



BEA eLink

Business Process Option Server Installation Guide

BEA eLink Business Process Option 1.2
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About This Document

This document provides detailed instructions for installing the BEA Business Process Option Server. The procedures listed provide instructions only for installing and testing the Business Process Engine and installing the Business Process Option servers. In order to run the complete Business Process Option, you must configure the system as described in the *Business Process Option BEA eLink Configuration Guide*.

Who Should Read This Document

The *BEA eLink Business Process Option Server Installation Guide* is intended for system administrators who are responsible for installing and configuring the BEA Business Process Option system.

How This Document Is Organized

The *BEA eLink Business Process Option Server Installation Guide* is organized as follows:

- Chapter 1, “Installation Overview,” summarizes the two-stage server installation process.
- Chapter 2, “Before You Begin,” explains how to prepare your system for the BEA eLink Business Process Option installation procedure.

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- Chapter 3, “Stage 1: Installing the eLink Business Process Engine,” provides detailed instructions for the first stage of the installation procedure, installing the eLink Business Process Engine and Document Repository.
 - Chapter 4, “Verifying the Stage 1 Installation,” describes the fundamental configuration procedures for completing a basic installation of the eLink Business Process Engine.
 - Chapter 5, “Stage 2: Completing the Installation,” explains how to install the eLink Business Process Option Server and provides post-installation procedures.

Documentation Conventions

The following documentation conventions are used throughout this manual.

Convention	Item
boldface text	Terms defined in the glossary.
Ctrl+Tab	The plus sign indicates that you must press two or more keys simultaneously, as in the example Ctrl+Tab.
<i>italics</i>	For emphasis or book titles.
monospace text	Code samples, commands and their options, data structures and their members, data types, directories, and file names and their extensions. Monospace text also indicates text that you must enter from the keyboard. <i>Examples:</i> <pre>#include <iostream.h> void main () the pointer psz chmod u+w * \tux\data\ap .doc tux.doc BITMAP float</pre>

Convention	Item
monospace boldface text	Significant words in code. <i>Example:</i> void commit ()
<i>monospace italic text</i>	Variables in code. <i>Example:</i> String <i>expr</i>
UPPERCASE TEXT	Device names, environment variables, and logical operators. <i>Examples:</i> LPT1 SIGNON OR
{ }	A set of choices in a syntax line. The braces themselves should never be typed.
[]	Optional items in a syntax line. The brackets themselves should never be typed. <i>Example:</i> buildobjclient [-v] [-o name] [-f <i>file-list</i>]... [-l <i>file-list</i>]...
	Separates mutually exclusive choices in a syntax line. The symbol itself should never be typed.
...	In a command line, indicates one of the following: <ul style="list-style-type: none"> ■ An argument can be repeated several times in a command line. ■ The statement omits additional optional arguments. ■ You can enter additional parameters, values, or other information. The ellipsis itself should never be typed. <i>Example:</i> buildobjclient [-v] [-o name] [-f <i>file-list</i>]... [-l <i>file-list</i>]...
.	Omission of items from a code example or from a syntax line. The vertical ellipsis itself should never be typed.

Related Documentation

The following sections list the documentation provided with the eLink software, and other publications related to its technology.

eLink Business Process Option Documentation

The eLink Business Process Option information set consists of the following documents:

- *BEA eLink Business Process Option User's Guide*
- *BEA eLink Business Process Option Release Notes*
- *BEA eLink Business Process Option Server Installation Guide*
- *BEA eLink Business Process Option Client Installation Guide*
- *BEA eLink Business Process Option Operation and Maintenance Guide*
- *BEA eLink Business Process Option Configuration Guide*

Note: These documents are online at the BEA Web site. The BEA Process Option CD set includes all the documents in both HTML and Adobe Acrobat PDF format. You can use Adobe Acrobat Reader to print all or a portion of each document.

BEA Publications

The following BEA publications, which cover the eLink Platform technology in depth, are available in the same formats as the Business Process Option information set.

TUXEDO System 6 Administration Guide

TUXEDO System 6 Administration Guide to the Web-Based GUI

TUXEDO System 6 Reference Manual

Other Publications

For more information about the eLink Platform technology, refer to the following books:

3-Tier Client/Server at Work (Edwards)

The TUXEDO System (Andrade, Carges, Dwyer, Felts)

The BEA eLink Business Process Option incorporates third-party business process engine technology. The relevant third-party documentation is directly incorporated within the eLink Business Process Option documentation set. This information should be sufficient; however, the eLink Business Process Engine CD also contains the relevant third-party information. Please note that neither the third-party documentation nor the usage it describes are directly supported by BEA Systems, Inc.

Customer Support

If you have questions about this version of the BEA eLink Business Process Option, or if you have problems installing and running the software, contact BEA Customer Support through BEA WebSupport at www.bea.com. You can also contact Customer Support by using the contact information provided on the Customer Support Card, which is included in the product package.

When contacting Customer Support, be prepared to provide the following information:

- Your name, e-mail address, phone number, and fax number
- Your company name and company address
- Your machine type and authorization codes
- The name and version of the product you are using
- A description of the problem and the content of pertinent error messages



1 Installation Overview

Before you start your eLink Business Process Option installation, please check the eLink Business Process Option Release Notes to make sure that the system upon which you will be installing the eLink Business Process Option meets all of the necessary hardware and software requirements. The most important software requirements are that you have the BEA eLink Platform, BEA eLink Foundation, and Oracle installed. Also, you should have significant experience administering and programming BEA Tuxedo applications.

We assume that you are familiar with the Tuxedo implementation model and terminology. If you are not, we strongly recommend attending a BEA Tuxedo training class before you install or create programs using the BEA eLink Business Process Option. You should also be familiar enough with Oracle database administration that you can set up Oracle database IDs and assign rights and privileges in the database.

BEA eLink Platform and eLink Foundation

Two products form the basis of the BEA eLink Business Process Option: The eLink Platform and the eLink Foundation. Intended for customers with minimal EAI requirements, the eLink Platform supports eLink Adapters only. The eLink Foundation meets the requirements of more complex EAI scenarios. It supports the Data Integration and Business Process Options, and contains bundled functionality that enables applications integrated using eLink to be called by Java applications (with no additional programming). The eLink Foundation requires the eLink Platform.

Note: Make sure that you read the installation guides and release notes for both the eLink Platform and the eLink Foundation products before installing them. The application of patches to the eLink Platform product is required before you can properly install the eLink Foundation product.

Business Process Option Installation Steps

The following sections provide an overview of the various procedures involved in installing, deploying, and testing the BEA eLink Business Process Option (BPO) Servers.

- Stage 1: Installing the Business Process Engine
- Stage 2: Installing the Business Process Option Server

Stage 1: Installing the Business Process Engine

As part of the Stage 1 installation, you will need to set up a customized instance on an Oracle database, so you will need a database administrator with experience in setting up Oracle database IDs and in assigning rights and privileges in the database. Stage 1 consists of two main procedures:

- Installation procedures
- Startup, test, and verification

Stage 1 Business Process Engine Installation

Stage 1 installation entails the following procedures:

- Mounting the CD-ROM
- Running the Extraction Script
- Starting the Installation Script
- Specifying General Parameters

- Populating the Database
- Configuring the eLink Business Process Engine for Test and Verification
- Defining Standard eLink Business Process Engine Classes and Attributes

For a detailed description of these procedures, see Chapter 3, “Stage 1: Installing the eLink Business Process Engine.”

Stage 1 Business Process Engine Startup, Test and Verification

Stage 1 test and verification entails the following procedures:

- Reviewing and Editing the Generated Configuration Files
- Verifying System Resources
- Creating the Transaction Log File
- Configuring the eLink Business Process Engine Repository
- Verifying the Special User and Repository Directory
- Starting the eLink Business Process Engine Repository Daemon
- Verifying That the Repository Daemon Is Running
- Checking eLink Business Process Engine Status

For a detailed description of these procedures, see Chapter 4, “Verifying the Stage 1 Installation.”

Stage 2: Installing the Business Process Option Server

Stage 2 installation consists of two main procedures:

- Installation
- Post-installation

Stage 2 BPO Server Installation

Stage 2 installation entails the following procedures:

- Mounting the CD-ROM
- Preparing the Installation readme File
- Starting the eLink Business Process Option Server Installation Script
- Entering Your Installation Information

For a detailed description of these procedures, see Chapter 5, “Stage 2: Completing the Installation.”

Stage 2 BPO Server Post-installation

Stage 2 post-installation entails the following procedures:

- Setting Up a BEA eLink Platform Configuration
- Installing the Sample Programs (optional)
- Setting Up Your License Key File
- Creating eLink Business Process Option Users

For a detailed description of these procedures, see the “Post-Installation Procedures” section in Chapter 5, “Stage 2: Completing the Installation.”

2 Before You Begin

The following sections describe the preparatory procedures for BEA eLink Business Process Option Server installation.

- Verifying System Requirements
- Gathering Your Installation Information
- Creating the UNIX User and Group
- Creating the eLink Business Process Engine Home Directory
- Creating the Default Business Process Engine Repository Directory
- Configuring the Oracle Database for the eLink Business Process Engine

These procedures are described in detail in the following sections.

Verifying System Requirements

Verify that your system meets the following hardware and software requirements.

Hardware Requirements

- At least 256 MB of RAM
- At least 150 MB of free disk space (depending on how much database space you want to allot—the default installation uses about 50 MB and creates a database of 100 MB)

Software Requirements

- HP-UX 11.00 (32- or 64- bit) or Solaris 2.6 with patch 105591-06 or 105591-07 (See Note below for more information on the necessity of this patch.)
- Oracle 8.0.5, with XA
- BEA eLink Foundation v1.2

Note: It is very important to have only the -06 or -07 patch level installed for Solaris. The file `/usr/lib/libCrun.so.1` is required in `LD_LIBRARY_PATH`. It comes with Solaris patch 105591-06 or -07. If the wrong version of this file is encountered, `IcBatRegSA` will core dump with a Bus Error during the “install/IcTuxInstall” process. For example, Solaris 2.6 patch 105591-08 will cause a core dump.

Use the following command to check your patch level:

```
>showrev -p|grep 105591
Patch: 105591-06 Obsoletes: 101242-13 Requires:
Incompatibles: Packages: SUNWlibc.2
```

If for some reason, you are not able to install these patches immediately, the workaround is to acquire the file `libCrun.so.1` from the -06 or -07 patch version. The file **must** be copied into the directory where `IcCliMgr`, `IcWorker`, `IcTMS`, `IcEvtAct`, and `IcEvtSched` live. In the case of this installation example, we chose to `/app/mlink/bpo_sw/tuxapp`. This directory is set as our `$APPDIR` in the installation guide examples. Those programs use the `libCrun.so.1` library.

Gathering Your Installation Information

Gather the information you need to complete the installation. Use the following checklist:

- Base directory of your existing BEA eLink Platform installation
- Base directory where the BEA eLink Business Process Engine components will be installed

- Base directory in which the BEA eLink Business Process Engine Repository will be created
- Your BEA eLink Business Process Option License token and serial number
- Unique identifier for your BEA eLink Business Process Option Server

Note: The formula for determining a unique server ID is as follows:

$$((serial\# - 1,000,000,000) \times 10) + 900,000,000$$

where *serial#* is the serial number in the BEA eLink Business Process Engine section of your license file.

- UNIX hostname for the installation machine as known to the UNIX kernel
- TCP/IP port number to be used to connect to the BEA eLink Business Process Engine Repository
- Database user's user ID and password
- Name of the tablespace to be dedicated to the BEA eLink Business Process Engine
- SQL*Net identifier for your database instance
- Absolute pathname for the Oracle installation directory
- Directory containing the SQL*Net configuration files
- Your Oracle site ID
- Your new or existing BEA eLink Platform domain ID
- Your unique identifier for interprocess communications for your eLink Platform domain
- Directory to which eLink Platform transaction logs should be written
- TCP port number to be used by client applications to connect to your eLink Platform domain

Creating the UNIX User and Group

The BEA eLink Business Process Engine requires a UNIX user ID and group be available for use in installing and configuring the BEA eLink Business Process Option. The examples in this guide employ a user ID called `eLink` and a group called `eLink`. The command and response shown in Listing 2-1 demonstrates a method for determining user and group ids. In this example, the user ID (`uid`) is `eLink` and the group ID (`gid`) is `eLink`.

Listing 2-1 Command for Determining User and Group IDs

```
>id
uid=1016(eLink)gid=4000(eLink)
```

Creating the eLink Business Process Engine Home Directory

You must create the BEA eLink Business Process Engine home directory (known as `IC_HOME`), which is where the eLink Business Process Engine software will be installed. The examples provided in the remainder of this installation guide will use an `IC_HOME` of `/app/eLink/bpo_sw`, so the example in this section will create a directory called `bpo_sw` in the `/app/eLink` directory.

Note: The Business Process Engine home directory must be owned by the `eLink` user, but must *not* be that user's home directory. It must also belong to the `eLink` group.

To create the eLink Business Process Engine home directory:

1. Identify a file system with at least 50 MB of free disk space and log in as `eLink`.
2. Create the eLink Business Process Engine home directory by entering:

```
mkdir directory
```

where *directory* is the name of the eLink Business Process Engine home directory. This directory cannot be the `elink` user's home directory.

Example:

`cd` to the `/app/elink` directory, then enter the following command to make the `IC_HOME` directory:

```
/app/elink> mkdir bpo_sw
```

3. Use the `chgrp` command with the `-R` option to make sure that the group of the eLink Business Process Engine home directory is `elink`:

```
chgrp -R elink directory
```

Example:

```
/app/elink> chgrp -R elink bpo_sw
```

4. Use the `chmod` command to change the permissions on the eLink Business Process Engine home directory to provide `elink` group members with read access:

```
chmod 755 directory
```

Example:

```
/app/elink> chmod 755 bpo_sw
```

Creating the Default Business Process Engine Repository Directory

One function of the BEA eLink Business Process Engine repository is storing the user interface data for the eLink Business Process window of the eLink Process Design Assistant. This repository is known as the *document repository*; and the directory for this repository must be created before installation. The `elink` user must have read/write access to the repository directory during installation. The examples provided in the remainder of this installation guide will use a repository directory of `/app/elink/bpo_rep`, so the example in this section will create a directory called `bpo_rep` in the `/app/elink` directory.

Note: Before you use the eLink Business Process Repository Server, make sure that you select the port number that the document repository server will listen on. Use the `netstat` command to list ports that are already in use.

To create the default Repository directory:

1. Log in as `elink`.
2. Enter the following command:

```
mkdir -p directory
```

where *directory* is the name of the eLink Business Process Engine Repository home directory. (This step creates the directory for the InConcert Document Repository.)

Example:

`cd` to the `/app/elink` directory, then enter the following command to make the repository directory:

```
/app/elink> mkdir -p bpo_rep
```

Warning: Do not create the Repository directory as a subdirectory of the eLink Business Process Engine home directory. This will prevent the `extract.sh` installation script from executing correctly.

3. Use the `chown` and `chgrp` commands to ensure that `elink` is the owner of the Repository directory, as follows:

```
chown -R elink directory
```

```
chgrp -R elink directory
```

Example:

```
/app/elink> chown -R elink bpo_rep
```

```
/app/elink> chgrp -R elink bpo_rep
```

4. Change the permissions on the Repository directory to provide only `elink` with read/write access:

```
chmod -R 700 directory
```

Example:

```
/app/elink> chmod -R 700 bpo_rep
```


5. Add an entry to your environment login file (`.kshrc`) or command file (`setenv`) that sets your `IC_HOME` environment variable.

Example:

```
IC_HOME=/app/mlink/bpo_sw
```

Note: If you ever have to reinstall the Business Process Engine, it is imperative that you delete all the contents of this repository directory. If you do not, you will have problems with the PDA client later. You will not be able to log into the Process Designer and may see messages like “Local Repository Mismatch”.

Configuring the Oracle Database for the eLink Business Process Engine

To run the eLink Business Process Engine, you must create an Oracle user and tablespace. In addition, you must change the Oracle configuration parameter `OPEN_CURSORS`.

Note: Before you install the eLink Business Process Engine, you must already have an Oracle instance installed and operating. Refer to your Oracle product documentation for information about installing the Oracle database.

Changing the OPEN_CURSORS Configuration Parameter

The BEA eLink Business Process Engine performs many SQL operations. To improve efficiency, it does not close explicit cursors between operations, thus allowing the Oracle database to keep information about the cursor in a cache. However, if you use the default setting for the `OPEN_CURSORS` parameter, it will result in an ORA-01000 runtime error.

To change the default setting for the `OPEN_CURSORS` parameter:

1. Shut down the Oracle instance.
2. Open the instance configuration file in a text editor.

This file is typically found in the directory `$ORACLE_HOME/dbs`, and is named `initSID.ora` (where *SID* is the Oracle system identifier for the instance).

3. Perform a case-insensitive search for the line containing `open_cursors`. Although Oracle configuration parameters are not case-sensitive, they are typically specified in lowercase.
4. Edit this line to set the value to 255. If it does not exist, create a new line as follows:

```
open_cursors = 255
```

5. Save your changes and exit the text editor.
6. Restart the Oracle instance.

Creating the eLink Business Process Tablespace and Database User

The eLink Business Process Engine database user owns all tables, views, and other database objects that support the operation of the eLink Business Process Engine. The procedure described here creates the user and a tablespace needed to run the eLink Business Process Option.

Note: To create the eLink Business Process Engine database user, you must have administrator access to the Oracle instance.

This procedure is appropriate for those sites without a full-time DBA. If your site does have a DBA, the DBA should create the tablespace in order to ensure that it meets the standards set by your organization.

To create the eLink Business Process Engine tablespace and database user:

1. Log in as the *oracle* user.

This login should set the `ORACLE_HOME`, `ORACLE_SID`, and `PATH` environment variables. If it does not, refer to your Oracle documentation for appropriate settings.

2. Identify a file system that contains sufficient space for the eLink Business Process Engine tablespace.

The required space depends on your expected usage of the eLink Business Process Engine. For a pilot installation, 100 MB is sufficient; for a production installation, you might want to reserve 200 MB or more. For our example, we will use the directory `/local/manda/ORACLE/godzilla` to store the tablespace.

3. Run the Oracle Server Manager utility by entering:

```
svrmgrl
```

4. Connect to the database instance by entering:

```
connect internal
```

5. Create the eLink Business Process Engine tablespace.

This example creates a 100 MB tablespace named `ICDB`. The default storage parameters in this database represent a trade-off between efficient storage of small tables and minimal fragmentation of large tables.

```
CREATE TABLESPACE ICDB
DATAFILE
  '/local/manda/ORACLE/godzilla/icdb.dbf'
  SIZE 100 M
DEFAULT STORAGE (
  INITIAL 256k
  NEXT 256
  PCTINCREASE 0
  MAXEXTENTS unlimited
);
```

6. Create the eLink Business Process Engine user.

This example creates the user `icdbown`, with the password `icdbown` and associates the user with the `ICDB` tablespace just created.

Note: The `icdbown` username and password are used in examples throughout the rest of this document.

This example also sets the user's temporary tablespace to `ICDB`. Many sites have a `TEMP` tablespace for temporary storage. Determine whether your site has a `TEMP` tablespace, and use it if available.

```
CREATE USER icdbown
IDENTIFIED BY icdbown
DEFAULT TABLESPACE ICDB
TEMPORARY TABLESPACE ICDB;
```

7. Grant connection access to the eLink Business Process Engine database user.

```
GRANT RESOURCE, CONNECT TO icdbown;
```

8. Grant access to the Oracle system view DBA_PENDING_TRANSACTIONS.

This step is required by the BEA eLink Platform; if omitted, you will get connection errors when attempting to start the eLink Business Process Engine.

```
GRANT SELECT ON DBA_PENDING_TRANSACTIONS TO icdbown;
```

9. Exit the Oracle Server Manager utility.

3 Stage 1: Installing the eLink Business Process Engine

The following sections describe the procedure for installing the BEA eLink Business Process Engine software.

- Installation Main Steps
- Mounting the CD-ROM
- Running the Extraction Script
- Starting the Installation Script
- Specifying General Parameters
- Populating the Database
- Configuring the eLink Business Process Engine for Test and Verification
- Defining Standard eLink Business Process Engine Classes and Attributes

Installation Main Steps

The following is an overview of the installation process. Subsequent sections describe these steps in more detail.

1. Insert the **eLink Business Process Engine** CD-ROM into the CD-ROM drive.

This release consists of two CD-ROMs:

- The BEA eLink Business Process Engine CD-ROM
- The BEA eLink Business Process Option CD-ROM

For Stage 1 of the Server installation process, you must use the eLink Business Process Engine CD-ROM.

2. Mount the CD-ROM.

On Solaris, if the automount daemon is running, the CDROM is automatically mounted as the `/cdrom` directory. If you are not installing on a Solaris platform or `vold` is not running, you must mount the CDROM manually, using the `-o cdcase` option. For example:

```
mount -F cdfs -o cdcase /dev/dsk/c0t2d0 /cdrom
```

Note: For detailed instructions, refer to “Mounting the CD-ROM,” below. Also refer to your UNIX Operating System Reference Manual page for the `mount_cdfs` command.

3. Go to the CD-ROM root directory.
4. Run the extraction script (`extract.sh`).
5. Enter the appropriate installation parameters for each `extract.sh` prompt.
6. Start the installation script.
7. Specify general parameters.
8. Populate the database.
9. Configure the eLink Business Process Engine for test and verification. (Engine classes and attributes are also installed.)

Mounting the CD-ROM

You can mount the CD-ROM with or without the Volume Manager. The following sections provide instructions for each method.

Mounting the CD-ROM with the Volume Manager

To mount the BEA eLink Business Process Engine CD-ROM with the Volume Manager:

1. Load the CD-ROM into the tray.

The Volume Manager automatically mounts the CD-ROM, and you see the directory `label` (where `label` is the CD-ROM volume label) appear under the standard CD-ROM mount point (usually `/cdrom`).

2. Once you finish loading the installation software, change to a safe directory location, such as the root directory, and eject the CD-ROM by entering:

```
eject cdrom
```

The Volume Manager automatically unmounts the CD-ROM.

Mounting the CD-ROM without the Volume Manager

To mount the BEA eLink Business Process Engine CD-ROM without the Volume Manager, do the following:

1. Log on as the root user.
2. Mount the CD-ROM.

For Solaris: Enter the following command to mount the CD-ROM:

```
mount -F hsfs -o ro /dev/dsk/c0t6d0s0 /cdrom
```

For HP-UX: Enter the following command to mount the CD-ROM:

```
mount -F cdfs -o ro,cdcase /dev/dsk/c0t6d0s0 /cdrom
```

3. To unmount and eject the CD-ROM, enter:

```
umount /cdrom  
eject /dev/dsk/c0t6d0s0
```

Note: The CD-ROM device specification may differ for your system (in the example above, it is `/dev/dsk/c0t6d0s0`). You must pick an empty directory for the mount point; the usual name for this directory is `/cdrom`.

Running the Extraction Script

Note: If you are manually copying the distribution files from CD-ROM to disk before running the extraction script, you must change the permissions for all of the copied files to READ-ONLY. For instructions, refer to your UNIX operating system reference manual page for the `chmod()` command, and refer specifically to the `-R` option (change permissions recursively) for this command.

Run the `extract.sh` script to extract the installation files from the CD-ROM. To run this script, you must have the CD-ROM mounted, and you must have created an `IC_HOME` directory as described in “Creating the eLink Business Process Engine Home Directory” in Chapter 2, “Before You Begin.”

Note: The `extract.sh` script fails if the Business Process Engine home directory is not empty. Make sure that this directory is completely empty before you run the `extract.sh` script.

When running `extract.sh`, you are prompted for configuration information, described in Table 3-1. You see a list of choices enclosed in parentheses, and a default value enclosed in square brackets as part of the prompt. Press Enter to accept the default parameter. You can run the extraction script from any directory. You do not need to change to the eLink Business Process Engine home directory or the CD-ROM mount point to run the extraction script.

To run `extract.sh`:

1. Make sure you are logged in as `elink` and enter:

`/cdrom/label/unix/icXXXtxm/extract.sh`

where *xxx* is the release number, and `/cdrom/label` is replaced by the actual mount point if it is different.

When `extract.sh` starts, it displays an introductory message and then prompts you for configuration information, such as the location of the eLink Business Process Engine home directory, `IC_HOME`, and the user name of the eLink Business Process Engine administrator, `IC_ADMIN_LOGIN`.

At any prompt, you can receive more information by entering `help` or `?`. You can exit the script and cancel the extraction at any prompt by entering `quit`.

2. Respond to each prompt or press Enter to accept the default response. The prompts, their defaults, and a description of each prompt are listed in Table 3-1.

Table 3-1 Install Script Prompts

Prompt	Default	Description
<code>IC_HOME</code>	None	Path name of the home directory that you created for the new eLink Business Process Engine installation. (The examples in this guide use an <code>IC_HOME</code> of <code>/app/elink/bpo_sw</code> .) This directory must be empty. <code>IC_HOME</code> should be specified without links in the path. Having links in the path may cause the <code>extract.sh</code> script to fail with an “internal error: cannot synchronize ic_home dir”error.
<code>IC_ADMIN_LOGIN</code>	<code>elink</code>	Login name for the eLink Business Process Engine administrator, who is the owner of the eLink Business Process Engine home directory specified in the previous prompt. If <code>elink</code> does not appear as the default, enter <code>quit</code> . Make sure you are logged in as <code>elink</code> , and restart the script.
<code>IC_MEDIA_DIR</code>	<code>/cdrom/label/unix/ic45txm</code>	Directory on the CD-ROM that contains the eLink Business Process Engine installation files.

3 Stage 1: Installing the eLink Business Process Engine

Prompt	Default	Description
IC_ARCH	<i>Current architecture</i>	Platform or operating system of the host on which you are installing eLink Business Process Engine. The available options are: <code>solaris</code> , <code>hpux11</code> .
IC_SERVER_DBMS	None	Database management system for your eLink Business Process Engine server. The available options are: <code>oracle</code> and <code>none</code> . Select <code>oracle</code> .
Install the InConcert API Development Environment?	No	The Development Environment must be installed for the eLink Business Process Option to run. Be sure to select <code>Yes</code> in response to this option.

When you finish answering the prompts, the script extracts the remaining data from the CD-ROM and displays a list of the files as they are extracted and the directories into which they are copied.

When the extraction procedure is complete, the script displays the following message:

```
InConcert Extraction Utility completed successfully.
```

Sample `extract.sh` Session

The following excerpt is a typical `extract.sh` session for eLink Business Process Engine:

```
Manatee% /cdrom/label/unix/ictxxm/extract.sh
```

```
This procedure guides you through extracting the relevant software components provided on the InConcert distribution media, as appropriate to the hardware architecture and underlying database software available at your installation.
```

```
At any prompt type 'help' (or '?') for instructions, or type 'quit' to exit the extraction process.
```

Enter the path to the InConcert installation directory.

IC_HOME: /home/jade/public/ic_home/tkdg

Enter the login for the designated InConcert system administrator. This account must own the release directory IC_HOME specified previously. If the default value is incorrect, or the value does not match the current Unix account, type 'quit' now and restart the extraction procedure as the correct user.

IC_ADMIN_LOGIN [elink]

Enter the directory name on which the distribution media is available, which is the same as the directory containing 'extract.sh' for a CD-ROM, or 'none' to use a special device. ('none' acceptable)

IC_MEDIA_DIR [/cdrom/icxxtxm/unix/icxxtxm]:

Enter the desired platform for this installation of InConcert. (hpux11, solaris)

IC_ARCH [solaris]:

Enter the DBMS for your InConcert server, or enter 'none' for a repository server or client-only installation. (oracle, none)

IC_SERVER_DBMS: oracle

Install the InConcert API Development Environment (yes/no) [no]? yes

Scanning for previously extracted components....

Extracting 'InConcert Common Installation Scripts' ...

Software component 'InConcert Common Installation Scripts' extracted successfully.

Extracting 'InConcert Common API Development System' ...

Software component 'InConcert Common API Development System' extracted successfully.

Extracting 'InConcert Oracle Common Scripts' ...

Software component 'InConcert Oracle Common Scripts' extracted successfully.

Extracting 'InConcert SPARC Solaris 2.6 Runtime System' ...

Software component 'InConcert SPARC Solaris 2.6 Runtime System' extracted successfully.

Extracting 'InConcert SPARC Solaris 2.6 API Development System' ...

Software component 'InConcert SPARC Solaris 2.6 API Development System' extracted successfully.

Extracting 'InConcert SPARC Solaris 2.6 Repository Server' ...

3 *Stage 1: Installing the eLink Business Process Engine*

```
Software component 'InConcert SPARC Solaris 2.6 Repository Server' extracted successfully.
```

```
Extracting 'InConcert SPARC Solaris 2.6 Server Administration Tools' ...
```

```
Software component 'InConcert SPARC Solaris 2.6 Server Administration Tools' extracted successfully.
```

```
Extracting 'InConcert SPARC Solaris 2.6 Oracle Server' ...
```

```
Software component 'InConcert SPARC Solaris 2.6 Oracle Server' extracted successfully.
```

```
Creating symbolic links....
```

```
InConcert Extraction Utility completed successfully.
```

```
Please consult the installation instructions in the InConcert Installation Guide for instructions on running the 'install/IcDbCreateScript' and 'install/IcTuxInstall' scripts.
```

Starting the Installation Script

This section explains how to start the Stage 1 installation script, `IcTuxInstall`. Before you can run this script, you must have completed all of the system preparation steps outlined in Chapter 2, “Before You Begin.”

Note: To run the Stage 1 installation script, your Oracle instance must be running.

Note: At each step of the installation, you are prompted to enter various kinds of information. You can quit the installation by entering `quit` at any prompt. To learn more about an individual prompt, enter `help` or `?`.

To start the `IcTuxInstall` script:

1. Log in to the eLink Business Process Engine host machine as `elink`.
2. Change to the directory specified as `$IC_HOME` for the `extract.sh` script (see Table 3-1). Make sure you are *not* in `$IC_HOME/install`.
3. Enter:

```
install/IcTuxInstall
```

The script prompts you to select one of the installation options described in Table 3-2:

Table 3-2 tadmin Installation Options

Option	Description
<code>install</code>	Initiates a new eLink Business Process Engine installation or resumes an incomplete installation. If you quit an installation or it fails due to an error, the installation will begin from the place at which the previous session ended.
<code>restart</code>	Lets you reinstall eLink Business Process Engine, using the default parameters of <code>IcTuxInstall</code> . The <code>IcTuxInstall</code> script starts at the beginning of the installation.
<code>reconfigure</code>	Lets you reinstall eLink Business Process Engine, changing the responses that you gave to a previous installation. <code>IcTuxInstall</code> script starts at the beginning of the installation and uses your previous response as the default value for each prompt.
<code>status</code>	Displays the current status of each eLink Business Process Engine submodule used in the installation procedure.
<code>display</code>	Displays the current configuration parameters, from the current or previous installation sessions. To change any of these parameters, you must quit, then run <code>IcTuxInstall</code> with the <code>restart</code> or <code>reconfigure</code> option.
<code>help</code>	Provides online help for <code>IcTuxInstall</code> options.
<code>quit</code>	Exits the <code>IcTuxInstall</code> script without performing the installation. Any parameters from previous installation attempts are preserved.

- For a new eLink Business Process Engine installation, enter `install`.

Also enter `install` if a previous installation failed or was terminated by `quit`, and you want to restart at the last successful operation. Enter `restart` if a previous installation failed or terminated, and you want to start from the beginning. Or enter `reconfigure` if you want to start from the beginning but preserve your earlier responses.

Specifying General Parameters

After selecting an installation option, you enter parameters that describe your system. To set general parameters, respond to the prompts as appropriate for your system. Table 3-3 lists the parameters that you are prompted to set, along with their default values.

Table 3-3 IcTuxInstall Prompts: General Parameters

Prompts	Default	Description
IC_SERVER_ID	None	A unique identifier for this Business Process Engine Server. The formula for determining a unique Server ID is as follows: $(((serial# - 1,000,000,000) \times 10) + 900,000,000)$ where: <i>serial#</i> is the serial number in the eLink Business Process Engine section of your license file and “ ” symbols denote absolute value. If you are installing additional eLink Business Process Engine instances on a machine, increment each additional IC_SERVER_ID by 1.
IC_SERVER_NAME	None	The name by which this eLink Business Process Engine Server will be known to clients. This should be the same as the UNIX hostname as reported by the UNIX command <code>uname -n</code>.
IC_REPOSITORY_TYPE	RepServer	The method used to access the document repository. Accept the default value.
IC_REPOSITORY_HOST	<i>machine_name</i>	The name of the host machine where the document repository is located. The default is the name of the machine on which you are running IcTuxInstall. Accept this default. The eLink Business Process Engine home directory (IC_HOME) and all repository directories must be mounted on this host, either locally or via NFS.

Table 3-3 IcTuxInstall Prompts: General Parameters (Continued)

Prompts	Default	Description
IC_REPOSITORY_PORTNUM	9001	Specify the TCP/IP port number that is used to connect to the repository.
IC_REPOSITORY_DIRECTORY	None.	The name of the eLink Business Process Engine Repository directory. You must provide an absolute path name.

Populating the Database

This section of the installation process creates the eLink Business Process Engine database objects and inserts initial data into those objects.

Note: Before you complete this section, make sure you have configured your Oracle installation for eLink Business Process Engine, as described in “Configuring the Oracle Database for the eLink Business Process Engine,” in Chapter 2, “Before You Begin.”

To populate the database:

1. After you set general parameters, the following prompt is displayed:

```
Is the InConcert database ready to be populated with data
(yes/no) [no]?
```

2. Select `yes` to continue, or `no` to terminate the installation script.

The script displays a series of prompts for information about your Oracle installation, as shown in Table 3-4.

Table 3-4 IcTuxInstall Prompts: Database Parameters

Prompts	Default	Description
IC_DATABASE_USER	icdbown	DBMS user name to use to log into the database.

Table 3-4 IcTuxInstall Prompts: Database Parameters (Continued)

Prompts	Default	Description
IC_DATABASE_PASSWORD	None.	The database user's password. Note: This is stored unencrypted; you should verify that the permissions on this file do not permit unauthorized people to read it.
IC_DATABASE_NAME	icdb	Name of tablespace dedicated to eLink Business Process Engine. Note that this is case insensitive (ICDB was used during the creation of the tablespace.)
OR_TWO_TASK	None.	The SQL*Net identifier for your database instance. If you choose to bypass SQL*Net, do not enter a response to this prompt (just press RETURN). You are then prompted for the Oracle System Identifier, ORACLE_SID.
OR_ORACLE_HOME	None.	Path for the Oracle installation directory.
OR_TNS_ADMIN	None.	The directory that contains SQL*Net configuration files. If your configuration files are in the default location of \$ORACLE_HOME/network/admin, you can respond with Enter; otherwise, enter the complete path name to this directory.
OR_ORACLE_SID	None	Oracle Site Identification.

3. Wait while `IcTuxInstall` configures the database.

Oracle displays a series of messages, including some apparent errors such as `table or view does not exist`. These messages are expected from a first-time installation: `IcTuxInstall` is attempting to remove data from a previous installation but can not find any.

When the database population is complete, `IcTuxInstall` displays the following message:

```
InConcert Database Population Procedure done.
```

4. If database population fails, check the file `/tmp/IcDbERRORLOG` file for errors.

Note: It is assumed that you will use SQL*Net for connectivity to Oracle, because it provides the most flexibility.

If you choose to bypass SQL*Net, replace `TWO_TASK` in all subsequent instructions with `ORACLE_SID`.

Configuring the eLink Business Process Engine for Test and Verification

In this step, `IcTuxInstall` creates several configuration files which are used to verify that the installation was successful. The content of these files is derived from your responses to the prompts described in Table 3-5. These files are:

- `UBBIC`
- `TuxEnvFile`
- `IcTuxConfig`
- `IcEnvFile`
- `IcCliMgr.cfg`
- `IcRepDaemon.config`
- `env.sh`
- `env.csh`

Note: Because this initial configuration is for the purpose of an initial startup test, accept all default values offered by the script.

Note: Configuration parameters beginning with `OR` identify the Oracle parameters as managed by `IcTuxInstall` (the actual Oracle parameters typically have the same name without the `OR_` prefix). Configuration parameters beginning with `TX` identify TUXEDO configuration parameters as managed by `IcTuxInstall` (the actual TUXEDO parameters typically have the same name without the `TX_` prefix). Refer to the *BEA TUXEDO Administrator's Guide* for more information on these parameters.

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To set Business Process Engine configuration parameters:

After the database population process completes, a series of prompts are displayed, as shown in Table 3-5. Respond to the prompts as appropriate for your system. Unless otherwise indicated, you can enter either full or relative path names. Relative path names are interpreted in relation to the eLink Business Process Engine home directory (IC_HOME).

Table 3-5 IcTuxInstall Prompts: Server Configuration Parameters

Prompt	Default	Description
IC_JOB_COPY_PROCESSES	1	The number of eLink Business Process Engine Server processes to handle job-copy requests. Accept the default.
IC_SERVER_HOST	<i><hostname></i>	Name of the physical host on which you are installing the eLink Business Process Engine.
IC_SERVER_PROCESSES	3	The number of eLink Business Process Engine server processes to handle calls other than job copy. Accept the default.
IC_SVC_TAGNAME	None	A unique suffix, 1-6 characters in length, that is appended to the names of all eLink Business Process Engine TUXEDO services. IMPORTANT: This item is case-sensitive. Be sure to enter eLink exactly. Failure to do so will result in errors when you attempt to access the Process Design Window in the PDA.
TX_DOMAINID	None	A new or existing TUXEDO domain ID. The domain ID typically identifies a particular application or autonomous group of applications.
TX_IPCKEY	None	A unique identifier for inter-process communications in this TUXEDO domain. The field's value must be in the range 32769 to 262142, and must be unique within the TUXEDO domains at your site.
TX_TLOG_DIRECTORY	None	The directory to which TUXEDO transaction logs should be written.

Table 3-5 IcTuxInstall Prompts: Server Configuration Parameters

Prompt	Default	Description
TX_TUXDIR	None	The full path name of the TUXEDO installation directory.
TX_WSL_PORT	50001	TCP port number used by client applications to connect to the domain. This field's value must be in the range 1024 to 65534. For more information, refer to the TUXEDO manual page <i>wsl(5)</i> .

Defining Standard eLink Business Process Engine Classes and Attributes

Warning: The classes and attributes are installed only if you specified Yes to the following installation script prompt:

```
Install the Windows GUI classes and attributes?
```

You must answer Yes. Otherwise, the classes and attributes will not be installed, and the eLink Business Process Option PC clients communicating with the Servers will not function properly.

Once the configuration files are created, `IcTuxInstall` generates the classes and attributes used by eLink Business Process Engine PC client applications.

`IcTuxInstall` runs the `IcBatchRegistry` utility, passing it several predefined scripts. At the start of this process you see the following output:

```
Running InConcert Class/Attribute Definition Procedure....
```

While this part of the installation is running, you see a long display of messages about the classes and attributes that are being created. When all classes and attributes have been installed, you will see the following message:

```
InConcert Class/Attribute Definition Procedure done.
```

3 *Stage 1: Installing the eLink Business Process Engine*

Installation of classes and attributes is the last step in the installation process. `IcTuxInstall` displays a message about the `env.sh` and `env.csh` files, after which you see your UNIX shell prompt.

Once you have answered all prompts, `IcTuxInstall` creates the necessary configuration files. When it has completed, it displays the following message:

```
InConcert TXM Installation Utility Completed.
```

```
To finish the installation process, please consult the InConcert  
TXM Installation Guide and the InConcert TXM Release Notes.
```

4 Verifying the Stage 1 Installation

The following sections describe how to verify the installation of the Business Process Engine software. This consists of:

- Reviewing and Editing the Generated Configuration Files
- Verifying System Resources
- Creating the Transaction Log File
- Configuring the eLink Business Process Engine Repository
- Verifying the Special User and Repository Directory
- Starting the eLink Business Process Engine Repository Daemon
- Verifying That the Repository Daemon Is Running
- Checking eLink Business Process Engine Status

Reviewing and Editing the Generated Configuration Files

The installation script `IcTuxInstall` creates the following configuration files in the `$IC_HOME/config` directory:

- The files `env.csh` and `env.sh`, which contain commands to configure a shell environment for the eLink Business Process Engine. They may be “sourced” at the UNIX shell prompt.
- A prototype TUXEDO configuration text file, `UBBIC`. You *must* compile the modified TUXEDO configuration text file with `tmloadcf` before you can boot the eLink Business Process Engine system.
- A two-route `IcTuxConfig` file, which is a simple client routing table. This file is used by the eLink Business Process Engine and must be stored in the `$IC_HOME` directory on each client machine.
- The files `IcEnvFile` and `TuxEnvFile`, which contain configuration settings for the eLink Business Process Engine server and native clients. These settings are loaded into the environment by the eLink Platform.
- The `IcCliMgr.cfg` file, which contains configuration information for the eLink Business Process Engine Daemon Manager (`IcCliMgr`) server process.
- A prototype `IcRepDaemon.config` file, to be used when running an eLink Business Process Engine Repository Daemon under the Daemon Manager.

Using Local SQL*Net

If your Oracle installation is on the local machine:

1. Remove or comment out the following line in the UBBIC file:

```
OPENINFO="Oracle_XA:Oracle_XA+Acc=P/icdbown/icdbown+SqlNet=+SESTm=600"
```

Note: The UBBIC file is located <IC_HOME>/config directory, where <IC_HOME> is the directory specified during the Stage 1 installation for the InConcert base directory.

2. Make sure the following line is present and uncommented in the UBBIC file:

```
OPENINFO="Oracle_XA:Oracle_XA+Acc=P/icdbown/icdbown+SESTm=600"
```

Using Remote SQL*Net

If your Oracle installation is *not* on the local machine:

1. Make sure the following line is present and uncommented in the UBBIC file:

```
OPENINFO="Oracle_XA:Oracle_XA+Acc=P/icdbown/icdbown+SqlNet=+SESTm=600"
```

Note: The UBBIC file is located <IC_HOME>/config directory, where <IC_HOME> is the directory specified during the Stage 1 installation for the InConcert base directory.

2. Remove or comment out the following line in the UBBIC file:

```
OPENINFO="Oracle_XA:Oracle_XA+Acc=P/icdbown/icdbown+SESTm=600"
```

Verifying System Resources

To run the eLink Business Process Engine, the host machine must have sufficient UNIX System V IPC resources, as specified in the eLink Platform installation guide.

To estimate the system resources that will be required:

1. Go to the `<IC_HOME>/config` directory, where `<IC_HOME>` is the base InConcert directory specified during the Stage 1 installation.
2. Edit `TuxEnvFile` as follows:
 - Append the `IcEnvFile` onto the end of this file merging them. This step is optional. However, by doing this, it reduces the number of environment files and makes it easier to keep track of where to put environment settings.
 - Add the environment variable setting `WSNADDR=//<hostname>:9020`
 - Note: You may have to use the IP Address if you have problems with the PDA. You will know this if you get a `TPESYSTEM Error` and can't login to the Process Designer when you click on Edit Flow. It is important to have the exact same line for `WSNADDR` in the `TuxEnvFile` and the UNIX shell environment (`env.sh` or `.kshrc`)
 - Add an `LD_LIBRARY_PATH` environment variable that sets paths to the `APPDIR`, `IC_HOME`, the eLink Platform library directory, and the Oracle library directory.
Example:

```
LD_LIBRARY_PATH=/app/elink/bpo_sw/tuxapp:/app/elink/bpo_sw/lib:/app/elink/platform/lib:/app/oracle/product/8.0.6/lib
```

 - NOTE: For HP-UX, you would set `SHLIB_PATH` instead of `LD_LIBRARY_PATH`.
3. Edit `TuxEnvFile` and `env.sh` files (or `.kshrc`) as follows:
 - Add the following files to the `FIELDTBLS32` parameter for both files:
`jrep.f32,jwsladmin.f32,Usysf132,eLink_BPO.f32,irep.f32`
 - Add the setting `APPDIR=$IC_HOME/tuxapp`
Example: `APPDIR=/app/elink/bpo_sw/tuxapp`
 - Put both `FIELDTBLS32` and `APPDIR` in the exported section if necessary.
 - If you have the Solaris patch issue, Add `$IC_HOME/tuxapp` at the beginning of `LD_LIBRARY_PATH`. Example: `/app/elink/bpo_sw/tuxapp`. This is where the `libCrun.so.1` was previously copied. Remember that this is only required if you are using the workaround where you copied the `libCrun.so.1` file into the `\tuxapp` directory. If you properly installed the patch, this would not be necessary. If HP-UX, this step would not be necessary since `libCrun.so.1` is part of a Solaris patch.

- Verify the following library directories are apart of your library path. (If NOT add them):

For Solaris:

```
$LD_LIBRARY_PATH:$IC_HOME/lib/sc42:$IC_HOME/lib:$ORACLE_HOME
/lib:$TUXDIR/lib:/usr/lib
```

For HP-UX:

```
$SHLIB_PATH:$IC_HOME/lib/sc42:$IC_HOME/lib:$ORACLE_HOME/lib:
$TUXDIR/lib:/usr/lib
:/usr/lib/aCC
```

Note: eLink_BPO.f32 and irep.f32 are files required by the BPO.

4. Run the `source` command on the file `env.sh` (or `.kshrc`).

Enter the following command at the UNIX prompt:

```
./env.sh (for systems running under ksh)
source ./env.csh (for systems running under csh)
```

5. Run the `uname` command to determine your machine name.

At the UNIX shell prompt, enter:

```
uname -n
```

This command displays your machine name as known to the UNIX kernel. Do not use the `hostname` command to determine your machine name, because it may display an alias machine name.

6. Modify `*MACHINES` section in the `UBBIC` file.

The default `MACHINES` entry may already have a full hostname entry in the following domain name format:

```
hostname.domain_name.domain_suffix
```

Enter the machine name as known to the UNIX kernel, as determined in Step 2. This entry must exactly match the output from the `uname -n` command.

Warning: Enter *only* the `hostname` portion of the machine name; do not enter the `domain_name.domain_suffix` portion.

Creating the Transaction Log File

Note: This procedure is intended *only* for verifying the eLink Business Process Engine installation, which uses the values from the `UBBIC` file created during installation. See your BEA TUXEDO documentation for information about creating a transaction log for different configurations.

Make sure the path specified for the `TLOG` device in the TUXEDO configuration file resides on a local (non-network) disk and that the path name is no longer than 63 characters.

To create a transaction log file:

1. Start the `tmadmin` utility.

`tmadmin` is a TUXEDO utility that provides an interface to administrative functions for a TUXEDO domain. Enter the following command:

```
tmadmin -c
```

2. Initialize space for the TLOG.

At the `tmadmin` prompt, enter the following command:

```
crdl -b 400 -z TLOGDEVICE
```

Note: The size specified in the `-b` option must exceed the size specified in the `UBBIC` parameter `TLOGSIZE` by some 50 blocks. The `TLOGDEVICE` variable exists in the `UBBIC` file. The setting you indicate here must exactly match the setting indicated in the `UBBIC` file.

3. Quit the `tmadmin` operation by entering the character `q`.

Configuring the eLink Business Process Engine Repository

The Repository Daemon performs file transfer operations between eLink Business Process Engine clients and a repository directory. Before you can start up the eLink Business Process Engine, you must configure a eLink Business Process Engine Repository.

Creating a Repository Daemon Configuration File

Before you can start the Repository Daemon, you must edit the `IcRepDaemon.config` file. The default location of this file is:

```
$IC_HOME/config/IcRepDaemon.config
```

The configuration file contains lines in this format:

```
keyword=value
```

Table 4-1 lists the keywords.

Note: These keywords are not case-sensitive.

Table 4-1 Keywords for IcRepDaemon Configuration File

Keyword	Can be Repeated	Value
VALID-HOST	Yes	The value for VALID-HOST can be a host name, or it can consist of four numeric fields separated by periods. Any of these four fields can also consist of the single character *, which is a wildcard, and means any value in that field is acceptable. If one or more VALID-HOST values are specified, all incoming connections are checked to ensure they are originating from a valid host. If no VALID-HOST values are specified, the incoming connection can be made from any host.

Table 4-1 Keywords for IcRepDaemon Configuration File (Continued)

Keyword	Can be Repeated	Value
VALID-DIR	Yes	The value for VALID-DIR specifies valid directories. If one or more VALID-DIR values are specified, only files within the specified directories (including all subdirectories) are allowed access. If no VALID-DIR values are specified, no directory checking is performed.
LOG-FILE	No	Pathname to the log file, or SYSLOG to direct error output to the system log. Note that the icrep user might not have the correct permission to write a log file in \$IC_HOME/logs.
SERVER-PATH	No	Path to the IcRepServer executable. The default is \$IC_HOME/bin/IcRepServer.
PORT	No	Port number used by the Repository Daemon.
USER-ID	No	Checks for the user ID at startup.

Verifying the Special User and Repository Directory

Before you can start the Repository Daemon, you must verify the existence of a repository directory for the Repository Daemon. The repository directory is a file system directory, owned by the `eLink` user, which will be managed by the Repository Daemon.

Note: Before you use a Repository Daemon, make sure that you selected a Server host where you want the Repository Daemon to run as well as a port number for the Repository Daemon. Use the UNIX command `ypcat services` to confirm that the port number you selected is not currently in use.

Starting the eLink Business Process Engine Repository Daemon

The eLink Business Process Engine Repository Daemon provides the following utilities:

<code>IcRepServer</code>	The eLink Business Process Repository Daemon Server itself (which is not a TUXEDO server).
<code>IcRepDaemon</code>	The Authentication daemon that spawns the main eLink Business Process Repository Daemon.
<code>IcCliMgr</code>	The TUXEDO server that starts and stops the <code>IcRepDaemon</code> .
<code>IcRepTest</code>	A utility to verify that the Repository Daemon is running.

Note: For HP-UX: Before the Repository Daemon can start, you must have certain aCC library files accessible via the `SHLIB_PATH` environment variable. If the files are not in `/usr/lib`, you must make sure the Repository Daemon can find the directory in which the files reside.

The eLink Business Process Engine Repository Server is started by an Authentication daemon called `IcRepDaemon`, which performs authentication services prior to starting the Repository Server. The `IcRepDaemon` is managed by the `IcCliMgr` TUXEDO server.

Configuring the Authentication Daemon

You can configure the Authentication daemon to perform the following activities on a Repository Server:

- Obtain eLink Business Process Option user IDs from a client application before servicing requests, and authenticate the IDs within the eLink Business Process Option database.
- Configure the Repository Daemon to accept requests only from a specified set of known hosts.
- Configure the Repository Daemon to access files only within a specified set of directories.

Edit `IcCliMgr.cfg` to add the `IcRepDaemon` to the list of clients that will run under the Daemon Manager. Uncomment the section from the `IcRepDaemon: NAME, DIR, PROGRAM, ARGS, ENVS`.

Note: A single Repository Daemon can be configured to communicate with one or more repositories for one or more eLink Business Process Engines. To do so, you must modify the `SERVER-PATH` setting in the `icRepDaemon.config` file to reflect the proper `$IC_HOME` directory.

Setting the Time Zone Environment Variable (TZ)

You *must* set the system-specific time zone environment variable TZ before you can run the Repository Daemon. In the US, the settings are PST8PDT, MST7MDT, CST6CDT, and EST5EDT. If you do not set the time zone, the default is system-specific.

Warning: The Repository Daemon uses the high-order bits of the current time as part of the encryption key for tokens. Therefore, the client machine's time must be within 10 minutes of the server time — including the client's time zone differential — or the client will get an error message referring to an expired or unknown key. This can be a particular problem when communicating across time zones, because the time differential will exceed the acceptable range of 10-20 minutes, and the client will not be able to connect. If this occurs, you can correct it by modifying the time of the client workstation to match that of the Repository Daemon host.

Estimating System Resources and Modifying Configuration to Accommodate

1. Enter the following command to retrieve an estimate of UNIX System V IPC resources needed for your eLink Business Process Engine configuration:

```
tmloadcf -c UBBIC
```

where UBBIC is the TUXEDO configuration text file.

Note: Refer to your TUXEDO documentation for a description of the output generated by this command.

2. Add an estimate of the resources needed to support your Oracle database.
3. Refer to the `$IC_HOME/config/UBBIC` file to retrieve the current values of the MAXACCESSERS and MAXWSCLIENTS parameters.
4. Do one of the following:

For HP-UX 11: Use the SAM screen Configurable Parameters in the Kernel Configuration area.

For Solaris: Edit `/etc/system`.

5. Use `sysdef` to display current settings.
6. To change settings, edit `/etc/system`, add `set` commands at the end of the file, and reboot your system. For further information, refer to your operating system documentation.
7. If you need to modify the kernel to support the eLink Business Process Engine, do so, and then reboot the kernel.

Booting the eLink Business Process Engine Repository Daemon

Before performing the following steps, be sure that you logged in as the `elink` user and that you have the environment set via the `env.sh` (or `env.csh`) script provided in `$IC_HOME/config`.

1. Create the TUXCONFIG file. From the `$IC_HOME/config` directory, run:

```
tmloadcf -y UBBIC
```

2. To boot the eLink Business Process Engine, enter the following command at the UNIX system prompt:

```
tmboot -y
```


Verifying That the Repository Daemon Is Running

Use the `IcRepTest` utility to verify that the Repository Daemon is available and running on the specified host name and port number.

To verify the Repository Daemon:

1. At a shell prompt that has the environment correctly set via the `env.sh` file, enter the following:

```
$ IcRepTest
```

2. Enter the Repository Daemon hostname and port number.

`IcRepTest` prompts you for the hostname and port number for the Repository Daemon Server:

```
Enter hostname where repository server has been installed: host  
Enter port number: port_number
```

3. Enter the appropriate information.

`IcRepTest` displays the following messages:

```
Attempting to connect to host:port_number
```

```
InConcert TCP/IP server [available|unavailable] and working.
```

4. If `IcRepTest` reports that the Repository Daemon (TCP/IP server, above) is unavailable, verify that the appropriate lines have been correctly placed in the `IcRepDaemon.config` file and that the `IcCliMgr` Server and `IcRepDaemon` processes are running.

Checking eLink Business Process Engine Status

The eLink Business Process Engine provides `IcStatusManage` and TUXEDO provides `tadmin`, utilities for examining the status of client and server applications running in the eLink Business Process Engine environment.

Make sure you have compiled a TUXEDO configuration file, created a transaction log file, and booted the domain before you use any of these utilities.

Using `IcStatusManage`

`IcStatusManage` enables you to view status log information unconditionally or conditionally based on facility, severity, time period, or a combination of these factors. You can delete status log entries unconditionally or conditionally. The following instructions explain how to run `IcStatusManage` interactively.

To run `IcStatusManage`:

1. At the prompt, enter the following command:

```
IcStatusManage
```

2. At the log file prompt, enter the file name of the status log file to be examined and press Enter. The Main Menu appears:

```
Main Menu
```

1. List Status Log Entries
2. Remove Status Log Entries
3. Quit

3. Choose `List Status Log Entries` to display log entries, or `Remove Status Log Entries` to delete log entries.

`IcStatusManage` displays the first of a series of submenus; you can select from the following:

- Log entry severity
- Facility from which the log entry originated
- Date of log entries

After you enter your selections, `IcStatusManage` displays or removes the specified log entries and returns to the `Date` menu.

4. Enter a different date to list or remove additional entries, or select `Quit` to return to the previous menu.

Using `tmadmin` to View Status

The `tmadmin` TUXEDO utility provides an interface to administrative functions for a TUXEDO domain. You can use `tmadmin` to:

- Retrieve the status of a TUXEDO application
- Retrieve the status of TUXEDO servers
- Make dynamic changes to your TUXEDO environment

To run `tmadmin`:

1. At the UNIX system prompt, enter the command `tmadmin`.
2. From the `tmadmin` prompt, enter any command shown in Table 4-2.

Table 4-2 tadmin Commands

Command	Description
<code>psr</code>	Displays the server name, queue name, group name, group name ID, number of requests processed, load done, current service, and machine. Note that if a service is shown as active, and the number of requests processed remains constant, it could indicate a problem.
<code>psc</code>	Displays the service name, routine name, server name, group name group name ID, number of client requests processed, and status of each service.
<code>pq</code>	Displays the server name, queue name, number of servers, machine, the load currently queued for a server, and the number of messages currently in the server's queue (# queued). If number queued is high, it may indicate a blocked or busy queue, which may require administrative interference to resolve a problem.
<code>pclt</code>	Lists the clients that are currently communicating with the TUXEDO domain and displays the service name, routine name, server name, group name server ID, number of requests processed, and status for each client.

5 Stage 2: Completing the Installation

The following sections describe how to install the BEA eLink Business Process Option Server. This will only install the required software. The system must then be configured as outlined in the *Business Process Option BEA eLink Configuration Guide* before you can run the Business Process Option. Installing the Business Process Option Server software consists of the following steps:

- Mounting the CD-ROM
- Preparing the Installation readme File
- Starting the eLink Business Process Option Server Installation Script
- Entering Your Installation Information
- Post-Installation Procedures

Note: Before beginning the Stage 2 installation, ensure that the InConcert Engine is running and that the shell environment has been properly set via the `env.sh` or `env.csh` file. This was booted as part of the Stage 1 installation in “Booting the eLink Business Process Engine Repository Daemon” in Chapter 4, “Verifying the Stage 1 Installation.” The Stage 2 installation will not succeed without the InConcert application running.

Mounting the CD-ROM

This release consists of two CD-ROMs:

- BEA eLink Business Process Engine CD-ROM
- BEA eLink Business Process Option CD-ROM

For Stage 2 of the Server installation process, you must use the **BEA eLink Business Process Option** CD-ROM.

You can mount the CD-ROM with or without the Volume Manager. The following sections provide instructions for each method.

Mounting the CD-ROM with the Volume Manager

To mount the BEA eLink Business Process Option CD-ROM with the Volume Manager:

1. Load the CD-ROM into the tray.

The volume manager automatically mounts the CD-ROM, and you see the directory *label* (where *label* is the CD-ROM volume label) appear under the standard CD-ROM mount point (usually `/cdrom`).

2. Change to a “safe” directory.

Once you finish loading the installation software, change to a safe directory location, such as the root directory, and eject the CD-ROM by entering:

```
eject cdrom
```

The Volume Manager automatically unmounts the CD-ROM for you.

Mounting the CD-ROM without the Volume Manager

To mount the BEA eLink Business Process Option CD-ROM without the Volume Manager:

1. Log on as the root user.

For Solaris: Enter the following command to mount the CD-ROM:

```
mount -F hsfs -o ro /dev/dsk/c0t6d0s0 /cdrom
```

For HP-UX: Enter the following command to mount the CD-ROM:

```
mount -F cdfs -o ro,cdcase /dev/dsk/c0t6d0s0 /cdrom
```

2. To unmount and eject the CD-ROM, enter:

```
umount /cdrom
```

```
eject /dev/dsk/c0t6d0s0
```

Note: The CD-ROM device specification may differ for your system (in the example above, it is `/dev/dsk/c0t6d0s0`). You must pick an empty directory for the mount point; the usual name for this directory is `/cdrom`.

Preparing the Installation readme File

Note: The eLink Business Process Option Server components are installed in the eLink Platform directory. Make sure that you have write permission for this directory.

Under some circumstances, the UNIX system appends a period (“.”) to file names when the file is written to a CD-ROM. The `install.sh` install script depends on a file named `readme` being in the platform directory. If the `readme` file has been renamed, the installation script fails because it cannot find this file. There are two possible workarounds:

- You can copy the distribution files to your installation machine and rename the `readme` file:

```
cp -r distribution_root_dir/* install_root_dir
cd install_root_dir
mv readme. readme
```

where:

distribution_root_dir is the top-level directory on the CDROM in which the installation files are located.

install_root_dir is your installation root directory.

- Or (on HP-UX systems only), you can start the PFS daemons and mount the CD-ROM as follows:

First, start the PFS daemons with the following commands:

```
nohup pfs_mountd &
nohup pfsd &
```

Then mount the CD-ROM using the `pfs_mount` command:

```
pfs_mount -o xlat=unix /dev/dsk/dev_file /mount_point
```

Once one of the previous steps has been completed, you can start the installation script and begin the installation.

Starting the eLink Business Process Option Server Installation Script

To start the Stage 2 installation script:

1. Log in as a user with write permission for the eLink Platform root installation directory (*\$TUXDIR*).
2. Go to the CD-ROM root directory.

The file `install.sh` is the Business Process Option Server installation script.

3. Start the Stage 2 installation script.

To start the script, enter the following at the command prompt, and press Enter:


```
sh ./install.sh
```

This invokes the Stage 2 installation script.

Warning: If the script does not execute, it may indicate that the installation `readme` file is not accessible to the installation script. Refer to the preceding section, “Preparing the Installation `readme` File,” for instructions on resolving this problem.

Entering Your Installation Information

Note: You can cancel the installation process at any time by pressing `CTRL-C`.

1. Enter the number corresponding to your operating system.

The script prompts you for the operating system on which the product is to be installed:

```
1) hp/hpux11          02) sun5x/sol26
```

```
Install which platform's files? [01-2, q to quit, l for list]:
```

Enter the number that corresponds to the name of the operating system you are using and press `Enter`.

2. Confirm your operating system selection.

The script prompts you to confirm your selection:

```
** You have chosen to install from hp/hpux11 **
```

```
BEA eLink Business Process Option Release 1.2
```

```
This directory contains the BEA eLink Business Process Option for  
HP-UX 11.0 on 9000/800 series.
```

```
Is this correct? [y,n,q]:
```

If correct, type `y` for yes, or `n` for no or `q` to quit. Press `Enter`.

3. Select the package to be installed.

You are prompted to select a package to install. For this distribution, there is only one choice:

The following packages are available:

```
1      bpo      BEA eLink Business Process Option
```

```
Select the package(s) you wish to install (or 'all' to install
all packages) (default: all) [?,??,q]: 1
```

Type 1 and press Enter.

4. Enter the pathname for the base directory of your existing BEA eLink Platform installation.

The prompt is as follows:

```
Base directory of existing TUXEDO installation (default:
YOUR_TUXEDO_HOMEDIR) [?,q]:
```

Enter the absolute pathname for this directory.

```
Determining if sufficient space is available ...
```

```
1000 blocks are required
```

```
17707318 blocks are available to <YOUR_TUXEDO_HOMEDIR>
```

```
Using <YOUR_TUXEDO_HOMEDIR> as the TUXEDO base directory
```

The script continues with the installation process, and displays the following status messages:

```
Moving BPO files to their proper location...
```

```
... finished
```

When the installation process is completed, the following status message appears:

```
Installation of BEA eLink Business Process Option was successful
```

```
Select the package(s) you wish to install (or 'all' to install
all packages) (default: all) [?,??,q]:
```

5. Update the Business Process Option Class Files.

Note: If you miss this step, you will receive Palette creation errors in the PDA.

- a. Make sure the Business Process engine is up and running with the following command:

```
> tmboot -y
```

- b. Make sure the repository is available and running with the following command:

- > IcRepTest
- c. Change directories to the Business Process Option installation directory.
Example:
> cd \$TUXDIR/eLink/BusProc/install
- d. Export the Business Process Option installation directory as BPODIR.
Example:
> export BPODIR=\$TUXDIR/eLink/BusProc/install
- e. Create and verify the Business Process Option Class with the following command:

> **../eLink_create_BPO.sh** (or **ksh ../eLink_create_BPO.sh**)
eLink Business Process Option Class Creation & Verification...
Please Enter Your icdba Password: **icdba**
Done.

View the results of running `eLink_create_BPO.sh` to verify its installation by viewing the output files `eLink_create_BPO.out` (sample results are shown in Listing 5-1) and `eLink_check_BPO.out` (sample results are shown in Listing 5-2). You should see results similar to that shown in these listings.

Listing 5-1 Output from eLink_create_BPO.sh (in eLink_create_BPO.out)

```
Host Name: <hostname>

System User Name: elink
Date & Time: 05/18/00 10:33:50
InConcert User Name: icdba

InConcert Server Name: <hostname>

Input File Name:
/app/elink/platform/eLink/BusProc/install/eLink_create_BPO.btg

Output File Name:
/app/elink/platform/eLink/BusProc/install/eLink_create_BPO.out

Command: CREATE SUBCLASS eLinkTask OF Task
Command Status: Success.

Command: CREATE SUBCLASS eLinkPalette OF Job
Command Status: Success.
```

5 Stage 2: Completing the Installation

```
Command: CREATE SUBCLASS eLinkProcess OF Job
Command Status: Success.

Command: UPDATE CLASS eLinkProcess ADD STRING ATTRIBUTE
ELINK_ERROR_TYPE DEFAULT ""
Command Status: Success.

Command: UPDATE CLASS eLinkProcess ADD STRING ATTRIBUTE
ELINK_APP_ERROR DEFAULT ""
Command Status: Success.

Command: UPDATE CLASS eLinkProcess ADD STRING ATTRIBUTE
ELINK_ADAPTER_ERROR DEFAULT ""
Command Status: Success.

Command: UPDATE CLASS eLinkProcess ADD STRING ATTRIBUTE
ELINK_ADAPTER_ERR_CODE DEFAULT ""
Command Status: Success.

Command: UPDATE CLASS eLinkProcess ADD STRING ATTRIBUTE
ELINK_SERVER_ERROR DEFAULT ""
Command Status: Success.

Command: UPDATE CLASS eLinkProcess ADD STRING ATTRIBUTE
ELINK_SERVER_ERR_CODE DEFAULT ""
Command Status: Success.

Number Of Successful Commands: 9
Number Of Errors: 0
Total Number Of Commands: 9
```

Listing 5-2 Output from eLink_create_BPO.sh (in eLink_check_BPO.out)

```
Host Name: <hostname>

System User Name: elink
Date & Time: 05/18/00 10:33:52
InConcert User Name: icdba

InConcert Server Name: <hostname>

Input File Name:
/app/elink/platform/eLink/BusProc/install/eLink_check_BPO.btg

Output File Name:
/app/elink/platform/eLink/BusProc/install/eLink_check_BPO.out

Command: LIST CLASS eLinkTask
Command Status: Success.
```

Attribute Name	Inherited	Type	Default Value
IC_APPLICATION	TRUE	STRING	Task
IC_RELATION_INFO	TRUE	STRING	
IC_TASK_ICON	TRUE	STRING	
IC_TASK_LOCATION	TRUE	STRING	
IC_TASK_NOTE	TRUE	STRING	
IC_TASK_UI_DOC	TRUE	STRING	
IC_WORK_TYPE	TRUE	INTEGER	0

Command: LIST CLASS eLinkPalette
Command Status: Success.

Attribute Name	Inherited	Type	Default Value
IC_APPLICATION	TRUE	STRING	Job
IC_WORKFLOW_TYPE	TRUE	INTEGER	1

Command: LIST CLASS eLinkProcess
Command Status: Success.

Attribute Name	Inherited	Type	Default Value
ELINK_ADAPTER_ERROR	FALSE	STRING	
ELINK_ADAPTER_ERR_CODE	FALSE	STRING	
ELINK_APP_ERROR	FALSE	STRING	
ELINK_ERROR_TYPE	FALSE	STRING	
ELINK_SERVER_ERROR	FALSE	STRING	
ELINK_SERVER_ERR_CODE	FALSE	STRING	
IC_APPLICATION	TRUE	STRING	Job
IC_WORKFLOW_TYPE	TRUE	INTEGER	1

Number Of Successful Commands: 3
Number Of Errors: 0
Total Number Of Commands: 3

The installation is now complete. The following section provides information on post-installation issues.

Post-Installation Procedures

After the installation is complete, you will need to

- Setting Up a BEA eLink Platform Configuration
- Installing the Sample Programs (optional)
- Setting Up Your License Key File
- Creating eLink Business Process Option Users

These procedures are described in the following sections.

Setting Up a BEA eLink Platform Configuration

After installing the BEA eLink Business Process Option, you must set up a BEA eLink Platform configuration to run the eLink Business Process Engine Servers, Business Process Option Agents, and Contract Repository Server (IREPSVR), eLink Jolt (eLink JSL), and /WS (WSL). Also, if you want sample applications, you must have the `MATHAPP` servers in this configuration. You can find sample configuration files in the `apps` directory under the `TUXDIR` directory.

Installing the Sample Programs (optional)

Before running any of the sample applications, you must read the `ReadMe.txt` file that is provided in the directory of each sample. It describes additional installation steps and other information that you need to run that particular sample successfully.

Setting Up Your License Key File

Note: If you have received a separate BEA eLink Business Process Option license key file, you must perform the steps outlined below.

You must enter the license key for your BEA eLink Business Process Option software to enable the connection capabilities for your system. As a prerequisite, BEA eLink Platform 1.2 must be installed and operational with its license key file available. To enable the eLink Business Process Option license key, you must merge this license key file with the eLink Platform 1.2 license file.

To merge the two license key files and enable licensing for your system:

1. Using a plain text editor such as UNIX `vi` or `emacs`, open the eLink Platform license key file `$TUXDIR/udataobj/lic.txt`.
2. Locate the matching section names within the existing eLink Platform 1.2 license file and your new BEA eLink Business Process Option license file.
3. Delete each matching section from the original eLink Platform 1.2 license file and replace with the new section.

Starting with the section name (enclosed in square brackets), delete each line in the matching section up to and including the entire signature line. Replace the deleted sections with the matching sections from the new BEA eLink Business Process Option license file sections.

4. Repeat for each matching section.
5. Save the file.

Creating eLink Business Process Option Users

The `BpoAddUser` script enables you to quickly add new eLink Business Process Option Users to your system. This script resides in the `$TUXDIR/eLink/BusProc` directory.

To create eLink Business Process Option Users, run the `BpoAddUser` script, as shown in this sample session:

```
$ $TUXDIR/eLink/BusProc/BpoAddUser
```

5 Stage 2: Completing the Installation

```
eLink Business Process Option User Creation...
```

```
Please Enter Your icdba Password: <icdba_password>
```

```
Please Enter User Name (Press Ctrl+D to Exit): newuser
```

```
Please Enter User Password: <password>
```

```
Please Enter User Name (Press Ctrl+D to Exit): ^D
```

```
$
```

You can continue adding as many new users as required. Exit the script by pressing Ctrl+D.

Example:

```
> cd /app/elink/platform/eLink/BusProc
> ../BpoAddUser
ELink Business Process Option User Creation...
Please Enter Your icdba Password: icdba
Please Enter User Name (Press Ctrl-D to Exit): elink
Please Enter User Password: elink
Done.
>^D
```

Note: This is the end of the Server Installation Process. Please proceed with configuration. Refer to the Business Process Option Configuration Guide for instructions.

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