

G2-Oracle Bridge

Release Notes
Version 12.0 Rev. 1



G2-Oracle Bridge Release Notes, Version 12.0 Rev. 1

May 2020

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Part Number: DOC047-1200

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Preface

Describes these release notes and the conventions that they use.

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About these Notes

These Release Notes:

- Explain how to install your G2-Oracle Bridge, and how to establish connections to the database and communicate with it. This information is unique to Oracle and is not included in the *G2 Database Bridge User's Guide*.
- Describe the system requirements for this release.
- Give information on all new and changed bridge features.

Audience

To use this manual, you must have at least a limited knowledge of G2, and a thorough understanding of the database system that you want to connect to G2.

Conventions

This guide uses the following typographic conventions and conventions for defining system procedures.

Typographic

Convention Examples	Description
g2-window, g2-window-1, ws-top-level, sys-mod	User-defined and system-defined G2 class names, instance names, workspace names, and module names
history-keeping-spec, temperature	User-defined and system-defined G2 attribute names
true, 1.234, ok, "Burlington, MA"	G2 attribute values and values specified or viewed through dialogs
Main Menu > Start KB Workspace > New Object create subworkspace Start Procedure	G2 menu choices and button labels
conclude that the x of y ...	Text of G2 procedures, methods, functions, formulas, and expressions
<i>new-argument</i>	User-specified values in syntax descriptions
<u>text-string</u>	Return values of G2 procedures and methods in syntax descriptions
File Name, OK, Apply, Cancel, General, Edit Scroll Area	GUIDE and native dialog fields, button labels, tabs, and titles
File > Save Properties	GMS and native menu choices
workspace	Glossary terms

Convention Examples	Description
c:\Program Files\Gensym\ /usr/gensym/g2/kbs	Windows pathnames UNIX pathnames
spreadsh.kb	File names
g2 -kb top.kb	Operating system commands
public void main() gsi_start	Java, C and all other external code

Note Syntax conventions are fully described in the *G2 Reference Manual*.

Procedure Signatures

A procedure signature is a complete syntactic summary of a procedure or method. A procedure signature shows values supplied by the user in *italics*, and the value (if any) returned by the procedure underlined. Each value is followed by its type:

```
g2-clone-and-transfer-objects
  (list: class item-list, to-workspace: class kb-workspace,
   delta-x: integer, delta-y: integer)
  -> transferred-items: g2-list
```

Related Documentation

G2 Core Technology

- *G2 Bundle Release Notes*
- *Getting Started with G2 Tutorials*
- *G2 Reference Manual*
- *G2 Language Reference Card*
- *G2 Developer's Guide*
- *G2 System Procedures Reference Manual*

- *G2 System Procedures Reference Card*
- *G2 Class Reference Manual*
- *Telewindows User's Guide*
- *G2 Gateway Bridge Developer's Guide*

G2 Utilities

- *G2 ProTools User's Guide*
- *G2 Foundation Resources User's Guide*
- *G2 Menu System User's Guide*
- *G2 XL Spreadsheet User's Guide*
- *G2 Dynamic Displays User's Guide*
- *G2 Developer's Interface User's Guide*
- *G2 OnLine Documentation Developer's Guide*
- *G2 OnLine Documentation User's Guide*
- *G2 GUIDE User's Guide*
- *G2 GUIDE/UII Procedures Reference Manual*

G2 Developers' Utilities

- *Business Process Management System Users' Guide*
- *Business Rules Management System User's Guide*
- *G2 Reporting Engine User's Guide*
- *G2 Web User's Guide*
- *G2 Event and Data Processing User's Guide*
- *G2 Run-Time Library User's Guide*
- *G2 Event Manager User's Guide*
- *G2 Dialog Utility User's Guide*
- *G2 Data Source Manager User's Guide*
- *G2 Data Point Manager User's Guide*
- *G2 Engineering Unit Conversion User's Guide*
- *G2 Error Handling Foundation User's Guide*
- *G2 Relation Browser User's Guide*

Bridges and External Systems

- *G2 ActiveXLink User's Guide*
- *G2 CORBALink User's Guide*
- *G2 Database Bridge User's Guide*
- *G2-ODBC Bridge Release Notes*
- *G2-Oracle Bridge Release Notes*
- *G2-Sybase Bridge Release Notes*
- *G2 JMail Bridge User's Guide*
- *G2 Java Socket Manager User's Guide*
- *G2 JMSLink User's Guide*
- *G2 OPCLink User's Guide*
- *G2 PI Bridge User's Guide*
- *G2-SNMP Bridge User's Guide*
- *G2 CORBALink User's Guide*
- *G2 WebLink User's Guide*

G2 JavaLink

- *G2 JavaLink User's Guide*
- *G2 DownloadInterfaces User's Guide*
- *G2 Bean Builder User's Guide*

G2 Diagnostic Assistant

- *GDA User's Guide*
- *GDA Reference Manual*
- *GDA API Reference*

Customer Support Services

You can obtain help with this or any Gensym product from Gensym Customer Support. Help is available online, by telephone and by email.

To obtain customer support online:

➔ Access Ignite Support Portal at <https://support.ignitotech.com>.

You will be asked to log in to an existing account or create a new account if necessary. Ignite Support Portal allows you to:

- Register your question with Customer Support by creating an Issue.
- Query, link to, and review existing issues.
- Share issues with other users in your group.
- Query for Bugs, Suggestions, and Resolutions.

To obtain customer support by telephone or email:

➔ Use the following numbers and addresses:

United States Toll-Free +1-855-453-8174

United States Toll +1-512-861-2859

Email support@ignitotech.com

Overview of the G2-Oracle Bridge

Describes the G2-Oracle Bridge.

Introduction 1

Obtaining Bug Fix Information 1



Introduction

The G2-Oracle Bridge is based on the G2-Database Bridge common architecture. This document supplements the *G2 Database Bridge User's Guide*.

the G2-Oracle Bridge:

- Provides additional features and enhancements to the G2-Oracle Bridge.
- Fixes various bugs in earlier versions of the bridge.

Obtaining Bug Fix Information

This release includes various bug fixes for G2-Oracle Bridge. These fixes are documented in the Dynamic Technical Bulletin, available on G2 HelpLink at:

<http://www.gensym-support.com>

To see a Dynamic Technical Bulletin:

- 1 From the HelpLink home page, choose Product Support > Dynamic Technical Bulletins.
- 2 On that page, choose the product in which you are interested from the drop down list, then click Submit.

-
-
- 3** Choose a report for one of the last three versions of the product by clicking on the icon of the bulletin, or specify a range of bugs fixed between one release and another by using the Starting From Version and Finishing At Version pull-down menu options.

Requirements

Describes the system and 3rd-party requirements of this bridge.

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Introduction

You install the G2-Oracle Bridge as part of the G2 Bundle.

The following version-specific materials comprise the G2-Oracle Bridge:

Product	Version
<i>G2 Database Bridge User's Guide</i>	Version 12.0 Rev. 0
<i>G2-Oracle Bridge Release Notes</i>	Version 12.0 Rev. 0
g2-ora10.exe, g2-ora11.exe, g2-ora12.exe,	Version 12.0 Rev. 0
g2-database.kb	Version 12.0 Rev. 0

Note To achieve a successful installation, you must use only materials in this release. You must not use materials from previous releases in conjunction with this release or unexpected results may occur.

Release Compatibility

G2-Oracle Bridge Version 12.0 has specific compatibility requirements with G2 and Oracle.

It is not necessary to have a separately installed G2 Gateway to run this version of the bridge.

G2

The G2 bridges ship with a bridge KB named `g2-database.kb`, which will load with G2 Version 6.x or later on any platform where G2 is supported.

To load the bridge KBs into G2, it must be authorized with the Online option or similar G2 Gateway and ICP options.

Oracle

There are seven versions of the G2-Oracle Bridge: `g2-ora7`, `g2-ora80`, `g2-ora81`, `g2-ora90`, `g2-ora92`, `g2-ora10`, `g2-ora11`, and `g2-ora12`. The `g2-ora7` bridge was built with Oracle Version 7.3, the `g2-ora80` bridge with Oracle Version 8.0, the `g2-ora81` bridge with Oracle Version 8.1, the `g2-ora90` and `g2-ora92` bridges with Oracle Version 9i, the `g2-ora10` bridge with Oracle Version 10g, `g2-ora11` bridge with Oracle Version 11g, `g2-ora12` bridge with Oracle Version 12c.

The following table lists the Oracle Client that you should use with each version and the Oracle Servers to which each version will connect:

For this Oracle Client version...	You must use this G2-Oracle Bridge version...	Which can connect with this Oracle Server version...
7.3	<code>g2-ora7</code>	7.3, 8.0, 8.1
8.0	<code>g2-ora80</code>	7.3, 8.0, 8.1, 9i
8.1	<code>g2-ora81</code>	8.0.6.1 or higher, 8.1
UNIX (9.0 client): 9i	<code>g2-ora90</code>	UNIX: 9.0
Windows (9.2 client): 8i, 9i		Windows: 9.0, 9.2

For this Oracle Client version...	You must use this G2-Oracle Bridge version...	Which can connect with this Oracle Server version...
8i, 9i	g2-ora92	9.2
10g	g2-ora10	10g
11g	g2-ora11	11g
12c	g2-ora12	12c

If you are communicating between a G2-Oracle Bridge and an Oracle Server that are on different network nodes, the version of the client software on the machine running the bridge and the version of the server software on the machine running the server must be compatible. If the versions are not compatible, some of the features of the G2-Oracle Bridge will function incorrectly.

Note When running g2-ora80 on RS 6000 platforms, you must first cd (change directory) to the directory in which the executable is located before starting the bridge; otherwise, the bridge may not function properly.

Note Oracle 9i introduced a bug (Oracle bug #2245771) that causes our Oracle 8 bridge not to work with Oracle 9i. To fix this problem, Oracle recommends upgrading to the 8.1.7.4 version of the client software. However, we have not yet tested this solution.

System Requirements

The following table lists the minimum system requirements to run the G2-Oracle Bridge on your system. Note that the Oracle 9i version of the bridge is supported on Windows, Sparc Solaris, and HP-UX only.

Platform	Operating System	G2-Oracle Bridge	Disk Space
Alpha	HP Tru64 UNIX 5.1A	g2-ora7	4.4 MBytes
	HP Tru64 UNIX 5.1A	g2-ora80	4.6 MBytes
	HP Tru64 UNIX 5.1A	g2-ora81	4.6 MBytes

Platform	Operating System	G2-Oracle Bridge	Disk Space
	HP Tru64 UNIX 5.1A	g2-ora10	4.6 MBytes
HP9000	HP-UX 11.0 or 11i V2	g2-ora7	7.0 MBytes
	HP-UX 11.0 or 11i V2	g2-ora80	5.1 MBytes
	HP-UX 11.0 or 11i V2	g2-ora81	5.1 MBytes
	HP-UX 11.0 or 11i V2	g2-ora90	5.1 MBytes
	HP-UX 11.0 or 11i V2	g2-ora92	5.1 MBytes
	HP-UX 11.0 or 11i V2	g2-ora10	5.1 MBytes
AIX	AIX 5L V5.2	g2-ora7	7.3 MBytes
	AIX 5L V5.2	g2-ora80	5.0 MBytes
	AIX 5L V5.2	g2-ora81	5.0 MBytes
	AIX 5L V5.2	g2-ora92	5.0 MBytes
	AIX 5L V5.2	g2-ora10	5.0 MBytes
Sparc	Solaris 2.6	g2-ora7	4.0 MBytes
	Solaris 2.6	g2-ora80	5.6 MBytes
	Solaris 2.6	g2-ora81	14.2 MBytes
	Solaris 2.8	g2-ora90	14.2 MBytes
	Solaris 2.8	g2-ora92	14.2 MBytes
	Solaris 2.8	g2-ora10	14.2 MBytes

Platform	Operating System	G2-Oracle Bridge	Disk Space
Windows	XP Pro/ 2003,2000	g2-ora7	3.0 MBytes
	XP Pro/ 2003,2000	g2-ora80	3.2 MBytes
	XP Pro/ 2003,2000	g2-ora81	14.2 MBytes
	XP Pro/ 2003,2000	g2-ora90	14.2 MBytes
	XP Pro/ 2003,2000	g2-ora92	14.2 MBytes
	Server 2010, Server 2008 R2, Server 2008, 10, 8.1, 7	g2-ora10	3 MBytes
	Server 2010, Server 2008 R2, Server 2008, 10, 8.1, 7	g2-ora11	3 MBytes
	Server 2010, Server 2008 R2, Server 2008, 10, 8.1, 7	g2-ora12	3 MBytes

Platform	Operating System	G2-Oracle Bridge	Disk Space
Linux	Linux kernel 2.4.26 or greater	g2-ora80	6.3 MBytes
	Linux kernel 2.4.26 or greater	g2-ora81	8.9 Mbytes
	Linux kernel 2.4.26 or greater	g2-ora90	8.9 Mbytes
	Linux kernel 2.4.26 or greater	g2-ora92	8.9 Mbytes
	Linux kernel 2.6 or greater	g2-ora10	8.3 Mbytes
	Linux kernel 2.6 or greater	g2-ora11	8.3 Mbytes
	Linux kernel 2.6 or greater	g2-ora12	8.3 Mbytes

Release Features

Describes the new and changed features in this release.

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Introduction

This chapter describes the new features and changes in the G2-Oracle Bridge for the last several releases of the bridge.

The following table shows the G2-Oracle Bridge versions that these release notes cover and their corresponding G2 Bundle versions:

G2-Oracle Bridge Version	G2 Bundle Version
Version 12.0 Rev. 0	Version 2015
Version 11.0 Rev. 0	Version 2011
Version 8.3 Rev. 0	Version 8.3 Rev. 0
Version 8.2 Rev. 0	Version 8.2 Rev. 0

G2-Oracle Bridge Version	G2 Bundle Version
Version 7.1 Rev. 0	Version 8.1 Rev. 1
Version 7.1 Rev. 0	Version 8.1 Rev. 0

G2-Oracle Bridge Version 12.0 Rev. 0

The G2-Oracle Bridge supports the Oracle 12c server. The new bridge executable is `g2-ora12`. You must use the Oracle 12c Client software with `g2-ora12`.

Both 32-bit and 64-bit G2-Oracle Bridges for Oracle 10g, 11g, 12c are provided in the bundle.

Older G2-Oracle Bridges for Oracle 7.x, 8.x and 9.x have been removed from the bundle. Please contact Gensym supports if any customer still needs them.

G2-Oracle Bridge Version 11.0 Rev. 0

The G2-Oracle Bridge supports the Oracle 11g server. The new bridge executable is `g2-ora11`. You must use the Oracle 11g Client software with `g2-ora11`.

Both 32-bit and 64-bit G2-Oracle Bridges for Oracle 10g and Oracle 11g are now provided in the bundle.

Older G2-Oracle Bridges for Oracle 7.x, 8.x and 9.x are still requiring V8 licenses.

G2-Oracle Bridge Version 8.3 Rev. 0

The G2-Oracle Bridge now requires `sys-mod.kb` and `uilroot.kb`.

The G2-Oracle Bridge supports the Oracle 10g server. The new bridge executable is `g2-ora10`. You must use the Oracle 10g Client software with `g2-ora10`.

The `g2-ora92` bridge is now supported on the IBM AIX platform.

The G2-Oracle Bridge supports “smart fetch.” For details, see the *G2 Database Bridge User's Guide*.

G2-Oracle Bridge Version 8.2 Rev. 0

G2-Oracle Bridge has been upgraded to Version 8.2 Rev. 0 for the G2 Bundle Version 8.2 Rev. 0. The bridge has been compiled with G2 Gateway Version 8.2.

G2-Oracle Bridge Version 8.2 Rev. 0 is supported on the Linux platform for Oracle 9i with Oracle 9.0 and 9.2 clients.

The G2-ODBC Bridge has two new features, which are available for all G2 Database Bridges:

- `-shutdown_on_disconnect` command-line option.
- Three new attributes on the `g2-database-interface` class for inserting NULLs into tables:
 - `set-null-string`
 - `set-null-number`
 - `set-null-options`

For details, see the *G2 Database Bridge User's Guide*.

G2-Oracle Bridge Version 7.1 Rev. 0

On Windows platforms, you can determine the bridge version without having to run G2 by choosing Properties on the bridge executable file, for example, `g2-oracle.exe`, and clicking the Version tab. The Product Version attribute indicates the bridge version.

G2-Oracle Bridge-Specific Information

Provides information specific to the G2-Oracle database.

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Introduction

This chapter contains G2-Oracle Bridge documentation unique to Oracle and not included in the *G2 Database Bridge User's Guide*. This information is not necessarily related to the release of a new version of the G2-Oracle Bridge.

Connecting to the Database

The bridge may be local or remote to the database. The Oracle connect string is required in both cases, and must be entered in the `database-connect-string` attribute of your `g2-database-interface` object.

The `database-connect-string` will vary depending on:

- Whether the bridge is local or remote to the database.
- Whether the type of protocol is TCP/IP, pipe, Mailbox, etc.
- What Oracle network facility is being used.

The `database-connect-string` must *not* contain the database user name or the password. However, the user name and password must be entered in the `database-user` and `database-password` attributes of the `g2-database-interface` object.

Note For a complete description of how and when to connect to the database from the bridge, see “Configuring Connections” in the *G2 Database Bridge User’s Guide*.

The following operations take place for the TCP/IP protocol when the bridge establishes a Net8 connection to a database server process, a shared dispatcher process, or a pre-spawned shadow process:

- 1 The bridge sends a connection request out on the TNS (transparent network substrate) network where it arrives at one of the communities to which the server is attached.
- 2 Oracle’s Net8 listener control utility (LSNRCTL) process, which is running on the database server node and listening for connection requests, receives the request from the bridge.
- 3 The LSNRCTL listener then either spawns a dedicated server process and directs the incoming request to a shared dispatcher process, or it directs the incoming request to a prespawnd shadow process. The listener then acknowledges the connection back to the bridge.
- 4 If the LSNRCTL listener spawns a dedicated server process, it will hand the connection off to that process, and the connection is established between the bridge and the database server.

Connecting the Bridge to a Local or Remote Database

When connecting the bridge to a local or remote database, Oracle's Net8 networking product and the appropriate Net8 transport driver, Net8, TCP/IP, etc., must be installed and running on the machine running the database. In addition, the LSNRCTL listener must be running on the database computer. To verify that the LSNRCTL listener is running, login to the database computer as an authorized Oracle database user and enter the following commands:

To display the status of the LSNRCTL listener:

- Enter `lsnrctl stat`. There should be a section at the end of the display that shows a services summary. The system identifier or name of the instance to which you wish to connect (SID) must be present in this summary.

To start the LSNRCTL listener:

- Enter `lsnrctl start`.

The LSNRCTL listener relies on two files that are created during Net8 configuration: `listener.ora` and `tnsnames.ora`.

Before a database can receive connections from the bridge, there must be a LSNRCTL listener running on the database machine. The configuration file for the listener is `listener.ora` which contains information about the database computer and the database instance in the form of a connect descriptor. Typically there is one listener file for each node running a database on the network.

Connect descriptors describe the location of the TNS listener and the SID or instance name of the database to which to connect. The connect descriptor is identified by a service name that should be used as the database connection string in the `g2-database-interface` object.

The file `tnsnames.ora` is used by Net8 to identify potential database server and interchange destinations. The `tnsnames.ora` file is essentially a mapping file that maps service names to connect descriptors. The database to which you wish to connect must have a service name entry in the `tnsnames.ora` file.

Note On Windows, you must run the Oracle SQL Net Configuration utility to define a connection descriptor or alias for the database and instance to which you wish to connect.

The connection string supplied in the `database-connect-string` of the `g2-database-interface` object for Net8 does not contain all of the network and database information required to locate a database instance. Instead, this information is included in the connect descriptor of the `listener.ora` file. For the `database-connect-string` of your `g2-database-interface` object, specify one of the service names listed in the `tnsnames.ora` file.

The database connection attributes of a `g2-database-interface` object for connecting the bridge to a local or remote database might be configured as follows:

G2 Attribute	Value
<code>database-user</code>	"scott"
<code>database-password</code>	"tiger"
<code>database-connection-string</code>	"bakery_dbase"

Connecting Automatically Using OS Authentication

Operating system (OS) account names may be used to automatically connect to the database. When this approach is used, the OS, instead of the database, authenticates the user.

In order to have the OS authenticate users, you must make sure that the Oracle database startup parameter `REMOTE_OS_AUTHENT` is set to `TRUE`. Oracle, by default, attaches the prefix `OPS$`, which is defined by the database startup parameter `OS_AUTHENT_PREFIX`, to your username. Oracle compares the prefixed user name with the Oracle user names in the database when a user attempts to connect.

For example, assume that `OS_AUTHENT_PREFIX` is set as follows:

```
OS_AUTHENT_PREFIX = OPS$  
REMOTE_OS_AUTHENT = TRUE
```

If you have an OS account named `SCOTT` and wish to connect to an Oracle database and be authenticated by the OS, simply supply `"/` for the `database-user` attribute of the `g2-database-interface` object. Do not supply a value for the `database-password` of the `g2-database-interface` object, and do not specify a password when the account is created. Oracle checks for a corresponding database user named `"OPS$SCOTT"` in the database.

For example:

```
create user ops$scott identified externally;
```

If a password is specified for the account when it is created, Oracle, instead of the OS, will attempt to authenticate the login.

The database connection attributes of a `g2-database-interface` object for connecting automatically using OS authentication might be configured as follows:

G2 Attribute	Value
<code>database-user</code>	<code>"/"</code>
<code>database-password</code>	<code>"none"</code>
<code>database-connection-string</code>	<code>"bakery_dbase"</code>

Using `TWO_TASK` or `LOCAL` Connection Information

You can use the `TWO_TASK` or `LOCAL` environment variable to supply connection information from the bridge process to the database, on UNIX and Windows platforms, respectively. This approach allows you to remove connection details from your application and manage connections externally. The environment variable must be set to a valid Net8 service name that has been defined in the `tnsnames.ora` file.

The following examples associate the `TWO_TASK` or `LOCAL` environment variable with the service name `bakery_dbase`:

- UNIX C-shell


```
setenv TWO_TASK bakery_dbase
```
- UNIX Bourne shell or Korn shell


```
TWO_TASK=bakery_dbase
export TWO_TASK
```
- Windows


```
set LOCAL=bakery_dbase
```

To use the environment variable within the bridge, you must set the value of the `database-connect-string` attribute of the `g2-database` interface object to "none".

The database connection attributes of a `g2-database-interface` object for connecting using information from the environment variable might be configured as follows:

G2 Attribute	Value
database-user	“scott”
database-password	“tiger”
database-connection-string	“none”

Note You may use `TWO_TASK` or `LOCAL` connections in conjunction with automatic operating system authentication.

Problems Connecting to the Database with Net8

The following points summarize the common reasons why Net8 connections may not be successfully established:

- The database executables must be built with the appropriate Net8 network protocols. Network protocols are found under the option `Netconfig` when running the Oracle installation program `oracleins`. For example, if you wish to connect to a database with the Net8 TCP/IP protocol, you must enable this option in `Netconfig` and rebuild your database executables. Please consult your database administrator and Oracle documentation for further details.
- An `LSNRCTL` listener must be started on the machine that is running the database server. The connection will be rejected if the `LSNRCTL` listener has not been started or if `listener.ora` and `tnsnames.ora` have not been properly configured. To verify that the `LSNRCTL` listener is running, login to the machine running the database and enter:

```
$ lsnrctl status
```

The output generated will indicate if the listener is started. It will also list the known service handlers corresponding to the database instances (SIDs) that you wish to connect. If the SID that you wish to connect to is not listed, you must modify your `listener.ora` and `tnsnames.ora` files and reload them into `LSNRCTL` before attempting a connection.

- The bridge must be run from within the Oracle environment. In other words, all of the environment variables, logicals, etc. must be properly configured prior to starting the bridge.
- The account that is starting the bridge must have the appropriate privileges, quotas, and resources available as detailed in the *Oracle Installation and*

Configuration Guide. In general, ORAUSER must be run prior to starting the bridge process.

- If you receive a message similar to one of the following:
 - TNS-12203: TNS:unable to connect to destination
 - ORA-12154: TNS could not resolve database name
 - ORA-01034: ORACLE not available

check to make sure that your LSNRCTL listener is started, and that your database is up and running. Also, you should make sure that your network and protocol are available.

You can check your connection syntax and verify that all of the steps above are working by testing your connection string with SQL*Plus.

The following example attempts a Net8 connection to a database on a computer which is identified by the service name `bakery_dbase`:

```
$ sqlplus scott/tiger@bakery_dbase
```

If this connection fails, you should go back and check all of the requirements listed above.

Accessing Database Data

This section describes Oracle-specific information about accessing database data.

Database Character Sets and Text Conversion

The bridge will translate character sets between G2 and the database based on the command line option `-CHARSET`. This functionality is achieved via translator routines that convert G2 internal character sets into character sets utilized by database vendors. For a list of supported character sets, refer to “Chapter 4, Running the Bridge” in the *G2 Database Bridge User’s Guide*.

If you are performing a remote connection from the bridge to the database, you may have to set the Oracle system variable `NLS_LANG` to *language_territory.character set*.

For example, on Unix systems enter:

```
setenv NLS_LANG korean_korea.ko16ksc5601
```

Please refer to your *Oracle Server Administrator’s Guide* for further details and the acceptable values for this parameter.

Bind Variables

Every SQL statement must be parsed and have an execution plan chosen for it before it can be executed. These parsed SQL statements are held in an Oracle memory area called the library cache. Statements within the library cache will be reused if identical SQL statements from any user are processed shortly thereafter. To be identical, statements must have exactly the same sequence of characters, including case, spaces, and punctuation.

Certain SQL statements can be made identical by providing place holders or bind variables. For example, assuming that there is an SQL statement that is designed to insert an employee name into the database, the only element in the SQL statement that will change will be the employee name.

For details on using bind variables in SQL statements to execute DML and query transactions, please refer to Chapters 6 and 7 respectively, in the *G2 Database Bridge User's Guide*.

Dates and Functions

Oracle does not support the use of a function or a database object such as SYSDATE as a bind variable value. However, functions may be used within an SQL statement.

The following example represents a *valid* SQL statement with bind variables:

```
variable = "98-DEC-25"  
insert into datetable values (to_date(:variable, 'YY-MON-DD'))
```

The following examples illustrate *invalid* SQL statements with bind variables:

```
variable = "SYSDATE"  
insert into datetable values (:variable)  
  
variable = "to_date('98-DEC-25', 'YY-MON-DD')"  
insert into datetable values (:variable)
```

If a function or database object such as SYSDATE is used as a bind variable, the database will view the bind variable as a string literal. In other words, it will not execute or de-reference the object within the bind variable but rather will consider the object as data.

PL/SQL Block Support

The G2-Oracle Bridge provides limited support for executing PL/SQL blocks such as begin-end blocks. PL/SQL blocks must *not* contain queries such as select statements. The PL/SQL block must be passed as a single text string to the G2 procedure `db-exec-stored-proc`.

For example:

```
sql-stmt ="insert into emp (ename) values ('Gensym');
delete from emp where age = 10;
update emp set comm = NULL where job = 'TRAINEE'"

status,code,msg,nrows = call db-exec-stored-proc ( sql-stmt );
```

Notice that each SQL statement is separated by a semicolon, and that the entire PL/SQL block is contained in the string, `sql-stmt`. The procedure `db-exec-stored-proc` automatically adds the begin and end keywords. Do not supply these keywords yourself.

PL/SQL blocks improve client and server performance, particularly remote access, because they reduce the amount of interaction between the Oracle database and the bridge. This improvement is seen as a reduction in procedure calls and reduced network traffic. In essence, a single SQL transaction may perform multiple operations.

PL/SQL blocks and stored procedures may also be executed by using the `g2-database.kb` procedure `db-exec-sql`. However, you must enclose the statement within begin and end keywords.

Event Notification through Triggers

Triggers provide the capability for G2 to respond to events occurring in the database. Triggers are defined by the database administrator on specific database objects such as tables. Trigger messages can be conveyed to G2 via either one of two methods:

- Messages to a G2 procedure.
- Updates to a trigger-object.

Up to 50 triggers may be set per bridge process. Please refer to the *G2 Database Bridge User's Guide* for details on how to set triggers.

In order for trigger information to be sent to the bridge, the following Oracle database package must be installed:

```
DBMS_PIPE      (for example, dbmspipe.sql)
```

The `DBMS_PIPE` package must be installed via the Oracle SYS account. If installed from another account, there may be multiple instances of this package in the database and you may be unable to send trigger information to the bridge. You must provide access to this package by granting the `EXECUTE` privilege on this package to selected users or roles.

If you fail to provide the execute privilege to users who will be using triggers, you may receive trigger validation errors in G2 when a trigger event occurs.

You must create triggers on database objects that you wish to monitor. In addition, you must invoke the `DBMS_PIPE` package in order to send the trigger information to the bridge.

If a trigger may fire several times within a single second, the pipe should be large enough to hold all the messages that will be sent to it during that 1 second period. The default size of a pipe is 8192 bytes. In our example, pipes are created implicitly and released when they are empty. If an application needs a pipe larger than the default size of 8192 bytes, it should create the pipe with the `dbms_pipe.create_pipe` function. In that case, you must explicitly deallocate the pipe with the `dbms_pipe.remove_pipe` function.

The following is an example of a trigger that executes when a row is inserted into the table named `my_table`. This trigger sends the message "Trigger Alert - INSERT!!" to a pipe named `trig_pipe1`. The bridge will receive this message and notify G2 with the trigger message and a timestamp that indicates when the message occurred.

```
create or replace trigger my_insert_trigger
after insert on my_table
for each row
declare
    status number;
    msg      varchar2(128);
begin
    msg := 'Trigger Alert INSERT';
    dbms_pipe.pack_message(msg);
    status := DBMS_PIPE.SEND_MESSAGE('TRIG_PIPE1');
end;
/
```

The next example will execute when a row is deleted from the table `my_table`. Note that this trigger will send the trigger information to a pipe named `trig_pipe2`:

```
create or replace trigger my_delete_trigger
after delete on my_table
for each row
declare
    status number;
    msg      varchar2(128);
begin
    msg := 'Trigger Alert DELETE !!';
    dbms_pipe.pack_message(msg);
    status := DBMS_PIPE.SEND_MESSAGE('TRIG_PIPE2');
end;
/
```

When you register trigger watches in G2, you specify the trigger name `trig_pipe1` and/or `trig_pipe2`. The bridge will watch for messages on these named pipes and report the trigger information to G2 when the trigger occurs.

Column Attribute Naming and Aliasing

Oracle supports column name aliases in queries. You specify the alias in your select list after the column name and before the comma. For example:

```
select ename employee, empno id, salary from emp
```

In this example, the value from the database column `ename` will be retrieved into a query object column attribute named `employee`, and the value from the database column `empno` will be retrieved into a query object column attribute named `id`. For database columns that are G2 reserved words, you may use aliases or you may use database views to redefine the result table column names.

When performing SQL functions such as *max*, *min*, *sum*, *avg*, and *count*, you must utilize an alias if you wish to associate the data with a G2 object attribute. For example:

```
select avg(age) age from emp
```

If the `age` alias is not used, the SQL statement will generate a column name of `avg(age)` instead of `age`, and an error message will be generated.

Column Number Values

Database column values of data type Number may be represented in the database as integers or as floats.

Keep in mind the following important characteristics of Number columns when querying:

- When left unspecified, the default precision and scale for a Number column is (38,10), and the bridge will treat it as a float. The corresponding query object column attribute must be either of type float or quantity.
- If a non floating-point number such as `INTEGER`, `NUMBER(P)`, etc. could exceed the maximum G2 integer precision of 30 bits (from -2²⁹ to (2²⁹ - 1)), it will be converted to a float value in G2. For example, `NUMBER(10)` with a value of 1 will be returned as a float since `NUMBER(10)` could hold a value that wouldn't fit in a G2 integer. Attribute definitions must be able to handle this conversion.
- When a query contains a select list column that has an SQL function being performed on it, the bridge will return a float to that column. Therefore, you must define your query object column attribute as type quantity or float.

For more information see "Querying the Database" in the *G2 Database Bridge User's Guide*.

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