

5765-E32



# IBM C for AIX Version 5.0

**Memo to Users - Read Me First!**

**プログラム資料説明書 - 最初にお読みください!**

**用户备注 - 用户必读!**

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## Memo to Users

Thank you for your order.

This document contains essential information about C for AIX. Before installing C for AIX, please read it carefully.

C for AIX operates under the control of the License Use Management System (LUM\*), Version 4. LUM is the name of the International Business Machines (IBM\*) enhanced version of the Information for Operating and Retrieval Licensing System (iFOR/LS\*\*). LUM is upwardly compatible with iFOR/LS. See "Installing the LUM Certificate" on page 7 for more information.

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### New in this Release

C for AIX Version 5.0 contains fixes and enhancements not available through PTF.

Differences between C for AIX V3.1.4 and C for AIX V5.0 are:

- New optimization routines
- New Interprocedural Analysis Tool
- Improved memory management routines to aid debugging
- Improved cross-platform portability
- Improved fast prototyping of programs
- 64-bit enablement
- Support for License Use Management Version 4.0 (LUM V4)
- Support for Symmetric Multi-Processing (SMP) programming, including OpenMP-compliant APIs
- Support for Unicode
- Additional debugging tools

Differences between C for AIX V4.1 and C for AIX V5.0 are:

- 64-bit enablement
- Support for License Use Management Version 4.0 (LUM V4)
- Support for Symmetric Multi-Processing (SMP) programming, including OpenMP-compliant APIs
- Added optimization routines
- Support for Unicode
- Additional debugging tools

Differences between C for AIX V4.3 and C for AIX V5.0 are:

- Support for Symmetric Multi-Processing (SMP) programming, including OpenMP-compliant APIs
- Added optimization routines

- Support for Unicode
- Additional debugging tools

Differences between C for AIX V4.4 and C for AIX V5.0 are:

- Added optimization routines
- Support for Unicode
- Support for OpenMP-compliant multi-processing programming APIs
- Additional debugging tools

This version of C for AIX is also fully NLS-enabled for the following languages:

- Japanese Ja\_JP
- Simplified Chinese zh\_CN

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## Contents of CD-ROM

The CD-ROM contains the C for AIX compiler, debugging tools, HTML-format documentation, and readme files containing current information about the product at the time of shipment. You should familiarize yourself with the contents of the readme files.

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## LUM Activation

C for AIX is controlled by LUM Version 4. To permit the use of the product, a LUM license certificate must be installed. Both concurrent-network and concurrent-nodelock LUM license certificates for C for AIX are provided with this product. Additional information is found in the section "Installing the LUM Certificate" on page 7.

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## Installation Information

The C for AIX licensed program provides:

- native optimizing C compiler
- memory-debugging library support
- debugging tools
- compile-time message catalogs
- HTML format documentation
- 64-bit enablement
- AIX Version 4.3 support
- Symmetric Multi-Processing (SMP) programming support, including support for OpenMP-compliant APIs.

You can install the components in the following ways:

- From CD-ROM
- From a network server

The following sections describe how the licensed program is packaged, the system requirements for installation, and the procedures for installing the licensed program.

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## Warnings

To run C for AIX, you must have a LUM license certificate installed. For more information, see "Installing the LUM Certificate" on page 7. After installing C for AIX, be sure to read the following product README files:

- /usr/vac/README.C
- /usr/vac/README.password

These README files contain information that the system administrator may need to act on or distribute to others who use the product.

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## How C for AIX is Packaged

The following table summarizes the available install images.

Install Image	Description	Size (kb)
<b>vac.C</b>	C for AIX Compiler	21,113
<b>vac.C.readme.ibm</b>	C for AIX Compiler iFOR/LS Information	25
<b>vac.msg.LANG</b>	C for AIX Compiler Messages	124
<b>vac.pdf.LANG</b>	C for AIX Compiler documentation (PDF)	2,433
<b>vac.html.LANG</b>	C for AIX Compiler documentation (HTML)	3,303
<b>vac.html.LANG.search</b>	C for AIX Compiler documentation search indices	173
<b>vac.html.common.search</b>	C for AIX Compiler documentation search common files	2

Install Image	Description	Size (kb)
<b>vac.html.SBCS.search</b>	C for AIX Compiler documentation search single-byte common files	107
<b>vac.html.DBCS.search</b>	C for AIX Compiler documentation search double-byte common files	62
<b>vacpp.cmp.rte</b>	VisualAge C++ Compiler Application Runtime	12
<b>xlC.rte</b>	C Set ++ Runtime	6,153
<b>xlC.aix41</b>	C Set ++ Runtime for AIX 4.2	16,000
<b>xlC.aix43</b>	C Set ++ Runtime for AIX 4.3	10,575
<b>xlC.msg.LANG.rte</b>	C Set ++ Runtime Messages	10
<b>xlsmprte</b>	SMP Runtime Library	420
<b>xlsmprte.msg.LANG.rte</b>	XL SMP Runtime Library Messages	2
<b>memdbg.adt</b>	User Heap/Memory Debug Toolkit	23
<b>memdbg.aix41.adt</b>	User Heap/Memory Debug Toolkit for AIX 4.2	1,400
<b>memdbg.aix43.adt</b>	User Heap/Memory Debug Toolkit for AIX 4.3	2,766
<b>memdbg.msg.LANG</b>	User Heap/Memory Debug Toolkit Messages	2
<b>idebug.adt.olt</b>	Object-Level Trace Development Toolkit	8
<b>idebug.server.olt</b>	Object-Level Trace Server	565
<b>idebug.client.olt</b>	Object-Level Trace Viewer	596
<b>idebug.client.gui</b>	Debugger Graphical User Interface	16,594
<b>idebug.engine.interpreted</b>	Debugger Engine for interpreted languages	1,430
<b>idebug.engine.compiled</b>	Debugger Engine for compiled languages	8,004
<b>idebug.rte.hpj</b>	High-performance Java runtime	24,520
<b>idebug.rte.olt.client</b>	Object-Level Trace Client Controller	480
<b>idebug.rte.olt.Cxx</b>	Object-Level Trace C++ Runtime	176
<b>idebug.rte.olt.Java</b>	Object-Level Trace Java Runtime	4,946
<b>idebug.msg.LANG.olt</b>	Object-Level Trace message catalogs	73
<b>idebug.msg.LANG.engine</b>	Debugger Engine message catalogs	10
<b>idebug.help.LANG</b>	Debugger Help	2,004
<b>IMNSearch.rte</b>	NetQuestion Search Engine	12,280

#### Notes:

1. The **Size** column shows the estimated space needed for the completed image installation. These amounts are approximate. To verify that the estimate is sufficient for your system, choose the following options from the SMIT Install Software Products at Latest Level panel before actually installing C for AIX:
  - PREVIEW only? (install operation will NOT occur)
  - VERIFY install and check file sizes
2. In the table, **LANG** represents one of the National Languages Codes. For example, US English compiler messages are in **vac.msg.en\_US.C**

During installation, C for AIX packaging tools will determine the level of the AIX Operating System present on your machine. Different versions of the following files may be installed to support 32-bit or 64-bit environments, based on the level of the AIX Operating System present.

vac.cfg	libhmd.a	libhmu_r.a	libhm.a	libhmd_r.a
libhu.a	libhm_r.a	libhmu.a	libhu_r.a	libpdf.a
libxlsmp.a	profiled/libhmd.a	profiled/libhmu_r.a	profiled/libhm.a	profiled/libhmd_r.a
profiled/libhu.a	profiled/libhm_r.a	profiled/libhmu.a	profiled/libhu_r.a	

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## Prerequisite Tasks or Conditions

Because of the complexity of the software, not every prerequisite has been listed in these instructions. Use the Install PREVIEW option to verify and display requisite software for your choice of components. However, the following items **must** be installed on your system:

<b>bos.adt.include</b>	Base Application Development Include Files
<b>bos.adt.lib</b>	Base Application Development Libraries
<b>bos.adt.libm</b>	Base Application Development Math Libraries
<b>ifor_ls.compat</b>	License Use Management Version 4 Compatibility
<b>ifor_ls_base</b>	License Use Management Version 4 Base
	<b>Note:</b> LUM requires APAR IX64105 if running on AIX Version 4.2.
<b>bos.net.ncs</b>	Base Network Computing Services

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

```
lspp -h bos.adt.include bos.adt.lib bos.adt.libm \
      bos.net.ncs ifor_ls.compat ifor_ls.base
```

Refer to the *AIX V4 Installation Guide* if you need to install these products.

The following optional items are prerequisites for some components:

<b>X11.base.rte</b>	AIXwindows Runtime Environment. Install this if you need to:
	<ul style="list-style-type: none"> <li>• Run the graphical debugger (xldb)</li> <li>• Use the <b>-qipa</b> compiler option</li> </ul>

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

```
lspp -h X11.base.rte
```

Refer to the *AIX V4 Installation Guide* if you need to install these products.

C for AIX operates under LUM Version 4, and a LUM license certificate is required to invoke the product. Both concurrent-network and concurrent-nodelock license certificates are provided in /usr/vac as files cforaix\_c.lic. and cforaix\_cn.lic. respectively.

The LUM Version 4 software is provided as part of the Base Operating System on AIX Version 4.3 and may already be installed on your system. The latest version of LUM can be obtained from:

<http://www.ibm.com/software/is/lum>

For AIX Version 4.2 users, LUM Version 4 is provided on the CD-ROM for your convenience. To install the CD-ROM version of these images, the CD-ROM must be mounted on your system. From the mount point, issue the following commands to install LUM Version 4:

```
installp -acd ifor_ls.base -XFq all
installp -acd ifor_ls.compat -XFq all
installp -acd ifor_ls.msg.en_US -XFq all
```

From the same mount point, issue the following command to install the NCS fix:

```
installp -acd bos.net.ncs -XFq all
```

Refer to the *AIX V4 Installation Guide* if you need to install these products.

**Note:** To verify the amount of space needed for the install operation, choose the following settings on the SMIT Install Software Products at Latest Level panel before actually installing C for AIX:

- PREVIEW only? (install operation will NOT occur)
- VERIFY install and check file sizes

The system makes additional resource checks during installation. If you want, specify the following as one of your installation options in SMIT:

EXTEND file systems if space needed

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## Installing C for AIX

No C compilations should be in progress when you install the compiler or one of its message catalogs.

The filesets associated with this product install files to the /usr/vac directory. No executables are installed in /usr/bin due to potential conflicts with other existing IBM C/C++ compiler product installations. See "Coexisting with Other IBM C/C++ Compiler Products" on page 9 for more information.

This product will overwrite earlier versions of C for AIX. However, if you do not first uninstall earlier versions, you may experience incorrect compiler functionality with respect to library placements. Uninstall earlier versions of C for AIX by using **root** authority to invoke the following commands:

```
installp -u vac
installp -u memdbg
```

## Installing from CD-ROM

1. Insert the CD-ROM containing the software into the CD-ROM drive.
2. Log on as a user with root authority.
3. Enter the following on the AIX command line:

```
smit install_latest
```

This command invokes the System Management Interface Tool (SMIT), which presents a menu driven environment for the installation process. SMIT will start at the following menu:

```
Install Software Products at Latest Level
```

4. Enter the name of the DEVICE that contains the install images. For example, for systems with a single CD-ROM drive, this is typically `/dev/cd0`. Your system may use different designations, particularly if there is more than one CD-ROM drive.
5. Select `all_licensed` to install the entire product, or,
  - a. Click on **List** or press **PF4** to get a list of components that are available to install.
  - b. From this list, select all of the filesets that you want to install.
  - c. When you have selected all of the elements that you want to install, click on **OK** or press **ENTER** to return to the main installation screen.

If you want to check your selections for disk requirements and requisites, change **PREVIEW** only to **Yes**. The install operation will **NOT** occur.
6. To ensure that all of the appropriate filesets are installed, leave **Automatically install REQUISITE software and Include corresponding LANGUAGE filesets at their defaults of Yes**.
7. While C for AIX is installing, the system will display messages. When the installation is complete, press **PF10** or chose **Exit SMIT** from the **Exit** menu to exit SMIT.

## Installing over a Network

If you have a network server installed, you can install C for AIX over a network. Follow the installation procedure described in "Installing from CD-ROM". For the **Device** in step 4 of this procedure, specify the directory on the client that corresponds to the installation source for on the network server.

You can also use the Network Install Manager (NIM) to perform network installs. Refer to the *AIX Network Installation Management Guide and Reference* for more information.

## Installing the LUM Certificate

To install the product, the License Use Run-time (server or client) must be installed on each system. Although the License Use Run-time is supplied with the operating system, you may obtain the latest version from:

```
http://www.ibm.com/software/is/lum
```

To invoke the product, an LUM license certificate must be installed. Concurrent-network and concurrent-nodelock certificate are provided in `/usr/vac` as `cforaix_c.lic` and `cforaix_cn.lic` upon completing the installation of C for AIX.



The certificates are installed using the `i4b1t` tool which resides in `/var/ifu` upon completing the installation of LUM. The `i4b1t` tool can be invoked using the command line or through a graphical user interface (if supported.)

Invoke `i4b1t` as **root** and **import** the license certificate. After importing the certificate, specify the number of licenses of The tool can be used to monitor the current usage of all LUM enabled products.

The iFOR/LS and NetLS products have their nodelock passwords installed in `/usr/lib/netls/conf/nodelock`. Installation of LUM moves this to `/var/ifu/nodelock`. It then creates a link to `/usr/lib/netls/conf/nodelock` for backwards compatibility. As a result, all previous nodelock passwords should continue to operate as prior to LUM installation.

If after installing the certificate C for AIX fails with the following error:

```
1506-333 (S) License failure: init: An error occurred during communication
with the concurrent nodelocked agent.
```

then the `i4conmgr` subsystem was not started. Execute the command `/var/ifu/i4cfg -start` to start the subsystem.

The file `/usr/vac/README.password` contains up-to-date information on using LUM with C for AIX.

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## Other Information

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### Coexisting with Other IBM C/C++ Compiler Products

By default, links to the various C for AIX compiler invocations are not created in `/usr/bin`. This allows C for AIX to coexist with other IBM C/C++ compiler products that may have links to their respective compiler invocations installed in `/usr/bin`. If coexistence with other IBM C/C++ compiler products is not an issue, you can create links from `/usr/bin` to the C for AIX compiler invocations by running the `replaceCSET` script found in `/usr/vac/bin`.

If you require C for AIX to coexist with either C Set ++ for AIX or IBM C and C++ Compilers for AIX, do not run the `replaceCSET` script. Instead, you should either add `/usr/vac/bin` to your path or invoke the compiler by its full path name, for example:

```
/usr/vac/bin/xlc
```

You can determine if you have run the `replaceCSET` script with the following procedure:

1. Issue the following command:

```
ls -l /usr/bin/xlc
```

2. Inspect the returned listing information.

- a. If there is a link from `/usr/bin/xlc` to `/usr/lpp/xlc/bin/xlc`, the `replaceCSET` script was not invoked. You have an environment which allows both C for AIX and C Set ++ for AIX to coexist.
- b. If there is a link from `/usr/bin/xlc` to `/usr/libmcxx/bin/xlc`, the `replaceCSET` script was not invoked. You have an environment which allows both C for AIX and IBM C and C++ Compilers for AIX to coexist.
- c. If there is a link from `/usr/bin/xlc` to `/usr/vac/bin/xlc`, the `replaceCSET` tool was invoked. If you do not require C for AIX to coexist with other IBM C/C++ compiler products, you should rerun the `replaceCSET` script after installation. Otherwise, you should run the `restoreCSET` script to remove the links from `/usr/bin/xlc` to C for AIX.

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### C for AIX Version 5.0 Documentation

Product information for C for AIX is included online in HTML form, and can be found at `/usr/vac/html`. Compiler options and invocation commands are also described here. To access the online information, use a standard frames-enabled browser to open the following file:

```
file:/usr/vac/html/en_US/index.htm
```

The same product information is also available in Portable Document Format (PDF) form in the file `cforaix.pdf` at `/usr/vac/pdf`.