

# ***Intel® Fortran Compiler 9.1 for Linux\**** ***Installation Guide***

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## **Introduction**

This document explains how to install and configure for use the Intel® Fortran Compiler 9.1 for Linux\* product. Installation is a multi-step process. Please read this document in its entirety before beginning and follow the steps in sequence. For information about the product contents, including new and changed features, please refer to the separate [Release Notes](#).

If you have an older version of the Intel Fortran Compiler for Linux installed, you do not need to uninstall it before installing this version. If you choose to uninstall the older version, you may do so before or after installing this version.

## **System Requirements**

### **Processor Terminology**

Intel compilers support three platforms: general combinations of processor and operating system type. This section explains the terms that Intel uses to describe the platforms in its documentation, installation procedures and support site.

#### **IA-32**

IA-32 (Intel Architecture, 32-bit) refers to systems based on 32-bit processors supporting at least the Pentium® II instruction set, (for example, Pentium® 4, Pentium® D, Celeron®, Intel® Core™ Duo or Intel® Xeon®), or processors from other manufacturers supporting the same instruction set, running a 32-bit operating system ("Linux x86").

## Intel EM64T

Intel® EM64T (Intel® Extended Memory 64 Technology) refers to systems based on IA-32 processors which have 64-bit architectural extensions, running a 64-bit operating system ("Linux x86\_64"). Systems based on the AMD\* Athlon64\* and Opteron\* processors running a 64-bit operating system are also supported by Intel compilers for Intel EM64T-based applications.

## Intel Itanium®

Refers to systems based on the Intel Itanium® 2 processor running a 64-bit operating system.

## Native and Cross-Platform Development

The term "native" refers to building an application that will run on the same platform that it was built on, for example, building on IA-32 to run on IA-32. The term "cross-platform" or "cross-compilation" refers to building an application on a platform type different from the one on which it will be run, for example, building on IA-32 to run on Intel Itanium®. Not all combinations of cross-platform development are supported and some combinations may require installation of optional tools and libraries.

The following list describes the supported combinations of compilation host (system on which you build the application) and application target (system on which the application runs).

### IA-32 Host

Supported target: IA-32

### Intel® EM64T-based Host

Supported targets: IA-32 and Intel® EM64T

### Intel® Itanium®-based Host

Supported target: Intel® Itanium®

**Note:** Development for a target different from the host may require optional library components to be installed from your Linux Distribution.

**Note:** Intel® Cluster OpenMP\* is a separately licensed feature and has different system requirements from that of the compilers. Please refer to the Intel Cluster OpenMP documentation for further details.

## Requirements to develop IA-32 applications

- A system based on an IA-32 processor (minimum 450 MHz Intel Pentium® II processor or greater - Intel Pentium® 4 or Intel® Core™ or Intel® Xeon® processor recommended), or a system based on an Intel processor with Intel EM64T, or a system based on an AMD\* Athlon\* or AMD Opteron\* processor

- 256 MB of RAM (512MB recommended).
- 100 MB of disk space, plus an additional 200 MB during installation for the download and temporary files.
- Linux system with glibc 2.2.4, 2.2.5, 2.2.93, 2.3.2 , 2.3.3, 2.3.4, or 2.3.5 and the 2.4.X or 2.6.X Linux kernel as represented by the following distributions. **Note:** Not all distributions listed are validated and not all distributions are listed.
  - Red Hat\* Linux 7.3, 8, 9
  - Red Hat Enterprise Linux\* 2.1, 3, 4
  - SUSE\* LINUX 8.2, 9.1
  - SUSE LINUX Enterprise Server\* 8, 9
  - Fedora\* Core 4
- Linux Developer tools component installed, including gcc, g++ and related tools.

### **Requirements to Develop Applications for Systems with Intel EM64T or AMD Opteron Processors**

- A system based on an Intel processor with Intel EM64T or based on an AMD Opteron processor
- 256 MB of RAM (512 MB recommended)
- 300 MB free hard disk space, plus an additional 300 MB during installation for download and temporary files.
- 100 MB of hard disk space for the virtual memory paging file. Be sure to use at least the minimum amount of virtual memory recommended for the installed distribution of Linux
- Linux system with glibc 2.2.93, 2.3.2, 2.3.3, 2.3.4 or 2.3.5 and the 2.4.X or 2.6.X Linux kernel as represented by the following Linux distributions, running in 64-bit mode. **Note:** Not all distributions listed are validated and not all distributions are listed.
  - Red Hat\* Enterprise Linux 3, 4
  - SUSE\* LINUX 9.1 Professional
  - SUSE LINUX Enterprise Server 9
  - Fedora\* Core 4
- Linux Developer tools component installed, including gcc 3.3.3, g++ and related tools.
- 32-bit (IA-32) C and C++ runtime libraries: libm.so.6, libpthread.so.0, libc.so.6, libstdc++.so.5 and libgcc\_s.so.1

**Note:** The requirement for the 32-bit (IA-32) libraries is due to the compiler and other tools being 32-bit applications that dynamically link to these libraries. If these libraries are not installed, the following error may be displayed when the compiler is invoked:

```
error while loading shared libraries: libstdc++.so.5:
cannot open shared object file: No such file or directory
```

The error message is confusing as it does not indicate that the IA-32 version of libstdc++.so.5 is required. To avoid this problem, be sure that the 32-bit (IA-32) versions of these libraries are installed. Most, but not all, Linux distributions for Intel EM64T will install these by default. Consult the documentation that came with your Linux distribution for instructions on how to install the 32-bit libraries, typically in packages named libstdc++ and libc. If you still have problems, please contact Intel® Premier Support for further assistance.

## Requirements to Develop Itanium-based Applications

- A system based on an Intel® Itanium® 2 processor.
- 512 MB of RAM (1 GB recommended).
- 150 MB of disk space, plus an additional 200 MB during installation for the download and temporary files.
- Linux system with glibc 2.2.4, 2.2.93, 2.3.2, 2.3.3 or 2.3.4 and the 2.4.X or 2.6.X Linux kernel as represented by the following distributions. **Note:** Not all distributions listed are validated and not all distributions are listed.
  - Red Hat Linux 7.2
  - Red Hat Enterprise Linux AS 2.1, 3, 4
  - SUSE LINUX Professional\* 9.1
  - SUSE LINUX Enterprise Server 8, 9
  - United Linux\* 1.0
- Linux Developer tools component installed, including gcc, g++ and related tools.

We recommend using binutils 2.14 or later, especially if using shared libraries as there are known issues with binutils 2.11.

### Notes:

- Compiling very large source files (several thousands of lines) using advanced optimizations such as `-O3`, `-ipo` and `-openmp`, may require substantially larger amounts of RAM.
- The above lists of processor model names are not exhaustive - other processor models correctly supporting the same instruction set as those listed are expected to work. Please contact Intel® Premier Support if you have questions regarding a specific processor model
- Some optimization options have restrictions regarding the processor type on which the application is run. Please see the documentation of these options for more information.

## Obtaining the Compiler and Tools

Before installing the compiler and tools, you should check the *File Downloads* section of Intel® Premier Support to see if a newer version or update is available. The version on CD or as listed in your electronic

download license letter may not be the most current. In order to download and install a compiler from Intel Premier Support, you will first have to register for support as described below in the topic [Obtaining Technical Support](#).

## Installing the Compiler and Tools

If you encounter difficulty with the initial installation or registration process, please visit <https://registrationcenter.intel.com/support> to request help from Intel.

The default installation directories, referred to elsewhere in this document as <install-dir> and <idb-install-dir>, are:

- /opt/intel/fc/9.1.xxx (for IA-32 and Intel Itanium)
- /opt/intel/fce/9.1.xxx (for Intel EM64T)
- /opt/intel/idb/9.1.xxx (for IA-32 and Intel Itanium)
- /opt/intel/idbe/9.1.xxx (for Intel EM64T)

Note that the path includes the full version number including update number. This means you can keep multiple versions of the compiler installed on the system.

If you are installing both the Intel C++ Compiler and the Intel Fortran Compiler, they each provide the Intel Debugger. If the update numbers are different between the C++ and Fortran installations, the Intel Debugger update numbers will also differ. If you are installing compilers for both languages which were released at the same time, we recommend that you choose a Custom Install for the second compiler and don't install the Intel Debugger a second time, as the debuggers will be the same.

Perform the following steps to install the compiler.

1. Unpack the compiler package in a directory to which you have write access.  

```
> tar -xvf l_fc_p_9.1.xxx.tar
```

or

```
> tar -zxvf l_fc_p_9.1.xxx.tar.gz
```
2. Run the installation script  
Execute the install script in the directory where the tar file was extracted.  

```
> cd l_fc_p_9.1.xxx
```

```
> ./install.sh
```
3. If you are not logged in as root, you will be asked if you want to install as root, install as root using sudo, or to install without root privileges. Installing as root (using sudo if you have that privilege) is recommended, as that will update the system RPM database. Select `root`, `sudo` or

`ignore` - the last says to install as not root. Use the not-root install if you want to install to a private area.

4. The install script will display a series of options, allowing you to begin installation or view documentation. Type `1` and press enter to begin the compiler installation.
5. You will then be prompted to enter your Intel Fortran Compiler for Linux serial number. The serial number was provided to you when you purchased the product, either in an e-mail from the reseller or on a sticker attached to the CD-ROM package. You may also choose to enter a path to an existing license file. Make your selection and then follow the prompts.
6. The install script then does some prerequisite checking and displays which Intel software development tools are installed, if any, and then offers a choice of a Typical Install or a Custom Install. Selection of a Typical Install is recommended - type `1` and press enter.
7. Press enter again to display the license agreement. After the license agreement is displayed, you are prompted to accept or reject the license. If you accept the license, type `accept` and press enter. If you reject the license, type `reject` and press enter to end the install.
8. The install will then continue - you may be prompted to accept further license agreements, specify install paths or to press enter to proceed through install steps.
9. At the end of the installation, you will be prompted to register for Intel® Premier Support. Registration gives you full access to Intel® Premier Support for the length of your support term (typically one year for licenses purchased with support), including all updates and new versions. Without registering, you will be unable to install or use product updates. Enter your e-mail address, when prompted, to register. (If you already have an Intel® Premier Support account, enter its registered e-mail address.) You will then receive an e-mail with registration information including an initial password. If you do not wish to register, or if you have already registered, press `x` and press enter to exit.
10. After registration, the install script exits.

### **Installation Warning for RPM 4.0.2 and RPM 4.1**

RPM 4.0.2 cannot install to a non-default directory. This has been resolved in RPM 4.0.3. RPM 4.1 cannot install to a non-default directory. This has been resolved in RPM 4.11 to 4.2.

### **Installing the Intel License Server**

If you have a floating, counted or node-locked license, the license must be installed in conjunction with the FLEXlm\* license server for Intel software (Intel License Server), which is available for many popular platforms. The

server may be installed on any supported platform accessible on your local network. The compiler CD contains license servers for several Linux distributions. If you do not have the CD, or need a license server for an additional platform, you can find all available license servers in the *File Downloads* section of your [Intel® Premier Support](#) account - select product Intel SW Dev Tools License Servers to find the server for your platform. Please note that the Intel License Server is not available for all platforms on which the compiler itself is supported.

### Installing the Intel License Server on SGI\* Altix\* Systems Running SGI ProPack\* 3

If you will be installing the Intel License Server on an SGI\* Altix\* system running SGI ProPack\* 3, please follow these alternate instructions to ensure correct operation in the partitioned cluster environment:

- Obtain the appropriate license server from Intel® Premier Support File Downloads at <https://premier.intel.com/>. On the File Downloads page, select product Intel SW Dev Tools License Servers. The file to use is `flexlm.Linux.ia64.EL3_SGIAltix.tar.Z`.
- Install the license server following the instructions in the `flexlm_ug.pdf` documentation file in the compiler package.
- To determine the host ID, required to retrieve the license file, log in to the partition from which the license server is to be run, set default (`cd`) to the directory where the Intel License Server is installed (default is `/opt/intel/flexlm`) and perform the following command:

```
./lmhostid
```

- If you do not already have your license, go to the Intel Registration Center and register your product as described in the section above. If you already have a license with an incorrect host ID, submit an issue to [Intel® Premier Support](#), providing the serial number of the license file, the results of running `lmhostid`, an indicator of whether this is a floating license or a node-locked license, and a request that a new license be generated for the new host ID. Be sure to specify that this is for an Altix system by selecting **SGI\* Altix\* ProPack\* 3.0** in the Linux\* Operating System dropdown list . The Intel customer support team will generate a new license for you with the corrected host ID.

## Setting Up the Compiler Environment

The programs in the Intel Fortran Compiler 9.1 for Linux product rely on the environment variables `PATH` and `LD_LIBRARY_PATH`. The installation script

(`install.sh`) creates compiler environment script files (`ifortvars.sh/idbvars.sh`) that set these variables. It is strongly recommended that you add those script files into your login script (`.login` file). Once the variables are set in the "`.login`" file there is no need to run the script files for each session.

source the script to setup the compiler environment:

- `> source <install-dir>/bin/ifortvars.sh(.csh)`  
to use ifort
- `> source <install-dir>/bin/idbvars.sh(.csh)`  
to use idb

The installation program also creates compiler configuration files named `<install-dir>/bin/ifort.cfg` that contain common settings for all compilations. You can edit these files to add additional default options. **Note**, if you install a compiler update package, you need to save the configuration file, if you have modified it, to another filename so that the installation doesn't overwrite your modified file.

If you have not already done so, please register for support after you install this product. See [Obtaining Technical Support](#) below for registration instructions.

## Uninstalling the Compiler and Tools

Please follow the steps below to uninstall the Intel Compiler and Debugger.

1. If you installed as `root`, you will need to log in as `root`
2. To uninstall the compiler:  
`<install-dir>/bin/uninstall.sh`  
or if you've installed the compiler to the default directory, use  
`/opt/intel/fc/9.1.xxx/bin/uninstall.sh` or  
`/opt/intel/fce/9.1.xxx/bin/uninstall.sh` on Intel EM64T-based systems
3. To uninstall the debugger:  
`<idb-install-dir>/bin/uninstall.sh`  
or if you've installed the debugger to the default directory, use  
`/opt/intel/idb/9.1.xxx/bin/uninstall.sh` or  
`/opt/intel/idbe/9.1.xxx/bin/uninstall.sh` on Intel EM64T-based systems

## Obtaining Technical Support

Your feedback is very important to us. To receive technical support for the tools provided in this product and technical information including FAQ's and product updates, you need to be registered for an Intel® Premier Support account on our secure web site, <https://premier.intel.com>. Please register at <https://registrationcenter.intel.com/> .

- Registering for support varies for release products or pre-release products (alpha, beta, etc) - only released products have support web pages on <http://support.intel.com/> .
- If you are having trouble registering or are unable to access your Intel® Premier Support account, please let Intel know of the problem at <https://registrationcenter.intel.com/support> .

**Note:** If your distributor provides technical support for this product, please contact them for support rather than Intel.

For information about the Intel Fortran Compiler Users Forums, FAQ's, tips and tricks, and other support information, please visit: <http://support.intel.com/support/performance/tools/fortran/linux/>. For general support information please visit <http://www.intel.com/software/products/support/>.

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