP	XAI JNDI Server Language
CI_XAI_OPTION	KP	XAI Option
CI_XAI_RCVR	KP	XAI Receiver
CI_XAI_RCVR_CTX	KP	XAI Receiver Context
CI_XAI_RCVR_L	KP	XAI Receiver Language
CI_XAI_RCVR_RGRP	KP	XAI Receiver Rule Group
CI_XAI_RCVR_RSP	KP	XAI Receiver Response
CI_XAI_RGRP	KP	XAI Rule Group
CI_XAI_RGRP_ATT	KP	XAI Rule Group Attachment
CI_XAI_RGRP_L	KP	XAI Rule Group Language
CI_XAI_ROUTING	KP	XAI Routing
CI_XAI_RT_TYPE	KP	XAI Route Type
CI_XAI_RT_TYPE_L	KP	XAI Route Type Language
CI_XAI_RULE	KP	XAI Rule
CI_XAI_SENDER	KP	XAI Sender
CI_XAI_SENDER_L	KP	XAI Sender Language
CI_XAI_SNDR_CTX	KP	XAI Sender Context
F1_BKT_CONFIG	KP	Bucket Configuration
F1_BKT_CONFIG_L	KP	Bucket Configuration Language
F1_BKT_CONFIG_REL_OBJ	KP	Bucket Configuration Related Object
F1_BKT_CONFIG_VAL	KP	Bucket Configuration Value
F1_BKT_CONFIG_VAL_L	KP	Bucket Configuration Value Language
F1_BUS_OBJ_STATUS_RS N_CHAR	KP	Status Reason Characteristic
F1_EXTSYS_OUTMSG_P ROF	KP	External System Outbound Message Type

Table Name	Upgrade Action	Description
F1_INSTALLATION	KP	Installation Option - Framework
F1_IWS_ANN_CHAR	KP	Inbound Web Service Annotation Characteristics
F1_IWS_ANN_TYPE_CHARACTER	KP	Inbound Web Service Annotation Type Characteristics
F1_IWS_SVC_ANN	KP	Inbound Web Service Link to Annotation
F1_IWS_SVC_CHAR	KP	Inbound Web Service Characteristics
F1_IWS_SVC_LOG	KP	Inbound Web Service Log
F1_IWS_SVC_LOG_PARM	KP	Inbound Web Service Log Parameter
F1_MAP_OVRD	KP	UI Map Override
F1_MD_DB_OBJ	KP	MD Database Object
F1_MST_CONFIG	KP	Master Configuration
F1_OUTMSG_TYPE	KP	Outbound Message Type
F1_OUTMSG_TYPE_L	KP	Outbound Message Type Language
F1_REQ_TYPE	KP	Request Type
F1_REQ_TYPE_L	KP	Request Type Language
F1_REQ_TYPE_LOG	KP	Request Type Log
F1_REQ_TYPE_LOG_PARAMETER	KP	Request Type Log Parameters
F1_SVC_TASK_TYPE	KP	Service Task Type
F1_SVC_TASK_TYPE_CHARACTER	KP	Service Task Type Characteristics
F1_SVC_TASK_TYPE_L	KP	Service Task Type Language
F1_WEB_SVC	KP	Web Service Adapter
F1_WEB_SVC_CHAR	KP	Web Service Adapter Characteristics
F1_WEB_SVC_L	KP	Web Service Adapter Language
F1_WEB_SVC_LOG	KP	Web Service Adapter Log
F1_WEB_SVC_LOG_PARAMETER	KP	Web Service Adapter Log Parameter

Table Name	Upgrade Action	Description
F1_WEB_SVC_OPERATIONS	KP	Web Service Adapter Operations
SC_USER	KP	User
SC_USER_CHAR	KP	User Characteristic
SC_USER_GROUP	KP	User Group
SC_USER_GROUP_L	KP	User Group Language
SC_USR_GRP_USR	KP	User Group User
CI_MD_ATT_TY	RF	MD Element Attribute Type
CI_MD_AT_DTL	RF	MD Element Attribute Type Detail
CI_MD_AT_DTL_L	RF	MD Element Attribute Type Detail Language
CI_MD_CTL	RF	Generator Control
CI_MD_CTL_L	RF	Generator Control Language
CI_MD_CTL_TMPL	RF	Generator Control Template
CI_MD_ELTY	RF	MD Element Type
CI_MD_ELTY_AT	RF	Element Type Attributes
CI_MD_ELTY_L	RF	Element Type Language
CI_MD_LOOKUP_F	RF	MD Lookup Field
CI_MD_MSG	RF	MD Message
CI_MD_MSG_L	RF	MD Message Language
CI_MD_PDF	RF	Predefined Fields
CI_MD_PDF_VAL	RF	Predefined Values
CI_MD_SRC_TYPE	RF	Source Type
CI_MD_SRC_TYPE_L	RF	Source Type Language
CI_MD_TMPL	RF	Template
CI_MD_TMPL_ELTY	RF	Template Element Types
CI_MD_TMPL_L	RF	Template Language
CI_MD_TMPL_VAR	RF	Template Variable
CI_MD_TMPL_VAR_L	RF	Template Variable Language
CI_MD_VAR	RF	Variable
CI_MD_VAR_DTL	RF	Variable Detail
CI_MD_VAR_DTL_L	RF	Variable Detail Language
CI_XAI_EXECUTER	RF	XAI Executer

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<b>Table Name</b>	<b>Upgrade Action</b>	<b>Description</b>
CI_XAI_EXECUTER_L	RF	XAI Executer Language

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# Appendix D

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## 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" )
/
```



# Appendix E

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