Oracle® Database

Installation Guide

10*g* Release 2 (10.2.0.5) for IBM z/OS on System z

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Oracle Database Installation Guide, 10*g* Release 2 (10.2.0.5) for IBM z/OS on System z

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Preface

This guide describes how to install and configure Oracle Database 10*g* release 2 (10.2.0.5) for IBM z/OS on System z.

Audience

This guide is intended for anyone responsible for installing, migrating, or upgrading to Oracle Database10*g* release 2 (10.2.0.5) on a single IBM z/OS on System z.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc.

Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info or visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs if you are hearing impaired.

Related Documents

The platform-specific documentation for Oracle Database 10*g* products includes the following manuals:

- Oracle Database
  - *Oracle Database Release Notes for IBM z/OS on System z*
  - *Oracle Database Installation Guide for IBM z/OS on System z*
  - *Oracle Database User's Guide for IBM z/OS on System z*
  - *Oracle Database Messages Guide for IBM z/OS on System z*
  - *Oracle Database System Administration Guide for IBM z/OS on System z*

  For information about upgrading from a previous release of Oracle Database, refer to the *Oracle Database Upgrade Guide* and the *Oracle Database System Administration Guide for IBM z/OS on System z*.
- Other Documentation

  In addition to the platform-specific documents, the following product-specific documents are referenced in this guide:

Oracle Books

- *Oracle Database Administrator's Guide*
- *Oracle Database Advanced Security Administrator's Guide*
- *Oracle Database Application Developer's Guide - Fundamentals*
- *Oracle Database Application Developer's Guide - Large Objects*
- *Oracle Database Backup and Recovery Book Set*
- *Oracle Database Concepts*
- *Oracle Database Data Guard Concepts and Administration*
- *Oracle Database Globalization Support Guide*
- *Oracle Database Performance Tuning*
- *Oracle Database Real Application Clusters Book Set*
- *Oracle Database Recovery Manager Book Set*
- *Oracle Database Reference*
- *Oracle Database SQL Reference*
- *Oracle Database Upgrade Guide*
- *Oracle Database Utilities*
- *Oracle Enterprise Manager Advanced Configuration*
- *Oracle Enterprise Manager Book Set*
- *Oracle Net Services Book Set*

IBM Books

- *CICS Transaction Server for z/OS Installation Guide V3R2.0* (GC34-6812)
- *IMS V10 System Definition Guide* (GC18-9998)
- *Redbooks: Experiences with Oracle Database 10g on z/OS* (SG24-7055)
- *z/OS V1R10.0 DFSMS Access Method Services for Catalogs* (SC26-7394)
- *z/OS V1R10.0 DFSMS: Using Data Sets* (SC26-7410)
- *z/OS V1R10.0 MVS Initialization and Tuning Reference* (SA22-7592)
- *z/OS V1R10.0 MVS Planning: Workload Management* (SA22-7602)
- *z/OS V1R10.0 MVS Setting Up a Sysplex* (SA22-7625)
- *z/OS V1R10.0 MVS System Commands* (SA22-7627)
- *z/OS V1R10.0 Security Server RACF Command Language Reference* (SA22-7687)
- *z/OS V1R10.0 Security Server RACF Macros and Interfaces* (SA22-7682)
- *z/OS V1R10.0 Security Server RACF Security Administrator's Guide* (SA22-7683)
- *z/OS V1R10.0 Security Server RACF System Programmer's Guide* (SA22-7681)
- *z/OS V1R10.0 UNIX System Services Planning* (GA22-7800)

IBM documents are referenced in a shorter form throughout this document. For example, *z/OS V1R10.0 MVS Initialization and Tuning Reference* (SA22-7592) is referred to as *MVS Initialization and Tuning Reference.*

Refer to *Oracle Database Release Notes for IBM z/OS on System z* for important information that was not available when this book was released. The release notes for Oracle Database 10*g* are updated regularly. You can get the most recent version from Oracle Technology Network at

`http://www.oracle.com/technetwork/indexes/documentation/index.html`

Refer to *Oracle Database Patch Set Notes 10g Release 2 (10.2.0.5) Patch Set 4 for IBM z/OS on System z* for other important information. The patch set notes is provided as a `readme` file and is included in the distribution files that are obtained from the My Oracle Support Web site.

Conventions

The following text conventions are used in this document:

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

1 Installation Overview

This chapter describes the different types of Oracle Database 10*g* for z/OS installations you can perform, and issues you must consider before installing the software. It includes information about the following topics:

- Overview of Oracle Database Installation
- Installation Considerations
- Upgrade Issues
- Working in Shell Environments

1.1 Overview of Oracle Database Installation

Oracle recommends that you review the installation process carefully before you begin. The new installation features and tasks are summarized in the following list:

- The Oracle software is compressed into installation files that can be downloaded from the Oracle Support Web site, as described in Chapter 2. The installation files are in the zip format.
- You must upload the installation files to z/OS using either File Transfer protocol (FTP) or network file system (NFS), and then extract the compressed files to a temporary location on your z/OS UNIX System Services file system. You must allocate either Hierarchical File System (HFS) or zFS temporary disk space for each task. Chapter 2 lists the instructions on transferring the files to your z/OS system and the temporary disk space requirements.
- You must allocate permanent disk space for the installed products. This disk space includes HFS or zFS disk space and data set disk space. Chapter 2 describes the permanent disk space requirements.
- You may need to configure z/OS UNIX System Services parameters and other system parameters depending on whether you are installing the Oracle Database software for the first time or upgrading an existing installation. This is described in Chapter 2.
- After installation is complete, temporary files can be removed.
- The installation process creates an Oracle environment on z/OS UNIX System Services that is complete for the maintenance of Oracle products. This environment is similar to that of a UNIX system. On the TSO/Batch side you will have many PDS (Partitioned Data Set) and PDSE (Partitioned Data Set - Extended) data sets.

The Oracle Database installation process consists of the following phases:

1. **Read the release notes:** Read the *Oracle Database Release Notes for IBM z/OS on System z* before you begin the installation. The release notes are available with the platform-specific documentation. The latest version of the release notes is available on Oracle Technology Network at

   `http://www.oracle.com/technetwork/indexes/documentation/index.html`

2. **Planning your installation:** This chapter describes the Oracle Database 10*g* for z/OS products that you can install, and issues that you must consider before starting the installation.
3. **Completing preinstallation tasks:** Chapter 2 describes preinstallation tasks that you must complete before installing the product.
4. **Installing software:** Use the following section to install Oracle Database:
   - Chapter 3 describes how to install the Oracle Database software and complete the database installation process.
   - Chapter 4 describes how to remove the Oracle software.
   - Appendix A describes the Oracle Library data sets, and how to choose data set name qualifiers.

1.1.1 Oracle Database 10*g* Options for Installation

You can choose to perform a complete Oracle Database installation or only the Oracle Database Client installation.

By default, the complete Oracle Database and Oracle Database Client are installed. However, you can specify a parameter to install only the Oracle Database Client software. You can use Oracle Database Client to run Oracle Database applications.

1.2 Installation Considerations

This section contains information that you must consider before deciding how to install Oracle Database 10*g* software. It contains the following sections:

- Software Certification
- Multiple Oracle Homes

1.2.1 Software Certification

The platform-specific software requirements included in this installation guide were current at the time this guide was published. However, because new platforms and operating system software versions might be certified after this guide is published, review the certification matrix on the My Oracle Support Web site for the most up-to-date list of certified operating system versions. My Oracle Support is available at the following URL:

`https://support.oracle.com`

1.2.2 Multiple Oracle Homes

Oracle Database 10*g* for z/OS supports multiple Oracle homes. You can install this release or previous releases of Oracle Database 10*g* for z/OS software more than once on the same system, in different Oracle home directories.

1.3 Upgrade Issues

For information about upgrading a previous release of Oracle Database for z/OS to Oracle Database 10*g* for z/OS, refer to the *Oracle Database Upgrade Guide* and the *Oracle Database System Administration Guide for IBM z/OS on System z*.

1.4 Working in Shell Environments

Some installation-related tasks are performed in the z/OS UNIX System Services environment and use shell commands. Throughout this document, tasks that involve shell commands are prefixed with a dollar sign ($) followed by a space, which is the default prompt for the TTY shell provided by IBM. If you use a different shell such as the OMVS shell in TSO, the prompt may be different but the commands are generally the same. However, the OMVS shell requires using an editor other than `vi` in situations where a file must be edited.

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Preinstallation Tasks

This chapter describes the tasks that you must complete before you start Oracle Universal Installer. It includes information about the following:

- Checking the Hardware Requirements
- Checking the Software Requirements
- Review System-Level Configuration Considerations
- Choosing Oracle Software Locations
- Identifying Required Software Directories
- Configuring the User Environment
- Installation Software Files

2.1 Checking the Hardware Requirements

The system must meet the following minimum hardware requirements:

- 1.4 GB to 3.6 GB of disk space for the Oracle software, depending on the installation type
- 4.0 GB of temporary disk space for a temporary work area, including the disk space required for the zip files that are downloaded and their expanded contents. The zip files and expanded installation files can be located in different file systems.
- 1000 cylinders (860 MB) of PDS disk space, including 350 cylinders (284 MB) for the `AUTHLOAD` library (only 10 cylinders are needed for client-only installations), 300 cylinders (244 MB) for the `CMDLOAD` library, and 125 cylinders (102 MB) for the `MESG` PDS. The remaining data sets require less than 10 cylinders (10 MB) each.

Your z/OS system may not have the required disk space available as an HFS or z/FS file system. In this case, ask your system administrator to allocate the space. Oracle recommends that you install Oracle software in its own separate zFS file system.

You can use the following command in a z/OS UNIX Systems Services shell to list the file systems which have space available:

```
$ df -k
```

The installation itself requires a maximum of 60 MB of temporary disk space for extracting the files.

Refer to *Oracle Database Patch Set Notes 10g Release 2 (10.2.0.5) Patch Set 4 for IBM z/OS on System z* for a detailed list and an accurate estimate of disk space requirements.

2.2 Checking the Software Requirements

Depending on the features that you intend to use, verify that the required software is installed on the system, as listed and described in the following table:

Installation Type or Product	Requirement
Operating System	IBM z/OS (5694-A01) V1.10.0 or later Required for all installations.
Java	The installation and patching procedures for Oracle Database 10*g* Release 2 (10.2.0.5) no longer require Java. However, if you do not have an `Unzip` utility available, you may substitute it with the Java `jar` utility for the installation process. Any version of jar at level 1.4.2 or later may be used. Other features of Oracle Database for z/OS may require Java. Refer to *Oracle Database Patch Set Notes 10g Release 2 (10.2.0.5) Patch Set 4 for IBM z/OS on System z* for the specific version of Java required.
IBM REXX	Required for all installations
CICS TS	V3.2 or later is required for Oracle Access Manager for CICS TS
IMS TM	V10.1 or later is required for Oracle Access Manager for IMS TM
z/OS UNIX System Services	Required for all installations.
TCP/IP	Required for all installations.
IBM C/C++	IBM z/OS XL C/C++ V1.10 or later is required for Pro*C and OCI applications
COBOL compiler	Any currently supported IBM COBOL compiler that uses the LE runtime environment is required for Pro*COBOL applications
PL/I compiler	Any currently supported IBM PL/I compiler that uses the LE runtime environment is required for PRO*PL/I applications
Unzip	The need to process `.zip` files is prominent in the installation and patching procedures for Oracle Database 10*g* Release 2 (10.2.0.5). Although there are substitutions and workarounds possible, Oracle recommends that you install an Unzip utility that can be used as a z/OS UNIX System Services command. An Unzip utility for z/OS UNIX System Services is available from the IBM Ported Tools web site.

To ensure that the system meets the software requirements, perform the following steps:

1. To determine which version of z/OS is installed, use the following command:

   ```
   $ uname -aI
   ```

   The operating system version should appear as follows, where *`systemname`* is the name of the system and *`nnnn`* is the hardware model:

   ```
   z/OS systemname 10.00 01 nnnn
   ```

2. To determine whether Java 1.4.2 is installed in the default `PATH`, enter the following command:

   ```
   $ java -version
   ```

The Java version should appear as follows:

```
java version "1.4.2"
Java(TM) 2 Runtime Environment, Standard Edition (build 1.4.2)
Classic VM (build 1.4.2, J2RE 1.4.2 IBM z/OS Persistent Reusable VM build
cm142ifx-20100705 (SR13 FP5) (JIT enabled: jitc))
```

If the `Java` executable is not found, or if the version displayed is less than 1.4.2, download Java 1.4.2 from the IBM Java Web site and install it:

`http://www-03.ibm.com/systems/z/os/zos/tools/java/`

Note: You can install IBM Java with or without SMP/E.

3. To determine whether the IBM `make` program is installed and in the path, enter the following command:

```
$ make -V
```

Usually `make` is located in the `/bin` directory. You may need to copy the file `/samples/startup.mk` to `/etc/startup.mk` for the `make` to function correctly. If `make` is not installed and in the path, then an error message is displayed. Oracle recommends that you should not modify this file.

2.2.1 Check for Required APARS

Refer to *Oracle Database Patch Set Notes 10g Release 2 (10.2.0.5) Patch Set 4 for IBM z/OS on System z* for more information on required APARS.

2.3 Review System-Level Configuration Considerations

This section describes configuration considerations to review for your system.

The following are required for both server and client-only installations:

- Perform Product Security Activities
- Configure BPX Parameters
- Check User Virtual Storage
- Add an APF-Authorized Library

The following are required for server installations only:

- Ensure Adequate Address Space IDs (ASIDs)
- Add Program Properties
- Create and Activate a Resource Class
- Associate User IDs with Services

2.3.1 Perform Product Security Activities

Some activities that are related to installing Oracle Database 10*g* for z/OS can be performed independently, even before the software arrives. All of these activities are related to product security features, and one activity, which is optional, requires an initial program load (IPL) of your system before it takes effect. Depending on the

organization and procedures of your installation, you may need to work with system security personnel or systems programmers to perform these activities.

The following descriptions are provided in RACF (IBM z/OS Security Server) terms with the assumption that RACF is in use. Any product which fully implements z/OS System Authorization Facility (SAF) can be substituted. If your installation uses a product other than RACF, refer to the documentation for that product for information about how to perform the steps that are discussed in this chapter.

2.3.2 Configure BPX Parameters

The following `BPX` parameter files must be modified and activated on the system. They are set in `SYS1.PARMLIB`(`BPX`*xxx*). After doing so, you do not need to IPL the system:

- `MAXTHREADTASKS`(1000)
- `MAXTHREADS`(1000)
- `MAXCPUTIME`(2147483647)
- `MAXASSIZE`(2147483647)
- `MAXSHAREPAGES`(131072)
- `SHRLIBMAXPAGES`(8192)

2.3.3 Check User Virtual Storage

Determine the virtual region size for the user performing the installation. If it is less than the required size, you must increase the maximum allowable size of the virtual region to 512 MB. The method you use to determine the virtual region size depends on whether you entered the z/OS UNIX System Services shell environment through Telnet or `rlogin` or through TSO OMVS:

- If you entered the z/OS UNIX System Services shell environment through Telnet or rlogin, the virtual storage is the amount set in the `SYS1.PARMLIB`(`BPXPRM`*xx*) field `MAXASSIZE`. This amount can be limited in the OMVS segment of your RACF profile.

  For example, if you do not define `ASSIZEMAX` in your RACF OMVS segment, and you have `MAXASSIZE` set to 2147483647, all Telnet or `rlogin` sessions will get 2 GB of virtual storage.

- If you entered the z/OS UNIX System Services shell environment through TSO OMVS, then the virtual storage is the region size that you set for the `REGION` field when you logged on to TSO. This value is in KB. This amount can be limited in the TSO segment of your RACF profile.

  You must ask your system administrator to issue the following command, which shows the maximum allowed value:

  ```
  $ tso listuser username tso
  ```

  For example:

  ```
  tso listuser arogers tso
  USER=AROGERS  NAME=ANDREW ROGERS         OWNER=RACF      CREATED=96.106
  DEFAULT-GROUP=OEG647    PASSDATE=03.356  PASS-INTERVAL= 92
  ...
  TSO INFORMATION
  ---------------
  ACCTNUM= NOACCT
  PROC= $AROGERS
  ```

```
SIZE= 02048000
MAXSIZE= 02048000
USERDATA= 0000
```

This shows that you can have up to 2 GB of virtual storage.

You must be aware that the SMF exit IEFUSI can limit virtual storage in either of the previous cases. Therefore, ensure that the SMF exit IEFUSI allows for enough virtual storage to use Oracle products.

2.3.4 Add an APF-Authorized Library

Oracle Database 10*g* for z/OS requires the database and network region programs to run with APF authorization, which means that the load modules must reside in an APF-authorized library. While it is possible to copy these modules into an existing authorized library, Oracle recommends that you create an authorized library specifically for Oracle Database 10*g* for z/OS. Because z/OS requires all modules that are loaded by an authorized program to come from authorized libraries, the library contains a number of modules in addition to the database and network region programs, including the Oracle Database kernel. The authorized library must be a PDSE type rather than a PDS type.

A load library can be authorized in either of two ways: add an entry for the data set to the `PROG`*`xx`* member of `SYS1.PARMLIB`, or add an entry for the data set to the `IEAAPF`*`xx`* member of `SYS1.PARMLIB`. The first way (using the `PROG`*`xx`* member) utilizes a newer mechanism. The second way (using the `IEAAPF`*`xx`* member) utilizes an older mechanism. You may need to talk to your systems programmer to determine which method to use and the correct suffix to substitute for *xx*. If you plan to name the authorized library `ORACLE.V10G.AUTHLOAD`, for example, then the following code shows a suitable entry in `PROG`*`xx`*:

```
APF ADD DSNAME(ORACLE.V10G.AUTHLOAD) SMS
```

If your installation is using `IEAAPF`*`xx`* instead of `PROG`*`xx`*, a comparable entry there would be:

```
ORACLE.V10G.AUTHLOAD ,
```

The comma in the above entry is included only if the entry is not the last record in the member. Omit the comma in the new entry if it is last in the member, and ensure that the preceding entry has a comma.

Changes to `PROG`*`xx`* or `IEAAPF`*`xx`* do not take effect until the next IPL. If your installation has enabled z/OS dynamic APF facilities, then a library can be authorized without an IPL by using a `SETPROG APF,ADD` operator command as shown in the following example:

```
SETPROG APF,ADD,DSN=ORACLE.V10G.AUTHLOAD,SMS
```

The authorization that is conferred by the `SETPROG` command is independent of the `PROG`*`xx`* or `IEAAPF`*`xx`* members and lasts only until the next IPL. This means that you would use this technique only if you expect to install the software and actually configure and run a database service or network service before the next IPL of your system.

Regardless of the technique used, a data set does not need to exist to be authorized. Oracle Universal Installer prompts you for the location of the data set and can optionally allocate it for you. If you can choose the data set name that you want to use, then this step can be performed before the data set is created and populated. However, once you create a data set, you must authorize it.

2.3.5 Ensure Adequate Address Space IDs (ASIDs)

Oracle Database 10*g* for z/OS instances can be composed of multiple address spaces and can make extensive use of z/OS Cross Memory Services. When a cross-memory address space is terminated, the address space ID (ASID) that was used for this address space is made unavailable. Eventually, the pool of z/OS ASIDs can become exhausted, which prevents new address spaces from being created. In order to avoid the above condition, the `RSVNONR` parameter in the `IEASYS`*xx* member of `SYS1.PARMLIB` must be set to a higher value.

> **See Also:** Refer to the IBM document *MVS Initialization and Tuning Reference*, for details on specifying the `RSVNONR` parameter

2.3.6 Add Program Properties

The database and network service region programs must run nonswappable and noncancelable, and should not be subject to system time limits. In addition, the database service runs in protect key 7. These attributes are indicated by adding entries for these programs to the z/OS Program Properties Table (PPT), through a member of the `SYS1.PARMLIB` data set named `SCHED`*xx*, where *xx* is a 2-letter or 2-digit suffix. The entries that you add must be similar to those in the following example. The comments, which are included for clarity, are allowed but are not required.

> **Note:** You may need to work with your systems programmer to determine the correct member name and to add the entries.

```
/* SCHEDxx PPT entry for Oracle database region */
PPT PGMNAME(ORARASC)        /* Program (module) name    */
    NOCANCEL                /* Not cancelable           */
    KEY(7)                  /* Protection key           */
    NOSWAP                  /* Not swappable            */
    SYST                    /* Not subject to timing    */
   /* SCHEDxx PPT entry for Oracle network region */
PPT PGMNAME(MINMAIN)        /* Program (module) name    */
    NOCANCEL                /* Not cancelable           */
    NOSWAP                  /* Not swappable            */
    SYST                    /* Not subject to timing    */
```

The entries in the `SCHED`*xx* member are usually read at z/OS IPL. You can cause z/OS to reread the member without an IPL by using the `SET SCH` operator command. The PPT entries must take effect before Oracle database and network services are started.

> **See Also:** For details on the `SCHED`*xx* member, the PPT, and the `SET SCH` command, refer to the following IBM documents:
>
> - *MVS Initialization and Tuning Reference*
> - *MVS System Commands*

2.3.7 Create and Activate a Resource Class

The authorization-checking mechanism of SAF is based on resource names, which are simply character strings that identify the data, interface, or other entity that is protected. Resource names are organized into classes. A resource class is a name for a group of resources with similar name structure and attributes. RACF has a number of predefined resource classes for items such as data sets, tape volumes, and terminals.

Oracle Database 10*g* for z/OS has three types of resources that are subject to authorization checking:

1. OSDI commands
2. The client-service bind interface
3. The database server SYSOPER/SYSDBA connection privilege

These resources must have an associated resource class. By default, Oracle Database 10*g* for z/OS is set up with the assumption that the resources are in the FACILITY class, which is a predefined RACF class. FACILITY is a general-use class whose resource name structure accommodates all three of the resource types of Oracle Database 10*g* for z/OS. If you use the default FACILITY class, then you may need to activate the class if your installation has not previously defined resources in the class.

> **See Also:** For directions on activating the FACILITY class, refer to the IBM document *Security Server RACF Security Administrator's Guide*

This is done with a SETROPTS CLASSACT RACF command and does not require a z/OS IPL.

> **See Also:** For a description of this command, refer to the IBM document *Security Server RACF Command Language Reference*

The security standards or procedures of your installation may make it preferable to create distinct resource classes for Oracle Database 10*g* for z/OS resources. RACF allows security administration privileges to be granted on a resource class basis. If you create distinct classes for Oracle Database 10*g* for z/OS, those RACF administration privileges can be granted to users without enabling administrative privileges on other non-Oracle Database resources that may be associated with the FACILITY class.

If you decide to create resource classes for Oracle Database 10*g* for z/OS, then two classes must be created: one for OSDI commands and one that is shared by both bind and database SYSOPER/SYSDBA connect authorizations.

> **See Also:** For information about adding installation-defined resource classes, refer to the following IBM documents:
>
> - *Security Server RACF Macros and Interfaces*
> - *Security Server RACF System Programmer's Guide*

The procedure involves coding Assembler Language macro instructions that are assembled to create non-executable load modules that are the class table and router table, and an IPL of z/OS is required to activate the change.

> **Note:** This is the only preinstallation activity that requires an IPL.

If you choose to add new resource classes for Oracle Database 10*g* for z/OS, then the ICHERCDE macro that you code for the class table entries must specify parameters as in the following example, which defines the classes $ORACMD and $ORACONN.

```
$ORACMD ICHERCDE CLASS=$ORACMD,
       GROUP=$ORACONN,
       ID=192,                    Some number between 128 & 255
       MAXLNTH=19,
       RACLIST=ALLOWED,
```

```
       FIRST=ALPHANUM,
       OTHER=ANY,
       POSIT=42,                  Probably unique to this class
       OPER=NO,
       DFTUACC=NONE
$ORACONN ICHERCDE CLASS=$ORACONN,
       MEMBER=$ORACMD,
       ID=191,                    Some number between 128 & 255
       MAXLNTH=19,
       FIRST=ALPHANUM,
       OTHER=ANY,
       POSIT=42,                  Probably unique to this class
       OPER=NO,
       DFTUACC=NONE
```

Note: In this example, the continuation indicators that are required in position 72 of each continued record are omitted.

You must also add entries to the installation-supplied router table module `ICHRFR01`, as in the following example:

```
ICHRFRTB CLASS=$ORACMD,ACTION=RACF
ICHRFRTB CLASS=$ORACONN,ACTION=RACF
```

After the class table is updated and the system is IPLed, the new classes can be activated with the `SETROPTS CLASSACT` command.

See Also: For more information, refer to the IBM document *Security Server RACF Security Administrator's Guide* and the *Security Server RACF Command Language Reference*

You must also provide Oracle Database 10*g* for z/OS with the class names. This is done in the subsystem parameter file discussed in the *Oracle Database System Administration Guide for IBM z/OS on System z*.

2.3.8 Associate User IDs with Services

Oracle Database 10*g* for z/OS-managed services execute as system address spaces, similar to started tasks or STCs. Some of the z/OS system functions that are invoked by Oracle Database 10*g* for z/OS services perform authorization checks based on the z/OS user ID that is associated with the service address space. Depending on the security configuration and standards of your installation, those system functions may fail if no user ID is associated with the address space. You, or security personnel for your installation, must take steps to ensure that Oracle Database 10*g* for z/OS services have an associated user ID that can be authorized for system functions that are invoked by the database and network services.

If you are running the TNS programs of previous releases as started tasks (as opposed to submitting them as batch jobs), then your installation probably has `STARTED` or `USER` profiles for the associated JCL procedures. You should not rely on those for Oracle Database 10*g* for z/OS because the Oracle Database 10*g* for z/OS procedures should have different names. Plan to create at least two new `STARTED` or `USER` profiles, one for the database service and one for the network service. These may be all that you need, because different instances of a type of service can generally share the same JCL procedure. You may want to create additional profiles, though, if you want different instances of a service to run with different user IDs. This requires using distinct JCL

procedures even though the procedures themselves may be otherwise identical. The `RDEFINE` command that is used to add profiles is described in the *Security Server RACF Command Language Reference*.

> **See Also:** For details on the `STARTED` and `USER` resource classes, refer to the IBM document *RACF Security Administrator's Guide*

With RACF, it is also possible to associate a user ID with a started task using a started procedures table that is built with Assembler macros somewhat like the resource class table discussed in the previous section. Activating such changes requires an IPL, however, and is not the preferred method.

> **See Also:** Refer to the IBM document *RACF Security Administrator's Guide* for more information

Certain database features are implemented using z/OS UNIX System Services, formerly called Open Edition. These features include Java, XML, Oracle Text, Spatial Data Option, UTL_FILE package, and external LOB(BFILE) support. In order for these features to work, the database service address space must be capable of being "dubbed" as a z/OS UNIX System Services process. This requires that the z/OS user ID that is associated with the address space have a default z/OS UNIX System Services segment that is defined to the security subsystem.

> **See Also:** For additional information, refer to the *Oracle Database System Administration Guide for IBM z/OS on System z*

In addition, certain utilities run only in a z/OS UNIX System Services shell environment, such as Oracle Universal Installer, Enterprise Manager, and some client-side Java applications. For users requiring these applications, an OMVS RACF segment must be defined. The OMVS RACF segment can be defined to a group and then the users who are likely to require these Oracle Java applications can be associated with the group. Such users are typically Oracle DBAs and Oracle operators.

Depending on whether this is the first time Oracle software is being installed on this system and on the products that you are installing, you may need to create several groups and users who will be responsible for the installation, maintenance, and operation of the Oracle database.

Installation User/Group Considerations

Oracle Universal Installer requires that all users performing Oracle software installation and maintenance belong to the same group. Oracle recommends that you define a user group for all users performing installation and maintenance.

The user who performs the installation becomes the owner of the files created as part of the installation. You may want to define a z/OS user who will be the software owner. Any user performing an Oracle installation must have an OMVS RACF segment defined. This user must be able to create and update the Oracle PDS/PDSE data sets.

For maintenance, only the software owner is granted write access to the archive libraries. You may need to change the permissions for the archive libraries to allow anyone in the group write access after the installation has completed.

2.4 Choosing Oracle Software Locations

The Oracle software is installed in different types of file systems on z/OS. These file systems are: z/OS UNIX System Services for the Oracle executable code, samples, and maintenance structure; PDSE data sets for the Oracle executable code required for the Oracle Database server and TSO/batch clients.

Subsequent sections in this chapter describe how to configure the system depending on the location you choose for the software.

2.5 Identifying Required Software Directories

You must identify or create three directories for all Oracle installations, as follows:

- Oracle Base Directory
- Oracle Home Directory
- Oracle PDS and PDSE Data Sets

The following subsections describe the requirements for these directories.

Oracle Base Directory

The Oracle base directory acts as a top-level directory for Oracle software installations. Generally, you must allocate a zFS file system for the Oracle installation files. Oracle recommends that you allocate a high-level directory, for example, `/oracle`, as the root directory for the installation, which can be fairly small. Allocate another file system under this directory for each product being installed, for example, `/oracle/v10.2.0.5`. This corresponds to the Oracle home directory.

Oracle Home Directory

The Oracle home directory is the directory where you choose to install the software for a particular Oracle product. You must install different Oracle products, or different releases of the same Oracle product, in separate Oracle home directories. Oracle recommends that you define this directory as a separate zFS file system mounted under the `/oracle` directory. In addition, you should specify a path similar to the following for the Oracle home directory:

```
/oracle/v10.2.0.5
```

Each new release of an Oracle product typically requires a separate Oracle home directory. Oracle recommends that you keep your Oracle home to less than 50 characters. This is because the path is placed in the sample JCL and has a line length of 80.

Oracle PDS and PDSE Data Sets

During installation, a number of files are placed into PDS and PDSE data sets. The installation process creates these data sets. The user performing the installation must have the RACF authority to create them. The installation process requires that all Oracle installation and executable files are kept under one high level qualifier.

You must determine a naming convention for high-level and second-level data set name qualifiers. For more information, refer to Appendix A. In addition, you must determine a convention for naming Oracle software data files and database data files. For example, try to use a naming convention for the Oracle executable modules in data sets which includes the version. For example, `ORACLE.V10G` or `ORACLE.V10205`.

Database files should not include the version number. This is because the database is likely to exist across multiple versions or patch sets of the Oracle software.

2.6 Configuring the User Environment

Starting with Oracle Database 10*g* Release 2 (10.2.0.5), installations no longer require a Client X Server environment. However, an interactive environment with the ability to edit, submit, and monitor batch jobs is required.

This section describes the required environment of the user (*user ID*) who is performing the 10.2.0.5 installation. The installation is performed by running z/OS batch jobs. The user must have access to an interactive environment with the ability to perform the following:

- Edit the JCL files that include the jobs needed for installation using either:
  - A TSO/ISPF environment.
  - A z/OS UNIX System Services OMVS shell environment controlled by a 3270-style terminal, and use of the OEDIT editor.
  - A z/OS UNIX System Services shell environment controlled by a VT-style terminal, and use of the vi editor.
- Submit the jobs for execution on the target z/OS system using either:
  - A TSO/ISPF environment.
  - A TSO environment with permission to use the SUBMIT command.
  - A z/OS UNIX System Services shell environment controlled by a VT-style terminal, and use of the SUBMIT command.
- Monitor jobs for progress and successful completion by using:
  - An SDSF environment.
  - A TSO environment with permission to use the STATUS and OUTPUT commands.
  - A z/OS UNIX System Services shell environment controlled by a VT-style terminal, and use of the SUBMIT command.

Although it is possible to perform the installation from a VT-style terminal and the UNIX shell, Oracle recommends that you use a 3270-style terminal where you have the ability to use TSO, ISPF, and SDSF. From that environment, you can still perform the UNIX System Services operations utilizing the OMVS shell.

This environment is only used to edit, submit, and monitor batch jobs. The actual installation is performed by batch jobs. These batch jobs require the correct configuration, authority, and resources to perform the installation.

2.7 Installation Software Files

For detailed information about the composition of the installation software zip files, refer to *Oracle Database Patch Set Notes 10g Release 2 (10.2.0.5) Patch Set 4 for IBM z/OS on System z*. It also contains specific information on obtaining these zip files and where they should be placed on the z/OS system.

In short, you download 4 to 8 zip files from Oracle Support, then transfer them to a temporary location in an HFS or zFS file space. You may delete these zip files after the installation is complete.

3

Database Installation Tasks

This chapter describes how to install Oracle Database 10*g* for z/OS products on your system. Review the information in Chapter 1, "Installation Overview" and complete the tasks listed in Chapter 2, "Preinstallation Tasks" before beginning the installation.

This chapter includes information about the following topics:

- Overview
- Installing the Oracle Database Software
- Required Postinstallation Tasks

3.1 Overview

This chapter describes how to install the Oracle Database software. These installation instructions apply to the Oracle Database products.

Before you install the software, you must perform the necessary preinstallation tasks, including transferring the software to your z/OS system and extracting the files. For more information, refer to Chapter 2, "Preinstallation Tasks."

Unlike previous releases, Oracle Universal Installer is not used to install the software. The software is installed by executing z/OS batch jobs. The batch jobs use the standard utility programs, the batch TSO TMP, and the batch UNIX shell BPXBATCH to install the software. Oracle recommends that you use the interactive tools, such as, ISPF and SDSF to edit, submit, and monitor the batch jobs.

This documents assumes that the user performing the installation has the tools to create and edit jobs, submit them for execution, and view the results or listings.

3.2 Installing the Oracle Database Software

Perform the following tasks to install the software:

1. Start the installation by setting up the JCL for JOB1.

   The purpose of JOB1 is to generate the JCL for other jobs. Several configuration parameters are specified in JOB1 to select the correct set of software and to specify the location for the software on the target z/OS system. These parameters are located at the beginning of the JCL for JOB1. You must customize the job contents for these parameters according to your requirements using a text editor.

2. Use any of the following methods to obtain the JCL to customize the parameters for JOB1:

- Open the Release Notes document (`readme.html`) in a Web browser on your computer. Copy the section marked JOB1 and create the file `job1.jcl`. You can either transfer the file to your z/OS system to begin editing or edit the file directly on your computer and then transfer the file to your z/OS system. A bulk transfer technique such as FTP, NFS, or IND$FILE must be used since JOB1 has over 500 lines of data. Since the data is large, it is not practical to cut and paste the data in a terminal emulator screen by screen.
- On your z/OS system, locate the EBCDIC copy of the Release Notes document (`readme-edbcic.html`) that was created by unzipping the distribution files. Copy the `readme-edbcic.html` file into a new text file. Retain only the lines between the markers "### start of JOB1" and "### end of JOB1". Do not include the markers "### start of JOB1" and "### end of JOB1".

3. Customize the JOB statements:

   a. Replace the JOB statement at line 1 in the `job1.jcl` file with a JOB statement that conforms to the requirements of your z/OS system. Also, provide any job-level statements and job-level JES statements. In general, JOB1 requires minimal resources. However, since JOB1 runs the batch TMP and shell, ensure that any `REGION` specifications are generous.

   b. Replace the JOB statement located after the line `"//JOBCARD  DD DATA,DLM='!!'"` near line 57 in the `job1.jcl` file with an appropriate JOB statement for your system. Also, provide any job-level statements and job-level JES statements in this section. This JOB statement is used for each of the jobs generated by JOB1. Since these jobs perform the actual installation, ensure that you provide generous resource parameters.

      JOB1 only generates the jobs. You still have an opportunity to tailor each job before submission.

4. Customize the installation parameters.

   The installation parameters start near line 4 and are similar to the following lines:

```
//   SET SSET=A
//   SET OHFS='/oracle/v10205a'
//   SET OHLQ=ORACLE.V10G
//   SET OMLQ=V10205A
//   SET THLQ=SCOTT.TEMP
//   SET TZFS='/scratch/scott'
//*
//   SET PERMLOC='MGMTCLAS=MCLASS3,STORCLAS=SCLASS3,DATACLAS=DCLASS3'
//   SET TEMPLOC='UNIT=3390,VOL=SER=TEMPV1'
//*
//   SET ZIP1='/scratch/ftp/v10205a_mvs_1of3.zip'
//   SET UZIP='/usr/local/bin/unzip'
//   SET JJAR='/usr/lpp/java150_31bit/J5.0/bin/jar'
```

   where:

   `SSET` is the software set. The value A specifies both server software and client software. The value C specifies only the client software.

   `OHFS` is the `HFS` directory for `ORACLE_HOME`.

   `OHLQ` is the high-level-qualifier for data sets that correspond to `ORACLE_HOME`.

   `OMLQ` is the mid-level-qualifier for data sets that correspond to `ORACLE_HOME`.

   `THLQ` is the high-level-qualifier for temporary (installation only) data sets.

TZFS is the HFS directory for temporary files created in HFS

PERMLOC and TEMPLOC specify the DD keyword parameters to be used for the allocation of permanent and temporary data sets, respectively. You can use SMS classes or UNIT/VOL keywords for either parameter.

ZIP1 is the absolute path name to the first (1of3) distribution zip file.

UZIP is the absolute path name to the unzip command. If there is no unzip command available, then specify UZIP=''.

JJAR is the absolute path name to the Java jar command. If there is no Java jar command available, then specify JJAR=''.

The pre-supplied values are just examples. You must edit these values to meet your requirements.

If you have questions about how these parameters are used, you can examine the lines of JOB1 to find where these parameters (symbols) are used (are substituted). In the JCL you will see &OHFS, &OHLQ, &OMLQ, &THLQ, &TZFS, &PERMLOC, and &TEMPLOC. In shell scripts you will see $OHFS, $OHLQ, $OMLQ, $THLQ, $TZFS, $PERMLOC, $TEMPLOC, $ZIP1, $UZIP, and $JJAR. In JCL, the limitation of 72 character line determines the length of the parameter values.

5. Run JOB1.

   This creates the PDS named &THLQ..V10205A.WRKLIB containing the other jobs.The members are named JOB2, JOB3, JOB4, and so on.

   a. JOB2 handles unzipping the distribution files. This job creates 11 HFS files with names ending in XMIT.

   b. JOB3 copies the HFS XMIT files to XMIT data sets. This creates 11 data sets with names ending in XMIT. These data sets were originally created with the TSO XMIT command.

   c. JOB4 allocates the production data sets and a temporary PAX data set.

   d. JOB5 loads each production data set from its counterpart XMIT data set. If you need to rerun JOB5, then you must rerun JOB4 first.

      The AUTHLOAD PDSE will contain only ORACLE and ORAAMSD modules if you are performing both server and client software installation (that is, if SSET=A). If you are performing only the client software installation (that is, if SSET=C), then the AUTHLOAD PDSE will contain only the ORAAMSD module.

   e. JOB6 creates the Oracle home directory in HFS from the PAX data set.

   f. If additional jobs are created, refer to *Oracle Database Release Notes for IBM z/OS on System z*.

   g. All steps of JOB1 should terminate with RC=0.

6. Run the generated jobs, JOB2, JOB3, JOB4, and so on in the sequential order.

   In general, the jobs are structured in a way that enables you to rerun or modify the jobs if you encounter problems. In some instances, you may need to go back further when you choose to rerun a job. For example, if you need to rerun JOB5, then you must rerun JOB4 first.

   Step DEL3 of JOB3 and step DEL4 of JOB4 may complete with RC=4 when both JOBS are executed for the first time. This can be safely ignored.

3.3 Required Postinstallation Tasks

You must perform the tasks described in the following sections after completing an installation:

- Downloading and Installing Patches
- Performing System Administrator Tasks
- Configuring Other Oracle Products

3.3.1 Downloading and Installing Patches

Check the My Oracle Support (formerly Oracle*MetaLink*) Web site for required patches for your installation. To download required patches:

1. Use a Web browser to log on to the My Oracle Support (formerly Oracle*MetaLink*) Web site:

   `https://support.oracle.com`

   Note: If you are not a My Oracle Support registered user, then click **Register for My Oracle Support** and follow the registration instructions.

2. On the main My Oracle Support page, click **Patches & Updates**.
3. In the Patch Search section, click the **Search** tab.
4. Use the Product or Family (Advanced) feature to search by Product or Family.
5. Specify the following information, then click **Search**:
   - In the Product field, select RDBMS Server from the list.
   - In the Release field, select the current release number from the list.
   - In the Platform field, select the platform from the list.

3.3.2 Performing System Administrator Tasks

Before you use the Oracle Database, you must perform various configuration tasks. Perform the following before using your Oracle Database for the first time:

- APF-authorize the `AUTHLOAD` library.
- Move load modules from the `AUTHLOAD` library to a system linklist PDSE and activate them. This can be done by configuring and running the batch job `COPYPROC` which has been provided as a sample in the `INSTLIB` PDS.

  After running `COPYPROC`, you must refresh the linklist library, by issuing the following command to a z/OS console:

  ```
  F LLA REFRESH
  ```

  See Also: For detailed information about configuring your database, refer to the *Oracle Database System Administration Guide for IBM z/OS on System z*

3.3.3 Configuring Other Oracle Products

Many other Oracle products and options must be configured before you use them for the first time. Before using other Oracle Database 10*g* for z/OS products or options, refer to product-specific administration and tuning guides for detailed configuration and tuning information. For more information, refer to the "Related Documents" section in the Preface.

4

Removing Oracle Software

This chapter describes how to completely remove an Oracle database and the Oracle software. It includes information about the following topics:

> **Note:** If you want to remove an individual product, check the product-specific documentation for requirements and restrictions.

4.1 Removing an Oracle Database

To completely remove Oracle Database 10*g* for z/OS software, you must remove any installed databases. To remove an Oracle Database, delete the VSAM data sets under the high-level qualifier for the database.

> **Caution:** Removing an Oracle Database deletes all the data in the database.

4.2 Removing Oracle Software

The following steps describe how to remove Oracle software:

1. Remove the Oracle Database software located in `ORACLE_HOME` as follows:

   ```
   $ rm -rf $ORACLE_HOME
   ```

2. Delete the Oracle executable PDSE files that were created during the installation, for example, `AUTHLOAD` and `CMDLOAD` files.
3. Delete the subsystem modules that were placed into any linklist libraries.
4. Remove any JCL procedures that were created for the Oracle services and placed in your `PROCLIB` library.

A

Installation Reference

This appendix documents additional installation information that is referenced in the installation sections. It includes information about the following topics:

A.1 Choosing Data Set Name Qualifiers

The Oracle Database for z/OS installation setup and initialization process creates the first of several z/OS data sets. Later in the installation, you can specify the high-level and second-level data set name qualifiers that are used for subsequently created data sets.

Oracle recommends that you use the same qualifiers for all of the installation-related data sets. At this time, you must choose and use the qualifiers that were selected during the installation process.

While choosing qualifiers, remember the following requirements:

- You must choose unique qualifiers.

  Using different qualifiers ensures that the products in the product set are maintained in separate libraries as required.

  Caution: Do not use the same qualifiers that you have used for any other Oracle Database for z/OS product set that you have previously installed. If you do, then the installation procedures will delete and reallocate your current Oracle libraries. In addition, do not concatenate these libraries with any existing libraries that you are running for previously installed product sets.

- In most z/OS systems, some preparation is required before creating data sets with a new high-level data set name qualifier.

  If you intend to use a new high-level qualifier for your Oracle data sets, then you must define an ALIAS before running the job that loads the installation JCL. If in doubt, ask your z/OS systems programmer for assistance.

A.2 Oracle Library Data Sets

This section describes the Oracle library data sets that were created during the installation process. You might not have all of these data sets on your system, depending on which products you selected to install.

Oracle Library Data Sets and their sizes are described in the following table:

Name	CYLS	Dsorg	Recfm	Lrecl	Blksz
AUTHLOAD	350	PDSE	U	0	27998
CMDLOAD	250	PDSE	U	0	27998
H	5	PDS	FB	80	8880
INSTLIB	2	PDSE	FB	80	27920
MACLIB	2	PDS	FB	80	27920
MESG	110	PDS	U	0	27998
OBJLIB	2	PDS	FB	80	27920
SQL	6	PDSE	VB	2048	27998
SQLLIB	2	PDSE	U	0	27798
SRCLIB	2	PDSE	FB	80	27920

The following Oracle libraries can be created on your system depending on which products you select during the installation process.

- *oracle_hlq*.AUTHLOAD

  This data set contains programs that must have APF authorization (normally you identify this as an authorized library. For more information, refer to the "Add an APF-Authorized Library" section on page 2-5).

- oracle_hlq.CMDLOAD

  This data set contains all other executable Oracle utilities, tools, and supporting modules, including Oracle Net and Oracle Access Manager for CICS and IMS TM.

- oracle_hlq.H

  This data set contains the header files and includes files that are used by the precompilers.

- oracle_hlq.MACLIB

  This data set contains the CICS and IMS TM macros.

- oracle_hlq.MESG

  This data set contains the NLS data objects and message files.

- oracle_hlq.OBJLIB

  This data set contains the object files necessary for linking Oracle Call Interface or Oracle Precompiler programs.

- oracle_hlq.PARMLIB

  This data set contains sample initialization and parameter files.

- oracle_hlq.SQL

This data set contains SQL scripts that create and initialize database tables and PL/SQL sample scripts. The PL/SQL sample script names are documented in the *Oracle Database PL/SQL User's Guide and Reference*.

- `oracle_hlq.SQLLIB`

  This data set contains the program objects necessary for linking Oracle Call Interface or Oracle Precompiler programs.

- `oracle_hlq.SRCLIB`

  This data set contains files to run the demo scripts for Oracle tools and Programmatic Interfaces. It also contains SMF examples, PL/SQL samples, OCI samples, Oracle Precompiler samples, and sample JCL and source code for Oracle Access Manager for CICS and IMS TM.

  The PL/SQL sample source names are the same as those that are documented in the *Oracle Database PL/SQL User's Guide and Reference*.

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