

Installing Programming Environment Products

004-5191-003

St. Peter's Basilica image courtesy of ENEL SpA and InfoByte SpA. Disk Thrower image courtesy of Xavier Berenguer, Animatica.

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Record of Revision

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About This Guide

This document describes installation and configuration of the Programming Environments, release 3.3, software and related products on the following platforms:

- Cray T3E systems
- The following PVP systems:
 - Cray T90 IEEE systems
 - Cray T90 systems
 - Cray C90 systems
 - Cray J90 systems
- Cray SV1 systems

The procedures described in this document support the installation of releases, revisions, and upgrades delivered on CD-ROM, physical media, and upgrade `cpio` files. Additional help is available through the Common Installation Tool (CIT) and the UNICOS Installation/Configuration Menu System (ICMS).

Related Publications

The following documents contain additional information that may be helpful:

- Online help file describing the modules package can be found in `/opt/modules/modules/doc/Modules-Paper.ps`
- The `module(1)` and `modulefile(4)` man pages
- The `cit(8)` man page for Common Installation Tool (CIT)
- The `install(8)` man page for the UNICOS Installation/Configuration Menu System (ICMS)
- *Common Installation Tool (CIT) Reference Card*
- *UNICOS Administrator Commands Reference Manual*

Obtaining Publications

The *User Publications Catalog* describes the availability and content of all Cray hardware and software documents that are available to customers. Customers who subscribe to the Cray Inform (CRInform) program can access this information on the CRInform system.

To order a document, call +1 651 683 5907. SGI employees may send e-mail to `orderdsk@sgi.com`.

Customers who subscribe to the CRInform program can order software release packages electronically by using the `Order Cray Software` option.

Customers outside of the United States and Canada should contact their local service organization for ordering and documentation information.

Conventions

The following conventions are used throughout this document:

<u>Convention</u>	<u>Meaning</u>																		
<code>command</code>	This fixed-space font denotes literal items such as commands, files, routines, path names, signals, messages, and programming language structures.																		
<code>manpage(x)</code>	Man page section identifiers appear in parentheses after man page names. The following list describes the identifiers: <table><tbody><tr><td>1</td><td>User commands</td></tr><tr><td>1B</td><td>User commands ported from BSD</td></tr><tr><td>2</td><td>System calls</td></tr><tr><td>3</td><td>Library routines, macros, and opdefs</td></tr><tr><td>4</td><td>Devices (special files)</td></tr><tr><td>4P</td><td>Protocols</td></tr><tr><td>5</td><td>File formats</td></tr><tr><td>7</td><td>Miscellaneous topics</td></tr><tr><td>7D</td><td>DWB-related information</td></tr></tbody></table>	1	User commands	1B	User commands ported from BSD	2	System calls	3	Library routines, macros, and opdefs	4	Devices (special files)	4P	Protocols	5	File formats	7	Miscellaneous topics	7D	DWB-related information
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7	Miscellaneous topics																		
7D	DWB-related information																		

8 Administrator commands

Some internal routines (for example, the `_assign_asgcmd_info()` routine) do not have man pages associated with them.

variable

Italic typeface denotes variable entries and words or concepts being defined.

user input

This bold, fixed-space font denotes literal items that the user enters in interactive sessions. Output is shown in nonbold, fixed-space font.

[]

Brackets enclose optional portions of a command or directive line.

...

Ellipses indicate that a preceding element can be repeated.

The default shell in the UNICOS and UNICOS/mk operating systems, referred to as the *standard shell*, is a version of the Korn shell that conforms to the following standards:

- Institute of Electrical and Electronics Engineers (IEEE) Portable Operating System Interface (POSIX) Standard 1003.2–1992
- X/Open Portability Guide, Issue 4 (XPG4)

The UNICOS and UNICOS/mk operating systems also support the optional use of the C shell.

Cray UNICOS Version 10.0 is an X/Open Base 95 branded product.

Reader Comments

If you have comments about the technical accuracy, content, or organization of this document, please tell us. Be sure to include the title and part number of the document with your comments.

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We value your comments and will respond to them promptly.

This chapter describes release media, directory structures, and online documentation included with your programming environment tools software and installation package.

1.1 Release Media

There are two media formats available to install programming environment products:

- CD-ROM media can be used on all combinations of supported SGI Cray systems and UNICOS and UNICOS/mk operating system releases.

All installations from CD-ROM media must be installed using the Common Installation Tool (CIT).

- Electronic media can be used on all SGI Cray systems to install upgrade packages. Refer to Section 5.3, page 35, for information about using the `opt_install` script to install electronic upgrade packages.

1.2 Product Directory Structure

On both UNICOS and UNICOS/mk systems, programming environments and related products are loaded into `/opt/ctl/prod/version`, where *prod* is the name of the product (for example, `cf90`) and *version* is the version of the product (for example, `3.3`). Each version of each product has its own directory from which its software is executed. This way you can maintain as many installed versions of a product as you want, and all versions will be available to users.

The installation tools allow you to link the name of the product to the default version of the product.

The following items are in the product directory:

- Driver scripts that are loaded into and executed from `/opt/ctl/bin`. Script names are based on product names; for example, the Fortran 90 compiler has an `f90` driver script that is used to access that compiler. Driver scripts are used to access the executable files for which they are named: and for compilers, loaders, and preprocessors, to access the correct include files and libraries.

- Three module files, one for the default version of the product, one for the specific version you are installing, and one for the default programming environment (called `PrgEnv`).

Refer to Section 4.1.5, page 28, for information about creating alternate module files.

- A news file that contains information about the current release.
- A dependency file that lists dependencies among software products.
- A version file that contains the product version number and version numbers of the components that make up the package.
- A COPYRIGHT file that shows copyright information for products.
- A bin directory that contains executable files.
- A lib directory that contains executable files and libraries.
- An include directory that contains include files (if any).
- An nls directory that contains message catalogs and explain files.
- A man directory that contains manual pages.
- An `.install.log` file that contains a record of installation activity.
- A `.MANIFEST` or `.VIF` file that contains a list of all files contained in a product. This file is used for upgrades and should not be altered.

1.3 Administration Directory Structure

Administrative software located in the `/opt/ctl/admin` directory supports configuration and maintenance of products in the `/opt/ctl` directories. The `/opt/ctl/admin` directory includes the following:

- A `ctladmin` tool that is used to change the default version of installed software, remove non-default versions, and perform other administrative functions. See Section 4.2, page 31, for additional information about the `ctladmin` tool.
- A bin directory that contains the following items:
 - `ctlconfig`, a script that provides a line-mode interface to a subset of `ctladmin` functions

- `opt_install`, a script that loads and installs electronic product upgrades
- `install_drivers`, a script used by `ctladmin` to install older versions of the driver scripts
- `relasync` and `verify`, executable files for checking the software manifest
- A `drivers` directory that contains drivers installed by the script in the `bin` directory. These drivers are installed into the `/opt/ctl/bin` directory.
- A `PEmenus` directory that contains menus and scripts used by the `ctladmin` tool.
- A `umods` directory that contains any operating system fixes needed for the current release.

1.4 Online Documentation

The following online documents are available in `/opt/ctl` to assist you in managing programming environments:

- `README`
- `README.ps`
- `README.modules`
- `README.mpt` (if Message Passing Toolkit is installed)
- `PRGENV.news`

Requirements and Dependencies [2]

This chapter contains notes about general installation techniques, explains how to order software fixes, describes various software issues of which you should be aware, explains licensing, lists software supported on various hardware platforms, and explains file system creation and file space needs.

2.1 Installation Notes

The following requirements must be met before you load and install programming environments and related products. For some requirements you may need dedicated machine time depending upon your site's level of security.

- The operating system must be installed and running on the SGI Cray system. The following operating system levels are supported:
 - UNICOS 10.0 or later
 - UNICOS/mk 2.0.4 or later
- You must have `root` permissions on the machine on which the software will be installed.
- The login ID under which the installation is done cannot have system resource limitations, such as disk quotas, memory limits, or CPU usage limits.
- Programming environments and related product releases are installed into `/opt/ctl/prod/version` on UNICOS or UNICOS/mk systems.
- Before each product is installed, a check is made to determine if there is sufficient disk space for the product. If sufficient space does not exist, the product will not be installed.

2.2 Common Installation Tool (CIT) Issues

The following issue is related to installing software from CD-ROM media with CIT. If your site is running UNICOS 10.0 or later, you must use CIT to perform the installation.

If your site removes the `NETW_RCMD_COMPAT` bit from the `SECURE_NET_OPTIONS` bit-mask in the `config.h` file and the UNICOS kernel,

then the UNICOS kernel will not allow `root` remote shell commands to be executed on the Cray system from the OWS or the SWS. This functionality is required, as CIT uses it to perform installation. If the `NETW_RCMD_COMPAT` bit is missing, you will need to reboot your system with a kernel that has this bit enabled, as CIT uses the `/.rhosts` file in the transfer of packages from the OWS operator workstation or the SWS system workstation to the Cray system.

2.3 UNICOS Security Issues

The following issues are related to installing software on an Multilevel Security (MLS) system.

- If you are not running UNICOS MLS or are running with the MLS `PRIV_SU` or `PRIV_SU` with PALS, you only need super-user (`root`) privileges to perform the installation.
- If you are running MLS `PRIV_TFM`, you must have super-user (`root`) privileges to perform the installation, along with the `reclsfy`, `install`, and `suidgid` permissions, authorized categories `secadm` and `sysfil`, and a maximum integrity class of 16.

To see whether you have these permissions, `su` to `root` and execute the `spget(1)` command. If you do not have the required permissions, contact your site security administrator.

If the MLS feature is not enabled at your site, the `spget` command responds as follows:

```
unicos# spget
spget: security is not enabled!
```

If the MLS feature is enabled at your site, `spget` responds similarly to the following sample response (specific permissions at your site may affect the response you see):

```
unicos# spget
permits equal 04130
           reclsfy
           suidgid
           install
...
listing of other security levels
```

- If your system is running Trusted UNICOS, you must reboot your system with the `PRIV_SU` kernel before performing the installation. Note that rebooting your system may require dedicated system time. Once your system is rebooted, you will need super-user (`root`) privileges to perform the installation.

2.4 Mixed-mode Installation and Use Issues

Cray T90 IEEE systems allow you to run mixed-mode versions of products. For example, mixed-mode versions of the Fortran 90 compiler permit the use of Cray or IEEE floating-point arithmetic. To use mixed-mode environments successfully, the following conditions must be met:

- The UNICOS operating system must be configured for mixed-mode support before loading a package containing a non-native version of a programming environment product. If the operating system is not configured properly, the nonnative version of the product will overwrite the native version in `/opt/ctl`.

The following screen shows the section of the ICMS to use to configure the UNICOS system for mixed-mode use:

```

UNICOS 10.0 Installation / Configuration Menu System
.  Configure System
.  .  Major Software Configuration

                Major Software Configuration

Mixed-mode CPU (MIXED) libraries           on
Mixed-mode library characteristics        cray-ts,ieee

```

Be sure to activate your choices.

Note: Use of ICMS assumes that mixed-mode support is loaded into the source tree. Sample settings shown are for a Cray Floating Point (CFP) host with both CF90 and IEEE support installed.

- The loader must be configured by using loader directives. This can be done through ICMS. See the example in Section 4.1.3. Loader configuration does not have to be done before loading a programming environment product.

2.4.1 Determining Target Type

To determine the host target type on your system, enter the `target(1)` command.

Example 1: target output for CFP

```
unicos# target
Primary machine type is:  CRAY-TS
...
  subtype=TS
...
  noieee
```

Example 2: target output for IEEE

```
unicos#target
Primary machine type is:  CRAY-TS
...
  subtype=TS-IEEE
...
  ieee
```

2.4.2 Loading the Default PrgEnv Module

Use the `module load` command to load the default `PrgEnv` module (See Section 4.1.5, page 28 for information on alternate `PrgEnv` module files.). In the following example, the default is CFP:

```
module load PrgEnv
```

To see what modules are loaded, use the `module list` command:

```
unicos# module list
Currently Loaded Modulefiles:
  1)modules   4)cf90     7)CCmathlib 10)PrgEnv
  2)craylibs  5)scclib  8)Cctoollib
  3)craytools 6)CC      9)cal

unicos# f90 fio.f file a.out
a.out:  executable CRAY-TS not stripped
```

The preceding screen shows sample output. Modules listed on your system may vary.

2.4.3 Swapping Modules on Mixed-mode Systems

If your site has installed mixed-mode versions of programming environment products, you may want to switch from compiling and linking for one version to another version. For example, your host system environment may be set to CFP and you may want to use the alternate IEEE environment. This requires that you use the `module swap` command to change versions.

While you may switch versions in either the default or the mixed-mode environment, you cannot switch between environments. For example, the first command line is allowed but the second is not:

```
module swap cf90.ieee cf90.3.0.1.1.ieee

module swap cf90 cf90.ieee
```

If you swap to an alternate environment and get a conflicting `machine characteristics` message from `libc.a`, you should contact your local help desk or system administrator because the default loader directives on your system are probably missing the required `defdir` instructions.



Caution: Always use the `swap` command when changing environments. Do not load one environment on top of another.

The following examples show how to switch between environments:

Example 3: Swapping from a host CFP environment to an IEEE environment

The following example swaps a CFP environment for an IEEE environment:

```
unicos# module swap PrgEnv PrgEnv.ieee
Switching 'PrgEnv' to 'PrgEnv.ieee' ...ok.
unicos# module list
Currently Loaded Modulefiles:
  1)modules          3)craytools.ieee    5)CC.ieee
  2)craylibs.ieee   4)cf90.ieee        6)PrgEnv.ieee

unicos# f90 fio.f
unicos# file a.out
a.out:  executable ieee CRAY-TS not stripped
```

When the `PrgEnv.ieee` environment is swapped, the `TARGET` environment variable is automatically set to `cray-ts,ieee`.

Example 4: Swapping from a host IEEE environment to a CFP environment

The next example swaps an IEEE environment for a CFP environment:

```
unicos# module swap PrgEnv.ieee PrgEnv
Switching 'PrgEnv.ieee' to 'PrgEnv' ...ok.
unicos#module list
Currently Loaded Modulefiles:
  1)modules   4)cf90   7)CCmathlib 10)PrgEnv
  2)craylibs  5)scc    8)CCToollib
  3)craytools 6)CC     9)cal

unicos# f90 fio.f
unicos# file a.out
a.out:  executable CRAY-TS not stripped
```

When the `PrgEnv` environment is swapped, the `TARGET` environment variable is automatically set to `cray-ts`.

2.5 Licensing Requirements

License keys are required for some programming environment products. When you order a product that requires a license key, the key will be sent to you automatically through electronic mail by the order desk along with instructions for installing it.

2.6 Product/Hardware Support Matrix

Table 1 shows the Silicon Graphics Cray computer systems on which programming environment products are supported.

Table 1. Product/Hardware Support Matrix (S = Supported)

Programming Environments and Related Products	Cray MPP	Cray PVP/SV1
CAL	-	s
CAM	s	-
CF90 Compiler	s	s
C++ Compiler	s	s
C++ MathPack	s	s
C++ Tools	s	s
Message Passing Toolkit (MPT)	s	s
CrayLibs	s	s
CrayTools	s	s

2.7 File System Space Requirements

Because software is installed in the `/opt/ct1` file system, an `/opt` file system must exist prior to installation. It is recommended that this file system be mounted in the `/` directory.

Table 2 shows the amount of disk space required to load software for programming environments and related products.

Table 2. /opt/ctl Space Requirements (4K Blocks)

Package name	Cray PVP/SV1	Cray MPP
cal	1000	-
cam	1000	1400
CC	5300	6400
CCmathlib	7300	11500
CCtoollib	1500	1900
cf90	4800	5900
craylibs	11300	15000
craytools	24600	23800
cvt	33500	40800
modules	600	600
mpt	4200	6000
misc	400	400

To compute the minimum disk space required to support software packages being installed, multiply the disk space required by all packages by two. (Space for two copies is needed because each upgrade creates a full package.)

For example, on a PVP system, if the CF90 and the C++ programming environments are the only packages being installed, you would calculate disk space as shown in Table 3.

Table 3. Calculating Disk Space

5,000	CF90 environment
5,300	C++ environment
15,100	CrayLibs product
26,600	CrayTools product
400	Miscellaneous
600	Modules product

53,300 * 2 = 106,000 (4K blocks)

Even though the CF90 and the C++ programming environments are both being installed, they will share the same copy of CrayLibs, CrayTools, Miscellaneous, and Modules.

Installing Software Products [3]

This chapter provides installation information for the Programming Environment 3.3 releases. You can install Programming Environment products in the following ways:

- Using CIT from CD-ROM (required for Unicos 10.0 or later)
- Using `opt_install` from the Cray system

3.1 Using CIT from CD-ROM

The CD-ROM that you received as part of the Programming Environment 3.3 package contains the most current version of the Common Installation Tool (CIT) and a product directory for each product. Each product directory has the following set of files:

```
async.cpio
product.tk
product.PIF
product.cmd
product_wrapper
```

The `async.cpio` file is the *product* and the next four files are CIT installation files.

When using CIT, the `Dependencies ->Views` menu lists software dependencies for products. In addition, warning and error windows are displayed by CIT if product installation would conflict with any product dependencies.

3.1.1 Communication Path Setup

All CD-ROM media is shipped with a paper copy of the *Common Installation Tool (CIT) Reference Card*, and with a PostScript version of the card included in `CYRIinstall/2218.ps`. The reference card contains information on how to set up communication paths between the OWS or SWS and the SGI Cray system and how to test that the paths are set up correctly.

3.1.2 Setting up Your Workstation for CIT

To set up your workstation to use CIT, perform the following steps:

1. If the CD-ROM is not automounted on your OWS as `root`, manually mount it as follows:

```
% mount -t hsfs -r /dev/sr0 /cdrom
```

2. CIT uses `rcp` and `remsh` to perform various installation tasks on the SGI Cray machine and to transfer files between the workstation and the Cray system. Therefore, you must ensure that the `.rhosts` file on both the Cray system and the workstation contain correct entries in the following format:

crayhost root on the workstation

your_workstation root on the Cray system

You can verify that the `.rhosts` files are set up correctly on the workstation and the Cray system with the following command:

```
% rsh crayhost -l root "remsh your_workstation -l root uname -a"
```

3.1.3 Invoking CIT

To start CIT, perform the following steps:

1. Use the `cd` command to move to the top level of the CD-ROM directory structure where CIT is located. Then use the `setup` script to invoke CIT as follows:

```
% cd /cdrom_mount
% setup -c crayhost [-D USE_DEFAULTS] -l root
```

Note: See steps 2 and 3 for information about how the use of the `-D USE_DEFAULTS` option affects installation.

2. If you do not use the `-D USE_DEFAULTS` option, a `Pre-install Queries` window will appear for each product you are installing.

After you have answered all the questions on the window, click the `Done` button.

Note: Installation will not begin until all questions have been answered for every product.

3. If you use the `-D USE_DEFAULTS` option, the Pre-install Queries window will not be displayed. This is because this option tells CIT to use the following defaults for all products during the installation:

```
overwrite=no
default=no
newfiles=no
```

3.1.4 Installation and Error Logs

Two error logs are created during product installation. The file `/opt/ctl/product/version/.install_log` is the record of the installation steps. The file `/opt/ctl/product/version/.VIF.log` is the record of errors generated by the product verification process. After an installation completes correctly, the `VIF.log` file is deleted.

Note: CIT also puts some installation logs on the workstation at `/tmp/cit.username`.

3.2 Using `opt_install` from the SGI Cray System

The `opt_install` script installs electronic upgrades and will install any product file named `async.cpio` that has been copied from media to the SGI Cray system. The `opt_install` script is located in the `/opt/ctl/admin/bin` directory. Electronic upgrade procedures are described in Chapter 5, page 33.

3.2.1 Installation and Error Logs (`opt_install`)

Two error logs are created during product installation. The file `/opt/ctl/product/version/.install_log` is the record of the installation steps. The file `/opt/ctl/product/version/.VIF.log` is the record of errors generated by the product verification process. After an installation completes correctly, the `VIF.log` file is deleted.

Configuring the Software [4]

At this point you have loaded and installed the programming environments and related product software into the `/opt/ctl/prod/version` directories. This chapter describes the administration and configuration functions available to you.

The `ctladmin` tool is tightly tied to the operating system on which it is run. It is recommended that you use `ctladmin` on any machine running one of the following operating systems:

- UNICOS 10.0 or later
- UNICOS/mk 2.0.4 or later

The `ctladmin` tool was written to reflect current programming environments. Menus used by `ctladmin` are dynamically rebuilt to reflect changes that may occur in the environments. To ensure this accuracy, the tool may run slowly for some users. If this is the case, you can use the following alternatives to `ctladmin` for faster performance:

- Use the `ctlconfig` command to set defaults and remove product versions.
- Use an editor to create an alternate module file by copying and editing the system module file found in `/opt/modulefiles`.

4.1 Menu-driven Administrative Functions

The `ctladmin` tool is available from within ICMS, or, if you have root privileges, you can invoke it directly by entering the following commands:

```
cray# cd /opt/ctl/admin
cray# ./ctladmin
```

The Programming Environment Configuration Menu appears:

```
Programming Environment Configuration Menu
S ->  Select product to act on?           cf90
      Select product version             3.0.2.0
      Set product default to select version ...
      Remove the selected version ...
      View dependency data for selected version ...
      View news file for selected version ...
      Update /usr/news file for selected version ...
      Update cmd drivers for selected version ...
      List available products and defaults ...
M ->  PrgEnv Module creation menu ==>
      File containing new default versions
                                   opt/modulefiles/Prg.Env.new
      Update default versions using above file ...
      Change CF90 command line defaults ==>
      Update PEmenus (copies /opt menus to /) ...
```

Note: Your display may differ from that shown depending upon how you have set your DISPLAY environment variable.

4.1.1 Configuring CF90 Compiler Options

The Programming Environment Configuration Menu allows you to configure the CF90 compiler with your choice of compiler options enabled or disabled.

4.1.1.1 Selecting Compiler Options

Perform the following to change default compiler options for the CF90 compiler:

1. Position the menu prompt next to the Change CF90 command line defaults menu item, as shown in the following example:

```
Programming Environment Configuration Menu
M-> Change CF90 command line defaults ==>
```



Caution: Making changes to command-line option default values invalidates the values specified in the *CF90 Commands and Directives Reference Manual*. Some combinations of command-line options are incompatible; this may cause unexpected aborts or other unusual behavior. Compiler users may be unaware of which compiler options are being used to invoke the compiler. Once command-line options are activated, all subsequent builds use the values specified by the current configuration unless a new configuration is activated or the current configuration is deactivated.

2. Press RETURN. A menu of available command-line options is displayed. Options are shown with their default values. If you change a value, the new, non-default, value ends with the string `_nd` (for new default).

```

                                F90 Command Line Options
S-> -e a                        off
    -e i                        off
    -e n                        off
    -e p                        on
    -e r                        on
    -e t                        off
    -e u                        off
    -e v                        off
    -m                          3
    -N                          72
    -O task                      1
    -O scalar                   2
    -O vector                   2
    -O unroll                   0
    -O aggress                  off
    -O bl                       off
    -O fastint                 on
    -O loopalign               off
    -O negmsgs                 off
    -O recurrence              on
    -O vsearch                 on
    -O zeroinc                 off
    -O overindex               off
    -O pattern                 on
    -O threshold               off
    -O taskinner               off
    Activate CF90 compiler options ...
    Deactivate CF90 compiler options ...

```

3. Use the space bar to toggle through the list of supported options. If you press RETURN to enter input mode, use CTRL-I or TAB to toggle through values for a particular option. When in input mode, press ESCAPE to return to the prompt column, leaving the value unchanged.

4.1.1.2 Activating/Deactivating Compiler Options

Perform the following to activate compiler options:

1. Position the menu prompt at the Activate CF90 compiler options action item.
2. Press RETURN.

The following example shows CF90 compiler options being activated:

```

      F90 Command Line Options
A-> Activate CF90 compiler options ...
      Deactivate CF90 compiler options ...
```

Before non-default options are made available for use, the activation option performs a test of the selected options to determine if any conflicting options have been selected.

- If the test fails, compiler-generated messages are displayed, explaining which options are in conflict. You will have to correct these conflicts before you can successfully activate your non-default options.
- If the test is successful, the non-default options are copied to `/opt/ctl/bin/.f90opts` with world read and execute permissions. The `/opt/ctl/bin/f90` command always uses the options found in this file, if it exists.

Deactivation removes the `/opt/ctl/bin/.f90opts` file and all future compiles will use the default options.

Perform the following to deactivate options:

1. Position the menu prompt at the `Deactivate CF90 compiler options` action item as shown in the following example, and press RETURN.

```

      CF90 Command Line Options
      Activate CF90 compiler options ...
A-> Deactivate CF90 compiler options ...
```

4.1.2 Configuring ToolTalk

ToolTalk is included with the CrayTools package. The `libtt.a` and `rpc.ttdb` servered components of CrayTools use ToolTalk at run time. ToolTalk installs commands that allow users to interface with other applications that use ToolTalk. These can include applications running on the host system or any host connected to the network and running ToolTalk. CrayTools installation installs all ToolTalk components as default.

4.1.2.1 ToolTalk Documentation

Documentation for ToolTalk is provided through the following set of man pages:

- `ttcp(1)`, `tttcp(1)`, `ttrm(1)`, `ttsession(1)`, `ttar(1)`, and `tt_type_comp(1)`
- `ttapi(3)`
- `ttdbck(8)` and `ttdbserverd(8)`

Additional documentation is available from the following vendors:

- *ToolTalk Setup and Administration Guide*, available from Sun Microsystems, Inc., contains complete details about ToolTalk setup and maintenance.
- *ToolTalk Reference Manual* and the *ToolTalk User Manual*, available individually from Sun Microsystems, Inc. These two manuals also are available as a single volume entitled *The ToolTalk Service: an Inter-Operability Solution* (ISBN 0-13-088717-X) available from Prentice-Hall.

4.1.2.2 Adding ToolTalk to the Generic Internet Daemon

If you want the ToolTalk database server (`rpc.ttdbserverd`) to start automatically upon system startup, you must make an entry in the `/etc/inetd.conf` file as follows:

1. Start up the UNICOS Installation/Configuration Menu System (ICMS). If you do not have ICMS running, set your terminal definition and invoke the menu system with the following commands:

```
# export TERM=xterm
# resize
# cd /root/etc/install
# ./install
```

The ICMS main menu will display.

2. From the ICMS main menu, use the following path to reach the Generic Internet Daemon Configuration menu item:

```
UNICOS Installation/Configuration Menu System
->Configure System
    ->Network Configuration
        ->TCP/IP Configuration
            ->Generic Internet Daemon Configuration
```

3. To add an entry for ToolTalk, if one does not already exist, position the menu prompt at the point in the Generic Internet Daemon Configuration list where you want to create the ToolTalk record and press either `n` to create a record below the current line or `N` to create a record above the current line. This creates a blank record, which you then must edit to include location and port entry-name information.

Press RETURN to begin editing the record, as shown in the following sample record:

```

Generic Internet Daemon
Configuration
Enable this daemon?      YES
Port name or number     100083/1
or
tooltalkd/1
Connection type         stream
Transport protocol      tcp
Wait for the daemon to return? YES
User name to run daemon as root
Internal to inetd?      NO
Path name of daemon
/opt/ctl/bin/rpc.ttdbserverd
Arguments

```

4.1.2.2.1 Setting the Daemon Location

You must set the path name of daemon selection to the location of the `rpc.ttdbserverd` driver. The path name is `/opt/ctl/bin/rpc.ttdbserverd`.

4.1.2.2.2 Setting the Port Name Entry

The installation system does not provide an interface for setting the ToolTalk port name in the `/etc/rpc` file. To add an entry for ToolTalk to the `/etc/rpc` file, you must edit the `/etc/rpc` file manually to add the following entry:

```
tooltalkd 100083
```

You may then use the name chosen for the ToolTalk port as the entry for the Port name or number item of the menu system, as shown in the following example:

```
Generic Internet Daemon Configuration . . .  
S-> Port name or number  
tooltalkd/1 . . .
```

If problems arise later (most frequently after an operating system upgrade), check to ensure that the ToolTalk port name still exists in the `/etc/rpc` file.

4.1.2.2.3 Activating the Port Name Entry

After you have added the port name entry, use the `Activate the TCP/IP configuration` menu item of the `TCP/IP Configuration` menu to activate ToolTalk configuration changes. This creates the proper entry in the `/etc/inetd.conf` file.

4.1.3 Configuring the Loader for a Mixed-mode Environment

If you are want to access mixed-mode environments, you must configure SEGLDR and edit specific directives.

1. Configure SEGLDR as shown in the following screen:

```

UNICOS Installation / Configuration Menu System
.   Configure System
.   .   SEGLDR Loader Configuration

                SEGLDR Loader Configuration

Target operating system (system)           unicos
Executable compression threshold (compress) 1000
Module at text address 0 (zerotext)         $$TEXT$$
Module at local data address 0 (zerodata)    $$DATA$$
Module at common data address 0 (zerocom)    $$COM$$
Default directory search paths (defdir)     /lib,/usr/lib
Starting program entry point (start)        $START
External entry point for xfer (callxfer)    M$A$I$N
Include zz?? syms in the load module (zsyms) off
Define Default System Libraries ==>

Define HARDREF directives (def_lib) ==>
Define SET directives (def_lib) ==>
A-> Edit SEGLDR specific directives (def_seg) ...
A-> Edit ld specific directives (def_ld) ...
    Import the SEGLDR loader configuration ...
A-> Activate the SEGLDR loader configuration ...

```

2. Edit `def_seg` and `def_ld` and add one of the following lines before any `def_lib` directives.

- If the host is `cray`, add:

```
defdir(cray-ts,ieee)=/lib/tsieeelib,/usr/lib/tsieeelib
```

- If the host is `ieee`, add:

```
defdir(cray-ts)=/lib/tslib,/usr/lib/tslib
```

3. Edit `def_seg` and `def_ld` to ensure that the `include=segdirs/def_lib` line appears before the `defdir` line for the alternate environment as shown in the following sample `def_ld` file for an alternate IEEE environment:

```
callxfer=M$A$I$N
compress=1000
include=segdirs/def_lib
```

```
defdir=lib,/usr/lib
defdir(cray-ts,ieee)=/lib/tsieelib,/usr/lib/tsieelib
lbin=_start_.o
start=$START
system=unicos
zerocom=$$COM$$
zerodata=$$DATA$$
zerotext=$$TEXT$$
zsyms=off
```

Note: If the `include=segdirs/def_lib` line appears after the `defdir` line for the alternate environment, the system will look in the `/lib/tsieelib` directory for a `segdirs` subdirectory and will not find it.

4. Activate your changes.

4.1.4 Configuring the Message Passing Toolkit

Message Passing Toolkit (MPT) software is self-configuring based on the operating system configuration in effect at the time of installation. You are not required to do any configuration at the initial installation of the product. If, however, you upgrade your operating system level to a new major release or change the system host name, you will need to reconfigure the MPT software. This reconfiguration can be done as follows:

```
cray# cd /opt/ctl/mpt/mptcray# ./mpt_config -u
cray# ./mpt_config -i
```

Note: You can also change to the `/opt/ctl/mpt/version` directory and do the configuration from there.

4.1.5 Creating an Alternate PE Configuration

The Programming Environment Configuration Menu allows you to select specific versions of programming environment products or create alternate `PrgEnv` module files. After creating an alternate `PrgEnv` module file, you then can swap the default module file with the alternate module file.

Read the `module(1)` man page for further information on swapping and loading module files. We recommend always swapping any alternate `PrgEnv` module files for the default `PrgEnv` module file.

Perform the following to configure an alternate PrgEnv module file:

1. Enter the Programming Environment Configuration Menu and make the following selection:

```
M-> PrgEnv Module creation menu ==>      ...
```

A menu appears with a list of all the products that the PrgEnv module file can load. Each time a product is loaded by the PrgEnv module file, a list of installed versions is displayed.

2. For each product with more than one version, select the version you want to have loaded. Programming environment products that you choose not to install are tagged with the words `not_available`; no other actions are taken in regard to uninstalled products. Products tagged `not_available` will be ignored when the alternate PrgEnv module file is loaded.

The following shows a sample screen for an alternate PrgEnv module file menu:

```

PrgEnv Module Creation Menu
A-> List available products and defaults ...
Alternate PrgEnv module name extension?
=== Common products =====
Version of CrayTools to use?
Version of CF90 to use?
Version of CC to use?
Version of SCC to use?
Version of CrayLibs to use?
Version of CAL to use?
Version of CCToollib to use?
Version of CCMathlib to use?

Create/install the alternate PrgEnv module ...
Remove selected Alternate PrgEnv module ...

```

3. Use the `List available products and defaults` action item to view a list of available product versions and see which are currently the defaults loaded by the PrgEnv module file.

4. Use the `Alternate PrgEnv module name extension?` selection item to choose a unique name extension for the alternate PrgEnv module file. The default extensions provided are `new` and `old`.
5. Use the `module available` command to view a list of available module files. Use the `module help PrgEnv.extname` command to view a description of the module file and how to use it.
6. Use the `Remove selected Alternate PrgEnv module` action item to remove any PrgEnv module files you have created but no longer need.
7. Once you have made your selections, use the `Create/install the alternate PrgEnv module` action item to create the alternate PrgEnv module file and install it into `/opt/modules/modules/modulefiles/PrgEnv.extname`.
8. Notify users that the alternate module file is available.

4.1.6 Updating the Default Product Version

There are two methods by which you can use `/opt/ctl/admin` functions to change the default version of a product:

- Select the product name and the product version on the `Programming Environment Configuration Menu` and then select `Set product default to select version ...` as shown in the following example that sets the default version of Fortran 90 to 3.0.2.0:

```
Programming Environment Configuration Menu
  Select product to act on?          cf90
  Select product version              3.0.2.0
S -> Set product default to select version ...
  Remove the selected version ...
  View dependency data for selected version ...
  View news file for selected version ...
  Update /usr/news file for selected version ...
  Update cmd drivers for selected version ...
  List available products and defaults ...
```

- Enter a file name in the form of `productname.version` (for example, `cf90.301`) and then select `Update default version using above file ..` as shown in the following example that sets the default version of Fortran 90 to 3.0.2.0:

```

PrgEnv Module creation menu ==>
  File containing new default versions
                                opt/modulefiles/cf90.3020
S -> Update default versions using above file ...
    Change CF90 command line defaults ==>
    Update PEmenus (copies /opt menus to /) ...

```

This method searches for strings in the form of *productname.version* and, when found, updates the default version of the product.

4.2 Line-mode `ctlconfig` Administrative Functions

Line-mode commands available through `ctlconfig` mimic the modules interface and allow you to perform a subset of the configuration functions available through `ctladmin`. These commands let you update the default version of a product, update multiple product defaults, and remove a version of a product.

You can invoke `ctlconfig` by entering the following commands:

```

cray# cd /opt/ctl/admin
cray# ./ctladmin

```

4.2.1 Updating the Product Default Version

To update the default version of a software product, enter the following command:

```
ctlconfig makedef product.version
```

For example, the following changes the default version of the C++ compiler to the 3.1 version:

```
ctlconfig makedef CC.3.1
```

4.2.2 Updating Multiple Product Default Versions

To change the default versions for multiple products, enter the following command:

```
ctlconfig upd_all_defs modulefile_name
```

For example, the following updates default product versions to the versions specified in `PrgEnv.new`:

```
ctlconfig upd_all_defs /opt/modulefiles/PrgEnv.new
```

4.2.3 Removing a Product Version

To remove a version of a software product, enter the following command:

```
ctlconfig remove product.version
```

For example, the following removes the 2.0.3.0 version of the C++ compiler from the system:

```
ctlconfig remove CC.2.0.3.0
```

4.3 Line-mode `configmixed` Administrative Functions

If your system is configured for mixed-mode use, the `configmixed` command replaces the `ctlconfig` command. The `configmixed` command performs the same functions as the `ctlconfig` command and has the same options. For example, to update the default version of a software product, you would enter the following command:

```
configmixed makedef product.version
```

Asynchronous Product Upgrades [5]

This chapter describes the process for obtaining binary upgrades to asynchronous products released as part of the programming environments. Upgrades are bugfix versions of software products released since the last major, minor, or revision release of a product. The following types of upgrades exist:

- An *electronic upgrade* contains object modules that have been corrected since the last release or revision. It does not contain a complete copy of the software product and must be installed on top of the major revision or update specified during the ordering process.
- A *media upgrade* contains a complete copy of the new product version.

5.1 Requesting a Software Upgrade

Software upgrades are ordered through the CRInform program, an online information, problem-reporting, and service request service. CRInform is available through the World Wide Web. To access it, you need permission to access the CRInform Web server and a browser.

If you do not have an CRInform account, you can sign up for the CRInform program through the following URL:

<http://crinform.cray.com/ACCESS/signup.html>

This web page contains a CRInform Program Enrollment form. You also can request Program Enrollment forms from your service representative.

Customers who have an account on the `crinform` machine can access the CRInform home page by using the following URL:

<http://crinform.cray.com/>

Employees can access an internal version of CRInform by using the following URL:

`http://wwwcst.cray.com/crinform/`

After you have connected to either of these pages, make the following selections:

1. Select the `Software ---> Order Cray Software` option.

The order form has links you can select to get help with ordering, including information about how orders are processed and how updates are delivered.

2. On the `Software Order Form`, enter your SGI Cray system serial number. After entering the serial number, select the hardware type update you want to order from the displayed list.
3. Select the major release level of the product(s) for which you are ordering an upgrade and press the `Continue with Order` button to display the `Software Update Order Form`.

Select either `media` or `electronic` for the format of your upgrade.

If you select `media`, complete the remainder of the page to indicate your preference for `Media Format`, `Shipping Method`, and the `Ship To` information. Then click on the `Submit Software Order` button to submit the order or select `Clear Order` to reenter your choices.

If you selected `electronic`, click on the `Submit Software Order` button. After you submit the electronic upgrade request, you will receive an order confirmation email containing the full name of the upgrade file on either `forest` (employees) or `crinform` (customers). At this point, you will also have the option of establishing an `ftp` connection to your new product file directory.

5.2 Upgrade Packages on Media

Media upgrades are installed using either `CIT` or `ICMS` depending on the media type. However, if you copy the `async.cpio` product file located in the product directory of the media to the SGI Cray system, you also can use the `/opt/ctl/admin/bin/opt_install` script to install the product. See Section 5.3, page 35, for complete information.

5.3 Installing an Electronic Upgrade Package

All product upgrades can be delivered electronically. Product upgrade packages are delivered to your `craypark` or `crinform` directory and are available within minutes for downloading through `ftp`.

You cannot use CIT or ICMS to install electronic upgrades. To unpack and install these upgrades, use the `/opt/ctl/admin/bin/opt_install` script.

To install an electronic upgrade you must use the `opt_install` script located in the `/opt/ctl/admin/bin` directory and be logged on as `root` on the machine on which you are installing the upgrade. The `opt_install` script is delivered with electronic upgrades in the file named `installation_instructions_product` and can also be accessed in the `/opt/ctl/admin/bin/` directory.

Each electronically transferred upgrade product is packaged into a file that is named using the following convention:

```
NEW_product_name_hardware_type.cpio
```

To install, move the upgrade files to the SGI Cray system and execute the `opt_install` script that was delivered with the Programming Environment 3.0 base release. You must execute the script from the directory on your SGI Cray system where the upgrade `cpio` file is stored. Products loaded using this script are copied into the `$TMPDIR` directory and then copied into `/opt/ctl/product_name/version`. A sample command line is shown in the following example:

```
/opt/ctl/admin/bin/opt_install -f file.cpio
```

To allow testing to be performed on a new version of a product, the old version is not automatically removed nor is the new version automatically made the default version.

The following example shows a sample upgrade session:

```
# /opt/ctl/admin/bin/opt_install -f NEW_cf90_cray-ymp_2034.cpio
Creating directory /tmp/jtmp.003134a/NEW_cf90...
Unwrapping /squall/u3/binary/NEW_cf90_cray-ymp_2034.cpio....
cmd-1467 cpio: 30160 512-byte blocks.
cmd-1467 cpio: 30144 512-byte blocks.
Uncompressing files....
Checking for space...
Space available: 73664 4k bytes...
Space needed for cf90: 11936 4k bytes.
```

```
Space available after the load: 61728 4k bytes or 12% of disk.
Done checking for disk space.
Writing base files from /opt/ctl/cf90/2.0.3.3
into /opt/ctl/cf90/2.0.3.4...done.
Writing generation files into /opt/ctl/cf90/2.0.3.4...done.
Checking /opt/ctl/cf90/2.0.3.4/.MANIFEST...
0 of 49 files/dirs checked were bad (from cf90, N/A)
done.
Current default cf90: 2.0.3.3.
Make /opt/ctl/cf90/2.0.3.4 the default cf90 on this system [y/n]? y
Making /opt/ctl/cf90/2.0.3.4 the default.
/opt/ctl/cf90/cf90 is linked to /opt/ctl/cf90/2.0.3.4.
Updating /opt/ctl/bin/f90 ...done.
Updating menu system files ...done.
Updating modulefiles ...done.

Load of package cf90 2.0.3.4 complete.
```

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