

Installing Programming Environment Products

SG-5191 3.1

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Record of Revision

Version	Description
2.0	December 1995 Original Printing. This manual supersedes the <i>Programming Environment Installation Guide</i> , publication SG-5217 for programming environments 2.0 and beyond.
2.0.1	August 1996 This revision supports the Programming Environment 2.0.1 release.
2.0.3	December 1996 This revision supports the Programming Environment 2.0.3 release.
3.0	May 1997 This revision supports the Programming Environment 3.0 release.
3.0.1	August 1997 This revision supports the Programming Environment 3.0.1 release.
3.0.2	March 1998 This revision supports the Programming Environment 3.0.2 release.
3.1	August 1998 This revision supports the Programming Environment 3.1 release.

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About This Guide

This document describes installation and configuration of the Programming Environments, release 3.1, software and related products on the following computer systems:

- CRAY T3E systems
- CRAY Y-MP systems
- CRAY Y-MP EL systems
- CRAY C90 systems
- CRAY J90 systems
- CRAY SV1 systems
- CRAY T90 systems
- CRAY T90 IEEE systems

The procedures described in this document support the installation of major releases and revisions and product 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(4)` man page for the UNICOS Installation/Configuration Menu System (ICMS)
- *Common Installation Tool (CIT) Reference Card*
- *UNICOS Administrator Commands Reference Manual*

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Conventions

The following conventions are used throughout this document:

<u>Convention</u>	<u>Meaning</u>
(1)	User commands
<i>variable</i>	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.

Reader Comments

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We value your comments and will respond to them promptly.

Introduction [1]

This chapter describes release media types, directory structures, and online documentation.

1.1 Release Media Types

The installation tool you use to install programming environment products depends upon the media from which you will be doing the installation. The following three types of media are available for installing programming environment products:

- DAT media is used on CRAY EL systems.

If you have a CRAY EL system and are installing from DAT media, you must install using the UNICOS Installation/Configuration Menu System (ICMS).

- DAT media is used on CRAY J90 systems running UNICOS 9.0.

If you have a CRAY J90 system running UNICOS 9.0 and are installing from DAT media, you must install using the UNICOS Installation/Configuration Menu System (ICMS).

- CD-ROM media is used on all other supported machines and operating system combinations.

All installations from CD-ROM media must be installed using the Common Installation Tool (CIT) regardless of the level of UNICOS that you are running. Because the directory format is different from tape media, you cannot use ICMS to install products from CD-ROM media. Refer to Section 3.1, page 15, for information about CD-ROM directory structure.

- Electronic media can be used on all Cray systems to install upgrade packages. Refer to Section 5.3, page 41, 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, `3.0.1`). Each version of each product has its own

directory. The software is executed from this directory. Therefore, you can have as many versions of a product installed 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 33, 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 has the following structure:

- A `ctladmin` tool that is used to change the default version of installed software, remove nondefault versions, and perform other administrative functions. See Section 4.2, page 36, 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 time depending upon your site's level of security.

- The operating system must be installed and running on the Cray Research mainframe. The following operating system levels are supported:
 - UNICOS 9.0 and updates to 9.0 (UNICOS releases 9.1, 9.2, and 9.3 are no longer supported.)
 - UNICOS 10.0 or later
 - UNICOS/mk 2.0.3 or later

Note: Older operating system levels may require a software fix package be installed to run programming environment software release 3.0 or later. See Section 2.2, page 6, for details.

- 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/product/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 Ordering Software Fixes

If you are not running the UNICOS 9.0.2.6 operating system release level or later, you must obtain the software fix package that contains the mods necessary to run programming environment products in your operating system environment. Fix packages are available at the following URL:

`ftp://ftp.cray.com/pub/pe/fixes/pe30_os_/`

1. Select the `README` file for information about extracting `tar` files and notes about the `SEGLDR` and include file portions of the fix package.
2. Select the correct platform for your site from the displayed list. The associated files will be saved in your home directory or the directory of your choice.

2.3 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 a later release, 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.

2.4 UNICOS Installation/Configuration Menu System (ICMS) Issues

When using ICMS, if the same version level of a product already exists in the `/opt/ctl` directory, you will be prompted to defer the installation. If you chose to defer, a manifest check is performed on the existing product. If you chose not to defer, the software product version currently installed will be overwritten.

2.5 UNICOS Security Issues

The following issues are related to installing software on a UNICOS 9.0 or later system. These issues are relevant whether you are installing software using ICMS or CIT.

- If you are not running UNICOS Multilevel Security (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 `suidguid` 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.

2.6 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 nonnative 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 9.x 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.

2.6.1 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
```

2.6.2 Loading the Default PrgEnv Module

Use the `module load` command to load the default `PrgEnv` module. 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)sc       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.

2.6.3 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`.

2.7 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.

2.8 Product/Hardware Support Matrix

Table 1 shows the 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 Systems	CRAY PVP Systems
CAL	-	s
CAM	s	-
CF90 Compiler	s	s
C++ Compiler (includes Standard C 5.0 & 6.0 Compilers)	s	s
C++ MathPack	s	s
C++ Tools	s	s
Message Passing Toolkit (MPT)	s	s
CrayLibs	s	s
CrayTools	s	s

2.9 File System Space Requirements

Because software is installed in the `/opt/ctl` 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	CRAY MPP
cal	1000	-
cam	1000	1400
CC	8500	10200
CCmathlib	7300	11500
CCtoollib	1500	1900
cf90	5000	6200
craylibs	15100	14400
craytools	25400	24300
cvt	35400	40800
modules	600	700
mpt	6000	5200
misc	1100	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
8,500	C++ environment
15,000	CrayLibs product
25,400	CrayTools product
1,100	Miscellaneous
600	Modules product

65,500 * 2 = 131,000 (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 3.1 releases. You can install Programming Environment products in the following ways:

- Using CIT from CD-ROM
- Using ICMS from DAT
- 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 3.1 package contains the most current version of the Cray 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` option of the `View` menu lists software dependencies for products. In addition, warning and error windows are displayed by CIT if product installation would violate 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 Cray system and how to test that the paths are set up correctly.

3.1.2 Setting Up the Workstation for CIT

To set up a 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 Cray Research 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/cdrom0
% 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 do use the `-D USE_DEFAULTS` option, the Pre-install Queries window will not be displayed 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 (CIT)

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.

3.1.5 Determining Product Dependencies

The `Dependencies` option of the `View` menu lists software dependencies for products. In addition, warning and error windows are displayed if product installation would violate any product dependencies.

3.2 Using ICMS from DAT

To use ICMS, you must have `root` privileges. The login ID under which installation is done cannot have system resource limitations, such as disk quotas, memory limits, or CPU usage.

Note: You can use ICMS only to install from digital audio tape (DAT).

3.2.1 Invoking ICMS

To start ICMS, make sure that you are logged on as `root` and enter the following commands:

```
cray# cd /etc/install
cray# ./install
```

The UNICOS Installation/Configuration Menu System main menu appears.

Note: Online help is available within the UNICOS Installation/Configuration Menu System.

3.2.2 Specifying the Load Device

To specify the appropriate load device for the media on which the software was delivered, follow the descending installation menu path, as shown in the following example:

```
UNICOS Installation/Configuration Menu System
->Release media management
  ->Define load device
```

The Define Load Device menu appears:

```
Define Load Device

Customize load device parameters ==>
Media type
Physical load device
Remote or local?
Remote host name
Package images directory name
Optional package image name
CD-ROM mount point
Verbose load (cpio -v option)
Location of archive directory
Continue load upon error (ldproto -I)
Reload only damaged/missing files (-R)
Verify/list only, do not load package (-n)
Miscellaneous load options
```

From this menu, the following selections are required:

- Physical load device
- Remote or local?

Additionally, depending on your choices for the required selections, you also may be required to set values for the following options selections:

- Media type
- Remote host name
- Package images directory name
- Optional package image name

Not all options have a set value; that is, the field may be blank depending on the choices you made for Media type, Physical load device, and the Remote or Local? selections. If an option is not valid at your site, the N/A (not available) notation is displayed next to that option when selected.

3.2.3 Specifying a Media Type for CRAY J90 and CRAY Y-MP EL Systems

You can load products with or without the tape daemon running. Depending upon if the tape daemon is running or not, physical device names are mapped to media types as shown in the following list:

<u>Physical device name</u>	<u>Media type</u>
/dev/rpd03	DAT (without tape daemon)
/dev/tape/rpd03	DAT (with tape daemon)

Note: The process for loading a DAT tape device using the ICMS changed with UNICOS 9.0. The older character special interface, frequently referred to as the DDAL interface, is not supported in UNICOS 9.0 or later for CRAY J90 and CRAY Y-MP EL systems. For more information about the new character special tape interface, see the *Tape Subsystem Administration*.

If you are loading software on a CRAY J90 or CRAY Y-MP EL system, you must select J90_EL for the Media type. After you select the Media type, verify that the device name in the Customize Load Device Parameters menu is set to the appropriate device for your system and set the remote cartridge device name as shown in the following steps:

1. Select the J90_EL value for Media type in the Define Load Device menu, as follows:

```
Release Media Management
->Define Load Device
->Media type
->J90_EL
```

2. Go to the `Customize Load Device Parameters` menu by selecting the following options:

```
Release Media Management
  ->Define Load Device
    ->Customize Load Device Parameters
```

3. Set the remote cartridge (`J90_EL`) device name to `/dev/tape/rpd03` unless the device names in your tape daemon configuration file are different from this device name. If your local device names are different, use those names.

After you have set the remote cartridge device name, the `Remote cartridge (J90_EL) blocking` field should default to `32`.

Note: Before data is read from the tape, you may be asked to verify the name of the nonrewind tape device being used. If during this verification step a device name is displayed with the letter `n` attached (for example, `/dev/tape/nrpd03`), respond by entering the device name without the `n`. That is, for example, you would enter `/dev/tape/rpd03`.

3.2.4 Specifying a Remote Host Name

If the specified `Physical load device` is on a remote host, you must set the `Remote or local?` selection to `remote` and then set the `Remote host name` selection to the name of the remote host.

If you specify `remote` for the `Remote or local?` option, the user specified in the `Remote login ID` entry of the `Customize Load Device Parameters` menu must have suitable authentication (for example, a correct `.rhosts` entry) on the remote host specified in the `Remote host name` menu item.

3.2.5 Loading from Physical Media

If you are loading software from physical media, a set of files describing the contents of the tape are read to a temporary directory. The installation tool uses these files to control the reading of multipackage tape volumes. Therefore, if you have not done so already, mount the release tape onto the selected drive.

3.2.6 Loading Individual Products

Each product has an installation script that controls loading. To begin loading software onto the system, press **M** to return to the main menu and then follow the descending menu path:

```
UNICOS Installation/Configuration Menu System
->Release media management
```

Position the menu prompt next to the `Load asynchronous product/revision` action item, as shown in the following example:

```

                                Release Media Management
                                .
                                .
                                .
                                Define load device ==>
A-> Load asynchronous product/revision ...
                                .
```

Press **RETURN** to start loading software. If the `Verbose load (cpio -v option)` menu item is set to **YES**, contents of `cpio` files are echoed to the screen as they are read from the selected media. Set this item to **NO** if you want this information suppressed.

Note: The archive directory must have the value of `/opt`.

3.2.7 Selecting Packages to Load

If the package you loaded contains multiple products, the following screen appears:

```

                                Distribution Package
                                .
M-> Distribution Package Contents ==>
```

To view a list of individual products in a package, position the **M->** menu prompt at the `Distribution Package Contents` menu item, and press **RETURN**.

A form menu describing the contents is displayed as shown in the following example:

Distribution Package Contents				
Load ?	[Description]	[Vol]	[Pos]	[Directory]
-----	-----	-----	-----	-----
E-> YES	Package 1	0	0	pkgdir0
YES	Package 2	0	1	pkgdir1
YES	Package 3	0	2	pkgdir2
	.			
	.			
YES	Package N	0	n	pkgdir(n)
Keys: ^? Commands H Help Q Quit V ViewDoc W WhereAmI				

If your screen is not wide enough to display the full form menu, an > or < symbol appears in the direction of the undisplayed information. Use the > and the < keys to scroll the screen from side to side.

Note: The default is to load all packages when the Load selected products action item of the Distribution Package menu is invoked. If you do not want to load all the packages, see Section 3.2.7.1, page 22 for information on deferring package loading.

When you choose the Load selected products option, the installation tool will determine which physical media you should mount. The tool will then load all products from the media.

3.2.7.1 Deferring Loading

To defer loading of a package, position the menu prompt next to the package you do not want to load and press RETURN as shown in the following example:

Distribution Package Contents				
Load ?	[Description]	[Vol]	[Pos]	[Directory]
-----	-----	-----	-----	-----
E-> YES	Package 1	0	0	pkgdir0
	.			
	.			

A menu describing the contents of the selected package appears.

Position the menu prompt next to the Load Subpackage? menu item and select the value NO, as shown in the following example:

```

Distribution Package Contents

S-> Load Subpackage ?           NO
Description [read only]         Package 1
Volume [read only]              0
Position [read only]            0
Directory [read only]           pkgdir0

```

Press E to return to the previous menu. Repeat this for any package you do not want to load.

After you have selected those packages that will not be loaded, press E to update the form file. To complete the update to the form file, answer y at the prompt, as shown in the following example:

```

Distribution Package Contents

.
.
Do you want to update form file? (y/n): y

```

The form file will now be updated, and you will be returned to the Distribution Package menu.

3.2.7.2 Initiating Loading

To start loading of the selected products, position the menu prompt next to the Load selected products action item and press RETURN, as shown in the following screen:

```

Distribution Package

Distribution Package Contents ==>
A-> Load selected products...

```

Selected products are loaded in the order of their position on the media (from first to last). As each product is loaded, the installation script for that product is invoked and runs to completion before the next product (if any) is loaded.

3.2.8 Completing the Load

When the last package has finished loading, a message appears prompting you to press RETURN. This action returns you to the Distribution Package menu.

To exit the Distribution Package menu, press `q`. A message appears notifying you that the load is complete. A message then appears prompting you to press RETURN. Press RETURN to return to the Release Media Management menu. At this point, the software is loaded and is ready to be used or configured; you will no longer need the Build/install system portion of the installation menu.

3.2.9 Installation and Error Logs (ICMS)

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.

3.2.10 Determining Product Dependencies

You can view product dependency information through the View dependency data for select version selection of the Programming Environment Configuration Menu, which appears in Section 4.1, page 25.

3.3 Using `opt_install` from the 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 Cray system. The `opt_install` script is located in the `/opt/ctl/admin/bin` directory. Electronic upgrade procedures are described in Chapter 5, page 39.

3.3.1 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/product/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 system running one of the following operating system versions:

- UNICOS 9.0.2.6 or later
- UNICOS/mk 1.6 or later

Note: Support for `ctladmin` is available only if you are running one of the above listed operating systems. The `ctladmin` tool was not tested in combination with earlier versions of UNICOS or UNICOS/mk, and we cannot guarantee its behavior when run under those versions of the operating system.

The `ctladmin` tool was written to reflect the 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 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

To change default compiler options for the CF90 compiler, 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.

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, nondefault, 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 ...

```

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

To activate compiler options, position the menu prompt at the `Activate CF90 compiler options` action item and 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 nondefault 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 nondefault options.
- If the test is successful, the nondefault 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.

To deactivate options, 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 ...
```

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

4.1.2 Configuring ToolTalk

ToolTalk is included with the CrayTools package. The `libtt.a` and `rpc.ttdbserverd` 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)`, `ttrcp(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. From the main menu of the UNICOS Installation/Configuration Menu System, 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
```

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 action 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 alternate module file with the default 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.

To configure an alternate PrgEnv module file, 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. 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 ...
```

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.

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`.

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.

Use the Remove selected Alternate PrgEnv module action item to remove any PrgEnv module files you have created but no longer need.

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`. Then 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`. Line-mode 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
```

The following example 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
```

The following example 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
```

The following example 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.

The contact person for service and information, including information about field alerts and advisories in the *Cray Research Service Bulletin*, depends on your service agreement. For clarification about your site's service agreement, contact your local Silicon Graphics representative.

5.1 Requesting a Software Upgrade

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

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 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 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 Cray system, you also can use the `/opt/ctl/admin/bin/opt_install` script to install the product. See Section 5.3, page 41, 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. See Section 5.3, page 41, for complete information.

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 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 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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