

Parallel Engineering and Scientific Subroutine Library  
for AIX  
Version 4 Release 2

*Installation Guide*





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for AIX  
Version 4 Release 2

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**Note**

Before using this information and the product it supports, read the information in "Notices" on page 17.

**Edition Notice**

This edition applies to:

- Version 4 Release 2 of the IBM Parallel Engineering and Scientific Subroutine Library (Parallel ESSL) for AIX licensed program, program number 5765-ESX and to all subsequent releases and modifications until otherwise indicated by new edition.

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## About this information

This explains how to install IBM® Parallel Engineering and Scientific Subroutine Library for AIX® (PESSL), Version 4 Release 2.

The following list summarizes the steps required to complete the installation of this product:

Chapter 1, “Plan the installation,” on page 1

Chapter 2, “Log in as root and install the product on AIX,” on page 5

Chapter 3, “Run the product Installation Verification Programs (IVPs) on AIX,” on page 7

When performing each step of the installation, enter all commands as shown because commands are case sensitive.

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## Conventions and terminology used in this book

Table 1 describes the typographic conventions used in this book.

Table 1. Summary of typographic conventions

Typographic	Usage
<b>Bold</b>	<b>Bold</b> words or characters represent system elements that you must use literally, such as commands, flags, and path names.
<i>Italic</i>	<ul style="list-style-type: none"><li>• <i>Italic</i> words or characters represent variable values that you must supply.</li><li>• <i>Italics</i> are also used for book titles and for general emphasis in text.</li></ul>
Constant width	Examples and information that the system displays appear in constant width typeface.
[ ]	Brackets enclose optional items in format and syntax descriptions.
{ }	Braces enclose a list from which you must choose an item in format and syntax descriptions.
	A vertical bar separates items in a list of choices. (In other words, it means “or.”)
< >	Angle brackets (less-than and greater-than) enclose the name of a key on the keyboard. For example, <Enter> refers to the key on your terminal or workstation that is labeled with the word Enter.
...	An ellipsis indicates that you can repeat the preceding item one or more times.
<Ctrl-x>	The notation <Ctrl-x> indicates a control character sequence. For example, <Ctrl-c> means that you hold down the control key while pressing <c>.
\	The continuation character is used in coding examples in this book for formatting purposes.





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## Chapter 1. Plan the installation

Plan your installation according to the requirements that follow.

- “Supported Operating System Environments”
- “Required Software Products on AIX”
- “Disk Space Requirements and Installation Materials” on page 2
- “Determining which product filesets to install” on page 2

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### Supported Operating System Environments

You must ensure that you are installing this product in a supported operating system environment, as listed in the table below:

*Table 2. Operating systems supported by Parallel ESSL*

Product	Supported Environment
Parallel ESSL for AIX, Version 4 Release 2 (program number 5765-ESX)	AIX Version 7.1 with the latest available service level.

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### Required Software Products on AIX

The following table lists the required software products for Parallel ESSL for AIX:

*Table 3. Required Software Products for Parallel ESSL for AIX*

	Required Software Products	On AIX Version 7.1
<b>For Compiling</b>	IBM XL Fortran for AIX	13.1 with the latest service or 14.1 with the latest service
	IBM XL C/C++ for AIX	13.1 with the latest service or 14.1 with the latest service
<b>For Linking, Loading, or Running</b> (See Table Note 1.)	IBM XL Fortran Runtime Environment for AIX (See Table Note 2.)	13.1 with the latest service or 14.1 with the latest service
	IBM ESSL for AIX (See Table Note 3 on page 2.)	5.1 with the latest service
	IBM XL C libraries	(See Table Note 4 on page 2.)
	Parallel Environment Runtime Edition for AIX (PE)	1.2 or later

#### Table Notes:

1. Optional filesets are required for building applications. For details, consult the AIX and compiler documentation.
2. The correct version of IBM XL Fortran Runtime Environment for AIX is automatically shipped with the compiler. It is also available for downloading from the following website:

<http://www.ibm.com/support/docview.wss?rs=43&uid=swg21156900>

3. ESSL for AIX must be ordered separately.
4. The AIX product includes the C and math libraries in the Application Development Toolkit.

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## Disk Space Requirements and Installation Materials

The following table lists the disk space requirements and installation materials for Parallel ESSL for AIX.

Table 4. Disk Space Requirements and Installation Materials for Parallel ESSL for AIX

Type of Requirement	Requirement
Disk space	<p>The following amounts of disk space are required:</p> <p><b>pessl.rte (package)</b> 23 MB</p> <p>This package is made up of the following:</p> <p><b>pessl.rte.common</b> 2 MB</p> <p><b>pessl.rte.rs1</b> 7 MB</p> <p><b>pessl.rte.rs2</b> 0.1 MB</p> <p><b>pessl.rte.smp</b> 14 MB</p> <p><b>pessl.rte.up</b> 0.1 MB</p> <p><b>pessl.rte.mp</b> 0.1 MB</p> <p><b>pessl.msg.en_US</b> 0.1 MB</p> <p><b>pessl.msg.En_US</b> 0.1 MB</p> <p><b>pessl.man.en_US</b> 2.5 MB</p> <p><b>pessl.loc.license</b> 0.5 MB</p>
Installation media	Parallel ESSL for AIX, LCD8-1725-01

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## Determining which product filesets to install

Parallel ESSL is packaged on the medium in such a way that groups of files (filesets) forming a logical unit of the product can be individually installed, allowing you to install only those files that you need.

Based on your needs, decide which Parallel ESSL filesets to install.

Table 5. Parallel ESSL Product Filesets

Fileset/Package Name	Description	Other Filesets or Software Required
<b>pessl.rte</b>	This package contains the following individual filesets:  pessl.rte.common pessl.rte.rs1 pessl.rte.rs2 pessl.rte.smp  (See the descriptions for these filesets below.)	(See the requirements for these individual filesets below.)
<b>pessl.rte.common</b>	Contains common files and programs that are used by the serial and SMP libraries.	<b>essl.rte.common</b> <b>xlfrte</b> <b>ppe.rte</b>
<b>pessl.rte.rs1</b>	Contains the serial libraries and control files with appropriate links to the serial libraries.	<b>pessl.rte.common</b> <b>pessl.rte.up</b> <b>xlfrte</b> <b>ppe.rte</b> <b>essl.rte.rs1</b>
<b>pessl.rte.rs2</b>	Contains control files with appropriate links to the serial libraries.	<b>pessl.rte.common</b> <b>xlfrte</b> <b>ppe.rte</b> <b>essl.rte.rs1</b> <b>essl.rte.rs2</b> <b>essl.rte.smp</b>  The following prerequisites will be installed automatically if the option “automatic installation of prerequisites” is selected:  <b>pessl.rte.rs1</b> <b>pessl.rte.smp</b>
<b>pessl.rte.smp</b>	Contains the SMP libraries and control files, with appropriate links to the SMP libraries.	<b>pessl.rte.common</b> <b>pessl.rte.mp</b> <b>xlfrte</b> <b>ppe.rte</b> <b>essl.rte.smp</b>
<b>pessl.msg.en_US</b>	Contains the en_US version of the message catalog; it is installed automatically for locale en_US when <b>pessl.rte</b> is selected.	N/A
<b>pessl.msg.En_US</b>	Contains the En_US version of the message catalog; it is installed automatically for locale En_US when <b>pessl.rte</b> is selected.	N/A

Table 5. Parallel ESSL Product Filesets (continued)

Fileset/Package Name	Description	Other Filesets or Software Required
<b>pessl.man.en_US</b>	Contains manpages that describe each of the Parallel ESSL subroutines. <b>Note:</b> These manpages will be installed in the /usr/share/man/man3 directory. The manpages provided by ScaLAPACK are installed in the /usr/share/man/man1 directory. By default, Parallel ESSL manpages will be displayed rather than PBLAS or ScaLAPACK manpages with the same names. If you want to access the PBLAS or ScaLAPACK manpages, you must set the MANPATH environment variable appropriately. See the documentation for the <b>man</b> command.	N/A
<b>pessl.loc.license</b>	Contains the electronic license agreement files.	N/A
<b>pessl.rte.up</b>	Contains control files.	<b>pessl.rte.common</b> <b>pessl.rte.rs1</b> <b>xlfrte</b>
<b>pessl.rte.mp</b>	Contains control files.	<b>pessl.rte.common</b> <b>pessl.rte.smp</b> <b>xlfrte</b>

**Table Note:**

- “List of product files on AIX,” on page 11 lists the individual files in each fileset.

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## Chapter 2. Log in as root and install the product on AIX

You can complete this step in either of two ways:

- installing on one node at a time
- installing on multiple nodes at once

Choose the way that is appropriate for your installation.

**Note:**

1. Ensure that you have the prerequisite software installed.
2. No application programs that use Parallel ESSL Libraries should be in progress when executing this step.
3. When performing each step of the installation, enter all commands as shown, as commands are case sensitive.

---

### Install on one node (that is, operating system image) at a time

Follow the steps below to install Parallel ESSL on one node at a time:

1. Log in to the AIX root.
2. Put the media in the drive.
3. Enter **smit** on the AIX command line and navigate to the “Install Software” panel. (Sample navigation steps to this panel are provided below. If you need more information about the **smit** command, use the help facility within SMIT.)
  - a. On the “System Management” panel, select the first option, **Software Installation and Maintenance**, and press **Enter**.
  - b. On the “Software Installation and Maintenance” panel, select the first option, **Install and Update Software**, and press **Enter**.
  - c. On the “Install and Update Software” panel, select the first option, **Install Software**, and press **Enter**.
4. On the “Install Software” panel, do one of the following:
  - Press **F4** or click on **LIST**, then select the appropriate input device and press **Enter**;
  - or*—
  - Type the name of the directory that contains the Parallel ESSL filesets, then press **Enter**.
5. When the “Install Software” panel is displayed again, select the Parallel ESSL filesets you want to install by doing one of the following:
  - Select the default value of **[\_all\_latest]**.

**Note:** If you choose this option, a message fileset will automatically be selected for installation based on your setting for locale. If you want to choose a different message fileset, follow the directions for selecting specific filesets from a list (described below).

—*or*—

- Select specific filesets from a list by doing the following:
  - a. Press **F4** to list the available filesets (described in “Determining which product filesets to install” on page 2).
  - b. Press **F7** to select the ones you want to install.

**Note:**

- 1) If you require the messages for a locale other than your own, you can select the appropriate message fileset at this time.
  - 2) If you want to install all the Parallel ESSL serial and SMP libraries, select **pessl.rte**.
- c. After selecting the filesets you want to install, press **Enter**.  
The “Install Software” panel is displayed again, listing the selected fileset names.

—or—

- Type the names of the Parallel ESSL filesets you want to install in the “SOFTWARE to install” field;
6. Move the cursor to the **ACCEPT new license agreements?** option and use the **Tab** key to change the default value to **yes**.

**Note:** When you install Parallel ESSL, you must specify that you are accepting the license agreement (or, alternatively, the license agreement must have been previously accepted) in order for the installation process to continue.

7. Fill in the other fields as appropriate for your situation, then press **Enter**.  
Messages are displayed as the installation of each fileset is successfully completed.

**Note:** For details about the contents of each package or fileset, see “Determining which product filesets to install” on page 2.

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## Install on multiple nodes (that is, operating system images) at once

If you are installing Parallel ESSL on several nodes at once, it is recommended you use xCAT. Instructions can be found at: [http://sourceforge.net/apps/mediawiki/xcat/index.php?title=IBM\\_HPC\\_Stack\\_in\\_an\\_xCAT\\_Cluster](http://sourceforge.net/apps/mediawiki/xcat/index.php?title=IBM_HPC_Stack_in_an_xCAT_Cluster).

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## Chapter 3. Run the product Installation Verification Programs (IVPs) on AIX

To test that the Parallel ESSL libraries have been properly installed, you must execute the installation verification programs corresponding to the libraries you have installed and the language from which you will be calling Parallel ESSL.

To run the IVPs on nodes specified in a host list file, do the following:

1. Create a host list file containing a list of the nodes on which you want to run the IVPs.
2. Use the `cd` command to change to a writable directory that is part of a shared file system accessible on all the nodes specified in your host list file.
3. Type one of the following commands and press **Enter**.

To run the 32-bit IVP:

```
/usr/lpp/pessl.rte.common/custom/pessl ivp language library number_of_nodes host_list
```

To run the 64-bit IVP:

```
/usr/lpp/pessl.rte.common/custom/pessl ivp64 language library number_of_nodes host_list
```

where:

*language*

is the language you want to verify. It can have any of the following values:

**fortran**

The XL Fortran compiler must already be on your system to use this value; see "Required Software Products on AIX" on page 1

**c**

The C compiler must already be on your system to use this value; see "Required Software Products on AIX" on page 1.

**C++**

The C++ compiler must already be on your system to use this value; see "Required Software Products on AIX" on page 1.

*library* is the Parallel ESSL library you are testing. It can have any of the following values:

**pesslsmp**

Test the SMP libraries.

**pessl** Test the serial libraries. (For use with 32-bit IVP only.)

**pesslp2**

Test the link to the serial libraries; provided for migration purposes. (For use with 32-bit IVP only.)

**pesslp2\_t**

Test the link to the SMP libraries; provided for migration purposes. (For use with 32-bit IVP only.)

*number\_of\_nodes*

is the number of nodes on which you wish to run the IVP.

*host\_list*

is the name of the (previously created) host list file containing the list of nodes on which you wish to run the IVP.





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## Chapter 4. Locating and obtaining product documentation

The following topics list the software products required to display Parallel ESSL documentation and the Internet locations where the documentation can be found.

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### Software products needed for displaying documentation

The software products needed to display Parallel ESSL documentation are listed in Table 6.

Table 6. Software needed to display various formats of Parallel ESSL documentation

Format of online information	Software needed
HTML	HTML document browser (such as Microsoft Internet Explorer)
PDF	Adobe Acrobat Reader, which is freely available for downloading from the Adobe website at: <a href="http://www.adobe.com">http://www.adobe.com</a>
Manpages	No additional software is needed.  To display a specific manpage, use the <b>man</b> command as follows: <b>man</b> <i>subroutine-name</i>  <b>Note:</b> These manpages will be installed in the /usr/share/man/man3 directory. The manpages provided by ScaLAPACK are installed in the /usr/share/man/man1 directory. By default, Parallel ESSL manpages will be displayed rather than PBLAS or ScaLAPACK manpages with the same names. If you want to access the PBLAS or ScaLAPACK manpages, you must set the MANPATH environment variable appropriately. See the documentation for the <b>man</b> command.

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### Parallel ESSL Internet Resources

Parallel ESSL documentation, as well as other related information, can be displayed or downloaded from the Internet at the URLs listed in Table 7.

Table 7. Online resources for Parallel ESSL documentation

website	Type of Information Provided	File Formats Available	
		PDF	HTML
IBM Cluster Information Center: <a href="http://publib.boulder.ibm.com/infocenter/clresctr/vrxr/index.jsp">http://publib.boulder.ibm.com/infocenter/clresctr/vrxr/index.jsp</a>	Documentation for IBM clustered-server and System p software products	Yes	Yes

Table 7. Online resources for Parallel ESSL documentation (continued)

website	Type of Information Provided	File Formats Available	
		PDF	HTML
IBM Publications Center: <a href="http://www.ibm.com/shop/publications/order">http://www.ibm.com/shop/publications/order</a>	Documentation for any IBM product	Yes	No

## Appendix. List of product files on AIX

Table 8 lists the files created in the file system after installing each Parallel ESSL fileset. If you have any files with the same full path name that are not related to Parallel ESSL, they must be renamed before installing that fileset.

Table 8. Parallel ESSL Product Files, Symbolic Links, and Installation Control Files

File or Directory Name	Description	Fileset
/usr/include/pessl.h	Parallel ESSL header file for C and C++	pessl.rte.common
/usr/include/Cblacs.h	C interface for the BLACS header file	pessl.rte.common
All ordinary files in: /usr/lpp/pessl.rte	Installation control files for pessl.rte package	pessl.rte.common pessl.rte.rs1 pessl.rte.smp pessl.rte.rs2
All files in: /usr/lpp/pessl.rte/deinstl	De-installation control files for the pessl.rte package.	pessl.rte.common pessl.rte.rs1 pessl.rte.smp pessl.rte.rs2
All ordinary files in: /usr/lpp/pessl.rte.common	Installation control files	pessl.rte.common
/usr/lpp/pessl.rte.common/properties/version/ Parallel_Engineering_and_Scientific_Subroutine_Library_for_AIX- 4.2.0.swtag	ILMT inventory signature tag file	pessl.rte.common
/usr/lpp/pessl.rte.common/README/pessl.rte.common.README	README for current release	pessl.rte.common
/usr/lpp/pessl.rte.common/README/notices.txt	Notices and Information file for current release	pessl.rte.common
/usr/lpp/pessl.rte.common/REDIST.txt	Information about redistributable files for the current release	pessl.rte.common
/usr/lpp/pessl.rte.common/custom	Fortran, C, and C++ IVP and related shell scripts	pessl.rte.common
/usr/lpp/pessl.rte.common/example	Sample programs	pessl.rte.common
/usr/lib/nls/msg/C/pessl.cat	Message catalog for default locale	pessl.rte.common
/usr/include/f90sparse.mod/usr/lpp/pessl.rte.common/include/64/ f90sparse.mod	Parallel ESSL Fortran 90 module definition for sparse solvers	pessl.rte.common
All ordinary files in: /usr/lpp/pessl.rte.rs1	Installation control files	pessl.rte.rs1

Table 8. Parallel ESSL Product Files, Symbolic Links, and Installation Control Files (continued)

File or Directory Name	Description	Fileset
/usr/lpp/pessl.rte.rs1/README/pessl.rte.rs1.README	README for current release	pessl.rte.rs1
All files in: /usr/lpp/pessl.rte.rs1/lib	Serial libraries	pessl.rte.rs1
/usr/lib/libpessl.a /usr/lib/libblacs.a	Links to serial libraries	pessl.rte.rs1
All ordinary files in: /usr/lpp/pessl.rte.rs2	Installation control files	pessl.rte.rs2
/usr/lpp/pessl.rte.rs2/README/pessl.rte.rs2.README	README for current release	pessl.rte.rs2
All ordinary files in: /usr/lpp/pessl.rte.smp	Installation control files	pessl.rte.smp
/usr/lpp/pessl.rte.smp/README/pessl.rte.smp.README	README for current release	pessl.rte.smp
All files in: /usr/lpp/pessl.rte.smp/lib	SMP libraries	pessl.rte.smp
/usr/lib/libpesslsmp.a /usr/lib/libblacssmp.a	Links to SMP libraries	pessl.rte.smp
All ordinary files in: /usr/lpp/pessl.rte.up	Installation control files	pessl.rte.up
/usr/lpp/pessl.rte.up/README/pessl.rte.up.README	README for current release	pessl.rte.up
All files in: /usr/lpp/pessl.rte.up/deinstl	De-installation control files	pessl.rte.up
All ordinary files in: /usr/lpp/pessl.rte.mp	Installation control files	pessl.rte.mp
/usr/lpp/pessl.rte.mp/README/pessl.rte.mp.README	README for current release	pessl.rte.mp
All files in: /usr/lpp/pessl.rte.mp/deinstl	De-installation control files	pessl.rte.mp
/usr/lib/nls/msg/en_US/pessl.cat	Message catalog for locale en_US	pessl.msg.en_US
All files in: /usr/lpp/pessl.msg.en_US/deinstl	De-installation control files	pessl.msg.en_US
/usr/lib/nls/msg/En_US/pessl.cat	Message catalog for locale En_US	pessl.msg.en_US
All files in: /usr/lpp/pessl.msg.En_US/deinstl	De-installation control files	pessl.msg.En_US
All files in: /usr/lpp/pessl.man.en_US	Installation control files	pessl.man.en_US

Table 8. Parallel ESSL Product Files, Symbolic Links, and Installation Control Files (continued)

File or Directory Name	Description	Fileset
All files in: /usr/lpp/pessl.man.en_US/deinstl	De-installation control files	pessl.man.en_US
All files in: /usr/share/man/man3	Manpages	pessl.man.en_US
/usr/swlag/locale/pessl.la	Electronic license agreement file for <i>locale</i>	pessl.loc.license



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## Accessibility features for Parallel ESSL

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use information technology products successfully.

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### Accessibility features

The following list includes the major accessibility features in IBM Parallel ESSL. These features support:

- Keyboard-only operation.
- Interfaces that are commonly used by screen readers.
- Keys that are tactilely discernible and do not activate just by touching them.
- Industry-standard devices for ports and connectors.
- The attachment of alternative input and output devices.

**Note:** The IBM Cluster Information Center and its related publications are accessibility-enabled. The accessibility features of the Information Center are described at:

<http://publib.boulder.ibm.com/infocenter/clresctr/vxrx/topic/com.ibm.cluster.addinfo.doc/access.html>

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### IBM and accessibility

See the *IBM Accessibility Center* at <http://www.ibm.com/able> for more information about the commitment that IBM has to accessibility.





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