

Compatibilities and Differences [3]

This chapter describes the user and system administration issues that are involved in the upgrade from the UNICOS 9.0 release to the UNICOS 10.0 release.

Each compatibility and difference documented in this section lists the type of user and type of hardware affected. For definitions of the terms used, see the Conventions section in the Preface.

3.1 Compatibility statement

To meet user requirements for compatibility between UNICOS 9.0 and UNICOS 10.0, upward compatibility is provided in subsequent releases of the system and products in the following areas:

- Upgrade paths
- UNICOS user commands
- Standard language syntax, semantics, and Cray Research extensions
- Absolute binary code
- Relocatable binary code

This section describes any changes introduced since UNICOS 9.0 for the following reasons:

- Hardware changes
- Third-party software changes
- Improved software design or numerical techniques
- Bug fixes

3.2 UNICOS 10.0 support for J90 VME-based and J90se GigaRing-based systems

Initial release: UNICOS 10.0

Users affected: all

Hardware supported: CRAY J90 systems with VME I/O and CRAY J90se systems with GigaRing based I/O.

UNICOS 10.0 is the first release to support both J90 systems with VME I/O and J90se systems with GigaRing based I/O. In addition, customers with J90se CPUs and VME I/O can now compile as if the system is a J90se rather than a CRAY Y-MP.

3.3 Tested and supported upgrade paths

Sites running any version of UNICOS 9.0 or any 9.X IDS restricted releases on one of the supported hardware platforms can upgrade directly to UNICOS 10.0.

Customers running any version prior to UNICOS 9.0 must first perform an upgrade installation to the UNICOS 9.0 release, then upgrade to UNICOS 10.0.



Warning: Checkpoint and restart are not supported across upgrades from the UNICOS 9.0 operating system (or revisions) to the UNICOS 10.0 operating system. Make sure all running job requests are complete before you upgrade to the UNICOS 10.0 operating system.

Initial installs of GigaRing-based systems have been supported since UNICOS 9.2; while support of initial installs of Model-E based systems stopped after UNICOS 9.1.

Note: If you have a *non*-GigaRing system and you wish to upgrade to a GigaRing-based system, you must perform an initial install.

For more information, see the following publications:

- *UNICOS Installation Guide for CRAY J90 Model V based Systems*, Cray Research publication SG-5271 10.0
- *UNICOS Installation Guide for CRAY J90se GigaRing based Systems*, Cray Research publication SG-5296 10.0
- *UNICOS Installation Guide for CRAY C90, CRAY T90, and CRAY T90 IEEE Model E based Systems*, Cray Research publication SG-5297 10.0
- *UNICOS Installation Guide for CRAY T90 and CRAY T90 IEEE GigaRing based Systems*, Cray Research publication SG-5298 10.0

Contact your Cray Research representative for further information.

3.4 Operating system

The following sections describe operating system changes for UNICOS 10.0 that differ from UNICOS 9.0.

3.4.1 UNICOS 8.0 release no longer supported

Initial release: UNICOS 9.1 (announced)

Users affected: all

Hardware supported: all Cray Research systems

Support for the UNICOS 8.0 release ended on September 30, 1996.

For Cray systems with an IOS model D, UNICOS 8.0 and its related products were supported with updates, as needed, from September 30, 1996, through September 30, 1997.

3.4.2 Continued support for GigaRing

Initial release: UNICOS 9.3

Users affected: system administrators and site analysts

Hardware supported: Cray T90 systems with GigaRing-based I/O, Cray J90 systems with GigaRing-based I/O

The UNICOS 10.0 system supports the sending and receiving of message and memory-mapped register (MMR) packets to GigaRing I/O nodes, introduced with UNICOS 9.3. The `/dev/fmsg` directory contains the character special nodes that provide a general purpose interface from the UNICOS system to the GigaRing message complex. These nodes are created with the `mkfm(8)` command. For information on the files in `/dev/fmsg`, see the `fmsg(8)` man page.

The `fping(8)` command sends an echo packet to a GigaRing node. The `mmr(8)` command reads or writes a GigaRing MMR register. These commands use the files in the `/dev/fmsg` directory.

For more information, see the `fmsg(4)`, `fping(8)`, `mkfm(8)`, and `mmr(8)` man pages.

3.4.3 Ability to disable core files reinstated

Initial release: UNICOS 9.3

Users affected: all

Hardware supported: all Cray Research systems

The `limit` command has been changed to allow you to disable the creation of core files. This feature was removed from UNICOS 8.0, but was reinstated in the UNICOS 9.3 release.

This feature adds an extra option to the `limit(1)` command and `limit(2)` system call. These options allow you to disable core file creation.

The `limit(1)` command syntax for this feature is as follows:

```
limit -d nocore
```

The `limit(2)` system call syntax has been enhanced to accept a new limit of `NO_CORE_FILES`. For example:

```
limit (C_PROC, 0, LCORE, NO_CORE_FILES)
```

For more information, see the `limit(1)` and `limit(2)` man pages.

3.4.4 Support removed for `libwatch.a` library

Initial release: UNICOS 9.3

Users affected: all

Hardware supported: all Cray Research systems

The `libwatch.a` library and the `watchword(7)` man page are no longer supported. They have been removed with the CDBX debugger and CF77 compiler.

3.4.5 New capability added to UNICOS source manager (USM)

Initial release: UNICOS 10.0

Users affected: administrators

Hardware supported: all Cray Research systems

The UNICOS source manager has been upgraded for UNICOS 10.0: a new PL type, "F", has been added to support Editions.

See Section 2.4.8, page 13 for more information. Also, see *UNICOS Source Manager (USM) User's Guide*, Cray Research publication SG-2097 10.0.

3.5 Installation, configuration and utilities

This section describes installation, configuration and utilities changes for UNICOS 10.0 that differ from UNICOS 9.0.

3.5.1 Checkpoint / restart warning



Warning: Checkpoint and restart are not supported across upgrades from the UNICOS 9.0 operating system (or revisions) to the UNICOS 10.0 operating system. Make sure all running job requests are complete before you upgrade to the UNICOS 10.0 operating system.

3.5.2 Common installation tool (CIT)

Initial release: UNICOS 9.2, UNICOS 9.3 for CRAY T90 Model E based systems and GigaRing based systems, UNICOS 10.0 for CRAY C90 systems and CRAY J90 Model V based systems

Users affected: administrators

Hardware affected: all Cray Research systems

The Common Installation Tool (CIT) is now the required tool for all hardware platforms for initial and upgrade software installations. Subsequently, no other installation tools are supported.

As a result of the CIT use requirement, sites must address several issues to upgrade to UNICOS 10.0:

- The OWS or console must be on the same network as the Cray mainframe to install UNICOS 10.0. If you wish, you can remove the console from the network after the software has been installed.
- You site's security requirements may demand dedicated time to install or upgrade to UNICOS 10.0.

For more information, see the *Common Installation Tool (CIT) Reference Card*, Cray Research publication SQ-2218.

3.5.2.1 CD-ROM media

Initial release: UNICOS 10.0

Users affected: administrators

Hardware affected: all Cray Research systems supported by UNICOS 10.0

Beginning with UNICOS 10.0 and the requirement to use CIT, DAT media will be discontinued, and all Cray software will be shipped on CD-ROM media. As a result, all asynchronous software ordered after you upgrade to UNICOS 10.0 will be packaged on CD-ROM, and can only be loaded through CIT.

3.5.3 Docview utilities not supported

Initial release: UNICOS 9.2

Users affected: all

The UNICOS 9.0 release was the final major release that delivered documentation in Docview format.

Cray Research now provides online versions of manuals through the DynaWeb online information server.

A DynaWeb CD-ROM containing the documentation is included with the release.

As a result of this change in support, the following configuration files are now obsolete:

- /etc/config/docpath
- /etc/config/docview_config

See Chapter 4, page 81 for more information.

3.5.4 File manager, `xfm(1)`, not supported

Initial release: UNICOS 9.2

Users affected: end user

Hardware supported: all Cray Research systems

The UNICOS 9.0 release was the final major release supporting the File Manager, `xfm(1)`. The `xfm(1)` utility is a prototype that provides a visual tool, based on the X Window System, to perform file management for the UNICOS system. When `xfm(1)` is retired, there will be no X Window System-based file manager tool on the UNICOS operating system. In the future, the Common Desktop Environment (CDE) will provide a file manager as part of the desktop; however, CDE may not be available at the time `xfm(1)` is retired.

3.5.5 Process monitor, `xproc(1)`, not supported

Initial release: UNICOS 9.2

Users affected: end users

Hardware supported: all Cray Research systems

The UNICOS 9.0 release was the final major release supporting the process monitor `xproc(1)`. The `xproc(1)` utility provides a visual tool, based on the X Window System, that displays and controls UNICOS processes and NQE jobs. Users who install NQE will be able to display and control NQS jobs. The `ps(1)` and `kill(1)` commands can be used to display and control UNICOS processes.

3.5.6 `getconf(1)` user command moved

Initial release: UNICOS 9.2

Users affected: administrators, programmer, end users

Hardware supported: all Cray Research systems

The `getconf(1)` user command has been moved from `/usr/bin` to `/bin`. If the entire *pathname* of this command is used in any application, this directory change must be noted. This change was made so that `getconf` would be available for use during startup when the `/usr` directory is not yet mounted.

3.5.7 Build menu support for J90 source packages

Initial release: UNICOS 9.3

Users affected: system administrators

Hardware supported: CRAY J90 systems

The install tool build menu now allows full system builds for CRAY J90 systems from within the install tool. A new selection, `Release Type`, has been added to the main build menu for this purpose. This allows you to specify which system components have been installed in `/usr/src`, and to control which components will be built.

If you select `Executable`, only the `uts` component of the system will be built. Otherwise, all standard components of `/usr/src` are built whether or not the system is a CRAY J90.

Note: On CRAY J90 systems, the default release type is `executable`. The default on all other systems is `source`.

3.5.8 MLS and Security Privileges for Installation and Upgrades

Initial release: UNICOS 10.0

Users affected: administrators

Hardware affected: all Cray Research systems supported by UNICOS 10.0

You must have appropriate MLS and security privileges to upgrade to UNICOS 10.0. Accordingly, there are several issues which can determine whether or not you are able to upgrade in multi-user mode, or in dedicated time with networks up and running:

- If your site does not run MLS, or if you run `MLS PRIV_SU` with `PALS`, you only need super-user (root) privileges to install UNICOS 10.0.
- If you are running MLS TFM, you must have super-user (root) privileges to install UNICOS 10.0. You must also have the `reclsfy`, `install` and `suidgid` permissions, authorized categories `secadm` and `sysfil`, and maximum integrity class 16.
- If you are running Trusted UNICOS, you must reboot your system with the `PRIV_SU` kernel before you can install UNICOS 10.0. Once your system is rebooted, you will need super-user (root) privileges to install UNICOS 10.0.

Note: You may need dedicated time to reboot your system.

- If you run UNICOS without the `NNETW_RCMD_COMPAT` bit set in the `SECURE_NET_OPTIONS` bit mask, you must reboot your system with this bit enabled. This is because CIT uses `.rhosts` to facilitate the transfer of packages from the J90 console to the Cray mainframe.

If you plan to upgrade from UNICOS 10.0 to the next release of UNICOS 10.0 and your site is running with PAL only and no `PRIV_SU`, you must:

1. Reboot your system with a `PRIV_SU` kernel during dedicated time.
2. Perform the software upgrade.
3. Go back to running PAL only with out `PRIV_SU`.

Cray Research does not support direct upgrades from PAL-only to PAL-only systems.

3.6 Multilevel Security

The following sections describe the differences between UNICOS 9.0 and UNICOS 10.0 regarding multilevel security (MLS).

Note: All of these items were first announced in the *UNICOS Release Overview*, Cray Research publication RO-5000 9.0.

3.6.1 `PRIV_TFM` support removed from multilevel security

Users affected: administrators, end users, operators

Hardware supported: all Cray Research systems

Support for UNICOS MLS systems with `PRIV_TFM` have been dropped as of UNICOS 10.0, and the `PRIV_TFM` configuration option is no longer available through the UNICOS Installation/Configuration Menu system.

Support for the `tsubcmd(8)` and `udbcmd(8)` commands and their associated man pages have been dropped. Also, all references to 7.0 `TFMgmt` and or `PRIV_TFM` have been removed from UNICOS 10.0 documentation.

Support for the `SYSTEM_ADMIN`, `SECURE_SYSTEM_CONSOLE`, and `SECURE_OPERATOR_CONSOLE` configuration parameters has been dropped with UNICOS 10.0.

System calls and commands that manage `PRIV_TFM` user classes, file classes, and file categories are still available in UNICOS 10.0. However, setting user class, file class, and file category attributes are no longer useful because UNICOS no longer uses those attributes to make security-related decisions.

3.6.2 Password required for `sysadm` category to `su`

Users affected: administrators

Hardware supported: all Cray Research systems

A user with an active `sysadm` category can no longer use the `su(1)` command without supplying a password. This change affects sites using UNICOS MLS systems with privilege assignment lists (PALs). The supported PAL for `/bin/su` was updated to remove the `sysadm` PAL category record. The `su(1)` man page was updated to reflect this change.

This change was introduced to prevent users with a `sysadm` category from gaining other types of administrative capabilities by invoking the `su(1)` command without a password. This would enable them to assume the identity of another administrator, and subsequently use facilities that perform reauthentication.

Sites that do not approve of the new restriction and are willing to assume the risks of preserving the previous functionality, can add the original `/bin/su` PAL definition to the `/etc/config/localpriv.db` file.

3.6.3 UNICOS non-MLS and MLS systems merged

Users affected: administrators, end users

Hardware supported: all Cray Research systems

With the UNICOS 9.2 release, support for the `CONFIG_SECURE` parameter was dropped, and all MLS features were incorporated into the UNICOS system.

Combining the non-MLS and MLS systems makes the security features, such as access control lists (ACLs) and security auditing, available to all Cray Research customers. Use of these security features is still optional. Sites can choose to use only those features that are applicable to their sites.

For sites that have been using a UNICOS non-MLS system, this feature provides a UNICOS configuration that has the same behavior as the former UNICOS non-MLS system. For sites that have been using a UNICOS MLS system, this feature provides a UNICOS configuration that has the same behavior as the former UNICOS MLS system. Commands, libraries, and system calls have not changed. However, interfaces which were formerly available only on UNICOS MLS systems are now generally available on all UNICOS systems.

Changes have been made to some of the default settings of options in the UNICOS Installation/Configuration Menu System. These changes do not impact sites that import their previous configurations.

3.6.4 Trusted UNICOS configuration option removed

Users affected: administrators

Hardware supported: all Cray Research systems

As of UNICOS 10.0, the functionality of the Trusted UNICOS system has been retained, but the `CONFIG_TRUSTED` option, which enforces conformance to the strict B1 configuration, is no longer available.

All references to Trusted UNICOS systems have been removed from UNICOS 10.0 documentation.

3.6.5 Supported system management configurations in UNICOS 10.0

Users affected: administrators

Hardware supported: all Cray Research systems

System management now supports the option of the all-powerful root administrative role. It also supports the definition of roles by assigning each role an administrative category. For example, the security administrator role is assigned the `secadm` category, while the operator role is assigned the `sysops` category. Categories are used in conjunction with the UNICOS privilege assignment list (PAL) based privilege mechanism to assign different administrative tasks to each administrative role.

UNICOS 10.0 MLS systems support the following mechanisms to enforce the assigning of privileges:

- a super user (`PRIV_SU`) system with PALs
- a non-super user (`non-PRIV_SU`) system with PALs

As of UNICOS 10.0, PALs are applied on all systems and continue to support only a subset of UNICOS software.

Sites must decide which UNICOS 10.0 system management configuration they want to use. Sites that do not need the strict separation of administrative roles will probably wish to use the `PRIV_SU` system with PALs. Sites that need more strict security measures will probably wish to use the `non-PRIV_SU` system

with PALs. Regardless, PALs must be assigned on all UNICOS 10.0 systems. Once assigned, their effect is transparent on systems administered only by the root user.

The PRIV-SU system without PALs that was supported in UNICOS 8.0 and UNICOS 9.0 is not supported in UNICOS 10.0.

3.6.6 Reduction of security-related configuration options

Users affected: end users, administrators

Hardware supported: all Cray Research systems

The number of configuration options related to security has been reduced for UNICOS 10.0.

The configuration options that will be deleted are as follows:

- MAC_COMMAND
- MLS_INTEGRITY
- PRIV_TFM
- SECURE_MLSDIR
- SECURE_MOUNT
- SECURE_REMOTE
- STAT_RESTRICT

Removal of these configuration options may cause migration issues for sites that upgrade from a UNICOS 9.0 MLS system to a UNICOS 10.0 system. All UNICOS 10.0 documentation has been updated to reflect the removal of these options.

The following list describes the impact of removing these configuration options. Restrictions, where appropriate, can be bypassed by an authorized administrator.

<u>Option</u>	<u>Impact</u>
MAC_COMMAND	With this option removed, subjects are permitted to view information for an object only when the subject dominates the object. This is consistent with MLS mandatory access control (MAC) policy.

MLS_INTEGRITY	This UNICOS MLS option is not currently used.
PRIV_TFM	See Section 3.6.1, page 53 for more information.
SECURE_MLSDIR	With this option removed, a user with a label that dominates but does not equal the label of the parent directory is no longer allowed to create a subdirectory in that parent directory. Instead, a user at the label of the parent directory can create a subdirectory with a higher label, or upgrade an existing subdirectory, provided that the subdirectory is empty and is initially at the same label as the user.
SECURE_MOUNT	This option is obsolete with UNICOS 10.0 because UNICOS non-MLS and MLS systems have been merged (see Section 3.6.3, page 54). All file systems are now treated as labeled file systems.
SECURE_REMOTE	This option is not used.
STAT_RESTRICT	With this option removed, a subject can perform a <code>stat(2)</code> operation for only an object that the subject dominates. This is consistent with MLS mandatory access control (MAC) policy.

3.6.7 Default value of the `FSETID_RESTRICT` configuration parameter changed

Users affected: administrators

Hardware supported: all Cray Research systems

Beginning with UNICOS 10.0, the default value of the `FSETID_RESTRICT` configuration parameter is `OFF`. The default value on UNICOS 9.0 MLS systems was `ON`.

3.6.8 Changes to `su` password use for system administrators

Users affected: administrators

Hardware supported: all Cray Research systems

A user with an active `sysadm` category can no longer use the `su(1)` command without first supplying a password. This change affects UNICOS MLS systems with privilege assignment lists (PALs). The supported PAL for `/bin/su` was

updated to remove the `sysadm` PAL category record. In addition, the `su(1)` man page has been updated to reflect this change.

This change was introduced to prevent users with a `sysadm` category from gaining other types of administrative capabilities by invoking the `su` command without a password to assume the identity of another administrator, and subsequently use facilities that perform reauthentication with that new user ID.

Sites that do not approve the new restriction, and are willing to assume the risks of preserving the previous functionality, can add the original `/bin/su` PAL definition to the `/etc/config/localpriv.db` file.

3.7 Diagnostics

The following sections describe compatibility issues affecting online diagnostics.

3.7.1 Diagnostics installed

Initial release: UNICOS 9.2

Users affected: administrators

Hardware supported: all Cray Research systems

Beginning with the UNICOS 9.2 release, the online diagnostics are delivered as part of the UNICOS release.

3.7.2 Change of installation location and usage for diagnostics

Initial release: UNICOS 9.2

Users affected: administrators, system analysts

Hardware supported: all Cray Research systems

The online diagnostics have typically been installed into `/ce` and have used `/ce` as their working directory (with the exception of `ddms` and `dgdemon`, which were installed in `/etc` and used `/ce` for log file and temporary file storage). With the release of UNICOS 9.2, the online diagnostics were integrated into the system directories so that administrators could more easily use the diagnostics. The diagnostic binaries will now reside in `/etc/diag` with the exception of `dgdemon`, `ddms`, `diagserver`, `oldmon`, `xdi`, and `xdms`, which will be installed in `/etc`. A `/usr/spool/diag` directory is created at

installation for logs, seeds, and other files created by the diagnostics. The `/tmp` directory will be used instead of `/ce/tmp` for temporary files.

The `/ce` directory will remain and be used as a basic user account for diagnostics. With UNICOS 10.0, however, sites can move the `/ce` user account to `/usr` if desired. Formerly, diagnostic binaries were linked to `/ce/bin`.

3.7.3 Changed network diagnostic directory tree

Initial release: UNICOS 9.2

Users affected: administrators, system analysts

Hardware supported: all Cray Research systems except CRAY J90 series

The release directory structure for the network diagnostics has been extended to allow the integration of additional network diagnostic applications. The directory tree beginning at `/usr/src/diag/dgnet` previously contained the subdirectories `netC` and `netF`. It now contains the subdirectories `olnet`, `vst`, and `vht`.

See the *OLNET Online Diagnostic Network Communications Program Maintenance Manual for UNICOS*, Cray Research publication SD-1021, for general OLNET information.

3.7.4 UNICOS 10.0 final release to support `olnet(8)` for HIPPI and FDDI

Initial release: UNICOS 9.1

Users affected: administrators, system analysts

Hardware supported: Cray PVP systems, except CRAY J90 series

Beginning with the UNICOS 10.0 release, `olnet(8)` support for the High Performance Parallel Interface (HIPPI) and the Fiber Distributed Data Interface (FDDI) will end. In UNICOS 10.0, the equivalent diagnostic capabilities are provided for HIPPI by `vht(8)` and for FDDI by `vft(8)`.

Additional diagnostic support will be added for Asynchronous Transfer Mode (ATM) by `vat(8)` and by `vet(8)` for Ethernet. The remaining functionality of `olnet(8)`, which includes FDR-4, NSC, FEI-3, and MPP I/O support, will be in maintenance mode until hardware support for those devices ends. In maintenance mode, only critical and selected urgent bugfixes are provided.

For more information see the `vht(8)`, `vst(8)` and `olnet(8)` man pages, and the *OLNET Online Diagnostic Network Communications Program Maintenance Manual for UNICOS*, Cray Research publication SD-1021.

3.7.5 Square root and divide functions

Initial release: UNICOS 9.2

Users affected: all

Hardware supported: all Cray Research systems

The online IEEE CPU diagnostics do not test the IEEE floating-point square root or floating-point divide functions against simulated results.

IEEE floating-point square root and divides are tested in `olcsvc`, where scalar results are compared against vector results. `olcsvc` will detect intermittent failures, but will not detect a solid failing functional unit.

Cray Research is committed to including these diagnostic functions in future UNICOS releases.

3.7.6 `vht(8)` command modified for GigaRing based systems

Initial release: UNICOS 9.2

Users affected: administrators, system analysts

Hardware supported: all Cray Research systems with GigaRing based I/O

Due to driver changes, the `vht(8)` command on a GigaRing system cannot be used in conjunction with `vht(8)` on a Mode E system. Users can access the new `vht(8)` command through the `xdi(8)` graphical user interface. A compatibility mode is available to allow the use of Model E style options.

For more information, see the `vht(8)` and `xdi(8)` man pages.

3.7.7 `unitap(8)` command is not supported on GigaRing systems

Initial release: UNICOS 9.2

Users affected: administrators, system analysts

Hardware supported: all Cray Research systems with GigaRing based I/O

On Cray Research systems with GigaRing based I/O, the `unitap(8)` command has been replaced by the `vtt(8)` utility. The `vtt(8)` utility can be accessed through the `xdi(8)` graphical user interface.

For more information, see the `vtt(8)` and the `xdi(8)` man pages.

3.7.8 `vtt(8)` replaces `unitap(8)`

Initial release: UNICOS 10.0

Users affected: administrators, system analysts

Hardware supported: all Cray Research systems with GigaRing-based I/O

On GigaRing-based systems, `vtt(8)` replaces `unitap(8)` in UNICOS 10.0.

For more information see the `vtt(8)` man page.

3.7.9 `o1hpa(8)` not supported

Initial release: UNICOS 10.0

Users affected: administrators, system analysts

Hardware supported: all Cray Research systems with GigaRing-based I/O.

`o1hpa(8)` will not be supported on GigaRing-based systems in UNICOS 10.0. Instead, error information can be viewed through `errpt(8)` (see Section 2.9.3, page 40) and the GUI `sysmon(8)` interface on the SWS.

For more information, see the *SWS-ION Administration and Operations Guide*, Cray Research publication SG-2204, and the `errpt(8)` and `sysmon(8)` man pages.

3.8 Programming environments

The following sections describe compatibility issues affecting programming environments.

3.8.1 Support for CF77 Programming Environment ending

Initial release: 9.1

Users affected: all

Hardware supported: all Cray Research systems

The CF77 Programming Environment (PE) is no longer available with UNICOS operating system releases. Support for the CF77 PE ended on September 30, 1996.

3.8.1.1 Fortran rules for `make` and `nmake` changed

As a result of the removal of the CF77 gen compiler, the Fortran rules for `make` and `nmake` have been changed to use `f90` as the default.

For more information, see the `make(1)` and `nmake(1)` man pages.

3.8.2 CAL assembler separate from UNICOS

Initial release: UNICOS 9.2

Users affected: all

Hardware supported: all Cray Research systems except CRAY T90 IEEE

The Cray Assembly Language (CAL) assembler is no longer included with the UNICOS operating system. Instead, CAL must be ordered with Programming Environment (PE) release packages. (For the CRAY T90 series with IEEE floating-point arithmetic, this change began with the UNICOS 9.1 release.)

CAL is still licensed as part of the UNICOS operating system — if customers are licensed for UNICOS, they are licensed for CAL.

3.9 Networking and communications

The following sections describe compatibility issues affecting network connectivity and communications.

3.9.1 `netmon`, `xnetmon`, and `xsnmpmon` networking tools support removed

Initial release: 9.1

Users affected: all

Hardware supported: all Cray Research systems

Beginning with UNICOS 10.0, the following networking tools will not be supported: `netmon`, `xnetmon`, and `xsnmpmon`.

Beginning with UNICOS 10.0, user displays that provide monitoring capabilities will no longer be supported. Instead, status information will be provided with Simple Network Management Protocol (SNMP) software. This software will support standard management information bases (MIBs) for these industry devices.

User displays providing monitoring information will only be available from third-party management stations.

For more information, see *UNICOS Networking Facilities Administrator's Guide*, Cray Research publication SG-2304 10.0, or contact your Cray Research representative.

3.9.2 4.4BSD upgrade to routing

Initial release: UNICOS 9.1

Users affected: administrators, operators, system analysts

Hardware supported: all Cray Research systems

Beginning with the UNICOS 9.1 release, the new `sact1(2)` system call has been added to support and emulate the 4.4BSD-lite `sysctl(3)` system call. This upgrades the routing code to 4.4BSD-lite. This has resulted in the following changes:

- `intro(4)` man page
 - Changed routing table entry format
- `netstat(1B)` man page
 - Added `-k` option, which forces `netstat(1B)` to use `/dev/kmem` to obtain data, rather than system calls.
 - Added `-A` option, which causes the kernel memory addresses of route data structures to be printed.
- Removed section 2.4, "Circuit-switched network support," from the *UNICOS Networking Facilities Administrator's Guide*, Cray Research publication SG-2304
- `rlogin(1)` man page
 - Added `-E` option, which stops any character from being recognized as an escape character.
 - Added `-L` option, which allows `rlogin(1B)` to be run in `-opost` mode.

- `traceroute(8)` man page
 “University of California” portion of the copyright notice changed.
- `ping(8)` man page
 “University of California” portion of the copyright notice changed.

The following options were added:

<u>Option</u>	<u>Description</u>
-c	Count
-f	Floods ping
-i	Wait
-l	Preload
-n	Numeric output
-p	Pattern
-q	Quiet output
-R	Records route
-s	Packet size

- Support for data size and count options was removed. Information was added about Internet control message protocol (ICMP) packets, duplicate and damaged packets, different data patterns, and transistor-transistor logic (TTL) details.
- `klogin(1)` man page

Added the following options:

-E	Stops any character from being recognized as an escape character.
-K	Turns off all Kerberos authentication.
-L	Allows the <code>klogin</code> process to be run in the <code>-opost</code> mode.

For more information, see the `intro(4)`, `netstat(1B)`, `rlogin(1B)`, `traceroute(8)`, `ping(8)`, and `klogin(1)` man pages.

3.9.3 OSI no longer supported

Initial release: 9.1

Users affected: users of the OSI optional product

Hardware supported: all Cray Research systems

UNICOS 9.0 was the final major release supporting the Open Systems Interconnection (OSI) protocol family, `AF_ISO`, at the socket level. Support for OSI lower layers in the UNICOS operating system and for the OSI unbundled product will not be available at UNICOS 10.0.

All OSI references have been removed from the *UNICOS Networking Facilities Administrator's Guide*, Cray Research publication SG-2304, and from the following man pages:

- `accept(2)`
- `airlog(3C)`
- `airlogger(1)`
- `fta(8)`
- `fta.conf(5)`
- `ftp(1B)`
- `gethost(3C)`
- `gethostinfo(3C)`
- `getnet(3C)`
- `getnetinfo(3C)`
- `hosts(5)`
- `hyroute(8)`
- `ifconfig(8)`
- `initif(8)`
- `intro(4D)`
- `intro(5)`
- `mknod(8)`
- `netstart(8)`
- `netstat(1B)`

- `nettest(8)`
- `network(3C)`
- `networks(5)`
- `nfs(4P)`
- `rcmd(3C)`
- `route(4P)`
- `route(8)`
- `services(5)`
- `trcollect(8)`
- `trformat(8)`

3.9.4 OSI name resolution code removed from `libc`

Initial release: UNICOS 9.2

Users affected: all

Hardware supported: all Cray Research systems

The support of OSI name resolution code has been removed from `libc`. The following external and documented entry points have been removed:

- `endhostinfo()`
- `endnetinfo()`
- `endservinfo()`
- `getnetinfo()`
- `getservinfo()`
- `sethostinfo()`
- `setnetinfo()`
- `setservinfo()`

A new entry point, `sethostlookup()`, has been added to the `gethostbyaddr(3)` routine. The following definitions have been removed from the `netdb.h` file:

- `struct hostinfo`
- `struct hostserv`
- `struct netinfo`
- `GHI_HOST_ADDR`
- `GHI_SERV_ADDR`

These changes will enable the `getnetby*()` routines to inquire for network name mappings from the name server, in addition to using `/etc/networks`.

3.9.5 Station and USCP networking products not supported

Initial release: UNICOS 9.2

Users affected: all

Hardware supported: all Cray Research systems

The UNICOS 9.0 release was the final major release supporting Cray Research station products and the UNICOS station call processor (USCP).

The following USCP man pages were removed for the UNICOS 9.2 release:

- `acquire(1)`
- `dispose(1)`
- `fetch(1)`
- `uscpblock(1)`
- `uscpmsg(1)`
- `uscpping(1)`
- `uscpqsub(1)`
- `uscproute(1)`
- `uscp_config(5)`
- `uscp.rc(5)`

- uscpssaf(5)
- uscpcore(8)
- uscpd(8)
- uscpdevs(8)
- uscpdump(8)
- uscpfix(8)
- uscplink(8)
- uscpops(8)
- uscpques(8)
- uscpssaf(8)
- uscpstat(8)
- uscpstrs(8)
- uscpترم(8)
- uscptrace(8)

3.9.6 DCE/DFS version upgraded to 1.1

Initial release: UNICOS 9.2

Users affected: administrators, programmers, system analysts

Hardware supported: all Cray Research systems

The Distributed Computing Environment/Distributed File System (DCE/DFS) has been updated to the 1.1 version for this UNICOS release. This upgrade includes the following new Open Software Foundation (OSF) and Cray Research features:

- Improved and simplified DCE administration
- Security enhancements
- Generic Security Service Application Program Interface (GSS_API)
- Internationalized interfaces

New Cray Research features:

- DFS ID mapping
- Multilevel security (MLS)
- Integrated DCE login and enhanced authentication configuration
- Single sign-on

The CRAY DCE Client Services 1.1 release and Cray DCE DFS Server 1.1 release are separately licensed products with charges attached. These products use are licensed by FLEXlm.

3.9.7 Routing upgraded to BIND 4.9.3 release

Initial release: UNICOS 9.2

Users affected: all

Hardware supported: all Cray Research systems

The network routing in the UNICOS operating system has been upgraded from BIND 4.9.3beta9, which the UNICOS 9.0 release was based upon, to the BIND 4.9.3 release, the current release level of BIND. This upgrade does not include any additional functionality or documentation.

3.9.8 sendmail upgraded to version 8.7.5

Initial release: UNICOS 9.2

Users affected: all

Hardware supported: all Cray Research systems

The `sendmail(8)` command was upgraded to version 8.7.5 for the UNICOS 9.2 release. This upgrade brings the UNICOS `sendmail` utility up to the current released version.

The following options have been added to `sendmail`:

<u>Option</u>	<u>Description</u>
-b	Specifies a minimum number of disk blocks
-h	Specifies a maximum hop count
-k	Specifies connection cache size

- K Specifies connection cache time-out
- p Set SMTP privacy flags

The following list describes the mailer flags that have been added to `sendmail`:

- a Specifies use of ESMTP when creating a connection
- b Adds a blank line to the end of each message
- c Strips comments from address headers
- o Adds sender as recipient of each message
- w User must have a password file entity

For more information about `sendmail 8.7.5`, see the *UNICOS Networking Facilities Administrator's Guide*, Cray Research publication SG-2304.

For sites upgrading from a previous UNICOS release, the upgrade in `sendmail` may cause some incompatibilities.

3.9.9 NQS `config.h` file removed

Initial release: UNICOS 9.2

Users affected: administrators

Hardware supported: all Cray Research systems

The NQS `/usr/src/net/nqe/src/nqs/include/config.h` file is no longer available. The configuration settings in the `config.h` file were moved to the `/etc/nqeinfo` file, which is included with the Network Queuing Environment (NQE) product. The `/etc/nqeinfo` file provides the capability to customize NQS without recompiling NQS programs. The settings within the `/etc/nqeinfo` file are available at run time.

This change was made to support Cray Research's continuing move towards binary releases, to provide a more consistent interface for NQS and to simplify NQS customization across NQE platform.

3.9.10 NQS and FTA NQE components removed from the UNICOS package

Initial release: UNICOS 9.2

Users affected: all

Hardware supported: all Cray Research systems

The Network Queuing System (NQS) and File Transfer Agent (FTA) subset of the Network Queuing Environment (NQE) are no longer included with the UNICOS release package. As of the NQE 3.1 release, the NQE product is packaged and released separately from the UNICOS release.

The complete NQE product is available beginning with the NQE 3.1 release for all Cray Research UNICOS systems. The NQE product consolidates the NQX, NQS, and FTA software components; they are now distributed as one product.

To provide continuity for systems currently using only NQS and/or FTA, CRAY PVP UNICOS customers that do not have an NQE license still have the option to run the NQE subset (NQS and FTA). The NQE subset (NQS and FTA) continues to be available at no additional charge for CRAY PVP systems. However, all new NQE features will be available only on systems licensed for NQE. For example, Distributed Computing Environment (DCE) support is available if you have an NQE license.

The NQE 3.1 release provides a consistent product for all supported platforms, and it consolidates the support for NQE and the NQE subset products.

3.9.10.1 NQS, NQX, and FTA commands repackaged

The following NQS, NQX, and FTA commands and related man pages were removed from the UNICOS release package and are included with the NQE release package only:

- cevent(1)
- cload(1)
- cqdel(1)
- cqstat(1)
- cqstat1(1)
- cqsub(1)
- ftua(1)
- qalter(1)
- qchkpnt(1)
- qdel(1)
- qlimit(1)

- qmsg(1)
- qping(1)
- qstat(1)
- qsub(1)
- rft(1)
- nqeapi(3)
- nqe_get_policy_list(3)
- nqe_get_request_ids(3)
- nqe_get_request_info(3)
- fta.conf(5)
- cs_support(7)
- nqe(7)
- ccollect(8)
- csuspend(8)
- fta(8)
- nlbconfig(8)
- nlbpolicy(8)
- nlbserver(8)
- nqeinit(8)
- nqestop(8)
- nqsdaemon(8)
- nqsfts(8)
- qconfigchk(8)
- qmgr(8)
- qstart(8)
- qstop(8)

NQS and FTA are now documented only in the NQE documentation set.

3.9.11 Support for full X11 clients removed

Initial release: UNICOS 9.2 (announced at UNICOS 9.1)

Users affected: all

Supporting hardware: all Cray Research systems

The X Consortium has decided to discontinue support of a number of programs as of X11 release 6. Therefore, Cray Research no longer supports the affected features with X11 release 6.

The following clients will still be available to the public in the X Consortium `contrib` directory:

<u>Client</u>	<u>Description</u>
<code>listres</code>	List resources in widgets
<code>viewres</code>	Graphical class browser for Xt
<code>xcalc</code>	Scientific calculator for Xt
<code>xditview</code>	Display distroff output
<code>xdpr</code>	Dump an X window directly to a printer
<code>xedit</code>	Simple text editor for X Window System
<code>xfontsel</code>	Point and click interface for selecting X11 fonts
<code>xload</code>	System load average display for X Window System
<code>xpr</code>	Print an X window dump

The `contrib` directory will remain available through anonymous `ftp` at `ftp.x.org`.

Note: The X Consortium is also discontinuing support for `xman`, a manual page display for the X Window System. Cray Research will continue to support `xman` in UNICOS 10.0 and in future Cray Visualization Toolkit (CVT) releases.

3.9.12 X11 removed from the UNICOS source tree

Initial release: 9.3

Users affected: all

Hardware supported: all Cray Research systems

Customers will no longer receive source code for X11 release 6 with UNICOS releases.

The X Consortium discontinued support of a number of programs as of X11 release 6. As a result, Cray Research discontinued support of the affected features in UNICOS 9.2 (see Section 3.9.11, page 73).

3.9.13 Pre-UNICOS 9.2 `sendmail` queue files incompatible with UNICOS 9.2 and later

Initial release: UNICOS 9.2

Users affected: all

Supported hardware: all Cray Research systems

After UNICOS 9.2, queue files generated by `sendmail` became incompatible with those generated before UNICOS 9.2. As a result, pre-UNICOS 9.2 `sendmail` queue files can be delivered by the new version of `sendmail` (see Section 3.9.8, page 69), but queue files generated by the new `sendmail` can not be delivered by the older version.

For further information, see the *UNICOS Networking Facilities Administrator's Guide*, Cray Research publication SG-2304.

3.10 Tape subsystem

The following sections describe changes to the tape subsystem since UNICOS 9.0.

3.10.1 Tape subsystem released as separate product, packaging change introduced

Initial release: UNICOS 9.2

Users affected: administrators

Hardware supported: all Cray Research systems

Beginning with the UNICOS 9.2 release, the UNICOS tape subsystem is packaged as a separate product in binary form and shipped with the UNICOS operating system. There are otherwise no changes in the way that it is used.

During the configuration process, the `tpinit(8)` command reads the tape configuration file and initializes the tape driver. The default tape configuration file is now `text_tapeconfig`, and the `text_tapeconfig(5)` man page replaces the `tapeconfig(5)` man page.

In addition, the character-special tape interface enables users to access online tape devices independent of the tape subsystem. This interface provides tape access similar to the access available on other UNIX systems: users can open a tape device, write to or read from a tape, close the device, and issue `ioctl(2)` requests.

Besides the packaging change, this UNICOS release includes some new command options, user exits, and the `mvf(1)` command.

For more information, see *Tape Subsystem Administration*, Cray Research publication SG-2307.

3.10.2 SCSI error report update

Initial release: UNICOS 9.2

Users affected: administrators, system analysts

Hardware supported: Cray Research systems with scalable I/O hardware

The SCSI error report entries have been combined with the block multiplexer (`mux`) and ESCON error report entries.

For more detail, see the troubleshooting information on `errrpt(8)` usage in the *Tape Subsystem Administration*, Cray Research publication SG-2307.

3.10.3 `tpconvert(8)` command not supported

Initial release: UNICOS 9.2

Users affected: all

Hardware supported: all Cray Research systems

The UNICOS system no longer supports the `tpconvert(8)` command.

3.10.4 SCSI error report update

Initial release: UNICOS 9.2

Users affected: administrators, system analysts

Hardware supported: Cray Research systems with scalable I/O hardware

The SCSI error report entries have been combined with the block multiplexer (mux) and ESCON error report entries.

For more information, see the troubleshooting information on `errpt(8)` usage in the *Tape Subsystem Administration*, Cray Research publication SG-2307.

3.10.5 New tape subsystem command options

Initial release: UNICOS 9.2

Users affected: administrators, system analysts

Hardware supported: all Cray Research systems

The following new tape subsystem command options provide users with more output control.

- `-t` on `rsv(1)` specifies the placement of the message file.
- `-a` on `tplist(1)` verifies the output from a `tplist(1)` copy operation.
- The `-N` option is no longer available.
- `-a` on `tpstat(1)` outputs device status for all tape devices, except those with `DOWN` status.
- `-a` on `tpgstat(8)` provides status information for device groups that are reserved or active.

For more information, see the `rsv(1)`, `tplist(1)`, `tpstat(1)`, `text_tapeconfig(5)`, `tape(7)`, `tpgstat(8)`, and `tpinit(8)` man pages.

3.10.6 New required `rcoptions` entry for tapes

Initial release: UNICOS 9.2

Users affected: administrators

Hardware supported: all Cray Research systems

The `rcoptions` file must contain the following entry if the system supports tape usage:


```
RC_TAPE="YES"
```

Formerly, tape usage was available by default; now the `rcoptions` entry is required to activate the tape software. This entry is necessary for users to access tapes through either the character-special tape interface, or the Cray Tape Management Facility, which is the tape daemon-assisted interface.

For information about tape configuration, see the *Tape Subsystem Administration*, Cray Research publication SG-2307.

3.10.7 New tape filter: `mvf(1)`

Initial release: UNICOS 9.2

Users affected: administrators

Hardware supported: all Cray Research systems

The `mvf(1)` command is a tape filter that handles input, output, and volume switches. For users of the character-special tape interface who need to dump and restore file systems that span multiple tape volumes, this command makes the volume switch transparent. Used with the tape subsystem, `mvf(1)` can handle labeled tapes and can transfer data at high rates.

For more information, see the `mvf(1)` man page.

3.10.8 USCP support removed from UNICOS tape subsystem

Initial release: UNICOS 9.2

Users affected: all

Hardware supported: all Cray Research systems

Support for the UNICOS station call processor (USCP) has been removed from the UNICOS tape subsystem. USCP options are no longer available on the `LOADER` or `OPTIONS` statements.

For more information, see the `text_tapeconfig(5)` man page.

3.10.9 Tape list I/O removed from UNICOS

Initial release: UNICOS 10.0

Users affected: all

Hardware affected: all Cray Research systems

The tape list I/O has been removed in favor of UNICOS list I/O in UNICOS 10.0. The tape list I/O was originally developed for Fortran read-and-write blocks using Model-D IOS. As a result, users can not issue an `ioctl(2)` system call with a `TPC_LIST` or `TPC_MULTLIST` request.

The UNICOS list I/O replaces all of the read/write functionality of tape list I/O. The exception is that the ability to read/write tapemarks and to do end-of-volume (EOV) processing must now be requested using `ffio` library functions.

Note: Cray Research customers that use CrayLibs for I/O will effectively see no change by the removal of this feature. However, user programs must be relinked in which a `TPC_LIST` or `TPC_MULTLIST` request has been replaced with a `FFIO` library routine.

3.11 Packaging

The following section describes changes in the media, licensing, or packaging.

3.11.1 Distribution medium limited to CD-ROM

Initial release: UNICOS 9.2

Users affected: administrators

Hardware supported: all Cray Research systems

CD-ROM is the only supported release media for all present and future releases and platforms.

3.11.2 `mtdump(1)` and `segldr(1)` packaging change

Initial release: UNICOS 9.2

Users affected: all

Hardware supported: all Cray Research systems

The UNICOS 9.0 release was the final major release containing both source and binary code for the `mtdump(1)` and `segldr(1)` utilities. The `mtdump` and `segldr` utilities are now packaged in binary form only, even for sites that have

a source license. The generation compiler necessary to build these utilities is not part of the UNICOS release package.

3.11.3 CAL assembler to be packaged separately from UNICOS

Initial release: UNICOS 9.2

Users affected: all

Hardware supported: all Cray Research systems except CRAY T90 IEEE

The Cray Assembly Language (CAL) assembler is no longer automatically shipped with the UNICOS operating system. Instead, CAL must be ordered with Programming Environment (PE) release packages. (For the CRAY T90 series with IEEE floating-point arithmetic, this change began with the UNICOS 9.1 release.)

CAL is still licensed as part of the UNICOS operating system — if customers are licensed for UNICOS, they are licensed for CAL.

3.11.4 UNICOS tape subsystem packaged separately

Initial release: UNICOS 9.2

Users affected: all

Hardware supported: all Cray Research systems

The UNICOS tape subsystem is now packaged in binary form only and shipped with the UNICOS operating system.

3.11.5 General packaging changes

Initial release: UNICOS 9.2 for CRAY T90 systems, UNICOS 10.0 for CRAY PVP systems.

Users affected: administrators

Hardware supported: CRAY T90 systems and CRAY PVP systems

The packaging changes can be broken down into three categories:

- Full replacement of `root` and `usr` files. Previously, these were installed by a build.

- Full replacement of source file relocatables. Previously, only partial replacement of source file relocatables was available.
- Full replacement of source code. Previously, only source code modifications (mods) were available.

Full replacement of `root` and `usr` impacts customers as follows:

- There is no need for a complete system build. This implies less margin for error. (The kernel, optional products, and local changes still require a build.)
- Files used for production can be verified, or assured to match what was shipped.
- Installation time and complexity is greatly reduced.
- Full replacement allows for the removal of obsolete files.

Full replacement of source code has the following customer impacts:

- A customer does not need to rely upon code to determine what mods were introduced in order to generate the modified source. Therefore, any errors associated with such mods are eliminated. (This is a packaging issue.)
- A customer does not require code to apply mods on site. Thus, such code related errors are eliminated.
- Local mods **must** be removed before the next release is loaded, and reapplied afterward. (This was required in the past, but not enforced. Now, it will be enforced.)