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Configuration Guide

ExpressConnect for Oracle
15.7.1 SP100

Microsoft Windows, UNIX, and Linux

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Contents

Conventions

These style and syntax conventions are used in Sybase® documentation.

Style conventions

Key	Definition
`monospaced(fixed-width)`	• SQL and program code • Commands to be entered exactly as shown • File names • Directory names
`italic monospaced`	In SQL or program code snippets, placeholders for user-specified values (see example below).
italic	• File and variable names • Cross-references to other topics or documents • In text, placeholders for user-specified values (see example below) • Glossary terms in text
bold san serif	• Command, function, stored procedure, utility, class, and method names • Glossary entries (in the Glossary) • Menu option paths • In numbered task or procedure steps, user-interface (UI) elements that you click, such as buttons, check boxes, icons, and so on

If necessary, an explanation for a placeholder (system- or setup-specific values) follows in text. For example:

Run:

```
installation directory\start.bat
```

where *installation directory* is where the application is installed.

Syntax conventions

Key	Definition
{ }	Curly braces indicate that you must choose at least one of the enclosed options. Do not type the braces when you enter the command.
[ ]	Brackets mean that choosing one or more of the enclosed options is optional. Do not type the brackets when you enter the command.
( )	Parentheses are to be typed as part of the command.
|	The vertical bar means you can select only one of the options shown.
,	The comma means you can choose as many of the options shown as you like, separating your choices with commas that you type as part of the command.
...	An ellipsis (three dots) means you may repeat the last unit as many times as you need. Do not include ellipses in the command.

Case-sensitivity

- All command syntax and command examples are shown in lowercase. However, replication command names are not case-sensitive. For example, **RA_CONFIG**, **Ra_Config**, and **ra_config** are equivalent.
- Names of configuration parameters are case-sensitive. For example, **Scan_Sleep_Max** is not the same as **scan_sleep_max**, and the former would be interpreted as an invalid parameter name.
- Database object names are not case-sensitive in replication commands. However, to use a mixed-case object name in a replication command (to match a mixed-case object name in the primary database), delimit the object name with quote characters. For example: **pdb_get_tables** "*TableName*"
- Identifiers and character data may be case-sensitive, depending on the sort order that is in effect.
  - If you are using a case-sensitive sort order, such as “binary,” you must enter identifiers and character data with the correct combination of uppercase and lowercase letters.
  - If you are using a sort order that is not case-sensitive, such as “nocase,” you can enter identifiers and character data with any combination of uppercase or lowercase letters.

Terminology

Replication Agent™ is a generic term used to describe the Replication Agents for Adaptive Server® Enterprise, Oracle, IBM DB2 UDB, and Microsoft SQL Server. The specific names are:

- RepAgent – Replication Agent thread for Adaptive Server Enterprise
- Replication Agent for Oracle

- Replication Agent for Microsoft SQL Server
- Replication Agent for UDB – for IBM DB2 on Linux, Unix, and Windows
- Replication Agent for DB2 for z/OS

About ExpressConnect for Oracle

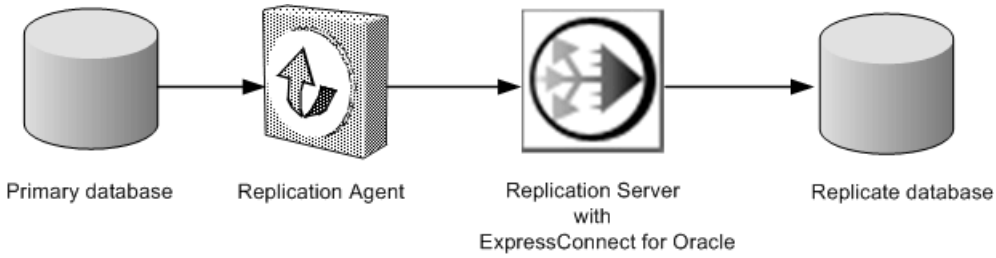
ExpressConnect for Oracle (ECO) is installed automatically with Replication Server®.

ECO provides direct communication between Replication Server and a replicate Oracle data server, making Oracle data easily accessible in a heterogeneous replication environment. Compared with the previous technology using a database gateway, ECO also eliminates the need for installing and setting up a separate gateway server, thereby improving performance and reducing the complexities of managing a replication system.

ExpressConnect for Oracle:

- Minimizes network overhead between products
- Reduces SQL parsing and datatype conversions
- Takes greater advantage of “bind variable” SQL statements where it is possible to make Oracle data server processing more efficient
- Uses array processing to the Oracle data server

Figure 1: ExpressConnect for Oracle Architecture



Licensing

You can use ECO if you have a licensed Replication Server and have purchased Replication Server Option for Oracle, which includes the additional ECO license.

Obtaining ECO Static License

ExpressConnect for Oracle (ECO) is installed with Replication Server. To use ECO, obtain the `SYBASE_REP_ECO.lic` static file and the `README.txt` file from the Replication Server Option for Oracle Getting Started CD.

Copy this license to `$SYBASE/REP-15_5/sysam` directory on UNIX platforms or the `%SYBASE%\REP-15_5\sysam` directory on Windows.

Installing Oracle Instant Client Libraries

As of version 15.7.1, ECO does not include Oracle Instant Client libraries in its packaging nor installation. Download and install these Instant Client libraries for the installed ECO from the Oracle Web site. ECO and the Oracle Instant Client libraries are loaded by Replication Server and are required for replication to an Oracle target database.

1. Create a temporary directory `<tempdir>`.
2. Go to the Oracle Web site at *http://www.oracle.com*.
3. Select **Downloads > Databases > Instant Client**.
4. Select the download link for your platform:

Table 1. Instant Client Download Links By Platform

Platform	Download Link
Windows x86 32-bit	Instant Client for Microsoft Windows (32-bit)
Windows x86-64 64-bit	Instant Client for Microsoft Windows (64-bit)
Linux x86-64 64-bit	Instant Client for Linux x86-64
Linux pSeries 64-bit	Instant Client for Linux on Power (64-bit)
Solaris SPARC 64-bit	Instant Client for Solaris Operating System (SPARC) (64-bit)
Solaris x86 64-bit	Instant Client for Solaris x86-64
HP-UX Itanium 64-bit	Instant Client for HP-UX Itanium (64-bit)
IBM AIX pSeries 64-bit	Instant Client for AIX5L (64-bit)

5. Read and accept the **OTN Development and Distribution License Agreement for Instant Client**.
6. Go to the specified version and download the Instant Client libraries package to the temporary directory `<tempdir>`:

Table 2. Instant Client Libraries Packages By Platform

Platform	Instant Client Version	Package
Windows x86 32-bit	10.2.0.4	`instantclient-basic-win32-10.2.0.4.zip`

Platform	Instant Client Version	Package
Windows x86-64 (64-bit) running Windows-XP, Windows Server 2000, or Windows Server 2003	10.2.0.5	`instantclient-basic-win64-10.2.0.5.zip`
Windows x86-64 (64-bit) running Windows Server 2008, Windows Vista, or Windows 7	10.2.0.5	`instantclient-basic-win64-10.2.0.5.zip`
Linux x86-64 64-bit	10.2.0.4	`basic-10.2.0.4.0-linux-x86_64.zip`
Linux pSeries 64-bit	10.2.0.4	`basic-10.2.0.4.0-linux-ppc64.zip`
Solaris SPARC 64-bit	10.2.0.4	`basic-10.2.0.4.0-solaris-sparc64.zip`
Solaris x86 64-bit	10.2.0.4	`basic-10.2.0.4.0-solaris-x86-64.zip`
HP-UX Itanium 64-bit	10.2.0.4	`basic-10.2.0.4.0-hpux-ia64.zip`
IBM AIX pSeries 64-bit	10.2.0.4	`basic-10.2.0.4.0-aix-ppc64.zip`

7. Extract the Oracle Instant Client package into the temporary directory `<tempdir>` using a zip utility (for Windows) or the **UnZip** utility (for UNIX platforms.)

   For UNIX platforms, the UnZip utility can be downloaded from: *https://updates.oracle.com/unzips/unzips.html*.

8. Copy the extracted Oracle Instant Client library files from the `<tempdir>\instantclient_10_2` directory to the `<eco_install_dir>\REP-15_5\connector\lib` directory.

Configuring ExpressConnect for Oracle

Configure ExpressConnect for Oracle to set up connections between Oracle and Replication Server.

1. Copy the Oracle server's `tnsnames.ora` file to the `RS_installation_directory\REP-15_5\connector\oraoci\network\admin` directory.
2. Determine the Oracle user ID and password used to connect from Replication Server. See *Oracle Replicate Database Permissions* in the *Replication Server Heterogeneous Replication Guide*.
3. Restart Replication Server.
4. Use **isql** to create a connection to Replication Server using the alias name defined in the Oracle `tnsnames.ora` file, user ID, and password combination. For example:

   ```
   create connection to
   <tnsnames_alias>.<ora_rdb_name>
   using profile rs_oracle_to_oracle;eco
   set username <userid>
   set password <password>
   set batch to 'off'
   ```

   where:

   - **tnsnames_alias** is the case-sensitive name identifying the replicate Oracle database in the `tnsnames.ora` file. For example:

     ```
     <tnsnames_alias> =
        (DESCRIPTION =
           (ADDRESS = (PROTOCOL = TCP)(HOST = hostname)(PORT = 1521))
           (CONNECT_DATA =
                (SERVER = DEDICATED)
                (SERVICE_NAME = orcl)
           )
        )
     ```

   - **ora_rdb_name** can be any name which best describes the replicate Oracle database, for example, orcl11g.

   If you are not using one of the Replication Server connection profiles for ECO, set **dsi_proc_as_rpc** to on in the **create connection** command. For example:

   ```
   create connection to <tnsnames_alias>.<ora_rdb_name>
   set error class <error_class>
   set function string class <function_class>
   set username <userid>
   set password <password>

   set batch to 'off'
   set dsi_proc_as_rpc to 'on'
   ```

If you are using one of the ECO connection profiles, **dsi_proc_as_rpc** is enabled by default.

See **create connection** in the *Replication Server Reference Manual*.

Trace and Debug

Enable the tracing option in Replication Server to gather connector-level and connection-level diagnostic information.

Diagnostic information related to ExpressConnect for Oracle execution is available for operations at both the connector level and the connection level, and for various diagnostic conditions. Not all conditions are available for both connector-level and connection-level tracing. Some also require the use of the diagnostic version of the ExpressConnect for Oracle executable.

Table 3. Tracepoints

Condition	Description	Availability	Requires Debug ECO Executable
cm_ct_connect	Enables all connection-level diagnostic conditions and all possible debugging methods available through the replicate data server connectivity layer. For ECO, the replicate data server connectivity layer is the OCI interface.	Connection only	Yes
general_1	Logs function entry and exit points with input and output parameters and return codes. Enabling this condition for the connector also enables it for all of the connector's connections.	Both connector and connection	Yes
general_2	Logs messages indicating the execution path through internal functions. Enabling this condition for the connector also enables it for all of the connector's connections.	Both connector and connection	Yes

Condition	Description	Availability	Requires Debug ECO Executable
consistency_1	Logs analysis and validation of internal function input parameters. Enabling this condition for the connector also enables it for all of the connector's connections.	Both connector and connection	Yes
consistency_2	Logs analysis and validation of data structures at key points in the execution path. Enabling this condition for the connector also enables it for all of the connector's connections.	Both connector and connection	Yes
dsi_buf_dump	Logs the language command buffer sent to the data server.	Connection only	No
dsi_trace_write_text	Logs key points in the execution path and data associated with sending large object (LOB) data to the replicate data server.	Connection only	Yes
rsfeature_dsql	Logs key points in the execution path of dynamic SQL management.	Connection only	Yes
rsfeature_bulk1	Logs key points in the execution of the bulk (array) insert feature at the operation level. This condition produces less output than rsfeature_bulk2.	Connection only	Yes
rsfeature_bulk2	Logs key points in the execution of the bulk (array) insert feature at the row and column level. This condition can produce a lot of output when there are many rows.	Connection only	Yes

Collecting Connector-Level Diagnostic Information

Enable the tracing option in Replication Server to help diagnose issues at the connector level. Make these settings:

```
alter connector "ora"."oci"
set trace to "econn,condition,[on|off]"
```

All connector-level and connection-level diagnostic messages are written to the Replication Server error log.

Configuring ECO to Write Error Messages to a Log File

Configure ExpressConnect for Oracle (ECO) to also record error messages in a connector-specific log file called `ecoraoci.log`.

Make these settings:

```
alter connector "ora"."oci"
set trace_logpath to <log-file-path>
```

Where `<log-file-path>` is the full path name where the `ecoraoci.log` is to be created.

Collecting Connection-Level Diagnostic Information

Enable the tracing option in Replication Server to help diagnose issues at the connection level.

Make these settings:

```
alter connection <tns_alias_name>.<ora_sid_name>
set trace to "econn,condition,[on|off]"
```

Using Diagnotics Version of ECO Libraries

Use the diagnostics version of ECO libraries for enhanced tracing.

Express Connect for Oracle (ECO) responds to certain diagnostic conditions only if the diagnostic version of the ECO libraries are loaded by Replication Server. To force Replication Server to load the diagnostic version of the ECO libraries, configure the library load path appropriate to your operating system (for example, %PATH% on Windows, $LD_LIBRARY_PATH on Solaris and other UNIX systems) to detect the `RS_installation_directory/REP-15_5/connector/devlib` directory before and in addition to the `RS_installation_directory/REP-15_5/connector/lib` directory.

The load library path is configured in the environment setup scripts (on UNIX) or batch files (on Windows) that were generated by the installer. If you are using these scripts to run Replication Server, edit them accordingly to locate the diagnostic version of the ECO libraries. See the *Replication Server Troubleshooting Guide* for information on diagnosing issues with Replication Server and using the debug version of Replication Server.

For enhanced diagnostic behavior:

- Alter the Replication Server library load path to use the diagnostic version of the ECO libraries (as described above).
- Enable **general_1**, **general_2**, **consistency_1**, and **consistency_2** conditions at the connector level.
- Enable **dsi_buf_dump**, **dsi_trace_writetext**, **rsfeature_dsql**, **rsfeature_bulk1**, and **rsfeature_bulk2** conditions at the connection level.

Migrating from ECDA for Oracle to ECO

Migrate from any version of Replication Server used with EnterpriseConnect Data Access (ECDA) for Oracle to Replication Server with ExpressConnect for Oracle (ECO).

The core functionality of ECO and ECDA for Oracle is identical. However, ECO functionality is preconfigured and tuned to best suit the usage of Replication Server with replicate Oracle database. The only reason to use ECDA for Oracle over ECO is to support an older version of Replication Server. Any new Oracle replication scenarios should use ECO.

Migration Considerations

Understand the benefits and limitations of ExpressConnect for Oracle (ECO) before deciding to migrate from an older version of Replication Server using ECDA for Oracle to a newer Replication Server using ECO.

The benefits of ECO over ECDA for Oracle are:

- ECO runs within the process space of Replication Server. Unlike ECDA for Oracle, which operates independently from Replication Server and can be located on a separate machine, ECO has no separate server process that needs starting up, monitoring, or administering.
- Since Replication Server and ECO run within the same process, no SSL is needed between them, and there is no requirement to configure settings previously covered in the ECDA for Oracle global configuration parameters.
- Server connectivity is derived from the *tns_alias_name* and *oracle_sid_name* provided to the Replication Server connection **create connection** and **alter connection** commands. You need not separately configure the equivalent to the ECDA for Oracle **connect_string** setting.
- You also need not configure the settings that are equivalent to the ECDA for Oracle service-specific settings, such as **text_chunksize**, **autocommit**, and **array_size**. These settings are automatically determined by Replication Server (in some cases based on the Replication Agent input) and communicated to ECO.

The limitation of ECO is:

- Error messages emanating from the ECO itself are currently available only in the us_english language in the iso_1 character set. However, error messages emanating from Oracle are sent in the language and character set that matches that of Replication Server.
- ECO does not support the use of custom function strings that use large objects (LOB).

See also

- *Configuring ExpressConnect for Oracle* on page 11

Creating a Connection to Oracle

Create a Replication Server connection to Oracle using ExpressConnect for Oracle (ECO).

ECO requires only the `tnsnames.ora` file to establish location transparency, unlike ECDA for Oracle, which also requires an interfaces file to set up connections between Oracle and Replication Server.

1. Copy the `tnsnames.ora` file used by ECDA for Oracle to the `RS_installation_directory\REP-15_5\connector\oraoci\network\admin` directory.
2. Use the value previously given to the **connect_string** configuration parameter of ECDA for Oracle as the **data_server** in the Replication Server **create connection** command. See **create connection** in the *Replication Server Reference Manual*.

Note: The **connect_string** configuration parameter is same as **<tnsnames_alias>** in the `tnsnames.ora` file obtained from the ECDA for Oracle installation.

See also

- *Configuring ExpressConnect for Oracle* on page 11

Index