

Oracle® Database

Client Installation Guide

12c Release 1 (12.1) for IBM: Linux on POWER Little Endian
Systems

E64754-02

December 2015

Oracle Database Client Installation Guide, 12c Release 1 (12.1) for IBM: Linux on POWER Little Endian Systems

E64754-02

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Preface

This guide provides instructions about installing and configuring Oracle Database Client for Linux on POWER Systems. This guide also describes about installing and configuring database using response files, globalization support, ports, and troubleshooting.

The preface contains the following topics:

- [Audience](#)
- [Documentation Accessibility](#)
- [Command Syntax](#)
- [Related Documentation](#)
- [Typographic Conventions](#)

Audience

This guide is intended for anyone responsible for installing Oracle Database Client 12c Release 1 (12.1). 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 at

<http://docs.oracle.com/en/database/database.html>

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.

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: <pre>dd if=/dev/rdisk/c0t1d0s6 of=/dev/rst0 bs=10b \ count=10000</pre>
braces { }	Braces indicate required items: <pre>.DEFINE {macro1}</pre>
brackets []	Brackets indicate optional items: <pre>cvtcrt <i>termname</i> [<i>outfile</i>]</pre>
ellipses ...	Ellipses indicate an arbitrary number of similar items: <pre>CHKVAL <i>fieldname</i> <i>value1</i> <i>value2</i> ... <i>valueN</i></pre>
<i>italics</i>	Italic type indicates a variable. Substitute a value for the variable: <pre><i>library_name</i></pre>
vertical line	A vertical line indicates a choice within braces or brackets: <pre>FILE <i>filesize</i> [K M]</pre>

Related Documentation

The product-specific and platform-specific documentation for Oracle Database products are available in both, PDF and HTML formats. You can view and download the documentation at

<http://docs.oracle.com/en/>

See *Oracle Database Client Release Notes for IBM: Linux on POWER Little Endian Systems* for important information that was not available when this book was released.

Typographic Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<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.

Overview of Oracle Database Client Installation

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

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

1.1 Planning Your Installation

The Oracle Database Client installation process consists of the following phases:

1. **Read the release notes:** Read the *Oracle Database Client Release Notes for IBM: Linux on POWER Little Endian Systems* before you begin the installation.
2. **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*

3. **Plan the installation:** This chapter describes the Oracle products that you can install and issues that you must consider before starting the installation.
4. **Complete preinstallation tasks:** [Chapter 2](#) describes preinstallation tasks that you must complete before installing the product.
5. **Install the software:** [Chapter 3](#) describes how to install Oracle Database Client.
6. **Complete postinstallation tasks:** [Chapter 4](#) 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 Link** options such as Product Delivery and Lifetime Support.

1.3 Oracle Database Client Installation Types

The Instant Client 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. This installation type requires much less disk space than the other Oracle Database Client installation types.

For more information about Instant Client, see *Oracle Call Interface Programmer's Guide* or *Oracle Database JDBC Developer's Guide*.

Included in the Instant Client installation is Instant Client Light. You may want to use this version of Instant Client if the applications generate error messages in American English only. Instant Client Light is beneficial to application that use one of the supported character sets and can accept error messages in American English. The following are the supported character sets:

- US7ASCII
- WE8DEC
- WE8MSWIN1252
- WE8ISO8859P1
- WE8EBCDIC37C for EBCDIC platforms only
- WE8EBCDIC1047 for EBCDIC platforms only
- UTF8
- AL32UTF8
- AL16UTF16

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 Client and Oracle Database Interoperability

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

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

1.5 Simplified Patching of Timestamp with Time Zone Data Type

Starting with Oracle Database 11g Release 2 (11.2), the patching process of `TIMESTAMP WITH TIMEZONE` data type values is simplified.

For information about simplified patching process and how certain clients work with server with different time zone files "Oracle Database 12c Release 1 (12.1) New Features in Globalization" and "Clients and Servers Operating with Different Versions of Time Zone Files" in *Oracle Database Globalization Support Guide*.

Oracle Database Client Preinstallation Tasks

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

- [Logging In to the System as root](#)
- [Checking the Hardware Requirements](#)
- [Checking the Software Requirements](#)

2.1 Logging In to the System as root

Before you install the Oracle software, you must complete several tasks as the `root` user. To log in as the `root` user, complete the following procedure:

- If you are installing the software from an X Window System workstation or X terminal, then:
 1. Start a local terminal session (`xterm`).
 2. If you are not installing the software on the local system, then enter the following command to enable the remote host to display X applications on the local X server:

```
$ xhost fully_qualified_remote_host_name
```

For example,

```
$ xhost somehost.us.acme.com
```

3. If you are not installing the software on the local system, then use the `ssh`, `rlogin`, or `telnet` command to connect to the system where you want to install the software:

```
$ telnet fully_qualified_remote_host_name
```

4. If you are not logged in as the `root` user, then enter the following command to switch user to `root`:

```
$ su - root
password:
#
```

Note: Unless you intend to complete a silent-mode installation, you must install the software from an X Window System workstation, an X terminal, or a PC or other system with X server software installed.

- If you are installing the software from a PC or other system with X server software installed, then:
 1. Start the X server software.

2. Configure the security settings of the X server software to permit remote hosts to display X applications on the local system.
3. Connect to the remote system where you want to install the software and start a terminal session on that system, for example, an X terminal (xterm).
4. If you are not logged in as the `root` user on the remote system, then enter the following command to switch user to `root`:

```
$ su - root
password:
#
```

Note: If necessary, refer to your X server documentation for more information about completing this procedure. Depending on the X server software that you are using, you may need to complete the tasks in a different order.

2.2 Checking the Hardware Requirements

The system must meet the following minimum hardware requirements for Oracle Database Client 12c Release 1 (12.1):

- [Memory Requirements](#)
- [System Architecture](#)
- [Disk Space Requirements](#)
- [Display Requirements](#)
- [Recommended Hardware Requirement for SQL Developer](#)

2.2.1 Memory Requirements

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

- 256 MB of RAM.

To determine the physical RAM size, enter the following command:

```
# grep MemTotal /proc/meminfo
```

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

- The following table describes the relationship between installed RAM and the configured swap space recommendation:

Note: On Linux on POWER Systems, the HugePages feature allocates non-swappable memory for large page tables using memory-mapped files. If you enable HugePages, then you should deduct the memory allocated to HugePages from the available RAM before calculating swap space.

Available RAM	Swap Space Required
Up to 256 MB	3 times the size of RAM

Available RAM	Swap Space Required
Between 257 MB and 512 MB	2 times the size of RAM
Between 513 MB and 726 MB	1.5 times the size of RAM
More than 726 MB	0.75 times the size of RAM

To determine the size of the configured swap space, enter the following command:

```
# grep SwapTotal /proc/meminfo
```

If necessary, see the operating system documentation for information about how to configure additional swap space.

To determine the available RAM and swap space, enter the following command:

```
# free
```

IMPORTANT:

- Oracle recommends that you take multiple values for the available RAM and swap space before finalizing on a value. This is because the available RAM and swap space keep changing depending on the user interactions with the computer.
 - Contact the operating system vendor for swap space allocation guidance for your server. The vendor guidelines supersede the swap space requirements listed in this guide.
-
-

2.2.2 System Architecture

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

```
# uname -m
```

Note: This command displays the processor type. Verify that the processor architecture matches the Oracle software release to install. If you do not see the expected output, then you cannot install the software on this system.

2.2.3 Disk Space Requirements

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

- The minimum disk space requirement for a client install in the `/tmp` directory is 120 MB. The minimum disk space requirement in the `/tmp` directory depends on the installation type you have selected. The following table lists the minimum disk space requirements for the `/tmp` directory in each type of installation.

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

```
# df -k /tmp
```

If there is less than 120 MB of free space available in the `/tmp` directory, then complete one of the following steps:

- Delete unnecessary files from the `/tmp` directory to meet the space requirement.

- Set the `TMP` and `TMPDIR` environment variables when setting the `oracle` user's environment.
- Extend the file system that contains the `/tmp` directory. If necessary, contact the system administrator for information about extending file systems.
- To determine the amount of free disk space on the system, enter the following command:


```
# df -k
```

The client install requires 130 MB disk space for software files on Linux on POWER Systems.

2.2.4 Display Requirements

The minimum display requirement for Oracle Database 12c Release 1 (12.1) is a resolution of 1024 x 768 or higher.

2.2.5 Recommended Hardware Requirement for SQL Developer

The following are the recommended CPU, Memory and Display requirements for SQL Developer:

Resource	Recommended
Memory	1 GB RAM (recommended), 256 MB RAM (minimum)
Display	65536 colors, set to at least 1024 X 768 resolution

2.3 Checking the Software Requirements

Depending on the products that you intend to install, verify that the following software is installed on the system:

Item	Requirement
Operating system	The following operating systems (or a later version) are supported: <ul style="list-style-type: none"> ■ Red Hat Enterprise Linux Server 7.1 ■ SUSE Linux Enterprise Server 12
Kernel version	The system must be running the following kernel versions (or a later version): <ul style="list-style-type: none"> ■ Red Hat Enterprise Linux Server 7.1 (3.10.0-229.ae17b.ppc64le) ■ SUSE Linux Enterprise Server 12 (3.12.28-4.6.ppc64le)

Item	Requirement
Red Hat Enterprise Linux Server 7.1 Packages	<p>The following packages must be installed:</p> <pre> binutils-2.23.52.0.1-30.ael7b.ppc64le compat-openldap-2.3.43-5.ael7b.ppc64le compat-libtiff3-3.9.4-11.ael7b.ppc64le compat-libcap1-1.10-7.ael7b.ppc64le compat-db47-4.7.25-28.ael7b.ppc64le compat-db-headers-4.7.25-28.ael7b.noarch libstdc++-4.8.3-9.ael7b.ppc64le libstdc++-devel-4.8.3-9.ael7b.ppc64le gcc-4.8.3-9.ael7b.ppc64le gcc-c++-4.8.3-9.ael7b.ppc64le libgcc-4.8.3-9.ael7b.ppc64le gcc-gfortran-4.8.3-9.ael7b.ppc64le libaio-devel-0.3.109-12.ael7b.ppc64le libaio-0.3.109-12.ael7b.ppc64le glibc-common-2.17-78.ael7b.ppc64le glibc-devel-2.17-78.ael7b.ppc64le glibc-2.17-78.ael7b.ppc64le glibc-headers-2.17-78.ael7b.ppc64le GNU Make 3.82 for powerpc64le-redhat-linux-gnu sysstat-10.1.5-7.ael7b.ppc64le java-1.7.0-openjdk-1.7.0.75-2.5.4.3.ael7b.ppc64le java-1.7.0-openjdk-headless-1.7.0.75-2.5.4.3.ael7b.ppc64le IBM XL C/C++ for Linux, V13.1.2 (5725-C73, 5765-J08) Version: 13.01.0002.0000 </pre>

Item	Requirement
SUSE Linux Enterprise Server 12 Packages	<p>The following packages must be installed:</p> <pre> binutils-2.24-2.165.ppc64le libstdc++-devel-4.8-6.189.ppc64le libstdc++6-4.8.3+r212056-6.3.ppc64le libstdc++48-devel-4.8.3+r212056-6.3.ppc64le libgcc_s1-4.8.3+r212056-6.3.ppc64le gcc48-info-4.8.3+r212056-6.3.noarch gcc-info-4.8-6.189.ppc64le gcc48-locale-4.8.3+r212056-6.3.ppc64le gcc-locale-4.8-6.189.ppc64le gcc-4.8-6.189.ppc64le gcc-c++-4.8-6.189.ppc64le gcc48-4.8.3+r212056-6.3.ppc64le gcc48-c++-4.8.3+r212056-6.3.ppc64le glibc-i18ndata-2.19-17.72.noarch glibc-devel-2.19-17.72.ppc64le glibc-info-2.19-17.72.noarch glibc-html-2.19-17.72.noarch glibc-locale-2.19-17.72.ppc64le linux-glibc-devel-3.12-3.98.noarch glibc-profile-2.19-17.72.ppc64le glibc-2.19-17.72.ppc64le libaio-devel-0.3.109-17.15.ppc64le libaio1-0.3.109-17.15.ppc64le sysstat-10.2.1-1.11.ppc64le sysstat-isag-10.2.1-1.11.ppc64le GNU Make 4.0 IBM XL C/C++ for Linux, V13.1.1 (5725-C73, 5765-J08) Version: 13.01.0001.0000 </pre>
C/C++ Runtime Environment	<p>Download the following IBM XL C/C++ Runtime Environment:</p> <ul style="list-style-type: none"> ■ V13.1.1 for SUSE Linux Enterprise Server 12 at http://www-01.ibm.com/support/docview.wss?uid=swg24039070 ■ V13.1.2 for Red Hat Enterprise Linux Server 7.1 at http://www-01.ibm.com/support/docview.wss?uid=swg24040214 <p>If you need VAC optimization packages, then you must download and install the XL Optimization Libraries component from this link.</p>
Compilers	<p>The version of GNU C and C++ compilers listed under Packages are supported.</p>
Pro*FORTRAN	<p>The following fortran versions (or a later version) are supported:</p> <ul style="list-style-type: none"> ■ IBM XL Fortran V15.1.2 ■ GNU Fortran (GCC) 4.8.3 20140911

Item	Requirement
Oracle JDBC-OCI Drivers	You can use the following JDBC - OCI drivers; however, these are not required for the installation: <ul style="list-style-type: none"> JDBC-OCI 1.7.0_71 or later on RHEL 7.1 JDBC-OCI 1.7.0 or later versions on SUSE 12
Oracle ODBC Driver	To use ODBC, you must also install the following additional ODBC RPMs, depending on your operating system. <p>Red Hat Enterprise Linux Server 7.1</p> <p>unixODBC-2.3.1-4.95.ppc64le</p> <p>SUSE Linux Enterprise Server 12:</p> <p>unixODBC-2.3.1-4.95.ppc64le</p>

If you want to use GNU Compiler Collection (GCC) as the primary compiler, see the "[Configuring GCC as the Primary Compiler](#)" section for instructions on configuring the primary compiler.

The following procedure describes how to verify and ensure that the system meets these requirements:

1. To determine which distribution and version of Linux is installed, enter the following command:

```
# cat /etc/issue
```

Note: Only the distributions and versions listed in the previous table are supported. Do not install the software on other versions of Linux on POWER Systems.

2. To determine whether the required kernel is installed, enter the following command:

```
# uname -r
```

The following is a sample output displayed by running this command on a Red Hat Enterprise Linux Server 7.1 system:

```
3.10.0-229.ael17b.ppc64le
```

In this example, the output shows the kernel version (3.10.0) and errata level (ael17b) on the system.

If the kernel version does not meet the requirement specified earlier in this section, then contact your operating system vendor for information about obtaining and installing kernel updates.

3. To determine whether the required packages are installed, enter commands similar to the following:

```
# rpm -q package_name
```

If a package is not installed, then install it from your Linux distribution media or download the required package version from your Linux vendor's website.

2.3.1 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
 - * WE8EBCDIC37C for EBCDIC platforms only
 - * WE8EBCDIC1047 for EBCDIC platforms only
 - Unicode
 - * UTF8
 - * AL32UTF8
 - * AL16UTF16

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.

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.

Installing and Removing Oracle Database Client

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

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

3.1 Downloading and Installing the Oracle Database Client Software

The following steps describe how to install the Oracle software:

1. Download the Instant Client for Linux on POWER Systems (64-bit) package from the Instant Client Downloads page on Oracle Technology Network at <http://www.oracle.com/technetwork/index.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_1` directory.
3. Set the `LD_LIBRARY_PATH` and the `NLS_LANG` environment variables to the full path of the `instantclient_12_1` directory. For example, if you unzipped the Instant Client zip file in the `/bin/oracle` directory, then set the `LD_LIBRARY_PATH` environment variable to `/bin/oracle/instantclient_12_1`.

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

This completes the installation of Oracle Database Client. To connect to the Oracle Database server, run the client from the Oracle Database Instant Client environment.

4. The Object Type Translator Utility (OTT) utility may have to be modified to reflect the correct environment variable `LD_LIBRARY_PATH` as `ORACLE_HOME` may not be available.

Note: If you want to use VAC compiler, then you need to set the COMPILER=VAC value in the environment:

- For Red Hat Enterprise Linux Server 7.1, set:

VAC_VERSION=13.1.2

- For SUSE Linux Enterprise Server 12, set:

VAC_VERSION=13.1.1

In addition to the preceding task:

- Ensure that xlc is in the PATH of your environment.
 - Also, set COMPILER_MODE = 64 if you want to build a 64-bit demo executable.
-
-

3.2 Removing the Oracle Database Client Software

To remove the Oracle Database Client software, delete the `instantclient_12_1` directory.

Oracle Database Client Postinstallation Tasks

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

- [Required Postinstallation Tasks](#)
- [Recommended Postinstallation Tasks](#)
- [Required Product-Specific Postinstallation Tasks](#)

You must perform the tasks listed in "[Required Postinstallation Tasks](#)" on page 4-1. Oracle recommends that you perform the tasks listed in "[Recommended Postinstallation Tasks](#)" on page 4-2 after all installations.

If you install and intend to use any of the products listed in "[Required Product-Specific Postinstallation Tasks](#)" on page 4-4, then you must perform the tasks listed in the product-specific subsections.

4.1 Required Postinstallation Tasks

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

- [Updating Instant Client](#)
- [Connecting with Instant Client](#)

4.1.1 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 `PATH` environment variable setting to reflect the new location.

Note: The Instant Client and Instant Client Light installations do not create an inventory. Therefore, you cannot perform patch upgrades for these installations using the `opatch` utility.

4.1.2 Connecting with Instant Client

If you installed the Instant Client installation type, you can configure users' environments to enable dynamically linked client applications to connect to a database as follows:

1. Set the appropriate shared library path environment variable for your platform to specify the directory that contains the Instant Client libraries. For the Instant Client installation type, this directory is the Oracle home directory that you specified during the installation, for example:

```
Your_current_dir/instantclient_12_1
```

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

- Specify a SQL connect URL string using the following format:

```
//host:port/service_name
```

For example:

```
//shobeen:1521/sales_us
```

- 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: It is not required that you specify the `ORACLE_HOME` environment variable.

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](#)

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

Before you can connect Instant Client (including Instant Client Light) to an Oracle database, ensure that the `LD_LIBRARY_PATH` environment variable specifies the directory that contains the Instant Client libraries. This directory is the `ORACLE_HOME` directory that you specified during installation.

For example, the shared libraries for Instant Client or Instant Client Light (if you have configured Instant Client Light), are in:

```
Your_current_dir/instantclient_12_1
```

After checking the `LD_LIBRARY_PATH` 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:

```
Enter user-name: 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 `OCIserverAttach()` call specify the connection information:

- Specify a SQL connect URL string using the following format:

```
//host[:port][/]service_name]
```

For example:

```
//shobeen:1521/sales_us
```

- 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 on 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](#)" on page 4-3.
- Oracle Net keyword-value pair.
- A `tnsnames.ora` entry and `TNS_ADMIN` is set to the location of `tnsnames.ora`.
- A `tnsnames.ora` entry and the following:
 - `tnsnames.ora` file located in `$ORACLE_HOME/network/admin`.
 - The `ORACLE_HOME` environment variable set to this Oracle home.

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.

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

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++.

Note: All precompiler configuration files are located in the \$ORACLE_HOME/precomp/admin directory.

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.

For more information about setting environment variables, see Pro*C/C++ Programmer's Guide.

4.3.2 Configuring GCC as the Primary Compiler

You can configure GNU Compiler Collection (GCC) as the primary compiler if the primary supported compiler is not available. Configuring the primary compiler enables you to speed up the performance of PL/SQL modules such as packages by compiling them into native code that resides in shared libraries. This method translates the module into C code, compiles it with a C compiler, and then links it into the Oracle process. Remember that you must use one compiler to compile all your Oracle modules. You cannot compile some modules with the primary compiler and others with a different compiler.

If both, the primary supported compiler for the operating system and GCC are available, then use the primary supported compiler. However, if the primary supported compiler is not available, then use GCC.

To configure GCC as the primary compiler:

1. Open the `spnc_commands` configuration file in a text editor. In a default installation, the `spnc_commands` file is located in the `$ORACLE_HOME/plsql` directory.
2. Look for the following line of text and comment it out:

```
/usr/local/packages/vac/vac/$(VAC_VERSION)/bin/xlc -F$(ORACLE_
HOME)/lib/xlc.cfg %(src) -O0 -qpvc -q64 -I$(ORACLE_HOME)/plsql/include
-I$(ORACLE_HOME)/plsql/public -s -qmkshrobj -o %(so)
```

3. Look for the following lines, which pertain to GCC, and uncomment them:

```
# /usr/bin/gcc -m64 -B/usr/bin/ %(src) -O1 -fPIC -I$(ORACLE_
HOME)/plsql/include -I$(ORACLE_HOME)/plsql/public -s -shared -o %(so)
```

4. Save and close the `spnc_commands` configuration file.

See Also: *Oracle Database PL/SQL User's Guide and Reference* for more information on PL/SQL native compilation and the `spnc_commands` configuration file

Using the IBM XL C/C++ compiler for PL/SQL Native Compilation

By default, PL/SQL native compilation is configured to use the GCC compiler. If you want to use the IBM XL compiler (XLC) instead of the GCC compiler, then make the following changes in the `$ORACLE_HOME/plsql/spnc_commands` file:

1. Comment out the lines for the GCC compiler.
2. Uncomment the lines for IBM XL compiler.

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