

# Oracle® Database

## Instant Client Installation Guide



12c Release 2 (12.2) for Apple Mac OS X (Intel)

E87814-01

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The Oracle logo, consisting of a solid red square with the word "ORACLE" in white, uppercase, sans-serif font centered within it.

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Oracle Database Instant Client Installation Guide, 12c Release 2 (12.2) for Apple Mac OS X (Intel)

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# Preface

This guide provides instructions about installing and configuring Oracle Database Client for Apple Mac OS X (Intel)(32-bit) and Apple Mac OS X (Intel)(64-bit).

## Audience

This guide is intended for anyone responsible for installing Oracle Database Client 12c Release 2 (12.2). Additional platform-specific installation guides for Oracle Database, Oracle Real Application Clusters, Oracle Clusterware, Oracle Database Examples, and Oracle Enterprise Manager Grid Control are available on the relevant installation media.

### See Also:

- *Oracle Database Installation Guide* to install Oracle Database using the default settings.
- You can view more information about supported Application Programming Interfaces (API) at

<http://docs.oracle.com/database/122/nav/development.htm>

## Documentation Accessibility

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## Related Documentation

The related documentation for Oracle Database 12c products includes the following manuals:

- *Oracle Database Installation Guide*
- *Oracle Real Application Clusters Installation Guide*

- *Oracle Grid Infrastructure Installation Guide*

 **Note:**

- *Oracle Database Error Messages* for information about Oracle error messages
- *Oracle Database Sample Schemas* for information about how you can create and use schemas

## Command Syntax

UNIX command syntax appears in `monospace` font. The dollar character (\$), number sign (#), or percent character (%) are UNIX command prompts. Do not enter them as part of the command. The following command syntax conventions are used in this guide:

Convention	Description
backslash \	A backslash is the UNIX command continuation character. It is used in command examples that are too long to fit on a single line. Enter the command as displayed (with a backslash) or enter it on a single line without a backslash:  <code>dd if=/dev/rdsk/c0t1d0s6 of=/dev/rst0 bs=10b \ count=10000</code>
braces { }	Braces indicate required items:  <code>.DEFINE {macro1}</code>
brackets [ ]	Brackets indicate optional items:  <code>cvtcrt termname [outfile]</code>
ellipses ...	Ellipses indicate an arbitrary number of similar items:  <code>CHKVAL fieldname value1 value2 ... valueN</code>
<i>italics</i>	Italic type indicates a variable. Substitute a value for the variable:  <code>library_name</code>
vertical line	A vertical line indicates a choice within braces or brackets:  <code>FILE filesize [K M]</code>

## Typographic Conventions

The following text conventions are used in this document:

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

# 1

## Overview of Oracle Database Instant Client Installation

This chapter describes the different installation types of Oracle Database Instant Client and issues to consider before you install Oracle Database Instant Client:

- [Planning Your Installation](#)
- [Installation Considerations](#)
- [Oracle Database Instant Client Installation Types](#)
- [Oracle Database Instant Client and Oracle Database Interoperability](#)
- [Simplified Patching of Timestamp with Time Zone Data Type](#)

### 1.1 Planning Your Installation

The Oracle Database installation process consists of the following phases:

1. **Review the licensing information:** Although the installation media in your media pack contain many Oracle components, you are permitted to use only those components for which you have purchased licenses.

Oracle Support Services does not provide support for components for which licenses have not been purchased.



#### See Also:

*[Oracle Database Licensing Information](#)*

2. **Plan the installation:** This chapter describes the Oracle products that you can install and issues that you must consider before starting the installation.
3. **Complete preinstallation tasks:** [Oracle Database Instant Client Preinstallation Tasks](#) describes preinstallation tasks that you must complete before installing the product.
4. **Install the software:** [Installing and Removing Oracle Database Instant Client](#) describes how to install Oracle Database Instant Client.
5. **Complete postinstallation tasks:** [Oracle Database Instant Client Postinstallation Tasks](#) describes recommended and required postinstallation tasks.

### 1.2 Installation Considerations

This section contains hardware and software certification information that you should consider before deciding to install this product.



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

<https://support.oracle.com/>

You must register online before using My Oracle Support. After logging in, from the menu options, select the **Certifications** tab. On the **Certifications** page, use the **Certification Search** options to search by Product, Release, and Platform. You can also search using the **Certification Quick Links** options such as Product Delivery and Lifetime Support.

## 1.3 Oracle Database Instant Client Installation Types

In Oracle Database Instant Client 12c Release 1, Instant Client and Instant Client Light are the only supported installation types.

The Instant Client installation type enables you to install only the shared libraries required by Oracle Call Interface (OCI), Oracle C++ Call Interface (OCCI), Pro\*C, or Java Database Connectivity (JDBC) OCI applications.



### See Also:

*Oracle Call Interface Programmer's Guide* or *Oracle Database JDBC Developer's Guide* for more information about Instant Client

The Instant Client Light (English) version of Instant Client further reduces the disk space requirements of the client installation. The size of the library has been reduced by removing error message files for languages other than English and leaving only a few supported character set definitions out of around 250.

This Instant Client Light version is geared toward applications that use either US7ASCII, WE8DEC, WE8ISO8859P1, WE8MSWIN1252, or a Unicode character set. There is no restriction on the `LANGUAGE` and the `TERRITORY` fields of the `NLS_LANG` setting, so the Instant Client Light operates with any language and territory settings. Because only English error messages are provided with the Instant Client Light, error messages generated on the client side, such as Net connection errors, are always reported in English, even if `NLS_LANG` is set to a language other than `AMERICAN`. Error messages generated by the database side, such as syntax errors in SQL statements, are in the selected language provided the appropriate translated message files are installed in the Oracle home of the database instance.

Instant Client Light supports the following client character sets:

- Single-byte
  - US7ASCII
  - WE8DEC
  - WE8MSWIN1252
  - WE8MSWIN1252

- WE8ISO8859P1
- Unicode
  - UTF8
  - AL16UTF16
  - AL32UTF8
- Instant Client Light can connect to databases having one of these database character sets:
  - US7ASCII
  - WE8DEC
  - WE8MSWIN1252
  - WE8ISO8859P1
  - WE8EBCDIC37C
  - WE8EBCDIC1047
  - UTF8
  - AL32UTF8

The advantage of using Instant Client Light is that it has a smaller footprint than the regular Instant Client. The shared libraries, which an application must load, are only 34 MB as opposed to the 110 MB that regular Instant Client uses. Therefore, the applications use less memory.

## 1.4 Oracle Database Instant Client and Oracle Database Interoperability

For information about interoperability between Oracle Database Instant Client and Oracle Database releases, see Note 207303.1 on the My Oracle Support website at

<https://support.oracle.com/CSP/main/article?cmd=show&type=NOT&id=207303.1>

## 1.5 Simplified Patching of Timestamp with Time Zone Data Type

Starting with Oracle Database 12c Release 1 (12.1), the patching process of `TIMESTAMP WITH TIMEZONE` data type values is simplified.

### See Also:

"Changes in This Release for Oracle Database Globalization Support Guide" and "Clients and Servers Operating with Different Versions of Time Zone Files" in *Oracle Database Globalization Support Guide* for information about simplified patching process and how certain clients work with server with different time zone files

# 2

## Oracle Database Instant Client Preinstallation Tasks

This chapter describes the tasks that you must complete before you install Oracle Instant Client. It includes the following information:

- [Checking the Hardware Requirements](#)
- [Checking the Software Requirements](#)

### 2.1 Checking the Hardware Requirements

The system must meet the following minimum hardware requirements for Oracle Database Instant Client 12c Release 2:

- [Memory Requirements](#)
- [System Architecture](#)
- [Disk Space Requirements](#)

#### 2.1.1 Memory Requirements

The following are the memory requirements for Oracle Database Instant Client 12c Release 1 (12.1):

- At least 512 MB of RAM.

To determine the physical RAM size, use System Profiler (/Applications/Utilities/System Profiler) or enter the following command:

```
$ /usr/sbin/system_profiler SPHardwareDataType | grep Memory
```

If the size of the physical RAM is less than the required size, then you must install more memory before continuing.

The following are the RAM requirements:

- Up to 512 MB
- Between 513 MB and 726 MB
- More than 726 MB

To determine the available RAM, enter the following command:

```
$ free
```

#### 2.1.2 System Architecture

To determine whether the system architecture can run the software, enter the following command:

```
$ uname -p
```

 **Note:**

This command displays the processor type. The command output must be `i386`. If you do not see the expected output, then you cannot install the software on this system.

## 2.1.3 Disk Space Requirements

The minimum disk space requirement for software files for Oracle Database Instant Client 12c Release 2 (12.2) is 220 MB.

To determine the amount of free disk space available, enter the following command:

```
$ df -h
```

## 2.2 Checking the Software Requirements

Depending on the products that you intend to install, verify that the following software is installed on the system. The procedure following the table describes how to verify whether these requirements are addressed.

Item	Requirement
Operating system	The following or later versions of the operating system are supported for Oracle Database 12c Release 2 (12.2): <ul style="list-style-type: none"> <li>• Apple Mac OS X El Capitan 10.11.6</li> <li>• Apple Mac OS X Sierra 10.12.5</li> <li>• Apple Mac OS X El Capitan 10.11.1</li> <li>• Apple Mac OS X Yosemite 10.10.4</li> <li>• Apple Mac OS X Mavericks 10.9.2</li> </ul>
Tools	<ul style="list-style-type: none"> <li>• Xcode 5.0.2 or later</li> <li>• Xcode 8.2.1</li> <li>• GNU C compiler (gcc) version 4.2.1 or later This version of gcc is included in Xcode 5.0.2 or later.</li> <li>• Apple LLVM version 8.0.0 (clang-800.0.42.1)</li> <li>• JDK 1.8.0_144</li> <li>• JDK 1.6.0_65 or later for Apple Mac OS X Mavericks</li> </ul>
Pro*C/C++, Oracle Call Interface, Oracle C++ Call Interface	The version of the GNU C and C++ compiler listed previously is supported for use with these products.
Oracle JDBC/OCI Drivers	You must use JDBC-OCI 1.6.0 or later versions with the JNDI extension.
Oracle ODBC Driver	Download and install unixODBC-2.3.1 or later at <a href="http://www.unixodbc.org">http://www.unixodbc.org</a>

To ensure that the system meets these requirements:

1. To determine the operating system version, enter the following command:

```
$ sw_vers
```

The output of this command must be similar to the following:

```
ProductName:   Mac OS X
ProductVersion: 10.11.6
BuildVersion:  15G1611
```

 **Note:**

Only the versions listed in the previous table are supported. Do not install the software on other versions of Apple Mac OS X.

2. To determine if the required version of `gcc` is installed, enter the following command:

```
$ gcc -v
```

This command returns output similar to the following:

```
Configured with: --prefix=/Applications/Xcode.app/Contents/Developer/usr --with-
gxx-include-dir=/Applications/Xcode.app/Contents/Developer/Platforms/
MacOSX.platform/Developer/SDKs/MacOSX10.12.sdk/usr/include/c++/4.2.1
Apple LLVM version 8.0.0 (clang-800.0.42.1)
Target: x86_64-apple-darwin15.6.0
Thread model: posix
InstalledDir: /Applications/Xcode.app/Contents/Developer/Toolchains/
XcodeDefault.xctoolchain/usr/bin
```

If the required version (including the date and build number) or a later version is not installed, then download and install Xcode 5.0.2 or later. You can download this software from the Apple Developer Connection website at

<https://developer.apple.com/>

3. To determine if the correct version of Xcode is installed, enter the following command:

```
$ /usr/bin/xcodebuild -version
```

This command returns output similar to the following:

```
Xcode 8.2.1
Build version 8C1002
```

If the required version (including the date and build number) or a later version is not installed, then download and install Xcode 5.0.2 or later. You can download this software from the Apple Developer Connection website at

<https://developer.apple.com/>

## 2.2.1 Instant Client Light Requirements

In addition to the requirements described in the preceding section, if you plan to use Instant Client Light, then the applications must use the following languages and character sets:

- **Language:** Any language that is supported by Oracle
- **Territory:** Any territory that is supported by Oracle
- **Character sets:**
  - Single byte

- \* US7ASCII
- \* WE8DEC
- \* WE8MSWIN1252
- \* WE8ISO8859P1
- Unicode
  - \* UTF8
  - \* AL16UTF16
  - \* AL32UTF8

Instant Client Light can connect to databases having one of the following database character sets:

- \* US7ASCII
- \* WE8DEC
- \* WE8MSWIN1252
- \* WE8ISO8859P1
- \* WE8EBCDIC37C
- \* WE8EBCDIC1047
- \* UTF8
- \* AL32UTF8

Instant Client Light can also operate with the OCI Environment handles created in the OCI\_UTF16 mode.

The language, territory, and character sets are determined by the `NLS_LANG` environment variable.

 **Note:**

Ensure that you set the `NLS_LANG` environment variable to the required character set before you run Oracle Database Instant Client.

# 3

## Installing and Removing Oracle Database Instant Client

The Oracle Database Instant Client software is available on Oracle Technology Network website. This chapter describes the following sections:

- [Downloading and Installing the Oracle Database Instant Client Software](#)
- [Removing the Oracle Database Instant Client Software](#)

### 3.1 Downloading and Installing the Oracle Database Instant Client Software

Download and install Oracle Database Instant Client 12c Release 2 (12.2) by completing the following steps:

1. Download the Instant Client for Mac OS X (Intel) (64-bit) package from the Instant Client Downloads page on Oracle Technology Network at

<http://www.oracle.com/technetwork/database/features/instant-client/index-097480.html>

2. Create a directory on your computer, for example, `instantclient`. Choose a directory to install the Oracle Instant Client and unzip the downloaded zip file in that directory. The unzipped file creates the `instantclient_12_2` directory.
3. Set the `NLS_LANG` environment variable to the required character set. For example, an `NLS_LANG` of `american_america.utf8` is a valid setting. It is in the following format: `[NLS_LANGUAGE]_[NLS_TERRITORY].[NLS_CHARACTERSET]`.

Refer to "[Instant Client Light Requirements](#)" for information about setting the `NLS_LANG` environment variable to the required character set.

This completes the installation of Oracle Database Instant Client.

### 3.2 Removing the Oracle Database Instant Client Software

To remove the Oracle Database Instant Client software, delete the `instantclient_12_2` directory.

# 4

## Oracle Database Instant Client Postinstallation Tasks

This chapter describes how to complete postinstallation tasks after you have installed the Oracle Database Instant Client software. It includes information about the following topics:

- [Using Oracle Database Instant Client](#)
- [Recommended Postinstallation Tasks](#)
- [Required Product-Specific Postinstallation Tasks](#)

Oracle recommends that you perform the tasks listed in "[Recommended Postinstallation Tasks](#)" after all installations.

If you install and intend to use any of the products listed in "[Required Product-Specific Postinstallation Tasks](#)", then you must perform the tasks listed in the product-specific subsections.

### 4.1 Using Oracle Database Instant Client

You can build a C/C++ application that uses Oracle Database Instant Client and connect to an Oracle Database server. If you want to build a 64-bit application and use `instantclient_12_2/sdk/demo.mk` file, then perform the following steps:

1. Set the `BUILD64` environment variable to `T`.
2. Edit the `instantclient_12_2/sdk/demo.mk` file and set the `CC` and `cc` to your `gcc` location.
3. Compile the C/C++ application using the flags specified in the `demo.mk` file, namely, `-idirafter . -DMAC_OSX -D_GNU_SOURCE -D_REENTRANT -g -m64 -mmacosx-version-min=10.11 <c_file_name> -I../include`.
4. Start `make -f demo.mk buildoci EXE=cdemo81 OBJS=cdemo81.o` for a working demonstration of the options.

The compilation options are as follows:

```
-idirafter . -DMAC_OSX -D_GNU_SOURCE -D_REENTRANT -g -m64 -mmacosx-version-min=10.11 <c_file_name> -I../include
```

The link options are as follows:

```
-g -m64 -mmacosx-version-min=10.11 -rpath full_path_to_instantclient_12_2_libs application_name -L../ -locci -lclntsh -lpthread
```

### 4.2 Recommended Postinstallation Tasks

Oracle recommends that you perform the tasks described in the following sections after completing an installation:



- [Connecting Instant Client or Instant Client Light to an Oracle Database](#)
- [Setting the NLS\\_LANG Environment Variable](#)
- [Updating Instant Client](#)

## 4.2.1 Connecting Instant Client or Instant Client Light to an Oracle Database

Use one of the following methods to specify the database connection information for the instant client application:

- For OCI and OCCI programs, use the following connection string format:  
`host[:port][//service_name][:server][/instance_name]`
- Set the `TNS_ADMIN` environment variable to specify the location of the `tnsnames.ora` file and specify a service name from that file.
- Set the `TNS_ADMIN` and the `TWO_TASK` environment variables to specify a service name from the `tnsnames.ora` file.



### Note:

You do not need to specify the `ORACLE_HOME` variable.

After checking the environment variable, you can use any of the following methods to specify Oracle Database connection information for client applications:

- [Specifying a Connection by Using the Easy Connect Naming Method](#)
- [Specifying a Connection Using an Empty Connect String and TWO\\_TASK](#)

### 4.2.1.1 Specifying a Connection by Using the Easy Connect Naming Method

You can specify a connection address to an Oracle Database directly from a client application, without having to configure a `tnsnames` setting for the Instant Client. This method is convenient as you do not have to create and manage a `tnsnames.ora` file. However, the application users must specify the host name and port number when they want to log in to the application.

For example, if you run SQL\*Plus on the client computer and want to connect to the `sales_us` database, which is located on a server whose host name is `shobeen` and port number is `1521`, then you can log in as follows:

```
sqlplus system/admin@shobeen:1521/sales_us
```

Similarly, in the application code, you can use Oracle Call Interface net naming methods to create the Instant Client-to-Oracle Database connection. For example, the following formats in the `OCI ServerAttach()` call specify the connection information:

- Specify a SQL connect URL string using one of the following format:  
`[ ( username, [ "/", password ] | "/" ), [ "@", db_address ] ], [ admin_role ], [ initial_edition ]`

or

```
scott/tiger@inst1
```

- Alternatively, you can specify the SQL connect information as an Oracle Net keyword-value pair. For example:

```
"(DESCRIPTION=(ADDRESS=(PROTOCOL=tcp) (HOST=shobeen) (PORT=1521))  
(CONNECT_DATA=(SERVICE_NAME=sales_us)))"
```

 **See Also:**

*Oracle Call Interface Programmer's Guide* for more information about using Oracle Call Interface Instant Client

### 4.2.1.2 Specifying a Connection Using an Empty Connect String and TWO\_TASK

You can set the connect string to an empty connect string (""), and then set the TWO\_TASK environment variable to one of the following values:

- A direct address, as described under "[Specifying a Connection by Using the Easy Connect Naming Method](#)"
- Oracle Net keyword-value pair
- A `tnsnames.ora` entry and `TNS_ADMIN` is set to the location of `tnsnames.ora`

This method allows the applications to specify internally a connection string if the application code itself uses an empty connection string. The benefit of an empty connect string is that the application itself does not have to specify the `tnsnames.ora` entry. Instead, when a user starts the application, the location of the database is determined by a script or the environment, depending on where you have set the TWO\_TASK environment variable. The disadvantage of using empty strings is that you must configure this additional information in order for the application to connect to the database.

### 4.2.2 Setting the NLS\_LANG Environment Variable

`NLS_LANG` is an environment variable that specifies the locale behavior for Oracle software. This variable sets the language and territory used by the client application and the database user session. It also declares the character set of the client, which is the character set of data entered or displayed by an Oracle client program, such as SQL\*Plus.

 **Note:**

The character set of the data displayed is determined by the environment of the operating system, such as keyboard driver and fonts in use. The `NLS_LANG` character set should match the operating system.

Refer to the "Setting Up a Globalization Support Environment" section in *Oracle Database Globalization Support Guide* for information about Globalization Support.

## 4.2.3 Updating Instant Client

To update Instant Client:

1. Download Instant Client from Oracle Technology Network at <http://www.oracle.com/technetwork/database/features/instant-client/index-097480.html>
2. If you want to place the files in the existing directory, then ensure that the directory is empty. If you want to place the files into a different directory (and remove the previous files), ensure that you update the environment variable setting to reflect the new location.

 **Note:**

A restriction on Instant Client or Instant Client Light is that you cannot perform patch upgrades using the `opatch` utility because the Instant Client installation does not create an inventory, which the patch upgrade process must access for patch upgrades.

## 4.3 Required Product-Specific Postinstallation Tasks

The following sections describe postinstallation tasks that you must perform if you install and intend to use Oracle Precompilers:

 **Note:**

You must perform postinstallation tasks only for products that you intend to use.

### 4.3.1 Configuring Oracle Precompilers

This section describes postinstallation tasks for Pro\*C/C++.

#### 4.3.1.1 Configuring Pro\*C/C++

Verify that the `PATH` environment variable setting includes the directory that contains the C compiler executable. The default directory for the `gcc` compiler executable is `/usr/bin`.

 **See Also:**

*Pro\*C/C++ Programmer's Guide* for more information about setting environment variables

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## C

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