Intel® Visual Fortran Compiler for Windows* Systems

Installing and Getting Started

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Contents

1 About This Guide

This guide helps you get started using the Intel® Visual Fortran Compiler 8.1 product. It describes Intel Visual Fortran installation and post-installation tasks, use of Intel Visual Fortran, and lists documentation and technical support resources. This guide assumes that you are familiar with the Fortran programming language, the Intel® processor architecture, and your Windows* operating system environment.

The installation instructions in this guide apply to the Intel® Visual Fortran Compiler 8.1, Standard Edition and the Intel® Visual Fortran Compiler 8.1, Professional Edition. With the Professional Edition, after you install the compiler, you can install the IMSL* libraries provided with the Professional Edition.

It contains the following chapters:

- Chapter 1, About This Guide

  The chapter you are reading describes the contents of this guide, related publications, and conventions used in this guide.

- Chapter 2, Prerequisites for Installing Intel Visual Fortran

  This chapter describes some of the system requirements and software requirements for installing Intel Visual Fortran, the Intel® Debugger, and Intel® Array Visualizer. It describes installation options and provides information about specifying the license file.

- Chapter 3, How to Install Intel Visual Fortran

  This chapter describes the step-by-step installation procedures for installing Intel Visual Fortran and Intel Array Visualizer.

- Chapter 4, Post-Installation Tasks

  This chapter describes post-installation tasks required to use Intel Visual Fortran, including understanding the program folders, how to reinstall or remove Intel Visual Fortran or Intel Array Visualizer, restrictions related to using Compaq* Visual Fortran project files, and how to register and check for product updates.

- Chapter 5, Using Intel Visual Fortran

  This chapter shows how to use Intel Visual Fortran, including the command-line environment, using the Microsoft* Visual Studio* .NET* development environment, using debuggers. It describes such product features as the Intel® Array Visualizer,

compatibility with Compaq* Visual Fortran, the Fortran 95 language, and library interface definitions provided by Intel Fortran.

- Chapter 6, Documentation Road Map

  This chapter provides an overview of the online (on-disk) documentation for Intel Visual Fortran, Intel Array Visualizer, and the Compiler Performance Tutorial.

- Chapter 7, Technical Support

  This chapter provides an overview of Intel Visual Fortran technical support and describes the use of the Intel® information reporter tool that you can use to provide system information when requested by the Intel technical support team.

Related Publications

The Intel Visual Fortran and Intel Array Visualizer documentation includes the following:

- *Intel® Visual Fortran Compiler* for Windows* Systems *User's Guide, Volume I: Building Applications*
- *Intel® Visual Fortran Compiler* for Windows* Systems *User's Guide, Volume II: Optimizing Applications*
- *Intel® Fortran Language Reference*
- *Intel® Fortran Libraries Reference*
- *Intel® Array Visualizer online documentation*, *Intel® Array Viewer online documentation*
- *Enhancing Performance with Intel® Compilers* (interactive training)
- *Using the Intel® License Manager for FLEXlm*
- *Release notes* for Intel Visual Fortran
- *Release notes* for Intel Array Visualizer

For more information about Intel Visual Fortran and Intel Array Visualizer documentation, see Chapter 6.

For software requirements and last-minute information about this release, please read the release notes. You can read the release notes before you install Intel Visual Fortran (see Reading the Release Notes and Documentation Before Installation in Chapter 2).

For additional technical product information including white papers about Intel compilers, open the page associated with your product at:

http://developer.intel.com/software/products

In addition to the documentation provided with Intel Visual Fortran, Intel provides architecture documentation, which you can view or download from the following Internet Web site:

http://developer.intel.com/

For example, the following are some of the pages about the Intel architecture.

For information about the …	Click:
Intel® Xeon™ processor	http://developer.intel.com/design/Xeon/
Intel® Pentium® 4 processor	http://developer.intel.com/products/desktop/processors/Pentium4/
Intel® Itanium® processor	http://developer.intel.com/design/itanium/itanium/

2 Prerequisites for Installing Intel® Visual Fortran

This chapter describes the steps you need to take to ensure that your installation of Intel® Visual Fortran will be successful.

System and Software Requirements for Intel Visual Fortran

Before you install Intel Visual Fortran and its related software, make sure that your system meets or exceeds the hardware requirements and has the required software installed.

You can build applications for Intel® Itanium®-based systems running Windows* operating systems. To do this, you need to select and install the Intel Visual Fortran Itanium-based compiler during installation when using either an:

- Itanium-based system running a Windows operating system.
- IA-32 system running a Windows operating system.

You can build applications for IA-32 systems running Windows operating systems only from an:

- IA-32 system running a Windows operating system.

If you have the necessary software installed, you can choose to install both compilers on the same IA-32 system, so you can build applications for both Itanium-based systems and IA-32 systems. For information on IA-32 systems with Intel® Extended Memory 64 Technology (Intel® EM64T) see the *Intel® Visual Fortran Compiler 8.1 Extended Memory 64 Technology Edition for Windows* Release Notes*.

The following table summarizes the type of processor systems and the methods you can use to build applications for IA-32 or Itanium-based systems running Windows operating systems.

To build applications for:	On this type of system:	You can use any of the following methods:
IA-32 systems	IA-32 system	- The command line (including makefiles). - The Microsoft Visual Studio* .NET* build environment.
Itanium-based systems	IA-32 system	The command line (including makefiles).
Itanium-based systems	Itanium-based system	The command line (including makefiles).

Note: If you have installed Intel Fortran Compiler 7.1 and included integration with the Microsoft Visual Studio* .NET* environment during the installation, you must remove Visual Studio.NET integration with Intel Fortran Compiler 7.1 before you install Intel Visual Fortran 8.1 on the same system (see <u>Checking for and Removing Intel® Fortran 7.0 or 7.1 Integration with Microsoft Visual Studio .NET</u>).

Note: The Intel Visual Fortran Compiler 8.1 can coexist on the same system with the Compaq* Visual Fortran 6.*x* products. For more information, see <u>Chapter 5</u>.

Processor, System, and Software Requirements to Build Applications

Before you install Intel Visual Fortran on the appropriate system, please read the release notes to ensure that the system meets the requirements.

The online release notes contain up-to-date information about processor, system, and software requirements, including:
- processor requirements
- RAM requirements
- disk space requirements
- virtual memory requirements
- operating system requirements
- development environment software requirements

For more information about reading the release notes, see <u>Reading the Release Notes and Documentation Before Installation</u>.

Checking Disk Space and Virtual Memory

To check on the disk space available for a disk on your system:

1. Click My Computer
2. Right click the disk drive where you will install Intel Visual Fortran and select Properties from the pop-up menu
3. View the disk space available

To check on the virtual memory page file size on your system:

1. Display the Control Panel (**Start > Settings > Control panel**)
2. Click the System icon
3. On Windows 2000 and XP systems:
   - Click the Advanced tab
   - In the Performance section, click the Settings button.
   - In the Performance Options dialog box, click the Performance Settings button
   - View the Virtual Memory size displayed
4. On other Windows systems:

- Click the Performance tab
- Click the Virtual Memory button
- View the Virtual Memory size displayed (or whether Windows manages virtual memory size)

System and Software Requirements for Intel® Array Visualizer

Intel® Array Visualizer can be installed only on IA-32 systems that are running the Windows 2000 and Windows XP operating systems. In addition, to use Intel Array Visualizer or Intel® Array Viewer, you must have Microsoft Internet Explorer 6.0 or later installed.

To view graphs, your graphics card and monitor need to support a sufficient number of colors, such as 16-bit or higher color. It is also recommended that your graphics card support OpenGL*.

Software Requirements for the Intel® Debugger

On IA-32 systems, the Intel® Debugger runs on the operating systems supported by Intel Visual Fortran installation (see the online release notes). On IA-32 systems, you can use the integrated Microsoft Visual Studio .NET debugger (see Using Debuggers).

On Itanium-based systems, the Intel Debugger can be installed on the same operating systems supported by Intel Visual Fortran.

Understanding Software Components and Your Installation Options

During installation, you will be asked to respond to certain dialog boxes and make decisions related to installation.

One decision includes where the installation files will be installed. For most of the installation files, the default base location is:

```
C:\Program Files\Intel\Fortran
```

You can specify that Intel Visual Fortran be installed in a different directory on the same or a different disk. You can choose to install or not install certain software components, including the following:

- Intel Visual Fortran IA-32 Compiler
- Intel Visual Fortran Itanium-based Compiler either installed on an Itanium-based system (native compiler) or installed on an IA-32 system (cross compiler)
- Intel Debugger (idb)
- Intel Array Visualizer

To install the Intel Visual Fortran Itanium-based Compiler, you need to have installed the most recent Microsoft Platform SDK.

The installation setup program lets you choose whether to select a Typical or Custom installation type. Both installation types let you choose whether an entire component will be installed on a local disk or not installed. The Typical installation type is sufficient for most users and installs all components, and installs them in the same disk/directory location. The Custom installation type lets more advanced users choose to:

- Install or not install the entire component on local disk.
- Install some of the subcomponents of this component on local disk (if it has subcomponents).
- Specify the disk/directory location for the files to be installed.
- Choose whether Intel Visual Fortran compiler environment variable definitions will be set system-wide.

Activating the License File

The Intel Visual Fortran Compiler uses Macrovision* FLEXlm* electronic licensing technology. Unless your Intel Visual Fortran license is already active, you need to activate your license before you can install Intel Visual Fortran. Also, the license must remain in place to use Intel Visual Fortran or Intel Array Visualizer.

The default directory that contains license files for Intel Visual Fortran:

- On IA-32 systems:

  ```
  C:\Program Files\Common Files\Intel\Licenses\
  ```

- On Itanium-based systems:

  ```
  C:\Program Files (x86)\Common Files\Intel\Licenses\
  ```

If this license directory does not exist on your system when you install Intel Visual Fortran, the license directory will be created and you will be prompted to specify the license file. You can also copy the license file to the license directory (shown above) before starting installation. License files have a file extension (suffix) of .lic.

The Intel Visual Fortran license can coexist with some previous versions of the Intel Fortran license. Intel Visual Fortran (and Intel Fortran) licensing technology changed with Version 6, so unless your license subscription has expired, Version 7.*x* and 8.0 licenses are valid for Intel Visual Fortran 8.1.

If you are using counted Intel Visual Fortran licenses (floating or node-locked) associated with Macrovision FLEXlm electronic licensing technology, and your license file and

license server are not already setup and running, you need to first install the Intel license manager software before you can configure your license server:

1.   Open the Intel® Software Development Tools program folder (**Start** > **Programs** > **Intel® Software Development Tools**)
2.   If not done previously, click: **Intel® FLEXlm* license manager** > **Install**. Accept the license agreement, specify the path and name of the license file for your counted license (or choose to specify the file later), and follow other displayed instructions needed to install the Intel license manager software.
3.   Once the license manager is installed, click: **Intel® FLEXlm* license manager** > **Configure Intel® FLEXlm* license server**. If you have not done so during installation of the Intel license manager, specify the counted license file. You can then start the license server (click the *Start Server* button or from the Services control applet). For more information, see the online guide *Using the Intel® License Manager for FLEXlm**.

Removing the Intel Visual Fortran Compiler does not delete the corresponding license or any other Intel license file.

Removing Previous Versions of Intel® Visual Fortran 8.0 or 8.1

If you are using Intel Visual Fortran Compiler 8.0 or an earlier version of Intel Visual Fortran Compiler 8.1, you must uninstall it prior to installing this product by using the Control Panel, Add/Remove Programs item (see Changing Installation Options, Reinstalling, or Removing Intel Visual Fortran).

Checking for and Removing Intel® Fortran 7.0 or 7.1 Integration with Microsoft Visual Studio .NET

If you have installed Intel Fortran Compiler 7.1 or 7.0 with integration with the Microsoft Visual Studio .NET environment, you must remove the Intel Fortran 7.1 or 7.0 integration with the Microsoft Visual Studio.NET before you install Intel Visual Fortran 8.1 on the same system. However, if you want to install Intel Visual Fortran 8.1 with no integration with Microsoft Visual Studio .NET and leave the Intel Fortran 7.1 or 7.0 integration with Microsoft Visual Studio .NET unchanged, you must perform a Custom installation of Intel Visual Fortran 8.1 and deselect integration with both versions of Microsoft Visual C++ .NET.

If your Intel Fortran 7.*x* installation was integrated with Microsoft Visual Studio 98 or Visual C++ 6 and not with the same version of Microsoft Visual Studio .NET, you do not need to remove these components of Intel Fortran 7.1 or 7.0 before installing Intel Visual Fortran 8.1 on the same system.

To check and remove the Intel Fortran 7.1 or 7.0 integration with the Microsoft Visual Studio.NET environment you need to modify the installation of Intel Fortran 7.*x*:

- Start the Control Panel and select Add/Remove Programs item

- Select `Intel® Fortran Compiler 7.1` or `Intel® Fortran Compiler 7.0`.

- Click the `Change` button

- Click the `Next>` button

- Click (select) `Modify`

- Under `Intel Fortran Compiler for 32-bit Applications`, click the plus sign (+) to the left of Microsoft Visual Studio Integration.

- If selected (a disk icon means it is selected; an X means it is deselected), you may need to deselect `For Microsoft Visual C++ .NET 2002` and deselect `For Microsoft Visual C++ .NET 2003`.

  With Intel Fortran 7.0, you must remove integration with both Visual C++ .NET 2002 and Visual C++ .NET 2003.

  With Intel Fortran 7.1 (please see the release notes for more information), you can have Intel 7.1 integrate with one version and Intel Visual Fortran integrate with the other version of Visual C++ .NET. For example, Intel Fortran 7.1 can integrate with Visual C++ .NET 2002, and Intel Visual Fortran can be integrated with Visual C++ .NET 2003.

- Click the `Next>` button

- Reply to other dialog boxes, and click the `Install` button to begin the installation

Please see the release notes for the latest information.

Reading the Release Notes and Documentation Before Installation

When installing Intel Visual Fortran from CD-ROM media, you can read the release notes before installation. Use a Web browser to open the `frelnotes.htm` file located in the CD-ROM root directory (in the **File** menu, click **Open**, click the `Browse` or `Choose File` button).

When installing Intel Visual Fortran from a Web download package, the downloaded file is unpacked into an intermediate directory that you specify. You can read the release notes from this intermediate directory by using a Web browser to open the `frelnotes.htm` file (in the **File** menu, click **Open**, click the `Browse` or `Choose File` button).

Whether you are using the CD-ROM media or the unpacked intermediate directory of the Web download, the `html` directory contains this guide and other Intel Visual Fortran documentation (see <u>Chapter 6</u>).

3 How to Install Intel® Visual Fortran and its Components

This chapter provides detailed installation instructions for installing the Intel® Visual Fortran compiler and, optionally, its major components: the Intel® Array Visualizer (IA-32 systems only) and the Intel® Debugger (idb).

Before you use the instructions in this chapter, make sure that you have completed the steps described in the previous chapter. For example, if you have Intel Visual Fortran compiler 8.0 or an earlier version of Intel Visual Fortran compiler 8.1 installed, you need to remove it before installing Intel Visual Fortran compiler 8.1 (see Removing Previous Versions of Intel® Visual Fortran 8.0 or 8.1).

> **Note**: On Microsoft* Windows* 2000 and Windows XP systems, you **must** use an account with administrative privilege to install or remove the Intel Visual Fortran Compiler and its components.

If you are installing Intel Visual Fortran from CD-ROM, please skip to the section Starting the Installation from CD-ROM or Disk.

Web Installation: Unpacking the Download File

With the Web download package, the downloaded file is unpacked into an intermediate directory that you specify. To unpack the downloaded file:

1. Use Windows Explorer or My Computer to locate the directory containing the downloaded file.
2. Double-click the downloaded file to display a screen resembling the following:
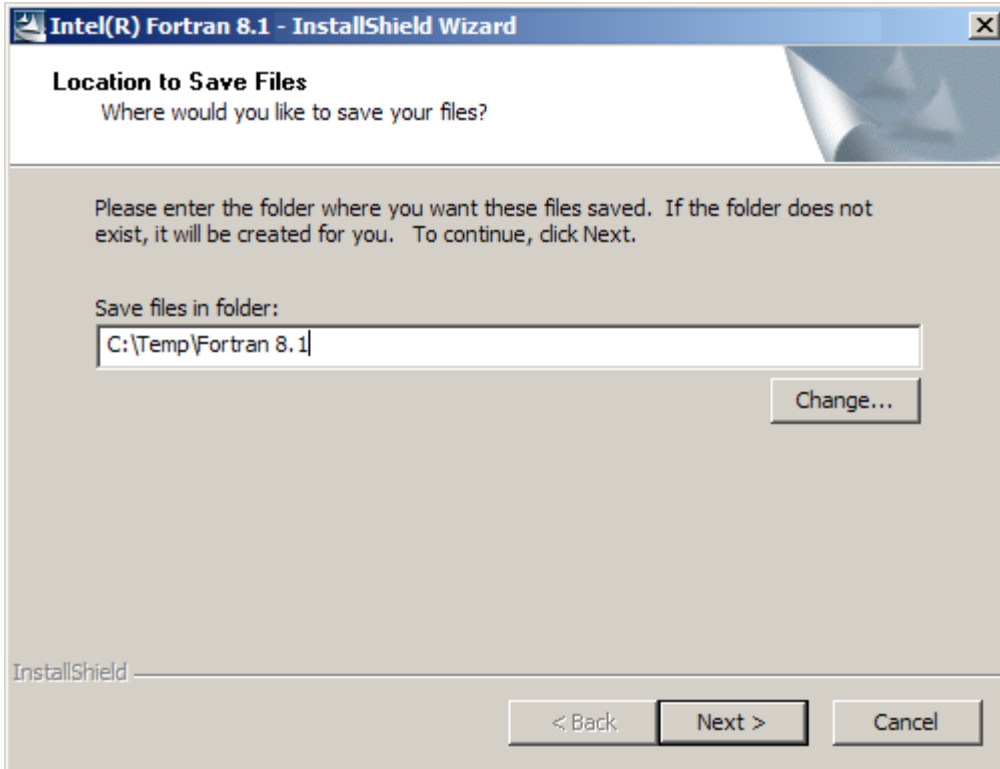
3. Specify the location of an intermediate directory where the downloaded files will be unpacked or click the Change... button to browse your system and select a disk and directory location. If you are not sure whether there is enough disk space on the disk where Intel Visual Fortran will be installed, choose a different disk.

   - You should remember this intermediate directory for future reference, for example, to free up disk space after installation. You should retain either the downloaded file or the contents of this intermediate directory to reinstall this version of Intel Visual Fortran.

4. Click the Next> button to begin copying the contents of the downloaded file into the intermediate directory. A dialog box appears showing the progress of the extracted files. When complete, your Web browser appears, initiating the installation of Intel Visual Fortran.

You do not need to keep both the downloaded file and the contents of the intermediate directory. You need only one of these to reinstall this version of Intel Visual Fortran (see Removing the Intermediate Download Directory in Chapter 4).

Starting the Installation from CD-ROM or Disk

After you unpack the downloaded file or insert the Intel Visual Fortran CD-ROM, a Web page appears in your Web browser displaying the Intel® Visual Fortran name and version number, such as Intel Visual Fortran 8.1 for Windows*.

If you are installing Intel Visual Fortran from CD-ROM, insert the Intel Visual Fortran CD-ROM into a CD-ROM drive. Your Web browser should automatically appear displaying the Intel Visual Fortran installation page; if it does not display, double-click the file name *autorun.exe* in the:

- Root directory of the CD-ROM
- Top-level (intermediate) directory that you selected when you unpacked a Web download of Intel Visual Fortran

This introductory Web page can be activated whenever needed, not only to install or reinstall Intel Visual Fortran, but also for easy access to the helpful Web links displayed in the left margin. For example, links in the left margin allow you to:

- Register for technical support
- Display a page containing relevant Web links
- Access the Intel® Premier Support Web pages
- Display this document

If you select one of the links in the left margin, click the `Back` button on your browser or click the link CD Home link in the left margin to return to the initial page.

> **Note**: Before you start the installation, make sure that you have activated the appropriate license file (see <u>Activating the License File</u> in Chapter 2).

To start the installation of Intel Visual Fortran, locate and click the Install Compiler link, which is under the Installation heading on the left side of the screen. Follow the instruction on the screen.

Installing Intel Visual Fortran 8.1

After loading the necessary installation software, the setup procedure checks for a valid license. If a valid license file is not found, the following screen appears.
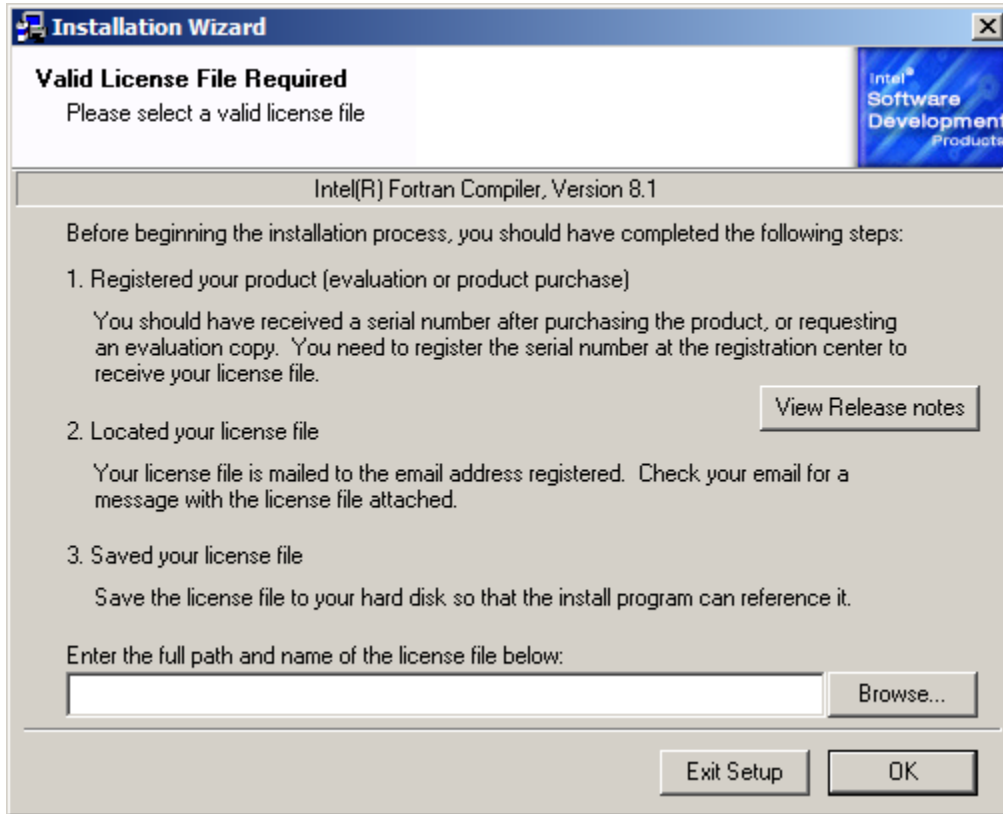
Before installation can occur, you need to save a valid license file to your disk. To do this, you need to:

- register your product to obtain a serial number (See <u>Intel® Visual Fortran Technical Support</u> in Chapter 7, or view the online release notes.)
- locate the license file sent to your specified email address
- save the license file to a disk with a file extension (suffix) of .lic.

After you have saved the license file, either type the path and file name or click the `Browse...` button to specify the location and file name of the license file. The license file will be copied to the necessary location. For the location of the license file and related information, see <u>Activating the License File</u>.

After you specify a valid license file, click the `OK` button. The following Welcome dialog box appears:
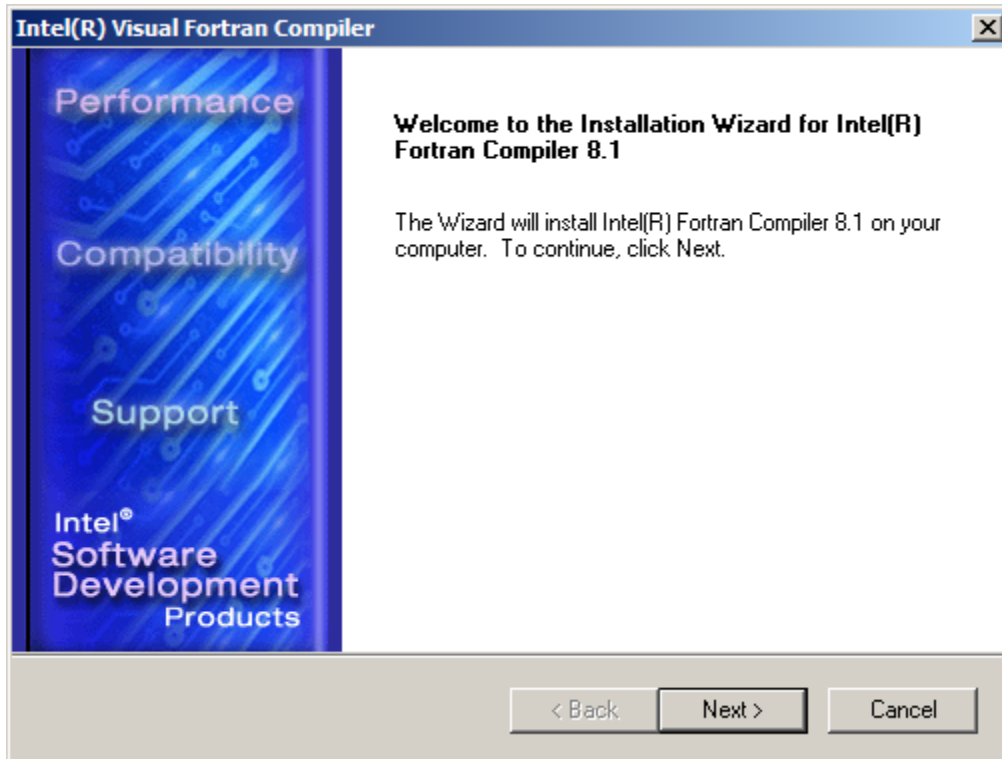
Click the `Next>` button to continue. To exit from the Intel Visual Fortran installation setup process at any time, click the `Cancel` button in the lower right of a dialog box.

If you previously installed Intel Visual Fortran, a dialog box will appear asking you whether you want to repair, modify, or remove Intel Visual Fortran.

> **Note:** If you want to install a newer version, you must choose to remove the previous version first.

To modify or repair the same version of Intel Visual Fortran, you can select:

- Modify to change whether or not certain components are installed on disk (or where they are installed).
- Repair if you are having problems with the current installation but do not want to change which components are installed on disk.

If this is a new installation of Intel Visual Fortran, the License Agreement dialog box appears:

1. Read the License Agreement. Use the scroll bar or Page Down key to display the entire text.
2. If you agree with the terms of the License Agreement, click the `Yes` button to continue. Alternatively, you can either click the `<Back` button to display the previous dialog box, or click the `No` button if you want to exit the installation of Intel Visual Fortran.

The Customer Information dialog box appears:

1. Enter your name and (if applicable) your company's name.
2. You can also specify whether this installation of Intel Visual Fortran can be used only by the account you are using to perform the installation or by other accounts using this computer system.
3. Click the `Next>` button to continue. Alternatively, you can click the `<Back` button to display the previous (License Agreement) dialog box.

Setup Type Dialog: Choose a Typical or Custom Installation

After the Customer Information dialog box, the Setup Type dialog box appears:
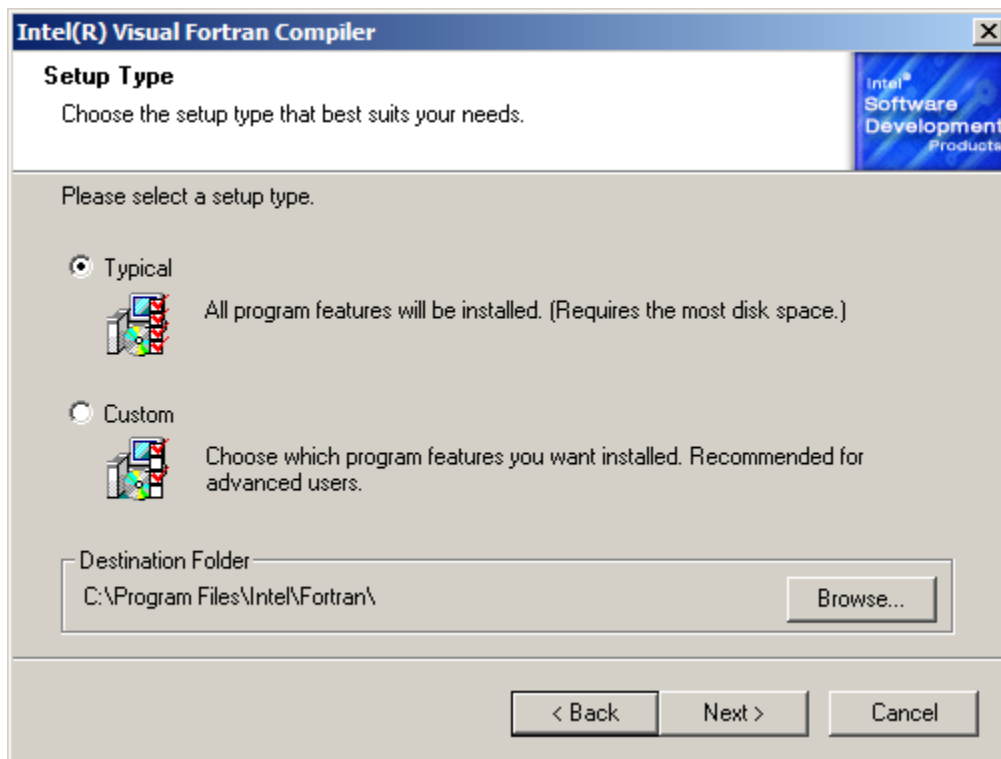
The Setup Type dialog box asks whether you want to:
- perform either a Typical or a Custom installation.
- accept the default destination directory (folder) or specify a different directory where files will be installed.

Select the Typical installation type if you want all possible components installed on your local hard disk, including Intel® Array Visualizer (IA-32 systems only) and the Intel® Debugger. The Typical installation type requires that all components are installed on the same disk/directory location.

Unless you have disk space limitations, most users should select the Typical installation type.

Select a Custom installation if you want control over how the components are installed on your local disk and if you want to select or deselect components. Using a Custom installation lets you choose to:

- install the entire component on local disk
- install some of the subcomponents of this component on local disk (if it has subcomponents)
- not install the entire component on the local disk
- specify the disk/directory location for each component
- choose whether Intel Visual Fortran compiler environment variable definitions will be set system-wide

After you click on the line for either the Typical or Custom installation type, you need to decide where the Intel Visual Fortran and related files will be installed.

The default base location that you can specify is: `C:\Program Files\Intel\Fortran`. If you accept this default base location, components are installed in directories below that location; for example, Intel Visual Fortran files are installed in `...\Compiler80`:

Component	Default Installation Location
Intel® Visual Fortran	`C:\Program Files\Intel\Fortran\Compiler80`
Intel® Array Visualizer	`C:\Program Files\Intel\Fortran\Array Visualizer`
Intel® Debugger:	`C:\Program Files\Intel\Fortran\IDB80`

To specify a different base directory location, click the `Browse…` button, which displays the Choose Folder dialog box. You can use the Choose Folder to specify a different disk device (scroll to the top of the displayed directory hierarchy) or specify the desired directory by selecting it or typing in its name. Click the `OK` button when you have specified the desired disk and directory location.

After you choose either a Typical or Custom installation and accept or specify a destination directory, click the `Next>` button in reply to the Setup Type dialog box. The dialog box that appears next depends upon whether you selected a Typical or a Custom installation.

If you selected a Custom installation, skip to the section <u>Performing a Custom Installation</u>.

Performing a Typical Installation

If you selected a Typical installation, the system checks to determine whether:

- You have the software needed to install all components. If prerequisite software needed for a component is not installed, a Missing Prerequisite dialog box appears, displaying the Intel Visual Fortran component and the name of the missing prerequisite software.

For example, if you do not have the Microsoft* Platform SDK installed on your system, you should not install the Intel Visual Fortran Compiler for Itanium®-based Systems.

- You have more than one Microsoft Visual Studio* .NET* development environment installed. In this case, the Multiple Development Environment dialog box appears, asking which of these Microsoft visual development environments will be used for Intel Visual Fortran command-line use. Intel Visual Fortran command-line use is limited to only one visual development environment, which you must select.

  You can use Intel Visual Fortran compiler within any of the supported Microsoft visual development environments (Microsoft Visual Studio .NET or Microsoft Visual Studio .NET 2003).

- If you have installed Intel Fortran Compiler 7.1 or 7.0 with integration with the Microsoft Visual Studio .NET environment, you must remove Intel Fortran Compiler 7.x's integration with the Microsoft Visual Studio .NET before you install Intel Visual Fortran 8.1 on the same system, as described in Checking for and Removing Intel® Fortran 7.0 or 7.1 Integration with Microsoft Visual Studio .NET.

The Environment Variables dialog appears, allowing you to set system-wide environment variables for command-line execution:

This dialog box lets you choose whether the Intel Visual Fortran compiler environment variable definitions for PATH, LIB, and INCLUDE should be set system-wide. If you do not set the environment variables system-wide, when you use the command line you can use the supplied

Intel Visual Fortran command-line environment (`Build Environment for xxx applications` item in the Intel Visual Fortran program folder) or apply the appropriate `ifortvars.bat` file (see Using the Command Line in Chapter 5). You can also set the environment variables within the Microsoft visual development environment.

Also, to run applications that have been linked against the Intel Visual Fortran Dynamic Link Libraries (DLLs), you will need the PATH environment variable to be defined either system-wide or defined for each environment (such as ifortvars.bat for a command line window) in which it is run.

If you will do *any* of the following, you do not need system-wide environment variables set:
- If you will not use the command-line environment.
- If you will use the supplied command-line environment provided by the Intel Visual Fortran program folder.
- If you will use your own command-line environment and will execute the `ifortvars.bat` file to set environment variables.

You do need to set system-wide environment variables if your applications are linked against Intel Visual Fortran DLLs and you will not execute the `ifortvars.bat` file (or otherwise set the PATH environment variable) before executing those applications.

After deciding whether to update the environment variables system-wide (check box enabled) or not update them (check box clear), click the `Next>` button to proceed to the Start Copying Files dialog box. In reply to the Start Copying Files dialog box, click the:

- `Next>` button to begin installation.
- `<Back` button to return to the previous dialog box (to select a Custom installation, click the `<Back` button several times to return to the Setup Type dialog box).
- `Cancel` button to exit the installation setup process.

Once you begin installation, files are copied to the target directories (Setup Status dialog box appears). When complete, the InstallShield* Wizard Completed dialog box appears. Click the `Finish` button to complete the installation of Intel Visual Fortran.

If needed, you will be prompted to reboot your system.

You can now become familiar with the contents of the Intel Visual Fortran and related program folders, as well as understand applicable post-installation tasks. Skip to Chapter 4 Post-Installation Tasks.

Performing a Custom Installation

After you select a Custom installation, the Select Features dialog box similar to the following one (shown for an IA-32 system where the Platform SDK was previously installed) appears:

Intel(R) Visual Fortran Compiler

Select Features

Choose the features Setup will install.

Intel
Software
Development
Products

Select the features you want to install, and clear the features you do not want to install.

- ☑ Intel(R) Visual Fortran Compiler for Itanium-bas
  - ☑ Main Program Files
  - ☑ Documentation
- ☑ Intel(R) Visual Fortran Compiler for IA-32 base
  - ☑ Main Program Files
  - ☐ ☑ IDE Integration for Visual C++.NET
  - ☐ ☑ Documentation
  - ☑ IReporter
  - ☑ Compiler Performance Tutorial

Description

Intel(R) Compilers feature optimization technology, language extensions and more, to deliver application performance on Intel Pentium(R) 4 and Itanium(R) processors.

Space Required on C: 221436 K
Space Available on C: 12289668 K

< Back   Next >   Cancel

The Select Features dialog box lets you choose for each component whether:

- The entire component will be installed on a local disk.
- The entire component will not be installed.
- Some of the subcomponents of this component will be installed on a local disk (if it has subcomponents).

In the sample dialog box shown above:

- The prerequisite Microsoft Platform SDK was installed, so the component Intel Visual Fortran Compiler for Itanium-based Systems is selected.
- The default for the Intel Visual Fortran Compiler for 32-bit applications is to install all components on the local disk, so the component is selected.

To change whether the component is installed on the local disk or not installed, click the check box to the left of the component name. All components are installed in the destination disk and folder directory specified in the Setup Type dialog box (click the <Back button to view the Setup Type dialog box).

After you have specified whether the components and subcomponents will be installed on the local disk, click the Next> button. Alternatively, you can press the <Back button to return to the Setup Type dialog box or press Cancel to exit the installation setup procedure.

After you click the `Next>` button, the system checks to determine whether:

- You have the software needed to install all components. If prerequisite software needed for a component is not installed, a Missing Prerequisite dialog box appears, displaying the Intel Visual Fortran component and the name of the missing prerequisite software. For example, if you do not have the Microsoft* Platform SDK installed on your system, you should not install the Intel Visual Fortran Compiler for Itanium®-based Systems.

- You have more than one Microsoft Visual Studio .NET development environment installed. In this case, the Multiple Development Environment dialog box appears, asking which of these Microsoft visual development environments will be used for Intel Visual Fortran command-line use. Intel Visual Fortran command-line use is limited to only one visual development environment, which you must select.

  You can use the Intel Visual Fortran compiler within any of the supported Microsoft visual development environments (Microsoft C++*.NET* or Microsoft Visual C++*.NET 2003).

The Environment Variables dialog appears, allowing you to set system-wide environment variables for command-line execution:

This dialog box lets you choose whether the Intel Visual Fortran compiler environment variable definitions for PATH, LIB, and INCLUDE should be set system-wide. If you do not set the environment variables system-wide, when you use the command line you can use the supplied Intel Visual Fortran command-line environment (`Build Environment for xxx`

`applications` item in the Intel Visual Fortran program folder) or apply the appropriate `ifortvars.bat` file (see <u>Using the Command Line</u> in Chapter 5). You can also set the environment variables within the Microsoft visual development environment.

Also, to run applications that have been linked against the Intel Visual Fortran Dynamic Link Libraries (DLLs), you will need the PATH environment variable to be defined either system-wide or defined for each environment (such as ifortvars.bat for a command line window) in which it is run.

If you will do *any* of the following, you do not need system-wide environment variables set:
- If you will not use the command-line environment.
- If you will use the supplied command-line environment provided by the Intel Visual Fortran program folder.
- If you will use your own command-line environment and will execute the `ifortvars.bat` file to set environment variables.

You do need to set system-wide environment variables if your applications are linked against Intel Visual Fortran DLLs and you will not execute the `ifortvars.bat` file (or otherwise set the PATH environment variable) before executing those applications.

After deciding whether to update the environment variables system-wide (check box enabled) or not update them (check box clear), click the `Next>` button to proceed to the Start Copying Files dialog box. In reply to the Start Copying Files dialog box, click the:

- `Next>` button to begin installation.
- `<Back` button to return to the previous dialog box (to select a Typical installation, click the `<Back` button several times to return to the Setup Type dialog box).
- `Cancel` button to exit the installation setup process.

Once you begin installation, files are copied to the target directories (Setup Status dialog box appears). When complete, the InstallShield Wizard Completed dialog box appears. Click the `Finish` button to complete the installation of Intel Visual Fortran.

If needed, you will be prompted to reboot your system.

You can now become familiar with the contents of the Intel Visual Fortran and related program folders, as well as understand applicable post-installation tasks. Skip to Chapter 4 <u>Post-Installation Tasks</u>.

Installing the Intel® Visual Fortran Compiler 8.1, Professional Edition, for Windows*

The steps and procedures included in the previous sections of this chapter generally apply to installing the Intel® Visual Fortran Compiler 8.1, Professional Edition, for Windows* product.

Follow the same general steps to install the Professional Edition from either CD-ROM or a downloaded file as you would to install the Standard Edition.

The IMSL* Libraries are installed separately from the compiler, and the IMSL* Libraries must be installed after installing the Professional Edition of Intel Visual Fortran compiler.

For information on installing the IMSL* Libraries refer to the installation instructions displayed when you start the Intel® Visual Fortran Compiler 8.1, Professional Edition, for Windows* installation from CD-ROM or disk (see <u>Starting the Installation from CD-ROM or Disk</u>).

See the <u>Using the IMSL* Libraries</u> section for information on using the IMSL* Libraries.

4 Post-Installation Tasks

This chapter discusses certain tasks you need to perform after installation.

Understanding the Intel® Visual Fortran and Intel® Debugger Program Folders

The Intel® Visual Fortran program folder is displayed when you click:

Start > Programs > Intel® Software Development Tools > Intel® Fortran Compiler 8.1

The contents of the Intel Visual Fortran program folder depends upon the components selected during installation and might include:

Program Folder Item	Description
Intel® Debugger 8.1	Program folder for the Intel Debugger, such as documentation, the command-line interface, the Intel Debugger GUI, and release notes.
Build Environment for Fortran IA-32 applications (if installed)	Displays a command-line window for developing Intel Visual Fortran applications for IA-32 systems from the command line.
Build Environment for Fortran Itanium®-based applications (if installed)	Displays a command-line window for developing Intel Visual Fortran applications for Itanium-based systems from the command line.
Compiler Performance Tutorial	Displays the Intel® Compiler performance tutorial in a Web browser.
Documentation Index	Provides an HTML file with links to the Intel Visual Fortran and related documentation (see Chapter 6) notes (displayed in a Web browser).
Intel® information reporter	Displays the Intel information reporter tool, which can be used to gather information about your system (see Chapter 7, Using the Intel information reporter tool).
Release Notes	Displays the Intel Visual Fortran release notes in a Web browser.

In addition to the Intel® Visual Fortran and Intel Debugger program folders, other program folders include the Intel® License Manager for FLEXlm* program folder, the Registration and Support program folder, and the Intel® Array Visualizer program folder.

Copy Files Needed to Run Itanium-based Applications Created on an IA-32 System

If you are developing IA-32 applications only or if you installed the Itanium-based Intel Visual Fortran compiler on your Itanium-based system and intend to use the Itanium-based system to develop applications, skip this step.

If you did not install the Itanium-based Visual Fortran compiler on your Itanium-based system and need to use an IA-32 system with the Intel Visual Fortran Itanium-based compiler to produce Itanium-based applications, you will need to copy specific, required files (.dll, .ocx, .lib, .exe, and .obj) for Itanium-based applications from your IA-32 development system to the Itanium-based system. The required files provide the minimum environment needed to run Intel Visual Fortran Itanium-based applications on Itanium systems.

See the *Fredist.txt* file, which is located in the ...\`Compiler80\docs` directory of the location specified during the installation, for a complete list of the required files. Search your IA-32 development system for the files listed in the *Fredist.txt* file, and copy the files in a directory structure on the Itanium-based system that mirrors the directory structures found on your IA-32 development system. You might need to create the necessary directory structure.

> **Note:** The DLLs in the Platform SDK directory "`Microsoft Platform SDK\redist\PreRelease\win64`" may also be required at runtime and should be copied into the same directory as the executable on the Itanium-based system, so they take precedence over any versions distributed with the operating system. Some of these DLL files are not distributed with the operating system and are only available from the Platform SDK.

Changing Installation Options, Reinstalling, or Removing Intel Visual Fortran

To remove Intel Visual Fortran, use the Control Panel:
1. Display the Control panel (**Start > Settings > Control panel**).
2. Double-click Add/Remove Programs.
3. Scroll to and click Intel Visual Fortran Compiler 8.1.
4. Click the `Remove` button.
5. Verify that you want to remove Intel Visual Fortran and follow the displayed instructions.
6. Also see the section <u>Checking for and Removing Old Environment Variable Definitions</u> later in this chapter.

To modify installation options or to reinstall Intel Visual Fortran, obtain the Program Maintenance dialog box by doing the following:
1. Display the Control panel (**Start > Settings > Control panel**).
2. Select Add/Remove Programs.

3. Scroll to and click Intel Visual Fortran Compiler 8.1.
4. Click the `Change` button.

The Welcome to the InstallShield* Wizard for Intel Visual Fortran 8.1 dialog box appears. Click the `Next>` button to display the following dialog box:
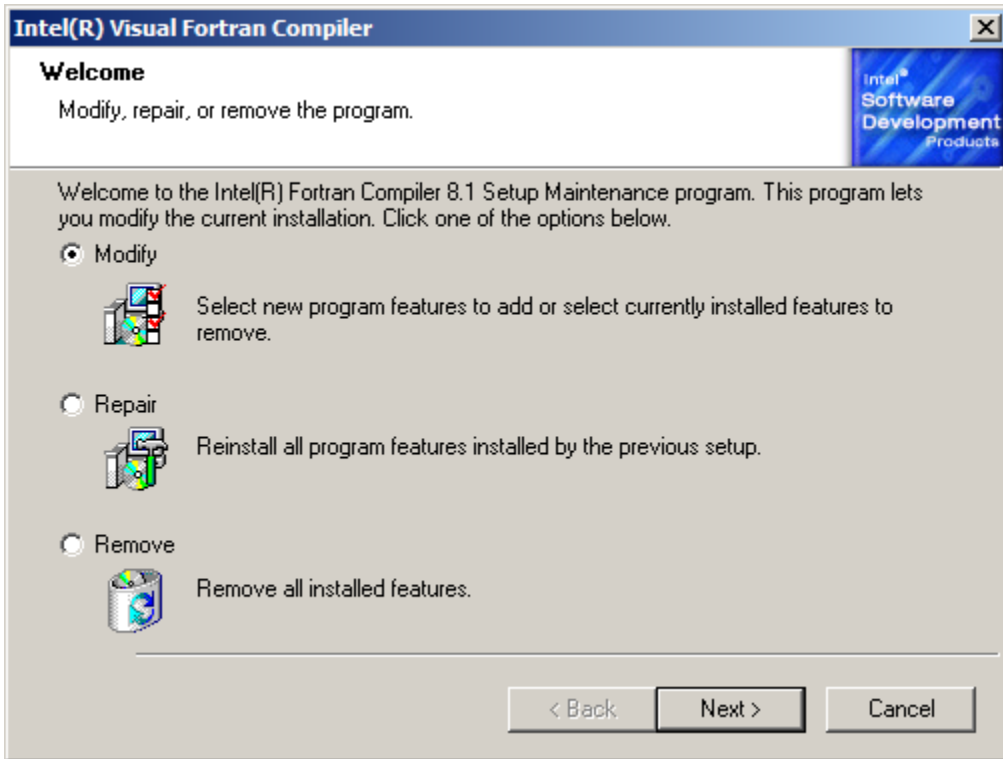
Select one of the following:

- Modify: To change the components selected in the previous installation of the same version, select Modify. This displays the Custom Setup installation dialog box described in Chapter 3, Performing a Custom Installation.

- Repair: To repair the existing installation without changing installation options of the same version, select Repair. The Setup Status dialog box appears. Click the `Install` button to reinstall the same components previously installed.

- Remove: To remove Intel Visual Fortran and the Intel Debugger (for example, before installing a newer version), select Remove. The Remove All Components dialog box appears. Click the `Remove` button to remove Intel Visual Fortran and the Intel Debugger. The removal setup program will not remove your license files. You can manually remove the license files if needed.

Understanding the Intel® Array Visualizer Program Folder

To display the contents of the Intel® Array Visualizer program folder, click:

Start > Programs > Intel® Software Development Tools > Intel® Fortran Compiler 8.1 > Intel® Array Visualizer

The contents of the Intel Array Visualizer program folder include:

Program Folder Item	Description
Array Viewer	Displays the interactive Intel® Array Viewer, that lets you display previously saved data files (see Using the Intel Array Visualizer in Chapter 5).
Documentation	Displays an HTML page that lets you select the Intel Array Visualizer online documentation (see Chapter 6).
Release Notes	Displays an HTML page that contains the Intel Array Visualizer release notes.

> **Note:** Certain tasks must be performed before you can develop applications that use Intel Array Visualizer, as described in the Intel Array Visualizer online documentation or release notes. These tasks include adding appropriate directories to the PATH, LIB, and INCLUDE environment variables.

Removing the Intermediate Download Directory

If you used the Web download package, you needed to unpack it into an intermediate directory (see Chapter 3, Web Installation: Unpacking the Download File). You can keep the contents of the intermediate directory or the downloaded package, but you do not need to keep both. In most cases, you can delete the contents of the intermediate directory. One exception is if you might change your options chosen during installation.

Registering Your Purchase and Obtaining Product Updates

If you purchased an Intel Visual Fortran CD-ROM package, you need to register your purchase and obtain and activate a new license. This enables you to receive technical support (see Chapter 7), which includes service updates.

If you purchased an Intel Visual Fortran Web download package, you have already registered your Intel Visual Fortran purchase and do not need to obtain and activate a new license. You also automatically are registered to receive technical support (see Chapter 7).

To determine whether any product updates are available, log in to your Intel® Premier technical support account (see Chapter 7).

Copying Compaq* Visual Fortran Project Files

Before you use Intel Visual Fortran in the Microsoft Visual Studio* .NET* development environment, consider making back up copies of any Compaq* Visual Fortran 6 project directories. If you open project workspaces (such as .DSW files) for applications created with Compaq Visual Fortran 6 within the Microsoft Visual Studio .NET development environment, you will be asked whether you want to convert the project workspace into the Microsoft Visual C++ .NET format, which allows use with Intel Visual Fortran. Compaq Visual Fortran cannot read project workspace files that have been converted into the Microsoft Visual C++ .NET format. For more information, see the *Intel® Visual Fortran Compiler for Windows* Systems User's Guide*.

Redistributing Intel Visual Fortran and Intel Array Visualizer Files

For information on redistributing your applications, see the *Fredist.txt* file, which is located in the ...\Compiler80\docs directory of the location specified during the installation.

Increasing the Stack Size for Programs That Use Large Data Arrays

Certain programs use large amounts of data. In particular, with those programs that use large allocatable arrays (dynamically allocated at run time) or use OpenMP* or related parallel processing, certain tasks must be performed to provide enough stack space for the program to run.

Many kinds of variables and expressions can be allocated on the stack. If you are using array intrinsics or expressions, these can use large amounts of stack-allocated temporary storage (temporaries), even if the original variable is static or dynamically allocated.

The default stack size is about 1 MB. You can increase this by specifying the linker option /stack:*nnnnn*, where *n* is the number of bytes (in decimal) you want for the stack. This linker option can be specified when you link the executable, either on the command line by specifying the /stack:*nnnnn* linker option, or in the Visual Studio .NET environment by using the Linker properties, System category, Stack Reserve Size.

To change the stack size of an already-linked executable, use the EDITBIN command, /stack:*nnnnn* option.

Checking for and Removing Old Environment Variable Definitions

Intel Visual Fortran modifies certain system-wide environment variables. You may need to remove the system-wide environment variables after you remove Intel Visual Fortran.

On Windows 2000 or Windows XP systems:

1. Log into an account with Administrator privilege.
2. Open the Control panel (**Start > Settings> Control panel**).
3. Click the System icon.
4. Click the Advanced tab, and then click the Environment Variables button.
5. View the displayed environment variables.
6. Make the necessary changes.
7. To have the environment variable changes take effect immediately, click Apply.
8. Click OK (to allow changes to be made) or Cancel (to not allow changes to be made.

For example, in the System Variables tab, check the definitions of the PATH variable, which is used by Intel Visual Fortran and other products:

- Double-click the PATH variable.
- Near the bottom of the window, the variable PATH and its full definition appear.
- Check the device and directory definitions of the PATH variable. If an older directory path exists, remove it. Directory path names are delimited by semicolons (;) and the last path name might contain %SystemRoot%.
- Check the INCLUDE and LIB variables (used by Intel Visual Fortran and other program development products).
- Check for the environment variable INTEL_LICENSE_FILE. If no other Intel software products are installed, this variable does not need to be defined.

5 Using Intel® Visual Fortran

Overview

On IA-32 systems, you can use Intel® Visual Fortran from the command line or from the Microsoft Visual Studio* .NET* development environment.

On Itanium®-based systems, use the command line.

Using the Command Line

To create applications from the command line for IA-32 systems:

- Use the Intel Visual Fortran command prompt, which has the appropriate environment variables already set for the command-line environment. In the Intel Visual Fortran program folder, select:
  ```
  Build Environment for Fortran IA-32 applications
  ```
- Use the `ifort` command, either directly on a command line or in a makefile, to invoke the Intel Visual Fortran compiler to create 32-bit applications for IA-32 systems.
- Refer to the *Intel® Visual Fortran Compiler User's Guide* for information on compiler options, customizing the compilation environment, using the `nmake` command to process makefiles, using optimizations for optimal run-time performance, and other compiler features.
- If multiple versions of the Microsoft visual development environment were available when Intel Visual Fortran was installed, the user specified which environment would be used for Intel Visual Fortran compiler command-line use, in reply to the Multiple Development Environments dialog box (see Setup Type Dialog: Choose a Typical or Custom Installation). Intel Visual Fortran command-line use is limited to only one of these visual development environments.

To create applications from the command line for Itanium-based systems:

- Use the Intel Visual Fortran command prompt, which has the appropriate environment variables already set for the command-line environment. In the Intel Visual Fortran program folder, select:
  ```
  Build Environment for Fortran Itanium®-based
  Applications
  ```
- Use the ifort command, either directly on a command line or in a makefile, to invoke the Intel Visual Fortran compiler to create applications for Itanium-based systems.
- Refer to the *Intel® Visual Fortran Compiler for Windows* Systems User's Guide* for information on compiler options, customizing the compilation environment, using optimizations for optimal run-time performance, and other compiler features.

If you selected the installation option to be able to create applications for Itanium-based systems on an IA-32 system, see <u>Copy Files Needed to Run Itanium-based Applications Created on an IA-32 System</u> before using the `ifort` command.

For example, assume you have used a text editor (such as Notepad) to create a small program that displays the text `Hello World!` on the screen, such as the following:

```
PROGRAM HELLO
   INTEGER I
   DO I=1,3
      WRITE (*,*) 'Hello World!'
   END DO
END PROGRAM
```

To compile and link the source file `hello.f90` for debugging on an Itanium-based system, type:

```
prompt> ifort /Zi /Od hello.f90
```

This creates the file `hello.exe` with symbol table debug information as well as hello.obj. If you are using an IA-32 system to create Itanium-based applications, copy the file `hello.exe` to the Itanium-based system before running the file. To run this file, type hello.exe:

```
prompt> hello.exe
Hello World!
Hello World!
Hello World!
```

To compile a source file for higher optimization, omit the `/Zi` and `/Od` options and use the appropriate optimization options. For example, to compile `calculate.f90` with highest optimization for an Itanium® 2 processor system, type:

```
prompt> ifort /O3 /G2 calculate.f90
```

If your application contains newly created or ported source code, you can request source (compile-time) diagnostic warning messages by specifying the `/warn` option. For example, to compile and link the source file `hello.f90` for debugging with all possible diagnostic message checking, type:

```
prompt> ifort /Zi /Od /warn:all hello.f90
```

Refer to the *Intel® Visual Fortran Option Quick Reference Guide* for a summary of compiler options, including a list of new options and an alphabetic list of options. Refer to the *Intel® Visual Fortran Compiler for Windows* Systems User's Guide* for detailed information on compiler options, customizing the compilation environment, using the `nmake` command to process makefiles, using optimizations for optimal run-time

performance, and other compiler features. For more information on Intel Visual Fortran documentation, see Chapter 6.

The Intel Fortran Compiler 8.1 can coexist on the same system with the Compaq* Visual Fortran 6.*x* product. If you use the command line tools from any of these products, please make sure that the PATH, LIB, and INCLUDE environment variables are set up correctly for the product you are using. You can apply the Intel Fortran `ifortvars.bat` file from the …`\compiler80\ia32\bin` directory to set the environment to build IA-32 executables or apply the `ifortvars.bat` from the …`\compiler80\Itanium\bin` directory to build Itanium-based executables. To use Compaq Visual Fortran from the command line, you can select "Fortran command prompt" from the Compaq Visual Fortran program folder. To use Intel Visual Fortran from the command line, you can similarly select the appropriate Intel Visual Fortran compiler from the Intel Visual Fortran program folder.

Using the Microsoft Visual Studio* .NET* Development Environment

You can use Intel Visual Fortran within the Microsoft Visual Studio .NET development environment to develop Fortran applications, including static library (.LIB), dynamic link library (.DLL), and main executable (.EXE) applications.

When using the Microsoft Visual Studio .NET development environment, you can only build applications for IA-32 Windows* systems.

Although Intel Visual Fortran Compiler 8.1 also supports Microsoft Visual Studio .NET 2003, examples in this section show the screens associated with Visual Studio .NET 2002. Visual Studio.NET 2003 and Visual Studio .NET 2002 can co-exist on the same system.

> **Caution:** If you open an existing solution in Visual Studio .NET 2003 and convert it to the new environment, you can no longer open that solution with Visual Studio .NET 2002. If you need to use your solutions in the Visual Studio .NET 2002 environment on the same or a different system, you should make backup copies of your solution directories before opening the project(s) with Visual Studio .NET 2003.

Mixed-Language Programming and Intel Visual Fortran Project Types

This version of Intel Visual Fortran produces only unmanaged code, which is architecture-specific code. You cannot create an Intel Visual Fortran main program that directly calls a subprogram implementing managed code. To call managed code, you can call an unmanaged code subprogram in a different language that does support calling managed code.

When using the Microsoft Visual Studio .NET development environment, Intel Visual Fortran supports the following project types:

- Console applications: the Intel Visual Fortran main program supports character cell output in a terminal-like window.
- QuickWin applications: the Intel Visual Fortran main program supports certain graphical output.
- Windows applications: the Intel Visual Fortran main program supports Win32 application programming.
- Static library applications: the .LIB file is used as a subprogram to another main program.
- Dynamic link library applications: the .DLL file (and its import library) is used as a subprogram to another main program.

For more information about Intel Visual Fortran project types, see <u>Understanding Intel Visual Fortran Project Types</u>.

An Intel Visual Fortran program can be a main program and call Intel Visual Fortran subprograms, including Intel Visual Fortran static and Intel Visual Fortran dynamic link libraries.

Similarly, Intel Visual Fortran can be called by Intel C++ main programs and can call Intel C++ subprograms, if the appropriate calling conventions are used (see the *Intel® Visual Fortran Compiler for Windows* Systems User's Guide)*.

Depending upon the language used, you can use Intel Visual Fortran dynamic link libraries or Intel Visual Fortran static libraries as subprograms in certain mixed-language applications (see the *Intel® Visual Fortran Compiler for Windows* Systems User's Guide)*.

For information about converting Compaq* Visual Fortran mixed-language applications to the Microsoft Visual C++.NET environment, see <u>Understanding Compatibility with Compaq* Visual Fortran</u>.

Understanding Solutions and Projects

The Microsoft Visual Studio* .NET* development environment consists of one or more projects contained within a *solution*. For example, if you have several Fortran applications that do different calculations but are related to the same research application you are working on, you can store all the individual projects in a single solution.

If you are familiar with Microsoft Visual C++ 6 or with Compaq Visual Fortran, instead of opening a *project workspace file* (.dsw or .dsp) to access an existing project(s), you open a *solution file* (.sln) in the Microsoft Visual Studio .NET development environment.

How to Start and Exit the Microsoft Visual Studio .NET Environment

From the Microsoft Visual Studio .NET program folder, click Microsoft Visual Studio .NET:

1. From the **Start** menu, click **Programs**, then **Microsoft Visual Studio .NET**
2. Click **Microsoft Visual Studio.NET**

The Microsoft development environment window appears.

To exit, close all open solutions and files, and then click **Exit** from the **File** menu.

Visual Development Environment Windows

After you start the Microsoft Visual Studio .NET environment, a window similar to the following appears:
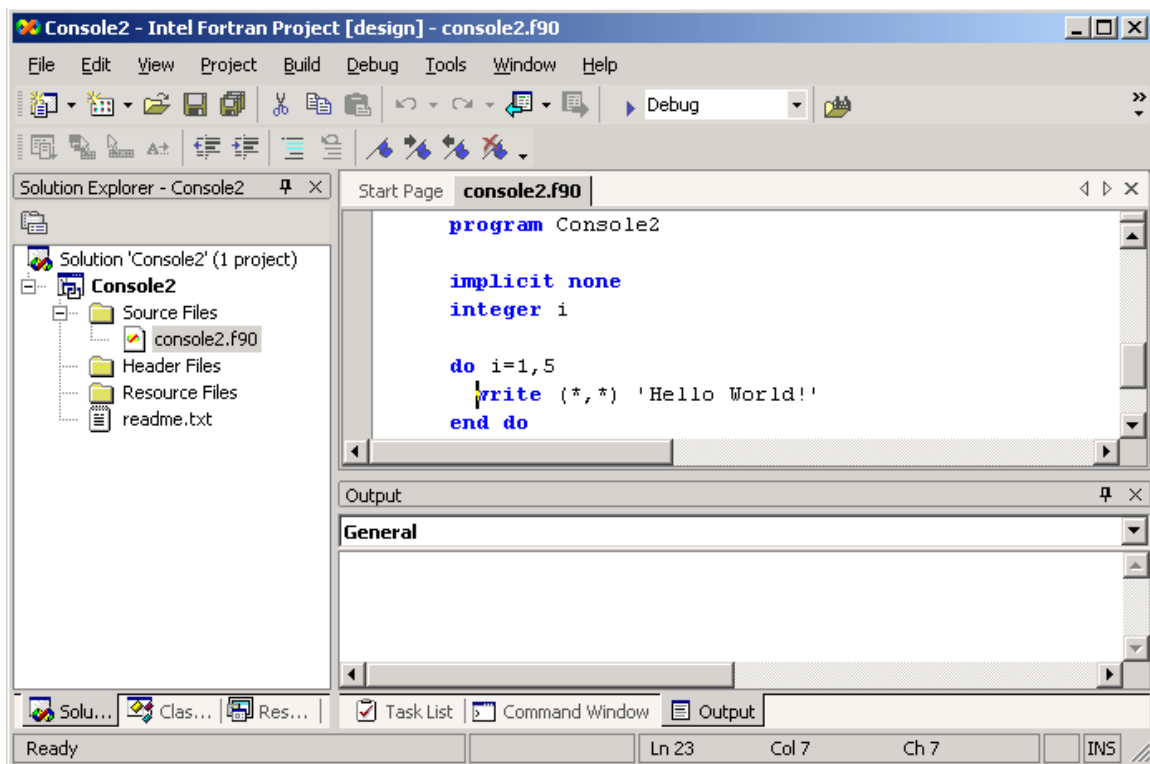
This screen shows that the Solution named Console2, the Project named Console2, and the source file `Console2.f90` have been opened. The right pane shows the file `Console2.f90` opened in the default language-sensitive visual development environment text editor, which uses different colors to identify the following:

- Source comments (green)
- Fortran standard language elements (blue)
- Other language text (black)

The left pane shows the Solution Explorer window, which lets you view different aspects of your solution, such as the source files in your solution. The tabs displayed with the Solution Explorer window vary depending upon the products installed. Intel Visual Fortran only uses the Solution tab. To display the Solution Explorer window, in the **View** menu, click **Solution Explorer (View > Solution Explorer)**.

To edit a file listed in the Solution pane, either double-click its file name or click **File** > **Open**.

The bottom of the right pane shown above also shows the output window, where compilation and linker messages are displayed. The tabs displayed with the Output window vary depending upon attributes associated with the current Solution and the windows you have elected to display. This bottom-right pane also has tabs for a Task list and a Command Window. The Output window displays build output, such as compiler and linker messages. To display the Output window, click: **View** > **Other Windows > Output**.

The appearance of windows in the visual development environment also depends upon the preferences that may have been chosen from the "My Profile" option on the start page. To display the start page, click **Help > Show Start Page**. Click the My Profile link in the left pane. In most cases, specifying the profile of a Visual C++ developer is preferred for Intel Visual Fortran users. You can customize your window layout in the Visual Studio .NET environment (see the section "Arranging Windows" in the Microsoft Visual Studio .NET documentation).

Understanding Intel Visual Fortran Project Types

Development is organized into *projects* consisting of the source files required to build an application. To set up a project, you need to define the project and set options for it. Then, using the source files, you can build the binary executable or library file. The output of building the application becomes part of the project. A project is stored in a project folder on your hard drive.

Intel Visual Fortran projects can be a main program, or they can be a subprogram in the form of a static or dynamic link library.

If the Intel Visual Fortran project is a main program, it must be one of the following *project types*:

- Console application. When you run a Fortran Console application, it displays a single character-cell terminal window. The programming

complexity for a Console application is simple, since the output resembles character-cell applications (no graphics).

- QuickWin application. When you run a Fortran QuickWin application, it displays as multiple windows with graphics such as menus, charts, and icons. Programming complexity ranges from simple to moderate, depending on the graphics and user interaction used.
- Windows application. A Windows application provides full access to the Win32* APIs, giving you a larger (and different) set of functions to work with than QuickWin projects. The programming complexity for Windows applications is typically more complex than with Console or QuickWin applications.

If your Intel Visual Fortran project is a subprogram that is linked into a main program written in Intel Visual Fortran, Intel C++, or one of the other supported Visual Studio .NET languages, it must be one of the following project types:

- Static Library application. A *static library* (file extension .LIB) is a set of routines that are loaded into your application at link time.
- Dynamic-Link Library (DLL) application. A DLL (file extension .DLL) is a set of routines that are loaded into your application at run time.

You need to create a separate project for each binary executable or library file to be created. A single solution can contain multiple projects, such as an Intel Visual Fortran Console main program and an Intel Visual Fortran Static library.

How to Create a New Project

You can create a new Intel Visual Fortran project by choosing one of the Fortran project types. To create a new project click **File** > **New** > **Project**. A window resembling the following appears:
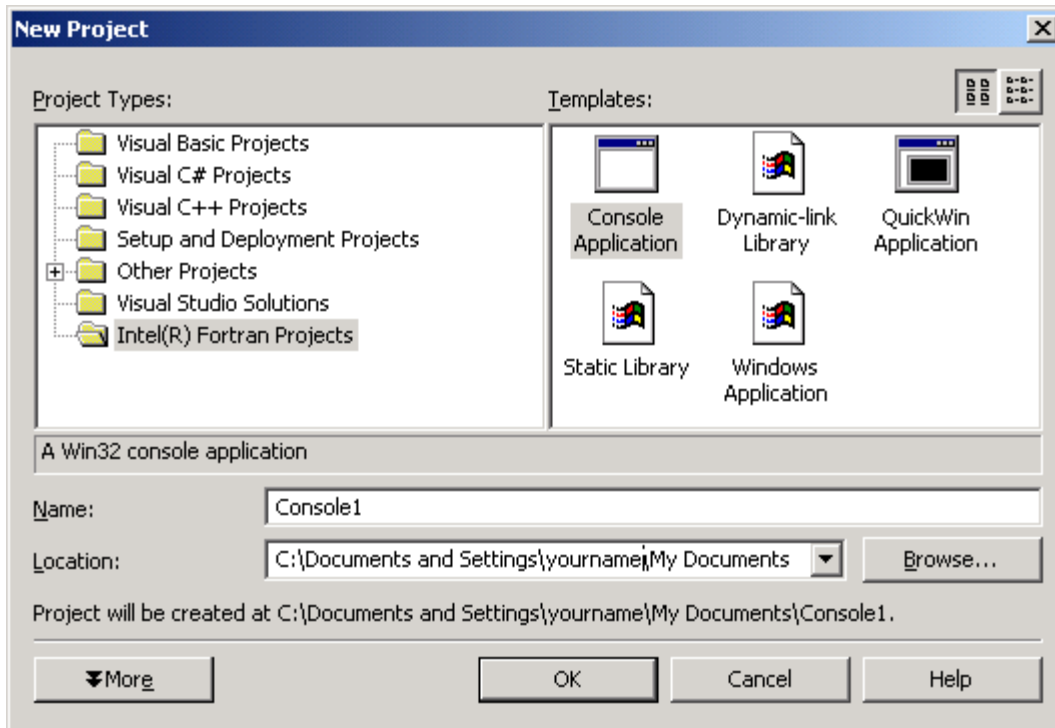
To create an Intel Visual Fortran project, do the following:

1. Click Intel® Fortran Projects in the left pane (as shown above) to display the Intel Visual Fortran project types.
2. Click the appropriate project type.
3. Accept or specify a project name (shown above as `Console1`).
4. Accept or specify the Location for the project directory.
5. Click the `OK` button. To assist you with project creation, Intel Visual Fortran provides an Application Wizard.

An Application Wizard window appears for the selected project type. For Console, Dynamic Link Library, Static Library, and Windows application projects, the Application Wizard window lets you select options for creating the project. For example, when you create a Console project, click `Application Settings` in the left margin to display the Application Wizard options.

Once you click the OK button, the project and its files appear in the Solution Explorer window. Some typical tasks you can perform include:

- Close a solution: click: **File** > **Close Solution**
- Open a solution, click one of:
    - **File > Recent Projects** > *solution-name*
    - **File > Open Solution**
- Open a file in the text editor, use one of:
    - Double-click the file name in Solution Explorer

o   Click **File** > **Open** > **File (**for files not in a project)
- Create a new file and add it to the project: click **Project** > **Add New Item**
- Add an existing file to the project: click **Project** > **Add Existing Item**
- Build the entire solution: click **Build** > **Build Solution**
- Build the project: click **Build** > *project-name*
- Rebuild the entire solution: click **Build** > **Rebuild Solution**
- Rebuild the project: click **Build** > **Rebuild** *project-name*

Other tasks include:

- Insert a debugger breakpoint: Either click in the left margin of the text editor window or use the Breakpoints tab
- Display or hide the Breakpoints tab: click **Debug** > **Windows** > **Breakpoints**
- Start the debugger: click **Debug** > **Start**
- Stop the debugger: click **Debug > Stop Debugging**

How to Set Configuration Options

You can set the compilation and related options for the current configuration by doing the following:

- Select the project name in the Solution Explorer (the project name Console1 in the sample screen below).
- As shown in the sample window below, right-click the project name and select Properties from the pop-up menu. Alternatively, select the project name and in the **Project** menu, click **Properties.**

Intel Visual Fortran also lets you specify compiler options for individual source files. Select the file name and click **View** > **Property Pages**.
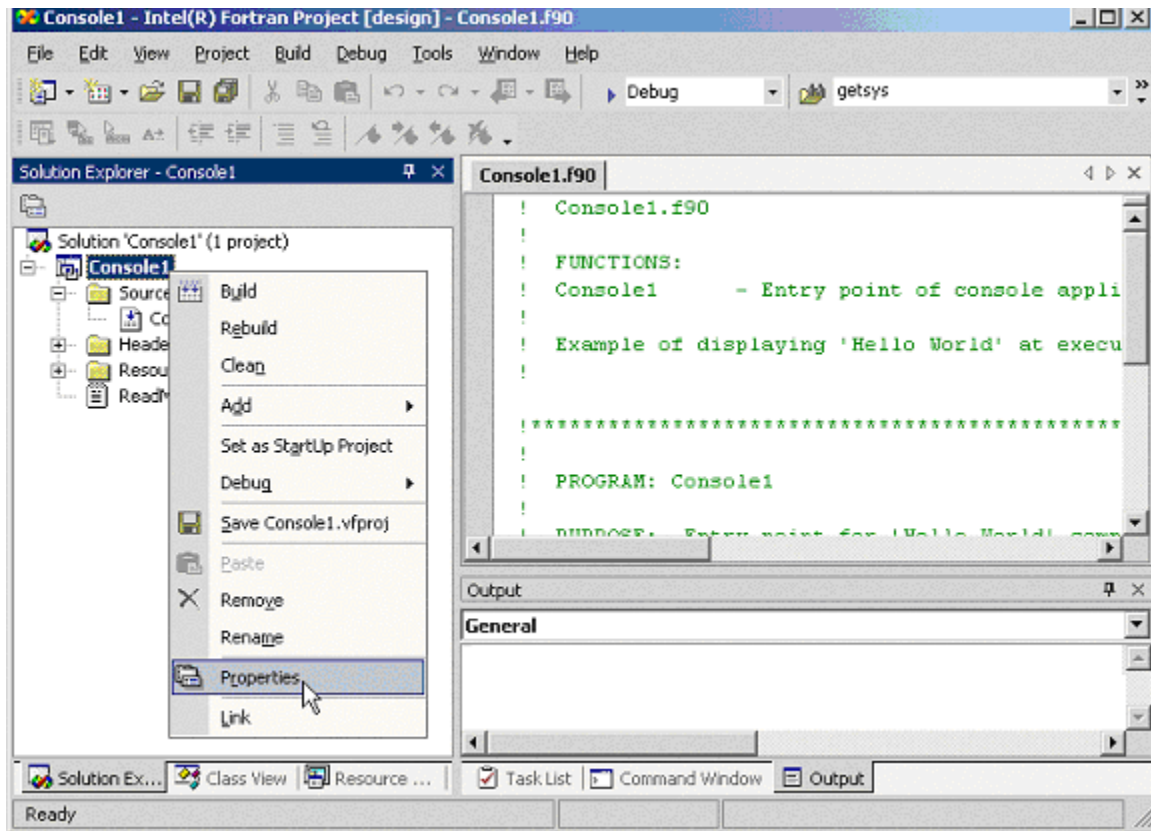
To display the Fortran compiler option categories, click the Fortran folder in the left pane. The following sample screen shows the compiler options in the General category in the right pane. The selected option within the General category is Suppress Startup Banner (value is Yes). Help for this option appears in the bottom of the pane, including the command-line name of the compiler option, which in this case is /nologo.
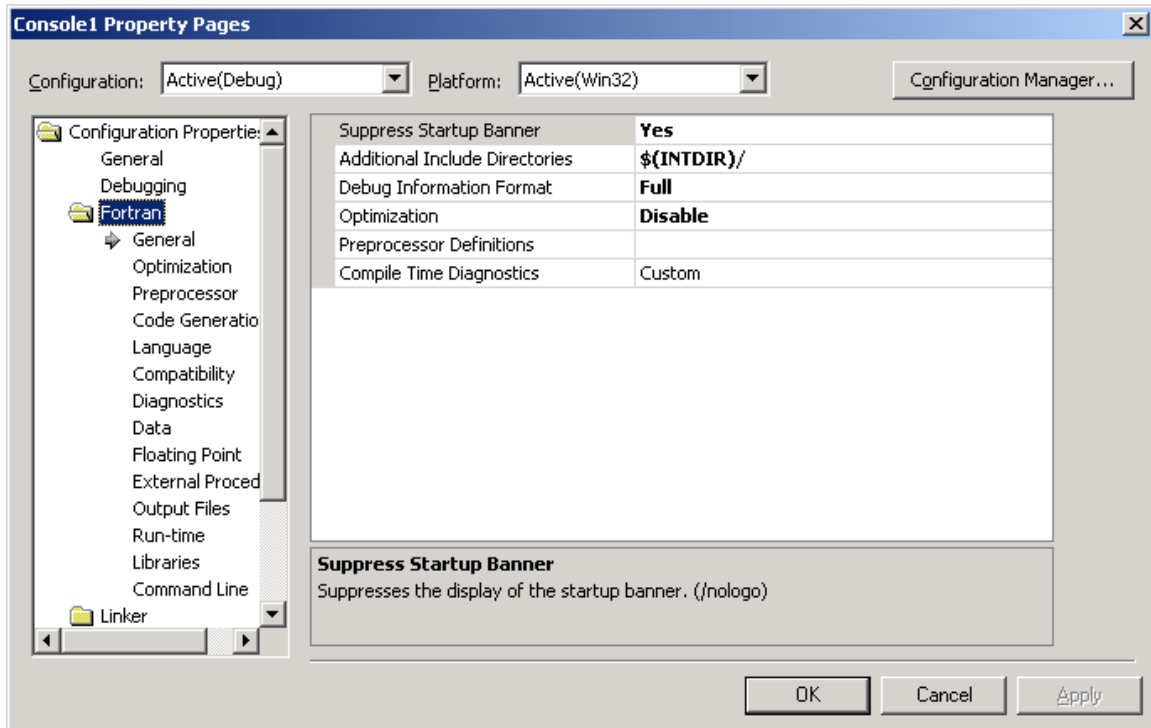
To change the setting for a compiler option, click the option's line to display a button near the end (right) of the line. For example, in the sample window above, the pointer is positioned near the down arrow for a drop-down list for the Suppress Startup Banner option. Click the button at the right of an option line (as shown above) to display the available selections or display a dialog box.

To change the configuration (such as from Debug to Release), click the `Configuration Manager` button in the upper-right of this window.

Some of the Intel Visual Fortran compiler options appear in multiple categories.

Options not listed in one of the categories can be typed into the Command Line category window under `Additional Options` box. For a description of these options, see the *Intel® Visual Fortran Compiler for Windows* Systems User's Guide*.

Using Debuggers

To debug applications created for IA-32 systems, most users prefer to use the integrated Microsoft Studio .NET* debugger. Users who are very familiar with the Intel® Debugger (idb) or who only use the command line can use the Intel Debugger.

To debug applications created for Itanium-based systems, use the Intel Debugger.

The program should be compiled with the /Zi and /Od options or by selecting a Debug configuration in the visual development environment. The /Od option disables most

optimizations, which often makes debugging easier. For cases where a problem does not occur or cannot be isolated with the /Od option, specify the /Zi option with a higher optimization level (such as /O1 or /O2) instead of /Od.

Using the Microsoft Visual Studio* .NET* Debugger

To debug applications created for IA-32 Windows* systems, you can use either the Intel Debugger or, if the application was created using the Microsoft Visual Studio .NET development environment, you can use the Microsoft Visual Studio .NET debugger.

Before you debug an application, open its Solution from the **File** menu **(File > Open Solution)**.

Build the project by clicking **Build** or **Rebuild** from the **Build** menu. If compilation or linker diagnostic messages appear in the Output window indicating source-related errors, fix the cause of the problem and rebuild the application until it builds successfully. To go to the source code associated with a diagnostic message in the Output window, double-click the line associated with the message in the Output window (or click the line with the message and press the F4 key).

To set breakpoints and control program execution:

- To set a breakpoint, click in the left margin next to the source where you want to set or remove a breakpoint. A filled-in red circle appears.
- To start the debugger, click **Start** in the **Debug** menu. The program executes and stops at the first breakpoint.
- You can Step Over the current statement (**Step Over** item in the **Debug** menu, or click the Step Over button on the Debug toolbar).
- You can Step Into a routine or Step Out of a routine using the **Debug** menu or the Debug toolbar.

To control the appearance of the debugger-related panes, in the **Debug** menu, click **Windows** and select the appropriate window, such as **Breakpoints**. For example, the Breakpoints window (appears as a tab near the Output window by default) allows you to disable or enable a breakpoint.

To restart execution of the application being debugged, click **Restart** in the **Debug** menu.

To stop debugging, click **Stop Debugging** in the **Debug** menu.

For more information about using the Visual Studio .NET* debugger, see the debugging section in the *Intel® Fortran Compiler for Windows Systems User's Guide*.

Using the Intel Debugger (idb)

To start the Intel® Debugger and load a program for debugging:

1. In the Intel® Software Development Tools program folder, click **Intel® Debugger 8.1 > Intel Debugger**.
2. On the command line, type the command `idb` and the name of the executable program to be debugged.

For more information, please refer to the online manual for the Intel Debugger or the debugging section in the *Intel® Fortran Compiler for Windows Systems User's Guide*.

To exit your program, type the `exit` command.

Using the Intel® Array Visualizer

The Intel® Array Visualizer allows you to display and graph array data. Application programs can use the following methods to control the displayed graphs and data grid:

- Library API routines
- ActiveX* controls
- Object model properties, methods, and events

The Intel Array Visualizer library routines allow Fortran and C++ applications to access a subset of the extensive object model by using traditional library routine API interfaces that are easier to use than ActiveX controls or object model interfaces.

The Intel Array Visualizer object model is a set of reusable objects that provide access to Intel Array Visualizer features and functionality. The COM interface supports an extensive object model that provides methods, properties, and events that can be accessed from any language that supports COM objects, including Microsoft Visual Basic*, Microsoft Visual Basic* .NET, Microsoft Visual C++, Microsoft Visual C++ .NET, Microsoft Visual C#* .NET, Intel C++, and Intel Visual Fortran.

Applications can also save their array data in the form of a graphics file, which can be read later by the Intel Array Viewer. When you install the Intel Array Visualizer, you also install its viewer, Intel Array Viewer.

The Intel Array Viewer lets you interactively display data grids as well as various types of graphical plots. Depending upon the data file selected, different attributes of the file will appear in the left pane.

If you accepted the default directory during installation, the sample graphics data files are installed in:

```
C:\Program Files\Intel\Fortran\Array Visualizer\data
```

The following figure shows the Intel Array Viewer displaying an image plot of one of the sample data files (file `sinxy.hdf`).
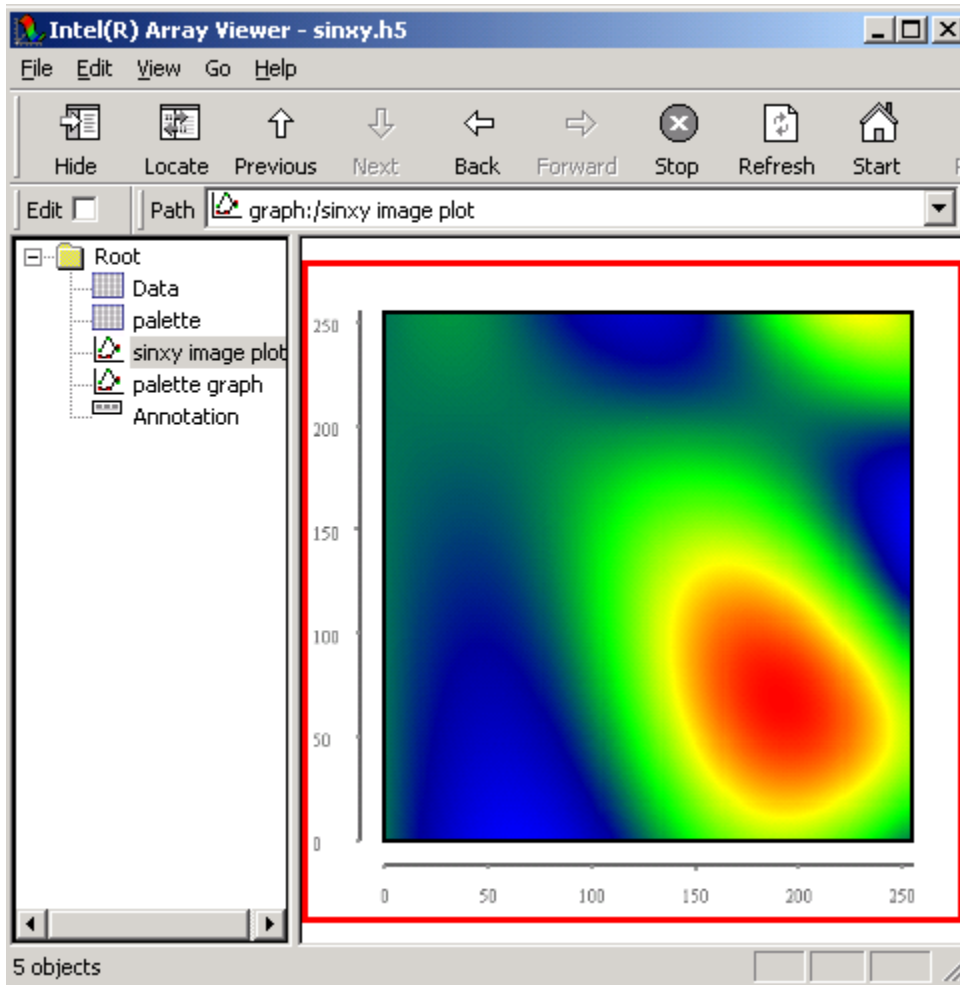
Support for COM and Automation Objects: Fortran Module Wizard

Intel® Visual Fortran provides a wizard to simplify the use of Component Object Model (COM) and Automation (formerly called OLE Automation) objects. The Intel Visual Fortran Module Wizard generates Fortran modules that simplify calling COM and Automation services from Fortran programs. This Fortran code lets you invoke methods of an Automation object and member functions of a Component Object Model (COM) object.

To run the Intel Visual Fortran Module Wizard, select **Intel® Fortran Module Wizard** from the **Tools** menu in the Visual Studio.NET IDE. For more information about using the Intel Visual Fortran Module Wizard, see the section about the Fortran Module Wizard in the *Intel® Visual Fortran Compiler for Windows* Systems User's Guide, Volume I*.

Understanding Compatibility with Compaq* Visual Fortran

Intel Visual Fortran provides source compatibility with Compaq* Visual Fortran 6.6 and similarly provides a highly optimizing compiler that supports standard Fortran 95 and a common set of language extensions. Intel Visual Fortran supports most of the Compaq Visual Fortran command-line options as well as support for:

- Fortran project types.
- Module files for Windows API interfaces.
- Attributes to simplify calling C/C++ routines.

Some of the major differences include:

- Intel Visual Fortran supports integration with Microsoft Visual Studio* .NET* (including Microsoft Visual C++ .NET), whereas Compaq Visual Fortran supports integration with Microsoft Visual Studio 98 (including Microsoft Visual C++ 6).
- For command-line use, Intel Visual Fortran uses the `ifort` command and Compaq Visual Fortran supports the `DF` command.
- Microsoft Visual Studio.NET does not support mixing Fortran and C++ source files in the same project. Instead, Fortran source files are placed in one project and the C++ source files are placed in another project. One of the projects is a static library project that is linked with the other project. If you open a Compaq* Visual Fortran project that contains mixed C++ and Fortran source code, the Intel Visual Fortran project converter converts this project into two projects: a C++ project and a separate Fortran project (see the User's Guide, Volume I for details on project conversion).
- The names of the module interface definition files differ. For example, Compaq Visual Fortran required a USE DFLIB statement for certain routines; with Intel Visual Fortran, the USE statement might be USE IFCORE or a similar name. For compatibility with existing sources, Intel Visual Fortran includes additional modules with the same names as most of those provided by Compaq Visual Fortran. These additional modules invoke the new Intel Visual Fortran modules. For faster compilation and future compatibility, Intel recommends converting to the new names.
- The Intel Array Visualizer has a different program interface based primarily on a comprehensive object model and a different tree-based user interface.

For information about converting Compaq Visual Fortran 6 project directories, see Copying Compaq* Visual Fortran Project Files and the *Intel® Visual Fortran Compiler for Windows* Systems User's Guide*.

For more complete information about compatibility with Compaq Visual Fortran, see the *Intel® Visual Fortran Compiler for Windows* Systems User's Guide*.

Intel Fortran Language

The Intel Fortran is shared by Intel Visual Fortran for Windows* Systems and Intel Fortran for Linux* Systems. The Intel Fortran language is fully compliant with the

ISO/IEC 1539:1995 Fortran standard, usually referred to as "the Fortran 95 Standard" or as "Fortran 95". Intel Fortran also includes a number of extensions to the Fortran 95 Standard, as well as command-line options that allow you to override the default actions of the compiler. The Intel Visual Fortran compiler provides source compatibility with Compaq Visual Fortran.

The Intel Visual Fortran compiler allows you to obtain outstanding performance from all Intel 32-bit processors, including the Intel Pentium® 4, Intel® Xeon™, Intel® Pentium® M processors, and the Intel Itanium® processors. Through the use of unique compiler optimizations, such as support for Streaming SIMD Extensions 2 (SSE2) in the Intel Pentium 4 processors and software pipelining in Intel Itanium processors, the Intel Visual Fortran compiler can deliver strong performance improvements. Using features such as Interprocedural Optimization and Profile-Guided Optimization can further improve application performance.

For more information, refer to the Intel Visual Fortran documentation (see <u>Chapter 6</u>).

Using the IMSL* Libraries

The Intel® Visual Fortran Compiler 8.1, Professional Edition, for Windows* includes the IMSL* Libraries, which is a collection of nearly 1,000 mathematical and statistical functions easily accessible from the visual and command line development environments. The IMSL* Libraries are provided in both static library and dynamic-link library (DLL) forms, each available in a single-processor and multiprocessor-enabled version.

The following table lists the IMSL* Libraries included in the Professional Edition of Intel Visual Fortran compiler.

File Name	Library Description
IMSL	IMSL* static library, contains FORTRAN 77 and Fortran 90 routines
IMSL_ERR	IMSL* error handler library
IMSLMPISTUB	Stub library for MPI routines used in IMSL*

You can find detailed information about working with the IMSL* Libraries in the Using the IMSL* Mathematical and Statistical Libraries topic of the *Intel® Visual Fortran Compiler for Windows* Systems User's Guide, Volume I: Building Application.* Additionally, you can view the IMSL* `readme` file and online help using the IMSL* Fortran Library 5.0 program folder. The online documentation included with the IMSL* Libraries includes text files and PDF files; the documentation includes all of the information you will need to understand and use the IMSL* Libraries.

Interface Definitions for Library Routines

Intel Visual Fortran provides interface definitions to certain external routines, including Intel Visual Fortran library routines, Intel Array Visualizer library routines, and certain Win32 routines.

Please refer to the beginning of the appropriate chapter in the *Intel® Fortran Libraries Reference* for interface blocks or USE statements needed for certain groups of library routines. For example, to call certain Portability routines, add the statement line USE IFPORT, which reads the precompiled `ifport.mod` file in the `...\INCLUDE` directory.

For information on calling Win32* routines (IA-32 systems only) using the Intel Visual Fortran interface definitions, see the *Intel® Visual Fortran Compiler User's Guide*.

For information about calling the Intel Array Visualizer routines, refer to the Intel Array Visualizer online documentation.

6 Documentation Road Map

Intel® Visual Fortran and Intel® Array Visualizer provide online documentation in multiple formats:

- Microsoft HTML Help CHM format
- Adobe Acrobat* PDF format
- HTML or HTML-based files

Accessing the Intel® Visual Fortran Documentation Index

To access the Intel® Visual Fortran documentation, open the Intel Visual Fortran documentation index in the Intel Visual Fortran program folder. To display the Intel Visual Fortran program folder:

Start > Programs > Intel® Software Development Tools > Intel® Fortran Compiler

Alternatively, you can open the file `fcompindex.htm` (in the **File** menu, click **Open**, click the `Browse` or `Choose File` button). The `fcompindex.htm` file is located in the CD-ROM root directory and is installed in the Intel Visual Fortran `...\Compiler80\Docs` directory.

Intel Visual Fortran Documentation in HTML Help Viewer Format

The *Intel® Visual Fortran online help* consists of the following documentation:

- The *Intel® Visual Fortran Compiler for Windows* Systems User's Guide, Volume I: Building Applications* describes the Intel Visual Fortran compiler, including the `ifort` command, and the various compiler options for IA-32 and Itanium®-based systems. It contains sections that describe new features for this release, using the command line environment, using the IDE environment, customizing the compilation environment and process, mixed language programming with C++, understanding libraries, and understanding error messages.
- The *Intel® Visual Fortran Compiler for Windows* Systems User's Guide, Volume II: Optimizing Applications* describes the comprehensive set of features available to optimize applications for optimal run-time performance, including command-line options, vectorization (on IA-32 systems), parallel processing using OpenMP*, timing and profiling applications, coding guidelines, and using optimization-related directives and intrinsic procedures.
- The *Intel® Visual Fortran Compiler for Windows* Systems Options Quick Reference Guide* provides an alphabetical listing of `ifort` command-line options, with links to the sections in the User Guides where the options are

described in more detail. It also includes a list of new options, as well as a list of Compaq Visual Fortran compatibility options.

- The *Intel® Fortran Language Reference* describes the Intel Fortran language and available library routines. This HTML Help document includes the material found in the *Intel® Fortran Language Reference* and the *Intel® Fortran Libraries Reference* PDF files. This topic also includes an A-to-Z summary of all Intel Visual Fortran intrinsics, statements, library routines, and directives. The description of each library routine includes the USE statement needed to include the interface definitions needed to call that routine.

HTML Help files have multiple tabs, including Contents, Index, and Search tabs. Here are some tips related to using the Search tab:

- To locate multiple adjacent words, enclose the words within quotation marks.
- After typing the search string, click the `List Topics` tab to display a list of topics that match the search string.
- You can either double-click one of the topics listed to display its contents, or select the topic and click the `Display` button.
- Buttons in the lower-left area let you select whether to search previous results, match similar words, or search titles only

Intel Visual Fortran Documentation in PDF Format

The *Intel® Fortran Language Reference* describes the Intel Fortran programming language, including intrinsic procedures. This document describes Intel Fortran language elements and visually identifies Intel Fortran extensions to the Fortran 95 standard. This document applies to Intel Visual Fortran for Windows* Systems and Intel Fortran for Linux* Systems. This document is also available in hardcopy printed form.

The *Intel® Fortran Libraries Reference* describes the library procedures in the various Intel Fortran libraries and provides an alphabetic listing of the library routines. This document applies to Intel Visual Fortran for Windows* Systems and Intel Fortran for Linux* Systems.

The *Intel® Visual Fortran Compiler for Windows* Systems Installing and Getting Started* is the guide you are now reading.

*Using the Intel® License Manager for FLEXlm** describes how to install and use the Intel(R) License Manager for FLEXlm* to configure a license server for systems using counted licenses. This document is available from the Intel® License Manager for FLEXlm* program folder.

To read these documents, you must have installed Adobe* Acrobat* Reader (or Adobe* Acrobat*) Version 4 or later.

Intel Visual Fortran Documentation in HTML Format

The *Enhancing Performance with Intel® Compilers* provides an interactive HTML-based tutorial on using compiler options that help you optimize your application for IA-32 and Itanium-based systems. To view this tutorial, select Tutorial from the Intel Visual Fortran Compiler program folder. You can also display this tutorial by selecting the link for Compiler Performance Tutorial from the Documentation index (see <u>Understanding the Intel® Visual Fortran and Intel Debugger Program Folders</u>).

The *release notes* for Intel Visual Fortran describe the latest information about the Intel Visual Fortran compiler. To view the release notes, select Release notes from the Intel® Visual Fortran Compiler program folder.

Accessing the Intel Array Visualizer Documentation Index

To access the Intel Array Visualizer documentation, open the Intel Array Visualizer documentation index in the Intel Array Visualizer program folder. To display the Intel Array Visualizer program folder, click:

Start > Programs > Intel® Software Development Tools > Intel® Array Visualizer

Alternatively, you can open the file `avindex.htm` (in the **File** menu of a Web browser, click **Open**, then click the `Browse` or `Choose File` button). The `avindex.htm` file is located in the CD-ROM root and is installed in the …`\Array Visualizer\Docs` directory.

Intel Array Visualizer Documentation in HTML Help Viewer Format

Intel Array Visualizer documentation in online HTML Help format includes the Intel Array Visualizer online reference documentation and the Intel Array Viewer online documentation.

The Intel Array Visualizer online documentation provides detailed information for the software developer about the Intel Array Visualizer:

- Object model, including methods, properties, and events.
- ActiveX* controls.
- Library routines.

The Intel® Array Viewer online documentation provides information about the Intel Array Viewer user interface. To view the Intel Array Viewer online documentation, click **Help Topics** in the Intel Array Viewer **Help** menu.

Intel Array Visualizer Documentation in HTML Format

The *release notes* for Intel Array Visualizer describe the latest information about Intel Array Visualizer software. To view the Intel Array Visualizer release notes, select Release notes from the Intel Array Visualizer documentation index.

Printed Documentation

In addition to the online PDF file, the *Intel® Fortran Language Reference* is available in printed (hardcopy) form. To order this document, contact your reseller or see the Intel Visual Fortran product Web pages at:

http://developer.intel.com/software/products

Other Documentation

To access the Intel® Debugger online documentation (HTML format), open the **Documentation** item from the **Intel® Debugger** program folder.

Other documentation files may be installed, such as the help files for tools. To access the help file for a tool, choose the appropriate item (such as Help Topics) from the tool's **Help** menu.

7 Intel® Visual Fortran Technical Support

Intel® Visual Fortran provides technical support primarily through your Intel® Premier Support account and related web site.

Accessing Your Intel® Premier Support Account

If you purchased an Intel Visual Fortran download package, you are automatically registered and can access your Intel® Premier Support account with the account information you obtained when you purchased the downloaded version of Intel Visual Fortran.

If you purchased the Intel Visual Fortran CD-ROM version, register your purchase and activate your Intel Premier Support account by opening the following internet URL in a Web browser:

http://www.intel.com/software/products/registrationcenter/

In addition to your name and related information, you need to provide the registration key (serial number) supplied with your Intel Visual Fortran CD-ROM package. Remember your username and password for your Intel Premier Support account, so you can obtain product updates and access technical support information. A new license file will be sent to you by email, which you should copy to your license directory (see Activating the License File in Chapter 2).

If you already have access to an Intel Premier Support account, register your new purchase at the Registration Center to obtain a new license file(s) and be eligible for support and updates.

Once you have registered and obtained an Intel Premier Support User name and Password, you can access your Intel Premier Support account using a secure web site at:

https://premier.intel.com/

Your account lets you access timely compiler support information, including top known technical issues, software updates, FAQs, and other information. If you have trouble accessing the Intel Premier Support Web site, you can send email requesting assistance to the following email address: `developer.support@intel.com`. Do not send descriptions of technical issues or other email to this account, since it is not a secure connection.
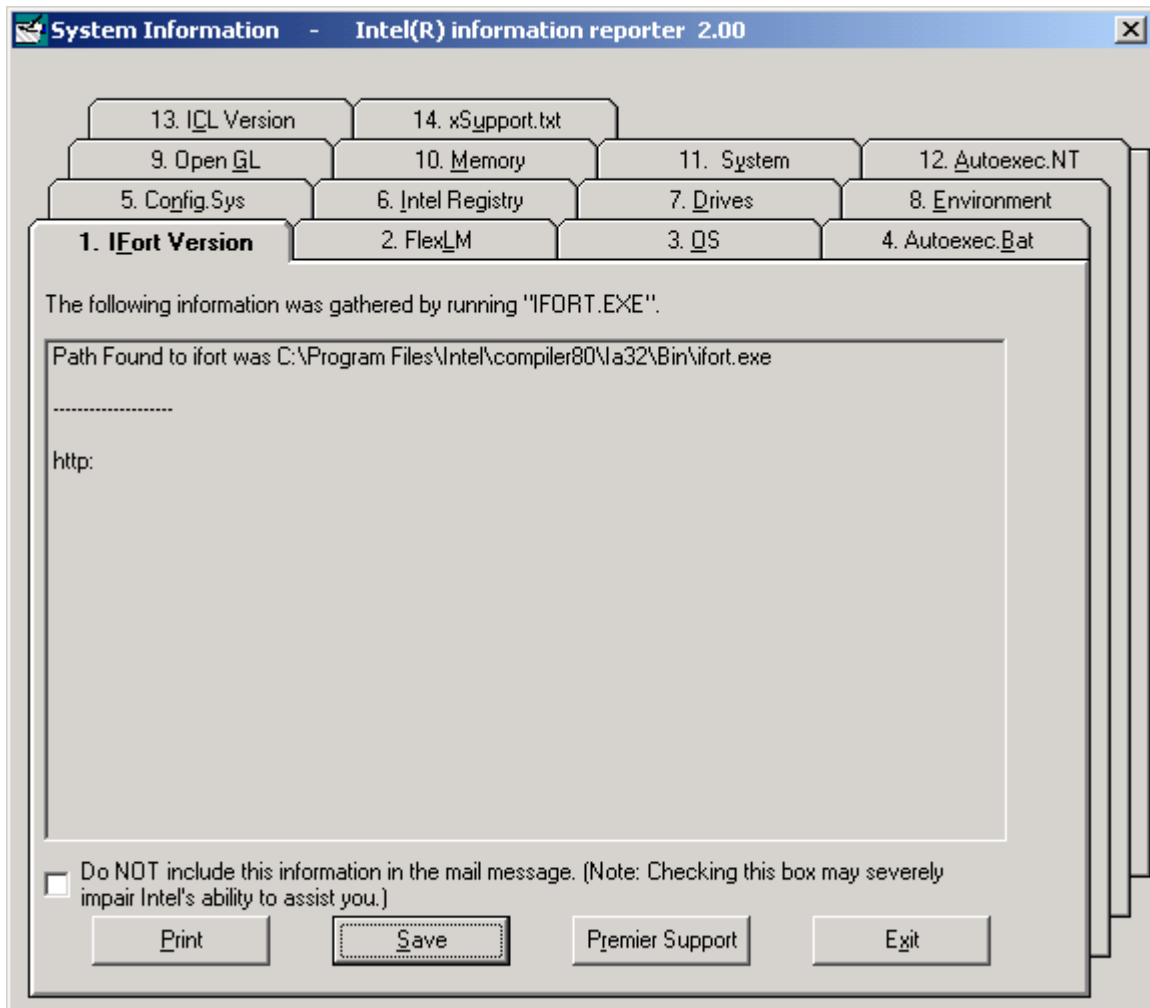
Guidelines for Reporting Problems

Before you report a potential problem, please use the following guidelines:

- Narrow down the problem to a small set of source code that reproduces the problem.
- Provide the exact error message that appears and when it appears.
- Indicate the compiler options used to reproduce the problem and any knowledge about which options are most relevant to the potential problem.
- You can use the Intel information reporter tool to gather system information, save it to a .TXT file for later use. If you need to submit an issue using your Intel Premier Support account, you can attach the saved .TXT file to the issue.
- To obtain the compiler package version, execute the compiler. For example, using the `ifort` command displays the package version.
- Make sure your Intel Premier Support contact information is correct, especially your email address.

Using the Intel® Information Reporter Tool

The Intel® information reporter is a tool installed with Intel Visual Fortran that gathers system data from your Windows* system (such as relevant registry information, environment variables, operating system name and version, and compiler information) and writes it into an ASCII text file that can be attached in an email to Intel Technical Support.

The Intel information reporter tool is installed automatically with Intel Visual Fortran and is an entry in the Intel Visual Fortran Compiler program subfolder. When you click Intel information reporter in the program folder, a screen resembling the following screen appears:

System Information — Intel(R) information reporter 2.00

Tabs:
- 13. ICL Version
- 14. xSupport.txt
- 9. Open GL
- 10. Memory
- 11. System
- 12. Autoexec.NT
- 5. Config.Sys
- 6. Intel Registry
- 7. Drives
- 8. Environment
- 1. IFort Version
- 2. FlexLM
- 3. OS
- 4. Autoexec.Bat

The following information was gathered by running "IFORT.EXE".

Path Found to ifort was C:\Program Files\Intel\compiler80\Ia32\Bin\ifort.exe

----

http:

☐ Do NOT include this information in the mail message. (Note: Checking this box may severely impair Intel's ability to assist you.)

Print   Save   Premier Support   Exit

Although the Intel information reporter tool is primarily used to gather and provide information to Intel Technical Support, you can use this tool to capture information about your system at various times.

Click a tab to view its contents. The buttons at the bottom of the screen let you perform the following functions:

- To print this information to a printer, click the `Print` button. Select the appropriate printer and printer job options.
- To save the captured information to a plain ASCII .TXT file, click the `Save` button. Choose an appropriate directory and file name to save the file. The saved file path and name is also placed in your clipboard.
- To access the Premier Support Web site so you can log in, click the `Premier Support` button.
- To discontinue using the Intel information reporter tool, click the `Exit` button.

If you need to submit an issue using your Intel Premier Support account, you can attach the saved .TXT file to the issue.