# SWS-ION Release Overview

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

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# Read Me First [1]

This document provides an overview of the Silicon Graphics SWS-ION 4.0 release for the system workstation (SWS) and I/O nodes (IONs). If your upgrade is not sequential, refer to Appendix A, page 53, for information on previous SWS-ION release changes.

The SWS-ION 4.0 release package includes the following items. You should reference them in the order that they are listed here:

1. *SWS-ION Release Overview* 4.0

   For information about software changes since the SWS-ION 3.10 release, see Section 5.4, page 31, and Section 5.5, page 36.

2. SWS-ION 4.0 Errata Document

   Scan through this document and pay special attention to the items changed (indicated by change bars). If the upgrade is not sequential, then read through it.

3. *SWS Operating System and Devices Installation Guide* 3.9

   If you are doing an initial installation, you will use this guide to install the Solaris operating system. If you are upgrading, you will not need this document.

4. SWS-ION 4.0 Installation Procedures

   This is a hard copy of the `/cdrom/cdrom0/README.install` file that exists on your CD-ROM.

5. *SWS-ION Administration and Operations Guide* 4.0 (Available online only)

6. *Cray Scalable I/O Functional Overview* 3.10

7. *Cray Scalable I/O Messages* 3.10

**Note:** The 4.0 version of the *SWS-ION Reference Manual* is available as printable PostScript files provided on the same DynaWeb CD as the rest of the supporting documents for this release. Individual man pages are also available online and can be accessed by using the Solaris `man`(1) command.

# Introduction [2]

This document provides an overview of the Silicon Graphics SWS-ION 4.0 release for the system workstation (SWS) and I/O nodes (IONs).

- The SWS lets you configure, operate, administer, monitor, and diagnose one or more Cray systems in a scalable I/O (SIO) environment based on GigaRing technology. You will also use the SWS to load media for SWS-ION, operating system, and application releases.
- The I/O nodes (IONs) support a wide range of connectivity requirements. IONs based on GigaRing technology provide access to mass storage devices such as disks and tapes, as well as to industry-standard computer networks such as HIPPI networks. There are two basic types of nodes: the multipurpose node (MPN) and single-purpose nodes (SPNs).

The SWS-ION 4.0 release supports the following hardware products:

- GigaRing based CRAY T90, CRAY T3E, CRAY J90se, and CRAY SV1 series of systems
- System workstation (SWS)
- Multipurpose node (MPN) hardware
- Single-purpose node (SPN) hardware
- CRAY SSD-T90 solid-state device

The SWS-ION 4.0 release supports the following software products:

- UNICOS/mk 2.0.3 and UNICOS/mk 2.0.4 operating systems
- UNICOS 10.0.0.3 and UNICOS 10.0.0.4 operating systems
- Cray Programming Environment 3.0

This release overview describes the SWS-ION 4.0 release and includes the following information:

- SWS operational model
- SWS-ION architecture overview
- Software commands and features
- Known problems

- Documentation
- Software support
- Licensing and ordering

The Common Desktop Environment (CDE) is the windowing system on the SWS. CDE differs in many ways from OpenWindows; for information about using CDE, see the SunSoft *DeskSet Quick Reference Guide*, part number 802–1972–10.

## 2.1 Distribution of This Release Overview

A copy of this release overview is included with the SWS-ION 4.0 release package. You can also access this release overview electronically. ASCII and PostScript files are available on the following systems:

- The Cray CRInform system, which is an online information and problem-reporting system for Cray customers. For more information on the CRInform program, see Section 6.3, page 46.
- The Silicon Graphics `hydra` system in the `/home/craypark/release_docs` directory. The `hydra` system is available to Silicon Graphics service personnel.

If you do not have access to these systems but would like a copy of the files, contact your Silicon Graphics representative.

## 2.2 Reader Comments

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We value your comments and will respond to them promptly.

# SWS Operational Model Overview [3]

A single SWS is designed to operate multiple system and I/O nodes, which can run various levels of software.

**Note:** The SWS uses the common desktop environment (CDE). Other windowing environments are not supported.

**Note:** This description of the operational model lists the commands that are used for normal operations. It does not list every command provided in the SWS-ION software.

To accommodate this design, the SWS operational model does the following:

- Uses simple ASCII configuration files:
  - A topology file that describes the layout of mainframe and I/O nodes on one or more GigaRing channels. A topology file is required to use the system-level commands. The `edittopo`(8) and `checktopo`(8) commands provide easy ways for you to create, modify, and validate topology files. New systems are shipped with a preinstalled topology file (`/opt/config/topology`). You should verify that this topology file matches your hardware configuration; if you have added hardware to the shipped system, you must modify the topology file.
  - Options files that provide customized defaults. An options file is required to use the system-level commands. New systems are shipped with a preinstalled options file (`/opt/config/options`); you should verify that the preinstalled options file meets your site's requirements. You can create additional options files if you wish.
  - Mainframe operating system parameter files.
  - Hardware configuration files.
  - `bootptab`(5) file.
- Supports a set of system-level commands, which are intended for operator use and can be used to perform operations on one or more system components. A *system component* can be an I/O node, a mainframe, or a ring, depending upon the command. The system-level commands gather information from the appropriate configuration files and invoke low-level commands. The system-level commands are as follows:
  - `bootsys`(8)

  - dumpsys(8)
  - haltsys(8) (mainframe only)
  - levelsys(8) (mainframe only)

- Supports a set of low-level commands that allow the system to be operated under special circumstances without accessing the configuration files. These low-level commands are not intended to be used by the operator. The low-level commands are as follows:
  - bootion(8)
  - bootj90(8)
  - bootsv1(8)
  - boott3e(8)
  - boott90(8)
  - checkion(8)
  - checkj90(8)
  - checksv1(8)
  - checkt3e(8)
  - checkt90(8)
  - clearj90(8)
  - clearssd(8)
  - clearsv1(8)
  - cleart3e(8)
  - dumpion(8)
  - dumpj90(8)
  - dumpsv1(8)
  - dumpt90(8)
  - dumpt3e(8)
  - haltj90(8)

- haltsv1(8)
- haltt3e(8)
- haltt90(8)
- mfcon(8)
- sv1mond(8)

The SWS model provides the following features:

- The operator needs to know only a limited set of system-level commands to operate various types of hardware.
- The operator can perform operations on multiple system components with a single command line. For example, the operator can boot every component listed in the topology file and start a console for every mainframe by simply executing the following:

  ```
  bootsys -c
  ```

  Or, the operator could boot only a specific mainframe named `production` and start a console for it by entering the following:

  ```
  bootsys -c production
  ```

- The administrator can configure multiple options files with defaults appropriate to different circumstances. For example, the administrator can create options files called `prod` and `dev` with options appropriate to production and development environments, respectively. The operator can then boot using these files by setting the `OPTIONS` environment variable. For example:

  ```
  OPTIONS=/opt/config/prod
  export OPTIONS
  bootsys -c
  ```

See the `topology`(5) and `options`(5) man pages for details.

# SWS-ION Architecture Overview [4]

This chapter provides an overview of the following Cray scalable I/O (SIO) architecture.

## 4.1 Cray Scalable I/O (SIO)

The SIO architecture consists of the following:

- GigaRing channel
- SWS
- Mainframes
- I/O nodes

The CRAY SSD-T90 solid-state storage device also connects directly to the GigaRing channel, providing dynamic random access memory (DRAM) secondary storage.

The minimum SIO environment consists of an SWS, an MPN, a mainframe, and the GigaRing channel.

### 4.1.1 GigaRing Channel

The *GigaRing* is the new system interconnect and input/output (I/O) channel developed for Cray supercomputers. The channel consists of two counter-rotating rings.

The GigaRing channel connects multiple clients together with high-speed, point-to-point links. GigaRing channel clients consist of Cray mainframes and I/O nodes (IONs) that support I/O peripherals.

The GigaRing channel provides high-performance, scalable, flexible, and reliable mainframe-to-mainframe and mainframe-to-peripheral communication. The GigaRing channel supports Cray SIO architecture and network technology. SIO supports the next generation of I/O peripherals.

GigaRing technology draws heavily from the logical layer of the IEEE Standard Coherent Interface (SCI). However, many additional features have been added to enhance the reliability, flexibility, and performance of the system channel.

#### 4.1.1.1 System Characteristics

The GigaRing channel is designed to unify all I/O and communication among new Cray products. The GigaRing interface enables full connectivity between nodes on a ring. The GigaRing interface architecture enhances interoperability, which allows direct communication between mainframes and IONs.

Because of its inherent flexibility and scalability, the GigaRing channel supports small system I/O configurations as well as large configurations requiring high connectivity to many peripherals.

#### 4.1.1.2 GigaRing Channel Topology

The GigaRing channel is a pair of high-speed channels configured as a counter-rotating ring. The GigaRing channel topology is modified from the Scalable Coherent Interface (SCI) to incorporate a pair of counter-rotating rings. Each node on the ring receives and transmits data on two 32-bit rings referred to as *positive* and *negative* rings. Each node acts as an interface between a host (system or I/O node) and the rings through a 64-bit full-duplex client interface. This change to the topology, along with sharing of a common channel by nodes on the ring, enhances interoperability.

Each mainframe and I/O node on a GigaRing channel has a unique identifier called the *physical node address*. The physical node address is a 13-bit unique physical node ID. The physical node address consists of seven ring identifier bits and six node identifier bits.

### 4.1.2 SWS Overview

The SWS lets you configure, operate, administer, monitor, and diagnose the SIO environment.

The following equipment is required:

- 110-MHz (minimum) or 170–MHz Sun SPARCstation 5 workstation with a keyboard and mouse.
- 32-Mbyte memory.
- 2.1-Gbyte or 4.2-Gbyte SCSI internal hard drive.
- 17-inch color monitor.
- Digital audio tape (DAT) drive.
- Motherboard with one 10BaseT Ethernet connection.

- Two SBus slots:
  - Quad Ethernet Controller board with four Ethernet connections (no other types of network connections are permitted).
  - Serial port bulkhead. If a bulkhead is not used, this slot is reserved by Cray.

The following equipment is optional:

- Additional 2.1-Gbyte SCSI internal drive for larger and more complex SIO configurations.
- 8- or 16-serial port bulkhead connected via an SBus card (instead of or in addition to a Micro Annex box) for warning and control system (WACS) connections.

  SWS serial port A is available for a WACS connection. If serial port B is not used for a modem, it too is available for a WACS connection.
- Laser printer. There is no SWS functional requirement for a printer, but it may be useful for the customer or customer service. If a printer is used, the customer will order it from Silicon Graphics, and it must be connected to the SWS parallel port.
- Modem, which is required for remote support. A 28.8 Kbit/s modem is supplied by Silicon Graphics, and must be connected to serial port B or the NetBlazer dial-up router.

### 4.1.3 Cray Mainframes Supported

The CRAY T3E, CRAY T90, CRAY J90se, CRAY SV1 series of mainframes, and the CRAY SSD-T90 solid-state storage device are supported in the SIO environment.

### 4.1.4 I/O Nodes

Silicon Graphics has developed a variety of I/O nodes (IONs) to support a wide range of connectivity requirements. These IONs fall into two basic types:

- Single-purpose nodes (SPNs), which support specific channel interfaces and/or devices.
- Multipurpose nodes (MPNs), which provide an interface based on the SBus standard to support industry-standard I/O channels such as Small

Computer System Interface (SCSI) and Asynchronous Transfer Mode (ATM) to the GigaRing channel interface.

IONs are housed in a stand-alone, air-cooled peripheral cabinet (PC-10). Each ION contains a SPARC processor that runs the VxWorks real-time operating system with Cray node-specific I/O software. This provides I/O capabilities to a system on a GigaRing channel.

IONs based on GigaRing technology provide access to mass storage devices such as disks and tapes, as well as to industry-standard computer networks such as HIPPI networks.

To provide greater reliability and resiliency, SPNs and MPN enclosures are field replaceable units (FRUs).

#### 4.1.4.1 Peripherals and Networks Supported

Table 1. Peripherals supported by SPNs

| Devices | Description |
|---|---|
| DD-60 | IPI-2 disk drive |
| DA-60 | IPI-2 disk array (RAID-3) |
| DD-62 | IPI-2 disk drive |
| DA-62 | IPI-2 disk array (RAID-3) |
| DD-301 | IPI-2 disk drive |
| DA-301 | IPI-2 disk array (RAID-3) |
| DD-302 | IPI-2 disk drive |
| DA-302 | IPI-2 disk array (RAID-3) |
| DD-308 | Fibre Channel disk drive (Single spindle version of the 9-Gbyte Fiber Channel drive) |
| DA-308 | Fibre Channel disk array (Array version of the 9-Gbyte Fiber Channel drive; 4 + 1 RAID-3) |
| DD-309 | Fibre Channel disk drive (Single spindle version of the 18-Gbyte Fiber Channel drive) |
| DA-309 | Fibre Channel disk array (Array version of the 18-Gbyte Fiber Channel drive; 4 + 1 RAID-3) |

| | |
|---|---|
| IBM 3420 | 9-track tape (256-Kbyte block limit or IBM 3420 compatible 9-track reel tapes, such as STK 4670) |
| IBM 3480 | 18-track tape |
| IBM 3490 | 36-track tape |
| STK 4480 | 18-track tape |
| STK 4490 | 36-track tape |
| STK 4400 | Libraries / Robots |
| STK 9310 | Libraries / Robots |
| STK 9360 | Libraries / Robots |
| IBM 3590 | Magstar |
| STK 3490E | 36-track tape (extended capacity) |
| STK 9490 | TimberLine |
| STK SD-3 | RedWood |
| | HIPPI network connections |
| IBM 3494 | Libraries / Robots |
| IBM 3495 | Libraries / Robots |
| STK 4400 | Libraries / Robots |
| STK 9310 | Libraries / Robots |
| STK 9360 | Libraries / Robots |
| ND-12 | Network disk |
| ND-14 | Network disk |
| ND-40 | Network disk with semaphore |

#### 4.1.4.2 MPNs

Table 2. Peripherals supported by MPNs

| Devices | Description |
|---|---|
| DD-314 | SCSI-2 disk drive |
| DD-318 | SCSI-2 disk drive |

| | |
|---|---|
| STK 4220 | SCSI tape (TD-3) |
| STK 4781 / 4480 | SCSI 18-track tape |
| STK 4791 / 4490 | SCSI 36-track tape |
| STK 4890 | SCSI tape, Twin Peaks (TD-4) |
| STK 9490 | SCSI tape, TimberLine |
| STK 9840 | SCSI tape, TimberLine |
| STK SD-3 | SCSI tape, RedWood |
| IBM 3490E | SCSI 36-track tape |
| IBM 3590 | SCSI tape, Magstar NTP |
| Quantum DLT 4000 | SCSI digital linear tape |
| Quantum DLT 7000 | SCSI digital linear tape |
| STK 4400 | SCSI libraries / robots |
| STK 9310 | SCSI libraries / robots |
| STK 9360 | SCSI libraries / robots |
| STK 9710 | SCSI libraries / robots |
| IBM 3494 | SCSI libraries / robots |

The MPN controller cards also support Ethernet, Fiber Distributed Data Interface (FDDI), and Asynchronous Transfer Mode (ATM) connections.

The following figure shows MPNs connected to a GigaRing channel.

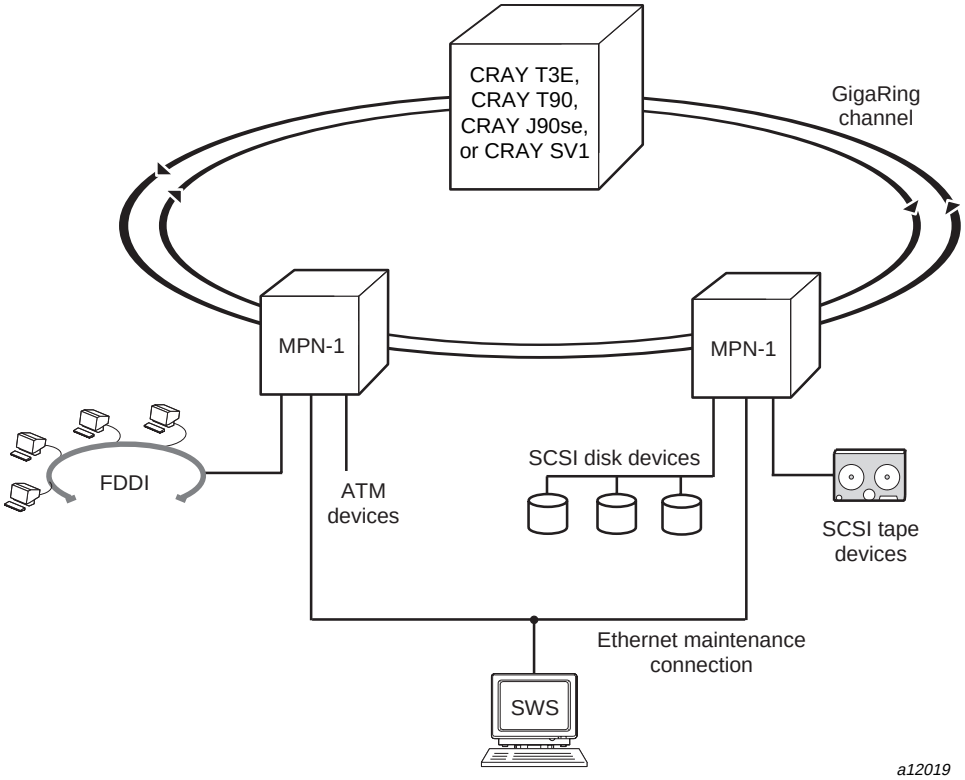


Figure 1. MPNs on a GigaRing channel

Figure 2 shows SPNs and MPNs connected to a GigaRing channel.

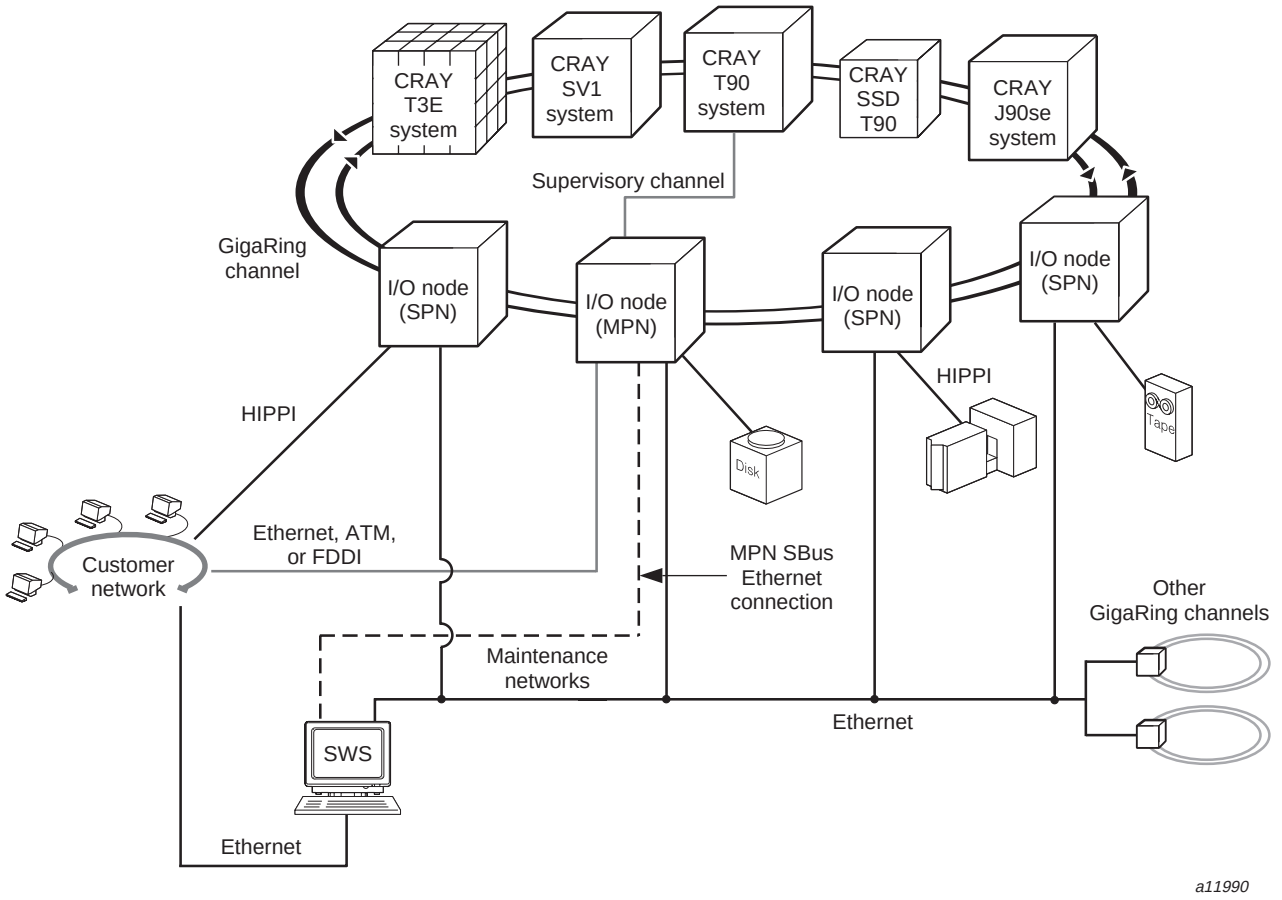


Figure 2. SPNs and MPNs on a GigaRing channel

# Software Commands and Features [5]

This section describes the commands and features included in the SWS-ION 4.0 release. If your upgrade is not sequential, refer to Appendix A, page 53, for information on previous SWS-ION release changes.

**Note:** The SWS uses the common desktop environment (CDE). Other windowing environments are not supported.

## 5.1 Operational Commands

The following general administrative and operational commands are supported in the SWS-ION 4.0 release:

- `autogen`(8)

  Generates UNICOS parameter files automatically

- `bootion`(8)

  Reboots an I/O node

- `bootj90`(8)

  Boots a CRAY J90se mainframe

- `bootsv1`(8)

  Boots a CRAY SV1 mainframe

- `bootsys`(8)

  Boots one or more system components

- `boott3e`(8)

  Boots a CRAY T3E mainframe

- `boott90`(8)

  Boots a GigaRing based CRAY T90 mainframe

- `ca_reset.sh`(8)

  Resets the application-specific integrated circuit (ASIC) on a CRAY SV1 CPU

- `checkion`(8)

  Checks that an ION has been booted

- `checkj90`(8)

  Checks a CRAY J90se system for a UNICOS panic and, if one is found, prints it

- `checksv1`(8)

  Checks a CRAY SV1 system for a UNICOS panic and, if one is found, prints it

- `checkt3e`(8)

  Checks a CRAY T3E system for a UNICOS/mk panic and, if one is found, prints it

- `checkt90`(8)

  Checks a GigaRing based CRAY T90 system for a UNICOS panic and, if one is found, prints it

- `checktopo`(8)

  Checks the validity of a `topology`(5) file

- `clearj90`(8)

  Clears and halts a CRAY J90se mainframe

- `clearssd`(8)

  Clears and initializes a CRAY SSD-T90 device

- `clearsv1`(8)

  Clears and initializes a CRAY SV1 mainframe

- `cleart3e`(8)

  Clears a CRAY T3E mainframe

- `cit`(8)

  Invokes the common installation tool

- `consys`(8)

Opens consoles for the specified mainframes

- `cpdmp`(8)

  Copies a mainframe dump image from an MPN to an SWS file system.

- `dring`(8)

  Executes `diagring`(8) commands via a command line interface

  For more information on `dring`(8), see Section 5.2, page 25.

- `dumpion`(8)

  Dumps an I/O node

- `dumpj90`(8)

  Dumps a CRAY J90se mainframe

- `dumpsv1`(8)

  Dumps a CRAY SV1 mainframe

- `dumpsys`(8)

  Dumps one or more system components

- `dumpt3e`(8)

  Dumps a CRAY T3E

- `dumpt90`(8)

  Dumps a GigaRing based CRAY T90 mainframe

- `edittopo`(8)

  Edits a topology file and verifies it

- `genparam`(8)

  Probes multipurpose nodes and calls the `autogen`(8) command to create a UNICOS parameter file

- `getcputype`(8)

  Returns the processor module type

- `gring_proxy_info`(8)

Displays GigaRing proxy server information

- `haltj90`(8)

  Halts a CRAY J90se mainframe

- `haltsv1`(8)

  Halts a CRAY SV1 mainframe

- `haltsys`(8)

  Halts one or more mainframes

- `haltt3e`(8)

  Halts a CRAY T3E mainframe

- `haltt90`(8)

  Halts a GigaRing based CRAY T90 mainframe

- `hwmcontrol`(8)

  Controls the monitoring that is initiated by the `hwmd`(8) hardware monitor daemon

- `hwmd`(8)

  Invokes the hardware monitor daemon

- `levelsys`(8)

  Sets or displays the run level of the operating system on one or more mainframes

- `lpremote`(8)

  Provides remote print capability for Remote Support

- `logmaint`(8)

  Initiates the `syslog`(3) log file maintenance program for the SWS

- `mfcon`(8)

  Provides a terminal interface to a mainframe system resource operating system

- `mflevel`(8)

Sets the run level of UNICOS

- `mkdmp`(8)

  Initializes a dump device header on a MPN

- `ops`(8)

  Invokes the operator system monitor, which displays hardware state information

- `pact`(8)

  Invokes the parameter configuration editor for defining the UNICOS/mk configuration file

- `param2ram`(8)

  Creates a RAM file system parameter file from an existing UNICOS parameter file

- `rshmpn`(8)

  Remotely runs a command on a multipurpose node (MPN) or a Fibre Channel node (FCN)

- `scantopo`(8)

  Extracts information from a topology file

- `siorev`(8)

  Prints SWS-ION version information

- `skdb`(8)

  Invokes the `skdb` server that is used to manage GigaRing I/O

- `skdbmem`(8)

  Views and modifies mainframe memory through the `skdb` server

- `statecomp`(8)

  Forces state server information to be set for a hardware component

- `stateds`(8)

  Displays hardware state information in ASCII format

- `statenode`(8)

  Sets state server information for a GigaRing node

- `staterm`(8)

  Removes a hardware component from the state server

- `statesrvd`(8)

  Starts the state server daemon

- `sv1mond`(8)

  Monitors the status of SV1 CPUs

- `swsbackup`(8)

  Backs up the SWS file systems

- `swsbp`(8)

  Modifies the `bootptab` and associated files required to install an I/O node

- `swsinstall`(8)

  Performs an initial or upgrade installation of SWS-ION software

- `sysoff`(8)

  Turns power off for the CRAY J90se or CRAY T90 mainframe and peripherals

- `syson`(8)

  Turns power on for the CRAY J90se or CRAY T90 mainframe and peripherals

- `t3epalprep`(8)

  Prepares a CRAY T3E boot privileged access library (PAL) binary file for selective logical processing element (LPE) restarts

- `t3epeboot`(8)

  Boots a specific CRAY T3E logical processing element (LPE), also known as a *warm reboot*

- `tunefsinfo`(8)

  Displays SWS file system tuning information

- `wacspower`(8)

Sends a power-on or power-off request to the nwacs daemon

The following configuration files are supported in the SWS-ION 4.0 release:

- options(5)

  Specifies options for booting, dumping, and starting a console

- topology(5)

  Specifies the layout of a GigaRing based system

There are also site-specific configuration files (the "normal" dot files, like.profile, are overwritten as part of the install process):

- .cshrc.site
- .dtprofile.site
- .kshrc.site
- .login.site

## 5.2 Diagnostic Commands

The following features provide diagnostic support:

- diag(7) man page

  The diag(7) man page contains a brief introduction to the concurrent maintenance tools and describes how to bring up the xdi(8) diagnostic user interface for client/server diagnostic applications. This man page is not published in hard-copy form.

- thresholding(7) man page

  The thresholding(7) man page contains a brief introduction to the concurrent maintenance tools and describes how to bring up the xdi(8) diagnostic user interface for client/server diagnostic applications. This man page is not published in hard-copy form.

- diagring(8)

  The diagring(8) program is the diagnostic client for the GigaRing channel diagnostics. It is used to view information about GigaRing channels and their associated nodes, to perform resiliency operations such as ring

masking and ring folding (ring masking and ring folding are deferred until a future release), and to execute diagnostic commands.

Diagnostic commands provide the ability to run specific node and ring tests, to isolate failures to specific components, and to take either automated or manual corrective actions when possible.

For more information, see the `diagring`(8) man page and the *SWS-ION Administration and Operations Guide.*

- `dring`(8)

  The `dring`(8) program executes the same set of commands as `diagring`(8), but it does so via a command line interface instead of through the `xdi`(8) interface as `diagring`(8) does. It may be used to view information about GigaRing channel rings and their associated nodes, to perform resiliency operations such as ring masking or folding on them, and to execute diagnostic commands.

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

- `diagccmt`(8)

  The `diagccmt`(8) program is the diagnostic client for the online I/O exercisers. When you connect to `diagccmt` using the `xdi`(8) diagnostic user interface, a list of I/O exercisers is displayed. Choosing one of these exercisers allows you to change desired parameters and then execute the exerciser.

  For more information, see the `diagccmt`(8) man page and the *SWS-ION Administration and Operations Guide.*

- `diagserver`(8)

  The `diagserver` program is the diagnostic server for the offline Cray Scalable I/O (Cray SIO) diagnostic environment.

  For more information, see the `diagserver`(8) man page and the *SWS-ION Administration and Operations Guide.*

- `diagsio`(8)

  The `diagsio`(8) program is the diagnostic client for the offline Cray SIO diagnostic environment. When `diagsio` begins running, it reads the SWS database to determine the names of the I/O nodes available to the SWS on which it is running. `diagsio` then attempts to create a connection to the diagnostic server (`diagserver`(8)) running on each of these I/O nodes.

For more information, see the diagsio(8) man page and the *SWS-ION Administration and Operations Guide.*

- MPN diagnostics and FRSTLOAD script

  As part of the power-on boot process, the FRSTLOAD script is run on the MPN. This script calls quick look versions of the MPN diagnostics. The MPN diagnostics that FRSTLOAD runs are as follows:

| Command | Description |
|---|---|
| mdd5s(8) | Executes a confidence test for MPN SCSI disk drives and controller |
| mnet(8) | Performs hardware testing of MPN network devices |
| mpt(8) | Executes a confidence test on the I/O processor (IOP) of the MPN |
| mscat(8) | Performs in-depth hardware testing of the ISP1000 chip on the SCSI adapter board |
| mspvt(8) | Executes loopback data testing on the supervisory channel of the MPN |
| mssbt(8) | Performs in-depth hardware testing of the MPN SBus system bridge (SSB) |
| mtp1(8) | Executes a confidence test on tape handlers |

  These tests run only on the MPN and will not run if the UNICOS/mk operating system is active.

  For more information, see the mdd5s(8), mpt(8), mscat(8), mssbt(8), mspvt(8), and mtp1(8) man pages and the *SWS-ION Administration and Operations Guide.*

- Remote Support Utilities

  The Remote Support utilities, lpremote(8) and xecho(8), allow Silicon Graphics personnel to run SWS programs to display and print back to remote Cray sites. The lpremote program allows sending data to a printer available on the Communication Hub Gateway (CHG). The xecho(8) program provides X Window System display back capabilities for Remote Support.

  For more information, see the lpremote(8) and xecho(8) man pages.

- scxrt(8)

  The scxrt program performs MPN-to-MPN diagnostic testing in an interactive mode. The test initializes local and remote GigaRing nodes and executes message-passing and direct memory access (DMA) tests. It runs only on the MPN. In future releases, the scxrt(8) command will be dropped, and its functionality will be provided by diagring(8).

  For more information, see the scxrt(8) man page and the *SWS-ION Administration and Operations Guide*.

- sserrpt(8) command

  The sserrpt(8) command processes data collected by the MPN disk error-logging mechanism and generates a report of that data. The default report is a summary of the last 100 disk errors. sserrpt runs only on the MPN.

  For more information, see the sserrpt(8) man page and the *SWS-ION Administration and Operations Guide*.

- sysmon(8)

  The sysmon system log viewer allows you to browse syslog error and log files from the SWS. You can also select certain messages and mail them to anyone by using a sysmon menu option. The sysmon(8) command can display one or more log files at a time. It accomplishes this by merging the selected log files, sorted by time or priority, into one display window. Currently, the sysmon(8) command provides a graphical view of all log files on the SWS that are generated by the ION devices (MPNs and SPNs) and the SWS itself. sysmon simplifies the eight syslog(3) priorities into four priority levels.

  For more information, see the sysmon(8) man page and the *SWS-ION Administration and Operations Guide*.

- t3e_hdw_boot(8)

  The t3e_hdw_boot program is a hardware boot program that precedes the operating system boot. It establishes a connection between the SWS and the MPN host across the Ethernet connection. The t3e_hdw_boot program also retrieves configuration information from the SWS in order to configure the code it downloads into the CRAY T3E system.

  For more information, see the t3e_hdw_boot(8) man page.

- t3ems(8)

The t3ems(8) command initiates the CRAY T3E offline diagnostic maintenance system.

For more information, see the t3ems(8) man page.

- vst(8)

  The online, socket-based, device-independent network exerciser, vst, will exercise any network device that supports TCP/IP and has been configured into the operating system. The vst command can be used to exercise TCP/IP network devices between two Cray systems, or between the SWS and the Cray system, or the SWS and the MPN.

  For more information, see the vst(8) man page and the *SWS-ION Administration and Operations Guide*.

- watchlog(8)

  The watchlog program monitors the syslog error and log files from the SWS for regular expressions, which by default are any WARNING/CRIT/ERR/EMERG/ALERT level messages. When a regular expression is matched, watchlog executes a user-specified command. Depending on how watchlog is configured, it can notify an operator when a specific error occurs and a message is put into syslog. You can set up notification to occur through messages sent to the console (the default) or via email.

  For more information, see the watchlog(8) man page and the *SWS-ION Administration and Operations Guide*.

- watchstream(8)

  The watchstream program is similar to the watchlog program, but monitors an input stream rather than log files. For example, it can be used to monitor piped output from stateds or xelog -notify start commands.

  For more information, see the watchstream(8) man page and the *SWS-ION Administration and Operations Guide*.

- whatmic(8) command

  The whatmic(8) program displays node device microcode levels. It runs only on the MPN.

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

- xdi(8)

  The xdi(8) graphical user interface (GUI) makes available a generic X Window System interface for client/server diagnostic applications. It provides a common look and feel across multiple diagnostic applications. The interface contains well-defined regions in which a diagnostic can place information or prompt you for information. The xdi interface can be used to access not only SWS-based tools, such as diagccmt(8) (online diagnostics), diagsio(8) (MPN-based diagnostics), and diagring(8) (GigaRing-based diagnostics), but also to access UNICOS/mk diagnostic applications.

  For more information, see the xdi(8) man page and the *SWS-ION Administration and Operations Guide*.

- CRAY T3E boot diagnostics

  In addition to the diagnostic applications previously mentioned, CRAY T3E boot diagnostics are also available. These include the boundary scan test, which verifies the connections among cabinets, modules, and options in the CRAY T3E system, and CRAY T3E offline diagnostic tests; MPN–1 diagnostics and FRSTLOAD script; and I/O node (ION) power-on self–test (POST) diagnostics. POST tests include motherboard (MPOST) and daughterboard (DPOST) POSTs.

  For more information, see the *SWS-ION Administration and Operations Guide*.

## 5.3 I/O Node Commands

The following commands provide ION support:

- bootpd(8) command

  The bootpd(8) utility implements a bootstrap protocol server for the GigaRing I/O nodes (IONs). Normally, the bootpd(8) daemon is started automatically during the SWS initialization.

- fcnenable(8) command

  Enables Fibre channel disks connected to an FCN-1 or FCN-2

- fcrash(8) command

  The fcrash(8) utility examines an I/O node (ION) dump image created by the dumpsys(8) command and displays system structures, raw memory, and symbolic information. The fcrash(8) utility prompts users for commands and contains a help facility that lists all commands.

- `probefcn`(8) command

  Creates an inventory list of Fibre Channel disks attached to a Fibre Channel node (FCN)

- `probempn`(8) command

  Creates an inventory list of SCSI devices attached to a multipurpose node (MPN)

- `smcp`(8)

  Copies a file between the SWS and the SCSI disk on the MPN

## 5.4 SPR Information

This subsection provides SPR information for this release.

**Note:** For information on SPRs resolved in the previous three release, see Appendix A, page 53.

### 5.4.1 SWS Operations SPRs

The following SWS SPRs have been resolved for the SWS-ION 4.0 release:

| SPR number | Resolution |
|---|---|
| 711083 | Adds SWS support for CRAY SV1 systems. |
| 713575 | Changes the `CYRIos` module so that it now appends `/opt/CYRIos/man` to `MANPATH`. This will allow the man pages to be found for the UNICOS/mk `CYRIos` package. |
| 712800 | Changes the `ops`(8) graphical user interface (GUI) run level display. The run level is now displayed as an ASCII character instead of the numeric representation for it. |
| 712806 | Removes the secure option from `tftp` datagram in the `inetd.conf`(5) file. |

| | |
|---|---|
| | Under certain situations, the `swssetup.script` would incorrectly modify the `/etc/inetd.conf` fiel during SWS upgrade installs. It would remove the following correct line:<br><br>`tftp dgram udp wait`<br>`root /usr/sbin/in.tftpd in.tftpd -s /opt`<br><br>and replace it with the following incorrect lines:<br><br>`tftp dgram udp wait`<br>`root /usr/sbin/in.tftpd in.tftpd /tftpboot`<br>`tftp dgram udp wait`<br>`root /usr/sbin/in.tftpd in.tftpd /opt`<br><br>The code causing the problem has been removed from `swssetup.script`. |
| 712852 | Changes the default behavior of the `dumpsys`(8) command by adding back the ability to boot MPNs and initialize GigaRing channels.<br><br>A previous change to the `dumpsys`(8) command was made to prevent the booting of SPNs if they were also being dumped. This change had an adverse side effect which prevented the booting of MPNs and the initializing of GigaRing channels. It also made the default behavior of `dumpsys` identical to `dumpsys -B`. |
| 713575 | Changes the `CYRIos` module so that it now appends `/opt/CYRIos/man` to `MANPATH`. This allows the man pages to be found for the UNICOS/mk `CYRIos` package. For more information, see Section 5.5.5, page 42. |

### 5.4.2 ION SPRs

The following ION SPRs have been resolved for the SWS-ION 4.0 release:

| SPR number | Resolution |
|---|---|
| 710428 | Adds single-purpose node (SPN) support for the mainframe console (see Section 5.5.6, page 42). |
| **NA** | **IPN SPRs** |
| 711644 | Fixes an IPN software panic condition 777. |
| **NA** | **FCN SPRs** |

| | |
|---|---|
| 713102, 713117 | Changes FCN device open processing to improve label analysis and better determine if a device actually exists before trying to read its label. |
| 713207 | Fixes FCN panic condition. |
| 712037, 713196 | Changes FCN software to hide residual errors which would occur when the `xdms`(8) command issues `readft` and `inquiry` commands. |
| 711108 | Changes FCN software so that when one member of an array is the target of a lock or unlock action by `xdms`(8) commands, all members are affected. |
| 710706, 712851 | Enhances FCN log messages for I/O errors to include the serial number of the device making it easier to track I/O operation history. If the channel processor can determine which member of an array actually caused the I/O error, its serial number is also displayed. |
| **NA** | **MPN SPRs** |
| 712892 | Changes MPN software to recognize the Quantum DLT 7000 SCSI tape drive. |
| 713086 | Changes the SBus system bridge (SSB) driver to fix an infrequent error where the MPN can write a bad network I/O response table entry into mainframe memory. When the mainframe processes this entry, it leads to a UNICOS or UNICOS/mk panic. The associated message `ssb ..window number ### already showing` appears in the SWS `ion_syslog.info` file. |
| **NA** | **Additional MPN SPRs** |
| | **Note:** The following MPN SPRs all address these two problems:<br>• A memory leak in the disk subsystem<br>• After a reset, the request queues would not restart properly |
| 706186 | Fixes a situation which would cause SCSI disks to sometimes become unavailable or unreachable causing a UNICOS operating system panic. |
| 706465 | Fixes a situation which would cause unrecoverable errors on DD-318 SCSI-2 disk drives. |
| 706683 | Fixes a situation which would cause CRAY T3E systems to hang with errors when accessing SCSI drives. |

| | |
|---|---|
| 706783 | Fixes repeated disk failures which required repeated MPN resets. |
| 707625 | Fixes a situation where an MPN stopped accessing a needed disk device and a reset would not clear it. |
| 707691 | Fixes SCSI disk drive hangs. |
| 707916 | Fixes a situation where SCSI bus resets would cause the UNICOS/mk operating system to hang and corrupt the root file system. |
| 707996 | Fixes a situation where the loss of a SCSI disk would hang CRAY T3E systems due to flooding console messages. |
| 708812 | Fixes a SCSI SBus read or write request time-out error. |
| 708845 | Fixes a detected disk error. |
| 708912 | Fixes SCSI disk problems which would cause the UNICOS/mk operating system to hang. |
| 709039 | Fixes SCSI unrecoverable errors after the failure of a SCSI Bus reset. |
| 709535 | Fixes a situation where multiple SCSI Bus resets would finally lead to an unconfigured disk. |
| 709721 | Addresses the following error message:<br>`TDISKTIMER: NOTICE: DISK.C LINE 2718 ;`<br>`DISK [DISK_TIMER_ALARM] : RESET SCSIBUS 6` |
| 710071 | Fixes a SCSI disk unrecoverable error. |
| 710079 | Fixes a SCSI disk time-out error. |
| 710607 | Fixes a situation where a SCSI Bus reset results in disk hang on the UNICOS operating system. |
| 711012 | Fixes a SCSI Sbus read or write request time-out error. |
| 711037 | Fixes a SCSI select time-out error. |
| 711660 | Fixes an MPN problem which prevented access to SCSI disks. |
| 711821 | Fixes a situation where SCSI bus resets caused jobs to abort. |
| 711918 | Fixes multiple errors on a DD-318 SCSI-2 disk drive for the `TDISKTIMER` fault. |
| 711995, 711996 | Fixes an MPN problem which caused SCSI disks to get sleep errors. |
| 712027 | Fixes a situation where DD-318 SCSI-2 disk drives would not respond to the `TDISKTIMER` fault. |

| | |
|---|---|
| 712067 | Fixes an MPN problem which caused SCSI disks to get sleep errors. |
| 712072 | Fixes a situation where CRAY T3E systems would not accept new logins but instead would perform a system dump and then reboot. |
| 712385 | Fixes a situation where DD-318 SCSI-2 disk drives had many errors for the `DISK_TIMER_ALARM` fault. |
| 712444 | Fixes MPN SCSI disk errors. |
| 712690 | Fixes a situation where the unavailability of SCSI disks on the MPN caused the UNICOS operating system to panic. |
| 710979, 711360, 711756, 711815, 712609 | Fixes a situation where read or write request time-outs on SCSI disks would hang the system. |
| 708291 | Fixes a situation where SCSI disks would go offline and therefore not allow a file system mount. |
| 710581 | Fixes a situation where the MPN SCSI disk drive unit 1 would time-out because it could not access a new drive nor resolve the problem. |
| 710899 | Fixes a situation where infrequently used MPN disks eventually would enter an uninitialized state and become unusable. |
| 711705 | Replaces a DD-318 SCSI-2 disk drive because the site was unable to access the `/home` file system. |
| 712513 | Fixes SCSI-2 disk drive sleep error. |
| 705617 | Addresses the following error message:<br>`SDISK [SDISK_INIT_TARGET] : CANNOT ASSIGN MEMORY FOR SCSIBUS INQUIRY` |
| **NA** | **HPN SPRs** |
| 709036 | Fixes error recovery problems on HIPPI disks. |
| 711010 | Fixes a situation where problems on the GigaRing channel caused the buffers in HPN network driver to be exhausted. |
| 711250 | Changes HPN software to send a notice-of-incomplete-completion status in the GigaRing packet completion status field when it receives incomplete data from devices on the GigaRing channel. |

| | |
|---|---|
| 711369 | Fixes a hard deadlock situation caused by a missing completion status for a HIPPI disk operation. |
| 713834 | Fixes a situation where the HPN would erroneously panic with an `EXCEPTION PANIC` after encountering certain protocol rule violations that the HPN should have been able to tolerate. |
| 703698 | Improves the timeout value for the HIPPI device driver. With this release, the HPN issues a reply to the cancel request. Consequently, the cancel request completes in a shorter time interval. |
| 710942 | Changes the HPN software to reply to a cancel request. See SPR 703698, previously mentioned. |
| 712087 | Changes HPN software to shutdown direct memory access (DMA) operations when posting an error. This avoids potential corrupt input data being written to the host. |

### 5.4.3 Diagnostics SPRs

The following diagnostics SPRs have been resolved for the SWS-ION 4.0 release:

| | |
|---|---|
| 713787 | Fixes the `query.pgm` script. For more information about this SPR, see Section 5.5.3, page 39. |
| 713782 | Changes the `xelog` diagnostic to report failing CPU number. For more information about this SPR, see Section 5.5.3.7, page 40. |

## 5.5 Software Dependencies, Operational Changes, Diagnostic Changes, Installation Changes, and ION Changes

This section discusses the dependencies and changes introduced with the SWS-ION 4.0 system.

**Note:** For a history of changes in the last three releases, see Appendix A, page 53.

### 5.5.1 Software Dependencies

The SWS-ION 4.0 system supports the UNICOS 10.0.0.3, UNICOS 10.0.0.4 , UNICOS/mk 2.0.3, and UNICOS/mk 2.0.4 operating systems, and has been qualified with the UNICOS/mk 2.0.4.31 system archive.

**Caution:** If you are using raw HIPPI and are running UNICOS 10.0.0.3 or UNICOS 10.0.0.4, you must set GUESTMAX to zero (0) in the UNICOS configuration specification language (CSL) parameter file.

Without setting GUESTMAX to zero (0) , multiple opens on a scalable I/O HIPPI device could cause the loss of posted read operations on the HPN; no inbound HIPPI packets would be accepted or processed.

A UNICOS system with GUESTMAX set to zero (0) is explicitly prevented from running a UNICOS under UNICOS guest system.

**Note:** If you want to install the SWS-ION 4.0 release to support network disks, you need to obtain a license. For network disk software licensing information, contact your product marketing representative and request HG_INSTRUCT instructions, which are available to licensed customers.

If your site is using IBM 3590 SCSI tape devices, contact your Global Product Support representative for workaround procedures for SPR 70694.

If your site is using Redwood STK ESCON tape devices, see SPR 712484, and Redwood STK incident 562456. Problems in the microcode were introduced in the Redwood ESCON CTU 4.0.1 release and resolved in the CTU 4.2.4 release. This problem does not affect Redwood SCSI tape drives.

Persistent console support requires that you run the UNICOS 10.0.0.1 release (or later) and the UNICOS/mk 1.6.1 release (or later).

Power-cycling support for the CRAY T90 mainframe, CRAY J90se mainframe, and associated peripherals requires the UNICOS 10.0.0.1 release (or later).

Dumping a mainframe to MPN-1 or FCN-1 disks requires the UNICOS 10.0.0.1 release (or later).

Power on and power off support requires the UNICOS/mk 2.0.3 release (or later).

### 5.5.2 Operational Changes

This section discusses new, changed, and removed operational functionality.

#### 5.5.2.1 New Functionality

##### 5.5.2.1.1 System Workstation (SWS) and ION

This release provides a new `consys`(8) command, which opens consoles for the specified mainframes. It uses the `mfcon`(8) command to open a console for each of the specified mainframes. If no mainframes are specified, the `consys`(8) command opens a console for each mainframe in the `topology`(5) file. For more information, see the `consys`(8) man page.

This release provides a new `gring_proxy_info`(8) command, which displays GigaRing proxy server information. It displays information about a running GigaRing proxy server task on an I/O node. For more information, see the `gring_proxy_info`(8) man page.

This release upgrades the MAGMA serial port concentrator `MAGMAsp` package to support 16 serial ports.

The `ca_reset.sh`(8), `sv1mond`(8), `K81sv1mon`(8) and `S81sv1mon`(8) commands are introduced in this release to support resetting the CA application-specific integrated circuit (ASIC) on CRAY J90se or CRAY SV1 systems running SV1 revision A processors. The CA ASIC is the cache on a CRAY SV1 system CPU. These commands are not meant to be used by SWS users. Refer to the UNICOS 10.0.0.4 `sv1cache`(7) man page for directions on how and when to configure your system to resetting the CA ASIC.

#### 5.5.2.2 Changed Functionality

##### 5.5.2.2.1 All GigaRing Based Systems

None for this release.

##### 5.5.2.2.2 CRAY T3E Systems

None for this release.

##### 5.5.2.2.3 CRAY T90 Systems

None for this release.

##### 5.5.2.2.4 CRAY J90se Systems

None for this release.

#### 5.5.2.2.5 System Workstation (SWS) and ION

None for this release.

### 5.5.2.3 Removed Functionality

None for this release.

## 5.5.3 Offline Diagnostic Changes

### 5.5.3.1 CRAY SV1

Multiple changes were made to the diagnostics and applications in the CRAY SV1 diagnostics software package.

**Note:** The `jcrid` diagnostic will fail on CRAY J90se systems if cache is enabled. You can disable cache on all CRAY J90se systems using the `jconfig` command when running the `jcrid` diagnostic or run with all cache disabled. A new version of the `crid` diagnostic, called `jcridse`, has been included in this release that will run on all architecture types with cache enabled.

### 5.5.3.2 CRAY T3E Systems

For the `t3ebst` application, this release changes the location in the code where the directory for vectors and log files is created.

For the `rchip` diagnostic, this release increases the `SPUT` and `SGET` timeout values. Section 3 of the `y` dimension in the test was timing out on large CRAY T3E LC systems (1032 PEs or larger).

This release fixes the `query.pgm` script, which was was failing with the following message:

```
ACTIVITY LOG =
     Using DEBUG PEM Configuration...
     Displaying Discovered PEM Configuration...
     FATAL -> SIMPLCellSetStr =
     String (0-1, 3, 5, 8, a-b, f-10, 13-14, 19, 1c, 1e, 20, 22-25,
     28, 2b, 2d-2f, 31, 35-36, 39-3b, 3d-3e, 43, 45-47, 4a, 4d,
     50-51, 53-54, 57-58, 5c-5d, 5f-60, 63-64, 68-69, 6d, 6f, 72,
     74-75, 77-7a, 7d, 7f-80, 83-84, 87, 89-8a, 8d, 91, ^A!V,#P$<\201

     ^X >$\/^F^H<\201^X        Current file, line 1686.
```

```
TRACEBK =  Current function is Output_pelist
TRACEBK =  Output_pelist called by output_pem_cfg
TRACEBK =  output_pem_cfg called by query_pem_cfg
TRACEBK =  query_pem_cfg called by main
TRACEBK =  main called by STARTUP
```

A string variable in the `Output_pelist` function in the `query.pgm` script would exceed the `SimPL` maximum string length of 256 characters causing the script to fail. The `Output_pelist` function now flushes the string before it reaches 256 characters. The `check_route.pgm` script is also affected by this change because it contains the `Output_pelist` function.

For the `query.pgm` and `check_route.pgm` applications, this release resolves SPR 713787.

#### 5.5.3.3 CRAY SSD-T90 Solid-State Device

None for this release.

#### 5.5.3.4 CRAY T90 Systems

None for this release.

#### 5.5.3.5 CRAY J90se Systems

For the `jclr` diagnostic, this release improves MEM512 (4–Gbytes) memory support and increases the run-time of the test.

For the `jconfig` application, this release adds a `-train` option to provide compatibility with the CRAY SV1 installation software.

#### 5.5.3.6 Cray Scalable I/O (SIO) Nodes

None for this release.

#### 5.5.3.7 SWS

For the `elogd` and `xelog` logging routines, this release adds the number of the failing CPU to the `-notify` option output for the `xelog` routine.

### 5.5.4 Online Diagnostic Changes

For the `dring`(8) and `diagring`(8) commands, this release provides the following:

- Changes the commands to automatically raise the ION proxy priority before critical operations and then changes it back to normal afterwards. As part of this implementation, changes were also made to the `tCmdServer` task within ION kernels. Some sites have been given scripts to alter proxy priorities manually. Those scripts are no longer be required.
- Changes to the `isolate` action functionality as follows:
  - Now attempts to reconnect to a proxy if the connection is lost.
  - Now attempts connections with other ION proxies if the maintenance host proxy is not responding.
  - Provides a more complete diagnosis if no proxy is available.
- Modifies the `dring -a monitor` action to fix outstanding problems.
- Changes the commands to no longer log messages about folded or masked rings if the folds and masks are are consistent with `topology`(5) file specifications.
- Changes the default monitor interval to 60 seconds.
- Fixes the `initnode` action to avoid issuing the `cannot maint write` warning message on FCNs. This problem was introduced in the SWS-ION 3.10 release. This was caused because the `dring` command was trying to set a maintenance memory-mapped register (MMR) before the FCN had completed its reboot. Now the `dring` command will wait up to 30 seconds before issuing this message.
- Changes the ring hang test (only called from other commands) so that it can be safely called during normal system operation.
- Adds the ring hang test to the `dring mmranalyze` action.
- Changes the `dring mmranalyze` action to report hung nodes to the stateserver as a client problem on the node.

This release adds a new GigaRing proxy locking facility, which prevents multiple copies of the `dring`(8) command, executing at the same time, from interfering with one another. The new proxy locking facility will recognize older versions of the GigaRing proxy and issue an unsupported error when the

old proxy is detected. It will still allow old applications to connect and operate as usual as long as the proxy is not locked.

The locking facility is on a per process basis. The process identification number (PID) and host name are used as a basis for comparison. This information is passed to the proxy as part of the `init` packet. This is significant for an application which maintains more than one connection to the proxy because actual locking should only be done through a single connection. In general, an application should wait for a resource with no locks held, unless it is trying to set a lock. The locks are priority based. Higher priority locks supersede lower priority locks. Locks also stack. This means that for every lock requested, a release lock call (`priority == GRLOCK_UNLOCK`) must be made. All locks held at the time of disconnect are automatically released.

**Note:** The GigaRing proxy locking facility functionality has been added to the SWS-ION 4.0 release, however, this functionality will not be utilized until a future SWS-ION release.

### 5.5.5 Installation Changes

This release changes the SWS install code for both upgrade and initial installs to ensure that the directory `/opt/CYRIos/man` and the file `/opt/CYRIos/man/windex` exist. If not, the install code creates this directory and file. This allows the `man -k` command to run without error for the UNICOS `CYRIos` package, which currently has no man pages. For more information, see Section 5.4.1, page 31.

### 5.5.6 ION Changes

This release provides single-purpose node (SPN) console support, which allows you to set up your `topology`(5) file (`/opt/config/topology`, by default) to make the mainframe console traffic go through an SPN (IPN-1, FCN-1, FCN-2, BMN-1, ESN-1, HPN-1, and HPN-2) instead of an MPN-1. Use the `mfcon`(8) command to open a console for a mainframe. The IO node that is used for the mainframe console traffic is the same one that has the `MAINTENANCE` keyword on the ring that also has the `BOOTNODE` keyword (see the examples below).

The topology file for the CRAY J90 system in the following example causes the console packet traffic to go through `sn9001-mpn0`.

```
#
# topology file for sn9001
#
```

```
RING    ring-0          3
J90     sn9001-0        2       BOOTNODE CONNECTION=0
MPN-1   sn9001-mpn0     6       MAINTENANCE
FCN-1   sn9001-fcn1     4

RING    ring-1          4
J90     sn9001-1        2       CONNECTION=1
FCN-1   sn9001-fcn0     4       MAINTENANCE
HPN-1   sn9001-hpn0     6
ESN-1   sn9001-esn0     5
```

The toplogy file for the same CRAY J90 system in the following example causes the console packet traffic to go through `sn9001-fcn1`.

```
#
#
# topology file for sn9001
#
RING    ring-0          3
J90     sn9001-0        2       BOOTNODE CONNECTION=0
MPN-1   sn9001-mpn0     6
FCN-1   sn9001-fcn1     4       MAINTENANCE

RING    ring-1          4
J90     sn9001-1        2       CONNECTION=1
FCN-1   sn9001-fcn0     4       MAINTENANCE
HPN-1   sn9001-hpn0     6
ESN-1   sn9001-esn0     5
```

This release provides network disk support on the GigaRing channel for the HIPPI Channel I/O Node, HPN-1 and HPN-2. In previous releases, this code was present but was only used by a few customers.

> **Note:** If you want to install the SWS-ION 4.0 release to support network disks, you need to obtain a license. For network disk software licensing information, contact your product marketing representative and request `HG_INSTRUCT` instructions, which are available to licensed customers.

An HPN-1 with two HIPPI channel pairs can run disk and network connections simultaneously, one on each channel pair.

The HPN-1 and HPN-2 software now supports multiple initialization requests. Previously, an unexpected `REQ_INIT` message would cause the HPN kernel software to panic. With this release, an HPN can process most `REQ_INIT` messages.

This release changes how HPN software reacts to peer-down notification messages. Previously, only a message would be issued in response to a peer-down notification message. Now, an HPN will idle the HIPPI channel and shut down GigaRing channel I/O.

The FCN-1 and FCN-2 boot process has been changed to now indicate how many devices were found on each channel after an FCN has been booted. This information is displayed on the FCN console and is logged in the `ion_syslog.info` file.

This release provides support for the STK 9840 tape drive. This release supports normal functionality of the tape drive, except for data compression. Data compression support will be added in a future SWS-ION release.

# Customer Service [6]

This section describes the following customer services that Silicon Graphics offers to support the SWS-ION 4.0 release:

- Training support
- Software problem reporting and resolution process
- Cray CRInform program
- *Pipeline Supercomputing Supplement*

## 6.1 Training Support

The *Customer Education* web site describes all Silicon Graphics Software Training support. The web site lists Silicon Graphics training office locations, describes the available training services and facilities for customers. It also contains the current class schedule and a description for each course.

The *Customer Education* web site is available at the following URL:

`http://www.sgi.com/support/custeducation/`

## 6.2 Software Problem Reporting and Resolution Process

If you experience problems with the SWS-ION 4.0 release, contact your Silicon Graphics service representative; your service representative will work with you to resolve the problem. If you choose to have full-time or part-time on-site support, your on-site support personnel are your primary contacts for service. If you have elected not to have on-site support, please call the call center and report your problem to them or submit a request for technical assistance (RTA) through the CRInform program.

For current information on the status of all SPRs, see the CRInform / Software Problem Report (SPR) database.

## 6.3 Cray CRInform System

The Cray Inform (CRInform) program is a World Wide Web-based information and problem-reporting service for Cray customers. Using the CRInform program, you can do the following:

- Report software problems
- Request technical assistance
- Communicate directly with other Cray customers
- Read about software problems similar to yours reported at other sites
- Learn about solutions to various problems
- Find out about classes
- Read about new products, and more

The CRInform program automatically logs as news items those events that are pertinent to your site, so you do not have to search through the system for new information. The logged events include changes in Software Problem Report (SPR) or request for technical assistance (RTA) activity, new orderable software, new issues of the *Pipeline Supercomputing Supplement*, new field notices (FNs), new software release documents, new software problem fix information, new marketing information, and new CRInform program information. You can also get automatic electronic mail (email) notification of any or all of the news items.

Version 4.0 of the CRInform program is available through the World Wide Web. You need access to the CRInform web server and a browser (such as Mosaic, Netscape, or Lynx), which allows you to view information or make service requests. You can use your own site's browser, or use either the Mosaic or Lynx browsers available on the `crinform` system.

## 6.4 Pipeline and Pipeline Supercomputing Supplement

The *Cray Research Service Bulletin* (CRSB) has been replaced by the *Pipeline* and the *Pipeline Supercomputing Supplement*.

Customers who have a support contract receive *Pipeline*, the Silicon Graphics customer newsletter. Customers who have a support contract for a Cray system also receive the *Pipeline Supercomputing Supplement. Pipeline* provides product and support information about Silicon Graphics workstations and servers, and the *Pipeline Supercomputing Supplement* provides product and support information about Cray supercomputers.

*Pipeline* and the *Pipeline Supercomputing Supplement* are both published six times a year (January / February, March / April, and so on).

*Pipeline* is available on the World Wide Web in Supportfolio Online at:

`http://support.sgi.com/`

and the *Pipeline Supercomputing Supplement* is available in CRInform at:

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

# Release Package [7]

This chapter contains information about the following for the SWS-ION 4.0 release:

- Licensing
- List and description of the contents of the release package
- Ordering instructions

## 7.1 Licensing Information

The SWS-ION product is licensed under the Cray Operating System Software license. For all Cray systems, customers will be shipped binary code for the SWS-ION 4.0 release.

The HIPPI network disks are licensed separately.

**Note:** If you want to install the SWS-ION 4.0 release to support network disks, you need to obtain a license. For network disk software licensing information, contact your product marketing representative and request `HG_INSTRUCT` instructions, which are available to licensed customers.

### 7.1.1 Licensing Contacts for Customers

For more information on the licensing and pricing of SWS-ION, customers should see their account representative or contract administrator.

## 7.2 SWS-ION Software Support Policy

The SWS-ION 4.0 system supports the UNICOS 10.0.0.3, UNICOS 10.0.0.4, UNICOS/mk 2.0.3, and UNICOS/mk 2.0.4 operating systems, and has been qualified with the UNICOS/mk 2.0.4.31 system archive.

This release supports the following upgrade paths:

- SWS-ION 3.9 release to the 4.0 release
- SWS-ION 3.10 release to the 4.0 release

Upgrade paths to the SWS-ION 4.0 release from releases prior to the SWS-ION 3.9 release are not supported.

## 7.3 Release Package Contents

The SWS-ION 4.0 release package includes the following:

**Note:** For information on what documentation to read first before installing this release, see Chapter 1, page 1.

- CD-ROM containing the SWS-ION software
- SWS-ION 4.0 Errata Document
- SWS-ION 4.0 Installation Procedures, which are also available in the `/cdrom/cdrom0/README.install` file on the CD-ROM
- A set of core documentation, as listed in Table 3

Table 3. Core documentation

| Title | Online | Hardcopy |
|---|---|---|
| *SWS-ION Release Overview* 4.0 | DynaWeb | Yes |
| Online man pages updated for the SWS-ION 4.0 release | `man` command | No |
| *SWS-ION Administration and Operations Guide* 4.0 | DynaWeb | No |
| *SWS Operating System and Devices Installation Guide* 3.9 | DynaWeb | Yes |
| *Cray Scalable I/O Functional Overview* 3.10 | DynaWeb | Yes |
| *Cray Scalable I/O Messages* 3.10 | DynaWeb | Yes |

**Note:** The 4.0 version of the *SWS-ION Reference Manual* is available as printable PostScript files provided on the same DynaWeb CD as the rest of the supporting documents for this release. Individual man pages are also available online and can be accessed by using the Solaris `man`(1) command.

The Cray DynaWeb server allows you to view documents online by using a World Wide Web (WWW) browser such as Netscape or Mosaic. PostScript versions of manuals are also available on the Cray DynaWeb server. To access

the Cray DynaWeb server, see your Cray Research system administrator for the local URL.

## 7.4 Obtaining Publications

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

To order a document, call 1 651 683 5907. Silicon Graphics employees may send electronic mail to `orderdsk@sgi.com` (UNIX system users).

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

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

## 7.5 Ordering the SWS-ION 4.0 Release Package

SWS-ION is distributed by order only to sites that have signed a Cray Research software license agreement for the 4.0 release of the product. The most current revision of the release package is supplied.

Please make sure your site has signed a Cray Research software license agreement before you order the SWS-ION 4.0 release package (see Section 7.1, page 49).

You can order the SWS-ION 4.0 release package by using one of the following methods:

- Customers who subscribe to the CRInform program can order software release packages electronically by using the `Order Cray Software` option.
- Customers can contact the order desk at the Silicon Graphics Eagan-campus Distribution Center by telephone (1 651 683 5907 or 1 800 284 2729 extension 35907) or through electronic mail (`orderdsk@sgi.com`).
- Customers outside of the United States and Canada should contact their local service organization for ordering and documentation information.

Software will be shipped by ground service or 5-day international service unless otherwise requested.

Sites outside the United States may be required to provide a customer-signed Letter of Assurance before this software can be shipped. Address questions about which customers must sign Letters of Assurance or which software requires such a letter to Alan Benfell at the following address:

Alan Benfell
International Administration
Cray Research, Inc.
655F Lone Oak Drive
Eagan, MN 55121 USA
Telephone: 1 651 683 7460
Fax: 1 651 683 7509
Email: benfa@sgi.com

# Software Release History [A]

This section describes changes to the SWS-ION software in the previous three releases. It also lists the SPRs that have been resoved. If your upgrade is not sequential, read this Appendix for software changes beginning with the 3.8 release.

This chapter addresses the following topics:

- Operational changes
- Diagnostic changes
- ION changes

## A.1 Operational Changes

### A.1.1 SWS-ION 3.8 Release

#### A.1.1.1 SWS-ION 3.8: SWS Operations SPRs

The following SWS SPRs have been resolved for the SWS-ION 3.8 release:

| SPR number | Resolution |
|---|---|
| 708292 | Fixes a problem where the ring number always has a value of zero instead of the value of the `BOOTNODE` ring in the `topology`(5) file. |
| 708527 | Removes support for the `dring`(8) command `-a initclient` option, which can cause the target node or ring to lock up. |
| 709729 | Fixes a problem with the `haltsys`(8) command where it would put incorrect string information in the state server file. |
| 709282 | Modifies the `tkfbox.tcl` routine to change the text comparison from numeric to string. The numeric comparison could not handle file names that were all numeric and contained more than 10 digits. It would fail and issue the following |

| | |
|---|---|
| | message: `Error: integer value too large to represent.` |
| 709992 | Changes the `swsinstall`(8) command to touch the `/etc/notrouter` file on initial installs only, not on software upgrades. It now prints a message stating whether the file was created or not. Also adds a couple debug messages. |
| 709994 | Fixes a problem where the `swsinstall`(8) command failed on a `resume` request when xhost permissions were not correct. Resume processing would end up calling the `create_lock` function twice. It also reworks heuristic to estimate disk space needed for software installation. |
| 710055 | Fixes problems in SWS setup software with the creation of the `/opt/opt symlink`. If a `symlink` exists, verify it points to the current directory. If `ln` fails, exit with an error status. |
| 710060 | For the `mfcon`(8) command, this release fixes a problem which would cause the console to hang when receiving `ZP_CONSOLE` packets. With this release, software only tracks sequence numbers on packets without `ZP_CONSOLE` set. On UNICOS/mk systems, the operating system must clear the `ZP_CONSOLE` bit from packets originating from the tty server.<br><br>**Note:** This fix requires the UNICOS/mk 2.0.3 release (or later). |
| 710245 | For the `dumpj90`(8) command, this release changes the timeout value from 20 to 60 seconds. This was required for third-party I/O. |

### A.1.1.2 SWS-ION 3.8: New Functionality

This release adds the `t3epalprep`(8) command, which prepares a CRAY T3E boot privileged access library (PAL) binary file for selective logical processing element (LPE) restarts.

This release adds the `t3epeboot`(8) command, which is a low-level command that boots one or more CRAY T3E application or command logical processing elements (LPEs) without rebooting the entire system. This is known as a

*warmboot*. The t3epeboot(8) command calls the t3epalprep(8) command prior to restarting the selected LPE.

**Note:** You will use this command only when application or command LPEs panic and halt cleanly. Do not use this command on I/O control LPEs. You cannot use this command if the UNICOS/mk operating system has halted.

#### A.1.1.3 SWS-ION 3.8 Changed Functionality

##### A.1.1.3.1 All GigaRing Based Systems

This release adds support for CRAY SSD-T90 solid-state devices with up to 32 PEs.

This release changes the dumpsys(8) command so that the I option now inhibits the dumping of I/O nodes (IONs). IONs will be reset (without dumping) prior to any mainframe dump. The ION resets can also be inhibited by specifying the -B option. If no components are specified on the command line, then all IONs will be reset prior to dumping the mainframe. If components are specified, then only those IONs that are specified will be reset prior to the mainframe dump. For more information, see dumpsys(8) man page (Examples 9 and 10 show examples of this change).

This release provides initial, limited support for shared GigaRing channels represented by changes to the bootsys(8) command. It adds a call within the bootsys(8) command to dring(8) with the initforboot action. When bootsys is invoked to boot a mainframe, bootysys calls dring -ainitforboot -m -T /opt/config/topology, before calling the appropriate low-level mainframe boot command. Once the call to dring(8) completes, the boot will continue normally.

The bootsys(8) command ignores a dring(8) failure when making the initforboot call. The bootsys(8) command will not run multiple dring initforboot calls in parallel. You can disable this feature by setting the SWS_DISABLE_INITFORBOOT environment variable to a non-NULL value.

This change makes sure that the bootsys(8) command does not interfere with other mainframes or I/0 nodes on a ring that have been previously booted.

##### A.1.1.3.2 CRAY T3E Systems

This release changes the haltt3e(8) command to retry halting on all other rings and nodes before exiting with an error. If the dump fails, it gives the operator the option to abort, retry the mainframe dump, or skip the mainframe

dump before exiting with an error. This increase functionality is useful in situations where the mainframe has problems dumping itself. The mainframe dump can now be retried without redumping or resetting all the IONS and other system resources on the GigaRing channel.

This release adds the `-H max_halt_attempts` option to the `haltt3e`(8) command, which specifies the maximum number of times the command will retry to halt the mainframe. The default is the number of ring/node connections for that mainframe.

This release adds the `-H max_halt_attempts` option to the `dumpt3e`(8) command, which specifies the maximum number of times the `haltt3e`(8) command will retry to halt the mainframe. The default is the number of ring/node connections for that mainframe.

#### A.1.1.3.3 CRAY T90 Systems

None for this release.

#### A.1.1.3.4 CRAY J90se Systems

#### A.1.1.3.5 System Workstation (SWS) and IONs

None for this release.

### A.1.1.4 SWS-ION 3.8 Removed Functionality

None for this release.

## A.1.2 SWS-ION 3.9 Release

### A.1.2.1 SWS-ION 3.9: SWS Operations SPRs

The following SWS SPRs have been resolved for the SWS-ION 3.9 release:

| SPR number | Resolution |
|---|---|
| 710416 | Changes the `tpio` transport protocol so that it now breaks memory read operations into 16 megaword chunks. The protocol cannot support transfers larger than 32 megawords. |

| | |
|---|---|
| 711512 | Enhances the `PeHasCheckedIn` member function. It now determines where to read the PE status based on the UNICOS/mk release level. This matches a change in the UNICOS/mk 2.0.4. release. |
| 711688 | Adds more helpful text about what to do after detecting a problem with the `/opt/opt` directory to the `swssetup` script called by the `swsinstall`(8) command. |
| 711323 | Removes the `opt/CYRIops/bin` version of the `S81umkcsp` script, which is obsolete.<br><br>Currently, there are two `S81umkcsp` scripts, one in `/opt/CYRIops/bin`, and the other in `/opt/CYRIos/bin`. This modification removes the `opt/CYRIops/bin` version. It also modifies `CYRIops_post_install` script to remove `/opt/CYRIops/bin/S81umkcsp` and to create the correct link as follows: `/etc/rc2.d/S81umkcsp -> /opt/CYRIos/bin/S81umkcsp`. |

### A.1.2.2 SWS-ION 3.9: New Functionality

#### A.1.2.2.1 CRAY SV1 Systems

The SWS–ION 3.9 release introduces some of the features required for the CRAY SV1 mainframe, but it is not fully supported. Therefore, although the following commands are present they should not be used:

- `bootsv1`(8)
- `checksv1`(8)
- `clearsv1`(8)
- `dumpsv1`(8)
- `haltsv1`(8)

The `SV1` type is provided in the `topology`(5) file. However, it should not be used.

### A.1.2.3 SWS-ION 3.9: Changed Functionality

#### A.1.2.3.1 All GigaRing Based Systems

None for this release.

#### A.1.2.3.2 CRAY T3E Systems

This release modifies the `boott3e`, `dumpt3e`, `cleart3e`, and `clearssd` commands to call the `dring -a` *nodelc* `-m` *mainframe* `-T` *topology* command after calling the `t3e_hdw_boot`(8) command.

This resolves a hardware problem that occurred when CRAY J90se systems are performing DMA operations, which would lock up when the `nodelc` register in the GigaRing interface on a CRAY T3E or a CRAY SSD-T90 is nonzero and the CRAY J90se tries a DMA operation targeting one of these systems. This problem became evident when mainframe-to-mainframe TCP/IP operations over the GigaRing channel were introduced. Here are the corresponding error messages:

```
ftp>ls
200 PORT command successful.
150 Opening ASCII mode data connection for /bin/ls.
DMA request time-out: aborting: tibp = 0206237000
error = 0 pending = 0360 done = 017
Engine 0 busy = 1: Engine 1 busy = 1
```

For more information about the `dring`(8) command , see Section A.2.2.2, page 70 in this manual and the man page.

#### A.1.2.3.3 CRAY T90 Systems

None for this release.

#### A.1.2.3.4 CRAY J90se Systems

None for this release.

#### A.1.2.3.5 System Workstation (SWS) and IONs

You can now use the `swsbp`(8) command to specify that all IONs of a given type, such as the set of SPNs using the `.vxss` template, will use the generic kernel (`spn-generic`) specified in the template. The result is that the boot file (`bf`) names in the `bootptab` file are commented out for each individual SPN

entry. You can use the same feature to switch back to the individual operating system (OS) kernels used when booting the mainframe operating system. The result is that the comment character is removed for the boot file (`bf`) names in `bootptab` for each individual SPN entry.

**Note:** The generic kernel (`spn-generic`) is used for offline diagnostic purposes only. Do not use this kernel for normal operation, because it can cause problems when you try to boot the mainframe operating system.

With the 3.9 release, the default behavior of the `mfcon`(8) command has changed. The `mfcon` command now always opens a nonpersistent connection for lines 1 through 4.

For the `viewpkt` and `tkviewpkt` commands, this release adds a `-t` *topology filename* option, which specifies an alternative `topology`(5) file to use. This change makes the commands consistent with the SWS commands that use the `-t` option. The default is `/opt/config/topology`. (Note that the `-T` *topology filename* format is still valid for compatibility purposes.)

#### A.1.2.4 SWS-ION 3.9: Removed Functionality

None for this release.

### A.1.3 SWS-ION 3.10 Release

#### A.1.3.1 SWS Operations SPRs

The following SWS SPRs have been resolved for the SWS-ION 3.10 release:

| SPR number | Resolution |
|---|---|
| 712282 | Adds a check to make sure the “truth PE” is enabled on a CRAY T3E system. If it is not enabled, this code tries another PE until the truth PE is found.<br><br>The "truth PE" contains an unmodified copy of the operating system. The first copy is placed in the boot PE and a second copy is placed in the truth PE. When the SWS issues a reset on the boot PE, the operating system code is copied from the truth PE to the rest of the PEs in the configuration. |

| | |
|---|---|
| | The only time the truth PE is not needed is for a maintenance boot. In this case, you only boot a single PE as a way to get a dump of the remaining PEs. |
| 712553 | Fixes a problem with third part dumps on CRAY T3E systems that was introduced in SWS-ION 3.9. |

### A.1.3.2 SWS-ION 3.10 Release: New Functionality

#### A.1.3.2.1 System Workstation (SWS) and IONs

This release provides a new `levelsys`(8) command, which sets or displays the run level of the operating system on one or more mainframes.

You can think of a run level as a software configuration of the system in which each configuration allows only a selected group of processes to exist. For more information on the run level of the operating system, see the `init`(8) and `inittab`(5) man pages.

This release provides a new `fcnenable`(8) command, which enables Fibre channel disks connected to an FCN-1 or FCN-2.

The DSF-2 subrack can be used for both DD-308 and DD-309 drives. However, from time to time and immediately after a power-up, some of the DD-308 drives are not available for use (that is, they do not show up in the `fcnstat`(8) command's output for the FCN). Noise on the Fibre Channel loop itself during power-up can be interpreted by the DD-308 drives as an `enable bypass` primitive command. This primitive instructs the drive to enable its bypass circuitry, which makes it disappear from the Fibre Channel loop. The `fcnenable`(8) command invokes a special function in the FCN kernel that issues a `disable bypass` primitive command to all drives on all Fibre Channel loops. This makes the drives reappear on the Fibre Channel loop. The drives are then available for use.

### A.1.3.3 SWS-ION 3.10 Release: Changed Functionality

#### A.1.3.3.1 All GigaRing Based Systems

For the `mflevel`(8) command, this release changes the message information on CRAY T90 systems so that it is the same as the message information on CRAY J90se and CRAY T3E systems. The `mflevel`(8) command sets or

displays the run level of the UNICOS or UNICOS/mk operating system on a single mainframe.

This release supports the booting and dumping of domains of multiple mainframes by using the new `-d` option to `bootsys`(8), `dumpsys`(8), and `scantopo`(8) commands. A mainframe domain includes the the mainframes and the GigaRing channels, I/O nodes, and CRAY SSD-T90 devices that are unique to the specified mainframes. The new `levelsys`(8) command also supports domains. For details, see the man pages.

#### A.1.3.3.2 CRAY T3E Systems

This release adds `-s` *scanlevel* and `-F` options to the `boott3e`(8) command. The `-s` *scanlevel* option sets the boot-time boundary scan testing. *scan_level* can be either 1 (enable testing) or `0` (disable testing); 0 is the default. Boundary scan testing is normally used in conjunction with diagnostic tests (that is, when the `-d` *diag_level* value is non-zero).

The `-F` option forces changes to the system configuration (made by boot diagnostics or boundary scan) to be automatically saved without prompting the operator for confirmation. You can enable diagnostics by setting the `-d` *diag_level* option to a non-zero value. You can enable boundary scan by specifying the `-s` 1 option.

#### A.1.3.3.3 CRAY T90 Systems

None for this release.

#### A.1.3.3.4 CRAY J90se Systems

The `bootj90`(8) command now calls the `dring`(8) command with `nodels` *action* argument. For more information, see Section 5.5.4, page 41.

This release reduces the amount of time required to run the `jclr` command. The `jclr` command clears mainframe memory in the process of booting CRAY J90 systems.

#### A.1.3.3.5 System Workstation (SWS) and ION s

### A.1.3.4 SWS-ION 3.10 Release: Removed Functionality

None for this release.

## A.2 Diagnostic Changes

### A.2.1 SWS-ION 3.8 Release

#### A.2.1.1 SWS-ION 3.8: Offline Diagnostic Changes

##### A.2.1.1.1 CRAY T3E Systems

For the Stand-Alone-Diagnostic-PAL (`sadpal` binary) and hardware boot (Hardware initialization for operating system boot), this release corrects errors in the Virtual Channel Selection table. Errors in this table would cause dateline failures for certain systems. The only systems affected are systems with all R6 routers larger than 64PEs (which have a network radix greater than four).

For the `cit` diagnostic, this release fixes timeout problems when running with Long Deterministic routing. It also makes minor changes to section 9 in Long Deterministic Routing.

##### A.2.1.1.2 CRAY SSD-T90 Solid-state Device

None for this release.

##### A.2.1.1.3 CRAY T90 Systems

For the logic monitor environment (LME) `lme` application, this release provides the following:

- Adds support to the `lmedump` command for dumping the instruction buffers and exchange package for a hung CPU (via the `-cphang` flag). This function checks for maintenance memory (upper 256K) before dumping CPUs when the UNICOS operating system is running.
- Adds support for issuing a warning instead of a fatal error when LME cannot connect to both sides of a CRAY T932 chassis.
- Simplifies the Record and Trigger panels in the Edit Parameters display (removes the `Change` button, and modifies the `Add` functionality to be more intuitive).
- Corrects an exchange package problem in maintenance mode. When dumping exchange packages (via the maintenance mode), LME now exchanges in a valid exchange package. This prevents invalid mode and flag

bits from being set when the original exchange package is exchanged back into the CPU.

- Fixes a problem with reporting CPU status when dumping testpoints; CPU status was being reported as `hung` when the CPU was actually running.

For the mainframe maintenance environment `mme` application, this release provides the following:

- Fixes a memory size problem for CM04/CRAY T932 (2 GigaWord) configuration.
- Adds a new interface for the offline GigaRing configuration file selection.

For the `ifp` diagnostic, this release provides the following:

- Updated runtime information displays for all test sections to include basic parameters in the MAIN display. Updated comments for some of the parameters in `ifp00`-`ifp02` to be more user friendly.
- Added new `SERRA` subroutine to report errors where the ACTual data is in S4, and EXPected data is in S3. This fixes code defects in `ifp00` and `ifp01` where the ACT/EXP data was swapped when errors were reported in parts of the tests.

For the `ctt` diagnostic, this release adds code to deselect test condition 5 when a CM04 memory module is installed.

For the `rict` diagnostic, this release fixes some errors in the runtime display for the `CPUTBL`, `CLNTBL`, and `OFFSET` tables.

For the `mcst` diagnostic, the `mcst02` function was reported to fail on a CRAY T32 systems with 2 GigaWords of memory if more than 26 CPUs were enabled. The failure was due to a call to shut down mainframe maintenance environment (MME) I/O that timed out before the test sequence completed. With this release, the timeout value changes from 2 seconds to 6 seconds. This should eliminate the slowdown seen when running with CM05 memory modules.

For the `tgrt` diagnostic, this release fixes code defect in the subroutine `SBUFRND`. This defect did not cause a failure, but it did not pattern the buffer as intended.

For the `sce` application, this release fixes a problem where the `sce_cpreset` command failed with a message indicating that the MPN hostname was not defined. This software bug was introduced when SCE was modified to support two maintenance channels on 7117. The `sce_cpreset` command was looking up the incorrect attribute; this has been corrected.

#### A.2.1.1.4 CRAY J90se Systems

None for this release.

#### A.2.1.1.5 Cray Scalable I/O (SIO) Nodes

None for this release.

#### A.2.1.1.6 SWS

For the `elogd/xelog` application, this release adds a software fix to retrieve correct MPN data from SCE in response to the SCE software bug introduced in the SWS-ION 3.7 release, described above.

#### A.2.1.1.7 SWS-ION 3.8: Online Diagnostic Changes

For the `dring`(8) and `diagring`(8) commands, this release provides the following:

- Updates the `ssdstatus` command to work with CRAY SSD-T90 systems with up to 32 PEs.
- Eliminates a software bug that might allow temporary ring folding during a `status` command. Folding should not occur during the operation of the `status` command.
- Eliminates a problem that causes a CRAY J90se system to lock up when mastering a direct memory access (DMA) request to a CRAY T3E system (for example, when doing mainframe to mainframe TCP/IP to a T3E system). This problem is eliminated by setting `NodeLc` to 0 on CRAY T3E systems and on CRAY SSD-T90 solid-state devices.
- Adds an `initvc` command, which can be used to reinitialize virtual channel allocation values for specified nodes or rings.
- Extends the syntax of `ringinit` files to allow specification of memory-mapped register (MMR) values for designated rings , nodes, or mainframes. Old `ringinit` files will continue to work with the new code.

### A.2.2 SWS-ION 3.9 Release

#### A.2.2.1 SWS-ION 3.9: Offline Diagnostic Changes

##### A.2.2.1.1 CRAY T3E Systems

For the `route_gen` application, this release:

- Fixes a problem where disabling a single node would cause routing difficulties and require that eight additional PEs had to be disabled in order to boot a system.
- Fixes a software bug in the route generation code where nodes on an odd numbered Z plane were incorrectly disqualifying potential routes requiring a final hop when calculating the legal route permutations.
- Fixes problems with the virtual channel (VC) optimization code which were causing dateline violation errors to occur when certain PE nodes were disabled. These problems were specific to multi-cabinet CRAY T3E-1200 systems.

For the `pst` diagnostic, this release adds heartbeat switch code to the `pst2` section. The `pst.uv` test failed section 2 on a large CRAY T3E-1200 systems (1024 PEs or larger).

For the Stand-Alone-Diagnostic-PAL (`sadpal` binary) and hardware boot (Hardware initialization for operating system boot), this release provides the following:

- Fixes a software bug in the `M_ERR` interrupt handler which was causing many daughter card failures to be reported incorrectly. For any non-single-error correction / double-error detection (non-SECDED) error incurred by a private read to any memory bank other than 0 or 4 (M0), the error was being incorrectly reported as an `ILLEGAL MMR ACCESS` error on M0. This software problem also caused the `_fail_cnt` location to be set to 2 instead of 1.

  The following example shows a bogus error report:

```
============================================================
                     PE007 - FAILURE ANALYSIS
      ============================================================
      PE007 _pass_cnt   00000000 00000000  pass count
      PE007 _fail_cnt   00000000 00000002  fail count
      PE007 _ecode      00000000 40030000  Unexpected CRAY Interrupt
```

```
PE007 _sec        00000000 00000000  failing test section
PE007 _cond       00000000 00000005  failing test condition
PE007 _info0      00000000 00000000  EIB number

PE007 _info9      00000000 000000fe  fill error indicator
PE007 _info10     00000000 00000625  exc_addr
PE007 _info11     fffffc80 10000400  x_ERR0 MMR Address
PE007 _info12     00000000 00000008  contents of x_ERR0
PE007 _info13     00000000 001effff  contents of x_ERR1
PE007 _info14     00000000 00000003  contents of x_ERR2
PE007 _info15     00000000 00000000  contents of x_ERR3
```

- Modifies the boot process to force the routes generated for the boot PE to be short when testing R chip performance (for example, `DS_PERF`). A short route is used in most cases because it finds the shortest and fastest route between two PEs. A long route is used mostly for testing purposes because it finds the longest path between two PEs. The distinction between short routes and long routes only affects the offline environment since the operating system is always booted using short routes. This fixes intermittent `DS_PERF` failures seen on machines with long distance routes.

For the `mile.pgm/mile2.11` diagnostic, this release provides the following:

- Now runs test sections 0 and 2 of the `lmem` routine separately, which allows for more efficient testing of mixed-memory systems.
- Removes `cit` and `gnt` tests from the buffer.
- Now forces the boot PE to use short routes to prevent intermittent `ds_perf` failures on very large systems when testing long-route modes.

For the CRAY T3E system boundary scan `t3ebst` application, this release provides the following:

- Adds a new test = partial pattern set interconnect test (`qbst`).
- Fixes the SCX (GigaRing channel) instruction code to enable the SCX loopback test.

#### A.2.2.1.2 CRAY SSD-T90 Solid-state Device

None for this release.

#### A.2.2.1.3 CRAY T90 Systems

For the `topo2cfg` application, this release fixes problem where `topo2cfg` application would generate a file that says that CRAY T90 nodes are associated with an CRAY SSD-T90 (when actually they are associated with a CRAY T3E system).

For the `svf` diagnostic, this release adds the `MaskVj` and `MaskBMM` operand mask. To clear the bits in the Matrix operands, you have to clear the bit in the operand mask.

**Note:** Only conditions that use the `RANV0` and `RANV` subroutines are affected. These are conditions are `5`, `6`, `7`, and `10`.

For the `fpt` diagnostic, this release provides the following:

- Adds a random operand `MaskOPA` and `MaskOPB` bit mask. To clear the bits in the operands, you have to clear the bit in the operand mask.

  **Note:** Only condition 1 uses random operands.

- Adds mask parameters to main runtime display.
- Changes the `STOP` parameter from `WAIT` to `STOP` in all sections but 13 and 15.

For the `ifp` diagnostic, this release adds the `OP00MSK` and `OP01MSK` user masks. The masks are used to clear bits in random operands in the random data loops of the `ifp01`, `ifp03`, and `ifp04` routines. The run–time displays have been updated to support these new masks.

For the `tgrt` diagnostic, this release provides the following:

- Updates the diagnostic to run better on large memory systems.
- Changed `JBSMT011` memory size mask from `00004001777` to `000001017777`, and changed the `JBSMT015` memory size mask from `00004001777` to `000001017777`. `JBSMT011` is the memory size mask for the Vector Memory background Job 0, and `JBSMT015` is the memory size mask for the Vector Memory background Job 1.

For the `pmt` diagnostic, this release changes the maximum index used when indexing into the Low-speed channel (LOSP) Channel table to prevent the use of channels 60 through 63.

For the `cbp` application, this release provides the following:

- Adds the popen() and pclose() functions, which open and close a pipe to a cbp command buffer.
- Adds the MMEDump() command to allow formatted dumps of memory, and adds the MMECtrlptSectionSymbol() command to return the value of a symbol from a diagnostic symbol table.
- Adds a DUMP.cmd sample dump command buffer, as well as mme_dump.h header file, which contains support code for dumping the diagnostic dump area.
- Adds documentation for the MMEDump() and MMECtrlptSectionSymbol() commands to the cbp help file in opt/CYRIdiag/t32/rel/cmd/cbp.ref.

For the sce application, this release fixes a problem where channel enable operation for I/O 1 module channels were not being reset when quadrant state was changed. Configuration information would show the channel enabled but not selected.

With this release, the run boundary scan runbscan diagnostic now calculates the upper two digits of year for the SunOS operating system for the swap log file.

#### A.2.2.1.4 CRAY J90se Systems

For the jclr diagnostic, this release modifies the diagnostic to support MEM512 memory modules.

**Note:** A MEM512 memory module equals 512 megawords (Mwords), which equals 4,096 Gbyte/s.

For the jconfig application, this release provides support for the JR94 Solitaire module.

For the jejt diagnostic, this release modifies the diagnostic to support MEM512 modules. Sec 7 of the jejt of the test failed on 4–Gword systems due to integer multiply overflow when calculating vector stride index within the GAA subroutine.

For the jmc application, this release provides the following:

- Fixes offline command to correctly configure mixed-memory systems.
- Adds changes for JR94 Solitaire module.
- Modifies search paths for tester version to match tester directory structure.

- Changes `textsw` store files to have system-unique file names to allow multiple applications to run simultaneously.
- Increases `textsw` buffer size for main window.

#### A.2.2.1.5 Cray Scalable I/O (SIO) Nodes

None for this release.

#### A.2.2.1.6 SWS

For the warning and control system `nwacs` application, this release provides the following:

- Adds the `plcdownload` program.

  This program allows a customer site engineer to download the Programmer Logic Controller (PLC) microcode to the WACS PLC.
- Fixes software bugs described in SPR 709195.
- Provides additional hardware status information for CRAY T90 systems as follows:
  - Sends count down message for shutdown on low coolant levels.
  - Adds power-cycle count to data screens.
  - Adds a display and function switch for CRAY T90 temperature settings.
- Adds the `wacspower` program.

  This program allows the system to be powered up remotely.
- Adds code to allow `nwacsuser` application to be run without an X Window System display.

  This allows the program to log `nwacs` messages without having a display up.
- Adds a new feature that allows the `nwacs` application to send log messages to `stdout`. This allows the SWS to do online monitoring of the system. Typically, this feature will be used with the `no display` option.

#### A.2.2.2 SWS-ION 3.9: Online Diagnostic Changes

For the `dring`(8) and `diagring`(8) commands, this release provides the following:

- Adds a new `dring`(8) command `-a nodelc` action to clear the `nodelc` bits in the client chip register on CRAY T3E and CRAY SSD-T90 systems. The `nodelc` bits in the client chip register regulate the flow of GigaRing packets. In a non-zero state, the `nodelc` bits could cause DMA operations to fail. Clearing this register, ensures that CRAY J90se system can master direct memory access (DMA) operations to the to CRAY T3E and CRAY SSD-T90 systems.

  The `nodelc` action can be used in conjunction with the `-m` argument to specify that the `nodeLc` register should be set to 0 for all GigaRing nodes belonging to the specified mainframe.

### A.2.3 SWS-ION 3.10 Release

#### A.2.3.1 SWS-ION 3.10: Offline Diagnostic Changes

The following diagnostics SPRs have been resolved for the SWS-ION 3.10 release:

| | |
|---|---|
| 710649 | Logs the CRAY T3E `bscan` output to a file if run from `t3ems`. |
| 711891 | Modifies resource mode for R-to-R clock signals. |

##### A.2.3.1.1 CRAY T3E Systems

For the Stand-Alone-Diagnostic-PAL (`sadpal` binary) and hardware boot (Hardware initialization for operating system boot), this release fixes a problem with the virtual channel (VC) optimization code, which was causing dateline violation errors to occur on large liquid-cooled CRAY T3E–1200 systems when running `xnet` code. This problem only affects large CRAY T3E-1200 systems with three or more cabinets, where the last cabinet is only partially populated.

For the `rchip` diagnostic, this release corrects two software bugs associated with Section 5 of the diagnostic as follows:

- Fixes an improper text string in the `rchip.pgm` error script.

- Fixes a false timing error failure which would occur when the last processing element (PE) of a four or greater depth X dimension was a 300-MHz CPU and the first PE in that dimension was a 600–MHz CPU.

For the `bmt0.pgm` diagnostic, this release provides the following:

- Fixes a software bug which caused the Addressing test to fail when testing daughter card configuration types MCFG4 and MCFG5; this bug resulted in a data miscompare (Difference == 1). (BMT0.PGM VERSION 1.08 diagnostic)
- Fixes a software bug where Data and Checkbit tests were skipped when testing MCFG4 cards.
- Changes one of the checkbit test patterns for the DPUT/DGET test from 35 to 55.

For the `lmem` diagnostic, this release fixes a problem causing spurious failures on a CRAY T3E system, where test section 3 would intermittently fail with a PAL error (unaligned reference) during SLOW/HIGH margin. This race condition was corrected by adding a memory barrier instruction to an interrupt handler. The problem only affects PEs which are configured with a 600–MHz processor and 128 Mbytes of local memory. Note that this processor and memory combination is not officially supported.

For the `t3e_hdw_boot` application, this release provides the following:

- Updates the program revision to 1.5c.
- Adds a `-F` command line option which forces an updated configuration to be saved without prompting the user after the boot diagnostic detects errors. This allows the system to reboot after an error without operator intervention.
- Moves the default scan file path to `t3euser` and adds the configuration name to the scan file path.
- Changes the scan mode to `qbst` (half patterns).

For the `t3ems` application, this release provides the following:

- Adds the ring number as separate parameter from the node ID in the configuration window. Previously, the ring number had to be merged with the node ID.
- Updates the program revision to 1.1e.

- Adds a log to file option to boundary scan options window, which is enabled by default. The default log file is set to `/opt/CYRIdiag/t3e/dump/t3ebst.log`.
- Adds the `all` scan error format mode as the new default setting.
- Appends the configuration name to the scan output log file.

For the `t3ebsg` application, this release modifies the default destination directory for generated vector files. (This is necessary to support multiple CRAY T3E systems on a single SWS.)

For the CRAY T3E system boundary scan `t3ebst` application, this release provides the following:

- Modifies the error information display; separated data into multiple lines and removed unused information.
- Adds an additional `mode = all` error display mode. This mode combines logical, physical, and resource modes.
- If run from `t3ems` application, the results from the `t3ebst` application are now logged to a file. (This resolves SPR 710649.) There is an option to disable or change default file name.
- Modifies the resource mode for R-to-R clock signals; identifies failing PE instead of failing link. (This resolves SPR 711891.)
- Modifies the default directory for interconnect test vector files. The environment was modified to support multiple CRAY T3E systems on a single SWS. The location of the test vectors is determined by the system configuration loaded. The default directory (for default configuration) is `/opt/CYRIdiag/t3e/t3euser/scan/Default/`. The directory for other configurations stored on the SWS is `/opt/CYRIdiag/t3e/t3euser/scan/`*configuration*.

#### A.2.3.1.2 CRAY SSD-T90 Solid-state Device

None for this release.

#### A.2.3.1.3 CRAY T90 Systems

For the `grcu` diagnostic, this release provides the following:

- Fixes several code defects that caused problems with hand-edited offline configuration files only. This version of the `grcu` diagnostic is also more failure tolerant.
- Changes code in the `C01` section of the test so that when the mainframe maintenance environment `MME` application is requested to send a soft reset, the commands are 052 and 060, not 252 and 260.
- Adds code to reset the current node pointer in `RCFGP[0-4]`.

For the `lat` diagnostic, this release removes all references to the Memory Section Select `MEMSECS` parameter in Section 21 of the test. This parameter was not being used so references to it have been removed.

For the `cach` diagnostic, this release removes all references to the Memory Section Select `MEMSECS` parameter in Section 15 of the test. This parameter was not being used so references to it have been removed.

For the `btv` diagnostic, this release provides the following:

- Updates the following Sections of the `btv` diagnostic: 4, 5, 7, 10, 13, 14, 15, 21, 22 , 23, 24, and 25.

  These Sections of the test did not update the Test Sequence Under Test (TSUT) Standard Location. When a failure occurred, the test always reported Sequence-0 as the failing sequence.
- Updates Section 24 of the test to have a lower and upper vector enable parameter at 1130 (`LVENBL`) and 1131 (`UVENBL`) for conditions 0-4.
- Removes the following unused test sequence select (TSSEL) parameters:
  - test sequence 0 = V0 ,A0,V1 / V2 ,A0,V3
  - test sequence 1 = V4 ,A0,V5 / V6 ,A0,V7

  These parameter are covered by the sequence select parameter.

For the `mpct` diagnostic, this release fixes failures in Sections 3, Conditions 1 and 2 of the test, running on CPUs 30 through 37. These failures were introduced when Runtime Displays were added to the test and the test data structures were rearranged and grouped by CPU partition.

For the `sce` application, this release provides the following:

- Fixes a problem with I/O to shared sanity description. Moves sanity selection to the I/O popup and changed description to better inform user of the function.

- With this release, when the `-default` option is specified and the filename argument has no path (that is, no slash characters (/) in the pathname), `usr/cfg/` is prepended to the filename so the file will load from the proper path.
- Assertion of a configuration can cause the SCE server to abort (core dump) due to a parameter misalignment. This is a hit and miss situation since it depends on the contents of stack at the time the function is called. This problem was introduced in SWS–ION 3.9 release with the new `sce` application print routine.

For the mainframe maintenance environment (`mme`) application, this release provides the following:

- Fixes the MPN hostname problem (hostname was blank) in the ENV0 Basic Communications SPV Loopback test.
- Fixes the following in the memory display window:
  - In the GigaRing memory display, the Error bit was shown in the CMD field of the display.
  - In the Transfer Initialization Block/Transfer Completion Block (TIB/TCB) memory display, the NAK bit was displaying the direct memory access (DMA) abort bit. The DMA abort bit and Packet single-error correction/double-error detection (SECDED) error bit were missing.
  - None of the fields in word 026 of the TIB/TCB window could be edited.

For the `simpl` application, this release changes the valid file descriptor check (for `fopen`, `fclose`, `fread`, `fwrite`, functions and so on) to accept zero as a valid file descriptor for the `fclose`/`pclose` functions and `fflush` functions also. This resolves some problems in some `t3ems` maintenance scripts.

For the `runbscan` boundary scan diagnostic, this release fixes a problem found with the `swaplog` feature that records the serial number of a moved module in a system. A bad serial number of 7037 appears in the `swaplog` file in a failing condition.

#### A.2.3.1.4 CRAY J90se Systems

For the `jclr` diagnostic, this release provides the following:

- Modifies the diagnostic to increase runtime for clearing memory.

- Modifies the diagnostic to clear memory quicker. This change targets MEM256/MEM512 systems.

  **Note:** A MEM256 memory module equals 256 megawords (Mwords), which equals 2,048 Gbyte/s. A MEM512 memory module equals 512 megawords (Mwords), which equals 4,096 Gbyte/s.

For the `jconfig` application, this release fixes the library to handle a mix of MAR8 and MAR4 memory modules.

For the `act` diagnostic, this release provides the following:

- Increases the time-out count for the `jaht` test under the `act` intermediate multiprocessor test menu for an 8 processor by 8 processor memory board (8x8) configured with MEM256 memory boards, equivalent to 1 Gigaword.
- Increased time-out count for `jsem` failure under the `act` intermediate multiprocessor menu for an 8 processor by 8 processor memory board (8x8) configured with 32 CPUs and 1 Gigaword.

#### A.2.3.1.5 Cray Scalable I/O (SIO) Nodes

None for this release.

#### A.2.3.1.6 SWS

For the warning and control system `nwacs` application, this release provides the following:

- Fixes the `Water Flow Rate` for the T4 data screen, it was reading 0.
- Fixes a problem where the Laser Alarm entry on the T16 data screen showed a fault when system appeared to be functioning normally.

### A.2.3.2 SWS-ION 3.10: Online Diagnostic Changes

For the `dring`(8) and `diagring`(8) commands, this release provides the following:

- Adds `nodeLs` as a valid `dring`(8) -a *action*, which initializes the `nodeLs` field of the `SCX_PKT_LIMIT` register for a single node (if the `-n` argument is used) or for all nodes of a specified mainframe (if the`-m` argument is used).
- Adds a `-p` command line argument to specify a value for the `nodeLs` action. If the `-p` argument is not used, a standard node-specific default is used.

- Modifies the `-a` *action* `isolate` function to try to use an alternative maintenance host if the default one is not accessible.
- Modifies the `-a` *action* `isolate` function to **not** perform the `topology` test if the `-Q` (quick test) argument is used.
- Modifies `initforboot` action to also initialize any uninitialized nodes on the GigaRing channels (rings) of the mainframe.
- Fixes a software bug that could leave a ring shared by multiple mainframes without a scrubber. In the event of an error, the `dring` scrubber function guarantees that any stale DMA packets will be scrubbed from the ring to assure data integrity.
- Adds functionality to check any accessed rings for scrubbers and adds them if they are not already there.
- Adds a user interface to existing GigaRing channel monitoring functionality performed by the `dring`(8) command as follows:

  `-a monitor -r` *ring_name* `-I` *monitor_interval_seconds*, which monitors the specified ring (`-r` option) at an interval (seconds) specified with the `-I` option. If a ring error is detected, `dring` will automatically isolate the problem and restore the ring to normal operations.

  The `dring` command must be aborted to discontinue monitoring. If an error is detected, `dring` will attempt to diagnose and repair the problem. Monitoring multiple rings requires running multiple copies of `dring` with this command.

  For more information on GigaRing channel monitoring, see the `dring`(8) man page.

## A.3 Installation Changes

### A.3.1 SWS-ION 3.8 Release

None for this release.

### A.3.2 SWS-ION 3.9 Release

None for this release.

### A.3.3 SWS-ION 3.10 Release

This release adds a new `getcputype`(8) command for CRAY J90se, CRAY J90se, and CRAY SV1 systems, which examines the hardware configuration files for these machines and then lists the processor module type for each processor module slot. The command resides in `/opt/CYRIinstall/bin`. Use this command if you wish to know the processor module types that are installed in your system.

## A.4 ION Changes

### A.4.1 SWS-ION 3.8 Release

#### A.4.1.1 SWS-ION 3.8: ION SPRs

The following ION SPRs have been resolved for the SWS-ION 3.8 release:

| SPR number | Resolution |
|---|---|
| 707484, 707722, 706172 | Fixes an IPN-1 connect problem where IPN did not reconnect properly after peer-down call. |
| 709037, 707899, 707755, 709259 | Fixes a problem where the software panic `PANIC 777` writes would wipe out the segment. |
| 709260 | Corrects a problem where IPN–1 disks did not switch to alternative path on a software panic. |
| 710311 | Fixes the `atmf` driver to allow for efficient use of memory while downloading the firmware file to the SBA200E ATM board in the MPN. This also resolves a software problem where the MPN would run out of memory when booting an MPN with multiple SBA200E interfaces. |
| 706512 | Fixes the following HPN software panic:<br>`PANIC: NW.C: CORRUPTED BP FOUND IN NW_RMQUE()`<br>This has been called the “canceled I/O problem”. |

| | |
|---|---|
| 708215 | Fixes the following HPN software panic:<br>`ASSERTION PANIC: HN_INPUT.C LINE 151; HN_INPUT_INTR: BAD STATE` |
| 708236 | Fixes the following HPN software panic: `ASSERTION PANIC: HN.C LINE 370; DMA_REQ_PUT_INTR: ACTIVE_REQS < 0` |
| 708283 | Fixes the HPN-1 ND40 file system corruption problem when adding `LDCACHE` |
| 709975 | Fixes the following HPN software panic:<br>`PANIC: HN_INPUT.C LINE 697; HN_INPUT_ERROR: BAD STATE1` |
| 710366 | Fixes the following HPN looping condition:<br>`GHIPPI1 NOT TALKING, HPN "THROTTLING" UMK` |

### A.4.2 SWS-ION 3.9 Release

#### A.4.2.1 SWS-ION 3.9: ION SPRs

The following ION SPRs have been resolved for the SWS-ION 3.9 release:

| SPR number | Resolution |
|---|---|
| 709036 | Resolves a problem associated with this submitted message: `HPN-1 SPN-1 EMERGENCY : BOOTCONFIG.C LINE 1342 ; DEADMAN RESET`<br><br>The deadman problem was a loop that incremented a non-referenced variable. Several error recovery and time-out situations were corrected in code to resolve this SPR. |
| 711010 | Fixes a problem where CRAY T3E systems and HPNs were not receiving all of the data when using the raw HIPPI application. |
| 711250 | Fixes two problems associated with this submitted message: `PANIC: NC1DIRSEARCH: DIRECTORY BLOCK CORRUPT ON A ND40 FILE SYSTEM`<br><br>First, the format for a disk response was corrected. The length now comes back accurate.<br><br>Second, the HPN will no longer return an error-free completion if no data was passed on a read request. |

| | |
|---|---|
| 711369 | Fixes a problem where HPN network disk access lead to a system slowdown. |
| 707328 | Fixes the problem associated with this submitted message: `FCN-1 ASSERTION PANIC: DISK_TASK PACKET STATE EXPECTED TO BE RQL_LOADED`. |
| 708841 | Fixes the problem associated with this submitted message: `ASSERTION PANIC: DISK.C LINE 1684; TMIO REQUEST COUNT PREMATURELY ZERO`. |
| 709597 | Fixes a problem where an `init` request from a disk array to a single disk would fail when Unit 4 was disabled. |
| 709624 | Fixes a problem where an `init` request would fail after unlock. |
| 709627 | Fixes a problem where an `init` request would not obey the locked state of disk drives. |
| 709649 | Fixes a problem where the FCN-1 would panic on reboot with concurrent I/O operations. |
| 709898 | Provides year 2000 compliance on the FCN-1. |
| 710091 | Fixes a problem where the FCN-1 would panic on RAID-3 configurations with alternate path functionality enabled. |
| 710092 | Fixes data corruption on FCN-1 RAID-3 disks. |
| 711160 | Fixes data corruption due to a bad RAID-3 spindle. |
| 711133 | Fixes the problem associated with this submitted message: `FCN-1 ASSERTION PANIC: DISK_TASK PACKET STATE EXPECTED TO BE RQL_LOADED`. |

This release provides network disk support on the GigaRing channel for the HIPPI Channel I/O Node, HPN-1 and HPN-2. In previous releases, this code was present but was only used by a few customers.

> **Note:** If you want to install the SWS-ION 3.9 release to support network disks, you need to obtain a license. For network disk software licensing information, contact your product marketing representative and request `HG_INSTRUCT` instructions, which are available to licensed customers.

This release provides locking software on a single FCN–1 to allow access from multiple mainframes.

### A.4.3 SWS-ION 3.10 Release

The following ION SPRs have been resolved for the SWS-ION 3.10 release:

| SPR number | Resolution |
|---|---|
| 708236 | Fixes the HPN active queue management that resulted in HPN panics. |
| 708300, 712313, and 711290 | Fixes the cyclic redundancy check (CRC) problem in the MPN Asynchronous Transfer Mode (ATM) SBus system bridge (SSB) controller card. It changes the number of SSB windows used by the `atmf` driver. Global variable assignments now determine this number rather than static values. For more information on this problem and changes that are required to resolve it, see Cray Research Field Notice, FN 2586 located at the CRInform at `http://crinform.cray.com/`. |
| 710138 and 710593 | Changes the Fiber Distributed Data Interface (FDDI) driver to make the maximum active I/O values slot specific. This prevents the downing of one FDDI device from interfering with another FDDI device. |
| 711768 | Changes the network strategy to shut down only the individually reinitialized device when a re-init packet is received from the mainframe. For more information, see Section 5.5.6, page 42. |
| 712029 | Fixes problem with raw HIPPI I/O not completing when transferring over multiple channels. |
| 712380 | Changes the Fast Ethernet driver to make the maximum active I/O values slot specific. This prevents the downing of one Ethernet connection from interfering with another Ethernet device. |
| 712393 | Fixes processing of canceled read request processing that resulted in HPN panic. |
| 707112 | Fixes problem with unexpected panics. |
| 711731 | Adds the `ifield` to the console output from the HPN. (The `errpt` report was beyond the range of HPN software.) |
| 712500, 712124 | Adds a lock to protect the output of data from the proxy to a client on the SWS. This protects against one task attempting to send a reply to a |

client while another task is in the process of closing the connection.

This release adds support for the DD-309 Fibre Channel disk drive and the DA-309 Fibre Channel disk array connected to the Fibre Channel I/O Node, FCN-1. The DD-309 is a single spindle version of the 18-Gbyte Fiber Channel drive. The DA-309 is an array version of the 18–Gbyte Fiber Channel drive.

This release adds support for ND-14 and ND-40 HIPPI network disk devices with 18-Gbyte drives.

The ND-40 is an ND-14 device with a semaphore. Software on the HPN supports this semaphore. The ND-40 device supports shared filesystems.

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## C