Software Enhancements [2]

This chapter describes the new features and enhancements included since the UNICOS 9.2 release.

For additional information about upgrading to this release, see Chapter 3, page 15.

Each section in this chapter lists the type of user and hardware affected by the software enhancement described. Consult the Preface of this document for definitions of the terms used.

Note: The documentation that supports the features described in this chapter was revised for the 9.3 release. For a list of publications that were revised only online or that were reprinted from a previous release, see Chapter 4, page 21.

2.1 Operating system

The following sections describe enhancements to the operating system since the UNICOS 9.2 release.

2.1.1 Support added for CRAY T90 asymmetric CPUs

Users affected: all

Hardware supported: CRAY T90 systems with Cray floating-point CPUs and with IEEE Std. 754 floating-point CPUs.

The CRAY T90 chassis now provides kernel support for a mixture of both Cray floating-point and IEEE floating-point CPUs within a single system.

In addition to kernel support, the following sections describe collateral changes to accommodate this feature.

2.1.1.1 Install tool changed

The install tool has been changed to make asymmetric CPUs a configurable option. This change switches the values in `/etc/config/config.mh`.

2.1.1.2 Library nmake files changed

All library `nmake` files, which previously provided cross-compatible version support for Cray floating-point CPUs on CRAY T90 systems, now provide IEEE floating-point support on CRAY T90 systems.

Only Cray floating-point versions will be supported on CRAY T90 systems with IEEE support.

2.1.1.3 Generation compiler environment changes

The generation compiler environments for the UNICOS operating system have been changed to support building alternate libraries for both CRAY T90 floating-point and CRAY T90 IEEE packages.

2.1.1.4 Programming environment support

Programming environments have been modified to include CRAY T90 asymmetric CPU support.

2.1.2 UNICOS under UNICOS (UUU) support for GigaRing based systems

Users affected: all

Hardware supported: all CRAY GigaRing based systems including CRAY J90se, CRAY T90, and CRAY T90 IEEE

UNICOS 9.3 extends UNICOS under UNICOS (UUU) support for the GigaRing architecture on CRAY J90se, CRAY T90, and CRAY T90 IEEE platforms. This includes support for the following:

- Network devices

  ATM

  HIPPI

  Ethernet

  FDDI

- Disks

  DA-60

  DA-61

DA-301

DA-302

DD-60

DD-61

DD-62

DD-301

DD-302

DD-304

DD-308

DD-316

DD-332

- Any tape drive supported on a CRAY Y-MP system

  Note: For CRAY J90se systems, usage of memory HIPPI is not supported with this feature.

  Note: For CRAY T90 and CRAY T90 IEEE systems, the following functions are not supported with this feature:

  - Use of memory HIPPI
  - Guest use of `ssdt` (solid state disk for CRAY T3E systems)

2.1.3 Added support for array services and MPI

Users affected: system administrators

Hardware supported: all Cray Research systems

The UNICOS 9.3 release includes the `libarray.a` library and the `arrayd` array services daemon, which provide support for the following asynchronous products:

- Array Services 3.0 for UNICOS, which uses `libarray.a` and `arrayd` for array service commands. This product, which contains all of the client commands for array services, will be available soon.
- Message Passing Toolkit (MPT), which needs `libarray.a` for its Message Passing Interface (MPI) in the 1.2 release.

2.1.3.1 File modifications required for array services and MPI

In order to use array services and/or MPI on your UNICOS system, you must make the following modifications in the default or existing `/etc/hosts.equiv` and `/etc/config/daemons` files:

- The `/etc/hosts.equiv` file must have `localhost` present:

```
MID @(#)skl/etc/hosts.equiv 100.1   07/14/97 09:35:57
#
#       (C) COPYRIGHT CRAY RESEARCH, INC.
#       UNPUBLISHED PROPRIETARY INFORMATION.
#       ALL RIGHTS RESERVED.
#
# This hosts.equiv file has been created with the line
# 'localhost' so that the array services daemon can
# create processes to handle requests on the machine it
# is running on.  The array services daemon is used by
# MPI from the MPT product.  Array Services and MPI require
# the localhost entry to function.
localhost
```

- The `/etc/config/daemons` file must contain a line for `arrayd` that has a start value of `YES`. This enables the `arrayd` deamon to start automatically when you go to multi-user mode:

```
# USMID @(#)skl/etc/config/daemons      100.1   07/11/97 14:19:09
#
# Configuration file for TCP daemons (and other commands) started by
# /etc/netstart (through /etc/sdaemon).
#
# File format is:
#
# group tag             start   kill            pathname arguments
#
                       <snip>
SYS2    arrayd          YES     *               /etc/arrayd
```

Note: The following applies to modifications to the `/etc/hosts.equiv` and `/etc/config/daemons` files:

- When upgrading from UNICOS 9.*x* to 9.3, the system automatically copies any existing `/etc/hosts.equiv` file or `/etc/config/daemons` file to 9.3 when the system is built. If these files did not exist for the previously installed release, the default `/etc/hosts.equiv` and `/etc/config/daemons` files are automatically copied onto your system. In either case, you need to make the modifications described above in order to use array services and MPI.
- If 9.3 is your initial operating system, the default `/etc/hosts.equiv` and `/etc/config/daemons` files are automatically copied onto your system when the system is built. However, you still need to make the modifications described above in order to use array services and MPI.

For more information, refer to the following man pages: `arrayd`(1M), `ascheck`(1), `newarraysess`(2), `syssgi`(2), `getash`(2), `setash`(2), `arrayd.conf`(4), and `array_sessions`(5).

2.1.4 Automatic downing of CPUs on uncorrectable memory errors

Users affected: all

Hardware supported: all Cray Research systems.

A mechanism has been created to automatically down a CPU that is experiencing uncorrectable memory errors.

This mechanism is released in an "off" state and can be enabled as required. It allows you to select the following options, parameters for which have been added to the `secded`(8) command:

- The number of errors seen by a CPU before it is downed
- The lifetime of each error (for example, three errors in a rolling 24-hour period)
- The length of time the CPU should remain down before the system is returned to service.

  Note: The system may also remain down indefinitely.

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

2.1.5 Third party device for direct memory access (DMA) dump for GigaRing based systems

Users affected: analysts

Hardware supported: CRAY J90se and T90 GigaRing based systems

This feature allows you to configure a disk partition to use as a raw dump device, rather than using the `/opt/CYRIdump` directory on the system workstation (SWS).

This feature increases the speed of a postmortem dump.

2.2 Storage devices

The following section describes support for storage devices new to UNICOS 9.3.

2.2.1 SSD-T90 support

Users affected: system administrators and site analysts

Hardware supported: CRAY T90 systems

The UNICOS 9.3 release supports the GigaRing-based Solid State Disk storage device known as the SSD-T90. The files in `/dev/ssdt` are special files that allow read and write operations to the SSD-T90.

For information on the files in `/dev/ssdt`, see the `ssdt`(4) man page. For information about configuring the SSD-T90 for use as SDS memory, see the *UNICOS Configuration Administrator's Guide*, publication SG–2303.

2.3 Tape subsystem enhancements

The following section describes enhancements to tape subsystems since the UNICOS 9.2 release.

2.3.1 IBM ESCON 3590 supported

Users affected: system administrators

Hardware supported: all Cray Research systems

The UNICOS 9.3 release supports the IBM ESCON tape devices.

The `DEVICE` statement contains a new parameter, `timeout`, and the `type` parameter now accepts `3590` as a type. The `timeout` parameter specifies the time-out value in seconds that the ESCON IOP, which supports the IBM ESCON 3490, 3490E, and 3590 devices, waits for a response from the channel. The `errpt`(8) command contains the new `-t` option, which requests the formatted output of the buffered logs from the control units of the IBM ESCON 3490, 3490E, and 3590 devices.

For more information, see the `text_tapeconfig`(5) man page for the `DEVICE` statement, and the `errpt`(8) man page.

2.3.2 `xtpldr`(8) documentation

The `xtpldr`(8) command, which manages selected autoloader operations, is now documented as an administrator command. Previously it was documented as a user command. For more information, see the `xtpldr`(8) man page.

2.3.3 New tape daemon optimization feature

Users affected: system administrator

Hardware supported: all Cray Research systems

A tape daemon optimization feature has been created that consolidates device-specific child processes into a single-device support child process. This feature controls the device from the initial tape mount through the release sequence.

2.4 Networking and communication

The following sections describe enhancements to networking and communication since the UNICOS 9.2 release.

2.4.1 Network device and driver optimization for GigaRing systems

Users affected: all

Hardware supported: all Cray GigaRing based systems

The UNICOS 9.3 release includes performance optimization for the following network devices and network drivers on GigaRing based systems:

- Unified network drivers

- MPN network drivers
- HPN network drivers

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

2.4.2 TCP/IP connections allowed over GigaRing channels

Users affected: all

Hardware supported: CRAY J90se and CRAY T90 GigaRing based systems.

The UNICOS 9.3 release supports a new feature that allows GigaRing based CRAY T90 and CRAY J90se systems to use TCP/IP for host-to-host communications.

2.4.3 New socket accounting feature

Users affected: system administrator, site analyst

Hardware supported: all Cray Research systems

A new socket accounting feature has been implemented with UNICOS 9.3 to track network usage from the perspective of sockets, wherein one process may use several sockets, and several processes may use the same socket.

The recorded accounting information tracks all of a socket's usage, but it can only be linked to the process which most recently closed the socket. This information can help an administrator resolve network problems and/or monitor system network usage.

This feature records the following information:

- Time a socket was created
- Time a socket was destroyed
- Socket user ID (UID)
- Socket group ID (GID)
- Socket family and domain
- Socket type
- Socket protocol

- Socket options
- The executing program
- Number of reads and writes performed
- Number of bytes read and written
- Foreign and local Internet addresses
- Foreign and local port numbers

Note: This feature does not include the ability to charge for network usage. The accounting records produced are only processed in order to make the data available to the site-supplied user exits.

You can use the standard accounting interface to turn this feature on or off. You can also use the `csasocket`(8) command to summarize and process the socket data.

For more information on this feature, see the `csaswitch`(8) and `csasocket`(8) man pages.

2.4.4 named (domain name service) granted all privileges to execute on a UNICOS system with MLS

Users affected: system administrator

Hardware supported: all Cray Research systems

The Internet domain name server command, `named`, is a service that controls the host information database that maps between host names and their internet addresses. With UNICOS 9.3, this service has been granted all privileges to execute on a UNICOS system with the multilevel security (MLS) feature. Previously, `named` privileges were restricted to `PRIV_SU` systems only.

Note: This feature will still function on a system that is not running `SECURE_MAC`.

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

2.5 File system enhancements

The following sections describe file system enhancements.

2.5.1 Bulk data service added as a supplement to the network file system (NFS)

Users affected: all

Hardware supported: all Cray Research PVP systems running UNICOS and NFS.

The Bulk Data Service (BDS) is a nonstandard enhancement to NFS that improves performance for large data transfers (100 megabytes or larger).

This enhancement includes modifications to the UNICOS kernel and the `mount` and `automount` commands, as well as a new `bds` daemon, and a new utility program called `lmdd`, which is used primarily for timing I/O.

For more information, see the `mount`(8), `automount`(8), `bds`(8), and `lmdd`(8) man pages.

2.5.2 New configuration specification language (CSL) parameters

Users affected: system administrator

Hardware supported: all Cray Research systems

UNICOS 9.3 adds the following new configuration specification language (CSL) parameters:

- `nfs3_async_max` defines the maximum amount of data that will be written per file asynchronously
- `nfs3_async_time` defines the amount of time that data will be held in the NFS async write cache on the client

For more information, see the *UNICOS Configuration Administrator's Guide*, publication SG–2303 9.3.

2.6 On-line diagnostics

The following sections describes enhancements to the on-line diagnostics.

2.6.1 New `errpt` enhancements

Users affected: system administrator, site analyst

Hardware supported: all Cray Research systems with IOS-E and GigaRing based architectures

Before UNICOS 9.3, there were two methods to create reports for hardware errors, `errpt`(8) and `olhpa`(8). `errpt` provided basic interpretation of data with few report format options. `olhpa`, on the other hand, included many features and report formatting options, but was difficult to maintain.

To eliminate a duplicated effort to maintain both utilities, `olhpa` is discontinued for GigaRing based architectures, and `errpt` functionality has been enhanced with some `olhpa` options as described in the following sections. (See also Section 2.3.1, page 8 for related information.)

2.6.1.1 One-line summary report for `errpt`

The short report format option has been added to the `errpt` utility. This 80-character format includes a one-line summary of each error, similar to the standard `olhpa` output.

Error reports can now be viewed in simple form, chronologically, and according to device type and date.

2.6.1.2 Enhanced `-s` option for `errpt`

An enhanced `olhpa`-style `-s` option will be added to `errpt` in UNICOS 9.3 to support the `-sl[0--n]` date format. This allows you to indicate a starting date `n` days prior to the current date, or an ending date (specified by the `-e` option).

2.6.2 New `vi` tagstack feature

Users affected: all

Hardware supported: all Cray Research systems

A new tagstack feature has been added for `vi` in UNICOS 9.3. Tagstack allows you to track backward through up to 20 tag jumps. This is very useful when examining unfamiliar C code.