Oracle® R Enterprise
Installation and Administration Guide
Release 1.4.1 for Windows, Linux, Solaris, and AIX
E57007-08

July 2015
# Contents

**Preface** .................................................................................................................................................. vii  
Audience .................................................................................................................................................. vii  
Related Documents ................................................................................................................................... vii  
Documentation Accessibility .................................................................................................................. vii  
Conventions ............................................................................................................................................... vii

**Changes in This Release for Oracle R Enterprise Installation and Administration Guide** .................................................................................................................................................. ix  
Changes in this Guide for Release 1.4.1 .................................................................................................... ix  
Changes in this Guide for Release 1.4 ........................................................................................................ x

## 1 Overview of Oracle R Enterprise Installation

1.1 Oracle R Enterprise Architecture ....................................................................................................... 1-1  
1.2 Client and Server Components of Oracle R Enterprise ....................................................................... 1-2  
1.3 Oracle R Enterprise Installation Steps .............................................................................................. 1-2  
1.4 Oracle R Enterprise System Requirements ...................................................................................... 1-3

## 2 Installing and Configuring the Database for Oracle R Enterprise

2.1 Installing Oracle Database for Oracle R Enterprise ........................................................................... 2-1  
2.2 Patching an 11.2.0.1 or 11.2.0.2 Database on Linux ........................................................................... 2-2  
2.3 Configuring EXTPROC for Embedded R Execution ........................................................................... 2-2

## 3 Installing R for Oracle R Enterprise

3.1 About R and Oracle R Enterprise ....................................................................................................... 3-1  
3.2 Installing Oracle R Distribution on Linux ........................................................................................... 3-2  
3.3 Installing Oracle R Distribution on Oracle Solaris ........................................................................... 3-10  
3.4 Installing Oracle R Distribution on IBM AIX .................................................................................... 3-11  
3.5 Installing Oracle R Distribution on Microsoft Windows ................................................................... 3-13  
3.6 Configuring Oracle R Distribution to Use MKL on the Client ........................................................... 3-13  
3.7 Uninstalling Oracle R Distribution ..................................................................................................... 3-15

## 4 Installing Oracle R Enterprise Server

4.1 About Oracle R Enterprise Server ....................................................................................................... 4-1  
4.2 About the SERVER Script .................................................................................................................... 4-2
4.3 Oracle R Enterprise Server Requirements ................................................................. 4-5
4.4 Installing Oracle R Enterprise Server ............................................................................ 4-7
4.5 Verifying the Oracle R Enterprise Server Installation .................................................. 4-8
4.6 Installing Oracle R Enterprise Server in a Multitenant Environment ......................... 4-9

5 Installing Oracle R Enterprise on Exadata
5.1 About Oracle R Enterprise on Exadata ......................................................................... 5-1
5.2 Using DCLI to Install Oracle R Enterprise on Exadata .............................................. 5-1
5.3 Installing Oracle R Distribution Across Exadata Compute Nodes ......................... 5-3
5.4 Installing Oracle R Enterprise Server Across Exadata Compute Nodes .................. 5-8

6 Installing Oracle R Enterprise Client
6.1 About Oracle R Enterprise Client .............................................................................. 6-1
6.2 Installing Oracle Database Instant Client ................................................................. 6-2
6.3 Installing the Oracle R Enterprise Packages .............................................................. 6-6
6.4 Installing the Oracle R Enterprise Supporting Packages .......................................... 6-8
6.5 Connecting Oracle R Enterprise Client to Oracle R Enterprise Server ................... 6-11

7 Administrative Tasks for Oracle R Enterprise
7.1 Upgrading Oracle R Enterprise ................................................................................... 7-1
7.2 Migrating Oracle R Enterprise Data ........................................................................... 7-2
7.3 Uninstalling Oracle R Enterprise ............................................................................... 7-2
7.4 Installing Additional R Packages on Linux or UNIX .................................................. 7-4
7.5 Creating a Database User for Oracle R Enterprise ...................................................... 7-4
7.6 Creating and Modifying Environment Variables on Windows .................................. 7-5
7.7 Creating an Oracle Wallet for an Oracle R Enterprise Connection .......................... 7-7
7.8 Controlling Memory Used by Embedded R ............................................................... 7-8

A A Sample Installation of Oracle R Enterprise
A.1 About the Oracle R Enterprise Sample Installation Environment ............................ A-1
A.2 Installing Oracle R Enterprise on the Server ............................................................. A-2
A.3 Installing Oracle R Enterprise on the Client ............................................................. A-5
A.4 Verifying the Oracle R Enterprise Installation .......................................................... A-9

B Installing RStudio
B.1 About RStudio ............................................................................................................ B-1
B.2 Installing RStudio Server .......................................................................................... B-1
B.3 Installing RStudio Desktop ........................................................................................ B-2

C Oracle R Distribution Packages

D License Information for Oracle R Enterprise
D.1 Licensing for Open Source R ..................................................................................... D-1
D.2 Licensing for Oracle R Distribution ........................................................................... D-8
This document explains how to install and administer Oracle R Enterprise Release 1.4.1.

Audience

This document is intended for anyone who is responsible for installing or administering Oracle R Enterprise. Installation of Oracle R Enterprise requires knowledge of R and knowledge of Oracle Database.

Related Documents

The Oracle R Enterprise documentation set includes the following:

- Oracle R Enterprise Installation and Administration Guide (this manual)
- Oracle R Enterprise User’s Guide
- Oracle R Enterprise Release Notes

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 that have purchased support 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.

Conventions

The following text conventions are used in this document:

<table>
<thead>
<tr>
<th>Convention</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>boldface</td>
<td>Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.</td>
</tr>
<tr>
<td>italic</td>
<td>Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.</td>
</tr>
<tr>
<td>Convention</td>
<td>Meaning</td>
</tr>
<tr>
<td>------------</td>
<td>---------</td>
</tr>
<tr>
<td>monospace</td>
<td>Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.</td>
</tr>
</tbody>
</table>
Changes in This Release for Oracle R Enterprise Installation and Administration Guide

This preface describes changes in Oracle R Enterprise Installation and Administration Guide for Releases 1.4.1 and 1.4.

- Changes in this Guide for Release 1.4.1
- Changes in this Guide for Release 1.4

Changes in this Guide for Release 1.4.1

- Installation and administration of Oracle R Enterprise Server are significantly enhanced.

  A single script, `server.sh` or `server.bat`, performs all administrative operations that affect Oracle R Enterprise Server. You can run the script to install, upgrade, or uninstall the server or to create or configure Oracle R Enterprise users. The script can be run interactively or in batch or hybrid mode.

  **See Also:** Chapter 4 for details

- The Multitenant Container Database (CDB) feature of Oracle Database 12c is supported.

  You can install support for Oracle R Enterprise Server in a multitenant environment. Oracle R Enterprise Server must be installed in a pluggable database, not in the root database.

  **See Also:**
  - Oracle Database Concepts for an introduction to multitenant architecture.
  - Oracle Database Administrator’s Guide for information about managing a multitenant environment.

- Oracle R Enterprise 1.4.1 includes two new supporting packages: `arules` and `statmod`. The Oracle R Enterprise 1.4.1 supporting packages are:

  ```
  arules 1.1-3
  cairo 1.5-5
  DBI 0.2-7
  png 0.1-7
  ```
Oracle R Enterprise supports both R 3.0.1 and R 3.1.1.
Previously only R 3.0.1 was supported.

Changes in this Guide for Release 1.4

- **R 3.0.1 requirement**
  Oracle R Enterprise 1.4 requires R 3.0.1. As with earlier releases of Oracle R Enterprise, Oracle recommends that you use Oracle R Distribution.
  See Chapter 3, "Installing R for Oracle R Enterprise".

- **Oracle R Distribution supported on Microsoft Windows**
  Oracle R Distribution 3.0.1 is supported on 64-bit Windows in addition to the 64-bit Linux and UNIX platforms that were supported in earlier releases.
  See Section 3.5, "Installing Oracle R Distribution on Microsoft Windows".

- **Cairo package used for graphics display on the server**
  Oracle R Enterprise 1.4 uses Cairo to display graphics on an Oracle R Enterprise server. Cairo is an open source R package that creates high quality bitmap, vector, and display output.
  Cairo is bundled with the Oracle R Enterprise supporting packages. With Cairo, there is no longer a need to configure an X11 server on Oracle Solaris and AIX servers.
  See Table 6–2, "Oracle R Enterprise Supporting Packages".

- **New client packages**
  Oracle R Enterprise 1.4 includes two new client packages:
  - **OREcommon** — Common low-level functionality for Oracle R Enterprise
  - **OREembed** — Embedded R functionality for Oracle R Enterprise
  See Section 6–1, "Oracle R Enterprise Packages".

- **Enhancements to Oracle R Enterprise Server installation script**
  The Oracle R Enterprise Server 1.4 installation script includes these enhancements:
  - **Configuration mode**
    When the **configonly** flag is set, the Installer performs database configuration for Oracle R Enterprise but does not copy the Oracle R Enterprise libraries to $ORACLE_HOME/lib and does not install the Oracle R Enterprise client packages.
  - **Prompts for the RQSYS password and displays the default password**
    The default password is displayed so that the user can determine whether to accept the default password or specify a different password.

- **Enhancements to demo_user script**
The `demo_user` script, which creates a database user for Oracle R Enterprise, can now enable an existing user for Oracle R Enterprise in addition to creating a new user.

See Section 7.5, "Creating a Database User for Oracle R Enterprise".

- **Migration scripts**

  Oracle R Enterprise 1.4 includes scripts for importing and exporting Oracle R Enterprise data and schema objects from a source environment to a target environment. The source and target must have the same version of Oracle Database and Oracle R Enterprise.
Overview of Oracle R Enterprise Installation

This chapter introduces the Oracle R Enterprise installation process. This chapter contains the following topics:

- **Oracle R Enterprise Architecture**
- **Client and Server Components of Oracle R Enterprise**
- **Oracle R Enterprise Installation Steps**
- **Oracle R Enterprise System Requirements**

### 1.1 Oracle R Enterprise Architecture

Oracle R Enterprise has a client/server architecture based on Oracle Database and Oracle Client. R engines run on the server computer and on each client computer.

- **SQL Transparency**
  
  Oracle R Enterprise packages on the client support SQL transparency, which enables Oracle tables to appear 'transparently' as native R objects. With SQL transparency, data analysts can use R to explore, cleanse, and transform data without having to know SQL.

- **Embedded R Execution**
  
  Oracle R Enterprise packages, libraries, and R and SQL APIs on the server support the execution of R commands within SQL queries and PL/SQL statements. Embedded R is executed in spawned R engines that can run in parallel. With embedded R, you can execute R algorithms on very large data sets, and you can use database facilities like `DBMS_SCHEDULER` to schedule the execution of user-defined R functions for lights out processing.

Figure 1–1 illustrates the client/server architecture of Oracle R Enterprise.
1.2 Client and Server Components of Oracle R Enterprise

- **Oracle R Enterprise Client Components:**
  - Oracle Database Client
  - Oracle R Enterprise packages and supporting packages

- **Oracle R Enterprise Server Components:**
  - Oracle Database with schema objects and shared libraries for supporting Oracle R Enterprise clients
  - Oracle R Enterprise packages and supporting packages

1.3 Oracle R Enterprise Installation Steps

The Oracle R Enterprise client and server installation steps are illustrated in Figure 1–2.

*Figure 1–2 Oracle R Enterprise Client and Server Installation Steps*
The Oracle R Enterprise Server installation script can install the supporting packages and create a database user along with the installation of Oracle R Enterprise Server. See Chapter 4 for details.

**Note:** If you intend to use both client and server components of Oracle R Enterprise on the computer that is hosting Oracle Database, then you do not need to perform a separate client installation. A local installation of Oracle Database Client is automatically included in the installation of Oracle Database.

### 1.4 Oracle R Enterprise System Requirements

Oracle R Enterprise runs on 64-bit platforms only. Both client and server components are supported on each of the platforms described in Table 1–1.

**Table 1–1 Oracle R Enterprise Platform Requirements**

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Hardware Platform</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linux x86-64</td>
<td>Intel and AMD</td>
<td>64-bit Oracle Linux Release 5 update 6 through Oracle Linux 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>64-bit Red Hat Enterprise Linux Release 5 update 6 through Red Hat Enterprise Linux 6</td>
</tr>
<tr>
<td>Oracle Solaris</td>
<td>Intel and SPARC</td>
<td>64-bit Oracle Solaris 10 update 10 through Oracle Solaris 11 for both SPARC and x86-64 (Intel) platforms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oracle SPARC SuperCluster</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oracle Solaris Studio (formerly Sun Studio) 12u3 or later</td>
</tr>
<tr>
<td>IBM AIX</td>
<td>IBM</td>
<td>64-bit IBM AIX 5.3 or higher</td>
</tr>
<tr>
<td>Microsoft Windows</td>
<td>Intel</td>
<td>64-bit Microsoft Windows</td>
</tr>
</tbody>
</table>

See Section 1.4.1, "Verifying 64-Bit Architecture on Microsoft Windows".

Table 1–2 shows the supported configurations of Oracle R Enterprise server components. Oracle recommends that you use Oracle R Distribution, Oracle’s free distribution of R, with Oracle R Enterprise. You should install Oracle R Distribution before installing Oracle R Enterprise.

**Table 1–2 Oracle R Enterprise Server Support Matrix**

<table>
<thead>
<tr>
<th>Oracle R Enterprise</th>
<th>Open source R or Oracle R Distribution</th>
<th>Oracle Database (see Note)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>2.13.2</td>
<td>11.2.0.3, 11.2.0.4, 12.1.0.1</td>
</tr>
<tr>
<td>1.1</td>
<td>2.13.2</td>
<td>11.2.0.3, 11.2.0.4, 12.1.0.1</td>
</tr>
<tr>
<td>1.2</td>
<td>2.15.1</td>
<td>11.2.0.3, 11.2.0.4, 12.1.0.1</td>
</tr>
<tr>
<td>1.3</td>
<td>2.15.1</td>
<td>11.2.0.3, 11.2.0.4, 12.1.0.1</td>
</tr>
<tr>
<td>1.3.1</td>
<td>2.15.1, 2.15.2, 2.15.3</td>
<td>11.2.0.3, 11.2.0.4, 12.1.0.1</td>
</tr>
</tbody>
</table>
1.4.1 Verifying 64-Bit Architecture on Microsoft Windows

Oracle R Enterprise only runs on 64-bit operating systems. You can determine if your Windows system is 64-bit by following these steps:

- Windows 7 or Windows Vista:
  1. From Windows Control Panel, choose **System**.
  2. Verify that **System type** is **64-bit Operating System**.

- Windows XP:
  1. From the Start menu, choose **My Computer**.
  2. Click **Properties**.
  3. On the **System** tab, verify that the system is **x64 Edition**.

---

**Table 1–2 (Cont.) Oracle R Enterprise Server Support Matrix**

<table>
<thead>
<tr>
<th>Oracle R Enterprise</th>
<th>Open source R or Oracle R Distribution</th>
<th>Oracle Database (see Note)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4</td>
<td>3.0.1, 3.1.1</td>
<td>11.2.0.3, 11.2.0.4, 12.1.0.1</td>
</tr>
<tr>
<td>1.4.1</td>
<td>3.0.1, 3.1.1</td>
<td>11.2.0.3, 11.2.0.4, 12.1.0.1</td>
</tr>
</tbody>
</table>

**Note:** Oracle Database versions 11.2.0.1 and 11.2.0.2 are supported on Linux if patched. For instructions, see Section 2.2, "Patching an 11.2.0.1 or 11.2.0.2 Database on Linux".

On other platforms, Oracle Database 11.2.0.3, 11.2.0.4, or 12.1 is required.

---

**See Also:**

- "Oracle R Distribution and Oracle R Enterprise" on page 3-2.
- *Oracle R Enterprise Release Notes* for the latest platform requirements and the latest versions of R that are supported with Oracle R Enterprise.
This chapter explains how to install and configure Oracle Database to support Oracle R Enterprise Server. This chapter contains these topics:

- Installing Oracle Database for Oracle R Enterprise
- Patching an 11.2.0.1 or 11.2.0.2 Database on Linux
- Configuring EXTPROC for Embedded R Execution

### 2.1 Installing Oracle Database for Oracle R Enterprise

Oracle R Enterprise requires the 64-bit version of Oracle Database Enterprise Edition. The database can be installed on any of the platforms described in Table 1–1, "Oracle R Enterprise Platform Requirements".

To install Oracle Database, follow the installation instructions for your platform:

- **Linux**

- **Oracle Solaris**

- **IBM AIX**

- **Microsoft Windows**

**Note:** You can install Oracle R Enterprise Server in a pluggable database (PDB) within a multitenant container database (CDB). The database may not be the root database.

For information about managing a multitenant environment, see Oracle Database Administrator’s Guide.

### 2.2 Patching an 11.2.0.1 or 11.2.0.2 Database on Linux

Oracle R Enterprise 1.4.1 requires Oracle Database 11.2.0.3, 11.2.0.4, or 12.1. On Linux, Oracle R Enterprise can also work with an 11.2.0.1 or 11.2.0.2 database if it is properly patched.

If you are running an earlier release of Oracle Database 11g Release 2 on Linux and you are unable to upgrade to 11.2.0.3 or later, then you can follow this procedure to patch the database:

1. Go to My Oracle Support:
   http://support.oracle.com
2. Log in and supply your Customer Support ID (CSI).
3. Choose the Patches & Updates tab.
4. In the Patch Search box, type 11678127 and click Search.
5. Select the patch for your version of Oracle Database, either 11.2.0.1 or 11.2.0.2.
6. Click Read Me, and read the installation instructions and other details about the patch.
7. Click Download to download the patch.
8. Install the patch using OPatch. Ensure that you are using the latest version of OPatch.

**See Also:** “Patching Oracle Software With OPatch” in Oracle Universal Installer and OPatch User’s Guide for Windows and UNIX for instructions.

### 2.3 Configuring EXTPROC for Embedded R Execution

An external procedure is a procedure invoked from a program that is written in a different language. Oracle Database uses an external procedure agent named extproc to support external procedures. Oracle R Enterprise uses extproc to support embedded R execution.

#### 2.3.1 About EXTPROC

When an application invokes an external procedure, Oracle Database starts an extproc agent. The application uses the network connection established by Oracle Database to pass instructions to the agent for executing the procedure. The agent loads a DLL or shared library, runs the external procedure, and passes back to the application any values returned by the external procedure.
2.3.2 About EXTPROC Configuration for Oracle R Enterprise

Oracle R Enterprise uses the default configuration of extproc. The extproc agent is spawned directly by Oracle Database, and no configuration changes are required for either listener.ora or tnsnames.ora.

By default, extproc supports any external procedure call. If you want to only allow external procedure calls for Oracle R Enterprise, you can edit the EXTPROC_DLLS environment variable in ORACLE_HOME/hs/admin/extproc.ora.

The following statement on a Linux or UNIX system sets EXTPROC_DLLS to only execute external procedures for Oracle R Enterprise:

```
SET EXTPROC_DLLS=ONLY:$ORACLE_HOME/lib/ore.so
```

To allow extproc to service any external procedure, set EXTPROC_DLLS to ANY or simply leave it blank (the default).

See Also: “Default Configuration for External Procedures” in Oracle Database Net Services Administrator’s Guide for details
This chapter explains how to install R for Oracle R Enterprise. This chapter contains these topics:

- About R and Oracle R Enterprise
- Installing Oracle R Distribution on Linux
- Installing Oracle R Distribution on Oracle Solaris
- Installing Oracle R Distribution on IBM AIX
- Installing Oracle R Distribution on Microsoft Windows
- Configuring Oracle R Distribution to Use MKL on the Client
- Uninstalling Oracle R Distribution

See Also: Chapter 5, "Installing Oracle R Enterprise on Exadata"

### 3.1 About R and Oracle R Enterprise

Oracle R Enterprise requires an installation of R on the server computer and on each client computer that interacts with the server. R is third-party, open source software. Open source R is governed by GNU General Public License (GPL) and not by Oracle licensing.

See Also:
- Table 1–2, "Oracle R Enterprise Server Support Matrix" for the versions of R that are supported with Oracle R Enterprise
- Appendix D, "License Information for Oracle R Enterprise"
- R Project for Statistical Computing at [http://www.r-project.org](http://www.r-project.org)

#### 3.1.1 About ROracle

ROracle is an open source R package that enables interaction between R and an Oracle database. ROracle is maintained and supported by Oracle.

ROracle is one of the open source supporting packages that is used by Oracle R Enterprise. The supporting packages are introduced in Section 1.2 and described in Table 6–2.
3.1.2 Oracle R Distribution and Oracle R Enterprise

Oracle recommends that you use Oracle R Distribution, Oracle’s free distribution of R, with Oracle R Enterprise. Oracle R Distribution offers significant advantages for Oracle R Enterprise.

Why Oracle R Distribution?

- Oracle R Distribution simplifies the installation of R for Oracle R Enterprise.
- Oracle R Distribution is supported by Oracle for customers of Oracle Advanced Analytics, Oracle Linux, and Oracle Big Data Appliance.
- On Windows and Linux, Oracle R Distribution simplifies integration with the Intel Math Kernel Library (MKL). MKL greatly improves the performance of many mathematical computations in R, including highly vectorized and threaded Linear Algebra, Fast Fourier Transforms (FFT), Vector Math, and Statistics functions. (See Section 3.6, "Configuring Oracle R Distribution to Use MKL on the Client".)
- On Oracle Solaris, Oracle R Distribution automatically uses Sun Performance Library. Like MKL for Linux and Windows, Sun Performance Library offers improved performance of many mathematical computations. Sun Performance Library is part of Oracle Solaris Studio.

3.1.3 Open Source R and Oracle R Enterprise

Although Oracle recommends that you use Oracle R Distribution whenever possible, you can use open source R with Oracle R Enterprise. If you choose to use open source R, then you must build it from source. Use the following configuration parameters:

```
./configure --with-lapack --with-ICU=no --enable-R-shlib
```

See Also:

- The R Installation and Administration manual for information about building R from source: [http://www.r-project.org/](http://www.r-project.org/)
- Section 7.4, "Installing Additional R Packages on Linux or UNIX"
- “Installing a Third-Party Package for Use in Embedded R Execution” in Oracle R Enterprise User’s Guide

3.2 Installing Oracle R Distribution on Linux

You can install Oracle R Distribution on Oracle Linux and on Redhat Enterprise Linux. Before you begin the installation, verify that your Linux version is supported by Oracle R Enterprise, as described in Table 1–1, "Oracle R Enterprise Platform Requirements". You can use this command to verify the Linux version:

```
# uname -r
```
Note: For Oracle Linux systems that have access to the internet, Oracle recommends installing Oracle R Distribution from the Oracle public yum server at the following URL:

http://public-yum.oracle.com/

This topic contains these sections:

- Installing Oracle R Distribution on Oracle Linux Using Yum
- Installing Oracle R Distribution on Oracle Linux Using RPMs
- Installing Oracle R Distribution on Red Hat Enterprise Linux

3.2.1 Installing Oracle R Distribution on Oracle Linux Using Yum

Oracle recommends that you use yum to install Oracle R Distribution. Yum simplifies the installation of Oracle R Distribution by automatically resolving RPM dependencies. If you install the RPMs directly as shown in Section 3.2.2, then you must resolve dependencies manually.

To install Oracle R Distribution on Oracle Linux Using Yum:

1. Log in to the Linux server as root and change to the /etc/yum.repos.d directory:

   # cd /etc/yum.repos.d

2. List the contents of the directory to determine if the yum configuration file is present. The name of the configuration file is public-yum-xxx.repo, where xxx is either el5, for Oracle Linux 5, ol6 for Oracle Linux 6, or ol7, for Oracle Linux 7.

   If the yum configuration file is not present, then download it from Oracle public yum by executing the wget command for your Linux platform:

   # wget http://public-yum.oracle.com/public-yum-el5.repo
   
   or

   
   or


3. Open public-yum-xxx.repo in a text editor and specify enabled=1 for xxx_latest and xxx_addons, where xxx indicates the version of Linux, either el5, ol6, or ol7:

   [xxx_latest]
   enabled=1

   [xxx_addons]
   enabled=1

   Also, for Oracle Linux 7 only:

   [ol7_optional_latest]
   enabled = 1

   The location of the Oracle R Distribution packages is specified in xxx_addons. The location of the dependencies for the Oracle R Distribution RPMs is specified in xxx_latest. For Oracle Linux 7 only, several dependencies are in optional_latest.
The URLs for the Oracle R Distribution RPMs in the addons repository are shown in Example 3–1. Specify 3.1.1-2 if Rversion is 3.1.1. Specify 3.0.1-2 if Rversion is 3.0.1.

Example 3–1  Oracle R Distribution RPMs in addons Repository
Oracle Linux 5:
http://public-yum.oracle.com/repo/EnterpriseLinux/EL5/addons/x86_64/getPackage
/R-Rversion.el5.x86_64.rpm
http://public-yum.oracle.com/repo/EnterpriseLinux/EL5/addons/x86_64/getPackage
/R-core-Rversion.el5.x86_64.rpm
http://public-yum.oracle.com/repo/EnterpriseLinux/EL5/addons/x86_64/getPackage
/R-devel-Rversion.el5.x86_64.rpm
http://public-yum.oracle.com/repo/EnterpriseLinux/EL5/addons/x86_64/getPackage
/libRmath-Rversion.el5.x86_64.rpm
http://public-yum.oracle.com/repo/EnterpriseLinux/EL5/addons/x86_64/getPackage
/libRmath-devel-Rversion.el5.x86_64.rpm
http://public-yum.oracle.com/repo/EnterpriseLinux/EL5/addons/x86_64/getPackage
/libRmath-static-Rversion.el5.x86_64.rpm

Oracle Linux 6:
http://public-yum.oracle.com/repo/OracleLinux/OL6/addons/x86_64/getPackage
/R-Rversion.el6.x86_64.rpm
http://public-yum.oracle.com/repo/OracleLinux/OL6/addons/x86_64/getPackage
/R-core-Rversion.el6.x86_64.rpm
http://public-yum.oracle.com/repo/OracleLinux/OL6/addons/x86_64/getPackage
/R-devel-Rversion.el6.x86_64.rpm
http://public-yum.oracle.com/repo/OracleLinux/OL6/addons/x86_64/getPackage
/libRmath-Rversion.el6.x86_64.rpm
http://public-yum.oracle.com/repo/OracleLinux/OL6/addons/x86_64/getPackage
/libRmath-devel-Rversion.el6.x86_64.rpm
http://public-yum.oracle.com/repo/OracleLinux/OL6/addons/x86_64/getPackage
/libRmath-static-Rversion.el6.x86_64.rpm

Oracle Linux 7:
http://public-yum.oracle.com/repo/OracleLinux/OL7/addons/x86_64/getPackage
/R-Rversion.el7.x86_64.rpm
http://public-yum.oracle.com/repo/OracleLinux/OL7/addons/x86_64/getPackage
/R-core-Rversion.el7.x86_64.rpm
http://public-yum.oracle.com/repo/OracleLinux/OL7/addons/x86_64/getPackage
/R-devel-Rversion.el7.x86_64.rpm
http://public-yum.oracle.com/repo/OracleLinux/OL7/addons/x86_64/getPackage
/libRmath-Rversion.el7.x86_64.rpm
http://public-yum.oracle.com/repo/OracleLinux/OL7/addons/x86_64/getPackage
/libRmath-devel-Rversion.el7.x86_64.rpm
http://public-yum.oracle.com/repo/OracleLinux/OL7/addons/x86_64/getPackage
/libRmath-static-Rversion.el7.x86_64.rpm
Note: If you are not using the most recent version of Oracle Linux and you want to install dependent packages that are specific to your version, then you must enable the corresponding Oracle Linux repository.

For example, to enable the Oracle Linux 5.8 repository instead of the latest repository, follow these steps:

1. Open the yum configuration file for Oracle Linux 5 in an editor.
   `/etc/yum.repos.d/public-yum-el5.repo`

2. Locate the section for Oracle Linux 5, update 8.
   `[ol5_u8_base]`

3. Change `enabled=0` to `enabled=1`.
   The result looks like this:
   ```
   [ol5_u8_base]
   name=Oracle Linux $releasever Update 8 installation media copy ($basearch)
   gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-oracle
   gpgcheck=1
   enabled=1
   ```

4. Execute the `yum install` command to install R. Specify 3.0.1 or 3.1.1 for `Rversion`

   ```
   # yum install R-Rversion
   ```

To install the most recent version of R that is available on Oracle public yum:

```
# yum install R.x86_64
```

**Note:** Do not assume that the most recent version of R on Oracle public yum is supported by your version of Oracle R Enterprise. Consult Table 1-2, "Oracle R Enterprise Server Support Matrix" to determine which version of R you should use.

### 3.2.2 Installing Oracle R Distribution on Oracle Linux Using RPMs

Oracle recommends that you use yum to install Oracle R Distribution, because yum automatically resolves RPM dependencies. However, if yum is not available, then you can install the RPMs directly and resolve the dependencies manually.

To download and install the RPMs, log in as root and execute this command for each RPM listed in Section 3.2.2.1:

```
rpm -Uvh rpm_name
```

The Oracle R Distribution RPMs for R 3.1.1 and R 3.0.1 are listed in these topics:

- Oracle R Distribution 3.1.1 RPMs for Oracle Linux 5
- Oracle R Distribution 3.1.1 RPM Dependencies for Oracle Linux 5
- Oracle R Distribution 3.1.1 RPMs for Oracle Linux 6
Installing Oracle R Distribution on Linux

- Oracle R Distribution 3.0.1 RPMs for Oracle Linux 5
- "Oracle R Distribution 3.0.1 RPM Dependencies for Oracle Linux 5"
- Oracle R Distribution 3.0.1 RPMs for Oracle Linux 6

3.2.2.1 Oracle R Distribution 3.1.1 RPMs for Oracle Linux 5
The Oracle R Distribution RPMs for Oracle Linux 5 are listed as follows:

http://public-yum.oracle.com/repo/EnterpriseLinux/EL5/addons/x86_64/getPackage
/R-3.1.1-2.el5.x86_64.rpm
http://public-yum.oracle.com/repo/EnterpriseLinux/EL5/addons/x86_64/getPackage
/R-core-3.1.1-2.el5.x86_64.rpm
http://public-yum.oracle.com/repo/EnterpriseLinux/EL5/addons/x86_64/getPackage
/R-devel-3.1.1-2.el5.x86_64.rpm
http://public-yum.oracle.com/repo/EnterpriseLinux/EL5/addons/x86_64/getPackage
/libRmath-3.1.1-2.el5.x86_64.rpm
http://public-yum.oracle.com/repo/EnterpriseLinux/EL5/addons/x86_64/getPackage
/libRmath-devel-3.1.1-2.el5.x86_64.rpm
http://public-yum.oracle.com/repo/EnterpriseLinux/EL5/addons/x86_64/getPackage
/libRmath-static-3.1.1-2.el5.x86_64.rpm

If the dependent RPMs for Oracle Linux 5, listed in Section 3.2.2.2, are not automatically included, then download and install them explicitly.

3.2.2.2 Oracle R Distribution 3.1.1 RPM Dependencies for Oracle Linux 5
The Oracle R Distribution dependent RPMs for Oracle Linux 5 are listed as follows:

atk-1.12.2-1.fc6.x86_64.rpm
avahi-0.6.16-10.el5_6.x86_64.rpm
avahi-compat-libdns_sd-0.6.16-10.el5_6.x86_64.rpm
avahi-compat-libdns_sd-devel-0.6.16-10.el5_6.x86_64.rpm
bitstream-vera-fonts-1.10-7.noarch.rpm
bzip2-devel-1.0.3-6.el5.x86_64.rpm
Cairo-1.2.4-5.el5.x86_64.rpm
Cairo-devel-1.2.4-5.el5.x86_64.rpm
cups-1.3.7-30.el5.x86_64.rpm
cups-libps-1.3.7-30.el5_6.x86_64.rpm
dbus-python-0.70-9.el5.x86_64.rpm
desktop-file-utils-0.10-7.x86_64.rpm
dialog-1.0.2.20051107-1.2.2.x86_64.rpm
e2fsprogs-devel-1.39-36.0.1.el5_9.x86_64.rpm
ed-0.2.39.el5_2.x86_64.rpm
fontconfig-devel-2.4.1-7.el5.x86_64.rpm
freetype-devel-2.2.1-32.el5_9.x86_64.rpm
gcc-gfortran-4.1.2-54.el5.x86_64.rpm
gdk-pixbuf-0.22.0-29.el5.x86_64.rpm
gdk-pixbuf-devel-0.22.0-29.el5.x86_64.rpm
ghostscript-8.70-14.el5_8.x86_64.rpm
ghostscript-fonts-5.50-13.11.noarch.rpm
glib2-devel-2.12.3-0.el5_3.x86_64.rpm
gmp-4.1.1-10.el5.x86_64.rpm
gnutil2-devel-1.4.1-14.el5_10.x86_64
gtk2-2.10.4-29.el5.x86_64.rpm
gtk+-1.2.10-57.el5.x86_64.rpm
hicolor-icon-theme-0.9-2.1.noarch.rpm
keyutils-libs-devel-1.2-1.el5.x86_64.rpm
krb5-devel-1.6.1-70.el5_9.2.x86_64.rpm
Installing Oracle R Distribution on Linux

Installing R for Oracle R Enterprise

The Oracle R Distribution RPMs for Oracle Linux 6 are listed as follows:

http://public-yum.oracle.com/repo/OracleLinux/OL6/addons/x86_64/getPackage
/R-3.1.1-2.el6.x86_64.rpm
http://public-yum.oracle.com/repo/OracleLinux/OL6/addons/x86_64/getPackage
/R-core-3.1.1-2.el6.x86_64.rpm
http://public-yum.oracle.com/repo/OracleLinux/OL6/addons/x86_64/getPackage
/R-devel-3.1.1-2.el6.x86_64.rpm
http://public-yum.oracle.com/repo/OracleLinux/OL6/addons/x86_64/getPackage
/libRmath-3.1.1-2.el6.x86_64.rpm
http://public-yum.oracle.com/repo/OracleLinux/OL6/addons/x86_64/getPackage
/libRmath-devel-3.1.1-2.el6.x86_64.rpm
http://public-yum.oracle.com/repo/OracleLinux/OL6/addons/x86_64/getPackage
/libRmath-static-3.1.1-2.el6.x86_64.rpm
If the following dependent RPM is not automatically included, then download and install it explicitly:

texinfo-tex-4.13a-8.el6.x86_64.rpm

3.2.2.4 Oracle R Distribution 3.0.1 RPMs for Oracle Linux 5

The Oracle R Distribution RPMs for Oracle Linux 5 are listed as follows:

R-3.0.1-2.x86_64.rpm
R-core-3.0.1-2.x86_64.rpm
R-devel-3.0.1-2.x86_64.rpm
libRmath-3.0.1-2.x86_64.rpm
libRmath-devel-3.0.1-2.x86_64.rpm
libRmath-static-devel-3.0.1-2.x86_64.rpm

If the dependent RPMs for Oracle Linux 5, listed in Section 3.2.2.2, are not automatically included, then download and install them explicitly.

3.2.2.5 Oracle R Distribution 3.0.1 RPM Dependencies for Oracle Linux 5

The Oracle R Distribution dependent RPMs for Oracle Linux 5 are listed as follows:

atk-1.12.2-1.fc6.x86_64.rpm
avahi-0.6.16-10.el5_6.x86_64.rpm
avahi-compat-libdns_sd-0.6.16-10.el5_6.x86_64.rpm
bitstream-vera-fonts-1.10-7.noarch.rpm
bzip2-devel-1.0.3-6.el5_5.x86_64.rpm
cairo-1.2.4-5.el5.x86_64.rpm
chkfontpath-1.10.1-1.1.x86_64.rpm
cpp-4.1.2-54.el5.x86_64.rpm
cups-1.3.7-30.el5.x86_64.rpm
cups-libc-1.3.7-30.el5.x86_64.rpm
dbus-python-0.70-9.el5.x86_64.rpm
desktop-file-utils-0.10-7.x86_64.rpm
dialog-1.0.20051107-1.22.x86_64.rpm
ed-0.2-39.el5_2.x86_64.rpm
gcc-4.1.2-54.el5.x86_64.rpm
gcc-c++-4.1.2-54.el5.x86_64.rpm
gcc-gfortran-4.1.2-54.el5.x86_64.rpm
ghostscript-8.70-14.el5_8.x86_64.rpm
ghostscript-fonts-5.50-13.11.noarch.rpm
gmp-4.1.4-10.el5.x86_64.rpm
gtk2-2.10.4-29.el5.x86_64.rpm
hicolor-icon-theme-0.9-2.1.noarch.rpm
libFS-1.0.0-3.1.x86_64.rpm
libX11-1.0.3-11.el5_7.x86_64.rpm
libX11-devel-1.0.3-11.el5_7.x86_64.rpm
libXau-devel-1.0.1-3.1.x86_64.rpm
libXdmcp-devel-1.0.1-2.1.x86_64.rpm
libXfont-1.2.2-1.0.4.el5_7.x86_64.rpm
libfontenc-1.0.2-2.2.el5.x86_64.rpm
libgcc-4.1.2-54.el5.i386.rpm
libgcc-4.1.2-54.el5.x86_64.rpm
libgfortran-4.1.2-54.el5.i386.rpm
libgfortran-4.1.2-54.el5.x86_64.rpm
libstdc++-4.1.2-54.el5.i386.rpm
libstdc++-4.1.2-54.el5.x86_64.rpm
libstdc++-devel-4.1.2-54.el5.i386.rpm
libstdc++-devel-4.1.2-54.el5.x86_64.rpm
libtiff-3.8.2-18.el5_8.x86_64.rpm
Installing Oracle R Distribution on Linux

3.2.2.6 Oracle R Distribution 3.0.1 RPMs for Oracle Linux 6

The Oracle R Distribution RPMs for Oracle Linux 6 are listed as follows:

- R-3.0.1-2.el6.x86_64.rpm
- R-core-3.0.1-2.el6.x86_64.rpm
- R-devel-3.0.1-2.el6.x86_64.rpm
- libRmath-3.0.1-2.el6.x86_64.rpm
- libRmath-devel-3.0.1-2.el6.x86_64.rpm
- libRmath-static-3.0.1-2.el6.x86_64.rpm

If the following dependent RPM is not automatically included, then download and install it explicitly:

texinfo-tex-4.13a-8.el6.x86_64.rpm

3.2.3 Installing Oracle R Distribution on Red Hat Enterprise Linux

Tip: Rversion represents the version of Oracle R Distribution. Replace Rversion with 3.1.1-2 for R 3.1.1; replace Rversion with 3.0.1-2 for R 3.0.1.

To install Oracle R Distribution on Red Hat Enterprise Linux 6:

1. Create an RPM build directory structure:

   mkdir -p /rpmbuild/{BUILD,RPMS,SOURCES,SPECS,SRPMS}

2. Set up RPM tools to use your own build tree (to avoid root):

   echo '%_topdir $(echo $HOME)/rpmbuild' > /.rpmmacros
3. Download the source RPM (R-version.el6.src.rpm) from Oracle public yum.
   For Red Hat Enterprise Linux 6:
   http://public-yum.oracle.com/repo/OracleLinux/OL6/addons/x86_64/
   Save the source RPM to the rpmbuild/SRPMS directory.

4. Rebuild Red Hat Enterprise Linux using rpmbuild.
   rpmbuild --rebuild /rpmbuild/SRPMS/R-Rversion.el6.src.rpm

   **Note:**
   - **Linux 5**
     The source RPM, R-3.1.1-2.el5.src.rpm, is here:
     http://public-yum.oracle.com/repo/EnterpriseLinux/EL5/addons/x86_64/
   - **Linux 7**
     The source RPM, R-3.1.1-2.el7.src.rpm, is here:
     http://public-yum.oracle.com/repo/OracleLinux/OL7/addons/x86_64/

   **Note:** If any dependencies are missing, install them as root.

The binary RPMs are built and saved under /rpmbuild/RPMS.

5. Log in as root and execute these commands to install R:
   # rpm -i path/rpmbuild/RPMS/R-Rversion-2.el6.x86_64.rpm
   # rpm -i path/rpmbuild/RPMS/R-core-Rversion.el6.x86_64.rpm
   # rpm -i path/rpmbuild/RPMS/libRmath-Rversion.el6.x86_64.rpm
   # rpm -i path/rpmbuild/RPMS/libRmath-devel-Rversion.el6.x86_64.rpm
   # rpm -i path/rpmbuild/RPMS/libRmath-static-Rversion.el6.x86_64.rpm
   # rpm -i path/rpmbuild/RPMS/R-devel-Rversion.el6.x86_64.rpm

   For example, this command installs R 3.1.1 on Red Hat Enterprise Linux x86-64 version 6, where the path to rpmbuild is /refresh/home/.
   # rpm -i /refresh/home/rpmbuild/RPMS/x86_64/R-core-3.1.1-2.el6.x86_64.rpm

### 3.3 Installing Oracle R Distribution on Oracle Solaris

You can install Oracle R Distribution on Oracle Solaris on Intel and on SPARC platforms. Before you begin the installation, verify that your Oracle Solaris version is supported by Oracle R Enterprise, as described in Table 1-1, "Oracle R Enterprise Platform Requirements". You can use this command to verify the version of Oracle Solaris:

    uname -r

**To install Oracle R Distribution on Oracle Solaris:**

1. Go to the Oracle Open Source Software Download page for Oracle R Distribution:
   https://oss.oracle.com/ORD/
2. Download the files for your installation, where Rversion is 3.1.1–2 for R 3.1.1 or 3.0.1–2 for R 3.0.1:
   - For x86 64-bit systems:
     ord-Rversion-sol10-x86-64-sunstudio12u3.tar.gz
     ord-Rversion-supporting-sol10-x86-64-sunstudio12u3.tar.gz
   - For SPARC 64-bit systems:
     ord-Rversion-sol10-sparc-64-sunstudio12u3.tar.gz
     ord-Rversion-supporting-sol10-sparc-64-sunstudio12u3.tar.gz

3. Uncompress the first file, either sol110-x86-64 or sol10-sparc.

4. Run install.sh as root to install the Solaris PKG file for Oracle R Distribution.
   # install.sh

5. Uncompress the second file, either supporting-sol10-x86-64 or supporting-sol10-sparc, to a local directory such as $ORACLE_HOME/lib. Add that directory to $LD_LIBRARY_PATH.

   These tar files contain the shared libraries for libR.so:
   - libiconv.so.2
   - libcurses.so.5
   - libreadline.so.6
   - libsunperf.so

   libsunperf.so, Sun Performance Library, and its dependent shared libraries are included in Oracle Solaris Studio.

6. Run the following command to verify that libR.so is picking up its shared library dependencies correctly from the local directory.
   # ldd -r /usr/lib/64/R/lib/libR.so

7. Start R by typing R at the command prompt:
   % R

### 3.4 Installing Oracle R Distribution on IBM AIX

Before installing Oracle R Distribution, verify that your version of IBM AIX is supported by Oracle R Enterprise, as described in Table 1–1, "Oracle R Enterprise Platform Requirements". You can use this command to verify the version of IBM AIX:

```
uname -r
```

To install Oracle R Distribution on IBM AIX:

1. Go to the Oracle Open Source Software Download page for Oracle R Distribution:
   
   https://oss.oracle.com/ORD/

2. Download the files for your installation, where Rversion is 3.1.1.0 for R 3.1.1 or 3.0.1.0 for R 3.0.1:
   
   ORD.Rversion.bff.gz
   ord-supporting-aix.tar.gz

3. Uncompress and untar ord-supporting-aix.tar.gz:
$ gunzip ord-supporting-aix.tar.gz  # get ord-supporting-aix.tar
$ tar -xvf ord-supporting-aix.tar  # extract contents of .tar file
$ ls ord-supporting-aix  # list of rpms

bash-4.2-5.aix5.1.ppc.rpm
libpng-devel-1.5.9-1.aix5.1.ppc.rpm
Cairo-1.10.0-1.aix5.2.ppc.rpm
pixman-0.28.2-1.aix5.1.ppc.rpm
expat-2.0.1-3.aix5.1.ppc.rpm
pkg-config-0.25-2.aix5.1.ppc.rpm
fontconfig-2.5.0-1.aix5.1.ppc.rpm
readline-6.2-3.aix5.1.ppc.rpm
ggettext-0.17-1.aix5.1.ppc.rpm
readline-devel-6.2-3.aix5.1.ppc.rpm
glib2-2.28.6-1.aix5.1.ppc.rpm
texinfo-4.13a-2.aix5.1.ppc.rpm
info-4.13a-2.aix5.1.ppc.rpm
xrender-0.9.1-3.aix5.2.ppc.rpm
libiconv-1.14-1.aix5.1.ppc.rpm
zlib-1.2.6-1.aix5.1.ppc.rpm
libpng-1.5.9-1.aix5.1.ppc.rpm
zlib-devel-1.2.6-1.aix5.1.ppc.rpm

You can also download these RPMs from http://www.perzl.org/aix/.

4. Install the RPMs as root using an rpm command:
   $ cd /download_directory
   $ su
   # rpm -i *.rpm

   To upgrade existing dependencies, use:
   # rpm -UF *.rpm

   If you experience conflicts with dependencies, use:
   # rpm -UF --nodeps *.rpm

5. Add /opt/freeware/lib to the LIBPATH environment variable:
   - For ksh:
     $ export LIBPATH=/opt/freeware/lib:$LIBPATH
   - For csh:
     $ setenv LIBPATH /opt/freeware/lib:$LIBPATH

   Ensure that /opt/freeware/lib is before /usr/lib.

6. Uncompress ORD-Rversion-aix.bft.gz to get ORD-Rversion-aix.bff:
   $ gunzip ORD.Rversion.bff.gz

7. To install all the filesets in Oracle R Distribution, execute the installp command (with the apply option) as root:
   $ cd /download_directory
   $ su
   # installp -a -d . ORD  # install all the filesets in ORD

   You can also install independent filesets:
8. Run `ldd` to ensure that shared library dependencies were picked up correctly:

   $ ldd /usr/lib/R/bin/exec/R
   $ ldd /usr/lib/R/lib/libR.so (libiconv, libreadline)
   $ ldd /usr/lib/R/lib/libRlapack.so
   $ ldd /usr/lib/R/lib/libRblas.so

9. Add `/usr/lib/R/lib` to the `LIBPATH` environment variable:
   - For ksh:
     
     $ export LIBPATH=/usr/lib/R/lib:$LIBPATH
   - For csh:
     
     $ setenv LIBPATH /usr/lib/R/lib:$LIBPATH

### 3.5 Installing Oracle R Distribution on Microsoft Windows

Before installing Oracle R Distribution, verify that your version of Microsoft Windows is supported by Oracle R Enterprise, as described in Table 1-1, "Oracle R Enterprise Platform Requirements".

Follow these steps to install Oracle R Distribution on Windows:

1. Go to the Oracle Open Source Software Download page for Oracle R Distribution:

   [https://oss.oracle.com/ORD/](https://oss.oracle.com/ORD/)

2. Select R Distribution for Windows 64 bit. Save the zip file on your computer.

   ORE-Rversion-win.zip

3. Unzip the file and extract the executable file.

   ORE-Rversion-win.exe

4. Double click the executable file to start the installation of Oracle R Distribution.

5. Follow the instructions to complete the installation.

### 3.6 Configuring Oracle R Distribution to Use MKL on the Client

The instructions in this section explain how to configure Oracle R Distribution to use MKL on a Linux or Windows client. With this simple configuration step, Oracle R Distribution dynamically uses MKL if it is installed on your system.

This topic contains these sections:

- Section 3.6.1, "Enabling MKL Support for Oracle R Distribution on a Linux Client"
- Section 3.6.2, "Enabling MKL Support for Oracle R Distribution on a Windows Client"

#### 3.6.1 Enabling MKL Support for Oracle R Distribution on a Linux Client

Follow these steps to enable MKL for Oracle R Distribution on a Linux Client:

1. Install MKL. You can download MKL from the following website:

Note: To install MKL on your computer, you must have an MKL license.

2. Add `libmkl_rt.so`, `$RHOME/lib`, and `$ORACLE_HOME/lib` to the `LD_LIBRARY_PATH` system environment variable. For example, in the Bash shell:

```
export LD_LIBRARY_PATH=${LD_LIBRARY_PATH}:
/path_to/libmkl_rt.so:
$RHOME/lib:
$ORACLE_HOME/lib
```

3. Start R and execute the `Sys.BlasLapack` function:

```
Sys.BlasLapack()
```

```
$vendor [1] "Intel Math Kernel Library (Intel MKL)"
$nthreads [1] -1
```

The returned value of `$vendor` indicates that MKL has replaced the BLAS and LAPACK that are native to R.

The returned value of `$nthreads` indicates the number of threads to be used by MKL.

By default all available threads are used ($nthreads = -1).

### 3.6.1.1 Modifying the Number of Threads for MKL on Linux

You can change the number of threads to be used by MKL by editing the system environment variable `MKL_NUM_THREADS`. For example, the following statement in the Bash shell, causes MKL to use 3 threads:

```
export MKL_NUM_THREADS=3
```

After setting `MKL_NUM_THREADS` to 3, the output of `Sys.BlasLapack` shows a value of 3 for `$nthreads`.

```
R> Sys.BlasLapack()
$vendor [1] "Intel Math Kernel Library (Intel MKL)"
$nthreads [1] 3
```

### 3.6.2 Enabling MKL Support for Oracle R Distribution on a Windows Client

Follow these steps to enable MKL for Oracle R Distribution on a Windows client (64-bit):

1. Install MKL. You can download MKL from the following website:


   Note: To install MKL on your computer, you must have an MKL license.

2. Add the location of `libOrdBlasLoader.dll` and `mkl_rt.dll` to the `PATH` system environment variable. For instructions, see.
Note: In a typical installation of Oracle R Distribution 3.1.1, libOrdBlasLoader.dll is located in the R home directory:
C:\Program Files\R\R-3.1.1\bin\x64

In a full installation of MKL 11.1, mkl_rt.dll is located in the Intel MKL Composer XE directory:
C:\Program Files (x86)\Intel\Composer XE 2013 SP

3. Start R and execute the Sys.BlasLapack function:

```r
R> Sys.BlasLapack()
$vendor
 [1] "Intel Math Kernel Library (Intel MKL)"
$nthreads
 [1] -1
```

The returned value of $vendor indicates that MKL has replaced the BLAS and LAPACK that are native to R.

The returned value of nthreads indicates the number of threads to be used by MKL. By default all available threads are used ($nthreads=-1).

3.6.2.1 Modifying the Number of Threads for MKL on Windows

You can change the number of threads to be used by MKL by editing the system environment variable MKL_NUM_THREADS. If MKL_NUM_THREADS does not exist, then you must create it as described in:

After setting MKL_NUM_THREADS to 3, the output of Sys.BlasLapack shows a value of 3 for $nthreads.

```r
R> Sys.BlasLapack()
$vendor
 [1] "Intel Math Kernel Library (Intel MKL)"
$nthreads
 [1] 3
```

3.7 Uninstalling Oracle R Distribution

To uninstall R, follow the instructions in the following sections:

- Uninstalling Oracle R Distribution on Windows
- Uninstalling Oracle R Distribution on Linux
- Uninstalling Oracle R Distribution on Oracle Solaris
- Uninstalling Oracle R Distribution on IBM AIX

3.7.1 Uninstalling Oracle R Distribution on Windows

Uninstall Oracle R Distribution just as you would uninstall any other Windows program, using Programs and Features in Windows Control Panel.
3.7.2 Uninstalling Oracle R Distribution on Linux

To uninstall Oracle R Distribution on Linux, log in as root and execute these commands in this order. To uninstall a different version of R, replace 3.1.1 with the version number.

**Example 3–2  Linux Commands for Uninstalling Oracle R Distribution**

Execute the following commands as root. Specify the version of R for Rversion, for example 3.1.1 or 3.0.1.

```
rpm -e R-Rversion
rpm -e R-devel
rpm -e R-core
rpm -e libRmath-devel
rpm -e libRmath
```

3.7.3 Uninstalling Oracle R Distribution on Oracle Solaris

To uninstall Oracle R Distribution on Oracle Solaris, follow the instructions in the readme on the Oracle R Distribution download page on the Oracle Technology Network:

[https://oss.oracle.com/ORD/](https://oss.oracle.com/ORD/)

The Oracle R Distribution installation directory on Oracle Solaris includes an uninstall script. Log in as root and run the script as follows:

**Example 3–3  Solaris Script for Uninstalling Oracle R Distribution**

Execute this script as root:

```
./uninstall.sh
```

3.7.4 Uninstalling Oracle R Distribution on IBM AIX

To uninstall Oracle R Distribution on IBM AIX, follow the instructions in the readme on the Oracle R Distribution download page on the Oracle Technology Network:

[https://oss.oracle.com/ORD/](https://oss.oracle.com/ORD/)

**Example 3–4  AIX Scripts for Uninstalling Oracle R Distribution**

To uninstall all filesets, execute this script as root:

```
./installp -u ORD
```

To uninstall individual filesets, specify their names:

```
installp -u ORD.devel
installp -u ORD.core
```
4

Installing Oracle R Enterprise Server

This chapter explains how to install and administer Oracle R Enterprise Server. This chapter includes these topics:

- About Oracle R Enterprise Server
- About the SERVER Script
- Oracle R Enterprise Server Requirements
- Installing Oracle R Enterprise Server
- Verifying the Oracle R Enterprise Server Installation
- Installing Oracle R Enterprise Server in a Multitenant Environment

See Also:
- Section 7.1, "Upgrading Oracle R Enterprise"
- Section 7.3, "Uninstalling Oracle R Enterprise"
- Chapter 5, "Installing Oracle R Enterprise on Exadata"
- Appendix A, "A Sample Installation of Oracle R Enterprise"

4.1 About Oracle R Enterprise Server

Oracle R Enterprise includes several components on the server. Together these components enable an Oracle R Enterprise client to interact with Oracle R Enterprise Server.

The server-side components of Oracle R Enterprise are:

- Oracle Database Enterprise Edition
- Oracle R Distribution or open source R
- Oracle R Enterprise Server

Oracle R Enterprise Server consists of the following:

- The rqsys schema, described in Section 4.1.1, "About the RQSYS Schema"
- Metadata and executable code in sys
- Oracle R Enterprise Server libraries in $ORACLE_HOME/lib (Linux and UNIX) or %ORACLE_HOME\bin (Windows)
- Oracle R Enterprise R packages in $ORACLE_HOME/R/library (%ORACLE_HOME\R\library on Windows)
The Oracle R Enterprise packages and supporting packages on the server support embedded R execution. These same packages must be installed separately on each client computer. (See Section 6.1.2, "About the Oracle R Enterprise Packages").

See Also: Figure 1–2 for an illustration of the server and client components of Oracle R Enterprise.

4.1 About the RQSYS Schema

The rqsys schema is the system account for Oracle R Enterprise in Oracle Database. It contains metadata, PL/SQL packages, and other executable code that is used internally by Oracle R Enterprise Server.

The Oracle R Enterprise Server installation process creates rqsys as a locked account with an expired password. The rqsys user does not have the CREATE SESSION privilege.

4.2 About the SERVER Script

A single script called server manages the installation and administration of Oracle R Enterprise Server. You can rerun the server script whenever you need to install, uninstall, upgrade, or configure server-side components of Oracle R Enterprise.

4.2.1 Overview of SERVER Operations

The server script supports the following operations:

- Installs Oracle R Enterprise Server
- Uninstalls Oracle R Enterprise Server
- Upgrades Oracle R Enterprise Server and migrates data from the earlier installation
- Installs the supporting packages, if they are available
- Creates or configures a database user, if one does not exist

Note: You can use the server script to install the supporting packages and create users, or you can choose to perform these tasks separately, as described in the following sections:

- Section 6.4, "Installing the Oracle R Enterprise Supporting Packages"
- Section 7.5, "Creating a Database User for Oracle R Enterprise"

4.2.2 SERVER Syntax

The server script supports a set of command-line arguments that direct its activities. The script can be run in interactive mode, in batch mode, or in hybrid mode. If you run the script without arguments, it installs or upgrades Oracle R Enterprise Server in interactive mode; it attempts to install the supporting packages; and it creates or configures a database user.

The command-line arguments for the server script are described in Table 4–1. The arguments for the script are the same for Linux, UNIX, and Windows. You can obtain a
list of the arguments with brief descriptions by executing the following on a Linux
or UNIX system:

`.server.sh -h`

or

`.server.sh --help`

On a Windows system, you can obtain a listing of the arguments with brief
descriptions by executing the following:

`server.bat -h`

or

`server.bat --help`

**Table 4–1 SERVER Script Command-Line Arguments**

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-y</code></td>
<td>Never prompt.</td>
</tr>
</tbody>
</table>
| `-i, --install` | Install or upgrade Oracle R Enterprise Server.  
An installation or upgrade includes the following by default:  
- Installation of the supporting packages, if they are present.  
- Creation or configuration of a database user, if one does not exist. |
| `-u, --uninstall` | Uninstall Oracle R Enterprise Server:  
- When used with `--keep` (the default), the script removes the **rqsys** metadata and PL/SQL packages from the database but retains the libraries and R packages under Oracle home (partial uninstall).  
- When used with `--full`, the script removes the libraries and R packages under Oracle home in addition to the **rqsys** metadata and PL/SQL packages in the database. (full uninstall). |
| `-s, --setup-user` | Create or configure a database user for Oracle R Enterprise (the default). |
| `--keep` | When uninstalling Oracle R Enterprise Server, keep the R packages and libraries under Oracle home but remove the database objects. Allows Oracle R Enterprise support to be removed from a single database instance or pluggable database (PDB) without affecting other databases in Oracle home. |
| `--full` | When uninstalling Oracle R Enterprise Server, remove the R packages and libraries under Oracle home in addition to the database objects. |
| `--no-supp` | When combined with `--install`, prevents installation of the supporting packages. By default the supporting packages are installed if they are available. |
| `--no-user` | When combined with `--install`, prevents the creation of an Oracle R Enterprise user. By default a user is created if one does not already exist. |
| `--admin` | Grant the **rqadmin** role to the Oracle R Enterprise user. By default, the **rqadmin** role is not granted. The `--admin` option should be used with caution. It is only available in batch mode. |
| `--sys PASSWORD` | sys password.  
The sys password is not required if the script is running under operating system authentication, as described in Section 4.3.3.1, "About Operating System Authentication". |
4.2.3 SERVER Examples

This topic provides these examples:

- A Default Interactive Installation
- A Default Batch Installation
- User Configuration in Interactive Mode
- User Configuration in Batch Mode

See Also: Example A–1, "A Default, First-Time Installation of Oracle R Enterprise Server" for an example with output.

4.2.3.1 A Default Interactive Installation

If your Linux or UNIX or Windows system meets the requirements specified in Section 4.3.1, then this command performs a default, first-time installation of Oracle R Enterprise Server:

For Linux or UNIX:

```
./server.sh
```

For Windows:

```
server.bat
```

As shown in Example A–1, a default, interactive installation performs the following:

- Prints out information about the environment
- Prompts for the password and permanent and temporary tablespaces for rqsys
- Prompts whether to install the supporting packages. (Installs the supporting packages by default if they are available.)
- Prompts whether to create a user account for Oracle R Enterprise. (Creates a user by default if one does not exist.) When creating a user, prompts for the permanent and temporary tablespaces.

---

**Table 4–1 (Cont.) SERVER Script Command-Line Arguments**

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>--pdb NAME</td>
<td>The name of a pluggable database (PDB) in a multitenant container database (CDB). Multitenant architecture enables an Oracle database to function as a container database that includes zero, one, or many pluggable databases. For information about multitenant architecture, see Oracle Database Concepts.</td>
</tr>
<tr>
<td>--perm PERM</td>
<td>Permanent tablespace for rqsys.</td>
</tr>
<tr>
<td>--temp TEMP</td>
<td>Temporary tablespace for rqsys.</td>
</tr>
<tr>
<td>--rqsys PASSWORD</td>
<td>rqsys password. See Section 4.1.1, &quot;About the RQSYS Schema&quot;.</td>
</tr>
<tr>
<td>--user-perm PERM</td>
<td>Permanent tablespace for Oracle R Enterprise user.</td>
</tr>
<tr>
<td>--user-temp TEMP</td>
<td>Temporary tablespace for Oracle R Enterprise user.</td>
</tr>
<tr>
<td>--pass PASSWORD</td>
<td>Oracle R Enterprise user password.</td>
</tr>
<tr>
<td>--user USER</td>
<td>Oracle R Enterprise database user name.</td>
</tr>
</tbody>
</table>
4.2.3.2 A Default Batch Installation
This example shows an installation like the one in Section 4.2.3.1, but specified to run in batch mode.

For Linux or UNIX:
```
./server.sh -y --install --setup-user --sys ORASYSPSWD,
    --perm SYSAUX --temp TEMP --rqsys RQSYSPWD
    --user-perm USERS --user-temp TEMP --pass RQUSERPSWD --user RQUSER
```

For Windows:
```
server.bat -y --install --setup-user --sys ORASYSPSWD,
    --perm SYSAUX --temp TEMP --rqsys RQSYSPWD
    --user-perm USERS --user-temp TEMP --pass RQUSERPSWD --user RQUSER
```

4.2.3.3 User Configuration in Interactive Mode
The `server` script automatically creates or configures a user if one does not already exist. If you supply the name of an existing user, the script configures it to support Oracle R Enterprise.

See Example 7–2, "Creating an Oracle R Enterprise User".

4.2.3.4 User Configuration in Batch Mode
This example shows how the `server` script could be run to grant the `rqadmin` role to the user created in Section 4.2.3.2. The `--admin` argument is only available in batch mode.

For Linux or UNIX:
```
./server.sh -y --setup-user --admin --sys ORASYSPSWD -
    --pass RQUSERPSWD --user RQUSER
```

For Windows:
```
server.bat -y --setup-user --admin --sys ORASYSPSWD -
    --pass RQUSERPSWD --user RQUSER
```

See Section 7.5.1, "About the RQADMIN Role".

4.3 Oracle R Enterprise Server Requirements
Before installing Oracle R Enterprise Server, verify your system environment, and ensure that your user ID has the proper permissions.

4.3.1 System Requirements
- The operating system must conform to the requirements specified in Section 1.4.
- Oracle Database must be installed and configured as described in Chapter 2.

---
**Note:** You can install Oracle R Enterprise Server in a pluggable database (PDB) in a multitenant environment. See *Oracle Database Administrator’s Guide*

- R must be installed as described in Chapter 3.
### 4.3.2 Environment Variables

**Table 4–2  Environment Variable Requirements for Oracle R Enterprise Server**

<table>
<thead>
<tr>
<th>Platform</th>
<th>Environment Variable Requirement</th>
</tr>
</thead>
</table>
| all                | **$ORACLE_SID** must specify the service identifier (SID) of the database that will support Oracle R Enterprise.  
                        **$ORACLE_HOME** must specify the home directory of the database identified by **ORACLE_SID**.  
                        On Windows, you can find the value of Oracle home and the Oracle instance identifier in the Windows Registry. If more than one Oracle home or Oracle instance exist on this computer, then you can specify the required values in environment variables. See Section 7.6, "Creating and Modifying Environment Variables on Windows". |
| Linux              | **$LD_LIBRARY_PATH** must include **$ORACLE_HOME/lib**.  
                        **$PATH** must include **$ORACLE_HOME/bin**. |
| Oracle Solaris     | **$LD_LIBRARY_PATH** must include **$ORACLE_HOME/lib**.  
                        **$PATH** must include **$ORACLE_HOME/bin**. |
| IBM AIX            | **$LIBPATH** must include **$ORACLE_HOME/lib**.  
                        **$PATH** must include **$ORACLE_HOME/bin**. |
| Microsoft Windows  | **%PATH%** must include %R_HOME%\bin\x64. The default value of %R_HOME% is C:\Program Files\R\R-3.1.1.  
                        You can find the value of the R home directory in the Windows Registry. If more than one R home exist on this computer, then you can specify the required value in an environment variable. See Section 7.6, "Creating and Modifying Environment Variables on Windows". |

### 4.3.3 User Requirements

The operating system user that installs Oracle R Enterprise Server must meet the requirements described in Table 4–3.

**Table 4–3  User Requirements for Oracle R Enterprise Server Installer**

<table>
<thead>
<tr>
<th>Platform</th>
<th>User Requirement</th>
</tr>
</thead>
</table>
| Linux and UNIX    | ■ Member of the **dba** group  
                        ■ Has write access to **$ORACLE_HOME/lib** |
| Microsoft Windows | ■ Administrator access  
                        ■ Member of the **ora_dba** group  
                        ■ Has write access to %R_HOME%/bin |

### 4.3.3.1 About Operating System Authentication

The Oracle R Enterprise Server installation script uses **system authentication** to connect to the database identified by **ORACLE_HOME** and **ORACLE_SID**. System authentication is based on the operating system credentials of the user instead of the database credentials.

For example, on a Linux system, the Oracle R Enterprise installation script uses this statement to start SQL*Plus without a password:

```
$ORACLE_HOME/bin/sqlplus / as sysdba
```
Membership in a special operating system group enables system authentication for Oracle Database. The operating system group is created during installation of the database, and the identity of the installer is automatically assigned to the group. The generic name for the group is OSDBA. On Linux and UNIX, the name for OSDBA is \texttt{dba}. On Windows, the name for OSDBA is \texttt{ora_dba}.

The user that installs Oracle R Enterprise Server must belong to OSDBA.

See Also:

- “Using Operating System Authentication” in Oracle Database Administrator’s Guide

4.3.3.2 Verifying the Group Membership of Your User ID

As described in “About Operating System Authentication”, the Linux or UNIX user ID that runs the Oracle R Enterprise Server installation script must belong to the \texttt{dba} group. Membership in the \texttt{dba} group is also required for running other Oracle R Enterprise scripts on the server. On Windows, the \texttt{dba} group is called \texttt{ora_dba}.

To determine the group membership of your Linux or UNIX user ID, type this command:

```
% groups
dba othergroup
```

To determine the group membership of your Windows user ID:

1. Open Windows Control Panel.
2. Select Users Accounts.
3. Select Manage User Accounts.
4. On the Users tab of the User Accounts dialog, the name, domain, and group of each user account are listed. Verify that your user ID belongs to the group \texttt{ora_dba}.

4.4 Installing Oracle R Enterprise Server

To install Oracle R Enterprise Server:

1. Ensure that your system satisfies the requirements specified in Section 4.3.
2. Create an installation directory for the Oracle R Enterprise server components. The directory can have any name. For example:

   `/oreserver_install_dir`

3. Download the Oracle R Enterprise Server installation files and supporting packages from the Oracle R Enterprise Downloads page on the Oracle Technology Network:

   \url{http://www.oracle.com/technetwork/database/options/advanced-analytics/r-enterprise/ore-downloads-1502823.html}

   a. Accept the license agreement and download the Oracle R Enterprise Server files for your platform to your installation directory.
b. Accept the license agreement and download the Oracle R Enterprise Supporting packages for your platform to your installation directory.

The installation directory now contains two zip files.

ore-server-platform-arch-1.4.1.zip
ore-supporting-platform-arch-1.4.1.zip

4. Unzip the files.

unzip ore-server-platform-arch-1.4.1.zip
unzip ore-supporting-platform-arch-1.4.1.zip

The installation directory looks like this after you unzip both files:

For Linux or UNIX:

/oreserver install_dir
    ore-server-platform-arch-1.4.1.zip
    ore-supporting-platform-arch-1.4.1.zip
    server.sh
    /server
    /supporting

For Windows:

\oreserver install_dir
    ore-server-platform-arch-1.4.1.zip
    ore-supporting-platform-arch-1.4.1.zip
    server.bat
    \server
    \supporting

5. For Linux or UNIX, run server.sh. For Windows, run server.bat. The script performs a default, first-time installation of Oracle R Enterprise Server, as described in Section 4.2.3.1.

For Linux or UNIX:

./server.sh

For Windows:

server.bat

See Also: Example A–1, "A Default, First-Time Installation of Oracle R Enterprise Server" for an example with output.

4.5 Verifying the Oracle R Enterprise Server Installation

The Oracle R Enterprise server installation script creates log files in the server subdirectory of the installation directory. Examine the log files to verify the success of the installation process.

The following commands on a Linux or UNIX system list the log files:

cd ./oreserver_install_dir/server
ls *.log
outcdb.log rqconfig.log rqdrop.log rqgrant.log rqinst.log rqpdrp.log rqproc.log rquser.log
If there are problems with the installation and you are unable to resolve them, you can request help from My Oracle Support or from the Oracle R Enterprise discussion forum.

- **My Oracle Support** — [https://support.oracle.com](https://support.oracle.com)

### 4.5.1 Validating Basic Oracle R Enterprise Functionality

After connecting as described in Section 6.5, you can test some of the basic functionality of Oracle R Enterprise with these commands:

```r
## Is the ORE client connected to the ORE server?
## The output of this command should be TRUE.
ore.is.connected()

## List the available database tables
ore.ls()

## Push an R dataframe to a database table
CARS <- ore.push(cars)
head(CARS)

## Run embedded R
ore.doEval(function() { 123 })
```

### 4.5.2 Running the Oracle R Enterprise Example Scripts

You can further verify the success of the installation by running the Oracle R Enterprise demo scripts. If a script runs to completion without errors, then the example is successful.

The example scripts are located in `$ORACLE_HOME/R/library/ORE/demo`.

This R command provides a list of available examples:

```r
demo(package="ORE")
```

These commands run two of the examples. The `aggregate` script tests the use of an R function on data that is resident in database memory; the `row_apply` script tests embedded R execution.

```r
demo("aggregate", package="ORE")
demo("row_apply", package="ORE")
```

This command exits from R.

```r
q()
```

### 4.6 Installing Oracle R Enterprise Server in a Multitenant Environment

You can install Oracle R Enterprise Server in one or more pluggable databases (PDBs) within a multitenant environment. Oracle R Enterprise Server must be installed in a pluggable database, not in the root database.

If you have more than one instance of Oracle R Enterprise Server installed in a Multitenant Container Database (CDB) and you want to uninstall one instance but
retain the others, you can perform a partial uninstall as described in Section 7.3.1.1, "Performing a Partial Uninstall".

See Also:

- Oracle Database Concepts for an introduction to multitenant architecture.
- Oracle Database Administrator’s Guide for information about managing a multitenant environment.
This chapter explains how to install Oracle R Distribution and Oracle R Enterprise Server on Oracle Exadata Database Machine. This chapter includes these topics:

- About Oracle R Enterprise on Exadata
- Using DCLI to Install Oracle R Enterprise on Exadata
- Installing Oracle R Distribution Across Exadata Compute Nodes
- Installing Oracle R Enterprise Server Across Exadata Compute Nodes

5.1 About Oracle R Enterprise on Exadata

Exadata is an ideal platform for Oracle R Enterprise. The parallel resources of R computations in Oracle R Enterprise take advantage of the massively parallel grid infrastructure of Exadata.

To install Oracle R Enterprise on Exadata:

1. On each node:
   - Install Oracle R Distribution as described in Chapter 3.
   - Verify and configure the environment as described in Section 4.3, "Oracle R Enterprise Server Requirements"
   - Install Oracle R Enterprise Server and the supporting packages as described in Section 4.4.

2. On the first node only, create a user, as described in Section 7.5.

You can simplify the process of installing Oracle R Enterprise on Exadata by using the Distributed Command Line Interface (DCLI) as described in the following topics.

5.2 Using DCLI to Install Oracle R Enterprise on Exadata

You can use DCLI to simplify the installation of Oracle R Enterprise on Exadata. With DCLI, you can use a single command to install Oracle R Distribution and Oracle R Enterprise Server across multiple Exadata compute nodes.

Example 5–1 shows the output of the DCLI help option, which explains the basic syntax of the utility.

Example 5–1 DCLI Help Option Output

$ dcli -h

Distributed Shell for Oracle Storage
This script executes commands on multiple cells in parallel threads. The cells are referenced by their domain name or ip address. Local files can be copied to cells and executed on cells. This tool does not support interactive sessions with host applications. Use of this tool assumes ssh is running on local host and cells. The -k option should be used initially to perform key exchange with cells. User may be prompted to acknowledge cell authenticity, and may be prompted for the remote user password. This -k step is serialized to prevent overlaid prompts. After -k option is used once, then subsequent commands to the same cells do not require -k and will not require passwords for that user from the host. Command output (stdout and stderr) is collected and displayed after the copy and command execution has finished on all cells. Options allow this command output to be abbreviated.

Return values:
0 -- file or command was copied and executed successfully on all cells
1 -- one or more cells could not be reached or remote execution returned non-zero status.
2 -- An error prevented any command execution

Examples:
dcli -g mycells -k
dcli -c stds2s2,stds2s3 vmstat
dcli -g mycells cellcli -e alter iormplan active
dcli -g mycells -x reConfig.scl

usage: dcli [options] [command]

options:
--version show program's version number and exit
-c CELLS comma-separated list of cells
-d DESTFILE destination directory or file
-f FILE file to be copied
-g GROUPFILE file containing list of cells
-h, --help show help message and exit
-k push ssh key to cell's authorized_keys file
-l USERID user to login as on remote cells (default: celladmin)
-n abbreviate non-error output
-r REGEXP abbreviate output lines matching a regular expression
-s SSHOPTIONS string of options passed through to ssh
--scp=SCPOPTIONS string of options passed through to scp if different from sshoptions
--serial serialize execution over the cells
-t list target cells
--unkey drop keys from target cells' authorized_keys file
-v print extra messages to stdout
--vmstat=VMSTATOPS vmstat command options
-x EXECFILE file to be copied and executed

See Also: My Oracle Support for more details about DCLI. Go to the following website, log in with your Customer Support Identifier, and type DCLI in the search box.
https://support.oracle.com/
5.3 Installing Oracle R Distribution Across Exadata Compute Nodes

This section explains how to run DCLI to install Oracle R Distribution across multiple Exadata Linux compute nodes. The commands are summarized in Section 5.3.1.

**Important:** Before beginning the installation, review the instructions for installing Oracle R Distribution in Chapter 3.

To install Oracle R Distribution on Exadata using DCLI, follow these steps:

1. Configure the Exadata environment to enable automatic authentication for DCLI on each compute node.
   a. Generate an SSH public-private key for the root user. Execute the following command as root on any node:
      
      ```
      $ ssh-keygen -N '' -f /.ssh/id_dsa -t dsa
      ```

      This command generates public and private key files in the .ssh subdirectory of the home directory of the root user.
   b. In a text editor, create a file that contains the names of all the compute nodes in the rack. Specify each node name on a separate line. For example, the nodes file for a 2-node cluster could contain entries like the following:
      
      ```
      $ cat nodes
      exadb01
      exadb02
      ```
   c. Run the DCLI command with the -k option to establish SSH trust across all the nodes. The -k option causes DCLI to contact each node sequentially (not in parallel) and prompts you to enter the password for each node.
      
      ```
      $ dcli -t -g nodes -l root -k -s "-o StrictHostkeyChecking=no"
      ```

      DCLI with -k establishes SSH Trust and User Equivalence. Subsequent DCLI commands will not prompt for passwords.

2. Download the file: ord-linux-x86_64-3.1.1.tar.gz. To download this file, you must obtain permission from Oracle Support:
   a. Log in to My Oracle Support.
      
      https://support.oracle.com/
   b. Click Contact Us.
   c. Request permission to access this file:
      
      ord-linux-x86_64-3.1.1.tar.gz
   d. When permission is granted, log in as root to any compute node and download the file.

3. Create a directory and replicate the downloaded file in this directory across all nodes. For example, the following commands create the directory /home/oracle/ORD and replicate the file ord-linux-x86_64-3.1.1.tar.gz in this directory.

   ```
   $ dcli -t -g nodes -l root mkdir -p /home/oracle/ORD
   $ dcli -t -g nodes -l root -f ord-linux-x86_64-3.1.1.tar.gz -d /home/oracle/ORD/ord-linux-x86_64-3.1.1.tar.gz
   ```
4. Uncompress and untar the file to replicate the dependent RPMs across all nodes.

```
$ dcli -t -g nodes -l root xvfz
/home/oracle/ORD/ord-linux-x86_64-3.1.1.tar.gz -C /home/oracle/ORD
$ ls /home/oracle/ORD/ord-linux-x86_64-3.1.1
```

Alternatively, you can download these RPMs from the Oracle public yum server. The locations of the RPMs are listed in Example 5–2 through Example 5–7.

**Example 5–2  Oracle R Distribution 3.1.1 RPMs for Oracle Linux 5**

The Oracle R Distribution RPMs for Oracle Linux 5 are listed as follows:

- http://public-yum.oracle.com/repo/EnterpriseLinux/EL5/addons/x86_64/getPackage/R-3.1.1-2.el5.x86_64.rpm
- http://public-yum.oracle.com/repo/EnterpriseLinux/EL5/addons/x86_64/getPackage/R-devel-3.1.1-2.el5.x86_64.rpm

If the dependent RPMs for Oracle Linux 5, listed in Example 5–2, are not automatically included, then download and install them explicitly. The dependent RPMs are listed in Example 5–3.

**Example 5–3  Oracle R Distribution 3.1.1 RPM Dependencies for Oracle Linux 5**

The Oracle R Distribution dependent RPMs for Oracle Linux 5 are listed as follows:

- atk-1.12.2-1.fc6.x86_64.rpm
- avahi-0.6.16-10.el5_6.x86_64.rpm
- avahi-compat-libdns_sd-0.6.16-10.el5_6.x86_64.rpm
- avahi-compat-libdns_sd-devel-0.6.16-10.el5_6.x86_64.rpm
- bitstream-vera-fonts-1.10-7.noarch.rpm
- bzip2-devel-1.0.3-6.el5.x86_64.rpm
- Cairo-1.2.4-5.el5.x86_64.rpm
- Cairo-devel-1.2.4-5.el5.x86_64.rpm
- chkfontpath-1.10-1.i.x86_64.rpm
- cups-1.3.7-30.el5_9.3.x86_64.rpm
- cups-devel-1.3.7-30.el5_9.3.x86_64.rpm
- cups-libs-1.3.7-30.el5_9.3.x86_64.rpm
- dbus-python-0.7.0-9.el5.x86_64.rpm
- desktop-file-utils-0.10-7.x86_64.rpm
- dialog-1.0.20051107-1.2.2.x86_64.rpm
- e2fsprogs-devel-1.39-36.0.1.el5_9.x86_64.rpm
- ed-0.2-39.el5_2.x86_64.rpm
- fontconfig-devel-2.4.1-7.el5.x86_64.rpm
- freetype-devel-2.2.1-32.el5_9.1.x86_64.rpm
- gcc-gfortran-4.1.2-54.el5.x86_64.rpm
- gdk-pixbuf-0.22.0-25.el5.x86_64.rpm
- gdk-pixbuf-devel-0.22.0-25.el5.x86_64.rpm
- ghostscript-8.70-14.el5_8.1.x86_64.rpm
- ghostscript-fonts-5.50-13.1.1.noarch.rpm
- gnome2-devel-2.12.3-4.el5_3.1.x86_64.rpm
- gmp-4.1.4-10.el5.x86_64.rpm

5–4  Oracle R Enterprise Installation and Administration Guide
Installing Oracle R Distribution Across Exadata Compute Nodes

Example 5–4 Oracle R Distribution 3.1.1 RPMs for Oracle Linux 6

The Oracle R Distribution RPMs for Oracle Linux 6 are listed as follows:

http://public-yum.oracle.com/repo/OracleLinux/OL6/addons/x86_64/getPackage
/R-3.1.1-2.el6.x86_64.rpm
http://public-yum.oracle.com/repo/OracleLinux/OL6/addons/x86_64/getPackage
/R-core-3.1.1-2.el6.x86_64.rpm
http://public-yum.oracle.com/repo/OracleLinux/OL6/addons/x86_64/getPackage
/R-devel-3.1.1-2.el6.x86_64.rpm

If the following dependent RPM is not automatically included, then download and install it explicitly:

texinfo-tex-4.13a-8.el6.x86_64.rpm

**Example 5–5  Oracle R Distribution 3.0.1 RPMs for Oracle Linux 5**

The Oracle R Distribution RPMs for Oracle Linux 5 are listed as follows:

- R-3.0.1-2.x86_64.rpm
- R-core-3.0.1-2.x86_64.rpm
- R-devel-3.0.1-2.x86_64.rpm
- libRmath-3.0.1-2.x86_64.rpm
- libRmath-devel-3.0.1-2.x86_64.rpm
- libRmath-static-devel-3.0.1-2.x86_64.rpm

If the dependent RPMs for Oracle Linux 5, listed in Example 5–5, are not automatically included, then download and install them explicitly. The dependencies are listed in Example 5–6.

**Example 5–6  Oracle R Distribution 3.0.1 RPM Dependencies for Oracle Linux 5**

The Oracle R Distribution dependent RPMs for Oracle Linux 5 are listed as follows:

- atk-1.12.2-1.fc6.x86_64.rpm
- avahi-0.6.16-10.el5_6.x86_64.rpm
- avahi-compat-libdnssd-0.6.16-10.el5_6.x86_64.rpm
- bitstream-vera-fonts-1.10-7.noarch.rpm
- bzip2-devel-1.0.3-6.el5_5.x86_64.rpm
- Cairo-1.2.4-5.el5.x86_64.rpm
- chkfontpath-1.10.1-1.1.x86_64.rpm
- cpp-4.1.2-54.el5.x86_64.rpm
- cups-1.3.7-30.el5_9.3-x86_64.rpm
- cups-libs-1.3.7-30.el5_9.3-x86_64.rpm
- dbus-python-0.70-9.el5_4.x86_64.rpm
- desktop-file-utils-0.10-7.x86_64.rpm
- dialog-1.0.20051107-1.2.2-x86_64.rpm
- ed-0.2-39.el5_2.x86_64.rpm
- gcc-4.1.2-54.e15.x86_64.rpm
- gcc-c++-4.1.2-54.e15.x86_64.rpm
- gcc-gfortran-4.1.2-54.e15.x86_64.rpm
- ghostscript-8.70-14.el5_8.1.x86_64.rpm
- ghostscript-fonts-5.50-13.1.1.noarch.rpm
- gmp-4.1.4-10.el5.x86_64.rpm
- gtk2-2.10.4-29.el5.x86_64.rpm
- hicolor-icon-theme-0.9-2.1.noarch.rpm
- libFS-1.0.0-3.1.x86_64.rpm
- libX11-1.0.3-11.e15_7.1.x86_64.rpm
- libX11-devel-1.0.3-11.e15_7.1.x86_64.rpm
- libXau-devel-1.0.1-3.1.x86_64.rpm
- libXdmc-pc-devel-1.0.1-2.1.x86_64.rpm
- libXfont-1.2.2-1.0.4.e15_7.x86_64.rpm
- libfontenc-1.0.2-2.2.e15.x86_64.rpm
- libgcc-4.1.2-54.e15.i386.rpm
Installing Oracle R Distribution Across Exadata Compute Nodes

Example 5–7  Oracle R Distribution 3.0.1 RPMs for Oracle Linux 6

The Oracle R Distribution RPMs for Oracle Linux 6 are listed as follows:

- R-3.0.1-2.el6.x86_64.rpm
- R-core-3.0.1-2.el6.x86_64.rpm
- R-devel-3.0.1-2.el6.x86_64.rpm
- libRmath-3.0.1-2.el6.x86_64.rpm
- libRmath-devel-3.0.1-2.el6.x86_64.rpm
- libRmath-static-3.0.1-2.el6.x86_64.rpm

If the following dependent RPM is not automatically included, then download and install it explicitly:

texinfo-tex-4.13a-8.el6.x86_64.rpm

5. To install the new RPMs and update existing RPMs across nodes, execute the following RPM command:

   $ dcli -t -g nodes -l root rpm -i --force
   /home/oracle/ORD/ord-linux-x86_64-3.1.1/*.rpm

   The --force flag prevents errors from circular dependencies.

6. Verify the R installations on each node by first returning to the location where R is installed and then starting R.
$ dcli -g nodes -l oracle R RHOME
exadb01: /usr/lib64/R
exadb02: /usr/lib64/R

The following command returns this output for each node.

$ dcli -g nodes -l oracle R --vanilla
exadb01: Oracle Distribution of R version 3.1.1 (--) -- "Good Sport"
exadb01: Copyright (C) The R Foundation for Statistical Computing
exadb01: Platform: x86_64-unknown-linux-gnu (64-bit)
exadb01: exadb01: R is free software and comes with ABSOLUTELY NO WARRANTY.
exadb01: You are welcome to redistribute it under certain conditions.
exadb01: Type 'license()' or 'licence()' for distribution details.
exadb01: exadb01: Natural language support but running in an English locale
exadb01: exadb01: R is a collaborative project with many contributors.
exadb01: Type 'contributors()' for more information and
exadb01: 'citation()' on how to cite R or R packages in publications.
exadb01: exadb01: Type 'demo()' for some demos, 'help()' for on-line help, or
exadb01: 'help.start()' for an HTML browser interface to help.
exadb01: exadb01: Type 'q()' to quit R.
exadb01: exadb01: You are using Oracle's distribution of R. Please contact
exadb01: Oracle Support for any problems you encounter with this
exadb01: distribution.

5.3.1 DCLI Command Summary for Oracle R Distribution installation on Exadata

The DCLI commands used to install Oracle R Distribution 3.1.1 on a Linux Exadata system are listed in Example 5–8.

Example 5–8  DCLI Command Summary for Oracle R Distribution

ssh-keygen -N "" -f ~/.ssh/id_dsa -t dsa
vi nodes # enter node names
dcli -t -g nodes -l root -k -s "-o StrictHostkeyChecking=no"
dcli -t -g nodes -l root mkdir -p /home/oracle/ORD
dcli -t -g nodes -l root tar xvfz /home/oracle/ORD/ord-linux-x86_64-3.1.1.tar.gz -C /home/oracle/ORD
dcli -t -g nodes -l root rpm -i --force
    /home/oracle/ORD/ord-linux-x86_64-3.1.1/*.rpm
dcli -g nodes -l root R RHOME
dcli -g nodes -l root R --vanilla

5.4 Installing Oracle R Enterprise Server Across Exadata Compute Nodes

This section explains how to run DCLI to install Oracle R Enterprise Server across multiple Exadata Linux compute nodes. The commands are summarized in Section 5.4.1.

Important: Before beginning the installation, review the instructions for installing Oracle R Enterprise Server in Chapter 4.
To install Oracle R Enterprise Server on Exadata using DCLI, follow these steps:

1. Ensure that the `ORACLE_HOME`, `ORACLE_SID`, `R_HOME`, `PATH`, and `LD_LIBRARY_PATH` environment variables are properly set on each node. For example, you could specify values like the following in a bashrc file:

   ```bash
   export ORACLE_HOME=/hostname/app/oracle/product/11.2.0.4/dbhome_1
   export ORACLE_SID=ORCL
   export R_HOME=/usr/lib64/R
   export PATH=$PATH:$R_HOME/bin:$ORACLE_HOME/bin
   export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:$ORACLE_HOME/lib:$R_HOME/lib
   ```

2. Go to the Oracle R Enterprise home page on the Oracle Technology Network:


   Select Oracle R Enterprise Downloads. On the Downloads page, select Oracle R Enterprise Server and the Supporting Packages for Linux. The following files are downloaded for Oracle R Enterprise 1.4.1.

   - `ore-server-linux-x86-64-1.4.1.zip`
   - `ore-supporting-linux-x86-64-1.4.1.zip`

3. Login as root, and copy the installers for Oracle R Enterprise Server and the supporting packages across nodes. For example:

   ```bash
   $ dcli -g nodes -l oracle mkdir -p /home/oracle/ORE
   $ dcli -g nodes -l oracle -f ore-server-linux-x86-64-1.4.1.zip -d /home/oracle/ORE/ore-server-linux-x86-64-1.4.1.zip
   $ dcli -g nodes -l oracle -f ore-supporting-linux-x86-64-1.4.1.zip -d /home/oracle/ORE/ore-supporting-linux-x86-64-1.4.1.zip
   ```

4. Unzip the supporting packages on each node:

   ```bash
   $ dcli -t -g nodes -l oracle unzip /home/oracle/ORE/ore-supporting-linux-x86-64-1.4.1.zip -d /my_destination_directory/
   ```

5. Install Oracle R Enterprise server components:

   ```bash
   $ dcli -t -g nodes -l oracle "cd /my_destination_directory; ./server.sh -y
   --admin --sys syspassword --perm permtablespace
   --temp temptablespace --rqs sys rqsystpassword
   --user-perm usertablespace --user-temp usertemptablespace
   --pass rquserpassword --user RQUSER"
   ```

   **Note:** The server script creates a user for Oracle R Enterprise. By default, the script does not grant the rqadmin role to the user.

   Any Oracle R Enterprise user can execute embedded R, but only those with the rqadmin role can create and drop the R scripts in the database. Use caution when granting the rqadmin role.

   See Section 7.5.1, "About the RQADMIN Role"


   ```bash
   > library(ORE)
   Loading required package: OREbase
   Attaching package: OREbase
   The following objects are masked from âpackage:baseâ:
   ```
Installing Oracle R Enterprise Server Across Exadata Compute Nodes

5.4.1 DCLI Commands Summary for Oracle R Enterprise Server

The DCLI commands used to install Oracle R Enterprise Server 1.4.1 and the supporting packages on a Linux Exadata system are listed in Example 5–9.

Example 5–9  DCLI Command Summary for Oracle R Enterprise Server

dcli -g nodes -l oracle mkdir -p /home/oracle/ORE
dcli -g nodes -l oracle -f ore-server-linux-x86-64-1.4.1.zip -d /home/oracle/ORE/ore-server-linux-x86-64-1.4.1.zip
dcli -g nodes -l oracle -f ore-supporting-linux-x86-64-1.4.1.zip -d /home/oracle/ORE/ore-supporting-linux-x86-64-1.4.1.zip
dcli -t -g nodes -l oracle /home/oracle/ORE/server/.server.sh .demo_user.sh
cd /home/oracle/ORE
sqlplus / as sysdba
grant RQADMIN to rquser;
grant CREATE TABLE to rquser;
grant CREATE SESSION to rquser;
grant CREATE VIEW to rquser;
grant CREATE PROCEDURE to rquser;
grant CREATE MINING MODEL to rquser;
exit;
dcli -t -g nodes -l oracle ORE -e "library(ORE)"
This chapter explains how to install Oracle R Enterprise Client. This chapter includes these topics:

- About Oracle R Enterprise Client
- Installing Oracle Database Instant Client
- Installing the Oracle R Enterprise Packages
- Installing the Oracle R Enterprise Supporting Packages
- Connecting Oracle R Enterprise Client to Oracle R Enterprise Server

### 6.1 About Oracle R Enterprise Client

Oracle R Enterprise includes several components that must be installed separately on each client computer.

**Components of Oracle R Enterprise Client**

- R (See Chapter 3, "Installing R for Oracle R Enterprise")
- Oracle Database Client Software
- Oracle R Enterprise packages
- Oracle R Enterprise supporting packages

The Oracle R Enterprise client components can be installed in any order:

*See Also:* Figure 1–2 for an illustration of the client and server components of Oracle R Enterprise.

### 6.1.1 About Oracle Database Client Software

ROracle, one of the supporting packages used by Oracle R Enterprise, requires an installation of Oracle Database client software to enable communication between an R client and an Oracle database. The Database client can be either Oracle Database Client or Oracle Database Instant Client:

- **Oracle Database Client** is distributed with Oracle Database and is based in the Oracle home of the database.
- **Oracle Database Instant Client** is a free, standalone implementation of Oracle Database Client. Oracle Instant Client is not based in an Oracle home directory and requires less disk space than Oracle Database Client.
6.1.2 About the Oracle R Enterprise Packages

The Oracle R Enterprise packages, shown in Table 6–1, are a set of Oracle proprietary packages that support Oracle R Enterprise. These packages are required on each client computer and on the server computer that hosts Oracle R Enterprise Server. On the server, the Oracle R Enterprise packages are installed automatically by the Oracle R Enterprise Server installation script.

<table>
<thead>
<tr>
<th>Package Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORE</td>
<td>The top-level package for Oracle R Enterprise.</td>
</tr>
<tr>
<td>OREbase</td>
<td>Corresponds to the open source R base package.</td>
</tr>
<tr>
<td>OREcommon</td>
<td>Contains common low-level functionality for Oracle R Enterprise</td>
</tr>
<tr>
<td>OREdm</td>
<td>Exposes Oracle Data Mining algorithms through R.</td>
</tr>
<tr>
<td>OREeda</td>
<td>Contains functions for exploratory data analysis.</td>
</tr>
<tr>
<td>OREembed</td>
<td>Supports embedded R</td>
</tr>
<tr>
<td>OREgraphics</td>
<td>Corresponds to the open source R graphics package.</td>
</tr>
<tr>
<td>OREmodels</td>
<td>Contains functions for advanced analytical modeling.</td>
</tr>
<tr>
<td>OREPredict</td>
<td>Enables scoring data in Oracle Database using R models.</td>
</tr>
<tr>
<td>OREstats</td>
<td>Corresponds to the open source R stats package.</td>
</tr>
<tr>
<td>ORExml</td>
<td>Supports XML translation between R and Oracle Database.</td>
</tr>
</tbody>
</table>

6.1.3 About the Oracle R Enterprise Supporting Packages

The supporting packages, shown in Table 6–2, are a set of open source packages that support the Oracle R Enterprise packages.

<table>
<thead>
<tr>
<th>Package Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>arules</td>
<td>Provides the infrastructure for representing, manipulating and analyzing transactional data and patterns (frequent itemsets and association rules)</td>
</tr>
<tr>
<td>Cairo</td>
<td>Supports graphic rendering on Oracle R Enterprise server.</td>
</tr>
<tr>
<td>DBI</td>
<td>A database interface definition for communication between R and Oracle Database.</td>
</tr>
<tr>
<td>png</td>
<td>Supports the reading and writing of PNG images for Oracle R Enterprise objects.</td>
</tr>
<tr>
<td>ROOracle</td>
<td>Oracle Database interface for R-based OCI.</td>
</tr>
<tr>
<td>statmod</td>
<td>Provides statistical modeling functions, including growth curve comparisons, limiting dilution analysis, mixed linear models, heteroscedastic regression, Tweedie family generalized linear models, the inverse-Gaussian distribution and Gauss quadrature</td>
</tr>
</tbody>
</table>

6.2 Installing Oracle Database Instant Client

As described in Section 6.1.1, Oracle R Enterprise requires Oracle Database client software. Oracle Instant Client is suitable for most configurations of Oracle R Enterprise.

This topic includes these sections:
6.2.1 Installing Oracle Database Instant Client on Windows

To Install Oracle Instant Client on Windows:

1. Create an installation directory for the Oracle R Enterprise client components. For example:
   c:\oreclient_install_dir

2. Go to the Oracle Database Instant Client page on the Oracle Technology Network:
   http://www.oracle.com/technetwork/database/features/instant-client/

3. Select See Instant Client downloads for all platforms.

4. On the Instant Client Downloads page, select Instant Client for Microsoft Windows (x64).

5. On the Instant Client Downloads for Microsoft Windows (x64) page, accept the license agreement.

6. Choose Instant Client Package - Basic for your version of Oracle Database.

7. Save the file in the installation directory that you created in Step 1. For example:
   c:\oreclient_install_dir\instantclient-basic-windows.x64-12.1.0.1.0.zip

8. Unzip the file. The files are extracted into a subdirectory called instantclient_version, where version is your version of Oracle Database. For example:
   c:\oreclient_install_dir\instantclient_12_1

9. Return to the Instant Client Downloads for Microsoft Windows (x64) page:
   http://www.oracle.com/technetwork/topics/winx64soft-089540.html

10. Accept the license agreement and select Instant Client Package - SDK for your version of Oracle Database.

11. Save the file in the installation directory that you created in Step 1.
   c:\oreclient_install_dir\instantclient-sdk-windows.x64-12.1.0.1.0.zip

12. Unzip the file. The files are extracted into the instantclient_version subdirectory. An Instant Client installation directory for Oracle Database 12.1 is shown in Figure 6–1
13. Add the full path of the Instant Client to the environment variables OCI_LIB64 and PATH. The following steps set the variables to the path used in this example, c:\myoreclient\instantclient_12_1:
   a. In Windows Control Panel, choose System, then click Advanced system settings.
   b. On the Advanced tab, click Environment Variables.
   c. Under System variables, create OCI_LIB64 if it does not already exist. Set the value of OCI_LIB64 to c:\myoreclient\instantclient_12_1.
   d. Under System variables, edit PATH to include c:\myoreclient\instantclient_12_1.

See Also: Section 7.6, "Creating and Modifying Environment Variables on Windows"

6.2.2 Installing Oracle Database Instant Client on Linux or UNIX

You can install Oracle Database Instant Client from a zip file on Linux or UNIX systems. On Linux, you can also install from RPMs.

This topic includes these sections:
- Section 6.2.2.1, "Installing Oracle Instant Client from a Zip File"
- Section 6.2.2.2, "Installing Oracle Instant Client on Linux from RPMs"

6.2.2.1 Installing Oracle Instant Client from a Zip File

1. Create an installation directory for the Oracle R Enterprise client components. For example:
   mkdir oreclient_install_dir

2. Go to the Oracle Database Instant Client page on the Oracle Technology Network:
   http://www.oracle.com/technetwork/database/features/instant-client/


4. Accept the license agreement and select the Instant Client Package - Basic RPM for your version of Oracle Database.

5. Save the file in the installation directory that you created in Step 1. For example:
   \oreclient_install_dir\instantclient-basic-linux.x64-12.1.0.1.0.zip
6. Unzip the file. The files are extracted into a subdirectory called `instantclient_version`, where `version` is your version of Oracle Database. For example:

```
unzip instantclient-basic-linux.x64-12.1.0.1.0.zip
ls
   instantclient_12_1/
   instantclient-basic-linux.x64-12.1.0.1.0.zip
```

7. Return to the Instant Client Downloads page:

```
```

8. Select the Instant Client for your platform.

9. On the Instant Client Downloads page for your platform, accept the license agreement and select **Instant Client Package - SDK** for your version of Oracle Database.

10. Save the file in the installation directory that you created in Step 1. For example:

```
\oreclient_install_dir\instantclient-sdk-linux.x64-12.1.0.1.0.zip
```

11. Unzip the file. The contents are extracted into the `instantclient_version` subdirectory.

```
unzip instantclient-sdk-linux.x64-12.1.0.1.0.zip
ls
   /instantclient_12_1
   instantclient-basic-linux.x64-12.1.0.1.0.zip
   instantclient-sdk-linux.x64-12.1.0.1.0.zip
   cd instantclinet_12_1
   ls
     /help
     /sdk
     /vc10
     /vc11
```

### 6.2.2.2 Installing Oracle Instant Client on Linux from RPMs

1. Create an installation directory for the Oracle R Enterprise client components. For example:

```
mkdir oreclient_install_dir
```

2. Go to the Oracle Database Instant Client page on the Oracle Technology Network:

```
http://www.oracle.com/technetwork/database/features/instant-client/
```

3. Choose **See Instant Client downloads for all platforms**.

4. On the Instant Client Downloads page, choose **Instant Client for Linux x86-64**.

5. On the Instant Client Downloads page for Linux, accept the license agreement and select the RPM for **Instant Client Package - Basic**.

6. As the root user, install the RPM:

```
rpm -i oracle-instantclient12.1-basic-12.1.0.1.0-1.x86_64.rpm
```

7. Return to the Instant Client Downloads page for Linux x86-64:

```
http://www.oracle.com/technetwork/topics/linuxx86-64soft-092277.html
```
8. Accept the license agreement and download the RPM for **Instant Client Package - SDK** for your version of Oracle Database. As root, install the RPM:

```bash
rpm -i oracle-instantclient12.1-sdk-12.1.0.1.0-1.x86_64.rpm
```

9. The RPMs place the files in standard locations that the ROracle configuration script can find. For example, Oracle Instant Client 12.1 is installed in `/usr/lib/oracle/12.1/client64/lib`.

10. After installing Oracle Instant Client, add the path of the Oracle Instant Client libraries to `LD_LIBRARY_PATH`. For example:

```bash
export LD_LIBRARY_PATH=/usr/lib/oracle/12.1/client64/lib:$LD_LIBRARY_PATH
```

### 6.3 Installing the Oracle R Enterprise Packages

Install the Oracle R Enterprise packages on each client computer. The Oracle R Enterprise packages are automatically included in the installation on the server.

This topic includes these sections:

- Section 6.3.1, "Installing the Oracle R Enterprise Packages on Windows"
- Section 6.3.2, "Installing the Oracle R Enterprise Packages on Linux or UNIX"

#### 6.3.1 Installing the Oracle R Enterprise Packages on Windows

1. Download the Oracle R Enterprise packages from the Oracle R Enterprise Downloads page on the Oracle Technology Network:

   ```
   ```

2. Accept the license agreement and select the Oracle R Enterprise packages for your platform. Download the zip file to the installation directory that you created for Oracle Instant Client. For example:

   ```
c:\oreclient_install_dir\ore-client-win-x86_64-1.4.1.1.zip
   ```

   **NOTE:** Choose the same installation directory for all Oracle R Enterprise client components.

3. Unzip the file. The contents are extracted into the `client` subdirectory:

   The resulting installation directory, shown in Example 6–1, contains Oracle Instant Client and the Oracle R Enterprise packages.

   **Example 6–1   Client Installation Directory Containing Client Packages and Instant Client**

   ```
c:\oreclient_install_dir
   \client
   \ORE_1.4.1.zip
   \OREbase_1.4.1.zip
   \OREcommon_1.4.1.zip
   \OREdm_1.4.1.zip
   \OREeda_1.4.1.zip
   \OREembed_1.4.1.zip
   \OREgraphics_1.4.1.zip
   \OREmodels_1.4.1.zip
   \OREpredict_1.4.1.zip
   \OREstats_1.4.1.zip
   \ORExml_1.4.1.zip
   ```
4. Choose one of the following methods to install the Oracle R Enterprise packages on Windows:

- **Install from the R Console**
  a. Start R x64 from the Windows Start menu.
  b. Execute this R command for each zip file in the client directory:

```
install.packages('oreclient_install_dir/client/client_package_name.zip', repos=NULL)
```

Each successful package installation produces this message in the R console:

```
package 'package_name' successfully unpacked and MD5 sums checked
```

- **Install from the R GUI**
  a. Start R x64 from the Windows Start menu.
  b. Select Packages from the RGui (64-bit) menu bar.
  c. From the Packages menu, select Install package(s) from local zip files.
  d. Change to the client directory.
  e. Select all the files in the directory.
  f. Click Open.

Each package installation produces this message in the R console:

```
package 'package_name' successfully unpacked and MD5 sums checked
```

- **Install from the Windows command prompt**
  a. Start R x64 from the Windows Start menu.
  b. Open a Windows command window.
  c. Change directory to the client directory and type these commands:

```
R CMD INSTALL OREbase_1.4.1.zip
R CMD INSTALL OREcommon_1.4.1.zip
R CMD INSTALL OREstats_1.4.1.zip
R CMD INSTALL OREgraphcs_1.4.1.zip
R CMD INSTALL OREeda_1.4.1.zip
R CMD INSTALL OREembed_1.4.1.zip
R CMD INSTALL ORExml_1.4.1.zip
R CMD INSTALL OREdm_1.4.1.zip
R CMD INSTALL OREmodels_1.4.1.zip
R CMD INSTALL OREPredict_1.4.1.zip
R CMD INSTALL ORE_1.4.1.zip
```

Each package installation generates this message:

```
package 'package_name' successfully unpacked and MD5 sums checked
```
6.3.2 Installing the Oracle R Enterprise Packages on Linux or UNIX

1. Download the Oracle R Enterprise packages from the Oracle R Enterprise Downloads page on the Oracle Technology Network:
   

2. Accept the license agreement and select the Oracle R Enterprise packages for your platform. Download the zip file to the installation directory that you created for Oracle Instant Client. For example:

   /oreclient_install_dir/ore-client-platform-arch-1.4.1.1.zip

   **NOTE:** Choose the same installation directory for all Oracle R Enterprise client components.

3. Unzip the file:

   % unzip ore-client-platform-arch-1.4.1.zip

   When you unzip the file, the /client directory is created and these files are extracted.

   /client/ORE_1.4.1_R_arch-unknown-platform-gnu.tar.gz
   /client/OREbase_1.4.1_R_arch-unknown-platform-gnu.tar.gz
   /client/OREcommon_1.4.1_R_arch-unknown-platform-gnu.tar.gz
   /client/OREdm_1.4.1_R_arch-unknown-platform-gnu.tar.gz
   /client/OREeda_1.4.1_R_arch-unknown-platform-gnu.tar.gz
   /client/OREembed_1.4.1_R_arch-unknown-platform-gnu.tar.gz
   /client/OREgraphics_1.4.1_R_arch-unknown-platform-gnu.tar.gz
   /client/OREmodels_1.4.1_R_arch-unknown-platform-gnu.tar.gz
   /client/OREpredict_1.4.1_R_arch-unknown-platform-gnu.tar.gz
   /client/OREstats_1.4.1_R_arch-unknown-platform-gnu.tar.gz
   /client/ORExml_1.4.1_R_arch-unknown-platform-gnu.tar.gz


5. Execute the following commands:

   R CMD INSTALL ORE_1.4.1_R_arch-unknown-platform-gnu.tar.gz
   R CMD INSTALL OREbase_1.4.1_R_arch-unknown-platform-gnu.tar.gz
   R CMD INSTALL OREcommon_1.4.1_R_arch-unknown-platform-gnu.tar.gz
   R CMD INSTALL OREdm_1.4.1_R_arch-unknown-platform-gnu.tar.gz
   R CMD INSTALL OREeda_1.4.1_R_arch-unknown-platform-gnu.tar.gz
   R CMD INSTALL OREembed_1.4.1_R_arch-unknown-platform-gnu.tar.gz
   R CMD INSTALL OREgraphics_1.4.1_R_arch-unknown-platform-gnu.tar.gz
   R CMD INSTALL OREmodels_1.4.1_R_arch-unknown-platform-gnu.tar.gz
   R CMD INSTALL OREpredict_1.4.1_R_arch-unknown-platform-gnu.tar.gz
   R CMD INSTALL OREstats_1.4.1_R_arch-unknown-platform-gnu.tar.gz
   R CMD INSTALL ORExml_1.4.1_R_arch-unknown-platform-gnu.tar.gz

6.4 Installing the Oracle R Enterprise Supporting Packages

Install the Oracle R Enterprise supporting packages on each client computer and on the server that hosts Oracle R Enterprise Server.

This topic includes these sections:

- Section 6.4.1, "Installing the Supporting Packages on Windows"
- Section 6.4.2, "Installing the Supporting Packages on Linux or UNIX"
6.4.1 Installing the Supporting Packages on Windows

1. Download the supporting packages from the Oracle R Enterprise Downloads page on the Oracle Technology Network:
   

2. Accept the license agreement and select the Supporting packages for your platform. Download the zip file to the installation directory that you created for Oracle Instant Client. For example:
   
   c:\oreclient_install_dir\ore-supporting-win-x86_64-1.4.1.1.zip

   **NOTE:** Choose the same installation directory for all Oracle R Enterprise client components.

3. Unzip the file. The contents are extracted into the supporting subdirectory:
   
   The resulting installation directory, shown in Example 6–2, contains all the client components: Oracle Instant Client, Oracle R Enterprise packages, and Oracle R Enterprise supporting packages.

   **Example 6–2  Client Installation Directory Containing All Client Components**
   
   c:\oreclient_install_dir
   \client
   \instantclient_12.1
   \supporting
   \arules_1.1-3.zip
   \Cairo_1.5-5.zip
   \DBI_0.2-7.zip
   \png_0.1-7.zip
   \ROracle_1.1-12.zip
   \statmod_1.4.20.zip
   instantclient-basic-linux.x64-12.1.0.1.0.zip
   instantclient-sdk-linux.x64-12.1.0.1.0.zip
   ore-client-win-x86_64-1.4.1.zip
   ore-supporting-win-x86_64-1.4.1.zip

4. Choose one of the following methods to install the supporting packages on Windows:
   
   ■ **Install from the R Console**
      
      a. Start R x64 from the Windows Start menu.
      
      b. Execute this R command for each zip file in the client directory:

         install.packages('oreclient_install_dir/support/support_package_name.zip', repos=NULL)

         Each successful package installation produces this message in the R console:

         package 'package_name' successfully unpacked and MD5 sums checked

   ■ **Install from the R GUI**
      
      a. Start R x64 from the Windows Start menu.
      
      b. Select Packages from the RGui (64-bit) menu bar.
      
      c. From the Packages menu, select Install package(s) from local zip files.
d. Change to the support directory.

e. Select all the files in the directory.

f. Click Open.

Each package installation produces this message in the R console:

```
package 'package_name' successfully unpacked and MD5 sums checked
```

### Install from the Windows command prompt

a. Start R x64 from the Windows Start menu.

b. Open a Windows command window.

c. Change directory to the client directory and type these commands:

   ```
   R CMD INSTALL ROracle_1.1-12.zip
   R CMD INSTALL DBI_0.2-7.zip
   R CMD INSTALL png_0.1-7.zip
   R CMD INSTALL Cairo_1.5-5.zip
   R CMD INSTALL arules_1.1-3.zip
   R CMD INSTALL statmod_1.4.20.zip
   ```

Each package installation generates this message:

```
package 'package_name' successfully unpacked and MD5 sums checked
```

### 6.4.2 Installing the Supporting Packages on Linux or UNIX

1. Download the Oracle R Enterprise packages from the Oracle R Enterprise Downloads page on the Oracle Technology Network:

   ```
   ```

2. Accept the license agreement and select the Supporting packages for your platform. Download the zip file to the installation directory that you created for Oracle Instant Client. For example:

   ```
   /oreclient_install_dir/ore-supporting-platform-arch-1.4.1.1.zip
   ```

   **NOTE:** Choose the same installation directory for all Oracle R Enterprise client components.

3. Unzip the file:

   ```
   % unzip ore-supporting-platform-arch-1.4.1.1.zip
   ```

   When you unzip the file, the `/supporting` directory is created and these files are extracted.

   ```
   /supporting/arules_1.1-3_R_arch-unknown-platform.tar.gz
   /supporting/Cairo_1.5-5_R_arch-unknown-platform.tar.gz
   /supporting/DBI_0.2-7_R_arch-unknown-platform.tar.gz
   /supporting/png_0.1-7_R_arch-unknown-platform.tar.gz
   /supporting/ROracle_1.1-12_R_arch-unknown-platform.tar.gz
   /supporting/statmod_1.4.20_R_arch-unknown-platform.tar.gz
   ```

4. Change to `/oreclient_install_dir/supporting`

5. Execute the following commands:

   ```
   R CMD INSTALL ROracle_1.1-12_R_arch-unknown-platform.tar.gz
   R CMD INSTALL DBI_0.2-7_R_arch-unknown-platform.tar.gz
   ```
R CMD INSTALL png_0.1-7_R_arch-unknown-platform.tar.gz
R CMD INSTALL Cairo_1.5-5_R_arch-unknown-platform.tar.gz
R CMD INSTALL arules_1.1-3_R_arch-unknown-platform.tar.gz
R CMD INSTALL statmod_1.4.20_R_arch-unknown-platform.tar.gz

6.5 Connecting Oracle R Enterprise Client to Oracle R Enterprise Server

To connect Oracle R Enterprise Client to Oracle R Enterprise Server, start R using the ORE script:

```r
% ORE
R> library(ORE)
```

The following examples connect as user RQUSER with password RQUSERpsw:

- For a remote database, specify the Oracle Database service identifier (SID), the host name, and the port for the connection.

  ```r
  ore.connect(user="RQUSER", sid="orcl", host="SVR3", password="RQUSERpsw", port=1521, all=TRUE)
  ```

  **Note:** To avoid specifying the password and other connection details in embedded R scripts, you can use Oracle Wallet. See Section 7.7, "Creating an Oracle Wallet for an Oracle R Enterprise Connection".

- For a local database, specify the connection as follows:

  ```r
  ore.connect("RQUSER", password="RQUSERpsw", conn_string='', all=TRUE)
  ```

  **See Also:** Oracle R Enterprise User’s Guide for details about connecting to Oracle R Enterprise Server.
This chapter describes administrative tasks for maintaining and optimizing Oracle R Enterprise. This chapter contains these topics:

- Upgrading Oracle R Enterprise
- Migrating Oracle R Enterprise Data
- Uninstalling Oracle R Enterprise
- Installing Additional R Packages on Linux or UNIX
- Creating a Database User for Oracle R Enterprise
- Creating and Modifying Environment Variables on Windows
- Creating an Oracle Wallet for an Oracle R Enterprise Connection
- Controlling Memory Used by Embedded R

7.1 Upgrading Oracle R Enterprise

You can upgrade Oracle R Enterprise to the current release from any previous release by reinstalling the product.

**Note on IBM AIX:** Upgrade from Oracle R Enterprise 1.1 is not supported on IBM AIX. To upgrade Oracle R Enterprise 1.1 on IBM AIX, first uninstall Oracle R Enterprise 1.1 (including R) and then download and install the later version.

**To upgrade Oracle R Enterprise and migrate your data:**

1. Ensure that you have the version of R that is required for the new version of Oracle R Enterprise.
   
   See Table 1-2, "Oracle R Enterprise Server Support Matrix" for the R requirement.

2. To upgrade Oracle R Enterprise Server, run the `server.sh` script to perform an installation:
   
   ```bash
   ./server.sh --install
   ```

   When the script detects an earlier version of Oracle R Enterprise Server, it asks if you want to upgrade. Type `Yes` to start the upgrade. (Type `No` to abort the process.)

   See Section 4.2, "About the SERVER Script" for details.
To upgrade Oracle R Enterprise Client, re-install the Oracle R Enterprise packages and supporting packages. You do not need to uninstall the current packages before installing the new packages.

See Chapter 6, "Installing Oracle R Enterprise Client" for instructions.

## 7.2 Migrating Oracle R Enterprise Data

Oracle R Enterprise Server includes migration scripts that you can run to migrate the rqsys schema and Oracle R Enterprise user data from a source database to a target database. The source and target must have the same version of the database and of Oracle R Enterprise Server.

To locate the scripts, navigate to the server directory and change to the migration subdirectory.

```
/oreserver_install_dir/server/migration
```

The migration subdirectory contains a README and the following subdirectories:

- **exp** — contains the script ore_srcexport.pl for exporting rqsys and all Oracle R Enterprise user data to a dump file.
- **imp** — contains the script ore_destimport.pl for importing rqsys and all Oracle R Enterprise user data from the dump file created by ore_srcexport.pl.
- **oreuser** — contains scripts for exporting and importing data for a specific Oracle R Enterprise user.

Instructions for running the migration scripts are provided in the README.

## 7.3 Uninstalling Oracle R Enterprise

This topic contains these sections:

- Section 7.3.1, "Uninstalling Oracle R Enterprise Server"
- Section 7.3.2, "Uninstalling Oracle R Enterprise Client"

See Also: Section 3.7, "Uninstalling Oracle R Distribution"

### 7.3.1 Uninstalling Oracle R Enterprise Server

To uninstall Oracle R Enterprise Server, run the server script with the --uninstall option. You can perform either a full or a partial uninstall. A partial uninstall is performed by default.

#### 7.3.1.1 Performing a Partial Uninstall

A partial uninstall removes the rqsys metadata and PL/SQL packages from the database but leaves the libraries and R packages that support Oracle R Enterprise Server in Oracle home. If Oracle R Enterprise Server support is installed in more than one database instance in the same Oracle home, or if it is installed in a pluggable database (PDB), then a partial uninstall removes Oracle R Enterprise Server support from the specified database without affecting the other databases. The server script performs a partial uninstall by default.
Note: If you accidentally perform a full uninstall for one of the instances or PDBs that share support for Oracle R Enterprise Server, then the other shared instances or PDBs will no longer support Oracle R Enterprise Server. You can easily restore Oracle R Enterprise Server support in Oracle home by rerunning the server script to perform an installation in one of the shared instances or PDBs.

If you run the server script with the -u option, then a partial uninstall is performed. You can specify the --keep option to explicitly request a partial uninstall. The following commands all perform a partial uninstall of Oracle R Enterprise Server:

```
./server.sh --uninstall
./server.sh -u
./server.sh -u --keep
./server.sh --uninstall --keep
```

### 7.3.1.2 Performing a Full Uninstall

A full uninstall removes the rqsys metadata and PL/SQL code from the database and removes all Oracle R Enterprise Server libraries and R packages from Oracle home.

The following commands both perform a full uninstall of Oracle R Enterprise Server:

```
./server.sh --uninstall --full
./server.sh -u -full
```

Note: If you accidentally perform a full uninstall in a shared Oracle home, then rerun the server script to reinstall Oracle R Enterprise Server support. See Section 7.3.1.1 for details.

### 7.3.2 Uninstalling Oracle R Enterprise Client

To uninstall the Oracle R Enterprise packages and supporting packages, start R and type the commands listed in Example 7-1.

**Example 7-1  R Commands for Uninstalling Oracle R Enterprise Packages**

```
remove.packages("ORE")
remove.packages("ORExml")
remove.packages("OREeda")
remove.packages("OREcommon")
remove.packages("OREembed")
remove.packages("OREgraphics")
remove.packages("OREstats")
remove.packages("OREbase")
remove.packages("ROracle")
remove.packages("DBI")
remove.packages("Cairo")
remove.packages("png")
remove.packages("OREdm")
remove.packages("OREpredict")
remove.packages("arules")
remove.packages("statmod")
```
7.4 Installing Additional R Packages on Linux or UNIX

On Linux and UNIX platforms, the Oracle R Enterprise Server installation provides the ORE script, which you can run from the operating system prompt to install additional R packages. The ORE script is a wrapper for the R installation command: 

\[ \text{R CMD INSTALL} \]

By default, R packages are installed in `/usr/lib64/R/library`. The ORE script, however, installs R packages in a subdirectory under `$ORACLE_HOME/R/library`.

To execute the script:

```
ORE CMD INSTALL R_package_name
```

7.5 Creating a Database User for Oracle R Enterprise

The server script installation process automatically creates or configures a user for Oracle R Enterprise if one does not already exist.

Example 7–2 Creating an Oracle R Enterprise User

```
./server.sh
```

Choosing ORE user

```
ORE user to use [list]:
```

Press Enter to display a list of available users.

```
BI HR IX OE SCOTT SH
```

```
ORE user to use [list]: ruser2
```

If you choose a user that exists, the script configures the user to support Oracle R Enterprise. If you specify a user that does not already exist, the script creates the user.

Example 7–3 Creating an Oracle R Enterprise User in SQL*Plus

You can create an Oracle R Enterprise user in SQL*Plus by following these steps:

1. Log in with system privileges:
   
   ```
   SQLPLUS / AS SYSDBA
   ```

2. Execute a statement like the following to create the user:

   ```
   CREATE USER ore_username IDENTIFIED BY password
   DEFAULT TABLESPACE default_tablespace_name
   TEMPORARY TABLESPACE temp_tablespace_name
   QUOTA UNLIMITED ON default_tablespace_name;
   ```

   See Also: Oracle Database SQL Language Reference for details about creating a user
### 7.6 Creating and Modifying Environment Variables on Windows

If the `PATH`, `ORACLE_SID`, and `ORACLE_HOME` environment variables do not exist, you must create them and assign the values specified in Figure 7–2. On Windows systems, you must be an administrator to create or modify environment variables.

Follow these steps to create or modify environment variables on Windows:

1. Right-click the Computer icon and choose Properties, or in Windows Control Panel, choose System.
2. Choose Advanced system settings.
3. On the Advanced tab, click Environment Variables.

Figure 7–1 Advanced System Settings in Windows

Figure 7–2 Environment Variables Dialog in Windows
Creating an Oracle Wallet for an Oracle R Enterprise Connection

4. Click **New** to create a new environment variable. Click **Edit** to modify an existing environment variable.

---

**Note:** The graphical user interface for creating environment variables may vary slightly, depending on your version of Windows.

---

7.7 Creating an Oracle Wallet for an Oracle R Enterprise Connection

An Oracle wallet is a password-protected container for storing security credentials in Oracle Database. Wallets provide a secure mechanism for specifying connection details in embedded R scripts.

**To create a wallet for an Oracle R Enterprise connection:**

1. Start Oracle Wallet Manager:
   - (Linux and UNIX) At the command line, enter `owm`.
   - (Windows) Select **Start**, **Programs**, **Oracle-HOME_NAME**, **Integrated Management Tools**, **Wallet Manager**.

2. Follow the instructions in your Oracle Database documentation to create the wallet:
   - For Oracle Database 12.1, see “Using Oracle Wallet Manager” in *Oracle Database Enterprise User Security Administrator’s Guide*:
     
   - For Oracle Database 11.2, see “Using Oracle Wallet Manager” in *Oracle Database Advanced Security Administrator’s Guide*:
     

3. Locate the connection string for the Oracle R Enterprise database in `tnsnames.ora`. For example:

   ```
   mydb_test =
   (DESCRIPTION =
    (ADDRESS =
     (PROTOCOL = TCP)
     (HOST = server23)
     (PORT = 1521)
    )
    (CONNECT_DATA = (sid=ORCL))
   )
   ```

4. Specify the connection information in the wallet. Follow the instructions in the Oracle Database security documentation referenced in step 2.

5. After you configure the wallet, you can connect to the Oracle R Enterprise server database by simply specifying the connection identifier. For example:

   ```
   ore.connect(conn_string = "mydb_test", all = TRUE)
   ```

To learn more about `ore.connect`, use the R help command:

```
help(ore.connect)
```
7.8 Controlling Memory Used by Embedded R

You can control the memory used by embedded R execution by limiting the heap memory (vector and cons in R terminology) that is automatically managed by the R gc mechanism. To limit the size of heap memory in the database, use the \texttt{sys.rqconfigset} utility. The keyword arguments for \texttt{sys.rqconfigset} are described in Table 7–1.

<table>
<thead>
<tr>
<th>Keyword</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIN_VSIZE</td>
<td>32M</td>
<td>Minimum R vector heap memory</td>
</tr>
<tr>
<td>MAX_VSIZE</td>
<td>4G</td>
<td>Maximum R vector heap memory</td>
</tr>
<tr>
<td>MIN_NSIZE</td>
<td>1M</td>
<td>Minimum number of R cons cells</td>
</tr>
<tr>
<td>MAX_NSIZE</td>
<td>20M</td>
<td>Maximum number of R cons cells</td>
</tr>
</tbody>
</table>

\textbf{Example 7–4 SQL Commands for Controlling Memory Used by Embedded R}

-- Set the minimum R vector heap memory to 20M
\texttt{EXEC \texttt{sys.rqconfigset('MIN\_VSIZE', '20M');}}

-- Set the maximum R vector heap memory to 100M
\texttt{EXEC \texttt{sys.rqconfigset('MAX\_VSIZE', '100M');}}

-- Set the minimum number of R cons cells to 500x1024
\texttt{EXEC \texttt{sys.rqconfigset('MIN\_NSIZE', '500K');}}

-- Set the maximum number of R cons cells to 10x10x1024
\texttt{EXEC \texttt{sys.rqconfigset('MAX\_NSIZE', '10M');}}

-- Set maximum vector heap memory and maximum cons cells to unlimited
\texttt{EXEC \texttt{sys.rqconfigset('MAX\_VSIZE', NULL);}}
\texttt{EXEC \texttt{sys.rqconfigset('MAX\_NSIZE', NULL);}}

\textbf{Note:} The \texttt{sys.rqconfigset} procedure does not control the C type memory that may be allocated by \texttt{Calloc}, \texttt{Realloc}, \texttt{calloc}, or \texttt{malloc}. Such C type memory is mainly created to hold temporary values used by R functions that are implemented in C. Under normal circumstances, C type memory is limited in size and does not significantly affect the memory usage of R.

The \texttt{sys.rqconfigset} procedure edits settings in a configuration table called \texttt{sys.rq_config}. You can view the contents of this table to verify various environment settings for Oracle R Enterprise. Among the settings stored in \texttt{sys.rq_config} are the memory limits for embedded R. If necessary, you can modify these memory limits, however in most cases you should not modify the values in \texttt{sys.rq_config}.

The following query shows sample values stored in \texttt{sys.rq_config}.

\texttt{SQL> SELECT * FROM sys.rq_config;}

<table>
<thead>
<tr>
<th>NAME</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>R_HOME</td>
<td>/usr/lib64/R</td>
</tr>
<tr>
<td>R_LIBS_USER</td>
<td>/dbhone_1/R/library</td>
</tr>
<tr>
<td>VERSION</td>
<td>1.4.1</td>
</tr>
<tr>
<td>Parameter</td>
<td>Value</td>
</tr>
<tr>
<td>-------------</td>
<td>-------</td>
</tr>
<tr>
<td>MIN_VSIZE</td>
<td>32M</td>
</tr>
<tr>
<td>MAX_VSIZE</td>
<td>4G</td>
</tr>
<tr>
<td>MIN_NSIZE</td>
<td>2M</td>
</tr>
<tr>
<td>MAX_NSIZE</td>
<td>20M</td>
</tr>
</tbody>
</table>
This appendix presents the steps in a typical installation of Oracle R Enterprise on a Linux server and a Windows client. This appendix contains these topics:

- About the Oracle R Enterprise Sample Installation Environment
- Installing Oracle R Enterprise on the Server
- Installing Oracle R Enterprise on the Client
- Verifying the Oracle R Enterprise Installation

**Note:** This appendix describes an initial installation of Oracle R Enterprise. If Oracle R Enterprise components already exist on your client or server, refer to Section 7.1, "Upgrading Oracle R Enterprise".

### A.1 About the Oracle R Enterprise Sample Installation Environment

**About the server computer:**

- The server is running Oracle Linux 5.
- The server has access to the internet and to Oracle public yum.
- Oracle Database Enterprise Edition 12.1 is installed on the server.
- Environment variables:
  - `$ORACLE_SID` specifies the identifier (SID) of the database.
  - `$ORACLE_HOME` specifies the home directory of the database.
  - `$LD_LIBRARY_PATH` includes `$ORACLE_HOME/lib`.
  - `$PATH` includes `$ORACLE_HOME/bin`.
- The Linux user ID of the installer:
  - Has sudo rights or root access for installing Oracle R Distribution.
  - Is a member of the dba group for installing and using Oracle R Enterprise.
  - Has write access to `$ORACLE_HOME/lib`.

**About the client computer:**

- The client is running 64-bit Windows.
- The client has access to the internet.
A.2 Installing Oracle R Enterprise on the Server

To install Oracle R Enterprise on the server computer, first verify that Oracle Database is installed and that the environment is configured as specified in Section A.1. Next, complete these steps in the specified order:

1. Verify the environment
2. Install Oracle R Distribution
3. Install Oracle R Enterprise Server

A.2.1 Verify the environment

Table A–1 Checklist for Oracle R Enterprise Server Requirements

<table>
<thead>
<tr>
<th>Question</th>
<th>Sample Answer</th>
</tr>
</thead>
</table>
| What is the Linux version?      | % cat /etc/*-release
                                            Enterprise Linux Server release 5.6 |
| Do you have access to the internet? | Start a browser |
| Can you log in as root?         | % sudo -s
                                            Password: ---------
                                            #
                                            # exit
                                            % |
| Is Oracle Database installed?   | % SQLPLUS / as sysdba
                                            Copyright (c) 1982, 2014, Oracle. All rights reserved.
                                            Connected to: Oracle Database 12c Enterprise Edition Release 12.1.0.1.0 - 64bit
                                            Production
                                            With the Partitioning, OLAP, Advanced Analytics and Real Application Testing options
                                            > exit
                                            % |
| What is the value of $ORACLE_HOME? | % echo $ORACLE_HOME
                                            /myhome/product/12.1.0.1/dbhome_1 |
| What is the value of $ORACLE_SID? | % echo $ORACLE_SID
                                            orcl |
| Does $LD_LIBRARY_PATH include $ORACLE_HOME/lib? | % echo $LD_LIBRARY_PATH
                                            /myhome/product/12.1.0.1/dbhome_1/lib:.... |
| Does $PATH include $ORACLE_HOME/bin? | % echo $PATH
                                            /myhome/product/12.1.0.1/dbhome_1/bin:...... |
| Are you a member of the dba group? | % groups
                                            g102 dba |
| Can you write to $ORACLE_HOME/lib? | % ls -ld $ORACLE_HOME/lib
                                            drwxr-xr-x 3 myuser g102 12288 Jan 27 15:31
                                            /myhome/product/12.1.0.1/dbhome_1/lib/ ... |

A.2.2 Install Oracle R Distribution

To install Oracle R Distribution on the server from Oracle public yum, follow these steps:

1. Log in as root and change to /etc/yum.repos.d:

   cd /etc/yum.repos.d
2. List the contents of the directory to determine if the yum configuration file is present. The yum configuration file for Oracle Linux 5 is called `public-yum-el5.repo`.

   If `public-yum-el5.repo` is not present, then execute the following command to download it from Oracle public yum:
   
   ```bash
   wget http://public-yum.oracle.com/public-yum-el5.repo
   ```

3. Open `public-yum-el5.repo` in a text editor and specify `enabled=1` for `latest` and `addons`:
   
   ```
   [el5_latest]
   enabled=1
   
   [el5_addons]
   enabled=1
   ```

4. Install Oracle R Distribution 3.1.1 by executing this command:
   
   ```bash
   yum install R-3.1.1
   ```

5. Exit the root user.
   
   ```bash
   exit
   ```

### A.2.3 Install Oracle R Enterprise Server

Oracle R Enterprise Server includes the `rqsys` schema in Oracle Database and Oracle R Enterprise packages and shared libraries.

**To install Oracle R Enterprise Server:**

1. Verify the environment according to Table A–1, "Checklist for Oracle R Enterprise Server Requirements".

2. Create an installation directory for the Oracle R Enterprise server components. The directory can have any name. For example:

   ```bash
   /myhome/myoreserver/
   ```

3. Download the Oracle R Enterprise Server installation files and supporting packages from the Oracle R Enterprise Downloads page on the Oracle Technology Network:

   ```
   ```

   a. Accept the license agreement and download the Oracle R Enterprise **Server** files for your platform to your installation directory.

   b. Accept the license agreement and download the Oracle R Enterprise **Supporting** packages for your platform to your installation directory.

The installation directory now contains two zip files.

   ```
   ore-server-linux-x86-64-1.4.1.zip
   ore-supporting-linux-x86-64-1.4.1.zip
   ```

4. Unzip the files.

   ```bash
   unzip ore-server-linux-x86-64-1.4.1.zip
   unzip ore-supporting-linux-x86-64-1.4.1.zip
   ```
The installation directory looks like this after you unzip both files:

/myhome/myoreserver
  ore-server-linux-x86-64-1.4.1.zip
  ore-supporting-linux-x86-64-1.4.1.zip
server.sh
/supporting

5. Run `server.sh` to perform a default installation of Oracle R Enterprise Server as shown in Example A–1. The script runs interactively. User input is shown in bold.

---

**Note:** When the script displays [list] in a prompt, you can press Enter to obtain a list of available items for your choice.

---

**Example A–1  A Default, First-Time Installation of Oracle R Enterprise Server**

ktaylor@adc2171704> ./server.sh -i

Oracle R Enterprise 1.4.1 Server.

Copyright (c) 2012, 2014 Oracle and/or its affiliates. All rights reserved.

Checking platform .................. Pass
Checking R ......................... Pass
Checking R libraries ............... Pass
Checking ORACLE_HOME ............... Pass
Checking ORACLE_SID ................ Pass
Checking sqlplus ................... Pass
Checking ORACLE instance ........... Pass
Checking CDB/PDB ................... Pass
Checking ORE ....................... Pass

Choosing RQSYS tablespaces
  PERMANENT tablespace to use for RQSYS [list]:
  EXAMPLE
  SYSAUX
  SYSTEM
  USERS
  PERMANENT tablespace to use for RQSYS [list]: SYSAUX
  TEMP
  TEMPORARY tablespace to use for RQSYS [list]: TEMP

Choosing RQSYS password
  Password to use for RQSYS: XXXXXX

Choosing ORE user
  ORE user to use [list]:
  BI
  HR
  IX
  OE
  SCOTT
  SH
  ORE user to use [list]: ruser2

Choosing RUSER2 tablespaces
  PERMANENT tablespace to use for RUSER2 [list]: USERS
TEMPORARY tablespace to use for RUSER2 [list]: TEMP
Choosing RUSER2 password
Password to use for RUSER2:

Current configuration
R Version ...................... Oracle Distribution of R version 3.1.1 (--) 
R_HOME ........................ /usr/lib64/R
R_LIBS_USER .................... /product/12.1.0.1/dbhome_1/R/library
ORACLE_HOME .................... /product/12.1.0.1/dbhome_1
ORACLE_SID ..................... orcl

Existing R Version .......... None
Existing R_HOME ............... None
Existing ORE data .......... None
Existing ORE code .......... None
Existing ORE libraries .... None

RQSYS PERMANENT tablespace ...... SYSAUX
RQSYS TEMPORARY tablespace ...... TEMP

ORE user type ............... New
ORE user name .............. RUSER2
ORE user PERMANENT tablespace .. USERS
ORE user TEMPORARY tablespace .. TEMP
Grant RQADMIN role .......... No

Operation ........................ Install/Upgrade/Setup

Proceed? [yes] y

Removing R libraries .......... Pass
Installing R libraries .......... Pass
Installing ORE libraries .......... Pass
Installing RQSYS data .......... Pass
Configuring ORE ................ Pass
Installing RQSYS code .......... Pass
Installing ORE packages .......... Pass
Creating ORE script .......... Pass
Installing migration scripts .... Pass
Installing supporting packages ...... Pass
Creating ORE user .......... Pass
Granting ORE privileges .......... Pass

Done

A.3 Installing Oracle R Enterprise on the Client

To install Oracle R Enterprise on the client computer, first verify that the Windows environment meets the requirements specified in Section A.1. Next, complete these steps:

To install Oracle R Enterprise on the Client:
1. Install Oracle R Distribution on the Windows Client
2. Install Oracle Instant Client
3. Install the Oracle R Enterprise Packages
4. Install the Oracle R Enterprise Supporting Packages

A.3.1 Install Oracle R Distribution on the Windows Client

Before installing Oracle R Distribution, verify that your version of Microsoft Windows is supported by Oracle R Enterprise and that you have access to the internet.

See Also:

- Table 1–1, "Oracle R Enterprise Platform Requirements"
- Section 1.4.1, "Verifying 64-Bit Architecture on Microsoft Windows"

Follow these steps to install Oracle R Distribution on Windows:

1. Go to the Oracle Open Source Software Download page for Oracle R Distribution:
   https://oss.oracle.com/ORD/
2. Under **R 3.1.1 Downloads**, select **R Distribution** for **Windows 64 bit**. Save the file on your computer.
   ORE-3.1.1-win.zip
3. When you unzip the file, the executable file is extracted.
   ORE-3.1.1-win.exe
4. Double click the executable file to start the installation of Oracle R Distribution.
5. Follow the instructions to complete the installation.

A.3.2 Install Oracle Instant Client

Oracle R Enterprise requires Oracle Database Client. Instead of installing the full Database Client, which must be installed in an Oracle home directory, you can install Oracle Instant Client.

To download and install Oracle Instant Client, follow these steps:

1. Create an installation directory for the Oracle R Enterprise client components. The directory can have any name. For example:
   c:\myoreclient
2. Navigate to the Oracle Database Instant Client page on the Oracle Technology Network:
   http://www.oracle.com/technetwork/database/features/instant-client/
3. Select **See Instant Client Downloads**.
4. On the Instant Client Downloads page, select **Instant Client for Microsoft Windows (x64)**.
5. Accept the license agreement.
6. Under **Version 12.1.0.1.0**, select **Instant Client Package - Basic** for Oracle Database 12.1.
7. Save the file in the installation directory that you created in Step 1. For example, if you choose the basic package, the following file is downloaded:
   c:\myoreclient\instantclient-basic-windows.x64-12.1.0.1.0.zip
8. Unzip the file.
When you unzip the file, the `instantclient_12_1` subdirectory is created. The contents of the installation directory are shown as follows:

```
myoreclient
    instantclient_12_1
        vc10
        vc11
```

9. Return to the Instant Client download page:

http://www.oracle.com/technetwork/topics/winx64soft-089540.html

10. Accept the license agreement and select **Instant Client Package - SDK**. Save the file in the directory that you created in Step 1.

```
c:\myoreclient\instantclient-sdk-windows.x64-12.1.0.1.0.zip
```

11. Unzip the file.
When you unzip the file, the `sdk` subdirectory is created. The contents of the installation directory are shown as follows:

```
myoreclient
    instantclient_12_1
        help
        sdk
        vc10
        vc11
```

12. Add the full path of the Instant Client to the environment variables **OCI_LIB64** and **PATH**. The following steps set the variables to the path used in this example, `c:\myoreclient\instantclient_12_1`:

1. In Windows Control Panel, choose **System**.
2. Click **Advanced systems settings**.
3. On the **Advanced** tab, click **Environment Variables**.
4. Under **System variables**, create **OCI_LIB64** if it does not already exist. Set the value of **OCI_LIB64** to `c:\oreclient\instantclient_12_1`.
5. Under **System variables**, edit **PATH** to include `c:\oreclient\instantclient_12_1`.

---

**Note:** The graphical user interface for creating environment variables may vary slightly, depending on your version of Windows.

---

**A.3.3 Install the Oracle R Enterprise Packages**

Follow these steps to download and install the Oracle R Enterprise packages:

**To download the Oracle R Enterprise packages:**

1. Navigate to the Oracle R Enterprise Downloads page on the Oracle Technology Network:

```
```
2. Accept the License Agreement.
3. Select the **Client** packages for Windows. Save the file in the installation directory that you created in Section A.3.2.
   
   c:\myoreclient\ore-client-win-x86_64-1.4.1.zip

4. Unzip the file.

   When you unzip the file, the **client** subdirectory is created. The contents of the installation directory are shown as follows:

   - ORE_1.4.1.zip
   - OREbase_1.4.1.zip
   - OREcommon_1.4.1.zip
   - OREdm_1.4.1.zip
   - OREeda_1.4.1.zip
   - OREembed_1.4.1.zip
   - OREgraphics_1.4.1.zip
   - OREmodels_1.4.1.zip
   - OREpredict_1.4.1.zip
   - OREstats_1.4.1.zip
   - ORExml_1.4.1.zip

   **To install the Oracle R Enterprise packages from the R Console:**

   1. Start R from the Windows Start menu. If you have installed both 32 and 64-bit R, be sure to choose 64-bit R.

   The R Console window is displayed, as shown in **Example A–2**

   2. Install the packages as follows:

   ```r
   install.packages("c:/myoreclient/client/ORE_1.4.1.zip", repos=NULL)
   install.packages("c:/myoreclient/client/OREbase_1.4.1.zip", repos=NULL)
   install.packages("c:/myoreclient/client/OREcommon_1.4.1.zip", repos=NULL)
   install.packages("c:/myoreclient/client/OREdm_1.4.1.zip", repos=NULL)
   install.packages("c:/myoreclient/client/OREeda_1.4.1.zip", repos=NULL)
   install.packages("c:/myoreclient/client/OREembed_1.4.1.zip", repos=NULL)
   install.packages("c:/myoreclient/client/OREgraphics_1.4.1.zip", repos=NULL)
   install.packages("c:/myoreclient/client/OREmodels_1.4.1.zip", repos=NULL)
   install.packages("c:/myoreclient/client/OREpredict_1.4.1.zip", repos=NULL)
   install.packages("c:/myoreclient/client/OREstats_1.4.1.zip", repos=NULL)
   install.packages("c:/myoreclient/client/ORExml_1.4.1.zip", repos=NULL)
   ```

   Each successful package installation produces this message in the R console:

   ```
   package 'package_name' successfully unpacked and MD5 sums checked
   ```

A.3.4 **Install the Oracle R Enterprise Supporting Packages**

Follow these steps to download and install the Oracle R Enterprise supporting packages:

To **download** the Oracle R Enterprise supporting packages:

1. Navigate to the Oracle R Enterprise Downloads page on the Oracle Technology Network:


2. Accept the License Agreement and select the **Supporting** packages for Windows. Save the file in the installation directory that you created in Section A.3.2.
   
   c:\myoreclient\ore-supporting-win-x86_64-1.4.1.zip
3. Unzip the file.

When you unzip the file, the supporting subdirectory is created. The contents of the installation directory are shown as follows:

- arules_1.1-3.zip
- Cairo_1.5-5.zip
- DBI_0.2-7.zip
- png_0.1-7.zip
- ROracle_1.1-12.zip
- statmod_1.4.20.zip

To install the supporting packages from the R Console:

1. Start R from the Windows Start menu. If you have installed both 32 and 64-bit R, be sure to choose 64-bit R.

   The R Console window is displayed.

2. Install the packages as follows:

   ```
   install.packages("c:/myoreclient/supporting/ROracle_1.1-12.zip", repos=NULL)
   install.packages("c:/myoreclient/supporting/DBI_0.2-7.zip", repos=NULL)
   install.packages("c:/myoreclient/supporting/png_0.1-7.zip", repos=NULL)
   install.packages("c:/myoreclient/supporting/Cairo_1.5-5.zip", repos=NULL)
   install.packages("c:/myoreclient/supporting/arules_1.1-3.zip", repos=NULL)
   install.packages("c:/myoreclient/supporting/statmod_1.4.20.zip", repos=NULL)
   ```

   Each successful package installation produces this message in the R console:

   ```
   package 'package_name' successfully unpacked and MD5 sums checked
   ```

A.3.4.1 The Oracle R Enterprise Client Installation Directory

The structure of the client installation directory after all the client components have been installed is shown as follows:

- myoreclient
  - client
    - instantclient_12.1
  - supporting

A.4 Verifying the Oracle R Enterprise Installation

To verify that the basic functionality of Oracle R Enterprise is working, establish a connection to Oracle R Enterprise Server, execute several basic commands, and run some of the Oracle R Enterprise demo programs.

---

**Note:** To start and use Oracle R Enterprise, your user ID must have the privileges required for Oracle R Enterprise installation. See Section 4.3.3, "User Requirements" for details.

---

**Example A–2 Connecting to Oracle R Enterprise Server**

To connect the Oracle R Enterprise Client to Oracle R Enterprise Server:

1. Select **R x64 3.1.1** from the Windows Start menu.

   The R Console is displayed.
2. Type this command to start Oracle R Enterprise:

   ```r
   > library(ORE)
   ```

3. Type this command to connect to the Oracle R Enterprise server. The following example connects user rquser to the database orcl on the server host serv1 using port 1521:

   ```r
   > ore.connect(user="rquser", sid="orcl", host="serv1", password="rquserpsw", port=1521, all=TRUE)
   Loading required package: ROracle
   Loading required package: DBI
   ```

4. Execute `ore.is.connected()` to validate the connection. If the connection is successful, the command returns `TRUE`:

   ```r
   > ore.is.connected()
   [1] TRUE
   ```

Example A–3  Listing the Database Tables Accessible to RQUSER

The `ore.ls` command lists the data sets that are available to the current user. For example, if `TABLE1` and `TABLE2` exist in the `rquser` schema:

   ```r
   > ore.ls()
   [1] "TABLE1" "TABLE2"
   ```

Example A–4  Pushing an R Data Frame to a Database Table

The `ore.push` command pushes an R data frame to a database table or a database table to an R data frame. For example:

   ```r
   > cars <- ore.push(cars)
   ```
**Example A–5  Executing an Embedded R Function**

The `ore.doEval` command schedules execution of the specified function in the database-embedded R engine and returns the results.

```r
> ore.doEval(function() { 123 })
[1] 123
```

**Example A–6  Listing the Oracle R Enterprise Demo Scripts**

The Oracle R Enterprise demo scripts are located in `$ORACLE_HOME/R/library/ORE/demo`. The `demo` command provides a list of available demos:

```r
> demo(package="ORE")
```

Demos in package 'ORE':

- `aggregate`: Aggregation
- `analysis`: Basic analysis & data processing operations
- `basic`: Basic connectivity to database
- `binning`: Binning logic
- `columnfns`: Column functions
- `cor`: Correlation matrix
- `crosstab`: Frequency cross tabulations
- `datastore`: DataStore operations
- `datetime`: Date/Time operations
- `derived`: Handling of derived columns
- `distributions`: Distribution, density, and quantile functions
- `do_eval`: Embedded R processing
- `freqanalysis`: Frequency cross tabulations
- `glm`: Generalized Linear Models
- `graphics`: Demonstrates visual analysis
- `group_apply`: Embedded R processing by group
- `hypothesis`: Hypothesis testing functions
- `matrix`: Matrix related operations
- `nulls`: Handling of NULL in SQL vs. NA in R
- `odm_ai`: Oracle Data Mining: attribute importance
- `odm_dt`: Oracle Data Mining: decision trees
- `odm_glm`: Oracle Data Mining: generalized linear models
- `odm_kmeans`: Oracle Data Mining: enhanced k-means clustering
- `odm_nb`: Oracle Data Mining: naive Bayes classification
- `odm_svm`: Oracle Data Mining: support vector machines
- `push_pull`: RDBMS <-> R data transfer
- `rank`: Attributed-based ranking of observations
- `reg`: Ordinary least squares linear regression
- `row_apply`: Embedded R processing by row chunks
- `sampling`: Random row sampling and partitioning of an ore.frame
- `sql_like`: Mapping of R to SQL commands
- `stepwise`: Stepwise OLS linear regression
- `summary`: Summary functionality
- `table_apply`: Embedded R processing of entire table

### A.4.1 Executing Oracle R Enterprise Demo Scripts

You can further verify the success of the installation by running some of the Oracle R Enterprise demo scripts. If a script runs to completion without errors, then the demo is successful.

**Example A–7  Executing the aggregate Demo**

This example shows the `aggregate` demo with partial output.
> demo("aggregate", package="ORE")

    demo(aggregate)
    ---- ~~~~~~~~~

Type <Return> to start:

> #
> #  ORACLE ENTERPRISE SAMPLE LIBRARY
> #
> #  Name: aggregate.R
> #  Description: Demonstrates aggregations
> #  See also summary.R
> #
> #
> #
> ## Set page width
> options(width = 80)

> # Push the built-in iris data frame to the database
> IRIS_TABLE <- ore.push(iris)

> # Display the class of IRIS_TABLE
> class(IRIS_TABLE)
[1] "ore.frame"
attr(,"package")
[1] "OREbase"

> # Select count(Petal.Length) group by species
> x = aggregate(IRIS_TABLE$Petal.Length,
+    by = list(species = IRIS_TABLE$Species),
+    FUN = length)

> class(x)
[1] "ore.frame"
attr(,"package")
[1] "OREbase"
.
.
.
.

Example A-8  Executing the row_apply Demo

This example shows the row_apply demo with partial output.

> demo("row_apply", package="ORE")

    demo(row_apply)
    ---- ~~~~~~~~~

Type <Return> to start:

> #
> #  ORACLE ENTERPRISE SAMPLE LIBRARY
> #
> #  Name: row_apply.R
> #  Description: Execute R code on each row
> #
> #
> ## Set page width
> options(width = 80)
>
> # Push the built-in iris data frame to the database
> IRIS_TABLE <- ore.push(iris)
>
> # Display the class of IRIS_TABLE
> class(IRIS_TABLE)
> [1] "ore.frame"
> attr(,"package")
> [1] "OREbase"
>
> # Apply given R function to each row
> ore.rowApply(IRIS_TABLE,
+ function(dat) {
+   # Any R code goes here. Operates on one row of IRIS_TABLE at
+   # a time
+   +
+   + cbind(dat, dat$Petal.Length)
+   +
+   })

$`1`
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6.4</td>
<td>2.8</td>
<td>5.6</td>
<td>2.1</td>
<td>virginica</td>
<td>5.6</td>
</tr>
</tbody>
</table>

$`2`
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7.2</td>
<td>3</td>
<td>5.8</td>
<td>1.6</td>
<td>virginica</td>
<td>5.8</td>
</tr>
</tbody>
</table>

$`3`
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7.4</td>
<td>2.8</td>
<td>6.1</td>
<td>1.9</td>
<td>virginica</td>
<td>6.1</td>
</tr>
</tbody>
</table>

$`4`
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7.9</td>
<td>3.8</td>
<td>6.4</td>
<td>2</td>
<td>virginica</td>
<td>6.4</td>
</tr>
</tbody>
</table>

$`5`
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6.4</td>
<td>2.8</td>
<td>5.6</td>
<td>2.2</td>
<td>virginica</td>
<td>5.6</td>
</tr>
</tbody>
</table>

Example A–9  Executing the cor Demo

This example shows the cor demo with partial output.

> demo ("cor")

demo(cor)

Type <Return> to start:

> #
> # ORACLE ENTERPRISE SAMPLE LIBRARY
> #
> # Name: cor.R
> # Description: Correlation matrix
> #
> #
> #
> #
> ## Set page width
> options(width = 80)
>
> # Push the built-in iris data frame to the database
> IRIS_TABLE <- ore.push(iris)
>
> # Display the class of IRIS_TABLE
> class(IRIS_TABLE)
> [1] "ore.frame"
> attr(,"package")
> [1] "OREbase"
>
> # Remove non numeric columns
> iris_numeric = IRIS_TABLE[, c("Sepal.Length", "Sepal.Width",
> + "Petal.Length", "Petal.Width")]
>
> # Pearson's correlation matrix
> cor(iris_numeric, use = "all.obs")

<table>
<thead>
<tr>
<th></th>
<th>Sepal.Length</th>
<th>Sepal.Width</th>
<th>Petal.Length</th>
<th>Petal.Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sepal.Length</td>
<td>1.0000000</td>
<td>-0.1175698</td>
<td>0.8717538</td>
<td>0.8179411</td>
</tr>
<tr>
<td>Sepal.Width</td>
<td>-0.1175698</td>
<td>1.0000000</td>
<td>-0.4284401</td>
<td>-0.3661259</td>
</tr>
<tr>
<td>Petal.Length</td>
<td>0.8717538</td>
<td>-0.4284401</td>
<td>1.0000000</td>
<td>0.9628654</td>
</tr>
<tr>
<td>Petal.Width</td>
<td>0.8179411</td>
<td>-0.3661259</td>
<td>0.9628654</td>
<td>1.0000000</td>
</tr>
</tbody>
</table>

Warning messages:
1: ORE object has no unique key - using random order
2: ORE object has no unique key - using random order
3: ORE object has no unique key - using random order
4: ORE object has no unique key - using random order

Example A–10  Executing the stepwise Demo

This example shows the stepwise demo with partial output.

> demo("stepwise")

demo(stepwise)
------ ~~~~~~~

Type <Return> to start:

> #
> #  O R A C L E  E N T E R P R I S E  S A M P L E  L I B R A R Y
> #
> #  Name: stepwise.R
> #  Description: STEPWISE Multivariate Regression
> #
> #
> ## Set page width
> options(width = 80)
> # Push the built-in iris data frame to the database
> IRIS_TABLE <- ore.push(iris)

> # Display the class of IRIS_TABLE
> class(IRIS_TABLE)
[1] "ore.frame"
attr(,"package")
[1] "OREbase"

> # Let us first project out the non numeric columns
> IRIS_TABLE = IRIS_TABLE[, c("Sepal.Length", "Sepal.Width",
+ "Petal.Length", "Petal.Width")]

> # Predict Sepal.Length based on the other 3 numeric columns
> # Do it stepwise
> model = ore.lm(Sepal.Length ~ ., data = IRIS_TABLE)

> model

Call:
ore.lm(formula = Sepal.Length ~ ., data = IRIS_TABLE)

Coefficients:
 (Intercept)  Sepal.Width  Petal.Length  Petal.Width
1.8560        0.6508       0.7091       -0.5565

.
This appendix provides tips for installing RStudio Server for use with Oracle R Enterprise on Linux. This appendix includes these topics:

- About RStudio
- Installing RStudio Server
- Installing RStudio Desktop

B.1 About RStudio

RStudio is a free, open source Integrated Development Environment (IDE) for R. RStudio is available under GNU Affero General Public License (AGPL). You can use RStudio with Oracle R Enterprise, however RStudio is not included with Oracle R Enterprise. If you want to use RStudio, you must install and license it separately.

See Also:

- [http://www.gnu.org/licenses/agpl-3.0-standalone.html](http://www.gnu.org/licenses/agpl-3.0-standalone.html) for details about AGPL
- [http://www.rstudio.com/](http://www.rstudio.com/) for details about RStudio

B.2 Installing RStudio Server

RStudio Server is a Linux application that provides a web-based interface to R on a server.

To install RStudio Server for use with Oracle R Enterprise:

1. Download RStudio to your Linux system from the RStudio website and follow the installation instructions:
   

2. Edit the configuration file `rserver.conf`. Supply the values of `RHOME` and `ORACLE_HOME`.

   ```bash
   sudo vi /etc/rstudio/rserver.conf
   rsession-ld-library-path=RHOME/lib:ORACLE_HOME/lib
   ```

   Note: The default value of `RHOME` on Linux is `/usr/lib64/R`.

3. Edit the configuration file `.Renviron`. Supply the values of `ORACLE_HOME`, `ORACLE_HOSTNAME`, and `ORACLE_SID`. For example, using the BASH shell:

   ```bash
   cd /home/oracle
   sudo vi .Renviron
   ```
B.3 Installing RStudio Desktop

RStudio Desktop is an IDE for standalone machines.

To install RStudio Desktop:

1. Install R.

2. Download RStudio Desktop from the RStudio website:

3. Run the installer and follow the prompts.

4. Click the desktop icon to initialize RStudio.
Table C-1 lists the packages in Oracle R Distribution that are used by Oracle R Enterprise.

See Also:
- Table 6-1 for a list of the packages supported by Oracle R Enterprise
- Table 6-2 for a list of the open source packages that ship with Oracle R Enterprise

<table>
<thead>
<tr>
<th>Package Name</th>
<th>Package Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>base</td>
<td>The R Base Package</td>
</tr>
<tr>
<td>boot</td>
<td>Bootstrap Functions (originally by Angelo Canty for S)</td>
</tr>
<tr>
<td>class</td>
<td>Functions for Classification</td>
</tr>
<tr>
<td>cluster</td>
<td>Cluster Analysis Extended Rousseeuw et al</td>
</tr>
<tr>
<td>codetools</td>
<td>Code Analysis Tools for R</td>
</tr>
<tr>
<td>compiler</td>
<td>The R Compiler Package</td>
</tr>
<tr>
<td>datasets</td>
<td>The R Datasets Package</td>
</tr>
<tr>
<td>foreign</td>
<td>Read Data Stored by Minitab, S, SAS, SPSS, Stata, Systat, dBase</td>
</tr>
<tr>
<td>graphics</td>
<td>The R Graphics Package</td>
</tr>
<tr>
<td>grid</td>
<td>The Grid Graphics Package</td>
</tr>
<tr>
<td>KernSmooth</td>
<td>Functions for kernel smoothing for Wand &amp; Jones (1995)</td>
</tr>
<tr>
<td>lattice</td>
<td>Lattice Graphics</td>
</tr>
<tr>
<td>MASS</td>
<td>Support Functions and Datasets for Venables and Ripley's MASS</td>
</tr>
<tr>
<td>Matrix</td>
<td>Sparse and Dense Matrix Classes and Methods</td>
</tr>
<tr>
<td>methods</td>
<td>Formal Methods and Classes</td>
</tr>
<tr>
<td>mgcv</td>
<td>GAMs with GCV/AIC/REML smoothness estimation and GAMMs by PQL</td>
</tr>
<tr>
<td>nlme</td>
<td>Linear and Nonlinear Mixed Effects Models</td>
</tr>
<tr>
<td>nnet</td>
<td>Feed-forward Neural Networks and Multinomial Log-Linear Models</td>
</tr>
<tr>
<td>parallel</td>
<td>Support for parallel computation, including random-number generation</td>
</tr>
<tr>
<td>Package Name</td>
<td>Package Description</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>rpart</td>
<td>Recursive Partitioning</td>
</tr>
<tr>
<td>spatial</td>
<td>Functions for Kriging and Point Pattern Analysis</td>
</tr>
<tr>
<td>splines</td>
<td>Regression Spline Functions and Classes</td>
</tr>
<tr>
<td>stats</td>
<td>The R Stats Package</td>
</tr>
<tr>
<td>stats4</td>
<td>Statistical Functions using S4 Classes</td>
</tr>
<tr>
<td>survival</td>
<td>Survival analysis, including penalised likelihood.</td>
</tr>
<tr>
<td>tcltk</td>
<td>Tcl/Tk Interface</td>
</tr>
<tr>
<td>tools</td>
<td>Tools for Package Development</td>
</tr>
<tr>
<td>translation</td>
<td>Bindings for the Google Translate API v2</td>
</tr>
<tr>
<td>utils</td>
<td>The R Utils Package</td>
</tr>
</tbody>
</table>
This appendix contains licensing information for third-party and open source products that are used in combination with Oracle R Enterprise. Licensing information for Oracle R Enterprise is in Oracle Database Licensing Information.

This appendix contains these topics:
- Licensing for Open Source R
- Licensing for Oracle R Distribution
- Licensing for ROracle

### D.1 Licensing for Open Source R

R is an open source language and environment that is governed by GPL2 and not under the terms of the Oracle license agreement.

R was initially written by Robert Gentleman and Ross Ihaka of the Statistics Department of the University of Auckland.

Since mid-1997 there has been a core group with write access to the R source, currently consisting of:
- Douglas Bates
- John Chambers
- Peter Dalgaard
- Seth Falcon
- Robert Gentleman
- Kurt Hornik
- Stefano Iacus
- Ross Ihaka
- Friedrich Leisch
- Uwe Ligges
- Thomas Lumley
- Martin Maechler
- Duncan Murdoch
- Paul Murrell
- Martyn Plummer
- Brian Ripley
- Deepayan Sarkar
- Duncan Temple Lang
- Luke Tierney
- Simon Urbanek

plus Heiner Schwarte up to October 1999 and Guido Masarotto up to June 2003.
For more information go to http://www.r-project.org.

Current R-core members can be contacted via email to R-project.org with name made up by replacing spaces by dots in the name listed above.

This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License version 2 as published by the Free Software Foundation.

This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.

You should have received a copy of the GNU General Public License along with this program; if not, write to the Free Software Foundation, Inc., 51 Franklin St, Fifth Floor, Boston, MA 02110-1301 USA

D.1.1 GNU GENERAL PUBLIC LICENSE Version 2

June 1991

Copyright © 1989, 1991 Free Software Foundation, Inc.

51 Franklin St, Fifth Floor, Boston, MA 02110-1301 USA

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation’s software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Library General Public License instead.) You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is
not the original, so that any problems introduced by others will not reflect on the
original authors’ reputations.

Finally, any free program is threatened constantly by software patents. We wish to
avoid the danger that redistributors of a free program will individually obtain patent
licenses, in effect making the program proprietary. To prevent this, we have made it
clear that any patent must be licensed for everyone’s free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

GNU GENERAL PUBLIC LICENSE
TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND
MODIFICATION

0. This License applies to any program or other work which contains a notice placed
by the copyright holder saying it may be distributed under the terms of this General
Public License. The "Program", below, refers to any such program or work, and a
"work based on the Program" means either the Program or any derivative work under
copyright law: that is to say, a work containing the Program or a portion of it, either
verbatim or with modifications and/or translated into another language. (Hereinafter,
translation is included without limitation in the term "modification".) Each licensee is
addressed as "you".

Activities other than copying, distribution and modification are not covered by this
License; they are outside its scope. The act of running the Program is not restricted,
and the output from the Program is covered only if its contents constitute a work
based on the Program (independent of having been made by running the Program).
Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you
receive it, in any medium, provided that you conspicuously and appropriately publish
on each copy an appropriate copyright notice and disclaimer of warranty; keep intact
all the notices that refer to this License and to the absence of any warranty; and give
any other recipients of the Program a copy of this License along with the Program.

You may charge a fee for the physical act of transferring a copy, and you may at your
option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Program or any portion of it, thus
forming a work based on the Program, and copy and distribute such modifications or
work under the terms of Section 1 above, provided that you also meet all of these
conditions:

a) You must cause the modified files to carry prominent notices stating that you
changed the files and the date of any change.

b) You must cause any work that you distribute or publish, that in whole or in part
contains or is derived from the Program or any part thereof, to be licensed as a whole
at no charge to all third parties under the terms of this License.

c) If the modified program normally reads commands interactively when run, you
must cause it, when started running for such interactive use in the most ordinary way,
to print or display an announcement including an appropriate copyright notice and a
notice that there is no warranty (or else, saying that you provide a warranty) and that
users may redistribute the program under these conditions, and telling the user how to
view a copy of this License. (Exception: if the Program itself is interactive but does not
normally print such an announcement, your work based on the Program is not
required to print an announcement.)
These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:

a) Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

b) Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

4. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License.
Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients’ exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be
guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

**NO WARRANTY**

11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

**END OF TERMS AND CONDITIONS**

**How to Apply These Terms to Your New Programs**

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

<one line to give the program’s name and a brief idea of what it does.>

Copyright (C) <year> <name of author>

This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version.

This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.

You should have received a copy of the GNU General Public License along with this program; if not, write to the Free Software Foundation, Inc., 51 Franklin St, Fifth Floor, Boston, MA 02110-1301 USA

Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:
Gnomovision version 69, Copyright (C) year name of author

Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type 'show w'.
This is free software, and you are welcome to redistribute it under certain conditions;
type 'show c' for details.

The hypothetical commands 'show w' and 'show c' should show the appropriate parts
of the General Public License. Of course, the commands you use may be called
something other than 'show w' and 'show c'; they could even be mouse-clicks or menu
items—whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if
any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample;
alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the program 'Gnomovision'
(which makes passes at compilers) written by James Hacker.

<signature of Ty Coon>, 1 April 1989
Ty Coon, President of Vice

This General Public License does not permit incorporating your program into
proprietary programs. If your program is a subroutine library, you may consider it
more useful to permit linking proprietary applications with the library. If this is what
you want to do, use the GNU Library General Public License instead of this License.

D.1.2 Code derived from software contributed to Berkeley by Guido van Rossum

Copyright © 1989, 1993, The Regents of the University of California. All rights
reserved.

Redistribution and use in source and binary forms, with or without modification, are
permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of
   conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list
   of conditions and the following disclaimer in the documentation and/or other
   materials provided with the distribution.
3. Neither the name of the University nor the names of its contributors may be used
   to endorse or promote products derived from this software without specific prior
   written permission.

THIS SOFTWARE IS PROVIDED BY THE REGENTS AND CONTRIBUTORS "AS IS"
AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND
FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT
SHALL THE REGENTS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT,
INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL
DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF
SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR
BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF
LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING
NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS
SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
D.1.3 FIG: Facility for Interactive Generation of figures

Copyright © 1985-1988 by Supoj Sutanthavibul
Parts Copyright © 1989-2002 by Brian V. Smith
Parts Copyright © 1991 by Paul King
Parts Copyright © 1992 by James Tough
Parts Copyright © 1998 by Georg Stemmer
Parts Copyright © 1995 by C. Blanc and C. Schlick

Any party obtaining a copy of these files is granted, free of charge, a full and unrestricted irrevocable, world-wide, paid up, royalty-free, nonexclusive right and license to deal in this software and documentation files (the "Software"), including without limitation the rights to use, copy, modify, merge, publish and/or distribute copies of the Software, and to permit persons who receive copies from any such party to do so, with the only requirement being that this copyright notice remain intact.

D.1.4 unzip.h -- IO for uncompress .zip files using zlib

Version 1.01e, February 12th, 2005
Copyright © 1998-2005 Gilles Vollant

This unzip package allow extract file from .ZIP file, compatible with PKZip 2.04g WinZip, InfoZip tools and compatible.

Multi volume ZipFile (span) are not supported.

Encryption compatible with pkzip 2.04g only supported

Old compressions used by old PKZip 1.x are not supported

I WAIT FEEDBACK at mail info@winimage.com

Visit also http://www.winimage.com/zLibDll/unzip.htm for evolution

Condition of use and distribution are the same than zlib:

This software is provided 'as-is', without any express or implied warranty. In no event will the authors be held liable for any damages arising from the use of this software.

Permission is granted to anyone to use this software for any purpose, including commercial applications, and to alter it and redistribute it freely, subject to the following restrictions:

1. The origin of this software must not be misrepresented; you must not claim that you wrote the original software. If you use this software in a product, an acknowledgment in the product documentation would be appreciated but is not required.

2. Altered source versions must be plainly marked as such, and must not be misrepresented as being the original software.

3. This notice may not be removed or altered from any source distribution.

D.2 Licensing for Oracle R Distribution

The licensing for Oracle R Distribution is the same as the licensing for open source R described in Section D.1.
D.3 Licensing for ROracle

ROracle is an open source package for R that allows R users to interact with an Oracle database. ROracle was developed by an individual called David James. Oracle has taken over new development, maintenance, and all upgrade activity on this package. ROracle is licensed under LGPL v.2 or later and not under the terms of your Oracle license agreement. For more information see:

http://cran.cnr.berkeley.edu/web/packages/ROracle/ROracle.pdf

D.3.1 GNU Lesser General Public License Version 2.1

February 1999

Copyright © 1991, 1999 Free Software Foundation, Inc.

51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

[This is the first released version of the Lesser GPL. It also counts as the successor of the GNU Library Public License, version 2, hence the version number 2.1.]

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public Licenses are intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users.

This license, the Lesser General Public License, applies to some specially designated software packages--typically libraries--of the Free Software Foundation and other authors who decide to use it. You can use it too, but we suggest you first think carefully about whether this license or the ordinary General Public License is the better strategy to use in any particular case, based on the explanations below.

When we speak of free software, we are referring to freedom of use, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish); that you receive source code or can get it if you want it; that you can change the software and use pieces of it in new free programs; and that you are informed that you can do these things.

To protect your rights, we need to make restrictions that forbid distributors to deny you these rights or to ask you to surrender these rights. These restrictions translate to certain responsibilities for you if you distribute copies of the library or if you modify it.

For example, if you distribute copies of the library, whether gratis or for a fee, you must give the recipients all the rights that we gave you. You must make sure that they, too, receive or can get the source code. If you link other code with the library, you must provide complete object files to the recipients, so that they can relink them with the library after making changes to the library and recompiling it. And you must show them these terms so they know their rights.

We protect your rights with a two-step method: (1) we copyright the library, and (2) we offer you this license, which gives you legal permission to copy, distribute and/or modify the library.

To protect each distributor, we want to make it very clear that there is no warranty for the free library. Also, if the library is modified by someone else and passed on, the
recipients should know that what they have is not the original version, so that the original author’s reputation will not be affected by problems that might be introduced by others.

Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that any patent license obtained for a version of the library must be consistent with the full freedom of use specified in this license.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the "Lesser" General Public License because it does Less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

**TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION**

0. This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called "this License"). Each licensee is addressed as "you".
A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A “work based on the Library” means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification").

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

1. You may copy and distribute verbatim copies of the Library’s complete source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and distribute a copy of this License along with the Library.

   You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

   a. The modified work must itself be a software library.

   b. You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.

   c. You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.

   d. If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

   (For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered
independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)
Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a “work that uses the Library” with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer’s own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable “work that uses the Library”, as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user’s computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the “work that uses the Library” must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work
based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:

a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above.

b) Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

9. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Library or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Library (or any work based on the Library), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Library or works based on it.

10. Each time you redistribute the Library (or any work based on the Library), the recipient automatically receives a license from the original licensor to copy, distribute, link with or modify the Library subject to these terms and conditions. You may not impose any further restrictions on the recipients’ exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties with this License.

11. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Library at all. For example, if a patent license would not permit royalty-free redistribution of the Library by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Library.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply, and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

12. If the distribution and/or use of the Library is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the
Library under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

13. The Free Software Foundation may publish revised and/or new versions of the Lesser General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Library specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Library does not specify a license version number, you may choose any version ever published by the Free Software Foundation.

14. If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

15. BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE LIBRARY AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE LIBRARY (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change. You can do so by permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of
warranty; and each file should have at least the "copyright" line and a pointer to where
the full notice is found.

one line to give the library’s name and an idea of what it does.

Copyright © year name of author

This library is free software; you can redistribute it and/or modify it under the terms
of the GNU Lesser General Public License as published by the Free Software
Foundation; either version 2.1 of the License, or (at your option) any later version.

This library is distributed in the hope that it will be useful, but WITHOUT ANY
WARRANTY; without even the implied warranty of MERCHANTABILITY or
FITNESS FOR A PARTICULAR PURPOSE. See the GNU Lesser General Public License
for more details.

You should have received a copy of the GNU Lesser General Public License along with
this library; if not, write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth
Floor, Boston, MA 02110-1301 USA

Also add information on how to contact you by electronic and paper mail.

You should also get your employer (if you work as a programmer) or your school, if
any, to sign a “copyright disclaimer” for the library, if necessary. Here is a sample; alter
the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the library 'Frob' (a library
for tweaking knobs) written by James Random Hacker.

signature of Ty Coon, 1 April 1990

Ty Coon, President of Vice

That’s all there is to it!
## Index

| C | client/server architecture, 1-1, 1-2 connecting to Oracle R Enterprise Server, 4-10, 6-11 |
| D | database configuring extproc, 2-2 connecting to, 6-11 installing, 2-1 patching, 2-2 PDB, ix, 2-2, 4-5, 9, 7-2 requirements, 1-3, 2-1 database user creating, 4-2, 7-4 requirements, 4-6 dba group, 4-7, A-1 DCLI, 5-1 demo scripts See example scripts Distributed Command Line Interface, 5-1 |
| E | embedded R execution, 1-1, 7-5, A-11 environment variables creating on Windows, 7-5 requirements, 4-6 Exadata, 5-1 example scripts, 4-9, A-11 extproc, 2-2 |
| I | IBM AIX, 1-3, 4-6 requirements, 1-3 upgrade restriction, 7-1 installing example, A-1 Oracle Database Instant Client, 6-2 Oracle R Enterprise Server, 4-7 overview, 1-2 user requirements for, 4-6, A-1 verifying, 4-8, 4-9, A-9 Instant Client, 6-1, A-6 installing on Windows, 6-2 |
| L | LD_LIBRARY_PATH, A-1 Linux requirements, 1-3 |
| M | Math Kernel Library, 3-2, 3-13 Microsoft Windows, 1-3 requirements, 1-3 verifying 64-bit architecture, 1-4 migrating Oracle R Enterprise data, 7-2 multitenant architecture, ix, 2-2, 4-5, 9, 7-2 |
| O | Oracle Call Interface, 6-1 Oracle Database configuring extproc, 2-2 installing, 2-1 patching, 2-2 requirements, 1-3, 2-1 Oracle Database Client, 1-3, 6-1, A-6 Oracle Database Instant Client, 6-1, A-6 Oracle Linux requirements, 1-3 Oracle public yum, A-2 Oracle R Distribution advantages, 1-3, 3-2 dependencies, 3-6, 3-8, 5-6 installing, A-2 installing on Exadata with DCLI, 5-3 installing on IBM AIX, 3-11 installing on Linux, 3-2 installing on Linux using RPMs, 3-5 installing on Microsoft Windows, 3-13 installing on Oracle Solaris, 3-10 installing on Red Hat Enterprise Linux, 3-9 overview, 3-2 requirements, 1-3 RPMs, 3-6, 3-8, 5-4, 5-6 Oracle R Enterprise client components, 1-2, 6-1 example scripts, 4-9 installing, 1-2, 4-1, 6-1 |
installing on Exadata, 5-1
server components, 1-2, 4-1
system requirements, 1-3
upgrading, 7-1
versions, 1-3
Oracle R Enterprise Client
installing, A-5
requirements, A-1
Oracle R Enterprise packages
described, 6-2
installing on Linux or UNIX, 6-8
installing on Windows, A-7
Oracle R Enterprise Server
environment variables, 4-6
installing, 4-7, A-2
installing on Exadata with DCLI, 5-8
Oracle Solaris, 1-3, 4-6
requirements, 1-3
Oracle Solaris Studio, 3-11
Oracle Wallet, 7-7
ORE package, 6-2, A-11
ore.connect, 6-11, A-10

P
PDB, ix, 2-2, 4-4, 4-5, 9, 7-2

R
R and Oracle R Enterprise, 3-1
installing on Windows, 3-13, A-6
memory usage, 7-8
open source, 3-1, 3-2, D-1
Red Hat Enterprise Linux
requirements, 1-3
ROracle package, 3-1, 6-1, 6-2, D-9
RQADMIN, 5-10
rqadmin, 4-3, 5-9
rqsys, 4-2

S
server script
text, 4-4
full uninstall, 4-3, 7-3
overview, 4-2
partial uninstall, 4-3, 7-2
requirements, 4-5
syntax, 4-2
upgrading Oracle R Enterprise Server, 7-1
SQL transparency, 1-1
Sun Performance Library, 3-11
supporting packages
described, 6-2
installing on Windows, A-8

U
uninstalling
Oracle R Enterprise Client, 7-3