Exemplar Fortran V1.2.1 Release Notice

Contents

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Exemplar Fortran V1.2.1 Release Notice

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Release Notice Location

Text and postscript versions of this notice are installed as

- /opt/fortran/newconfig/RelNotes/Fortran.exemplar.1.2.1 (text)
- /opt/fortran/newconfig/RelNotes/Fortran.exemplar.1.2.1.ps

Introduction

This document describes the Exemplar V1.2.1 release of the `f77` Fortran compiler. This version of Hewlett-Packard's Fortran compiler is derived from the 10.30 version of the HP `f77` product. It has been modified to support the Exemplar programming model, allowing for creation, profiling, and debugging of thread-parallel applications on Exemplar S-Class and X-Class systems and Convex SPP1200 and SPP1600 systems.

This document is organized as follows:

- How to run Exemplar Fortran
- Requirements and compatibility
- Installation notes
- New in this release
- Known problems
- Associated documents
- Getting assistance

Whenever you encounter a new problem with this product, please report it to the Hewlett-Packard Convex Technical Assistance Center (TAC). Reporting procedures are described in the *Getting Assistance* section of this document.

How to run Exemplar Fortran

The installation procedures and directory structure of the HP Exemplar Fortran compiler are identical to those of the 10.30 version of the standard HP Fortran compiler. Only one version of the Fortran compiler can exist on a single system. The installation software provides support for replacing the version of the compiler that is installed on a system.

Installation locations

This product is installed in the `/opt/fortran` directory and in the `/opt/langtools` directory.

Running the compiler

The `f77` or `fort77` drivers are used to invoke the compiler. The following instructions will use `f77`. The instructions for using `fort77` are the same, except `f77` is replaced with `fort77`.

The `f77` driver can be invoked in several ways. The recommended method is to add the directory `/opt/fortran/bin` to your `PATH` environment variable. HP recommends that system administrators add this directory to each user's `PATH` variable automatically.

Another approach is to fully specify the complete path to the `f77` driver (`/opt/fortran/bin/f77`). This can be done explicitly, via a shell alias or with a shell script.

Requirements and compatibility

This section describes the hardware and operating system requirements for the product. It also discusses compatibility with other products and previous software versions.

Hardware and operating system requirements

The V1.2.1 release of Exemplar Fortran is supported on the following hardware platforms:

- HP Exemplar S-Class servers
- HP Exemplar X-Class servers
- Convex SPP1200 servers
- Convex SPP1600 servers

Version 5.2 or greater of the SPP-UX operating system is required to use the Exemplar V1.2.1 Fortran compiler on all supported platforms

Compatibility

Object files containing kernel-threaded parallelism used by the Exemplar programming model are not compatible with object files compiled for other models of parallelism. For this reason, HP recommends that any object files compiled with other versions of the HP Fortran compiler at optimization levels +O2 and higher be recompiled with the Exemplar Fortran 1.2.1 compiler.

Applications and object files compiled for the Exemplar S-Class and X-Class servers may contain PA-RISC 2.0 instructions and therefore will not run on SPP1200 or SPP1600 systems.

The optimization technology used by this compiler differs from that used by previous Convex compilers. As a result of the different transformations available and the limitations or restrictions on each of these transformations, individual codes or code segments may experience a greater or lesser degree of optimization using this compiler than they experienced using previous Convex compilers.

Applications compiled with the Exemplar Fortran V1.2.1 compiler are compatible with the following profiling and debugging tools:

- CXtools version 4.2

Refer to the cxdb(1) and cxpa(1) man pages or the CXdb and CXpa online help systems for information using these tools with Exemplar compilers.

Installation notes

This product has been packaged for use with the SD software distribution package. To install this product, use the swinstall command of SD and specify installation of the product:

```
FORTRAN,r==1.2.1
```

Selection of this product will automatically select installation of corequisite products if they have not been previously installed.

See the Exemplar Software Installation document for instructions on loading products using SD.

Installing updates

In general, updates to HP Fortran V10.30 **are not compatible** with Exemplar Fortran V1.2.1. Before installing any patch or update, make sure that it applies to the Exemplar Fortran V1.2.1 compiler. If you are not sure whether an update applies to Exemplar Fortran V1.2.1, consult the TAC using the information provided in the *Getting Assistance* section of this release notice.

Product licensing

Exemplar Fortran is a licensed product. Its use is restricted by your agreement with Hewlett-Packard Company. No license key is required to activate the product.

New in this release

This section describes new functionality that has been added and problems that have been fixed since Exemplar Fortran V1.1.

EQUIVALENCE and memory class directives

The previous version of the compiler contained several bugs in the processing of EQUIVALENCE statements containing variables with a user-specified memory class. These bugs have been fixed.

critical and ordered sections

In the previous version of the compiler, the critical_section, ordered_section, gate, and barrier directives were ignored when +O3 +Oparallel was not specified on the command line. These directives are now honored at all optimization levels. It should be noted that it is now necessary to add the -lcps flag to the compiler command line when +Oparallel has not been specified and one or more of these directives are used.

unroll_and_jam directives

The compiler now supports the unroll_and_jam and no_unroll_and_jam directivesto control the new loop unroll and jam optimization. Refer to the *Exemplar Programming Guide* for details about this optimization.

+pal

In conjunction with the Cxpa profilier, the compiler now supports loop-level profiling via the +pal command-line flag. SPP-UX 5.2 or greater is required for this functionality.

+Olibcalls

At optimization levels of +O2 or greater, the compiler now uses the +Olibcalls interface to call millicode library routines for certain intrinsic functions. This behavior can be avoided by specifying +Onolibcalls on the compiler command line.

Known problems

This section lists known problems or limitations related to this release of the Exemplar Fortran compiler that are specific to this version of the compiler. Refer to the file /opt/fortran/newconfig/RelNotes/Fortran.10.30 for known problems that also occur in the HP V10.30 release of the compiler.

-Bimmediate -Bnonfatal

To work around a race condition in `dld.sl`, the compiler driver passes `-Bimmediate` and `-Bnonfatal` as options to `ld`. As a result, it is possible to obtain a successful program linkage, but have unresolved symbols when the program is executed. When the dld.sl problem is resolved, the compiler driver will no longer pass these options to the linker.

libpthread.1

Any existing applications that reference the shared library `libpthread.1` will need to be relinked to reference `libpthread.1e`.

If such an application is not relinked, it will abort with the following messages at runtime:

```
/lib/dld.sl: Unresolved symbol: _start (code) from /usr/lib/libpthread.1
/lib/dld.sl: Unresolved symbol: getrlimit (code) from /usr/lib/libpthread.1
IOT trap (core dumped)
```

You can use the *chatr* utility (`/bin/chatr`) to determine if an executable references the `libpthread.1` shared library.

loop fusion

In some cases, when loops from an inlined routine are fused into a parallel region, incorrect runtime behavior may occur. The output of the `+Oreport` option can be used to help detect this condition. To workaround this problem, compile with the `+Oparallel` and `+Onoinline` options.

loop_private

The `loop_private` directive is ignored when applied to variables on the formal parameter list. A workaround is to assign the value of the formal parameter to a local temporary variable and apply the `loop_private` directive to the temporary.

stack space

Depending on the size and number of the modules, compiling at optimization level `+O4` can consume a large amount of virtual memory. Optimization level `+O4` may consume roughly 1.25 megabytes per 1000 lines of noncommented source. When you use `+O4` on a large application, it is a good idea to increase the system swap space. Your system administrator can increase the system swap space using the `sam` utility.

Associated documents

Hewlett-Packard Company provides the following documents to help you use the `f77` compiler and associated tools:

- *Programming on HP-UX* (B2355-90652): This book describes how to develop software on HP-UX using the HP compilers, assemblers, linker, libraries, and object files.
- *FORTRAN/9000 Programmer's Reference* (B3906-90002): This book is a language reference.
- *FORTRAN/9000 Programmer's Guide* (B3906-90001): This manual is a task reference. It describes features and requirements in terms of the tasks a programmer might perform. These tasks include how to compile, link, run, debug, and optimize programs.
- *Exemplar Programming Guide* (B5600-90001). This book describes efficient programming techniques for SPP1200 and SPP1600 systems and S-Class and X-Class systems.
- *Exemplar C and Fortran 77 Programmer's Guide* (B5600-90002). This book is an introduction to the use of the Exemplar C and Fortran 77 compilers.
- *Assembly Language Reference Manual* (92432-90001): This manual describes the use of the Precision Architecture RISC (PA-RISC) Assembler.
- *HP MPI User's Guide* (B6011-90001): This book discusses message-passing programming using the Message-Passing Interface library.

- *HP PVM User's Guide* (B5885-90001): This book discusses message-passing programming using the Parallel Virtual Machine library.
- *SPP-UX System Administrator's Guide* (B5655-90002): This manual describes fundamental concepts and tasks associated with setting up and maintaining an S-Class or X-Class system.

Ordering documents

To order the current edition of this or any other Exemplar document, send requests to:

Hewlett-Packard Company
Convex Division
Customer Service
P.O. Box 833851
Richardson TX 75083-3851 USA

Please include the order number (DSW or DHW number, or xxxxx-9xxxx number) or the exact title and edition of the document.

Getting assistance

If you have questions that are not answered in this book or in the documents listed in the "Associated documents" section on page 6, contact the Hewlett-Packard Convex Technical Assistance Center (TAC) at the following locations:

Within the continental U.S., call 1-800-952-0379.

From Canada, call 1-800-345-2384.

All other locations, contact your local Hewlett-Packard office.

You can also use the `contact` utility, if you would like to report any problems you may have with the Exemplar compilers or the documentation. For more information refer to the contact(1) man page.