

IBM XL Fortran for AIX, V15.1.3



Installation Guide

Version 15.1.3

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Version 15.1.3

Note

Before using this information and the product it supports, read the information in "Notices" on page 35.

First edition

This edition applies to IBM XL Fortran for AIX, V15.1.3 (Program 5765-J09; 5725-C74) and to all subsequent releases and modifications until otherwise indicated in new editions. Make sure you are using the correct edition for the level of the product.

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About this document

This guide provides detailed installation instructions for IBM® XL Fortran for AIX®, V15.1.3. It includes multiple installation procedures that you can follow based on your installation requirements and scenarios. Specific instructions are given in cases requiring atypical installation. It also shows you how to test the installation, launch remotely-accessible HTML help, and enable and view different types of documentation. Read it carefully before installing the compiler. You can also read the README file in the root directory of your installation media, which contains current information about the compiler.

Who should read this document

This document is intended for anyone who is responsible for installing IBM XL Fortran for AIX, V15.1.3.

The majority of users can follow the basic installation method detailed in this documentation. *Basic examples* are tailored to reflect, as much as possible, the steps required to perform a basic installation.

The advanced installation method addresses the needs of users who require a customized installation for various purposes, such as maintaining more than one version of XL Fortran on a single system. These are users who are familiar with compiler installations and the file structures of the versions of the compiler products installed on the system. *Advanced examples* are tailored to reflect, as much as possible, the steps required to perform an advanced installation.

How to use this document

This document provides procedures for three main installation scenarios:

Basic installation

This scenario allows you to install a single version of XL Fortran to a default location. This scenario is applicable to the majority of users, and is the recommended method of installation.

For an overview of the steps that you need to follow to perform a basic installation, see Chapter 2, “Basic installation,” on page 9.

Advanced installation

This scenario allows you to maintain multiple versions of XL Fortran on a single system, or to install the compiler to a nondefault location. This scenario is applicable only to advanced users who have specialized needs, and is not recommended for the majority of users.

For an overview of the steps that you need to follow to perform an advanced installation, see Chapter 3, “Advanced installation,” on page 13.

Update installation

This scenario applies to users who have obtained a Program Temporary Fix (PTF) package for an existing XL Fortran V15.1.3 installation.

For an overview of the steps required to install a PTF, see Chapter 4, “Update installation,” on page 19.

For highly specialized installation scenarios that are outside the scope of this document, see the Technotes at <http://www.ibm.com/software/products/en/xlfortran-aix>.

How this document is organized

This book is organized to reflect the pre-installation, installation, post-installation, and troubleshooting phases of an XL Fortran installation.

Table 1. Phases of an XL Fortran installation

Phase	Chapters	User segment
Pre-installation	Chapter 1, "Before installing XL Fortran," on page 1	All users
Installation	Chapter 2, "Basic installation," on page 9	<ul style="list-style-type: none"> Users who want to use the simplest, most direct installation process Users who do not have any special requirements, such as the use of multiple versions of the compiler
	Chapter 3, "Advanced installation," on page 13	<ul style="list-style-type: none"> Users who want to install the compiler in a nondefault location Users who want to have multiple versions of the compiler on the same system
Post-installation	Chapter 4, "Update installation," on page 19	Users who want to update XL Fortran V15.1.3 to the next fix level
	Chapter 5, "After installing XL Fortran," on page 25	All users
Product removal	Chapter 6, "Uninstalling XL Fortran," on page 31	Any user who needs to remove an XL Fortran compiler from the system

Conventions

Typographical conventions

The following table shows the typographical conventions used in the IBM XL Fortran for AIX, V15.1.3 information.

Table 2. Typographical conventions

Typeface	Indicates	Example
lowercase bold	Invocation commands, executable names, and compiler options.	<p>The compiler provides basic invocation commands, <code>xlf</code>, along with several other compiler invocation commands to support various Fortran language levels and compilation environments.</p> <p>The default file name for the executable program is <code>a.out</code>.</p>
<i>italics</i>	Parameters or variables whose actual names or values are to be supplied by the user. Italics are also used to introduce new terms.	Make sure that you update the <i>size</i> parameter if you return more than the <i>size</i> requested.









Table 2. *Typographical conventions (continued)*

Typeface	Indicates	Example
<u>underlining</u>	The default setting of a parameter of a compiler option or directive.	nomaf <u>maf</u>
monospace	Examples of program code, reference to program code, file names, path names, command strings, or user-defined names.	To compile and optimize myprogram.f, enter: xlf myprogram.f -03.
UPPERCASE bold	Fortran programming keywords, statements, directives, and intrinsic procedures. Uppercase letters may also be used to indicate the minimum number of characters required to invoke a compiler option/suboption.	The ASSERT directive applies only to the DO loop immediately following the directive, and not to any nested DO loops.

Qualifying elements (icons and bracket separators)

In descriptions of language elements, this information uses icons and marked bracket separators to delineate the Fortran language standard text as follows:

Table 3. *Qualifying elements*


Icon	Bracket separator text	Meaning
 F2008  F2008	Fortran 2008 begins / Fortran 2008 ends	The text describes an IBM XL Fortran implementation of the Fortran 2008 standard.
 F2003  F2003	Fortran 2003 begins / Fortran 2003 ends	The text describes an IBM XL Fortran implementation of the Fortran 2003 standard, and it applies to all later standards.
 IBM  IBM	IBM extension begins / IBM extension ends	The text describes a feature that is an IBM XL Fortran extension to the standard language specifications.
 TS 29113  TS 29113	TS 29113 begins / TS 29113 ends	The text describes an IBM XL Fortran implementation of Technical Specification 29113, referred to as TS 29113.

Note: If the information is marked with a Fortran language standard icon or bracket separators, it applies to this specific Fortran language standard and all later ones. If it is not marked, it applies to all Fortran language standards.

Syntax diagrams

Throughout this information, diagrams illustrate XL Fortran syntax. This section helps you to interpret and use those diagrams.

- Read the syntax diagrams from left to right, from top to bottom, following the path of the line.

The  symbol indicates the beginning of a command, directive, or statement.

The \longrightarrow symbol indicates that the command, directive, or statement syntax is continued on the next line.

The \blacktriangleright symbol indicates that a command, directive, or statement is continued from the previous line.

The $\longrightarrow\blacktriangleleft$ symbol indicates the end of a command, directive, or statement.

Fragments, which are diagrams of syntactical units other than complete commands, directives, or statements, start with the $|$ — symbol and end with the —| symbol.

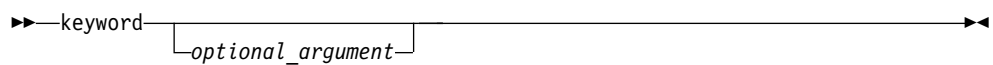
IBM XL Fortran extensions are marked by a number in the syntax diagram with an explanatory note immediately following the diagram.

Program units, procedures, constructs, interface blocks and derived-type definitions consist of several individual statements. For such items, a box encloses the syntax representation, and individual syntax diagrams show the required order for the equivalent Fortran statements.

- Required items are shown on the horizontal line (the main path):

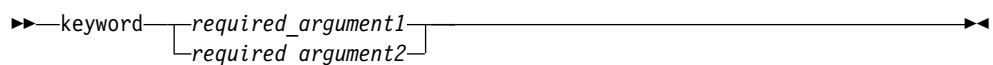


- Optional items are shown below the main path:



Note: Optional items (not in syntax diagrams) are enclosed by square brackets ([and]). For example, [UNIT=]u

- If you can choose from two or more items, they are shown vertically, in a stack. If you *must* choose one of the items, one item of the stack is shown on the main path.



If choosing one of the items is optional, the entire stack is shown below the main path.



- An arrow returning to the left above the main line (a repeat arrow) indicates that you can make more than one choice from the stacked items or repeat an item. The separator character, if it is other than a blank, is also indicated:



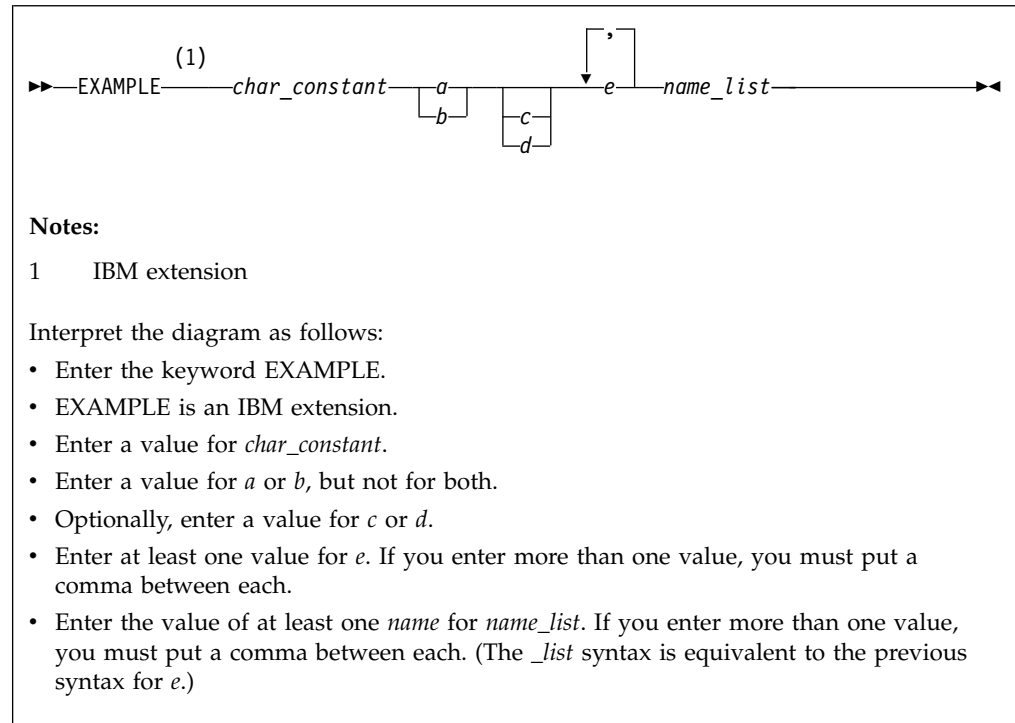
- The item that is the default is shown above the main path.



- Keywords are shown in nonitalic letters and should be entered exactly as shown.
- Variables are shown in italicized lowercase letters. They represent user-supplied names or values. If a variable or user-specified name ends in *_list*, you can provide a list of these terms separated by commas.
- If punctuation marks, parentheses, arithmetic operators, or other such symbols are shown, you must enter them as part of the syntax.

Sample syntax diagram

The following is an example of a syntax diagram with an interpretation:



How to read syntax statements

Syntax statements are read from left to right:

- Individual required arguments are shown with no special notation.
- When you must make a choice between a set of alternatives, they are enclosed by { and } symbols.
- Optional arguments are enclosed by [and] symbols.
- When you can select from a group of choices, they are separated by | characters.
- Arguments that you can repeat are followed by ellipses (...).

Example of a syntax statement

`EXAMPLE char_constant {a|b}[c|d]e[,e]... name_list{name_list}...`

The following list explains the syntax statement:

- Enter the keyword `EXAMPLE`.
- Enter a value for *char_constant*.
- Enter a value for *a* or *b*, but not for both.

- Optionally, enter a value for *c* or *d*.
- Enter at least one value for *e*. If you enter more than one value, you must put a comma between each.
- Optionally, enter the value of at least one *name* for *name_list*. If you enter more than one value, you must put a comma between each *name*.

Note: The same example is used in both the syntax-statement and syntax-diagram representations.

Examples in this information

The examples in this information, except where otherwise noted, are coded in a simple style that does not try to conserve storage, check for errors, achieve fast performance, or demonstrate all possible methods to achieve a specific result.

The examples for installation information are labelled as either *Example* or *Basic example*. *Basic examples* are intended to document a procedure as it would be performed during a basic, or default, installation; these need little or no modification.

Notes on the terminology used

Some of the terminology in this information is shortened as follows:

- The term *free source form format* often appears as *free source form*.
- The term *fixed source form format* often appears as *fixed source form*.
- The term *XL Fortran* often appears as *XLF*.

Related information

The following sections provide related information for XL Fortran:

IBM XL Fortran information

XL Fortran provides product information in the following formats:

- Quick Start Guide

The Quick Start Guide ([quickstart.pdf](#)) is intended to get you started with IBM XL Fortran for AIX, V15.1.3. It is located by default in the XL Fortran directory and in the `\quickstart` directory of the installation DVD.
- README files

README files contain late-breaking information, including changes and corrections to the product information. README files are located by default in the XL Fortran directory and in the root directory of the installation DVD.
- Installable man pages

Man pages are provided for the compiler invocations and all command-line utilities provided with the product. Instructions for installing and accessing the man pages are provided in the *IBM XL Fortran for AIX, V15.1.3 Installation Guide*.
- Online product documentation

The fully searchable HTML-based documentation is viewable in IBM Knowledge Center at http://www.ibm.com/support/knowledgecenter/SSGH4D_15.1.3/com.ibm.compilers.aix.doc/welcome.html.
- PDF documents

PDF documents are available on the web at <http://www.ibm.com/support/docview.wss?uid=swg27036673>.

The following files comprise the full set of XL Fortran product information:

Table 4. XL Fortran PDF files

Document title	PDF file name	Description
IBM XL Fortran for AIX, V15.1.3 Installation Guide, SC27-4243-02	install.pdf	Contains information for installing XL Fortran and configuring your environment for basic compilation and program execution.
Getting Started with IBM XL Fortran for AIX, V15.1.3, SC27-4242-02	getstart.pdf	Contains an introduction to the XL Fortran product, with information about setting up and configuring your environment, compiling and linking programs, and troubleshooting compilation errors.
IBM XL Fortran for AIX, V15.1.3 Compiler Reference, SC27-4244-02	compiler.pdf	Contains information about the various compiler options and environment variables.
IBM XL Fortran for AIX, V15.1.3 Language Reference, SC27-4245-02	langref.pdf	Contains information about the Fortran programming language as supported by IBM, including language extensions for portability and conformance to nonproprietary standards, compiler directives and intrinsic procedures.
IBM XL Fortran for AIX, V15.1.3 Optimization and Programming Guide, SC27-4246-02	proguide.pdf	Contains information on advanced programming topics, such as application porting, interlanguage calls, floating-point operations, input/output, application optimization and parallelization, and the XL Fortran high-performance libraries.

To read a PDF file, use Adobe Reader. If you do not have Adobe Reader, you can download it (subject to license terms) from the Adobe website at <http://www.adobe.com>.

More information related to XL Fortran, including IBM Redbooks® publications, white papers, and other articles, is available on the web at <http://www.ibm.com/support/docview.wss?uid=swg27036673>.

For more information about Fortran, see the Fortran café at <https://www.ibm.com/developerworks/mydeveloperworks/groups/service/html/communityview?communityUuid=b10932b4-0edd-4e61-89f2-6e478ccba9aa>.

Standards and specifications

XL Fortran is designed to support the following standards and specifications. You can refer to these standards and specifications for precise definitions of some of the features found in this information.

- American National Standard Programming Language FORTRAN, ANSI X3.9-1978.
- American National Standard Programming Language Fortran 90, ANSI X3.198-1992.
- ANSI/IEEE Standard for Binary Floating-Point Arithmetic, ANSI/IEEE Std 754-1985.
- Federal (USA) Information Processing Standards Publication Fortran, FIPS PUB 69-1.
- Information technology - Programming languages - Fortran, ISO/IEC 1539-1:1991. (This information uses its informal name, Fortran 90.)
- Information technology - Programming languages - Fortran - Part 1: Base language, ISO/IEC 1539-1:1997. (This information uses its informal name, Fortran 95.)
- Information technology - Programming languages - Fortran - Part 1: Base language, ISO/IEC 1539-1:2004. (This information uses its informal name, Fortran 2003.)

- *Information technology - Programming languages - Fortran - Part 1: Base language, ISO/IEC 1539-1:2010.* (This information uses its informal name, Fortran 2008. We currently provide partial support to this standard.)
- *Information technology - Further interoperability of Fortran with C, ISO/IEC TS 29113:2012.* (This information uses its informal name, Technical specification 29113, referred to as TS 29113. We currently provide partial support to this specification.)
- *Military Standard Fortran DOD Supplement to ANSI X3.9-1978, MIL-STD-1753* (United States of America, Department of Defense standard). Note that XL Fortran supports only those extensions documented in this standard that have also been subsequently incorporated into the Fortran 90 standard.
- *OpenMP Application Program Interface Version 3.1 (full support), and OpenMP Application Program Interface Version 4.0 (partial support),* available at <http://www.openmp.org>

Other IBM information

- *Parallel Environment for AIX: Operation and Use*
- The IBM Systems Information Center, at <http://publib.boulder.ibm.com/infocenter/systems/index.jsp?topic=/com.ibm.aix.doc/doc/base/aixparent.htm>, is a resource for AIX information.

You can find the following books for your specific AIX system:

- *AIX Commands Reference, Volumes 1 - 6*
- *Technical Reference: Base Operating System and Extensions, Volumes 1 & 2*
- *AIX National Language Support Guide and Reference*
- *AIX General Programming Concepts: Writing and Debugging Programs*
- *AIX Assembler Language Reference*

Technical support

Additional technical support is available from the XL Fortran Support page at http://www.ibm.com/support/entry/portal/product/rational/xl_fortran_for_aix. This page provides a portal with search capabilities to a large selection of Technotes and other support information.

If you cannot find what you need, you can send an email to compinfo@ca.ibm.com.

For the latest information about XL Fortran, visit the product information site at <http://www.ibm.com/software/products/en/xlfortran-aix>.

How to send your comments

Your feedback is important in helping us to provide accurate and high-quality information. If you have any comments about this information or any other XL Fortran information, send your comments to compinfo@ca.ibm.com.

Be sure to include the name of the manual, the part number of the manual, the version of XL Fortran, and, if applicable, the specific location of the text you are commenting on (for example, a page number or table number).

Chapter 1. Before installing XL Fortran

Before you install IBM XL Fortran for AIX, V15.1.3, do the following tasks:

- Familiarize yourself with the installation image, which contains the installable compiler filesets.
- Ensure that system prerequisites such as disk space and operating system are met.
- Determine the tasks you need to perform, depending on your installation requirements.
- Become either the root user or a user with administrator privileges.

Coexistence with previous version compilers

Installing this version of the compiler does not remove or change previous versions of the compiler, only the Fortran runtime library and the SMP runtime library are migrated to the new versions. This was achieved by differentiating the installation fileset names from those of the previous versions, including the version, release and modification level (V.R.M) in the name, and installing to new locations that include V.R.M in the installation paths.

The compiler invocations from previous compiler installations in the `/usr/bin/` directory will not be removed. The new compiler invocations will be installed to the `/opt/IBM/xlf/15.1.3/bin/` directory. To invoke this version of the compiler without specifying the full installation path, you must update your `PATH` or create shortcuts. For details, see “Creating shortcuts to the XL Fortran invocation commands” on page 28.

Upgrading the evaluation copy of the XL Fortran compiler

You can upgrade the evaluation version of the compiler to the licensed version by installing the licensed product package on top of the evaluation package. By following the procedures for the licensed product package in Chapter 2, “Basic installation,” on page 9 or Chapter 3, “Advanced installation,” on page 13, you can install the compiler license. Shared filesets between the evaluation and licensed versions that have already been installed are reported as `Already installed`.

Note: If the evaluation version was installed using the advanced (nondefault) installation method, and you want to install the licensed version to the same location, you must first remove the evaluation version using `rm -rf`. If you do not remove the evaluation version first, you have to install the licensed version to a different directory than the evaluation version.

The installation image and filesets

The installation image contains filesets for all the components of the compiler for all supported language locales.

Filesets

The image includes filesets for the compiler components.

This section lists the filesets that are included in the installation image and the default directories to which the fileset contents are installed during a basic installation. You might optionally install all available filesets, or only the ones you want. If you select specific filesets for installation, you might also choose to automatically install any prerequisite filesets by using the `installp -g` flag.

XL Fortran compiler filesets

This topic lists XL Fortran compiler filesets V15.1.3.

Table 5. XL Fortran compiler filesets and default installation locations

Fileset name	Fileset description	Default installation locations
xlfcmp.15.1.3	XL Fortran compiler	/opt/IBM/xlf/15.1.3/ /opt/IBM/xlf/15.1.3/bin/ /opt/IBM/xlf/15.1.3/listings/ /opt/IBM/xlf/15.1.3/etc/ /opt/IBM/xlf/15.1.3/lib/aix61/ /opt/IBM/xlf/15.1.3/include/ /opt/IBM/xlf/15.1.3/include_d7/ /opt/IBM/xlf/15.1.3/man/ /opt/IBM/xlf/15.1.3/samples/ /opt/IBM/xlf/15.1.3/doc/ /opt/IBM/xlf/15.1.3/bin/default_msg/ /opt/IBM/xlf/15.1.3/msg/
xlfcmp.15.1.3.bundle	XL Fortran media defined bundles	/usr/sys/inst.data/sys_bundles/
xlfcmp.15.1.3.license ¹	XL Fortran license files	/opt/IBM/xlf/15.1.3/
xlfcmp.15.1.3.evaluation ²	XL Fortran license files for the evaluation copy	/opt/IBM/xlf/15.1.3/
xlfcmp.15.1.3.ndi	XL Fortran non-default installation script	/opt/IBM/xlf/15.1.3/bin/
xlfcmp.15.1.3.lib	XL Fortran libraries for AIX 6.1, AIX 7.1, and AIX 7.2	/opt/IBM/xlf/15.1.3/lib/aix61/
Note:		
1. Only included in XL Fortran for AIX, V15.1.3.		
2. Only included in the evaluation copy of the XL Fortran for AIX compiler.		

XL Fortran runtime environment filesets

This topic lists XL Fortran runtime environment filesets V15.1.3.

Table 6. XL Fortran runtime environment filesets and default installation locations

Fileset name	Fileset description	Default installation locations
xlfrte	XL Fortran runtime libraries	/usr/lib/ /usr/lpp/xlf/lib/ /usr/lpp/xlfrtemsg/
xlfrte.aix61	XL Fortran runtime environment for AIX 6.1, AIX 7.1, and AIX 7.2	/usr/lpp/xlf/lib/aix61/

Table 6. XL Fortran runtime environment filesets and default installation locations (continued)

Fileset name	Fileset description	Default installation locations
xlfirte.msg.LANG	XL Fortran runtime messages LANG = [en_US, EN_US, ja_JP, JA_JP, Ja_JP]	/usr/lib/nls/msg/LANG/

Runtime debug memory routine filesets

This topic lists the runtime debug memory routine filesets V5.5.

Table 7. Runtime debug memory routine filesets and default installation locations

Fileset name	Fileset description	Default installation locations
memdbg.adt	User heap/memory debug toolkit	/usr/vac/lib/ /usr/vac/lib/profiled/
memdbg.aix53	User heap/memory debug toolkit for AIX 5.3, AIX 6.1, AIX 7.1, and AIX 7.2	/usr/vac/lib/aix53/ /usr/vac/lib/profiled/aix53/
memdbg.msg.LANG	User heap/memory debug messages LANG = [en_US, EN_US, ja_JP, JA_JP, Ja_JP]	/usr/lib/nls/msg/LANG

Shared-memory parallelism (SMP) runtime environment filesets

This topic lists the SMP runtime filesets V4.1.3.

Table 8. SMP runtime filesets and default installation locations

Fileset name	Fileset description	Default installation locations
xlsmp.rte	SMP runtime library	/usr/include/ /usr/lpp/xlsmp/default_msg/
xlsmp.msg.LANG.rte	SMP runtime messages LANG = [en_US, EN_US, ja_JP, JA_JP, Ja_JP]	/usr/lib/nls/msg/LANG/
xlsmp.aix61.rte	SMP runtime libraries for AIX 6.1, AIX 7.1, and AIX 7.2	/usr/lpp/xlsmp/aix61/

Mathematical Acceleration Subsystem (MASS) filesets

This topic lists the MASS filesets V8.1.3.

Table 9. MASS filesets and default installation locations

Fileset name	Fileset description	Default installation locations
xlmass.8.1.3	IBM MASS files	/opt/IBM/xlmass/8.1.3/ /opt/IBM/xlmass/8.1.3/include/ /opt/IBM/xlmass/8.1.3/lib/

Utilization reporting tool fileset

This topic lists the utilization reporting tool filesets V1.2.

Table 10. Utilization reporting tool fileset and default installation locations

Fileset name	Fileset description	Default installation locations
urt12	Utilization reporting tool files	/opt/ibmurt/1.2/ /opt/ibmurt/1.2/bin/ /opt/ibmurt/1.2/config/
urt12.man.LANG	Utilization reporting tool manual page files LANG = [en_US, EN_US, ja_JP, JA_JP, Ja_JP]	/opt/ibmurt/1.2/man/LANG/man1/
urt12.msg.LANG	Utilization reporting tool message files LANG = [en_US, EN_US, ja_JP, JA_JP, Ja_JP]	/opt/ibmurt/1.2/msg/LANG/

Note: The utilization reporting tool can be installed on the same machine as the compiler or on a different machine. You must use the **installp** command to install the urt12 fileset. The utilization reporting tool typically needs to be installed only once, no matter how many compiler installations you have. This tool is useful for those who are responsible for monitoring the overall compiler usage within an organization. Individual developers and build teams do not need to use this tool. To install the utilization reporting tool, see the instructions provided in the README.LANG files found in the urt/ directory, which is located in the root directory of the installation image.

Preparing the electronic distribution package

If you have downloaded the XL Fortran electronic distribution package, IBM_XL_FORTRAN_V15.1.3.0_AIX.tar.Z, follow the steps described in this topic before the installation.

Note: You must be logged in as the root user or have superuser authority.

To decompress and unpack the file, use the command:

```
zcat IBM_XL_FORTRAN_V15.1.3.0_AIX.tar.Z | tar -xvf -
```

The following example shows the steps to prepare the electronic distribution package, IBM_XL_FORTRAN_V15.1.3.0_AIX.tar.Z, located in the /compiler/install/ directory for installation.

```
cd /compiler/install  
zcat IBM_XL_FORTRAN_V15.1.3.0_AIX.tar.Z | tar -xvf -  
cd usr/sys/inst.images
```

See “System prerequisites” on page 5 to ensure that system prerequisites are met and use the installation methods described in either Chapter 2, “Basic installation,” on page 9 or Chapter 3, “Advanced installation,” on page 13 to install the compiler.

National language support

The LANG environment variable determines which message catalogs are used. All message catalogs are installed by default. If LANG is not defined or is assigned an unsupported locale, en_US message catalogs are used. This topic introduces a list of available locales.

The XL Fortran messages support the following language locales:

- en_US (ISO8859-1)
- EN_US (UTF-8)
- ja_JP (IBM-eucJP)
- JA_JP (UTF-8)
- Ja_JP (IBM-943)

English (en_US) is the default national language. Following installation, you can set the NLSPATH so that messages are displayed in a different language. See “Enabling the XL Fortran error messages” on page 27.

System prerequisites

All system prerequisites must be ready on your system before XL Fortran and its documentation can be successfully installed.

- **Supported operating systems:**
 - AIX V6.1 TL 2 Service Pack 5 or later
 - AIX V7.1
 - AIX V7.2
 - IBM i V7.1 PASE V7.1
 - IBM i V7.2 PASE V7.2

Note: Additional filesets must be installed on these systems. For details, see “Required filesets for installing XL Fortran.”

- **Required hard disk space:** 250 MB
- **Required software for documentation:**
 - HTML browser
 - PDF viewer

Verifying the amount of hard disk space available

You can use the following command to determine the amount of space available in the default installation location (/opt/IBM/xlf/15.1.3/):

```
df -m /opt
```

If you plan to install the compiler to a nondefault location, you can use the following command:

```
df -m installation_path
```

In this command, *installation_path* represents the nondefault location.

Required filesets for installing XL Fortran

The following filesets must be installed on your system to install IBM XL Fortran for AIX, V15.1.3.

Fileset name	Fileset description
bos.adt.include	Base application development include files
bos.adt.lib	Base application development libraries
bos.adt.libm	Base application development math libraries
bos.rte	Base operating system run time
bos.rte.libc	Base application runtime library

At least one of the following locale-specific filesets must be installed on your system.

Fileset name	Fileset description
bos.loc.LANG	Base locale support
bos.loc.pc.LANG	Base system locale PC code set
bos.loc.utf.LANG	Base system locale UTF code set
bos.loc.iso.LANG	Base system locale ISO code set

You can view information about the installed filesets by using the **ls1pp** command. For example, to determine if the required filesets have been installed, use the following command:

```
ls1pp -L bos.adt.include bos.adt.lib bos.adt.libm bos.loc.* bos.rte bos.rte.libc
```

Note: If one of the required filesets is missing, an error message might be generated. An example follows.

MISSING REQUISITES: The following filesets are required by one or more of the selected filesets listed above. They are not currently installed and could not be found on the installation media.

```
bos.adt.libm 6.1.5.1 # Base Level Fileset
```

This message indicates that the `bos.adt.libm` fileset is required but not installed.

You can find the required `bos.*` filesets on your AIX OS installation image.

To install a missing fileset, use the following command:

```
# installp -acXd installation_path fileset
```

In this command, *installation_path* represents the location of the fileset to be installed.

Previewing the installation and license agreements

Before installing IBM XL Fortran for AIX, V15.1.3, you can verify the default installation process, check file sizes and disk space, and preview the license agreements using either the System Management Interface Tool (SMIT) or the **installp** command.

The terms and conditions for using XL Fortran are specified in the following PDF files, which are located in the root directory of the distribution package:

- LicenseAgreement.pdf
- license.pdf

Note: For the evaluation copy of the XL Fortran for AIX compiler, the license files are `LicenseAgreement.EVAL.pdf` and `license.EVAL.pdf`. These license files can be found in the `/opt/IBM/xlf/15.1.3/` directory after basic installation.

Note: You can use the utilization tracking and reporting feature to ensure the compiler usage is compliant with the number of Concurrent User licenses you have purchased. For more information, see *Tracking and reporting compiler usage* in the *XL Fortran Compiler Reference*.

Using SMIT

You can use the System Management Interface Tool (SMIT) to preview the basic XL Fortran installation.

Follow the steps to install the compiler to the default location given in “Using SMIT” on page 11. When prompted with the SMIT dialog to customize the installation in step 3, set the Preview only? field to **yes**. With this setting enabled, SMIT displays progress messages at each stage of the installation but does not actually install the compiler on your system.

Using installp

You can also preview the command line installation process and write the output to a log file, using the **installp** command. Follow the steps to install the compiler to the default location given in “Using installp” on page 11 and specify the **-p** flag to preview the process without installing the compiler.

The following example previews the installation of all the available compiler filesets in the `/cdrom/usr/sys/inst.images` source directory and writes an installation log file to `/tmp/install.log`.

Example:

```
installp -paXgd /cdrom/usr/sys/inst.images -e /tmp/install.log all
```

Chapter 2. Basic installation

You can use the basic installation procedure to install XL Fortran if you are installing IBM XL Fortran for AIX, V15.1.3 to the default directory, `/opt/IBM/xlf/15.1.3/`.

The basic installation is the easiest and fastest method because it can install the latest version and configure the compiler, all through the use of a single installation tool.

If you are using the basic installation to install IBM XL Fortran for AIX, V15.1.3, any previous version of the XL compiler will not be uninstalled. However, the C++ runtime library, the Fortran runtime library, and the shared-memory parallelism (SMP) runtime library will be migrated to the new versions.

If you are not installing IBM XL Fortran for AIX, V15.1.3 to the default directory, do not use basic installation. Instead, see the procedures in Chapter 3, “Advanced installation,” on page 13.

The following basic installation methods install XL Fortran to the default directory. If you have the root access or an account with superuser privileges, you can use the Bundle installation method, the System Management Interface Tool (SMIT), or the **installp** command to install the compiler.

You can use the basic installation methods to perform any of the following tasks:

- Install IBM XL Fortran for AIX, V15.1.3 on a clean system.
- Install IBM XL Fortran for AIX, V15.1.3 on a system that has a previous version of the XL compiler installed. In this case, both compilers will use the Fortran runtime library and the SMP runtime library provided with IBM XL Fortran for AIX, V15.1.3.
- Install IBM XL Fortran for AIX, V15.1.3 on a system where IBM XL C for AIX, V13.1.3 or XL C/C++ for AIX, V13.1.3 is already installed. In this case, both compilers will use the SMP and MASS libraries provided with XL Fortran for AIX. (For information about installing XL C or XL C/C++ , see the *IBM XL C for AIX, V13.1.3 or XL C/C++ for AIX, V13.1.3 Installation Guide*.)
- Install an update on a system where IBM XL Fortran for AIX, V15.1.3 has already been installed. In this case, use the procedure in Chapter 4, “Update installation,” on page 19.

Installation demonstration videos are also available on IBM Education Assistant at <http://publib.boulder.ibm.com/infocenter/ieduasst/rtnv1r0/index.jsp>.

Tasks for basic installation

Before you perform a basic installation, you must make sure that you have a user account with administrator privileges and that your system meets all system requirements. After you have finished installing the compiler, you must confirm that the installation has been successful and enable the man pages of the compiler.

The following table outlines the procedure for basic installation.

Table 11. Steps for basic installation: new or upgrade installation

Steps	References
Become either the root user or a user with administrator privileges.	Documentation supplied with the operating system
Ensure that all system prerequisites are satisfied.	"System prerequisites" on page 5
Use the bundle installation method, SMIT, or the installp command to install and configure the compiler, using the default paths.	<ul style="list-style-type: none"> • "Using the bundle installation method" • "Using SMIT" on page 11 • "Using installp" on page 11
Confirm that the compiler packages have been successfully installed, and test the installation.	<ul style="list-style-type: none"> • "Checking compiler and fileset information" on page 25 • "Testing the installation" on page 29
Enable the compiler man pages.	"Enabling the manual pages" on page 28
If your system locale, encoding, or both are not en_US, enable the compile-time error messages. Otherwise, skip this step.	"Enabling the XL Fortran error messages" on page 27

Using the bundle installation method

You can install XL Fortran using the bundle installation method. The bundle fileset contains scripts to help install either the evaluation version or the licensed version of the compiler.

Procedure

1. As the root user, install the compiler bundle fileset `xlfcmp.15.1.3.bundle`, using the **installp** command. You can skip this step if you are upgrading from the evaluation version because the fileset is already installed on the system.


```
installp -aXd . xlfcmp.15.1.3.bundle
```
2. Enter the following command from the command line to start the Smit easy mode:


```
# smitty easy_install
```
3. Enter the name of the installation device. It is the path in which the filesets can be found; for example, `/usr/sys/inst.images`. If the filesets are in your current directory, you can use `."` as the input device.


```
* INPUT device / directory for software  [.]
```
4. From the selection screen, select the package that you need.
 - If you are installing the evaluation version on AIX V6.1, V7.1, or V7.2, choose `xlfcmp.15.1.3-evaluation`.
 - If you are installing or upgrading to the licensed version on AIX V6.1, V7.1, or V7.2, choose `xlfcmp.13.1.3-licensed`.
5. Change the following values provided on the bundle screen as appropriate to your situation, and press **Enter** to continue.
 - You can change the **AUTOMATICALLY install requisite software?** option to **yes** to install the compiler automatically.
 - You can change the **EXTEND file systems if space needed?** option to **yes** to extend file systems.
 - You must change the **ACCEPT new license agreements?** option to **yes** to accept new license agreements.

6. Scroll to the end of the installation output to check the installation summary. The output indicates whether the installation of your bundle has been successful. Exit using Esc+0.

Note: Using the bundle installation method prevents the installation tools from installing filesets that are not supported by your operating system. Therefore, no error messages or failures that are caused by unsupported filesets are generated.

Using SMIT

The SMIT guides you step by step through the installation process.

Procedure

1. Enter the command `smit install_latest`. This command runs the SMIT, which presents a menu-driven user interface for the installation process. You must specify the INPUT device/directory of the software.
2. Press **F4** to select from a list of suggested devices and directories, or type in the name of the CD-ROM device or the path to the location of the packages. If you want to install over a network you must have a network server installed, and then specify the directory on the client that corresponds to the installation source on the network server.
3. Press **Enter**. At this stage you are prompted with a list of questions that can help you customize the compiler installation on your system. Verify the default values, or modify them where necessary to accommodate your preferences.

Important: You must select **yes** next to Accept new LICENSE agreements? to continue with the installation.

Note:

- You can select the SOFTWARE to install field and press **F4** to view the installable filesets on the device or in the directory, and then select the filesets to install. Install the runtime libraries first, and then install the other filesets in any order. It is recommended that you keep the default setting, `_all_latest`, to install all the filesets.
 - To preview the installation process without actually installing the compiler, select **yes** next to the Preview only? field.
4. Press **Enter** and then press **Enter** again.

Notes:

- The runtime libraries and compiler filesets are always required.
- You do not need all of the compile-time and runtime message catalogs, only those for the national languages that you need for compile-time and runtime messages.
- Messages are displayed as each part is successfully installed.
- The installation log is stored in the `/home/smit.log` file.

Using installp

You can install XL Fortran directly from the command line using the AIX command `installp`. After the installation is completed, the installation output is written to a log file.

Procedure

Run the the **installp** command as follows:

```
installp -aYgd install_images_location -e logfile fileset_names
```

►---installp---aYg---┌-p┐┌-X┐┌-d-*install_images_location*┐┌-e-*logfile*┐---*fileset_names*---►

-aYg

Specifies that all the latest installable filesets available in the *install_images_location* directory are applied and that the required software license agreement is accepted.

-p

Performs a preview of the installation process by running the preinstallation checks. See "Using installp" on page 7.

-X

Attempts to expand the file system at the default location if there is insufficient space to complete the installation.

-d *install_images_location*

Specifies the directory where the filesets are located. This path can also be a mounted CD-ROM drive.

-e *logfile*

Specifies the name and location of the installation log file.

fileset_names

Specifies a list of names of the filesets in *install_images_location* that you want to install.

Note: The keyword *all* can be used to indicate that all filesets should be attempted during installation.

Example

The following example installs all available compiler filesets in the */cdrom/usr/sys/inst.images* source directory to the default locations, as specified in "Filesets" on page 1, and writes an installation log file to */tmp/install.log*.

```
installp -aYgd /cdrom/usr/sys/inst.images -e /tmp/install.log all
```

For information about return codes of the **installp** command, see "installp Command" in the IBM AIX documentation at <http://www.ibm.com/systems/power/software/aix/resources.html>.

Chapter 3. Advanced installation

You must use the advanced installation procedure if any of the following is true:

- You are maintaining multiple fix levels of the compiler on a single system.
- You do not wish to alter the system run times with the compiler installation.
- You are installing the product to a nondefault location.
- You are installing the product on an IBM i V7.1 PASE system or V7.2 PASE system.

To perform an advanced installation, you need to use the `xlfndi` Perl script provided with the installation image to install XL Fortran to a nondefault directory. The script is packaged in the `xlfcmp.15.1.3.ndi` fileset. To avoid unexpected behavior during installation, do not modify this script.

Limitations of nondefault installation

Although nondefault installation gives you more freedom to choose how many versions of XL Fortran to keep on your system and where to install them, in many ways a nondefault installation is also more restrictive, demanding to implement, and difficult to maintain than a basic installation.

- It is recommended that you install XL Fortran to the default location. Use the `xlfndi` script to install XL Fortran only if you are an expert user who is familiar with the compiler and the standard installation process.
- The `xlfndi` script does not check whether prerequisite packages are installed.
- You cannot use this script to install the product filesets individually.
- You cannot use AIX tools (such as `lspp`) to uninstall or to query installed filesets for version or release level information.
- Service refreshes of the compiler assume a default installation path. For a nondefault compiler installation, the `xlfndi` script must be used to apply service packages.
- To run `xlfndi`, you must have Perl version 5.5.3 or higher, runtime environment `perl.rte` installed on your system. This fileset is supplied with the AIX base operating system.
- The `xlfndi` script requires that the original filesets are not renamed. This means that you cannot install the compiler using filesets that have been copied by the SMIT suboption "Copy Software to Hard Disk for Future Installation" because the version number of the compiler is appended to the filesets when they are copied.
- The `xlfndi` tool requires you to install the current PTF version of the `xlfcmp.15.1.3.ndi` fileset before the tool can be used to install the PTF to a nondefault location.

Tasks for advanced installation

Before you perform an advanced installation, you must make sure that you have a user account with administrator privileges and that your system meets all system requirements. You might also want to uninstall any previous versions of XL Fortran on your system. After you have finished installing the compiler, you must confirm that the installation has been successful and enable the man pages of the compiler.

The recommended procedure for advanced installation is outlined in the following table.

Table 12. Steps for advanced installation: new or upgrade installation

Task	References
Become either the root user or a user with administrator privileges.	Documentation supplied with the operating system
Ensure that all system prerequisites are satisfied.	"System prerequisites" on page 5
If you do not need to maintain multiple versions of the product on your system, remove any existing versions of XL Fortran for AIX.	Chapter 6, "Uninstalling XL Fortran," on page 31
Use the nondefault installation script to install the compiler. If you are installing the compiler on an IBM PASE system, use the nondefault installation method.	"Nondefault installation procedure" "Installing on an IBM i PASE system" on page 16
Confirm that the compiler packages have been successfully installed, and test the installation.	<ul style="list-style-type: none"> • "Checking compiler and fileset information" on page 25 • "Testing the installation" on page 29
Enable the compiler man pages.	"Enabling the manual pages" on page 28
If your system locale, encoding, or both are not en_US, enable the compile-time error messages. Otherwise, you can skip this step.	"Enabling the XL Fortran error messages" on page 27

Nondefault installation procedure

To install XL Fortran to a nondefault location, first use **installp** to install the xlfcmp.15.1.3.ndi fileset, and then use the xlfndi Perl script included in that fileset to install the compiler.

Procedure

1. Run the **installp** command to install the xlfcmp.15.1.3.ndi fileset as follows:

```
installp -aYgd install_images_location -e logfile xlfcmp.15.1.3.ndi
xlfcmp.15.1.3.license
```

→ installp -aYg -p -x -d *install_images_location* -e *logfile* xlfcmp.15.1.3.ndi xlfcmp.15.1.3.license →

-aYg

Specifies that all the latest installable filesets available in the *install_images_location* directory are applied and that the required software license agreement is accepted.

-d *install_images_location*

Specifies the directory where the filesets are located. This path might also be a mounted CD-ROM drive.

-e *logfile*

Specifies the name and location of the installation log file. By default, the installation log file xlfndi.log is stored in your working directory.

-p
Performs a preview of the installation process by running the preinstallation checks. See “Previewing the installation and license agreements” on page 6.

-X
Attempts to expand the file system at the default location if there is not enough space to complete the installation.

Example:

```
installp -aYgd /cdrom/usr/sys/inst.images -e /tmp/install.log xlfcmp.15.1.3.ndi \
xlfcmp.15.1.3.license
```

Note: This command automatically installs and accepts the license agreement fileset, xlfcmp.15.1.3.license, required to install xlfcmp.15.1.3.ndi.

2. Install any available updates to the xlfcmp.15.1.3.ndi fileset. You can download the latest compiler updates from the support website: http://www.ibm.com/support/entry/portal/product/rational/xl_fortran_for_aix

To check the version number of the xlfcmp.15.1.3.ndi fileset currently installed on your system, use the following command:

```
lslpp -l xlfcmp.15.1.3.ndi
```

To install a new version of the xlfcmp.15.1.3.ndi fileset, use the following command:

```
installp -aYgd ptf_images_location -e logfile xlfcmp.15.1.3.ndi
```

3. Install XL Fortran by entering the following command:

```
▶▶▶ perl /opt/IBM/xlf/15.1.3/bin/xlfndi -d source_path [-e logfile]
[-b target_dir] [-rte] [-version] ▶▶▶
```

```
perl /opt/IBM/xlf/15.1.3/bin/xlfndi -d source_path [-e logfile] [-b target_dir]
[-rte] [-version]
```

where:

-d *source_path*

Specifies the directory where the filesets are located. This path can also be a mounted CD-ROM drive.

-e *logfile*

Specifies the name and location of the installation log file. By default, the installation log file xlfndi.log is stored in your working directory.

-b *target_dir*

Specifies the target location where the filesets are copied and expanded. By default, the files are copied to the xlfndi directory in your working directory. If the directory exists already, you will receive an error message and the installation will stop.

-rte

Specifies that only the runtime components should be installed.

-version

Displays the version of the nondefault installation tool.

Note: The **-eval** option is deprecated and has no effect. The xlfndi Perl script automatically determines the type of installation that is happening.

The following example uses the `xlfndi` Perl script to install all available compiler filesets in the `/cdrom/usr/sys/inst.images` source directory to the nondefault location, `/compiler/xlf/`, and writes the installation log file `xlf.ndi.inst.log` to `/tmp`.

Example:

```
perl /opt/IBM/xlf/15.1.3/bin/xlfndi -d /cdrom/usr/sys/inst.images
-b /compiler/xlf/ -e /tmp/xlf.ndi.inst.log
```

Results

IBM XL Fortran for AIX is installed into the chosen location.

The `xlfndi` Perl script returns 0 if the installation is successful, or 1 if the installation fails.

Installing on an IBM i PASE system

To install XL Fortran on an IBM i PASE system, you must follow the nondefault installation method because the AIX SMIT and `installp` utilities are not supported.

About this task

During installation, if the `xlfndi` script determines that you are installing the compiler onto a PASE system, it modifies the name of the XL Fortran configuration file and one of its variables, `oslevel`, to match the version of PASE you are running. For example, if the compiler has been installed on a system running IBM i V7.2 PASE V7.2, `xlf.cfg.71` is renamed to `xlf.cfg.72`, and the value of OS level is changed from 7.1 to 7.2.

Procedure

1. Start the installation by inserting the compiler product installation CD into the CD drive, or using the electronic distribution package.

Note: If you use the electronic image, you must extract the distribution package into a case sensitive file system, such as `/QOpenSys/`. The nondefault installation option `-i` can only be used if you install the compiler using the CD.

2. Sign on to the system with a user profile that has `*ALLOBJ` authority. The compiler product files are owned by this user profile.
3. Start an interactive i PASE terminal session by entering this CL command.

```
call qp2term
```

4. Restore the appropriate compiler installation script.

- If you use the electronic distribution package, run the following commands:

```
cd /QOpenSys/home/user
zcat IBM_XL_FORTRAN_V15.1.3.0_AIX.tar.Z | tar -xvf -
restore -qf usr/sys/inst.images/xlfcmp.15.1.3.ndi ./opt/IBM/xlf/15.1.3/bin/xlfndi
```

- If you use the installation CD, run the following commands:

```
cd /QOpenSys/home/user
restore -qf /QOPT/CDROM/USR/SYS/INST.IMA/XLF.NDI ./opt/IBM/xlf/15.1.3/bin/xlfndi
```

5. Run the installation script to install the compiler. The destination directory for the compiler is specified by the `-b` option in the command. The preferred directory names for the compilers are used in the following commands. If you choose a different directory, the directory is in the `/QOpenSys` tree to allow for case-sensitive file names.

- If you use the electronic distribution package, run the following commands:

```
/QIBM/ProdData/DeveloperTools/pase/bin/perl ./opt/IBM/xlf/15.1.3/bin/xlfndi -d \  
./usr/sys/inst.images -b /QOpenSys/xlf
```

- If you use the installation CD, run the following commands:

```
/QIBM/ProdData/DeveloperTools/pase/bin/perl ./opt/IBM/xlf/15.1.3/bin/xlfndi -i -d \  
/QOPT/CDROM/USR/SYS/INST.IMA -b /QOpenSys/xlf
```

Results

After the XL Fortran compiler is installed for use in i PASE, the XL Fortran compiler commands (for example, `xlf`) can be found in directory `/QOpenSys/xlf/opt/IBM/xlf/15.1.3/bin/`.

Note: You can add the directory that contains the compiler commands to the `$PATH` environment variable. The `$PATH` environment variable specifies the directories to be searched to find a command. For example, if you have installed XL C/C++ compiler, you can change the `$PATH` environment variable as follows to avoid specifying the command path when you use the compiler commands:

```
export $PATH=$PATH:/QOpenSys/xlf/opt/IBM/xlf/15.1.3/bin
```

For information about installing PTFs for compiler installation updates on the PASE system, see “Installing PTF updates on the PASE system” on page 20.

For more information about the IBM i V7.2 PASE system, see IBM PASE for i.

Running XL Fortran from a nondefault location

The compiler invocation commands are installed to `/target_dir/opt/IBM/xlf/15.1.3/bin/`, where `target_dir` is the location of the compiler as set by the `-b` flag during the nondefault installation.

Procedure

- For example, if you installed XL Fortran to the `/compiler/xlf` directory, you can run the compiler by using this command:

```
/compiler/xlf/opt/IBM/xlf/15.1.3/bin/xlf -o hello_f hello.f
```

- Alternatively, you can create a shortcut to the compiler invocations, as described in “Creating shortcuts to the XL Fortran invocation commands” on page 28.

Chapter 4. Update installation

A program temporary fix (PTF) is an update to XL Fortran that provides a fix or multiple fixes to the product.

You can download the latest compiler updates from the support website:

http://www.ibm.com/support/entry/portal/product/rational/xl_fortran_for_aix .

You can also find the instructions on Fix Central.

Tasks for update installation

If you are installing an update to XL Fortran, you must first determine whether the compiler has been installed to a default or nondefault directory, and then follow the recommended steps for updating that installation type.

If the compiler has been installed to the default directory, `/opt/IBM/xlf/15.1.3/`, you must follow the steps outlined in the Table 13.

Table 13. Steps for basic installation: update installation

Task	References
Become either the root user or a user with administrator privileges.	Documentation supplied with the operating system
Ensure that all the system prerequisites are met.	"System prerequisites" on page 5
Download, decompress, and unpack the PTF package.	"Preparing a PTF package for installation" on page 20
Generate a .toc file.	"Preparing a PTF package for installation" on page 20
Use SMIT or the <code>installp</code> command to install PTFs, using the default paths.	<ul style="list-style-type: none">• "Using SMIT" on page 21• "Using <code>installp</code>" on page 22
Confirm that the compiler packages have been successfully installed, and test the installation.	<ul style="list-style-type: none">• "Checking compiler and filesset information" on page 25• "Testing the installation" on page 29

If the compiler has been installed to any directory other than `/opt/IBM/xlf/15.1.3/`, you must follow the steps outlined in the Table 14.

Table 14. Steps for advanced installation: update installation

Task	References
Become either the root user or a user with administrator privileges.	Documentation supplied with the operating system
Ensure that all system prerequisites are met.	"System prerequisites" on page 5
Download, decompress, and unpack the PTF package.	"Preparing a PTF package for installation" on page 20
Generate a .toc file.	"Preparing a PTF package for installation" on page 20
Install any PTF updates to the <code>xlfcmp.15.1.3.ndi</code> filesset using SMIT or <code>installp</code> .	<ul style="list-style-type: none">• "Using SMIT" on page 21• "Using <code>installp</code>" on page 22

Table 14. Steps for advanced installation: update installation (continued)

Task	References
Use the nondefault installation script to install further updates.	"Updating an advanced installation using xlfndi" on page 22
Confirm that the compiler packages have been successfully installed, and test the installation.	<ul style="list-style-type: none"> • "Checking compiler and fileset information" on page 25 • "Testing the installation" on page 29

Preparing a PTF package for installation

Updates to the compiler are supplied as PTF packages. Before you use these PTF packages to update the compiler, you must download and decompress these packages, and then generate a .toc file.

Before you begin

You must log in as root or have superuser authority.

Procedure

1. Download the PTF package that you want (for example 15.1.3.1-IBM-xlfcmp-AIX-FP001.tar.Z) into an empty directory.
2. Restore the compressed file and extract the PTF filesets from the downloaded package. To decompress and unpack the tar file, use the following command:
`zcat package_name.tar.Z | tar -xvf -`
3. Use the command **inutoc directory_name** to generate a .toc file in the same directory as the unpacked filesets.

Example

The following example shows the steps to prepare the package, 15.1.3.1-IBM-xlfcmp-AIX-FP001.tar.Z, located in the directory /compiler/update/, for installation.

```
cd /compiler/update
zcat 15.1.3.1-IBM-xlfcmp-AIX-FP001.tar.Z | tar -xvf -
inutoc .
```

Installing PTF updates on the PASE system

This section describes the steps to install PTFs for the XL Fortran compiler on the PASE system.

Before you begin

Before installing the PTFs, you must have already installed the compilers on the PASE system using the steps in "Installing on an IBM i PASE system" on page 16.

Procedure

1. Obtain the PTF package files to be installed.
2. Decompress and then unpack the PTF package files. If you have downloaded the compressed TAR images to the /Q0penSys/ptf/ directory, you can use the following commands from a QP2TERM command line:

```
cd /QOpenSys/ptf
uncompress <filename.tar.Z>
tar -xvf <filename.tar>
```

3. Create a file containing a list of the PTF packages to be installed. To do so, use the following commands on a QP2TERM command line:

```
cd /QOpenSys/ptf
ls *.bff > ptflist.txt
```

4. Check and update, if necessary, the nondefault installation (NDI) tool itself. The updated version of the NDI tool needs to be restored first in order to use the updated version to install the rest of the PTF package. To do so, use the following commands:

```
cd /QOpenSys/home/user
ls /QOpenSys/ptf/xlfcmp.15.1.3.ndi_*
restore -qf xlfcmp.15.1.3.ndi_V.R.M.F.bff ./opt/IBM/xlf/15.1.3/bin/xlfn di
```

Notes:

- If the **ls** command returns an error message indicating the file does not exist, it means the NDI tool is not updated by the PTF package. Skip this command and continue with the next step in the instructions.
- If the **ls** command returns a file name, make a note of this file name and use that file name in the **restore** command.

```
restore -qf xlfcmp.15.1.3.ndi_V.R.M.F.bff ./opt/IBM/xlf/15.1.3/bin/xlfn di
```

For example, if the file name returned is `xlfcmp.15.1.3.ndi_15.1.3.1.bff`, issue the following command:

```
restore -qf xlfcmp.15.1.3.ndi_15.1.3.1.bff ./opt/IBM/xlf/15.1.3/bin/xlfn di
```

5. Run the installation script to install the PTFs. Enter the following command from the QP2TERM command line:

```
/QIBM/ProdData/DeveloperTools/pase/bin/perl ./opt/IBM/xlf/15.1.3/bin/xlfn di \
-d /QOpenSys/ptf -b /QOpenSys/xlf -u /QOpenSys/ptf/ptflist.txt
```

The installation script creates a compressed TAR backup of the compiler files that exist before the PTF update. If you use the directories as shown in these instructions, this file is named `/QOpenSys/xlf.backup.tar.Z`. If a problem occurs with the installation of the PTF update or with the PTF update itself, you can restore from this backup to uninstall the PTF update.

Updating a basic installation

If you used a basic installation process to install XL Fortran to a default location, it is recommended that you use SMIT or the **installp** command to install PTFs.

Using SMIT

You can use the SMIT interface to install a PTF.

Procedure

1. Run the command: `smit update_all`. This command invokes the SMIT, which presents a menu-driven user interface for the installation process.
2. When you see INPUT device/directory of the software, enter the path of the directory where the PTF filesets and `.toc` are located.
3. Press **Enter**.

At this stage, you are prompted with a list of questions that help you customize the compiler installation on your system. Verify the default values, or modify them where necessary, to accommodate your preferences. Do not modify the value in the **SOFTWARE to install** field.

4. Press **Enter** twice.

Messages are displayed as each part is successfully installed, and the installation log is stored to `/home/smit.log`.

Note: If you have migrated your system to a new operating system version, use `smit install_all` to ensure all filesets related to this operating system version are installed.

Using `installp`

You can use the `installp` command to install a PTF and write the output to a log file.

Procedure

Run the command:

```
▶-----installp--ag-[-p] [-X] [-d-PTF_filesets_location] [-e-logfile] fileset_names-----▶
```

```
installp -aXgd PTF_filesets_location -e logfile fileset_names
```

-ag

Specifies that all the latest installable filesets available in the *PTF_filesets_location* directory are applied.

-p

Performs a preview of the installation process by running the preinstallation checks. See “Previewing the installation and license agreements” on page 6.

-X

Attempts to expand the file system at the default location if there is not enough space to complete the installation.

-d *PTF_filesets_location*

Specifies the directory where the filesets are located. This path might also be a mounted CD-ROM drive.

-e *logfile*

Specifies the name and location of the installation log file.

fileset_names

Specifies a list of names of the filesets in *PTF_filesets_location* that you want to install.

Note: The keyword *all* can be used to indicate that all filesets must be attempted during installation.

Example

The following example installs all available PTF filesets in the `/compiler/update/` source directory to the default locations, as specified in “Filesets” on page 1, and writes an installation log file to `/tmp/install.log`.

```
installp -aXgd /compiler/update/ -e /tmp/install.log all
```

Updating an advanced installation using `xlfdi`

If the XL Fortran compiler has been installed to a nondefault directory, you must use `xlfdi` to install PTFs.

About this task

Note: The `xlfndi` tool forces you to install the PTF `xlfcmp.15.1.3.ndi` fileset before using the tool to install the PTF to a nondefault location.

Procedure

1. Install the `xlfcmp.15.1.3.ndi` fileset included in the PTF. This fileset must be installed first so that the `xlfndi` script inside it can be used to correctly install the remaining filesets.

To determine the version number of the `xlfcmp.15.1.3.ndi` fileset currently installed on your system, run the command:

```
lslpp -l xlfcmp.15.1.3.ndi
```

To install a new version of the `xlfcmp.15.1.3.ndi` fileset, run the command:

```
installp -aXgd ptf_images_location -e logfile xlfcmp.15.1.3.ndi
```

2. Create a text file listing the PTF filesets you want to install. This text file must contain the name of a single PTF file on each line. You can use the `ls` command to do this:

```
ls source_path > ptf_names_file
```

Example

```
ls /compiler/update/*.bff > /home/user/update.list
```

`update.list` contains all the updated fileset names, one for each line as follows:

```
xlfcmp.15.1.3.1.bff
```

3. Use the `perl` command to run the `xlfndi` script:

```
▶▶▶perl /opt/IBM/xlf/15.1.3/bin/xlfndi -d source_path -u ptf_names_file
▶▶▶┌-e logfile┐ ┌-b target_dir┐ ┌-rte┐ ┌-version┐
▶▶▶
```

```
perl /opt/IBM/xlf/15.1.3/bin/xlfndi -d source_path -u ptf_names_file [-e logfile]
-b [target_dir]
```

where:

-d *source_path*

Specifies the directory where the filesets are located. This path might also be a mounted CD-ROM drive.

-u *ptf_names_file*

Specifies the text file containing the names of PTF filesets you want to install.

-e *logfile*

Specifies the name and location of the installation log file. By default, the installation log file `xlfndi.log` is stored in your working directory.

-b *target_dir*

Specifies the directory where the compiler you are updating is installed.

-rte

Specifies that only the runtime component is installed.

-version

Displays the version of the nondefault installation tool.

Note: The installation script creates a compressed TAR backup of the compiler files that exist before the PTF update. If a problem occurs with the

installation of the PTF update or with the PTF update itself, you can restore from this backup file `target_dir.tar.Z` to uninstall the PTF update.

The following example uses the `xlfindi` Perl script to install all available PTF filesets in the `/compiler/update/` source directory to the nondefault location, `/compiler/xlf/` and writes the installation log file to `/tmp/xlf.ndi.inst.log`.

Example:

```
perl /opt/IBM/xlf/15.1.3/bin/xlfindi -d /compiler/update/ -u /compiler/update/ptflist  
-b /compiler/xlf/ -e /tmp/xlf.ndi.inst.log
```

Product version migration

If you have a previous version of the compiler, it will not be removed when you are installing this version; only the Fortran runtime library and the SMP runtime library will be migrated to the new versions. You can maintain multiple versions of the compiler on your system.

If you intend to maintain multiple versions of XL Fortran on your system, see Chapter 3, “Advanced installation,” on page 13.

Operating system migration

If you have the compiler installed on AIX 7.1, you might want to migrate the operating system to AIX 7.2.

The compiler filesets are not OS specific. If XL Fortran V15.1.3 is installed on AIX 7.1, you do not need to migrate the compiler filesets when the operating system is migrated to AIX 7.2. If an OS-specific fileset is required in the future for a higher level of AIX, it will be identified in a Technote tied to the PTF that adds support for that version of AIX.

Chapter 5. After installing XL Fortran

There are optional setup and verification procedures that you can use after you have installed the compiler. You might also want to use the product documentation.

These are documented in the following sections:

- “Checking compiler and fileset information”
- “Enabling utilization tracking” on page 26
- “Enabling IBM License Metric Tool (ILMT) and Tivoli Asset Discovery for Distributed (TADd)” on page 26
- “Configuring compiler defaults” on page 27
- “Setting environment variables” on page 27
- “Enabling the XL Fortran error messages” on page 27
- “Enabling the manual pages” on page 28
- “Creating shortcuts to the XL Fortran invocation commands” on page 28
- “Accessing the local documentation” on page 29
- “Testing the installation” on page 29

Checking compiler and fileset information

You can check the versions of the compiler and individual filesets installed by using the **lslpp** command, the **-qversion** compiler option, or by viewing the `.vrmf_history` file.

Using lslpp

You can view information about the installed filesets by using the **lslpp** command:

lslpp option_string

where *option_string* can be:

-L fileset

Displays the version and state of the fileset specified.

-f fileset

Displays the files and symbolic links associated with the fileset specified.

-w filename

Indicates which fileset the specified file (*filename*) belongs to.

Note: **lslpp** detects only filesets that have been installed using the SMIT or **installp** methods.

Using -qversion

To get more details about the version, release, and PTF levels of the compiler, you can use the **-qversion** compiler option. For more information, see “-qversion” in the *XL Fortran Compiler Reference*.

Viewing the .vrmf_history file

If you have installed XL Fortran to a nondefault location, you can view the version information for each fileset installed by viewing the `.vrmf_history` text file that is installed in the main directory of the compiler.

Note: You must not edit this file because it might cause unexpected behavior of the `xlfndi` script.

Enabling utilization tracking

Utilization tracking can be used to detect whether the compiler usage exceeds your entitlement based on the number of Concurrent User licenses you have purchased.

Utilization tracking is disabled by default. You can enable it by modifying the entry `-qnoenabletracking` to `-qenabletracking` in the utilization tracking configuration file, `urt_client.cfg`. Various other aspects of utilization tracking can also be specified in this file. In each installation of the compiler, there is a symlink named `urt_client.cfg` that points to the utilization tracking configuration file. You might need to change the symlink if you use a copy of the utilization tracking configuration file in a different location or if you use multiple copies of the file. For more information about utilization tracking, see *Configuring utilization tracking* in the *XL Fortran Compiler Reference*.

Enabling IBM License Metric Tool (ILMT) and Tivoli Asset Discovery for Distributed (TADD)

IBM License Metric Tool (ILMT) and Tivoli® Asset Discovery for Distributed (TADD) can help you manage software usage metering and license allocation services on supported systems. In general, ILMT and TADD recognize and monitor the products that are installed and in use on your system.

ILMT and TADD are enabled for IBM XL Fortran for AIX, V15.1.3 for inventory support only, which means that ILMT and TADD can detect product installation of XL Fortran but not its usage.

Note: ILMT and TADD are not a part of the XL Fortran compiler offering, and must be purchased and installed separately.

Once installed and activated, ILMT and TADD scan your system for product inventory signatures that indicate whether a given product is installed on your system. ILMT and TADD also identify the version, release, and modification levels of the product. Inventory signature files are not updated after PTF installation.

If XL Fortran is installed in the default location, the signature files are in the `/opt/IBM/xlf/15.1.3/` directory. Otherwise, if XL Fortran is installed in a nondefault location, the signature files are in the `/target_dir/opt/IBM/xlf/15.1.3/` directory, where `target_dir` is the target directory for installation specified by the `-b` option of the nondefault installation script.

For more information, see *IBM License Metric Tool and Tivoli Asset Discovery for Distributed*.

Configuring compiler defaults

You can change some of the default settings of the compiler for your specific needs.

- If you are using XL Fortran on a system running AIX 6.1, the configuration file is `/opt/IBM/xlf/15.1.3/etc/xlf.cfg.61`.
- If you are using XL Fortran on a system running AIX 7.1, the configuration file is `/opt/IBM/xlf/15.1.3/etc/xlf.cfg.71`.
- If you are using the compiler on a system running AIX 7.2, the configuration file is `/opt/IBM/xlf/15.1.3/etc/xlf.cfg.72`.

For more information about how to change the XL Fortran compiler settings, see Customizing the configuration file in the *XL Fortran Compiler Reference*.

Setting environment variables

Before using the compiler, verify that the environment variables LANG, MANPATH, NLSPATH, and PATH are set.

You can use the **echo** command to determine the current setting of these variables:
`echo -e "\n $LANG \n\n $NLSPATH \n\n $MANPATH \n\n $PATH"`

LANG	Specifies the national language for message and help files. See “National language support” on page 5. The LANG environment variable can be set to any of the locales provided on the system. See the description of locales in <i>AIX General Programming Concepts</i> for more information. The national language code for United States English is en_US . If the appropriate message catalogs have been installed on your system, any other valid national language code can be substituted for en_US .
MANPATH	Optionally specifies the directory search path for finding man pages. MANPATH must contain <code>/opt/IBM/xlf/15.1.3/man/\$LANG</code> before the default man path.
NLSPATH	Specifies the path name of the message and help files.
PATH	Specifies the directory search path for the executable files of the compiler.

Note: The LANG and NLSPATH environment variables are initialized when the operating system is installed, and might differ from the ones you want to use.

Enabling the XL Fortran error messages

If your system uses the en_US locale and encoding, the compiler message catalogs are automatically configured to display correctly, whether you used the basic or advanced method of installation and configuration. However, if your system uses any other supported locale, you must set the NLSPATH environment variable so that the compiler and runtime functions can find the appropriate message catalogs following installation.

For example, to specify the Japanese locale with the IBM_eucJP code page, use the following commands:

```
LANG=ja_JP
NLSPATH=/usr/lib/nls/msg/%L/%N:/usr/lib/nls/msg/prime/%N
export LANG NLSPATH
```

Substitute any valid national language code for **ja_JP**, provided the associated message catalogs are installed.

See “National language support” on page 5 for a list of supported language locales.

Enabling the manual pages

Manual pages are provided for the compiler invocation commands and other compiler utilities.

Before you can view the manual pages, you must add the manual page directory to the MANPATH environment variable by entering the following command:

```
export MANPATH=$MANPATH:/opt/IBM/xlf/15.1.3/man/LANG
```

where *LANG* might be any of the following language locales:

- en_US
- EN_US
- ja_JP
- JA_JP
- Ja_JP

For example, to set the language of the manual pages to English, run the commands:

```
MANPATH=$MANPATH:/opt/IBM/xlf/15.1.3/man/en_US
export MANPATH
```

Alternatively, to set the language of the manual pages to one of the other supported languages, run the commands:

```
MANPATH=$MANPATH:/opt/IBM/xlf/15.1.3/man/$LANG
export MANPATH
```

where *\$LANG* is set to any of the language locales listed above.

To test whether the manual pages have been successfully installed, open one or more of the manual pages, as described in “Viewing the manual pages” on page 29.

Creating shortcuts to the XL Fortran invocation commands

If you performed a default installation, the invocation commands are automatically installed in `/opt/IBM/xlf/15.1.3/bin/`, unlike previous compiler installations, which installed them to `/usr/bin/`. To invoke the compiler without specifying the full path, you need to create a shortcut to the invocation commands, or update your `PATH` environment variable.

When you perform a nondefault installation, the invocation commands are installed to `/target_dir/opt/IBM/xlf/15.1.3/bin` where *target_dir* is the target directory for installation specified by the **-b** option of the nondefault installation

script. You can create a shortcut to the invocation commands of a nondefault installation by adding the location of the compiler invocations, `/target_dir/opt/IBM/xlf/15.1.3/bin/`, to the PATH environment variable.

For example, if you installed XL Fortran to the `/compiler/xlf` directory, you would run the commands:

```
PATH=$PATH:/compiler/xlf/opt/IBM/xlf/15.1.3/bin/  
export PATH
```

Accessing the local documentation

Manual pages for the compiler invocation commands and other command utilities are included.

Viewing the manual pages

Manual pages are included for all compiler invocation commands and utilities.

For instructions about how to enable the man pages for viewing, see “Enabling the manual pages” on page 28.

To invoke a manual page, run the command:

```
man command
```

where *command* is any XL Fortran invocation or utility command.

Example:

```
man xlf
```

Testing the installation

To test the product installation and the critical search paths, try building, compiling, and running a simple program.

For example:

1. Create the following Fortran program:

```
[hello.f]  
PRINT *, "Hello World!"  
END
```

2. Compile the test program. For example:

```
xlf hello.f -o hello
```

Note: To use shortcuts to the compiler invocation commands, see “Creating shortcuts to the XL Fortran invocation commands” on page 28. Otherwise, include the full path to the commands to compile the program.

3. Run the program:

```
./hello
```

The expected result is that "Hello World!" is displayed on the screen.

4. Check the exit code of the program:

```
echo $?
```

The result is zero.

Chapter 6. Uninstalling XL Fortran

This section outlines the steps required to uninstall both basic and advanced installations of XL Fortran.

Notes:

1. You must have the root access to uninstall XL Fortran.
2. Some filesets might not be uninstalled if they are required by other installed products. See “Filesets” on page 1 for details about filesets included with IBM XL Fortran for AIX, V15.1.3.
3. Because automatically uninstalling dependent packages might cause problems, it is recommended that you preview uninstallation to ensure that all dependent filesets are no longer required.

Uninstalling a basic installation

To uninstall the compiler from the default location, you can use either **SMIT** or **installp** to remove the compiler filesets.

If you attempt to remove a fileset that is required by another installed fileset, the selected fileset will not be removed unless its dependents are also being removed.

Using SMIT

The following steps illustrate how to uninstall IBM XL Fortran for AIX, V15.1.3 using the SMIT interface:

- Run the command:
`smit remove`
- In the SOFTWARE name field, enter the fileset names (wildcards accepted) separated by a space. If you have XL C or XL C/C++ installed in its default location, you must not remove any filesets which are shared between the compilers. In this case, enter the following name in the field:
`xlfcmp.15.1.3*`

Otherwise, enter the following name in the field:

`xlfcmp.15.1.3* xlmass.8.1.3 memdbg.*`

If you also want to uninstall the SMP library and the Fortran runtime library, enter the following name in the field. (Generally, you are not recommended to do this, because you might have applications that are dependent on these runtime libraries.)

`xlsmp.* xlfрте.*`

In the REMOVE dependent software? field, select **yes**.

Note: To preview the uninstallation, set the PREVIEW only? value to **yes**.

Using installp

To uninstall IBM XL Fortran for AIX, V15.1.3 using the **installp** command, enter the following command on the command line:

```
installp -ug filesets
```

where *filesets* is the list of filesets (wildcards accepted) to uninstall.

If you have XL C or XL C/C++ installed in its default location, you must not remove any filesets that are shared between the compilers. In this case, *filesets* should be

```
xlfcmp.15.1.3\*
```

Otherwise, *filesets* are

```
xlfcmp.15.1.3\* xlmass.8.1.3 memdbg.\*
```

If you also want to uninstall the SMP library and the Fortran runtime library, enter the following name in the field. (Generally, this is not recommended, because you might have applications that are dependent on these runtime libraries.)

```
xlsmp.\* xlfрте.\*
```

Uninstalling an advanced installation

If the compiler is installed to a nondefault location, you have to remove the filesets yourself.

About this task

To uninstall the XL Fortran compiler installed to a nondefault location, delete the compiler directory, and uninstall the `xlfcmp.15.1.3.ndi` fileset and the license agreement fileset.

To determine which version of each fileset is installed, see “Checking compiler and fileset information” on page 25.

Procedure

- To delete the compiler directory, enter the following command:

```
rm -rf target_dir
```

where *target_dir* is the target directory for installation specified by the `-b` option of the nondefault installation script.

- To uninstall the `xlfcmp.15.1.3.ndi` and the license agreement filesets, enter the following command:

```
installp -u xlfcmp.15.1.3.ndi xlfcmp.15.1.3.license
```

- If you are uninstalling an evaluation version of the compiler, enter the following command to uninstall the `xlfcmp.15.1.3.ndi` and the `xlfcmp.15.1.3.evaluation` filesets:

```
installp -u xlfcmp.15.1.3.ndi xlfcmp.15.1.3.evaluation
```

Uninstalling versions of the MASS components downloaded from the web

If you have previously installed the MASS libraries on the system on which you are installing the IBM XL Fortran for AIX, V15.1.3, it is recommended that you uninstall the libraries by removing the directory in which they have been installed.

Procedure

Enter the following command to remove the MASS directory:

```
rm -rf mass_directory
```

where *mass_directory* is the location of the MASS libraries.

If you have created symbolic links in the `/usr/lib/` directory to the libraries in the MASS directory, you must delete them as well. The compiler installation automatically handles the creation of the necessary symbolic links.

Notices

Programming interfaces: Intended programming interfaces allow the customer to write programs to obtain the services of IBM XL Fortran for AIX.

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