COBOL for AIX

IBM

Installation Guide

Version 4.1.1

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> **Note!**
>
> Before using this information and the product it supports, be sure to read the general information under "Notices" on page 25.

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Preface

About this information

This information provides installation instructions for IBM® COBOL for AIX®, V4.1.1. It also shows you how to test the installation, and view different types of product information. Read it carefully before installing. Also read the README file in the root directory of your installation media, which contains current information about the compiler.

The term *VSAM file system* is a generic reference to either the SdU (SMARTdata Utilities) or Encina SFS (Structured File Server) file system.

Who should read this information

This information is intended for anyone responsible for installing IBM COBOL for AIX, V4.1.1.

How to use this information

This information provides procedures for two installation scenarios:

- Installation

  This scenario tells you how to install a single version of COBOL for AIX.

  For an overview of the steps to perform an installation of a single version of COBOL for AIX, refer to Chapter 2, "Installation," on page 9.

- Update installation

  This scenario tells you how to install a Program Temporary Fix (PTF) package for an existing COBOL for AIX, V4.1.1 installation.

  For an overview of the steps required to install a PTF, refer to Chapter 3, "Update installation," on page 13.

How this information is organized

This information is organized to reflect the pre-installation, installation, post-installation, and product removal phases of a COBOL for AIX installation.

Table 1. Phases of a COBOL for AIX installation

Phase	Chapters	User segment
Pre-installation	Chapter 1, "Before installing COBOL for AIX," on page 1	All users
Installation	Chapter 2, "Installation," on page 9	Users who want to install COBOL for AIX, V4.1.1
Post-installation	Chapter 3, "Update installation," on page 13	Users who want to update COBOL for AIX, V4.1.1 to the next fix level
	Chapter 4, "After installing COBOL for AIX," on page 17	All users
Product removal	Chapter 5, "Uninstalling COBOL for AIX," on page 23	Users who want to uninstall COBOL for AIX, V4.1.1

How to read the syntax diagrams

Use the following description to read the syntax diagrams in this information:

- 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 syntax diagram.

  The ---> symbol indicates that the syntax diagram is continued on the next line.

  The >--- symbol indicates that the syntax diagram is continued from the previous line.

  The --->< symbol indicates the end of a syntax diagram.

  Diagrams of syntactical units other than complete statements start with the >--- symbol and end with the ---> symbol.

- Required items appear on the horizontal line (the main path).

  Format

  ```
  ►►──STATEMENT──required item──────────────────────────────────────────────►◄
  ```

- Optional items appear below the main path.

  Format

  ```
  ►►──STATEMENT──────────────────────────────────────────────────────────────►◄
                └─optional item─┘
  ```
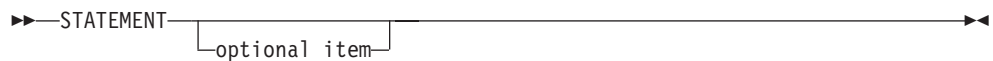
- When you can choose from two or more items, they appear vertically, in a stack.

  If you *must* choose one of the items, one item of the stack appears on the main path.

  Format

  ```
  ►►──STATEMENT──┬─required choice 1─┬──────────────────────────────────────►◄
                 └─required choice 2─┘
  ```

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

  Format

  ```
  ►►──STATEMENT──────────────────────────────────────────────────────────────►◄
                ├─optional choice 1─┤
                └─optional choice 2─┘
  ```

- An arrow returning to the left above the main line indicates an item that can be repeated.

  Format

  ```
                ┌──────────────────┐
                ▼                  │
  ►►──STATEMENT────repeatable item──┴─────────────────────────────────────────►◄
  ```

  A repeat arrow above a stack indicates that you can make more than one choice from the stacked items, or repeat a single choice.

- Variables appear in italic lowercase letters (for example, *parmx*). They represent user-supplied names or values.
- If punctuation marks, parentheses, arithmetic operators, or other such symbols are shown, they must be entered as part of the syntax.

How to send your comments

Your feedback is important in helping us to provide accurate, high-quality information. If you have any comments about this document or any other COBOL for AIX documentation, contact us in one of these ways:

- Fill out the Readers' Comment Form and return it by mail or give it to an IBM representative. If there is no Readers' Comment Form at the back, address your comments to:

  IBM Corporation
  Reader Comments
  DTX/E269
  555 Bailey Avenue
  San Jose, CA 95141-1003
  U.S.A.

- Use the Online Readers' Comment Form at www.ibm.com/software/awdtools/ rcf/.
- Send your comments to the following address: comments@us.ibm.com.

Be sure to include the name of the document, the publication number of the document, the version of the product, and, if applicable, the specific location (for example, page number or section heading) of the text that you are commenting on.

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Accessibility

Accessibility features help users who have a disability, such as restricted mobility or limited vision, to use information technology products successfully. The accessibility features in AIX provide accessibility for COBOL for AIX.

The major accessibility features in AIX are:
- Interfaces that are commonly used by screen readers and screen-magnifier software
- Keyboard-only navigation
- An accessible command-line interface through a direct attached or networked remote Windows or Linux system using AT and terminal emulation software

Interface information

Assistive technology products work with the user interfaces that are found in AIX. For specific guidance information, see the documentation for the assistive technology product that you use to access AIX interfaces.

Keyboard navigation

For information about accessing AIX interfaces, see Accessibility features for AIX in the IBM System p and AIX Information Center at publib16.boulder.ibm.com/ pseries/index.htm.

Accessibility of this information

The English-language XHTML format of this information that will be provided in the IBM AIX Compiler Information Center at www.ibm.com/software/awdtools/cobol/aix/library is accessible to visually impaired individuals who use a screen reader.

To enable your screen reader to accurately read syntax diagrams, source code examples, and text that contains the period or comma PICTURE symbols, you must set the screen reader to speak all punctuation.

IBM and accessibility

See the IBM Human Ability and Accessibility Center at www.ibm.com/able for more information about the commitment that IBM has to accessibility.

Chapter 1. Before installing COBOL for AIX

Before you install IBM COBOL for AIX, V4.1.1:

- 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.

Upgrading the evaluation copy of the COBOL for AIX 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 installation procedure for the licensed product package, the compiler license can be installed. Shared filesets between the evaluation and licensed versions that have already been installed are reported as already installed.

The installation image and filesets

The installation image for COBOL for AIX is available physically on an installation CD, and electronically in the cobol.4.1.1.GM.aix.tar.Z installation package in the /usr/sys/inst.images directory.

The image includes filesets for the following compiler components:

- "COBOL for AIX compiler filesets 4.1.1"
- "COBOL for AIX runtime environment filesets 4.1.1" on page 2
- "XL C++ runtime environment filesets 11.1" on page 2
- "SMARTdata Utilities filesets" on page 2
- "IBM Debugger filesets 7.1" on page 3

Filesets

The following tables list the filesets included in the installation image and the directories to which the fileset contents are installed during an installation. All filesets are automatically installed.

COBOL for AIX compiler filesets 4.1.1

Table 2. COBOL for AIX compiler filesets and installation locations

Fileset name	Fileset description	Installation locations
cobol.cmp	COBOL for AIX compiler	/usr/lpp/cobol/ /usr/lpp/cobol/bin/ /usr/lpp/cobol/samples/ /usr/lpp/cobol/samples/oo/ /usr/lpp/cobol/samples/odbc/ /usr/lpp/cobol/samples/msgexit/ /usr/lpp/cobol/properties/ /usr/lpp/cobol/properties/version/ /usr/lpp/cobol/include/ /usr/bin/

Table 2. COBOL for AIX compiler filesets and installation locations (continued)

Fileset name	Fileset description	Installation locations
cobol.dbg	COBOL for AIX debugger support	/usr/lpp/cobol/lib /usr/lib/
cobol.tools	COBOL tools	/usr/lpp/cobol/ /usr/lpp/cobol/bin/
cobol.license	COBOL for AIX electronic license *LANG = [en_US, ja_JP, Ja_JP]*	/usr/swlag/cobol/GM/411/LANG/ cobol.la
cobol.lic	COBOL for AIX license files	/usr/lpp/cobol/lib/
cobol.man	COBOL for AIX compiler invocation command `man` pages COBOL for AIX utility (`scu` and `gdgmgr`) `man` pages	/usr/share/man/man1 /usr/lpp/cobol/man/man1
cobol.msg.*LANG*	COBOL for AIX compiler messages *LANG = [en_US, ja_JP, Ja_JP]*	/usr/lib/nls/msg/*LANG*/

COBOL for AIX runtime environment filesets 4.1.1

Table 3. COBOL for AIX runtime environment filesets and installation locations

Fileset name	Fileset description	Installation locations
cobol.rte	COBOL for AIX runtime libraries	/usr/lpp/cobol/ /usr/lpp/cobol/lib/ /usr/lib/
cobol.rte.msg.*LANG*	COBOL for AIX runtime messages *LANG = [en_US, ja_JP, Ja_JP]*	/usr/lib/nls/msg/*LANG*/

XL C++ runtime environment filesets 11.1

Table 4. XL C++ runtime environment filesets and installation locations

Fileset name	Fileset description	Installation locations
xlC.rte	XL C++ runtime libraries	/usr/lpp/xlC/lib/ /usr/lpp/xlC/lib/profiled/ /usr/ccs/lib/libp/
xlC.aix50.rte	XL C++ runtime environment for AIX 5.3 libraries	/usr/lpp/xlC/lib/aix53/ /usr/lpp/xlC/lib/profiled/aix53/
xlC.aix61.rte	XL C++ runtime environment for AIX 6.1 libraries	/usr/lpp/xlC/lib/aix61/ /usr/lpp/xlC/lib/profiled/aix61/
xlC.msg.*LANG*	XL C++ runtime messages *LANG = [en_US, ja_JP, Ja_JP]*	/usr/lib/nls/msg/*LANG*/

SMARTdata Utilities filesets

Table 5. SdU filesets and installation locations

Fileset name	Fileset description	Installation locations
SdU.sfs	SMARTdata Utilities SFS	/usr/lpp/SdU/ /usr/lpp/SdU/sfs/ /usr/lpp/SdU/sfs/lib/ /usr/lib/
SdU.vsam	SMARTdata Utilities VSAM	/usr/lpp/SdU/ /usr/lpp/SdU/vsam/ /usr/lpp/SdU/vsam/lib/ /usr/lib/

Important: SdU filesets are backward compatible with COBOL for AIX, Version 2 or later and PL/I for AIX, Version 2 or later.

IBM Debugger filesets 7.1

Table 6. IBM Debugger filesets

Fileset name	Fileset description
ibmdebugger	IBM Debugger for AIX
ibmdebugger.engine	IBM Debugger for AIX Compiled Languages Engine
ibmdebugger.engine.msg.*LANG*	IBM Debugger messages *LANG = [de_DE, en_US, es_ES, fr_FR, it_IT, ja_JP, ko_KR, pt_BR, zh_CN, zh_TW]*
ibmdebugger.jre	Supersede entry, not installed
ibmdebugger.ui	Supersede entry, not installed

The IBM Debugger for AIX, V7.1 is included with the COBOL for AIX installation image. This source-level debugger uses a client/server model:

- The debug engine is a server component that is installed on AIX.
- The debug client is a graphical user interface that is installed on Windows workstations.

The installation file, `idebug.install_7.1.0.zip`, of the Windows debug client is in the `IBMdebugger/windows/` directory of the installation image.

Notes:

- The IBM Debugger for AIX, V7.1 supersedes the IBM Distributed Debugger. If the IBM Distributed Debugger V9.2 is installed on your system, it will be removed upon installation of the IBM Debugger for AIX, V7.1. The post-installation script then modifies the idebug fileset levels in the Object Data Manager (ODM) database to 99.99.9999.9999 to prevent future installations of idebug.* filesets.
- The AIX client of the IBM Debugger for AIX is discontinued.
- The IBM Debugger for AIX, V7.1 debug engine filesets, ibmdebugger.*, are automatically installed during a basic compiler installation. To install the Windows debug client of the IBM Debugger, see "Installation information for the Windows client" on page 5.

Preparing the electronic distribution package

If you have downloaded the COBOL for AIX electronic distribution package, cobol.4.1.1.GM.aix.tar.Z, follow these steps before attempting to install:

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

1. To uncompress and unpack the file, use the command:

   ```
   zcat cobol.4.1.1.GM.aix.tar.Z | tar -xvf -
   ```
2. Use the command `inutoc` *directory_name* to generate a .toc file in the specified directory.

The following example shows the steps to prepare the electronic distribution package, cobol.4.1.1.GM.aix.tar.Z, located in the new directory, `/compiler/install/` for installation.

```
cd /compiler/install
zcat cobol.4.1.1.GM.aix.tar.Z | tar -xvf -
cd usr/sys/inst.images
inutoc .
```

Refer to "System prerequisites" on page 6 to ensure that system prerequisites are met and the installation method described in Chapter 2, "Installation," on page 9 to install the compiler.

National language support

The COBOL for AIX compiler and runtime messages support the following language locales:

- en_US (ISO8859-1)
- ja_JP (IBM-eucJP)
- 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 COBOL for AIX error messages" on page 19.
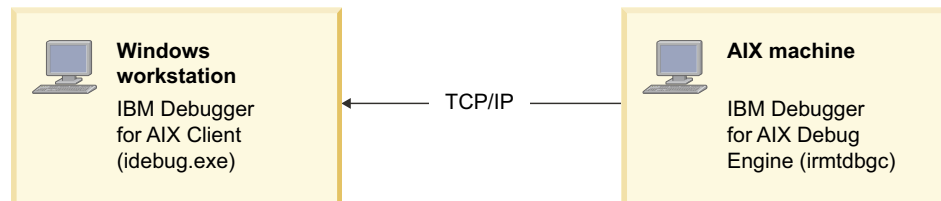
IBM Debugger for AIX Installation

The IBM Debugger for AIX is composed of an AIX debug engine and a Windows debug client. The AIX debug engine filesets are automatically installed during a basic compiler installation. You can install the Windows debug client of the IBM Debugger.

Debugger components

The IBM Debugger for AIX uses a client/server model composed of two components:

- The debug engine (`irmtdbgc`), which is a server component installed on the AIX machine.
- The debug client (`idebug.exe`), which is a graphical user interface installed on a Windows workstation.

Notes:

- The AIX client of the IBM Debugger for AIX is discontinued. For information about the Windows client, see "Installation information for the Windows client" on page 5.
- The IBM Debugger for AIX, V7.1 debug engine is a 64-bit application.
- The IBM Debugger for AIX, V7.1 supersedes the IBM Distributed Debugger. If the IBM Distributed Debugger V9.2 is installed on your system, it will be removed upon installation of the IBM Debugger for AIX, V7.1. The post-installation script then modifies the idebug fileset levels in the Object Data Manager (ODM) database to 99.99.9999.9999 to prevent future installations of idebug.* filesets.
- Either the debug engine or the debug client reports itself as version 7.1.0. Collectively, these components are referred to as IBM Debugger for AIX, V7.1.

Installation information for the AIX debug engine

Required operating system

IBM Debugger for AIX, V7.1 debug engine must be installed on one of the following AIX operating systems:
- IBM AIX V5.3 TL 5300-07, or higher
- IBM AIX V6.1

Compatibility with previous debugger versions

The installation of the IBM Debugger of AIX debug engine uninstalls any existing debuggers. To restore previous debuggers, do the following steps:
1. Uninstall the IBM Debugger for AIX, V7.1 debug engine with this command:

   ```
   installp -ug ibmdebugger
   ```
2. Reinstall any previous debuggers according to their documentation.

Installation instructions

Note: The IBM Debugger for AIX, V7.1 debug engine filesets, ibmdebugger.*, are installed by default during a basic compiler installation. If you did not do a default compiler installation, you can follow the instructions to install the IBM Debugger for AIX debug engine on your AIX machine.

To install the IBM Debugger for AIX debug engine on your AIX machine, do the following steps:
1. Enter the `usr/sys/inst.images/` directory of the compiler installation image.
2. Run this command:

   ```
   installp -aXgd . ibmdebugger
   ```

The debug engine will be installed to the `/usr/idebug/` directory.

For all the IBM debugger filesets that are automatically installed, see Table 6 on page 3 in *The installation image and filesets* topic.

Installation information for the Windows client

To install the IBM Debugger for AIX debug client on your Windows workstation, do the following steps:
1. Copy the compressed file, `IBMdebugger/windows/idebug.install_7.1.0.zip`, from the compiler CD-ROM or electronic image to your Windows machine, and uncompress it.
2. Run `install.exe`.

The installation process also installs the IBM Installation Manager.

If previous versions of the IBM Debugger for AIX debug client present, you must uninstall them before you install this version.

To uninstall the debug client, start the IBM Installation Manager and select the **Uninstall** option.

For information about the included Java™ runtime environment, see `readmefirst.win32.txt` in the `jre/docs/` directory of the installation image.

System prerequisites

All system prerequisites must be present on your system before COBOL for AIX can be successfully installed and run.

Hardware requirements:
- COBOL for AIX, V4.1.1 and its generated object programs run on any processors that are supported by AIX V5.3.9.0 or later, AIX V6.1.2.0 or later, or AIX V7.1. These processors must be configured with at least one supported display, keyboard, and mouse.
- An SVGA 800 x 600 display (1024 x 764 recommended).
- 256 MB of memory (512 MB, or higher, recommended).
- 210 MB of disk space for the COBOL compiler, tools, and product information.

Software requirements: Required programs

COBOL for AIX, V4.1.1 and its generated object programs run on the following operating systems: AIX V5.3.9.0 or later, AIX V6.1.2.0 or later, or AIX V7.1.

To view and print PDF and license agreement files you need the Adobe Acrobat Reader.

Software requirements: Optional programs

To use COBOL for AIX with optional programs such as online help, DB2® and CICS®, additional products are required:
- Online help:
  - A Mozilla browser to access the information center.
- DB2:
  - COBOL 32-bit applications that embed EXEC SQL statements require DB2 V9.1 for Linux, UNIX, and Windows, DB2 V9.5 for Linux, UNIX, and Windows with fix pack 3, or DB2 V9.7 for Linux, UNIX, and Windows.
  - COBOL 64-bit applications that embed EXEC SQL statements require DB2 V9.1 for Linux, UNIX, and Windows, DB2 V9.5 for Linux, UNIX, and Windows with fix pack 3, or DB2 V9.7 for Linux, UNIX, and Windows.
- CICS:
  - COBOL applications that embed EXEC CICS statements require TXSeries for Multiplatforms:
    - When you use the integrated translator: TXSeries for Multiplatforms, Version 6.2 with PTF 2 or TXSeries for Multiplatforms, Version 7.1.
    - When you use the precompiler: TXSeries for Multiplatforms, Version 6.1 with PTF 4, or TXSeries for Multiplatforms, Version 6.2 with PTF 2, or TXSeries for Multiplatforms, Version 7.1.
    - When you use both the integrated translator and the precompiler: TXSeries for Multiplatforms, Version 6.2 with PTF 2 or TXSeries for Multiplatforms, Version 7.1.
- Java:
  - Applications that use object-oriented COBOL syntax for Java interoperability require Java 2 Platform, Standard Edition, v1.4.2.275, or Java 2 Platform, Standard Edition, v5, or Java 2 Platform, Standard Edition, v6.
  - 64–bit applications require the 64–bit version of the Java SDK.

– 32–bit applications require the 32–bit version of the Java SDK.

Verifying the amount of hard disk space available

You can use the following command to determine the amount of space available in the installation location (/usr/lpp/cobol/):

```
df -m /usr
```

Verifying that the required filesets are installed

You must have installed the following filesets on your system to install IBM COBOL for AIX, V4.1.1:

Fileset name	Fileset description
AIX 5.3: bos.rte.5.3.9.0 or later AIX 6.1: bos.rte.6.1.2.0 or later AIX 7.1: bos.rte.7.1.0.0	Base operating system run time
AIX 5.3: bos.rte.libc.5.3.9.0 or later AIX 6.1: bos.rte.libc.6.1.2.0 or later AIX 7.1: bos.rte.libc.7.1.0.0	Base application runtime library
AIX 5.3: bos.rte.aio.5.3.9.0 or later AIX 6.1: bos.rte.aio.6.1.2.0 or later AIX 7.1: bos.rte.aio.7.1.0.0	Base operating system run time posix asynchronous I/O

Note: You need to enable posix asynchronous I/O (AIO) in order for it to work. For instructions about how to enable posix I/O, see the AIX documentation about AIO.

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 **lslpp** command.

Use the following command to determine if these filesets have been installed:

```
lslpp -L bos.loc.* bos.rte bos.rte.libc
```

Previewing the installation and license agreements

Before installing IBM COBOL for AIX, V4.1.1, you can verify the installation process, check file sizes and disk space, and preview the license agreements using either SMIT or `installp`.

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

- LicAgree.pdf
- LicInfo.pdf

After installation, the license PDF files can be found in the /usr/lpp/cobol/ directory.

- If you install the licensed product package, the file names are:
  - LicenseAgreement.GM.pdf
  - LicenseInformation.GM.pdf
- If you install the evaluation package, the file names are:
  - LicenseAgreement.EVAL.pdf
  - LicenseInformation.EVAL.pdf

You can view both sets of files if you install the licensed product package on top of the evaluation package.

Using SMIT

You can use the System Management Interface Tool (SMIT) to preview the COBOL for AIX installation.

Follow the steps to install the compiler to the location given in "Using SMIT" on page 9. 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 location given in "Using installp" on page 10 and specify the **-p** flag to preview the process without installing the compiler.

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

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

The following example previews the license text in the /cdrom/usr/sys/ inst.images source directory, and writes a log file to /tmp/install.license.log.

Example:
```
installp -EpaXgd /cdrom/usr/sys/inst.images -e /tmp/install.license.log all
```

Chapter 2. Installation

The installation methods below install COBOL for AIX into the `/usr/lpp/cobol/` directory. If you have root access or a profile with superuser privileges, you can use either the System Management Interface Tool (SMIT) or the `installp` command to install the compiler.

You can use the installation methods to perform any of the following tasks:
- Install COBOL for AIX, V4.1.1 on a clean system.
- Install COBOL for AIX, V4.1.1 on a system where IBM PL/I for AIX, V2.0 or later is already installed. In this case, both compilers use the SMARTData Utilities provided with COBOL for AIX, V4.1.1.
- Install an update on a system where IBM COBOL for AIX, V4.1.1 has already been installed. In this case, use the procedure in Chapter 3, "Update installation," on page 13.

Tasks for installation

Before you perform an 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 was successful and enable the `man` pages of the compiler.

The complete procedure for installation is outlined in the following table.

Table 7. Steps for installation: new or upgrade installation

Task	For more information, see . . .
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 6
Use SMIT or the `installp` command to install and configure the compiler.	"Using SMIT" or "Using installp" on page 10
Confirm that the compiler packages were successfully installed, and test the installation.	"Checking compiler and fileset information" on page 17, "Testing the installation" on page 21
Enable the compiler `man` pages.	"Enabling the man pages" on page 19
If your system locale or encoding, or both are *not* en_US, enable the compiler and runtime error messages. Otherwise, you can skip this step.	"Enabling the COBOL for AIX error messages" on page 19

Using SMIT

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

Remember:
- If you use the command `smit install_latest`, SMIT produces an error message indicating that either xlC.aix50.rte or xlC.aix61.rte failed to install. This is normal, and you can ignore the error message. If you install the compiler onto a system running AIX V5.3, only xlC.aix50.rte is required, and xlC.aix61.rte

automatically fails to install. Likewise, if you install the compiler onto a system running AIX V6.1 or AIX V7.1, only xlC.aix61.rte is required, and xlC.aix50.rte fails to install.

- Similarly, any language specific filesets that are not supported by your system produces an error message and fails to install. For example, if local support is not present for Ja_JP, installation might fail when attempting to install a Ja_JP specific language fileset for the compiler. These error messages are normal and can be ignored.
- 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.

To install the compiler using the SMIT interface, follow these steps:

1. Enter the command smit install_latest. This command invokes SMIT, which presents a menu-driven user interface for the installation process. You must specify the device and directory in the INPUT device/directory of the software field.

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 will 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? field to continue with the installation.

   Tip: To preview the installation process without actually installing the compiler, select **yes** next to the Preview only? field.

4. Press **Enter** and then **Enter** again.

Using installp

You can install COBOL for AIX directly from the command line using the AIX command installp.

Remember:

- If you use the keyword *all*, as in the example below, installp produces an error message indicating that either xlC.aix50.rte or xlC.aix61.rte failed to install. This is normal, and you can ignore the error message. If you install the compiler onto a system running AIX V5.3, only xlC.aix50.rte is required, and xlC.aix61.rte automatically fails to install. Likewise, if you install the compiler onto a system running AIX V6.1 or AIX V7.1, only xlC.aix61.rte is required, and xlC.aix50.rte fails to install.
- Similarly, any language specific filesets that are not supported by your system produces an error message and fails to install. For example, if local support is

not present for Ja_JP, install fails when it attempts to install a Ja_JP specific language fileset for the compiler. These error messages are normal and can be ignored.

To install the compiler and write the installation output to a log file, run this `installp` command:

```
installp -aXYgd install_images_location -e logfile all
```

```
►►──-──installp──-aYg──┬────┬─┬────┬─┬────┬─┬──────────────────────────┬─┬──────────────┬──all─────►◄
                       └-p─┘ └-X─┘ └-E─┘ └-d──install_images_location─┘ └-e──logfile─┘
```

-aYg

Specifies that all the latest and prerequisite installable filesets available in the *install_images_location* directory are applied and committed, 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 8.

-X

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

-E Displays software license agreements. This flag is only valid with the **-a** or **-l** flags. If the **-E** flag is specified with the **-a** flag, a new section is displayed showing the pending license agreements associated with the selected filesets. If the **-E** flag is specified with the **-l** flag, output is displayed showing the license agreements associated with all filesets on the media.

-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.

all

Indicates that all the filesets in *install_images_location* should be attempted during installation.

Important: Although you can choose to install the filesets that you need, it is recommended that you install all the filesets. Otherwise you might encounter errors.

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

Example:
```
installp -aXYgd /cdrom/usr/sys/inst.images -e /tmp/install.log all
```

Chapter 3. Update installation

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

You can download the latest compiler updates from the support web site: www.ibm.com/software/awdtools/cobol/aix/support/. You can also find the instructions on Fix Central.

You can install updates by using either System Management Interface Tool (SMIT) or the `installp` command.

Tasks for update installation

The complete procedure for update installation is outlined in the following table.

Table 8. Steps for installation: update installation

Task	For more information, see . . .
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 6
Download, uncompress, and unpack the PTF package.	"Preparing a PTF package for installation"
Generate a .toc file.	"Preparing a PTF package for installation"
Use SMIT or the `installp` command to install PTFs, using the default paths.	"Using SMIT" on page 14 or "Using installp" on page 14
Confirm that the compiler packages were successfully installed, and test the installation.	"Checking compiler and fileset information" on page 17, "Testing the installation" on page 21

Preparing a PTF package for installation

Updates to the compiler are supplied as PTF packages. Before these PTF packages can be used to update the compiler, they must be downloaded and uncompressed, and a .toc file must be generated.

To prepare the update package for installation, follow these steps:

Remember: You must be logged in as root or have superuser authority.

1. Download the desired PTF package (for example `cobol.411.YYMMDD.tar.Z`) into an empty directory.
2. Restore the compressed file and extract the PTF filesets from the downloaded package. To uncompress and unpack the tar file, use the 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.

The following example shows the steps to prepare the package, `cobol.411.YYMMDD.tar.Z`, located in the new directory, `/compiler/update/` for installation:

```
cd /compiler/update
zcat cobol.411.YYMMDD.tar.Z | tar -xvf -
inutoc .
```

Using SMIT

To install a PTF using the SMIT interface, follow these steps:

1. Run the command: `smit update_all`.

   This command invokes SMIT, which presents a menu-driven user interface for the installation process.

2. When asked to, specify the path of the directory where the PTF filesets and .toc are located in the `INPUT device/directory of the software` field.

3. Press **Enter**.

   At this stage, you are prompted with a list of questions to help you customize the compiler installation on your system. Verify the default values, or modify them where necessary, to accommodate your preferences.

4. Press **Enter** and then **Enter** again.

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

Tip: PTF packages often include base level filesets as prerequisites. If the command `smit update_all` is used, then those packages will not be installed, which might cause requisite failures. For this reason, use `smit install_all` to install the prerequisites and commit the updates.

Using installp

To install a PTF by using the `installp` command and write the output to a log file, run this command:

```
►►──-──installp──-ag─┬────┬─┬────┬─┬────┬─┬──-d──PTF_filesets_location──┬─┬──────────────┬──fileset_names────────────►◄
                     └-p─┘ └-X─┘ └-E─┘ └────────────────────────────┘ └──-e──logfile──┘
```

`installp -aXgd PTF_filesets_location -e logfile fileset_names`

-ag

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

-p

Performs a preview of the installation process by running the preinstallation checks. See "Using installp" on page 8.

-X

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

-E Displays software license agreements. This flag is only valid with the **-a** or **-l** flags. If the **-E** flag is specified with the **-a** flag, a new section is displayed showing the pending license agreements associated with the selected filesets. If the **-E** flag is specified with the **-l** flag, output is displayed showing the license agreements associated with all filesets on the media.

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

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`.

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

Product version migration

If you have a previous version of the compiler, you can replace it with the current version.

If you are upgrading to COBOL for AIX, V4.1.1 using Chapter 2, "Installation," on page 9, any previous versions of the filesets already installed on your system are automatically detected and migrated to the current version.

After COBOL for AIX, V4.1.1 is installed, you can only install older compiler versions after uninstalling V4.1.1 first.

Operating system migration

If you have the compiler installed on AIX V5.3, you might want to migrate the operating system to AIX V6.1 or later to take advantage of the latest IBM POWER® technology.

The compiler filesets are not OS specific and do not require migration if COBOL for AIX, V4.1.1 is installed on AIX V5.3 and the operating system is migrated to AIX V6.1 or later. If an OS specific fileset is required in the future for a higher level of AIX, it will be identified in an IBM Technical Note tied to the PTF that will add support for that version of AIX.

Remember: When an AIX V5.3 machine is migrated to AIX V6.1, the AIX V5.x C++ runtime fileset `xlC.aix50.rte` is uninstalled, and the AIX V6.1 C++ runtime fileset `xlC.aix61.rte` is installed from the AIX V6.1 install image. The service level of the AIX V6.1 C++ runtime on the install image might be different from the service level of the AIX V5.x C++ runtime on your machine before migration. This means that after an OS migration, all PTFs applied to the C++ runtime before OS migration are gone, and then have to be re-installed. If the AIX V6.1 C++ runtime is at a different version, you can download the latest runtime updates from Fix Central.

Chapter 4. After installing COBOL for AIX

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

These are documented in the following sections:
- "Checking compiler and fileset information"
- "Enabling IBM Tivoli License Compliance Manager (ITLCM)"
- "Setting environment variables" on page 18
- "Enabling the COBOL for AIX error messages" on page 19
- "Enabling the man pages" on page 19
- "Accessing the information" on page 19
- "Testing the installation" on page 21
- "Redistributing COBOL for AIX library components" on page 21
- "Accessing additional information" on page 22

Checking compiler and fileset information

You can check the versions of the compiler and individual filesets installed 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 belongs to the specified file (*filename*)

Restriction: The command lslpp detects only filesets that have been installed using the SMIT or installp methods.

For example, to check the version of the compiler installed, enter the following command:

`lslpp -L cobol.cmp`

Enabling IBM Tivoli License Compliance Manager (ITLCM)

IBM Tivoli® License Compliance Manager (ITLCM) is a web-based solution that can help you manage software usage metering and license allocation services on supported systems. In general, ITLCM recognizes and monitors the products that are installed and in use on your system.

IBM COBOL for AIX, V4.1.1 is ITLCM-enabled for inventory support only, which means that ITLCM is able to detect product installation of COBOL for AIX, but not its usage.

Remember: ITLCM is not a part of the COBOL for AIX compiler offering, and must be purchased and installed separately.

Once installed and activated, ITLCM scans your system for product inventory tags that indicate whether a given product is installed on your system. ITLCM also identifies the version, release, and modification levels of the product. Inventory tag files are not updated after PTF installation.

When IBM COBOL for AIX, V4.1.1 is installed, the inventory tag files are:

- COBOL_for_AIX.4.1.1.swtag, which is located in the `/usr/lpp/cobol/properties/version` directory
- COBOL_for_AIX_Runtime.4.1.1.swtag, which is located in the `/usr/lpp/cobol/lib/properties/version` directory

For more information about IBM Tivoli License Compliance Manager, see: www.ibm.com/software/tivoli/products/license-mgr/.

Setting environment variables

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

To determine the current setting of these variables, use this command:

```
echo "\n $LANG \n\n $NLSPATH \n\n $MANPATH \n\n $PATH"
```

LANG	Specifies the national language for message files. See "National language support" on page 4.
	The LANG environment variable can be set to any of the locales provided on the system. See the description of locales in *AIX General Programming Concepts* 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 `/usr/lpp/cobol/man` before the default man path.
NLSPATH	Specifies the path name of the message files.
PATH	Specifies the directory search path for the executable files of the compiler.
	For example, to run the COBOL for AIX utilities (`scu` and `gdgmgr`), add the following directory to the PATH environment variable by entering this command: `export PATH=$PATH:/usr/lpp/cobol/bin`

Remember: 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 COBOL for AIX error messages

If your system uses the en_US locale and encoding, the compiler and runtime message catalogs are automatically configured to display correctly. 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 4 for a list of supported language locales.

Enabling the man pages

man pages are provided for the compiler invocation commands and other compiler utilities (scu and gdgmgr).

Before you can view the COBOL for AIX utility man pages, you must add the man page directory to the MANPATH environment variable by entering the following command:

```
export MANPATH=$MANPATH:/usr/lpp/cobol/man
```

The directory search path for finding the compiler invocation command man pages is already set in the default man path.

To test whether the man pages have been successfully installed, open one or more of the man pages, as described in "Viewing the man pages" on page 20.

Accessing the information

This section provides an overview of the information offered with the product. Information about the compiler, its debugger and utilities, and the COBOL programming language is provided through an HTML-based information center on the IBM external web and through publications in Portable Document Format (PDF).

Accessing the Installation Guide, Quick Start Guide and License Agreement

The *Installation Guide* (install.pdf) is located in the doc/en_US/pdf/ directory of the distribution package. Alternatively, the *Installation Guide* (install.pdf) is available for download from the web in the COBOL for AIX library page at www.ibm.com/software/awdtools/cobol/aix/library/. The *Quick Start Guide* (quickstart.pdf) is located in the root directory of the distribution package.

The *License Agreement* (LicAgree.pdf) is also located in the root directory of the distribution package. After the installation, the license files can be found in the `/usr/lpp/cobol/` directory.

Accessing the online information

HTML versions of the COBOL for AIX information including the IBM Debugger for AIX, V7.1 information are part of the IBM AIX Compiler Information Center at www.ibm.com/software/awdtools/cobol/aix/library/.

The IBM Debugger for AIX, V7.1 information consists of HTML online help and additional HTML information accessible from the debugger graphical user interface.

Context-sensitive help for the debugger is available by pressing F1 while you are using the debugger.

For the latest information regarding the IBM Debugger for AIX, V7.1, check the README file for the debugger. You can find the README file for the debugger in `/usr/idebug/readme/`.

Accessing PDF files

PDF versions of the COBOL for AIX information are available for download from the web in the COBOL for AIX library page at www.ibm.com/software/awdtools/cobol/aix/library/. You can view and print this information by using the Adobe Acrobat Reader. If you do not already have the Adobe Acrobat Reader program installed, you can download it from the Adobe web site at www.adobe.com.

The following PDF files are available from the COBOL for AIX library page:
- *COBOL for AIX Installation Guide* (this information), GC27-3604, provides information about prerequisite products and the steps for installing COBOL for AIX.
- *COBOL for AIX Programming Guide*, SC27-3601, provides information about how to write, compile, link-edit, and run COBOL for AIX programs.
- *COBOL for AIX Language Reference*, SC27-3602, describes the COBOL language supported by IBM COBOL for AIX, V4.1.1.
- *VSAM File System Reply Messages*, SC27-3603, provides information about the causes of reply messages that you might receive while using the Virtual Storage Access Method (VSAM) file system.

Viewing the man pages

`man` pages are included for all compiler invocation commands and utilities (`scu` and `gdgmgr`).

For instructions about how to enable the `man` pages for viewing, see "Enabling the man pages" on page 19.

To invoke a `man` page, run this command:
`man command`

command is any COBOL for AIX invocation or utility command.

Examples:

```
man cob2
man scu
man gdgmgr
```

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 COBOL program:

   [hello.cbl]
   ```
   000100  IDENTIFICATION DIVISION.
   000200  PROGRAM-ID.  HELLO.
   000300  AUTHOR.       JOE PROGRAMMER.
   000400  ENVIRONMENT DIVISION.
   000500  DATA DIVISION.
   000600  PROCEDURE DIVISION.
   000700  MAINLINE.
   000800      DISPLAY 'Hello World!'.
   000900      STOP RUN.
   ```

2. Compile the test program. For example:

   ```
   cob2 hello.cbl -o hello
   ```

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 should be zero.

Redistributing COBOL for AIX library components

You can redistribute COBOL for AIX runtime library components with a developed
application. You can install the components on any number of AIX systems that
you use for production deployment of your COBOL application.

About this task

You must install a licensed copy of the full COBOL for AIX product on the AIX
system that you use to develop the application that is to be redistributed. You can
redistribute the following COBOL for AIX packages without needing any
additional licenses:

- cobol.rte (runtime libraries)
- cobol.rte.msg.en_US (runtime messages in English)
- cobol.rte.msg.Ja_JP (runtime messages in Japanese)
- cobol.rte.msg.ja_JP (runtime messages in Japanese)
- SdU.sfs (SMARTdata Utilities SFS)
- SdU.vsam (SMARTdata Utilities SdU and SFS)

You can likewise redistribute the following IBM XL C++ runtime packages, which
are required by the COBOL for AIX run time:

- xlC.rte (runtime libraries)
- xlC.aix50 (runtime environment for AIX 5.3)

- xlC.aix61 (runtime environment for AIX 6.1)
- xlC.msg.en_US (runtime messages in English)
- xlC.msg.Ja_JP (runtime messages in Japanese)
- xlC.msg.ja_JP (runtime messages in Japanese)

You can find these packages on the product CD.

Accessing additional information

For the latest information about COBOL for AIX, visit the IBM COBOL for AIX web site at www.ibm.com/software/awdtools/cobol/aix/about/.

Chapter 5. Uninstalling COBOL for AIX

This section outlines the steps required to uninstall COBOL for AIX.

Remember:

1. You must be a root user or a user with administrator privileges to uninstall this product.
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 COBOL for AIX, V4.1.1.
3. Because uninstalling dependent packages automatically might introduce problems, it is recommended that you preview uninstallation to ensure that all dependent filesets are no longer required.

Uninstalling an installation

Remember: You must be a root user or a user with administrator privileges to uninstall the product.

To uninstall the compiler, 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

To uninstall IBM COBOL for AIX, V4.1.1 using the SMIT interface, enter the following command:

```
smit remove
```

In the `SOFTWARE name` field, enter the fileset names (wildcards accepted) separated by a space. If you have PL/I for AIX installed, you must not remove any filesets which are shared between the compilers. In this case, enter the following name in the field:

```
cobol.*
```

Otherwise, enter the following name in the field:

```
cobol.* SdU.*
```

To uninstall the IBM Debugger for AIX, V7.1 engine on AIX, also enter the following name in the field:

```
ibmdebugger*
```

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

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

Using installp

To uninstall IBM COBOL for AIX, V4.1.1 using the `installp` command, enter the
following command:

```
installp -u filesets
```

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

If you have PL/I for AIX installed, you must not remove any filesets which are
shared between the compilers. In this case, *filesets* are as follows:

```
'cobol.*'
```

Otherwise, *filesets* are as follows:

```
'cobol.*' 'SdU.*'
```

To uninstall the IBM Debugger for AIX, V7.1 engine on AIX, enter the following
command:

```
installp -u ibmdebugger
```

To uninstall the Windows remote debug interface, see the instructions in
`idebug.install_7.1.0\README.idebug.txt`.

For the latest information regarding the IBM Debugger for AIX, V7.1, check the
README file for the debugger. You can find the README file for the debugger in
`/usr/idebug/readme/`.

Cleaning up kernel and library memory

To remove any currently unused modules in kernel and library memory, enter the
following command:

```
slibclean
```

Uninstalling the electronic license agreement

The license agreement text file remains on the system after the license fileset has
been uninstalled, so that you do not have to accept the product license again if you
reinstall COBOL for AIX.

To remove the license agreement text file, run the commands:

```
ODMDIR=/usr/lib/objrepos; odmdelete -o lag -q "fileset=cobol.license"
rm -rf /usr/lpp/swlag/cobolGM/411/*/cobol.la
```

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List of resources

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Installation Guide, GC27-3604

Language Reference, SC27-3602

Programming Guide, SC27-3601

VSAM File System Reply Messages, SC27-3603

Support

If you have a problem using COBOL for AIX, see the following site, which provides up-to-date support information www.ibm.com/software/awdtools/cobol/aix/support/.

Related publications

AIX

Commands Reference: Volume 1, a - c, SC23-5243

Commands Reference: Volume 2, d - h, SC23-5244

Commands Reference: Volume 3, i - m, SC23-5245

Commands Reference: Volume 4, n - r, SC23-5246

Commands Reference: Volume 5, s - u, SC23-5247

Commands Reference: Volume 6, v - z, SC23-5248

General Programming Concepts: Writing and Debugging Programs, SC23-5259

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