START HERE: Installing IRIX 6.5.22

The goal of the IRIX 6.5 release family is to provide a high quality and stable operating system for all SGI systems. This release family supports all SGI hardware platforms supported by IRIX 6.2, 6.3, and 6.4, except for Crimson. Significant additional software has been packaged with IRIX 6.5, including some important system and network management and interoperability tools.

Before You Install Checklist

1. **Make Sure Your System Can Run IRIX 6.5.22**
   See the Minimum Requirements page to confirm that IRIX 6.5.22 is supported on your system.

   Because IRIX 6.5.*x* (that is, 6.5.1, 6.5.2, and so on) releases are cumulative, you do not need to upgrade to the previous IRIX 6.5.*x* release in order to upgrade to a new one.

   Similarly, if you are running a pre-6.5 version of IRIX you can install the IRIX 6.5 and 6.5.x software at the same time. For example, by following the instructions in the *IRIX 6.5 Installation Instructions* CD booklet, you can upgrade directly from IRIX 6.2 to 6.5.22.

2. **Check For Important Caveats That Affect Your Installation**
   Review the special Caveats to Read Before You Upgrade. These caveats may include key details that significantly affect your installation process. (You want to print the entire page, because it also contains Caveats to Read After You Upgrade. This way, you will not have to look them up after installation.)

   Beginning with the IRIX 6.5.4 release, a *New_IRIX_Info* icon can be found on the WhatsNew page in the Icon Catalog. When you click on this icon, a web page opens and provides descriptions of the key new features and changes of this IRIX release.

   After you install IRIX, users can access the *New_IRIX_Info* icon from their desktops through the following pulldown menu:

   Toolchest > Find > Icon Catalog > WhatsNew

   The information displayed is the same Key New Features and Changes information included in this Start Here (see step 6 below).

   Note: The IRIX Welcome product is located on the Installation Tools and Overlays CDs (either CD 1 of 4 or 2 of 4, depending on which stream you are installing) in the */dist* directory; it is installed by default. The IRIX Welcome product must be installed in order for the *New_IRIX_Info* icon to be included in the WhatsNew page of the Icon Catalog.

3. **Confirm That The Applications You Rely On Are Supported**
   If you *rely on* any applications that are not bundled with this release, do not upgrade until you can confirm that they are supported on the IRIX 6.5 release family and/or until you have access to the IRIX 6.5-compatible version of such applications. Check the Software Product Knowledge Database at the *Supportfolio Online* site (http://support.sgi.com/irix/6.5) to help you with IRIX 6.5 compatibility questions.

   The best way to confirm application compatibility is to either check the SPK database if you received the application from SGI, or check with the third-party product vendor if you received the application from the product vendor.

   A few examples are given in the Caveats section.

4. **Create A Full System Backup**
   If you are upgrading from a pre-6.5 version of IRIX, then create a full system backup before upgrading to a new operating system. If, for any reason, you need to return to a previous operating system after the upgrade, you can use a full system backup tape or filesystem to do so. If you are upgrading from IRIX 6.5 or 6.5.x to IRIX 6.5.22, a full system backup is not required, but we encourage you to back up your system fully during any operating system installation or upgrade. Instructions for backing up and restoring workstations can be found in the online *Personal System Administration Guide*. For servers, use the backup(1) and restore(1) commands; refer to the online book *IRIX Admin: Backup, Security, and Accounting* for details. If you don’t know where to find these books, see the General Documentation section
   .

5. *(Optional)* **Read About The CDs You Will Use**
   Are you upgrading from IRIX 6.5 or 6.5.x to IRIX 6.5.22?
   Then you only need to install the IRIX 6.5.22 CDs, unless you want to switch release streams (in which case you will also need the base IRIX 6.5 CDs). (To switch release streams, see the *IRIX 6.5 Installation Instructions* CD booklet.)

   Are you upgrading a system running a pre-6.5 version of IRIX, or installing onto a clean disk? If so, you need to install both the IRIX 6.5 and 6.5.22 CDs (except for the IRIX 6.5 Installation Tools CD).

   For a summary of the contents of the CDs, see the CD Descriptions page.

   For a full listing of the contents of the IRIX 6.5.22 and 6.5 CDs, see the CD Contents page.

6. *(Optional)* **Check For Key Changes In This Upgrade**
   To find out about key changes in this upgrade, check the Key New Features and Changes list. For specific details about changes in each individual software product, see the product release notes.

7. *(Optional)* **Request A License Password**
   If you need a license password for any of the optional applications that require a license password, you can refer to the Software License site (http://www.sgi.com/support/licensing/) for details.

8. **Register Your System with SGI**
   Register your system with SGI to protect your investment and enable you to receive important updates. To register your system go to the online system registration page at http://www.support.sgi.com/custreg.

Do you have questions that remain unanswered? See the resources section.

Resources

This section lists the resources that are available to you before and during installation, or during configuration and use of your SGI system.

IRIX 6.5 Overview Information

This section provides information about hardware system platforms and peripherals, the IRIX CD descriptions, internationalization, and supported third-party software.

Supported Hardware System Platforms and Peripherals

To find out more information about the supported hardware and peripherals, see the Minimum Requirements page.

CD Descriptions

See the CD Descriptions page for a detailed description about each CD.

Internationalization

See the Language and Cultural Support page for information on how to set up your system for different locales.

Supported Third-Party Software

To find out about supported third-party software and peripherals, see the SGI Applications & Solutions Directory (http://www.sgi.com/products/appsdirectory.dir/appsdirectory.html), a comprehensive guide to over 3,100 third-party software applications, peripherals, and services for SGI workstations and servers.

Freeware

SGI's Freeware web page http://freeware.sgi.com provides free downloads of many powerful open-source applications, packaged for convenient over-the-web installation onto your IRIX system. Graphics, design, development, media, desktop, utilities, web serving, system administration, and games software are available, including GNOME, KDE, Gimp, CDrecord, TeX/LaTeX, ViewFax, PlotUtils, Abiword, Gnumeric, Samba, Sharity, Mpg123, and many others.

General Documentation

This section provides information on the types of documentation that are available with this IRIX release.

Release Notes

You can access release notes for each software product in a few different ways, including:

- **Before installation,** you can use the Base Documentation CD.
- **On systems running 6.3 or later**, you can use Software Manager to read the release notes by selecting the product name from the distribution list and choosing Selected > Release Notes... .
- **After installation**, choose Release Notes from the Toolchest Help menu.

Check for **Caveat and Release Note Updates**, which contain late-breaking information, at Supportfolio Online.

IRIX Man Pages

The IRIX man pages are available on the Technical Publications Library Web site at http://techpubs.sgi.com.

IRIX Manuals

Installed | Printed | On the Web

Installed

SGI documentation is installed by default. Most applications have a Help menu or Help button. You can also use the Help menu on the Toolchest.

Some things you will find under Toolchest > Help:

- **InfoSearch:** "One-stop shopping" and searching for virtually all installed documentation, including online books, Man pages and Release Notes. (To launch InfoSearch from the command line, enter `infosearch` in a shell.)
- **Quick Answers:** Quick answers to common questions related to the tasks and tools that are a part of your system's end user software environment, including personal system administration tasks. Includes search capability.
- **Hints and Shortcuts:** A visual overview of hints and shortcuts for the IRIX Interactive Desktop.

- **Online Books:** A searchable library of online books.

Note: You can also access online documentation before (and after) installation, by using the Base Documentation CD.

Printed

Each system comes with an Owner's Guide. Hardware boards and peripherals also come with printed documentation. In addition, some hardware documentation is shipped online, and most hardware documentation can also be found on the Technical Publications Library Web site (listed below).

On the Web

Another place to find general documentation is on the Web:

- `http://techpubs.sgi.com`

  The IRIX 6.5 bookshelf on the Technical Publications Library Web site allows you to access all IRIX 6.5 books on the Web. It includes hardware books as well. You can search for a manual by entering its title or document number in the keyword search. You can download PDF files by clicking on the book's download link.

- `http://www.sgi.com/developers/technology/index.html`

  Tech Focus provides easy access to FAQs (Frequently Asked Questions), Newsgroups and much more.

Technical Support

SGI Technology Solutions

Complete information about SGI Technology Solutions, including worldwide support contact information, can be found at http://www.sgi.com/support/supportcenters.html.

Telephone Support

Obtaining service is easy. Simply contact the SGI Customer Support Center(CSC) for person-to-person technical assistance. The SGI CSC provides assistance in the following areas:

- Hardware and software telephone technical support
- Opening a service call or checking the status of an existing call
- Requesting on-site assistance or replacement parts
- Ordering spare parts

Service is provided in accordance with your system's current level of support. Service varies by warranty coverage and support program.

Online Support

Supportfolio Online (http://support.sgi.com/) provides you with online access to software downloads, technical help, including the SGI Knowledgebase, service call logging and tracking, and much more. You can also sign up for our email notification service to automatically receive updates on new support information and features.

Sign up for your free Supportfolio ID. It's easy and quick.

To experience the benefits of all of Supportfolio's features, you must have a support contract with a software component.

General Software Patches

Information about software patches that apply to the general user environment can also be found on Supportfolio (under the Browse Collections and Downloads sections).

Minimum Requirements and Supported Platforms

Memory and Disk Space Requirements

- **Memory.** The minimum memory requirement for Indy, R4000 Indigo and Indigo2 is 32 megabytes (MB). However, 64MB of memory or more is highly recommended. For all other supported systems, the minimum is 64MB.

- **Disk Space.** A standard, default installation of IRIX 6.5 plus IRIX 6.5.22m occupies approximately 1.5 gigabytes (GB) of disk space.

  A 2GB or larger hard drive is recommended, although it is possible to limit your installations so that you can run 6.5 on less than 1GB, as shown in the example below.

  Example of a "Minimal IRIX" Upgrade
  What follows is an example of how you could install a *very* minimal IRIX 6.5.22 on less than 1GB--by substituting these installation commands for the installation selection part of the IRIX upgrade. This "minimal IRIX" example occupies about 500MB on an Indy, and does not include any of the online books or man pages.

```
Inst> keep *

Inst> install required

Inst> install default eoe 4Dwm desktop_base x_eoe desktop_eoe netscape

Inst> keep *.books *.man
```

```
Inst> install prereqs
```

Supported Platforms

You can upgrade from IRIX 5.3, or IRIX 6.2 through 6.5.15.

IRIX 6.5.22 supports all SGI systems with R4x00, R5x00, R8000, and R1x000 CPU types, except Crimson. This includes:

- Challenge® M
- Challenge® S
- Indigo®--see special preinstallation caveat
- Indigo2™ --see special preinstallation caveats
- Indigo2™ Extreme™
- Indigo2 Impact™10000
- Indy®
- Origin® 2000 (now also includes the Cray Origin® 2000 systems)
- Power Challenge™
- Power Challenge™ M
- Power Indigo2™
- Power Onyx™
- SGI® Onyx®300
- SGI® Onyx®3000
- SGI® Origin®200
- SGI® Origin®300
- SGI® Origin® 3000 server series
- Silicon Graphics® Fuel™
- Silicon Graphics® O2®
- Silicon Graphics® O2+™
- Silicon Graphics® Octane®
- Silicon Graphics® Onyx®
- Silicon Graphics® Onyx2®

Obsolete Peripherals and Software

The following are not supported in 6.5.22:

- 4DDN™
- 4DLT™
- EISA Sync Serial Card
- GIO Sync Serial Card
- GIO Token Ring
- Hibernator II
- InPerson®
- IRIS® 5080 Emulator
- IRIS Annotator™
- IRIS Channel Adapter
- IRISxfr mainframe software

- IRIXpro™
- IRIXpro™ Proconf
- Molecular Inventor
- PeoplePages
- Propel
- SNAserver
- SX.25
- Tooltalk Dev
- USL C++ Translator V3.0.1
- Vigra VME audio board
- VME Sync Serial Card
- VME Token Ring Card

To Install

IRIX Operating System Installation Methods

The installation instructions for installing/upgrading the IRIX operating system in the *IRIX 6.5 Installation Instructions* CD booklet use either the `Inst` command line program or the Software Manager program, the graphical version of `Inst` that uses a graphical user interface (GUI). To obtain more details on either of these programs, see the following:

- For more information on using `Inst`, you have a few options:
  - See the online book, *IRIX Admin: Software Installation and Licensing* (choose Help > Online Books from the Toolchest, or use the Base Documentation CD).
  - Use the command line help provided in `Inst` by entering **`help help`** at the `Inst` prompt.
  - See the inst(1M) man page.
- For more details on using `Software Manager`, use the Software Manager (swmgr(1M)) Help menu.

IRIX Operating System Installation Instructions

After you have read through the Before You Install Checklist, return to the relevant installation instructions in the *IRIX 6.5 Installation Instructions* CD booklet that came with your CDs.

PDF file of *IRIX 6.5 Installation Instructions* CD booklet.

If you ever need to return to the IRIX 6.5 release, follow the "Installing an Intermediate Release on IRIX 6.5 or Later" instructions in the *IRIX 6.5 Installation Instructions* CD booklet, but use the selection commands given for switching to the *maintenance* release. Also, use the core 6.5 CDs in addition to any other relevant CDs for the release to which you are downgrading.

Key New Features and Changes

The goal of the IRIX 6.5 release family is to provide a high quality and stable operating system for all SGI systems. This release family supports all SGI hardware platforms supported by IRIX 6.2, 6.3, and 6.4, except for Crimson. Significant additional software has been packaged with IRIX 6.5, including some important system and network management and interoperability tools.

This page contains a partial list of the key new features and changes for IRIX **6.5.22**. To see the list of key features and changes for the IRIX 6.5 and IRIX 6.5.1 through 6.5.21 releases, see the previous IRIX features page.

Look for information about the IRIX 6.5 release family on Supportfolio Online (http://support.sgi.com/irix/6.5) and http://www.sgi.com.

For details on any of these new features and changes, refer to the release notes.

Note: Some features listed here apply only for certain software bundles or hardware configurations.

This page also contains a summary of some upcoming changes in future IRIX releases.

IRIX 6.5.22 Key New Features

The following changes have been incorporated into the core IRIX 6.5.22 overlay CDs and the Applications CD.

New Software Enhancements - Maintenance and Feature Stream

Maintenance Stream Support

- **Feature support added to maintenance stream**
  For IRIX 6.5.22, support for the following features is now provided in both the feature stream (IRIX 6.5.22f) and the maintenance stream (IRIX 6.5.22m). In previous releases, these features were supported in the feature stream only:
  - The XVM logical volume manager
  - CXFS
  - The SJIS feature of IRIX Language Support, supporting Shift JIS, Traditional Chinese BIG5, and Simplified Chinese GBK locales.

Installation

- **Updated Inst program**
  New installation features were used starting with IRIX 6.5.21 that necessitate an updated version of the Inst program. If you plan to install using the miniroot, then you may do so by

the usual method. However, if you plan to upgrade by 'live' install and are running IRIX 6.5.19 or earlier, you must first install patch 5086. For further information, see Caveats to Before You Upgrade.

Filesystems

- **Changes to CXFS Packaging in IRIX 6.5.22**

  Starting with IRIX 6.5.22, The IRIX CXFS software is no longer bundled in the IRIX overlay CDs but instead is on a separate CD that is labeled **CXFS IRIX Server and Client 3.0 for IRIX 6.5.22**. This changes the installation procedure. For information on CXFS installation, see *SGI InfiniteStorage CXFS Administration Guide*.

  Note: If you are upgrading from a previous IRIX release and have CXFS installed, you must upgrade both IRIX and CXFS. If you try to upgrade one without the other, conflicts will occur.

  CXFS customers should make sure that their CXFS support contract contains the CD media option. This option is required for future delivery of the latest features, enhancements, and bug fixes, available only on CD. The CD media option allows you to take advantage of secure and expedited delivery using the online ordering system, through Software Updates on Supportfolio, or through your local support center by telephone.

  For further information on this packaging change and CXFS support, go to the following page on Supportfolio: http://support.sgi.com/search_request/publications/index. Select the following parameters:

  - Publication type: news
  - Product type or keyword(s): CXFS Separate CD Media

- **Case-insensitive filename support for XFS filesystems**
  In IRIX 6.5.22, the mkfs command supports a new version=ci suboption for the -n (naming) option. Specifying this option enables a version 2 filesystem directory with case-insensitive filenames. Filenames will be stored in directories as they were created, but all file or directory name searches will be case-insensitive. This feature is normally used only when the filesystem will be used by Windows CXFS clients.

  Note that you will be able to mount filesystems created with this option only when running IRIX releases 6.5.22 and later. Attempting to mount the filesystem when running an earlier release produces an error message of "Wrong filesystem type: xfs".

  For information on the mkfs command, see the mkfs_xfs(1M) man page.

- **Trusted IRIX and IRIX extended attribute support added to UDF filesystems**
  Write-capable UDF filesystem format Universal Disk Format (UDF) is the filesystem used on DVDs. A read-only implementation of UDF was added to IRIX 6.5.18, and a write-capable version was added for IRIX 6.5.20. Trusted IRIX support and Extended Attribute support (using UDF streams) was added to the UDF filesystem for IRIX 6.5.22.

Worldview

- **Japanese GUI and Japanese resource files no longer shipped**
  The graphical user interfaces (GUIs) for CXFS and XVM contained in IRIX 6.5.22 and later no longer support the localized Japanese GUI and the Japanese resource files do not ship with "WorldView Japanese 6.5 For IRIX 6.5.22 and above". If you are upgrading to CXFS or XVM on a system running IRIX 6.5.22 or later versions and have previously installed the Japanese resource files for these packages, you should remove them. To remove the Japanese resource files, run the following commands as root:

```
# versions remove WorldView_japanese.sw.euc_sysadm_cxfs
# versions remove WorldView_japanese.sw.sjis_sysadm_cxfs
# versions remove WorldView_japanese.sw.euc_sysadm_xvm
# versions remove WorldView_japanese.sw.sjis_sysadm_xvm
# versions remove WorldView_japanese.sw.euc_sysadm_cluster
# versions remove WorldView_japanese.sw.sjis_sysadm_cluster
# versions remove WorldView_japanese.sw.euc_sysadm_base
# versions remove WorldView_japanese.sw.sjis_sysadm_base
```

Checkpoint and Restart

- **New features of REPLACE keyword of the cpr command**
  In IRIX 6.5.22, the operation of the REPLACE action keyword of the cpr command has been enhanced.

  Under certain constraints, REPLACE actions may invoke SUBSTITUTE actions for files that have been modified or deleted, or a MERGE action for all other files.

  If a SUBSTITUTE action is performed, a notice specifying the location of the substituted file is displayed. It is the responsibility of the user to pick up any output file thus substituted. Applications that reopen a substituted file by its original name may not operate as expected.

  Checkpoint/Restart users are encouraged to review the information on this behavior change detailed in the *IRIX Checkpoint and Restart Operation Guide*.

Security

- **Support for Pluggable Authentication Module (PAM)**
  IRIX 6.5.22 includes support for Pluggable Authentication Modules (PAM). PAM provide a general purpose interface for customer-definable authentication. Implementation of PAM is off by default. For information on PAM, see *IRIX Admin: Backup, Security, and Accounting*.

Deaktop

- **New musicplayer application**
  The IRIX 6.5.22 release includes musicplayer, a skinnable desktop music player that plays sound files using sgi audio hardware. The musicplayer application handles multiple files in a single session. For information, see the musicplayer(1) man page and the online help provided in the Help menu of the application.

Device Drivers

- **PCI Bus Interrogation**
  In IRIX 6.5.22, a driver can obtain information about the PCI bus in which its device is installed. (The only information available about PCI buses on the other side of a PCI-to-PCI bridge is whether multi-master capability is supported.) PCI bus information is returned by the pciio_businfo_get() function as a pointer to a bus information structure pciio_businfo_s. For information about interrogating a PCI bus, see the *IRIX Device Driver Programmer's Guide*.

NFS

- **Improvements to NFS operation**
  The IRIX 6.5.22 release includes the following improvements to NFS

  - Changes have been made to the operation of the buffer cache during NFS operation. These updates keep I/O performance from collapsing under heavy load and improve the efficiency of I/O in general.

  - A new mode has been added to IRIX's kernel NFS service where the number of NFS server daemons grows and shrinks in response to NFS load. Previously on IRIX this was a fixed number that the system administrator had to choose, and both the default number and the recommended tuning procedure ensured inadequate NFS performance for many workloads. IRIX now requires less tuning and will perform better out of the box.

    For information on this mode, see the section on DYNAMIC NFS DAEMONS in the nfsd(1M) man page.

  - A new -d option has been added to the nfsstat command that will display statistics about individual NFS daemons. For information on this option, see the nfsstat(1M) man page.

  - NFS now provides an optional "async" mode to improve write performance. This mode is set with the async option of the exportfs command. By allowing an administrator to switch from synchronous write/commit cycles to performing the same operations asynchronously, NFS writes can finish up-to 10 times faster on the client and server can perform writes in the way which can optimize backend filesystem IO pattern. This option is recommended only for heavy synchronous write loads. For further information, see the exportfs(1M) man page.

  - A an "offline" option to the exportfs command has been added for use with Failsafe operations. Historically Failsafe relied on brute-force approach to stop NFS-related activity by killing NFS daemons. With the "offline" option a selected subset of filesystem can be moved offline while NFS server can continue to serve requests to other filesystems. For information on this option, see the exportfs(1M) man page.

Networking

- **Network time protocol (NTP) support**
  Network time protocol (NTP) is a newly supported component as of the IRIX 6.5.22 release.

For more information see "Setting up Time Synchronization Service" in *IRIX Admin: Networking and Mail*.

- **Bind Version 9.2.2**
  The IRIX 6.5.22 release supports BIND version 9.2.2. BIND version 9 is a major rewrite of nearly all aspects of the underlying BIND architecture. Some of the important features of BIND 9 are, as follows:

  - DNS security
    - DNSSEC (signed zones) - not supported on IRIX
    - TSIG (signed DNS requests)

  - IP version 6
    - Answers DNS queries on IPv6 sockets
    - IPv6 resource records (A6, DNAME, and so on.)
    - Bitstring labels
    - Experimental IPv6 Resolver Library - not supported on IRIX

  - DNS protocol enhancements
    - IXFR, DDNS, Notify, and EDNS0
    - Improved standards conformance

  - Views
    - One server process can provide multiple "views" of the DNS namespace, for example, an "inside" view to certain clients, and an "outside" view to others.

  - Multiprocessor support

  - Improved portability architecture

  For more information on BIND version 9, see *IRIX Admin: Networking and Mail*, and detailed information is available at the following location: http://www.isc.org. Follow the link to BIND documentation.

SGI Software Product Life Cycle Management

In accordance with the SGI software product life cycle management strategy announced in December 2002, SGI will announce support mode changes for various software products on a semi-annual basis. To view customer letters containing support mode changes announced since December 2002, as well as the latest IRIX Support Policy documents, visit the IRIX Support Policy Web page on Supportfolio Online.

IRIX OS Bundled Software

For information about the bundled software that is included on the Applications CD with this release, see CD Contents and the Bundled software and licenses web page.

System Platform Bundles

No changes have been made to the demonstration software CDs developed for the specific system platforms.

Freeware

For information about the freeware that is supported for this release, see http://freeware.sgi.com/.

Documentation

The following manuals have been revised for the new features incorporated into this release:

- *IRIX Admin: Backup, Security, and Accounting*, 007-2862-006, includes information about Pluggable Authentication Modules (PAM).

- *IRIX Admin: Networking and Mail*, 007-2860-009, includes information about BIND version 9 and network time protocol (NTP).

- *IRIX Admin: Software Installation and Licensing*, 007-1364-140, includes small technical corrections.

- *IRIX Checkpoint and Restart Operation Guide*, 007-3236-009, includes updated information about the REPLACE keyword.

- *IRIX Device Driver Programmer's Guide*, 007-0911-210, includes information about interrogating a PCI bus.

- *Personal System Administration Guide*, 007-1366-190, includes small technical corrections.

- *SGI InfiniteStorage CXFS Administration Guide*, 007-4016-018, includes (formerly titled *CXFS Version 2 Software Installation and Administration Guide*) new information about the installation process as well as new information about CXFS configuration and operation.

- *Trusted IRIX/CMW Security Administration Guide*, 007-3299-009, includes updated information on the xfsdume and xfsrestore utilities.

- *Trusted IRIX/CMW Security Features User's Guide*, 007-3300-005, includes small technical updates and corrections.

- *XVM Volume Manager Administrator's Guide*, 007-4003-016, can now be used as an independent reference for the XVM Graphical User Interface.

Upcoming Changes to Support Mode Status

The following workstations, graphics and scalable server systems will transition to retired support mode after the IRIX 6.5.22 release in November 2003:

- Challenge S
- Challenge M
- Challenge DM
- Challenge L
- Challenge XL
- Indigo
- Indigo2
- Indigo2 Extreme
- Indigo2 Impact
- Indy
- Power Challenge
- Power Indigo2
- Power Onyx
- Onyx1

For information on support for these systems in IRIX 6.5.22 and IRIX 6.5.23, go to the following page on Supportfolio: http://support.sgi.com/search_request/publications/index. Select the following parameters:

- Publication type: news
- Product type or keyword(s): IRIX 6.5.22 System Platform Retirement

The following product will transition to retired support mode after the IRIX 6.5.22 release in November 2003:

- Distributed Computing Environment (DCE) / Distributed File System (DFS)

Contact your local sales representative to discuss options for replacement or upgrade products.

IRIX Bundled Software

IRIX is bundled with an extensive set of desktop software applications, including Web tools, desktop productivity tools, and other software.

The IRIX 6.5 Applications CD, November 2003 and IRIX 6.5 Complementary Applications CD are companions to IRIX 6.5.22. These CDs contain the IRIX Desktop and various desktop applications. Th replace all previous IRIX 6.5 Applications CDs (June 1998 through August 2003). The Complementary Applications CD is not installed by default.

Application upgrades shipped with the IRIX releases are either Full images or Overlays. Updates to Ful images are found on the Applications CD whereas updated Overlays are found on the IRIX 6.5.22 Over CDs. Additional applications can be found on the Base IRIX 6.5 CDs. To install the new versions of Overlay applications you must install IRIX 6.5.22.

IMPORTANT Apps CD NOTE:

Because the .related_dists file has been removed from the IRIX 6.5 Apps CD distribution, users may nc aware of the /CDROM/dist/dev and /CDROM/dist/extras directories. To access these use the "Open" oı in Software Manager.

The following full images have been added to the IRIX 6.5 Applications CD, November 2003:

- Java3D 1.3.1

The following full images have been added or moved to the IRIX 6.5 Complementary Application CD, November 2003:

- OpenOffice.org, 1.0.3.1a
- Common Desktop Environment, 5.3.2
- Cosmo Create Authoring Environment, 1.0.3a
- Netscape Navigator Client, 4.8a (extras)
- Netscape Communicator Developer's Environment, 4.8a (dev)
- SGI Book Building Tools, 5.3 (dev)

The following full images have been revised for the IRIX 6.5 Applications CD, November 2003:

- Access for Movement-Impaired Users, 1.1.5
- Adobe Acrobat Reader, 4.05b
- Macromedia's Flash5 plugin - 5.0.89.2
- Information Searching Execution Environment, 6.5.22
- Online Documentation Software, 5.3
- Java2 v1.4.1_02 Execution Environment (Sun JRE v1.4.1_02)
- Java2 v1.4.1_02 Debug Binaries (Sun JDK v1.4.1_02) (dev)
- Java2 v1.4.1_02 Development Environment (Sun JDK v1.4.1_02) (dev)
- Macrovision FLEXlm (v9.0) License Tools, 3.4.10
- Mozilla 1.0.2b
- Netscape Communicator Client, 4.8a
- SGI Scientific Library 1.4.1.3 (SCSL 1.4.1.3)
- SGI Web Server based on Apache, 1.3.28
- SGImeeting Collaboration Environment, 2.0.6
- sgsearch Indexing and Search Environment, 4.3
- SiteMgr - Web Content Administration, 1.2.2

The following overlays have been revised on the IRIX 6.5.22 Overlay CD:

- IRIX® Interactive Desktop
- IRIX® Interactive Desktop Tools
- IRIX® Interactive Desktop Administration
- Impressario(TM)Printing & Scanning Tools
- WebViewer Library Execution only Enviroment

The following images have been retired from the IRIX 6.5 Applications CD, November 2003:

- Display PostScript/X, 2.0.8 based on PostScript Level

Starting with IRIX 6.5.18 the IRIS InSight Viewer (insight) has been converted to a full image rather th
an overlay image and the Dynaweb product was removed with it's functionality integrated into InSight
Infosearch.

Documentation

As an SGI customer you have access to all of SGI's product documentation online. view a document please visit our Technical Publications Web page at http://techpubs.sgi.com.

IRIX 6.5.22 Advanced Server Environment

SGI is introducing complete, value-added solutions to servers and workstations witl IRIX 6.5 Advanced Server Environment and IRIX 6.5 Advanced Workstation Environment. IRIX 6.5 ASE and AWE give you a complete operating environment, including interoperability tools, enterprise management software, and the maturity a performance of IRIX 6.5.

IRIX 6.5.22 Advanced Workstation Environment

ASE	AWE	Contents	Location
		Maturity and Performance	
Y	Y	IRIX 6.5.22	IRIX 6.5.22 (1 of 3) Installation Tools & Overlays IRIX 6.5.22 (2 of 3) Overlays CD IRIX 6.5.22 (3 of 3) Overlays CD
Y	Y	XFS(TM)	IRIX 6.5.22 (1 of 3) Installation Tools & Overlays IRIX 6.5.22 (2 of 3) Overlays CD IRIX 6.5.22 (3 of 3) Overlays CD
		TCO/Enterprise Management	
Y	Y	NFS(TM)	NFS CD
Y	Y	HP-UX MIB (SNMP)	HP-UX MIB (SNMP) Host Access CD
		Interoperability	
Y	Y	Xinet AppleTalk®	IRIX 6.5 Applications CD, November 2003
Y	Y	Electric Arc Teleffect	IRIX 6.5 Applications CD, November 2003
		Other Applications	
Y	Y	Common Desktop	IRIX 6.5 Complementary Applications CD,

Y	Y	Environment (CDE)	November 2003
Y	-	Database Accelerator (DBA)	DBA CD
Y	Y	OpenOffice.org	IRIX 6.5 Complementary Applications CD, November 2003
Y	Y	SGI Scientific Library (SCSL)	IRIX 6.5 Applications CD, November 2003
-	Y	General, O2, Octane, & Octane2 Demos	IRIX 6.5.12 (1 of 2) Demos CD IRIX 6.5.12 (2 of 2) Demos CD
Y	Y	Freeware Open Source Products	http://freeware.sgi.com/

NOTE: SGI no longer bundles the Freeware CDs with IRIX AWE or ASE software packages. See the following website for more information on the available Freeware products, http://freeware.sgi.com/.

NOTE: SGI no longer bundles the CA Unicenter TNG Framework with IRIX ASE software packages. See the following webpage for more information on the availabl Computer Associates products and support, http://www.ca.com/.

IRIX 6.5 Advanced Workstation Environment desktops are also available in Chines Japanese, Korean, French, and German.

Over time, SGI will continue to deliver total solutions by adding to IRIX 6.5 Advan Server Environment and Advanced Workstation Environment, allowing you to do n with your SGI machines.

Licenses for IRIX Applications

To see what licenses you have, open *License Manager*. If you have a question abou which licenses you may be entitled to, send an e-mail to license@sgi.com, put "help the subject line, and your serial number and a description of the question in the body the message. In the U.S. or Canada you can call SGI support at 1(800)800-4SGI.

Third-Party Applications Support

Some of the products shipped are third-party applications. To find out how to get support for these products, refer to the Third-Party Applications Support page.

Key Features and Changes for Previous IRIX Releases

The page contains a list of the key features and changes for the IRIX releases from 6.5 through 6.5.21:

IRIX 6.5.x Key Features

IRIX 6.5 Key Features

To see the list of key new features and changes for the IRIX 6.5.22 release, see the Key New Features and Changes page.

For information about the IRIX 6.5 release family, see Supportfolio Online at http://support.sgi.com/irix/6.5 and www.sgi.com.

For details on any of these new features and changes, see the release notes for the software product.

Please be aware that some features listed here are only applicable for certain software bundles or hardware configurations.

IRIX 6.5.x Key Features

The following features are in the core IRIX 6.5.x overlays.

Hardware Support Added in IRIX 6.5.1 through IRIX 6.5.21

- SGI Origin 350 server (initially supported in IRIX 6.5.21).
- Silicon Graphics Onyx4™ UltimateVision™ (initially supported in IRIX 6.5.21).
- SGI Origin 3900 server (initially supported in IRIX 6.5.19).
- Silicon Graphics Fuel visual workstation (initially supported in IRIX 6.5.17).
- Version 3.01.07 firmware for QLogic 2 Gbit fibre channel adapters: the 2300, 2310 and 2342 (initially supported in IRIX 6.5.17).
- PCI Expansion Module to Origin 300 systems (initially supported in IRIX 6.5.15).
- SGI Origin 300 server series (initially supported in IRIX 6.5.14).
- 500MHz R14000 processor on SGI Origin 2000 series and Onyx2 systems (initially supported in IRIX 6.5.13)
- 500MHz R14000 processor on SGI Origin 3000 series and Onyx 3000 systems (initially supported in IRIX 6.5.12)
- SGI Origin 3000 server series, including the SGI 3200, SGI 3400, and SGI 3800 servers (initially supported in IRIX 6.5.9)
- TVO digital video option board for Silicon Graphics Onyx2 systems (initially supported in IRIX 6.5.9)
- VPro Graphics, the next generation graphics for Octane systems (initially supported in IRIX 6.5.8)
- Onyx2 InfiniteReality3 systems (initially supported in IRIX 6.5.8)
- 66 MHz QLogic 2200 controller(initially supported in IRIX 6.5.7)
- FC-Tape on a Storage Area Network (fabric) using the QLogic 2200 fibre channel controller to the tpsc driver (initially supported in IRIX 6.5.7)
- R12KS CPU on sgi2200, sgi2400, and sgi2800 systems (pending overall product release) (initially supported in IRIX 6.5.7)
- QLA2200 (both copper and optical) is supported for FC-AL, FC-AL via the Emulex hub or

Fabric attach via the Brocade Silkworm 2000 switches (initially supported in IRIX 6.5.5)

- 270 Mhz processor for O2 and Silicon Graphics Octane (initially supported in IRIX 6.5.4)
- HDTV XIO Board for Silicon Graphics Onyx2 and SGI Origin 2000 systems (this includes systems formerly known as Cray Origin2000 systems) (initially supported in IRIX 6.5.4)
- Systems using the MIPS R12000 processor (initially supported in IRIX 6.5.3)
- Digital Video Multiplexer option board (DPLEX) for Silicon Graphics Onyx2 systems (initially supported in IRIX 6.5.3)
- Redundant Power Supply (RPS) (initially supported in IRIX 6.5.3)
- 21" Monitor Support for O2 and Octane (initially supported in IRIX 6.5.3)
- Flat Panel Monitor for O2 systems (initially supported in IRIX 6.5.2)
- 16 pipe Onyx2 InfiniteReality systems (initially supported in IRIX 6.5.2)
- GSN network adapter (initially supported in IRIX 6.5.2)
- Gigabit Ethernet for Octane and SGI Origin systems (initially supported in IRIX 6.5.1)
- 128p Metarouter for Origin 2000 systems (formerly known as Cray Origin2000 systems) (initially supported in IRIX 6.5.1)
- Dual Channel Display option for O2 systems (initially supported in IRIX 6.5.1)
- Onyx2 InfiniteReality2 systems (initially supported in IRIX 6.5.1)
- 225QC for SGI Origin 200 (initially supported in IRIX 6.5.1)

Software Support Added in IRIX 6.5.1 through IRIX 6.5.21

Feature Stream Only

Introduced in IRIX 6.5.21f:

- In the IRIX 6.5.21f release, the output to the XVM show command indicates whether an XVM physical volume (physvol) has no physical connection to the system. This indicates that an I/O error would be returned when trying to read or write anywhere on the volume.

Introduced in IRIX 6.5.20f:

- IRIX 6.5.20f provides the following options for the CXFS and XVM Manager GUIs:
    - New GUI login choices, including support for a remote shell connection, which connects to the server via a user-specified command shell, such as rsh(1C) or ssh(1).
    - The ability for the root user to grant other users permission to execute specific GUI tasks.
- In IRIX 6.5.20f, the default values for cxfsd_min and cxfsd_max have changed to 16. The legal value for cxfsd_max has also changed to be an integer in the range 8 through 4096.

Introduced in IRIX 6.5.19f:

- CXFS upgrades
    - A new rolling annual upgrade policy permits you to upgrade from IRIX 6.5.n to the n+1 or n+4 release. This policy takes effect as of IRIX 6.5.18f.

- The time required to update and propagate the database across nodes in the cluster has been significantly decreased.

- If you use I/O fencing and ipfilterd(1M) on a node, the ipfilterd configuration must allow communication between the node and the telnet(1) port on the switch.

- The CXFS Manager graphical user interface (GUI) has added a new icon to represent client-only nodes. In preparation for future CXFS MultiOS client releases, the CXFS software now also allows you to specify the Linux, IBM AIX, and Hewlett-Packard HP-UX operating systems when defining a node.

- Application programmers should be aware that XFS recently relaxed the requirement that direct I/O be aligned along filesystem block boundaries. As of IRIX 6.5.19f, direct I/O will also be accepted using 512-byte alignment. This change makes the use of direct I/O on a CXFS partition more consistent with that of other vendors requirements and thus makes the use of CXFS more transparent. See the description of direct I/O requirements in the fcntl(2) man page.

For details, see the *SGI InfiniteStorage CXFS Administration Guide*.

Introduced in IRIX 6.5.18f:

- In IRIX 6.5.18f, the CXFS Manager graphical user interface (GUI) has been enhanced to contain all of the XVM GUI functionality. Using the CXFS GUI in IRIX 6.5.18f or later release, you can view and configure CXFS filesystems as well as use drag-and-drop to structure volume topologies and administer XVM disks. Command buttons provide shortcuts to some tasks.

  For information on the CXFS GUI, see *SGI InfiniteStorage CXFS Administration Guide*. For details about XVM volume management, see the *XVM Volume Manager Administrator's Guide*.

- The XVM snapshot feature provides the ability to create virtual point-in-time images of a filesystem without causing a service interruption. The snapshot feature requires a minimal amount of storage because it uses a copy-on-write mechanism that copies only the data areas that change after the snapshot is created. The XVM snapshot feature is supported in the CXFS XVM GUIs.

  For information on the XVM snapshot feature, see the *XVM Volume Manager Administrator's Guide*.

  Use of the XVM snapshot features requires a FLEXlm license.

- In an environment without cluster services enabled, you can set up and administer logical volumes with the XVM Manager GUI as a standalone product. For information on XVM volume management, see the *XVM Volume Manager Administrator's Guide*.

- As of 6.5.18f, IRIX nodes may now be CXFS client-only nodes, meaning that they run a minimal implementation of the CXFS and cluster services, and do not contain a copy of the CXFS cluster database. Client-only nodes are installed with the cxfs_client software product.

Nodes that you want to run as potential metadata servers must be installed with the cluster_admin software product, allowing the node to perform cluster administration tasks and contain a copy of the cluster database. They must also be defined as metadata server-capable administration nodes.

A CXFS cluster is now supported with as many as 32 nodes. As many as 16 of those nodes can be CXFS administration nodes and all other nodes can be client-only nodes. SGI strongly recommends that only potential metadata servers be configured as CXFS server-capable administration nodes and that there be an odd number of server-capable nodes for quorum calculation purposes.

- In IRIX 6.5.18f, CXFS relocation is disabled by default and CXFS recovery is supported only when using standby nodes. This includes recovery (when using standby nodes) of hierarchical storage management (HSM) products using the data management application programming interface (DMAPI).

  A standby node is a metadata server-capable administration node that is configured as a potential metadata server for a given filesystem, but does not currently run any applications that will use that filesystem. To use recovery, you must not run any applications on any of the potential metadata servers for a given filesystem; after the active metadata server has been chosen by the system, you can then run applications that use the filesystem on the active metadata server and client-only nodes.

  Relocation and recovery are fully implemented, but the number of associated problems prevents full support of these features in the current release. Although data integrity is not compromised, cluster node panics or hangs are likely to occur. Relocation and recovery will be fully supported in a future release when these issues are resolved.

  For information on CXFS, see *SGI InfiniteStorage CXFS Administration Guide*.

Introduced in IRIX 6.5.17f:

- The IRIX 6.5.17f release includes the XVM Manager GUI. The XVM Manager GUI provides access to the tasks that help you set up and administer XVM logical volumes and provides icons representing states and structure of the XVM volume elements.

  With the XVM Manager GUI, you can perform the following tasks:

  - Administer XVM logical volumes by means of a web browser, such as Netscape or Internet Explorer.

  - Drag and drop XVM volume elements to create local and cluster volume topologies.

  - Drag and drop disks to label them or give them away.

- See volume element and filesystem status changes instantly, reflected in color-coded icons.

- Click buttons to create volume elements quickly.

For information on the XVM Manager GUI, see *XVM Volume Manager Administrator's Guide*.

Use of the XVM snapshot features requires a FLEXlm license.

- IRIX 6.5.17f includes support for the use of local XVM volumes as FailSafe resources. This requires FailSafe version 2.1.3. XVM volumes used in conjunction with CXFS should not be added as FailSafe resources. For information on configuring FailSafe resources, see the *IRIS FailSafe Version 2 Administrator's Guide*, 007-3901-006.

Introduced in IRIX 6.5.16f:

- For the IRIX 6.5.16f release, the -extend option was added to the XVM show command. Specifying this option will display additional information about physvols, slices, stripes and foreign disks than the show command alone. The *XVM Volume Manager Administrator's Guide* and the XVM help screens have been updated with examples that use this option.

- For IRIX 6.5.16f, CXFS features include the following:

  - Support for multiple operating system (multiOS) clients, such as Solaris nodes and Windows NT nodes. The CXFS GUI and cmgr(1M) command now allow you to specify the operating system for a given node.

  - I/O fencing, which allows a problem node to be isolated from the storage area network (SAN) so that it cannot corrupt data in the shared CXFS filesystem; this is required for Solaris nodes and Windows NT nodes. A Brocade switch is required to support I/O fencing.

  - Support for a two-node CXFS cluster running with FailSafe and an L1 controller on Origin 300 and Origin 3200 systems.

  See the *SGI InfiniteStorage CXFS Administration Guide* for more information.

- The IRIX 6.5.16f release added the joblimitsign group of kernel tunables that can be used to specify that specific job limit resource accumulation and enforcement should be ignored by the kernel. Setting the kernel tunable value to 1 indicates the specific limit should be ignored. Setting the value to 0 will re-enable the limit for newly created jobs.

  The following kernel tunable parameters have been added:

  - jlimit_cpu_ign parameter

    The jlimit_cpu_ign parameter specifies that the accumulation and enforcement of CPU time limits for jobs should be ignored.

- jlimit_data_ign parameter

  The jlimit_data_ign parameter specifies that the accumulation and enforcement of data memory limits for jobs should be ignored.

- jlimit_nofile_ign parameter

  The jlimit_nofile_ign parameter specifies that the accumulation and enforcement of limits for the number of open files in jobs should be ignored.

- jlimit_numproc_ign parameter

  The jlimit_numproc_ign parameter specifies that the accumulation and enforcement of limits for the number of processes in jobs should be ignored.

- jlimit_pmem_ign parameter

  The jlimit_pmem_ign parameter specifies that the accumulation and enforcement of physical memory limits for jobs should be ignored.

- jlimit_pthread_ign parameter

  The jlimit_pthread_ign parameter specifies that the accumulation and enforcement of limits for the number of pthreads should be ignored.

- jlimit_rss_ign parameter

  The jlimit_rss_ign parameter specifies that the accumulation and enforcement of resident set size (RSS) memory limits for jobs should be ignored.

- jlimit_vmem_ign parameter

  The jlimit_vmem_ign parameter specifies that the accumulation and enforcement of virtual memory limits for jobs should be ignored.

For more information on kernel tunable parameters, see the setjusage(2) entry in Appendix A in *IRIX Admin: Resource Administration*.

- In IRIX 6.5.16f, the new setjusage system call is used to update resource usage for jobs in the kernel. The system call can only be used to update usage information if the limit accumulation and enforcement for the specified resource is being ignored. This function can be used by sites to implement a site-specific solution for resource accumulation and enforcement. Using this system call allows the various job limit status commands to display usage values as reported from the site-specific implementation. For more information, see the setjusage(2) man page and the setjusage(2) entry in Appendix A in *IRIX Admin: Resource Administration*.

- The IRIX 6.5.16f release removes the ACCT_FS parameter in the /etc/csa.conf file. The MIN_BLKS parameter now determines the minimum number of free 1K blocks needed on the file system on which the /var/adm/acct directory resides. The default is 2000. To ensure that the MIN_BLKS variable has been set correctly, check the value in the /etc/csa.conf configuration file.

  For more information, see Chapter 5, "Comprehensive System Accounting", in *IRIX Admin: Resource Administration*.

Introduced in IRIX 6.5.15f:

- As of the IRIX 6.5.15f release, the default naming convention for subvolumes in the /dev/lxvm/ and /dev/cxvm directories is volname, subvolume.

  Older releases of XVM created a directory entry for a subvolume of the form volname_subvolname. This convention can yield potential problem. For example, since vol1_data is a legal name for a volume it is impossible to determine whether /dev/lxvm/vol1_data refers to the data subvolume of the volume vol1 or to a volume named vol1_data. The volname_subvolname form of subvolume directory entries is still supported in IRIX 6.5.15f and later, but its use is not recommended.

  For information on XVM device directories and pathnames, see the *XVM Volume Manager Administrator's Guide*.

- As of the IRIX 6.5.15f release of IRIX, you can implement disk quotas on XFS filesystems according to group ID. Previous releases of IRIX supported implementing quotas according to user and project ID. Project and group accounting are mutually exclusive. This feature is on-disk compatible with Linux-XFS group accounting, where this feature is already active. For information on administering XFS quotas, see *IRIX Admin: Disks and Filesystems.*

  Caution: Group quotas are supported in the feature stream only. If you implement group quotas on a disk and, subsequently, mount that disk with the pquota mount option on a machine running the maintenance stream or an earlier release of the feature stream on which group quotas are not supported, the quota accounting could be corrupted.

- IRIX 6.5.15f provided the following new features for CXFS.

  - Support has been added for clients of other operating systems such as Solaris as defined in *CXFS Client Administration Guide*. These clients are released asynchronously from the IRIX release. This support requires IRIX 6.5.15f or later plus appropriate patches. For more information, contact your SGI support contact.

  - Default scripts are now provided in the /var/cluster/clconfd-scripts directory to permit NFS-exporting of CXFS filesystems listed in /etc/exports.

  - Changes have been made to the rotatelogs script syntax. The root crontab file now has an entry to run the rotatelogs script weekly. If you run the script twice in one day, it will append the current log file

Introduced in IRIX 6.5.14f:

- The CXFS GUI was enhanced in the IRIX 6.5.14f release as follows:

    - **CXFS Manager** and **CXFS Cluster View** windows are now combined into one window called **CXFS Manager**.

    - Tasks can now be launched by clicking the right mouse button over the tree-view area, or by selecting **Tasks** on the menu bar.

    - Command line interfaces (CLIs) that the GUI runs can be viewed from a new **File > Show SALog** menu item.

    - You can now partially mount filesystems on just a subset of nodes, using the **Define Filesystem** and **Modify Filesystem** tasks.

    - A new **Find** text field helps you find items within the displayed tree-view area.

    - Filesystem status and cluster status update faster.

  For more information, see the *SGI InfiniteStorage CXFS Administration Guide*.

Introduced in IRIX 6.5.13f:

- With IRIX 6.5.13f, the structure of the CXFS filesystem configuration was changed. CXFS filesystems can now be defined, modified, managed and deleted independently of each other, and of the cluster definition. (Previously, the CXFS filesystems were defined as attributes to the cluster definition.) To accommodate clusters mixing nodes running IRIX 6.5.12f and IRIX 6.5.13f, backwards compatibility is enforced by default in IRIX 6.5.13f. For more information, see the *SGI InfiniteStorage CXFS Administration Guide*.

- The XVM Volume Manager can be used when layered with the CXFS filesystem. The XVM Volume Manager can also be used as a standalone volume manager; this requires that you be running the IRIX 6.5.13f release leg of the IRIX operating system. The IRIX 6.5.13m leg does not support XVM as a standalone volume manager; this support will be added in a later release. For information on CXFS filesystems, see *SGI InfiniteStorage CXFS Administration Guide*.

- The IRIX 6.5.13f release added support for the use of mirrors in XVM logical volumes. The mirroring feature of XVM requires the XFS Volume Plexing software option. Customers running CXFS and who want to run mirrors will need to purchase this license. XLV customers with plexing licenses can upgrade to XVM without having to acquire a new license.

Introduced in IRIX 6.5.12f:

- Supports the labeling of disks as XVM system disks in the XVM Volume Manager. This lets you create XVM logical volumes that include the partitions of a system disk. The following XVM system disk features are supported:

- Root partitions can be mirrored
- There can be multiple root partitions on a system disk
- You can include usr and swap partitions in any XVM logical volume configuration, including mirrors, concats, and stripes
- A system disk can include slices that are not part of a root, usr, or swap partition

You can now convert existing system disks to XVM system disks, and then use their partitions as part of an XVM logical volume. After you have converted an existing system disk to an XVM disk, you can convert the disk back to its original state by unlabeling the disk with the XVM unlabel command. For information on XVM system disks, see the *XVM Volume Manager Administrator's Guide.*

Introduced in IRIX 6.5.10f:

- XVM installed with CXFS is now qualified on IP35 (Origin 3000) systems in addition to the existing qualification on the IP27 (Origin 200, Origin 2000, and Onyx2) and IP30 (Octane) systems.

Introduced in IRIX 6.5.9f:

- CXFS supports the use of hierarchical storage management (HSM) products through the data management application programming interface (DMAPI). An example of an HSM product is the SGI DMF product.

- Support for the Scheduled Transfer Protocol (STP). STP is a lightweight network protocol that is compliant with the ANSI Standard Revision 3.1 protocol suite that is designed to support extremely high performance data movement. STP uses Direct Memory Access (DMA) to read and write data into user space from a network interface. This lets high bandwidth devices, such as Gigabyte System Network (GSN) and Gigabit Ethernet (GigE), perform at network speeds with minimum interrupt overhead. For more information, see the stp(7P) man page or http://www.hippi.org.) This STP feature was initially added in IRIX 6.5.9. In IRIX 6.5.6, STP was initially added to the IRIX feature stream with minimal functionality.

- Support for disk quotas that can now be set by project ID. Disk quotas let you limit the amount of space a user or project can occupy and the number of files (inodes) that each user or project can own. You can implement hard or soft limits; hard limits are enforced by the system and soft limits only remind the user to decrease disk usage.

  For more information on disk quotas and their administration, see *IRIX Admin: Disks and Filesystems,* which now includes information about project quota administration. For more information on project IDs, see *IRIX Admin: Backup, Security, and Accounting.* For more information on the administration of disk quotas by project, see the edquota(1M), find(1M), quota(1M), repquota(1M), and fstab(4) man pages.

- Support for the waitjob feature, which includes the new functions setwaitjobpid( ) and waitjob( ). These functions let the batch schedulers query job information following job termination. When a batch scheduler launches a job, it calls setwaitjobpid( ) to tell the new job what pid is waiting for information upon termination. When the job terminates, it remains as a zombie until either the batch scheduler calls waitjob( ) to retrieve the job's termination information or the waiting pid no longer exists. The information returned includes the job start time, usage information, and reason for termination.

  For more information, see *IRIX Admin: Resource Administration* and the waitjob(1M) and setwaitjobpid(1M) man pages.

Introduced in IRIX 6.5.8f:

- Support for Comprehensive System Accounting (CSA). CSA is a set of user and administrative C programs and shell scripts that provide methods to collect per-process resource usage data, monitor disk usage, and charge fees to specific login accounts. CSA uses this per-process accounting information and combines it by job identifier within the system boot uptime periods. CSA provides the following features that are not available with any other IRIX accounting package:

  - Per-job accounting
  - Daemon accounting (tape and Network Queuing System (NQS))
  - Flexible accounting periods (daily and periodic accounting reports can be generated as often as desired and not restricted to once per day or once per month)
  - Flexible system billing units (SBUs)
  - User exits for site specific customization of daily and periodic accounting
  - Configurable parameters within the /etc/csa.conf file
  - User job accounting (ja command)

  For more information, see *IRIX Admin: Resource Administration* and the csa(1M) man page.

Introduced in IRIX 6.5.7f:

- Support for the CXFS product, which provides a cluster file system that allows file sharing between machines. CXFS includes the following capabilities:

  - High resiliency and availability
  - Reduced storage costs
  - Scalable high performance

  The 6.5.7f release contains metadata server recovery. See the *SGI InfiniteStorage CXFS Administration Guide* for the administrative shutdown procedures and additional troubleshooting information. The CXFS feature was initially added in IRIX 6.5.6f.

- Support for job limits. You can use this feature if you want to prevent individual users from exceeding specified usage limits; this can improve system throughput and utilization by restricting how much of the machine each user can access. For more information, see *IRIX Admin: Resource Administration* and the jstat(1), jlimit(1), genlimits(1M), and showlimits(1) man pages.

Introduced in IRIX 6.5.2f:

- Motif 2.1/ViewKit 2.1
- IRIX Oplock Support
- Support for Non EUC encoding and locales (sjis/big5/gbk/utf8)

Maintenance and Feature Stream

Introduced in IRIX 6.5.21:

- In an SGI Origin 3900 system, a Cx-brick contains node boards without CPU packages or cache that are referred to as a memory-only nodes. The Cx-brick is a "super" CPU brick. It contains multiple node cards. One of those node cards must be a CPU node, but any of the other nodes can be memory-only nodes. Memory-only nodes, sometimes called headless nodes, allow you to expand the memory capabilities of your system without the cost or overhead of adding unnecessary additional processors.

  In IRIX 6.5.21, the new keyword directives for use in the cpuset configuration file (there are equivalent structures or flags for the cpuset API) to support memory-only nodes are as follows:

  - POLICY_SHARE_WARN
  - POLICY_SHARE_FAIL
  - NODE *nodeid* or *nodeids*
  - MEM *nodeid* or *nodeids*
  - MEMORY_SIZE_ADVISORY *size*
  - MEMORY_SIZE_MANDATORY *size*
  - CPU_COUNT_ADVISORY *count*
  - CPU_COUNT_MANDATORY *count*

  For a description of these new keywords see the cpuset(4) man page and *IRIX Admin: Resource Administration.*

- Boot cpusets are used to constrain regular system activities to a subset of the available CPUs. In IRIX 6.5.21, kernel threads not forced to run on specific CPUs run within the boot cpuset if one exists. Boot cpusets are used to constrain regular system activities to a subset of the available CPUs.

- In IRIX 6.5.21, the tcp_wrappers package is available in the eoe.sw.base IRIX subsystem. It consists of the following components:

  - A library in /usr/lib/libwrap.so
  - A header file in /usr/include/tcpd.h
  - A suite of programs to verify tcp_wrappers operation: tcpdchk, tcpdmatch, and try-from

  In IRIX 6.5.21, inetd(1m) is built with tcp_wrappers by default. See the inetd(1M) man page for details.

  For information on using the tcp_wrappers package, see the *IRIX Network Programming Guide*.

- The IRIX 6.5.21 release provides a new PLACEMENT policy keyword for checkpoint and restart processes. PLACEMENT offers two action keywords, STRICT and FLEXIBLE. The STRICT action keyword restores the memory of process(es) according to the placement policies saved at the time of checkpoint. The FLEXIBLE action keyword attempts to place process memory according to a basic memory placement algorithm (TOPOLOGY_FREE) if and only if process memory placement fails when adhering to the checkpointed placement policies; this is the default action. For more information on this new PLACEMENT policy, see the cpr(1) man page and the *IRIX Checkpoint and Restart Operation Guide*.

- IRIX 6.5.21 includes support for the M-Audio Revolution PCI audio card on Octane and Octane2 systems.

- The sysdump command, first added in IRIX 6.5.19, has been enhanced to generate level 1 system crash dump files of a running system. The sysdump command is used by system administrators to generate a crash dump file of the operating system without the need to reboot the system. The crash dump file can be used to diagnose system problems. For information, see the sysdump(1M) man page.

- IRIX 6.5.21 provides support for the thread and system nonpreemption pthread mutex protocols that let real-time pthreads avoid being preempted while in critical sections. Real-time developers would use this feature when the priority inheritance and priority ceiling mutexes incur too much overhead. For information, see the pthread_mutexattr_setprotocol(3P) man page.

- IRIX 6.5.21 includes OpenLDAP version 2.1.17. The previous release of OpenLDAP on IRIX was split into an openldap and an openldap_dev package. This release combines both packages into a single openldap package that includes all libraries, headers and binaries normally included in the OpenLDAP distribution. For information on OpenLDAP, see http://www.openldap.org/.

- IRIX 6.5.21 includes OpenSSH version 3.6.1p2. For information on OpenSSH, see http://www.openssh.com/.

- IRIX 6.5.21 includes OpenSSL version 0.9.7b. The previous release of OpenSSL on IRIX only included selected libraries. This release includes all libraries, headers and binaries normally included in the OpenSSL distribution. For information on OpenSSL, see http://www.openssl.org/.

- IRIX 6.5.21 includes support for USB tablets.

- In the IRIX 6.5.21 release, the NFS Access control mechanism has been updated to support new access control list elements such as IP netmasks, domain name suffixes and explicit exclusion of a host or group of hosts. For information see the exports(4) man page.

  NFS Access control checks are now performed by rpc.mountd for both MOUNT and NFS protocols.

- With the 6.5.21 release, a user must have the same or a subset of the Mandatory Integrity (MINT) divisions of an object in his or her label and the integrity divisions of the user must be the same or a subset of the integrity divisions of the object. For information, see the *Trusted IRIX/CMW Security Administration Guide*.

  With this release, the integrity divisions of the user must be the same or a subset of the integrity divisions of the file. For information, see the *Trusted IRIX/CMW Security Features User's Guide*.

Introduced in IRIX 6.5.20:

- For the IRIX 6.5.20 release, Sysadm Base 3.0 ports the Sysadm Base 2.0 software from Java1 (version 1.1.8) to Java2 (version 1.4.1) which is the latest Java version supported by SGI. Sysadm Base 3.0 supports SGI's IRIX software for remote cluster and storage administration. The CXFS, FailSafe, and XVM Manager GUIs depend on Sysadm Base.

  The use of Java2 simplifies the Java installation and co-operation with third-party GUIs. This also enhances the ability to run the GUIs through a web browser. For example, for the CXFS GUI, you can open http://*server*/CXFSManager/.

- IRIX 6.5.20 integrates MP3 audio decoding into the digital medial libraries and all associated dmedia tools. For information, see the soundplayer(1) man page or the *Digital Media Programmers Guide*.

- IRIX 6.5.20 supports the Huffman YUV (HuffYUV) video codec, which allows lossless real-time compression of 4:2:2 video in the range of 2:1 to 3:1. Note that since it is software-based, we do not guarantee real-time compression. For information, see the movieplayer(1), dmconvert(1), and makemovie(1) man pages.

- IRIX 6.5.20 adds support for the Griffin iMic USB audio interface.

- IRIX 6.5.20 adds support for the M-Audio Revolution PCI audio card.

- OpenGL Shader is now shipped with IRIX. OpenGL Shader is a powerful multi-platform appearance-modeling tool that provides incredible realism effects through an easy and powerful development toolkit. For information see the release notes installed under

/usr/relnotes/shader_eoe and the ISL shading language specification installed under /usr/share/shader/doc/user/islspec.html.

- Universal Disk Format (UDF) is the filesystem used on DVDs. The UDF specifications are produced by OSTA, and are based on the ECMA-167 specification. A read-only implementation of UDF was added to IRIX 6.5.18, and a write-capable version was added for IRIX 6.5.20.

- For the IRIX 6.5.20 release, support for Motif 2.1 and ViewKit 2.1 development has been added to the Maintenance stream.

- IRIX 6.5.20 includes libraries and utility programs from MIT kerberos V version 1.2.7. The libraries included are: libcom_err.so, libdes425.so, libgssapi_krb5.so, libk5crypto.so, and libkrb5.so. The following utility programs are included: kdestroy, kinit, klist, kpasswd, and kvno. For information on kerberos, see http://web.mit.edu/kerberos/www/.

- IRIX 6.5.20 includes OpenLDAP version 2.1.12 with support for TLS/SSL and Kerberos authentication. This includes the complete suite of programs and header files necessary to implement an LDAP server and client applications. For information on OpenLDAP, see http://www.openldap.org/.

- The Job Limits and Comprehensive System Accounting packages, long available in the IRIX feature stream, have been added to the maintenance stream. These features are available in the optionally installable packages eoe.sw.jlimits and eoe.sw.csa.

- For IRIX 6.5.20 the mod_ssl package has been added to the sgi_apache web servers. The mod_ssl package adds secure http (https or TLS) support to apache, using openssl to do the encryption. Note that to use secure connections you must generate a certificate for your host. See the sgi_apache release notes for details.

- The IRIX 6.5.20 release adds support for Trusted IRIX attributes to checkpoint and restart processes (CPR). If enabled, capabilities, mandatory access control (MAC) labels, and access control lists (ACLs) are saved at the time of checkpoint and restored upon restart. Capabilities are saved and restored for processes and files. MAC labels are saved and restored for processes, files, pipes, named pipes, and System V shared memory segments. ACLs are saved and restored for files and named pipes. For more information on these attributes, see "Using CPR in Trusted IRIX" in the *IRIX Checkpoint and Restart Operation Guide* and the capabilities(4), DOMINANCE(5) and acl(4) man pages.

- The IRIX 6.5.20 release adds information about set-capabilities (SCAP) programs in a Trusted IRIX environment to the "Capability Assignment" section of *Trusted IRIX/CMW Security Administration Guide* as follows:

  Like set-user-ID (SUID) and set-group-ID (SGID) programs, programs assigned capabilities (set-capabilities (SCAP) programs) are handled differently. A user cannot use the process activity reporter par system utility program on a SCAP process or trace a SCAP process unless the user has the CAP_PROC_MGT capability. See the par(1) and exec(2) man pagase for more details.

Similarly, certain environments variables are not respected when dealing with SCAP programs. These include _RLD*_LIST and LD_LIBRARY*_PATH environment variables of the runtime linker rld command, the IFL_DATABASE environment variable of the Image Format Library ifl command (see rld(1) and ifl(1)) and the NLSPATH environment variable of the open/close a message catalogue catopen routine that allows user control of message formatting (see catopen(3C)).

- IRIX 6.5.20 adds information to *IRIX Admin: Resource Administration* on using the XThread Control Interface (XTCI) with cpusets as follows:

  Kernel system threads and interrupt threads can be confined to the boot cpuset by using the XThread Control Interface (XTCI), which is documented in the realtime(5) man page and the *REACT Real-Time Programmer's Guide*.

Introduced in IRIX 6.5.19:

- IRIX 6.5.19 provides a Pseudo Random Number Generator, accessible through the special files /dev/random, and /dev/urandom. These files support the standard file interface operations. The PRNG is implemented in the kernel. For further information, see the random(7) man page.

- In IRIX 6.5.19, the rdrtc() function was added to libc. This function provides a simplified interface to read the system's raw real-time clock value. This feature is similar to those in other operating systems that read the cycle counter. For information, see the rdrtc(3c) man page.

- IRIX 6.5.19 includes OpenSSH version 3.4p1. This has been patched for TRIX support and SOCKS support and uses the OpenSSL libraries.

- For IRIX 6.5.19, a bug was fixed that allowed processors isolated and made non-preemptive with mpadmin() or sysmp() to become unisolated while still non-preemptive. This has been changed to force the processor to become preemptive before it can become unisolated. For information, see the mpadmin(1) and sysmp(2) man pages.

- IRIX 6.5.19 supports Internet Protocol Version 6 (IPv6). Internet Protocol Version 6 (IPv6) is the next generation Internet protocol, designed eventually to replace the current IPv4. IPv6 is expected to grow in usage gradually over many years and will coexist and interoperate with IPv4 for the foreseeable future.

  IPv4 uses a 32-bit address scheme to represent a unique Internet address while IPv6 uses a 128-bit addressing scheme. Because IPv6 has four times the number of bits to represent addresses, it provides several billion times the address space of IPv4 and adds an almost unlimited number of available IP addresses. This resolves a projected future shortage of IPv4 addresses as more and more devices are added to the Internet.

  To ease the transition from IPv4 based networks to IPv6, IRIX supports a dual-stack protocol implementation that supports both IPv4 and IPv6 protocols on the same system. The IPv6 basic socket API is supported and allows network programs to use either protocol. The IPv6 API software interface communicates transparently with both IPv4 and IPv6 nodes. It automatically chooses the right protocol to communicate with any particular node. It has an encapsulation mechanism called tunneling that allows IPv6 packets to operate over IPv4 networks. The IPv6 protocol allows networking applications to operate transparently in both environments.

For more information, see the *IRIX Network Programming Guide* and *IRIX Admin: Networking and Mail*.

- The new gigabit ethernet driver (device tgx) now dynamically adjusts the cards parameters to maintain good performance across very dynamic workloads. Manual setting of this parameter is no longer needed.

- IRIX 6.5.19 includes 64-bit versions of libaudiofile and libcdaudio. For information on these libraries, see the afIntro(3dm) and CDintro(3dm) man pages.

- IRIX 6.5.19 supports sendmail version 8.12.5, which provides the following features:

    - Simple Mail Transfer Protocol (SMTP)

    - Performance improvements including multiple queues, memory-buffered pseudo-files, and more control over resolver timeouts.

    - Support for "message submission agent", as defined by RFC 2476.

    - Changes to support running sendmail with group-id privileges. sendmail no longer runs with set-uid-root privileges.

    - Ability to connect to servers running on named sockets.

    - Changes to support IPv6.

    - Improved support for virtual hosting.

    - Improved anti-spam control features.

    - Several new map classes, including ph, arith, and macro.

    For more information on sendmail, see *IRIX Admin: Networking and Mail*.

- For security reasons, sendmail is no longer implemented as a setuid-root program. Rather, it is implemented as a setgid-sgismmsp program. The sendmail functionality is now split between the Mail Transfer Agent (MTA) and Mail Submission Agent (MSA) programs and requires new account and group categories both named sgismmsp.

    Trusted IRIX/CMW system relies on a number of administrative data files to provide crucial information for the system.

    This release adds a new /etc/mail/submit.cf configuration file for the mail submission program which is used to submit emails as invoked by programs (or users).

For more information, see the *Trusted IRIX Security Administration Guide* and *IRIX Admin: Networking and Mail*.

Introduced in IRIX 6.5.18:

- The IRIX 6.5.18 release includes read-only support for the UDF filesystem format typically used for DVDs and packet-written CD-RWs. IRIX support for UDF filesystems does not, however, include support for playing DVD movies. DVDs will be automatically mounted by mediad in the same way that CD-ROMs are automatically mounted. For further information on mounting UDF filesystems, see *IRIX Admin: Peripheral Devices*.

  Note: Support for UDF filesystems requires that you install eoe.sw.udf.

- QLFC has been enhanced to improve its output message format for messages logged to the console and SYSLOG. The name of the driver as it appears in messages has been changed from "QL" to "QLFC". The syntax of the messages has been modified to include the fabric port number in the message, in a form similar to the manner in which fabric devices are named.

  For example, where the old driver would output this message:

  ```
  ql11d(0x200400a0b80cd1ab): target has returned.
  ```

  the new driver will output this message:

  ```
  qlfc11: 200400a0b80cd1ab/c11p2: target has returned.
  ```

- In IRIX 6.5.18, the /etc/shells file has been added to provide system administrators with the ability to define appropriate shells for users. The implementation of this feature includes the following ramifications:

  - A user’s shell, as defined in /etc/passwd or an NIS map, must be listed in /etc/shells for the user to change a password with yppasswd or ypchpass.

  - A user’s shell, as defined in /etc/passwd or an NIS map, must be listed in /etc/shells for sendmail to deliver a user’s mail if the user’s mail is piped to a process (such as procmail or vacation).

  Users are able to log in and use the system interactively, regardless of whether the shell is listed in /etc/shells. For more information see the shells(4) man page.

- For the IRIX 6.5.18 release, the hinv command with the -v option displays the PCI/PCI-X bus speed of QLogic fibrechannel adapters. The hinv -t scsictlr command displays the SCSI/fibrechannel adapters.

- Beginning with IRIX 6.5.18, a user is able to keep the interrupt and processing load generated by interval timers away from specific CPUs. This feature may reduce latency and jitter for real-time applications. For more information see the sysmp(2) and mpadmin(1) man pages.

- The reboot_on_panic parameter, when set to 1, specifies that the system should automatically reboot after a kernel panic. This is particularly useful for servers or other systems which frequently go unattended or are used remotely, where it may not be convenient to physically reset the system. The default for SGI servers and large graphical systems is to reboot after a kernel panic.

  It is important to note that the rebound variable, an environment variable set in the PROM monitor for most processors, is always checked before the reboot_on_panic parameter and can override it. If the reboot_on_panic parameter is set to 0 and the rebound value is set to y, the reboot_on_panic parameter in effect becomes 1 and your system will automatically reboot.

  For more information, see *IRIX Admin: System Configuration and Operation*.

- Job limit values (rlim_t) are 64-bit in both n32 and n64 binaries. Consequently, n32 binaries can set 64-bit limits. o32 binaries cannot set 64-bit limits because rlim_t is 32-bits in o32 binaries. IRIX supports three Application Binary Interfaces (ABIs): o32, n64, and n32 (for more information on ABIs, see the abi(5) man page). IRIX Admin: Resource Administration, IRIX Admin: System Configuration and Operation, and the setjlimit(2) man page have been updated with this information.

- At checkpoint time and at restart time, registered functions are called in the same order as the first-in-first-out order of their registration with atcheckpoint() or atrestart(), respectively. This is an important consideration for applications that need to register multiple callback handlers for checkpoint or restart events.

  Use of atcheckpoint() and atrestart() now ensures that registered signal handlers are invoked only when a checkpoint or restart of the application is actually in progress (as opposed to the user sending the signals directly via a function such as sigsend()).

- The Falls screen saver is a new choice that can be selected from the IRIX screen saver control panel. It is an OpenGL depiction of a waterfall.

Introduced in IRIX 6.5.17:

- With IRIX 6.5.17, the underlying documentation tools and books have undergone a major upgrade. These processes now allow for SGML or XML documents to be published directly into HTML (our delivery format). These same tools are available to you as part of the "SGI Book Building Tools" product; formerly the "IRIS InSight Professional Publisher".

  For viewing documentation on the IRIX Interactive Desktop, the following changes have been made: InfoSearch (the primary online documentation viewer) has been revamped to support the new document format, SGIHelp (the IRIX Desktop Help system) has undergone minor changes, and the Dynaweb product is no longer shipped (or required). In addition, the IRIS InSight Viewer (insight) now exists solely as an intermediate process that launches your standard desktop web browser to access InfoSearch. Online books can also be viewed using

your standard desktop web browser by opening the (local) file:
/usr/share/Insight/library/SGI_bookshelves/index.html

Our goal is to deliver all online books to you in this new format. There are circumstances whereby some books may still exist on your local system in the "old format". Examples would include some of the SGI Developer documentation: the MIPSpro compiler books and the ProDev WorkShop books fall into this category (books that require conversion). The online documentation tools will report a warning when encountering books in the "old format" that require conversion.

A conversion process is provided (the existing insightAdmin command). Various options for performing the conversion are available through this tool. It is important to note that the conversion only needs to be done once, unless additional products are installed that still contain books in the "old format". Be advised that this process can be time consuming. Total time is based on the size and number of books that need to be converted, and the availability of system resources. On average, 1-3 minutes per book on an older desktop-class machine (R5000 O2) can be expected. For that reason, a system administrator may wish to perform this operation at an off-peak time.

For further details, see the insight and infosearch release notes, and the related man pages (insightAdmin, insight, sgihelp, infosearch). Virtually all SGI documentation can be accessed from http://techpubs.sgi.com.

- In IRIX 6.5.17, the Remote Shell Daemon (rshd) has been enhanced to check for expired passwords. Users who attempt to access a system using rsh to an account that has an expired password will be denied access. An administrator who is using password expiration no longer has to disable rshd in order to prevent expired users from accessing the system. For information, see the rshd(1M) man page.

- The overall behavior of the NFS Version 3 client has been modified to improve mixed and heavy load performance. Most casual users of NFS will probably notice little change. However, users should see a marked improvement in performance under the following conditions:

    - Running applications that write large amounts of data over NFS
    - Heavy use of bi-directional NFS I/O
    - Mixed heavy local disk and NFS I/O

  To improve performance under heavy loads, a new set of behaviors have been added that perform the following actions:

    - Enable full-duplex NFS traffic
    - Prevent read and write starvations
    - Provide resource limiting to make the NFS client a fairer user of system resources

These behaviors are based on the notion of fair scheduling of asynchronous NFS I/O to prevent starvations and provide more efficient use of network bandwidth and server disk resources. This also extends to prevent starvations between different NFS mounted directories.

- The build_cmgr_script(1M) command generates a cmgr(1M) script from the cluster database. The script can be used later to recreate the cluster database after performing a cdbreinit. For further information, see the build_cmgr_script(1M) man page.

- For the IRIX 6.5.17 release, device drivers can create kernel threads not associated with particular interrupts to act as daemons and do background processing. For more information, see the drv_thread_create(3D) man page and the *IRIX Device Driver Programmer's Guide*, 007-0911-190.

- For IRIX 6.5.17, two new options have been added to the cpuset command. The -M option allows the user to move a process or group of processes and their associated memory from one cpuset to another. The -T option allows the user to move a process or group of processes but not their memory from one cpuset to another. For more specific information, see the cpuset(1) man page.

- In IRIX 6.5.17, support for following interfaces has been added:

  - For nodename-to-address and address-to-nodename translations, getaddrinfo(3), getnameinfo(3), gai_strerror(3), freeaddrinfo(3), getipnodebyname(3), getipnodebyaddr(3) and freehostent(3)

  - For interface index-to-name and name-to-index conversions, if_indextoname(3), if_nametoindex(3), if_nameindex(3) and if_freenameindex(3)

  These interfaces perform the following functions:

  - The getaddrinfo() function translates the node name and/or a service name and returns a set of socket addresses and associated information. This is used in creating a socket with which to address the specified service. It can provide the functionality of gethostbyname() and getservbyname().

  - The getnameinfo() function translates a socket address to a node name and a service location.

  The above translations are done in a protocol-independent manner to support both IPv4 and IPv6. (Note that IPv6 is not supported in this IRIX release.)

  - The gai_strerror() function returns a text string describing an error that is returned by getaddrinfo() or getnameinfo().

  - The freeaddrinfo() function frees one or more addrinfo structures returned by getaddrinfo(), along with any additional storage associated with those structures.

  - The getipnodebyname() and getipnodebyaddr() functions are for node name to address and address to node name translations for a given address family type.

The getaddrinfo(), getnameinfo(), getipnodebyname() and getipnodebyaddr() functions are thread-safe.

- The freehostent() function frees the memory occupied by the hostent structure that was obtained by a call to getipnodebyname() or getipnodebyaddr().
- The if_indextoname() function maps an interface index to its corresponding name.
- The if_nametoindex() function maps an interface name to its corresponding index.
- The if_nameindex() function returns all interface names and indexes.
- The if_freenameindex() function frees memory allocated by if_nameindex().

For more information, see the getaddrinfo(3), getnameinfo(), gai_strerror(3), freeaddrinfo(3), getipnodebyname(3), getipnodebyaddr(3), freehostent(3), if_indextoname(3), if_nametoindex(3), if_nameindex(3), and if_freenameindex(3) man pages.

Introduced in IRIX 6.5.16:

- IRIX 6.5.16 supports a new XThread Control Interface (XTCI) that allows users to control many interrupt thread parameters, including cpu binding. System administrators can use this interface to control kernel thread properties separate from the physical interrupts they service. For information on this interface, see the realtime(5) man page.
- For the IRIX 6.5.16 release, performance improvements have been made to the rtmond system monitoring daemon. These improvements will be most noticeable on systems with 128 CPUs and larger. For information on the rtmond daemon, see the rtmond(1) man page.
- For the IRIX 6.5.16 release, Array Services scaling support has increased from a maximum of 8 hosts to 64 hosts. Array Services also provides increased interoperability with job limits and new functions such as askillash. For more information, see the Array Services release notes and the array_services(5) man page and the Array Services chapter in *IRIX Admin: Resource Administration*.
- IRIX 6.5.16 provides support for mice with more than three buttons and mice with wheels. Users with Microsoft Intellimouse or Intellimouse Explorer can use this expanded functionality in many IRIX and Open Source applications. For information on this feature, see the pcmouse(7) man page.
- The IRIX 6.5.16 release added an -x[processor] option to the mpadmin(1) command that allows you to exclude the specified CPU from performing any work. This functionality is useful in a situation in which you suspect a CPU may have a hardware error but you do not want to shut down your entire system.

  For more information, see the "Excluding a CPU from Performing Work" section in *IRIX*

Admin: System Configuration and Operation and the mpadmin(1) man page.

- The IRIX 6.5.16 release includes two new options to the cpr command:

  - The IRIX 6.5.16 release includes the cpr -w option that allows you to use the attribute file located in the current working directory (versus $HOME/.cpr). For more information, see the *IRIX Checkpoint and Restart Operation Guide* and the cpr(1) man page.

  - The IRIX 6.5.16 release includes a new -m memory migration option to the cpr command, which allows you to migrate the checkpointed memory to the location in the system topology where the restart operation is executing; for example, within a specific cpuset or within the global cpuset. In addition, a new CKPT_RESTART_MIGRATE restart-related flag has been added for use with the ckpt_restart() library interface function.

    These enhancements to the cpr command and ckpt_restart() library interface provide better functionality when restarting processes within cpusets. For more information on the cpr -m option, see the *IRIX Checkpoint and Restart Operation Guide* and the cpr(1) man page.

- The IRIX 6.5.16 release added a CONTENTS action keyword for the FILE policy of a CPR attribute file. This causes the system to calculate checksum (currently MD5) on the file at checkpoint. Upon restart, the system detects if the file has been modified between begin-of-file and file-size-at-checkpoint; if the file has been modified in this area, the process is refused restart, otherwise, it seeks to the previous offset and continues. For more information, see the *IRIX Checkpoint and Restart Operation Guide*.

- The IRIX 6.5.16 release added two new functions in the Cpuset library called cpusetMove(3x) and cpusetMoveMigrate(3x). The Cpuset library routines, cpusetMove(3x) and cpusetMoveMigrate(3x), can be used to move processes between cpusets and optionally migrate their memory. They allow you to move specific processes, or groups of processes, between existing cpusets, and out of a named cpuset into the pool of CPUs not assigned to any specific named cpuset.

  Using this functionality, you can easily destroy existing cpusets to free resources to run a prime job and then easily reconstitute cpusets to continue prior jobs. Because memory used by a process can be migrated to the node associated with the new cpuset, memory locality is improved.

  For more information on the cpusetMove(3x) and cpusetMoveMigrate(3x) routines, see Chapter 4, "Using the cpusetMove and cpusetMoveMigrate Functions" in the *IRIX Admin: Resource Administration* manual and the cpusetMove(3x) and cpusetMoveMigrate(3x) man pages.

- The IRIX 6.5.16 release added a disable_uspollsema_chk systune variable for the usopenpollsema(3P) library call. This variable turns off the standard access mode checking on usopenpollsema(3P) (set on the first call to usopenpollsema(3P) via the ’acc’ parameter).

Some older IRIX applications that were written to work with usopenpollsema(3P) may now require this variable.

For more information, see the usopenpollsema(3P) man page and the /var/sysgen/mtune/kernel configuration file.

- The IRIX 6.5.16 release added documentation for the following kernel tunable parameters:

  - min_bufmem general parameter

    min_bufmem specifies the minimum amount of memory held by filesystem metadata that is cached in the buffer cache when the system runs into low memory conditions.

  - rtcpus dispatch parameter

    rtcpus controls the quality of the real-time scheduler.

  - bdflush_interval filesystem parameter

    bdflush_interval specifies the interval at which the bdflush function executes to push dirty file data to disk.

  For more information on kernel tunable parameters, see Appendix A in *IRIX Admin: System Configuration and Operation*.

- IRIX 6.5.16 provides support for upgrading license_eoe to the FLEXlm 8.1a release from Globetrotter Software, Inc. The license manager daemon is built in V5 compatibility mode. For more information see the *FLEXlm End User Manual* and the associated man pages.

  IRIX 6.5.16 also provides support for upgrading license_dev to include new optional thread-safe FLEXlm 8.1a client side libraries and headers. For more information see the license_dev release notes.

Introduced in IRIX 6.5.15:

- XFS inode numbers are 64-bit values containing an encoded disk location. For large filesystems (1 Terabyte plus), the inode numbers can overflow into the top 32 bits of the number. Certain backup applications which use the inode number only allow 32 bits of space, and thus have severe problems dealing with very large XFS filesystems.

  In IRIX 6.5.15, XFS was changed to allocate inodes only within the lower portion of the filesystem to avoid this overflow issue. Other allocation policies in the filesystem will make this lower order space preferred for inodes and reduce the risk of a filesystem refusing to create new inodes when it still has space available.

  For existing large filesystems with high numbered inodes this does not solve the problem, but it does solve it for new filesystems, and for new files created on existing filesystems.

For backwards compatibility a new mount option is available, inode64, this will allow xfs to place inodes anywhere in the filesystem and follow exactly the original placement policies. Filesystems which were small enough not to be able to overflow 32 bits of inode number also retain the old behavior.

- The IRIX 6.5.15 release added support for disks that have a capacity of 2 terabytes. Previously, the maximum was 1 terabyte. The maximum disk capacity had become an issue with the introduction of 180-GB drives, multiples of which can be combined into a single logical unit (lun) behind a RAID controller.

  The maximum capacity of a logical unit for both of our current RAID controllers is 2 terabytes, so this change allows us to support that maximum.

- For the IRIX 6.5.15 release, Chapter 5 "System Administration in a Multiuser Environment" in *IRIX Admin: System Configuration and Operation* was updated with a new section on Project ID numbers and the chproj(1) command that changes the project ownership of a file. The project ID may be either a project name found in the project file, or a decimal project ID. For more information, see the chown(1) man page and the *IRIX Admin: System Configuration and Operation* manual.

- In IRIX 6.5.15 and later, the systune parameter gang_sched_off is turned on by default. This means that gangs will not be running on the system unless the system administrator sets gang_sched_off to 0. This differs from previous IRIX releases, for which gangs ran on the system automatically.

  This change has been made per field request because we have discovered that having gang scheduling on by default greatly diminishes system performance. Most customers have been running with it off.

- The IRIX 6.5.15 release added a coremask parameter set in the /var/sysgen/mtune/kernel file to determine what kind of permissions a core file will receive. Currently, when a process creates a core file, it uses the umask of the owner of the process to determine the permissions. This can lead to core files containing sensitive information being created with world readable permissions. This systune variable allows the system administrator to limit access to core files. The default is 0, which is the current behavior. However, if the coremask variable is set to some other value, it uses that number as the umask and ignores the umask of the owner of the process. For example, if coremask is set to 0177 and the owner of the process has a umask of 022, the permissions set on the core file will be 600 instead of 644. This variable assumes that the number entered is octal. The default setting is 0. The minimum setting is 0. The maximum setting is 0177.

  For more information on the coremask parameter, see Appendix A, "IRIX Kernel Tunable Parameters", in *IRIX Admin: System Configuration and Operation.*

- A new partitioning administration command, partmgr(1M), was added to define and store partition definitions. For more information, see *IRIX Admin: System Configuration and Operation.*

- The IRIX 6.5.15 release added support for the /dev/poll interface for scalable and efficient event notification. For information on /dev/poll, see the poll(7M) man page.

- The Dynamic Host Configuration With Proclaim section in *IRIX Admin: Networking and Mail* was updated to include detailed procedures and descriptions for setting up DHCP.

- For the IRIX 6.5.15 release, the DHCP client (proclaim) was updated to include options to allow DHCP clients to capture changes to DNS, NIS, or GATEWAY in your environment. For more information, see the proclaim(1M) man page and *IRIX Admin: Networking and Mail*.

- The IRIX 6.5.15 release provides the ability to designate one or more CPUs or a range of CPUs on a single line in the cpuset configuration file. The CPUs in a cpuset configuration file do not have to be specified in a particular order.

  The following is a sample configuration file that describes an exclusive cpuset containing 7 CPUs:

  ```
  # cpuset configuration file
  EXCLUSIVE
  MEMORY_LOCAL
  MEMORY_EXCLUSIVE

  CPU 16
  CPU 17-19, 21
  CPU 27
  CPU 25
  ```

  For more information on the cpuset configuration file, see Chapter 4, "Cpuset System", in *IRIX Admin: Resource Administration*.

- For the 6.5.15 release, the systune(1M) man page was updated to describe a situation where the system segment size value (syssegsz) reported by the systune command is different than the value set in the /unix file as follows:

  The systune(1M) may not show the user-defined value of syssegsz after a system reboot. This is due to the fact that the colormap must be calculated and added to the syssegsz value for machine types IP19, IP20, IP22, and IP32. When systune is called, it compares the value of syssegsz in the kernel to the value set in the /var/sysgen/stune file. If this is done on one of the above machines, the values will not match because syssegsz has been altered with the colormap value in the kernel, but not in the /var/sysgen/stune file. This indicates normal functioning of the operating system.

- Starting with the IRIX 6.5.15 release, each partition of a partitioned Origin 3000 system will have a new unique FLEXlm host ID (lmhostid). Any FLEXlm license based on the old non-partitioned lmhostid value will no longer work and a new license key must be generated. See the following web page for additional details, http://www.sgi.com/support/licensing/.

  - Contact the applicable software product vendor and provide the lmhostid number of the partition to generate a new license key. For nodelock licenses, provide the lmhostid for all partitions of the software installed and operating.

- For software licensed by SGI, see the following web page for more details: http://www.sgi.com/support/licensing/.
- For e-mail and telephone contact information, see the Bundled software page.

- For IRIX 6.5.15 we added HOTPLUG attach and detach support for SGI Gigabit Ethernet Network adapters. This feature is supported on IP35 Origin 3000 series systems only; it is not supported on IP35 0300 systems. For information on this feature, see *IRIX Admin: Networking and Mail*.
- The IRIX 6.5.15 release supports the lmparthostids and lmbasehostid commands. The lmparthostids command generates a list of all 63 partition specific hostids and the unpartitioned id. This list can be passed to a license key generation tool for nodelock licenses so that the license works across all partitions or an unpartitioned system. The lmbasehostid command takes any arbitrary lmhostid (this could be a partition specific value) and generates the base unpartitioned id. That number could be used when the base lmhostid is required, even from a partition.
- FLEXlm v7.2i support from GLOBEtrotter Software, Inc. was added. The license manager daemon and the floating license server are built in V5 compatibility mode. For backwards compatibility, the client libraries and header files are still based on FLEXlm v6.1g. For more information, see the *FLEXlm End User Manual* and the associated man pages.

Introduced in IRIX 6.5.14:

- In the IRIX 6.5.5 release, SGI introduced a new optional directory format for XFS filesystems, referred to as the "version 2" directory format in mkfs output.

  XFS filesystems with a version 2 directory format can provide improved reliability and performance over filesystems with a version 1 directory format in some applications, particularly for applications that use NFS exported XFS filesystems.

  The directory format for an XFS filesystem is specified with the -n parameter of the mkfs command. The default directory format is currently the original version 1 directory format.

  Beginning with the IRIX 6.5.14 release, version 2 directories of XFS will be the default for all new filesystems created with mkfs. Version 1 directory filesystem creation will still be supported, but this will require that you specify the -n version=1 parameter of the mkfs command.

  SGI recommends that all new XFS filesystems be created with version 2 directories. IRIX releases older than IRIX 6.5.5, however, will not be able to mount a filesystem created with a version 2 directory and will issue the following message when a mount is attempted:

  Wrong filesystem type: xfs

Many SGI customers are currently running production servers with version 2 directories. If you want to format filesystems with the version 2 directory format prior to the IRIX 6.5.14 release, you can specify the following option of mkfs:

mkfs -n version=2

There is no means for converting a filesystem, in place, between version 1 and version 2 directories. A filesystem can be converted between version 1 and version 2 directories by means of an xfsdump/mkfs/xfsrestore sequence.

For more information, see *IRIX Admin: Disks and Filesystems.*

- In IRIX 6.5.14, added a -q *cpuset_name* -p option to the cpuset command that allows you to see the properties of particular cpuset, such as, the number of processes and CPUs associated with the specified cpuset.

- In IRIX 6.5.14, added cpusetGetProperties( ) and cpusetFreeProperties( ) functions to the Cpuset System library .The cpusetGetProperties( ) function allows you to retrieve various properties associated with a cpuset. The cpusetFreeProperties( ) functions allows you to release the memory used by a cpuset_Properties_t structure. Any programmer that uses the cpuset API from IRIX 6.5.14 and later, can use these functions. For information, see chapter 4, "Cpuset System", in the *IRIX Admin: Resource Administration* manual and the cpusetGetProperties(3x) and cpusetFreeProperties(3x) man pages.

- Parts of the *IRIX Interactive Desktop* were refreshed in IRIX 6.5.14. While functionality has not changed, the navigation, imagery, and graphics design have been enhanced in the following areas:

  - The main IRIX login window (clogin) has a new design using new SGI colors, font, and logo. The product is called sysadmdesktop and appears automatically at boot when root has "chkconfig noiconlogin on".

  - **EZsetup** has a new layout and login icon using new SGI colors, font, and logo. The product is called sysadmdesktop and is launched by logging into **EZsetup account** from main IRIX login window.

  - The **System Manager** main window uses new SGI colors, font, and logo. The product is sysadmdesktop and is launched from the **System toolchest.**

  - The Welcome to SGI web pages have new navigation and new SGI colors, font, and logo. The product is Welcome. Launch from **Find toolchest**, select **WhatsNew**, double-click the **Welcome_to_SGI** icon.

  - The Background Setting panel includes seven new desktop patterns using the new SGI logo and font: Camouflage, Citrus Citrus, Iron, Midnight, Reef, Sand, and Sprinkle. Note: You may notice slow performance when previewing all but the Sprinkle background, but not when switching desks (see the background(1) man page). Old backgrounds are still available. The product is desktop_eoe and is launched from the

Desktop toolchest, select **Customize**, then **Backgrounds**.

- SCSL is a collection of high-performance mathematical and numerical libraries that are widely used in scientific and technical compute intensive applications. An iterative solver for sparse systems of linear equations, as well a direct solver for sparse complex symmetric systems of linear equations, have been added to the SCSL 1.4 release. Additional features added to SCSL for this release are as follows:

  - A thread-safe parallel random number generator
  - Fortran90 interfaces to the BLAS
  - A parallel implementation of the solve phase for the out-of-core sparse solver
  - Removal of all entry points to the CHALLENGEcomplib FFT routines
  - Performance enhancements and rollup bug fixes from SCSL 1.3.

  SCSL can also be downloaded free of charge from the Download Cool Software page at http://www.sgi.com/products/evaluation/.

  For more information on SCSL, see http://www.sgi.com/software/scsl.html.

  For customers who do not have web access and are enrolled under a valid support contract, CD media can be requested free of charge from their local support center. Non-contract customers can order SCSL from their local sales representative.

Introduced in IRIX 6.5.13:

- The xfsrestore command returns an incorrect exit code when it encounters a media error; improving this process lets a system administrator intelligently react to these conditions.

- Improved exit codes for the xfsrestore and xfsdump commands. This lets a system administrator correctly respond to end-of-media or operator interrupt conditions

- Changed the mkfs command to allow you to specify the size of an XFS allocation group, as an alternative to specifying the total number of allocation groups. You use the -d agsize= option for this. For information, see the mkfs_xfs man page and *IRIX Admin: Disks and Filesystems*.

- Changed the mkfs command to allow you to specify the size of a stripe unit and the size of a stripe width in bytes or in filesystem blocks, as an alternative to specifying these values in 512-byte block units. You use the -d su= and the -d sw= options for this. For information, see the mkfs_xfs man page and *IRIX Admin: Disks and Filesystems*.

- Changed the default size of an XFS allocation group; larger filesystems will result in larger default allocation group sizes.

- The xfsdump and xfsrestore commands will provide the VSN of the tape that reached its end-of-volume (or the VSN of a new tape that needs to be mounted) and pass this VSN to the media_change_alert_program specified with the -c option. This lets system administrators send commands to a tape jukebox to mount the next tape.

- Changed the default size of an XFS log. The default log size grows with the size of the filesystem up to the maximum log size, 128 megabytes, on a 1 terabyte filesystem. For information on the default values of XFS allocation groups and XFS log sizes, see *IRIX Admin: Disks and Filesystem*s.

- Added cpusetAttachPID( ) and cpusetDetachPID( ) functions to the Cpuset System library. The cpusetAttachPID( ) function allows a programmer to attach a currently running program to an existing cpuset. The cpusetDetachPID( ) function allows a programmer to detach a currently running program to an existing cpuset. Any programmer that uses the cpuset API from IRIX 6.5.13, and later, can use these functions. For information, see chapter 4, "Cpuset System", in the *IRIX Admin: Resource Administration* manual and the cpusetAttachPID(3x)and cpusetDetachPID(3x) man pages.

- The following features have been moved from Enhanced DHCP to standard DHCP:

  - Ping check before an address is leased to insure it is not already in use

  - MAC address filtering; clients whose MAC address is listed in a file will be unable to obtain a lease and/or accesses from these clients will be logged.

  For more information, see the dhcp_bootp man page.

- Added implementation of End Sequence to Scheduled Transfer Protocol. The upper layer protocol or applications can now terminate a transfer and restart another one without taking down virtual connection.

- VPro for Octane and OpenGL performance improvements have been added as follows:

  - Improved X window performance by 25 percent based on x11perf

  - Iproved performance of OpenGL glCopypixel( )) function

- The following new system controller features have been implemented for the SGI Origin 3000 server series:

  - Enabled router port security, which prevents unauthorized enabling of additional router ports on router bricks in the SGI Origin and Onyx 3400 server series

  - Enabled system serial number security, which prevents unauthorized changes to the system serial number

  - Completely redesigned the graphical interface for the front-panel display of the SGI 3400 and 3800 servers

- Added hotplug attach feature that allows Gigabit Ethernet cards to be installed on a running system. A system administrator can use the pciconfig command to add cards to an Origin 3000 system and the ifconfig command to configure the cards for networking. For more information, see the pciconfig and ifconfig man pages.

- Added Origin 3000 system partitioning support in the eoe.sw.partition software package. This feature improves how system partitioning software is installed, enabled, and disabled. It also eliminates the need to manually edit configuration files.

- Efficiency improvements have been made to the BTE driver layer to reduce both latency and contention. This feature is a performance improvement to the existing functionality that is used internally by the system.

- The tools that report CPU utilization have been modified to correct the sampling of %WIO to omit idle time in line with industry standards. See the sar(1) man page for details.

- Updated FLEXlm v7.2f support from GLOBEtrotter Software, Inc. The license manager daemon and the floating license server are built in V5 compatibility mode. For backwards compatibility, the client libraries and header files are still based on FLEXlm v6.1g. For more information, see the *FLEXlm End User Manual* and the associated man pages.

Introduced in IRIX 6.5.12:

- OpenGL Performer 2.4.1 execution environment, which is a powerful suite of tools and features that creates real-time visual simulation and other professional performance-oriented 3D graphics applications for the IRIX operating system. The following new features for OpenGL Performer provide enhanced realism and peak-performance rendering:

  - Programmable model shading using pfShader
  - Use of pfVolFog for rendering layered and patchy fog
  - Use of pfRotorWash to create the visual effect of downwash in helicopter simulation
  - Double-precision matrix support for rendering extremely large databases where objects are far away from the origin
  - CPU priority specification to allow multiple run-time processes to run on the same processor
  - Multi-pipe scalability enhancements
  - Improved pfLOD behavior to allow custom evaluation functions
  - Speed and functionality enhancements for pfFlux, pfCliptexture, and pfLightpoints
  - pfHyperpipe support for the DPLEX hardware option
  - EventView performance tuning tool for instrumenting and tuning your OpenGL Performer application

- The IRIX tape-support feature consists of a tape support driver, personality daemons, and a daemon that manages the personality daemons. The feature enables new personality daemons to be developed and added individually. The tape-support driver, which co-exists with the current IRIX tape driver (tpsc), passes all device-dependent tasks, except for I/O processing, to a personality daemon. This release supports various devices including the Fibre Channel implementation on the StorageTek 9840 and T9940A tape drives. The reserve, release, preempt, clear, and prsv commands are available for these tape drives on the mt command. For more information, see the mt(1), tsarchive(1M), tsdaemon(1M), tserrpt(1M), tsset(1M), tsstop(1M), ts.config(4), and ts(7) man pages.

- Updated FLEXlm v7.2e support from GLOBEtrotter Software, Inc. The license manager daemon and the floating license server are built in V5 compatibility mode. For backwards compatibility, the client libraries and header files are still based on FLEXlm v6.1. For more information, see the *FLEXlm End User Manual* and the associated man pages.

- The Scheduled Transfer Protocol (STP) has moved from the feature stream to the maintenance and feature stream. STP is now a mature supported protocol and it includes TRIX support.

Introduced in IRIX 6.5.11:

- Support for the use of a reserved area of memory; this reserved area is between virtual addresses 0x30000000 and 0x40000000. This feature disables the reserved area of memory that the kernel provides for applications to place their mmap and shmat mappings. For more information, see the mmap(2), shmat(2), syssgi(2), and sgi_use_anyaddr(1) man pages.

- Support for weightless pthreads; they allow you to lower the priority of a process by using the npri -w command. For more information, see the npri(1) man page.

- Support for upgrading license_eoe to the FLEXlm 7.1 release from Globetrotter Software, Inc. The license manager daemon will be built in V5 compatibility mode. For more information, see the *FLEXlm End User Manual* and the associated man pages.

- Support for an increased maximum number of logical unit numbers (LUNs) in the SCSI infrastructure from 64 to 255. This change impacts only the fcadp and qlfc fibre channel drivers and they will now enforce this LUN limit. If a LUN is greater than 255, it will be ignored after issuing a message to this effect. If you use large numbers of LUNs, you can exhaust the hardware graph. You may need to use the systune command to increase the hwgraph_num_dev parameter to let the kernel build larger hardware graphs.

- Support for licensing of partitioned environments. The SGI Origin 3000 server series and SGI Onyx 3000 series of systems give you the flexibility to distribute and manage a partitioned system environment on a large CPU server system. In most cases, software licensing behaves in the same manner on a single system image as in a partitioned environment. However, there are some differences. Depending on your applications, you may need either systemwide or per-CPU licensing. For more information, see *IRIX Admin: Software Installation and Licensing.*

- Support for the PCI Hot Plug infrastructure on the SGI 3200, SGI 3400, and SGI 3800 servers. The Hot Plug feature consists of the Hot Insertion and Hot Removal actions. Each device driver must be qualified as supporting one or both of these actions. Currently, the QLogic fibre channel and QLogic SCSI device drivers are qualified for Hot Insertion. For more information on specific administrative options, see the pciconfig(1) man page.

Introduced in IRIX 6.5.10:

- Support for point-to-point connections between the QLogic 2200 fibre channel controller and the Brocade switch. This type of connection lets the QLogic 2200 controller perform full duplex transfers with the switch offering a potential increase in bandwidth. This capability was enabled by changing the value assigned to the qlfc_use_connection_mode variable (in

/var/sysgen/master.d/qlfc) to 2. The previous value was 0. This change does not impact loop operation.

- Support for the IRIX SCSI tape driver (tpsc) enhancements that let system administrators and privileged applications specify a persistent reservation on shared tape drives. After the reservation has been established, the shared tape drive cannot be accessed by another host until the reservation has been released. For more information, see the mt(1) and mtio(7M) man pages.

- Support for the new Fortran, C++, and base compiler runtime libraries packaged under the ftn_eoe, c++_eoe and compiler_eoe overlay images. These libraries are based on the MIPSpro 7.3.1.2m compilers and contain new interfaces released under the MIPSpro 7.3 compilers. The libraries are backward compatible with the libraries that were released in previous versions of IRIX 6.5. For more information, see the ftn_eoe, c++_eoe, and compiler_eoe release notes.

Introduced in IRIX 6.5.9:

- Support for Embedded Support Partner 2.0 (ESP2.0). This release supercedes patch 3895 and includes the major features as follows:

    - Automatic Call Logging to the SGI call centers for Mission Critical Supported customers
    - Support of event profiles for monitoring
    - A new command line interface to setup and use ESP
    - A new user interface with a high level of usability and navigational features
    - Fixes to the System Group Manager for secure interconnectivity between group members and the group manager
    - Support for an unlimited number of group members to the System Group Manager
    - Multiple ESP user support with page privileges
    - ESP logbook for electronically logging and tracking support activities locally on the system

  The migration from ESP1.0 to ESP2.0 is done seamlessly when upgrading from previous versions of IRIX to IRIX 6.5.9.

  The *Embedded Support Partner Overview* and the *Embedded Support Partner User Guide* have been combined. The new document is called the *Embedded Support Partner User Guide* and will contain overview and usage information for the ESP 2.0 command line and graphical user interfaces.

- Support for the SCSI Enclosure Services (SES). A new subsystem that manages the Fibre Channel drive enclosures has been added. The new daemon, sesdaemon, supports the Xyratex 12-slot enclosure and the Clarion 10-slot enclosure. The new client application, sesmgr, uses a command set similar to the set used by the previous fcagent/fccli subsystem. For more information, see the sesdaemon(1M) and sesmgr(1M) man pages.

Introduced in IRIX 6.5.8

- Support for 32-bit direct mapping to any node on the system. This feature lets the system administrator change the 32-bit direct mapping node for a specific Peripheral Component Interconnect (PCI) bus. It also provides a new interface, pcibr_get_dmatrans_node( ), that lets a device driver obtain the node ID. For more information, see the *IRIX Device Driver Programmer's Guide* and the pcibr_get_dmatrans_node(D3) man page.

- Support for the Cpuset System programming interface application (previously known as miser_cpuset). This interface is provided in the form of a Dynamic Shared Object (DSO). You can use this programming interface to create cpusets, remove cpusets, and attach processes to cpusets. You can use the cpuset programming interface in areas where the cpuset command is inappropriate. For example, if a batch system needs to use the cpuset capability in IRIX, the programming interface will provide a more flexible and robust solution than the cpuset command. For more information, see *IRIX Admin: Resource Administration* and the cpuset(5), cpusetAllocQueueDef(3x), cpusetAttach(3x), cpusetCreate(3x), cpusetDestroy(3x), cpusetDetachAll(3x), cpusetFreeCPUList(3x), cpusetFreeNameList(3x), cpusetFreePIDList(3x), cpusetGetCPUCount(3x), cpusetGetCPUList(3x), cpusetGetName(3x), cpusetGetNameList(3x), and cpusetGetPIDList(3x) man pages.

- Support for new Miser cpuset options. These options allow the creation of restrictive memory pools from the nodes that contain the CPUs listed in the configuration file. Processes that exceed the available memory on those nodes may be terminated or paged (selectable). For more information on these options, see the cpuset(4) man page.

Introduced in IRIX 6.5.7:

- Support for the IRIX sendmail mail system based on sendmail version 8.9.3 (see http://www.sendmail.org). Some of the new functions in version 8.9.3 are as follows:

  - The major difference between sendmail versions 8.8.8 and 8.9.3 is their configuration file. The configuration file in sendmail version 8.9.3 is configured with the *sendmail.mc* file which is processed with the m4 macro processor to create the *sendmail.cf* file.

  - A new version of configmail configures the *sendmail.mc* file and provides features similar to the configmail utility in previous versions of IRIX. This version of configmail also processes the *sendmail.mc* file into *sendmail.cf* by using the m4 macro processor.

  - Sendmail 8.9.3 includes many new features requested by IRIX users, such as anti-relay features which can be used to control spam messages.

  For more information on the 8.9.3 version of sendmail, see the *IRIX Administration: Networking and Mail* manual. For more information on how to configure sendmail, see http://www.sendmail.org/m4/readme.html. The sendmail feature was initially added to the IRIX 6.5.7 release.

- Integration of the fsr_xfs(1M) command into the fsr(1M) command. With previous releases of IRIX, the fsr command could be run only on EFS filesystems and the fsr_xfs command could be run only on XFS filesystems. Both commands reorganize filesystems so that the layout of the extents is improved. This improves the performance of mounted filesystems that have become fragmented over time. With this release, the fsr command invokes fsr_xfs when it encounters XFS filesystems. With this change, the default crontab(1M) entry that calls fsr, also reorganizes XFS filesystems. For information on the fsr command and the fsr_xfs and fsr_efs options, see the fsr(1M), fsr_xfs(1M), and fsr_efs(1M) man pages.

- Support for the -u option of the sat_interpret utility that writes unbuffered output. You can use this new option if you are using the sat_interpret utility to process system audit trail data, and then you can pipe this output to another filter utility. For more information, see the sat_interpret(1M) man page.

- Support for bzero error recovery; this RAS feature prevents the kernel from panicking when a memory Multiple Bit Error (MBE) is encountered while the kernel is zeroing out a new page in the virtual memory fault handler (vfault). The kernel will now discard the page with the memory error, grab a new page, and continue its task.

Introduced in IRIX 6.5.6:

- Support for a multithreaded version of the automatic filesystem mount daemon *autofsd*. This enhanced functionality allows for simultaneous multiple automounts. If a particular server for an automounted filesystem is not running or is slow to respond, one *autofsd* thread can wait for that server while other *autofsd* threads mount filesystems from other servers. This capability improves the automount performance and simultaneously provides longer wait times for downed servers, which should lead to a decrease in automount failures.

Introduced in IRIX 6.5.5

- Embedded Support Partner, which is an integral part of the IRIX operating system, provides system administrators with a way to monitor various events (such as system events, changes in system hardware and software configuration, and system performance) that can occur on their system. Embedded Support Partner consists of a set of daemons that perform the monitoring activities. These include an event monitoring daemon (eventmond), an event management daemon (espemd), and a database daemon (espdbd). Embedded Support Partner provides single system monitoring capabilities as a standard part of IRIX. Optionally, Embedded Support Partner can be configured to receive event and system configuration data from all systems contained within a system group. Embedded Support Partner is controlled through a Web browser that is connected to the Configurable Web Server that is included in the Embedded Support Partner package. For more information, see the *Embedded Support Partner Overview*, the *Embedded Support Partner User's Guide*, and the Embedded Support Partner man pages.

- Support for the version 2 XFS directory format; this format provides you with the capability to choose a filesystem block size to match the distribution of data file sizes without adversely affecting directory operation performance. The directory format is specified with the -n parameter of the *mkfs* command. For more information, see the *IRIX Admin: Disks and Filesystems* and the mkfs_xfs(1M) man page.

- SCSL version 1.2 supports features such as convolution/correlation and filter routines to the Signal Processing functionality. Additional IRIX features added to SCSL for this release are improved ordering techniques for the sparse linear solvers, performance enhancements for the MIPS R12000 processor, rollup bug fixes from SCSL 1.1, and all other Challengecomplib 3.1 functionality.

- Support for Automated Performance Monitoring. Together with Embedded Support Partner, the base performance monitoring services in the pcp_eoe product have been extended to include an inference engine for evaluating rules about system-level performance and raising alarms. Also provided is a parameterized set of standard rules that can be selectively enabled and tuned to meet local requirements and to choose alternative alarm notification mechanisms. These features are of most value to operations staff running production IRIX systems. For more information, see the pmie(1) and pmieconf(1) man pages, and the *Performance Co-Pilot*(TM) *IRIX Base Software Administrator's Guide*.

- Two new options were added to the "miser_create_cpuset" command. These options allow additional restrictions on memory assignment for processes running on a cpuset. These options are documented in the miser_cpuset(4) man pages.

- Support for SAN addressing

Introduced in IRIX 6.5.4:

- Support for the Miser queue repack policy. When a job finishes execution prior to the end of its schedule, the system resources it was using are released. This policy attempts to reschedule the jobs using earlier start and end times in order to take advantage of these released system resources. The order of the scheduled jobs will be maintained. This feature can be used by all Miser users running IRIX 6.5.4m or f. For more information, see the miser(4) and miser(5) man pages, and the *IRIX Admin: System Configuration and Operation*, Chapter 7 "Managing User Processes."

- Distributed Computing Environment (DCE) Client for accessing shared resources in distributed computing DCE/DFS serving environments

    - Kernel libraries only
    - As of IRIX 6.5.8 and later, DCE/DFS 1.2.2b software is required for full functionality

Introduced in IRIX 6.5.3:

- (Octane systems only) The worst-case interrupt response time is guaranteed to be less than one millisecond on properly configured Octane systems

- Support for the X security and appgroup extensions (combined with a new Netscape plugin, these allow the embedding of X applications in Web pages)

- Extra support for European fonts, including the new Euro currency symbol

- New Software Manager and Inst commands to simplify selections for upgrades

- New Software Manager and Inst configuration variable to more easily handle cases where configuration files are upgraded. See the "smart_config_handling" preference in inst or swmgr for more information

- LDAP 3.0 now supported

Introduced in IRIX 6.5.2:

- AutoFS extended to use Unified Name Service (UNS) for map information
- Support for DCShare application sharing extension
- Fibre channel support to Dmnet
- Three new HP printer drivers

Applications CD

Introduced in IRIX 6.5.21:

The following full images were revised in the IRIX 6.5 Applications CD:

- Common Desktop Environment, 5.3.1
- Information Searching Execution Environment, 6.5.21m
- IRIS InSight Viewer & Base Environment, 5.2
- Macrovision FLEXlm (v9.0) License Tools, 3.4.10
- Mozilla 1.0.2a
- MPI 4.3 (MPT 1.8)
- MPT 1.8
- Fulltext Indexing and Search Environment, 4.3
- SMA 4.1 (MPT 1.8)
- Web Setup and Administration, 3.6

The following overlays images were revised for the IRIX 6.5 Applications CD:

- IRIX® Interactive Desktop
- IRIX® Interactive Desktop Tools
- IRIX® Interactive Desktop Administration

- Impressario(TM)Printing & Scanning Tools
- WebViewer Library Execution only Enviroment

Introduced in IRIX 6.5.20:

The following full images were added to the IRIX 6.5 Applications CD:

- Java2 v1.4.1 Execution Environment (Sun JRE v1.4.1)
- Java2 v1.4.1 Development Environment (Sun JDK v1.4.1)
- Java2 v1.4.1 Debug Binaries (Sun JDK v1.4.1)
- Java2(tm) Runtime Plug-in for IRIX, Edition 1.4.1

The following full images were revised for the IRIX 6.5 Applications CD:

- Color Management 2.3
- Cosmo Create Authoring Environment, 1.0.3a
- ImageVision Tools, 3.2.2
- Information Searching Execution Environment, 6.5.20m
- Macrovision FLEXlm (v8.3b) License Tools 3.4.9
- Mozilla 1.0.2
- MPI 4.2 (MPT 1.7)
- MPT 1.7
- SGI Scientific Library 1.4.1.2 (SCSL 1.4.1.2)
- SGImeeting 2.0.5
- SGI WebServer Based on Apache 1.3.27a
- IRIS Showcase 3.4.3a
- SiteMgr - Web Content Administration, 1.2.1
- SMA 4.0 (MPT 1.7)
- Web Setup and Administration, 3.5

The following overlays were revised for the IRIX 6.5 Overlay CD:

- IRIX Interactive Desktop
- IRIX Interactive Desktop Tools
- IRIX Interactive Desktop Administration
- Impressario Printing & Scanning Tools

The following images were retired from the IRIX 6.5 Applications CD:

- On-Line Registration, 1.4
- FDDIVisualyzer, 6.5
- Novell NetWare Client 1.1.1
- VLAN software 1.0 for IRIX 6.5
- 3D File Translators 1.1.1

Several overlays were revised to fix Section 508 bugs.

Introduced in IRIX 6.5.19:

The following full images were added to the IRIX 6.5 Applications CD:

- GNU Software configured & precompiled for IRIX, 1.1
- InSight Base 5.2
- Macromedia’s Flash5 plugin 1.0
- Mozilla 1.0.1

The following full images were revised for the IRIX 6.5 Applications CD:

- Access for Movement-Impaired Users 1.1.4
- Adobe Acrobat Reader 4.05a
- Cosmo Player VRML Viewer 2.1.6 for IRIX 6.5
- GLOBEtrotter FLEXlm License Tools 3.4.8
- Information Searching Execution Environment, 6.5.19m

    - InSight 5.2, InSight Dev 5.2, and InSight Glossary
    - NEdit 5.3
    - Netscape Communicator, Navigator, and Dev 4.8
    - Outbox Personal Web Site 1.8
    - SCSL 1.4.1.1
    - SGImeeting 2.0.4
    - SGI WebServer Based on Apache 1.3.27
    - Fulltest Indexing and Search Enviroment 4.2
    - WebSetup 3.4

  The following overlays were revised for the IRIX 6.5 Overlay CD 2003:

    - IRIX Interactive Desktop
    - IRIX Interactive Desktop Tools
    - IRIX Interactive Desktop Administration
    - Impressario$^{(TM)}$Printing & Scanning Tools

  Several overlays were revised to fix Section 508 bugs.

Introduced in IRIX 6.5.18:

- The following full images were added to the IRIX Applications CD:
    - Common Desktop Environment 5.3 (CDE)
    - Java2 v1.3.1_02 JRE
    - Java2 v1.3.1_02 JDK
    - Java2 v1.3.1_02 plugin
- The following full images were revised with bug fixes for the IRIX 6.5 Applications CD for IRIX 6.5.18:
    - Fulltest Indexing and Search Environment
    - Information Searching Execution Environment

- InSight, InSight Dev, and InSight Glossary
- License Tools
- SCSL 1.4.1

- The following full image was revised with localization updates for the IRIX 6.5 Applications CD for IRIX 6.5.18:
  - SGImeeting 2.0.3a
- The following Overlays were revised with bug fixes for the IRIX 6.5 Overlay CD for IRIX 6.5.18:
  - IRIX Interactive Desktop
  - IRIX Interactive Desktop Tools
  - IRIX Interactive Desktop Administration
  - Impressario Printing Tools
- Several overlays were revised to fix Section 508 bugs.
- The IRIS InSight Viewer (insight) was converted to a full image rather than an overlay image and the Dynaweb product was removed.

Introduced in IRIX 6.5.17:

- The following products were added to the IRIX Applications CD:
  - MPT 1.6 - Message Passing Toolkit

    MPT was previously released on a separate CD. It is also available as a download from the Products Evaluation page. It includes MPI 4.0 and SMA 3.2.
  - SCSL 1.4.0.1 - Scientific Computing Software Library

    SCSL was moved from the Overlay CD to the Applications CD. It is also available as a download from the Products Evaluation page.
  - Teleffect 1.0 - Mouse and keyboard sharing service

    Teleffect was moved from the Teleffect CD to the Applications CD. The Teleffect product enables the sharing of a single keyboard and mouse between multiple IRIX or Windows NT systems. An NT install shield for Teleffect is located in /CDROM/NT/TeleffectInstall.exe.

- The following products were updated with bug fixes only:
  - Impressario Printing Tools
  - Webviewer
  - IRIX Interactive Desktop
  - IRIX Interactive Desktop Tools
  - IRIX Interactive Desktop Administration

    In IRIX 6.5.17, the Jot text editor was replaced with a wrapper to launch NEdit. The Desktop Utilities customization panel still allows Jot to be chosen as the desktop environment Text Editor.
- The following products contain enhancements or new features:
  - NEdit 5.2a

    In IRIX 6.5.17, NEdit 5.2a added localized strings and messages.
  - SGImeeting 2.0.3

    The SGImeeting user interface was reworked to make it more compact and attractive. Changes include new icons, popup tooltips, color scheme support, and better desktop integration.
  - SGI Webserver 1.3.26

    In IRIX 6.5.17, SGI Webserver 1.3.26 added Trusted IRIX(TM), Kasenna(TM) MediaBase, and base SSL (Secure Socket Layer) support.
  - FLEXlm License Tools 3.4.7

    The floating license server was upgraded to FLEXlm v8.1b.
  - InSight 5.0
  - InSight Dev 5.0
  - Information Searching Execution Environment 6.5.17m
  - SgSearch 4.0
- InSight, SgSearch, and InfoSearch changed from being overlay images to being full images. Because of the changes for InSight, AccessX, Gateway, Imgtools, Outbox, Showcase, and Sitemgr had their online books rebuilt with no other software changes.

- Dynaweb has been removed from the IRIX Applications CD since its functionality has been integrated into InSight and InfoSearch.

Introduced in IRIX 6.5.16:

- The following products were updated with bug fixes only:
    - Impressario Printing Tools
    - IRIX Interactive Desktop
    - IRIX Interactive Desktop Administration
    - IRIX Interactive Desktop Tools
    - SGImeeting 2.0.2
- The following products contain enhancements or new features:
    - Array Services 3.5
    - Information Searching Execution Environment
    - License Tools 3.4.6
    - NEdit 5.2
    - Xinet Appletalk 10.02

Introduced in IRIX 6.5.15:

- The following products were updated with bug fixes only:
    - Netscape Communicator 4.79
    - IRIX Interactive Desktop System Administration
    - Information Searching Execution Environment
    - Impressario 2.10.5
    - NEdit 5.1.1c
    - Webviewer 3.0.2
- InSight Online Doc Viewer 4.4.1 is now N32 for better performance.
- SGI Web Server, based on the Apache 1.3.22

- SGI Scientific Library 1.4.0.1 (SCSL 1.4.0.1) is now included on the IRIX Overlays CDs.

Introduced in IRIX 6.5.14:

- The following products were updated with bug fixes only:
  - Bug fix update for SGImeeting 2.0.1
  - Final bug fix update for Color Management
  - Bug fix update for Internet Gateway 3.2
  - Security and other bug fixes for NEdit 5.1.1b
  - Minor fixes for Appletalk 10.01
  - Netscape Communicator 4.78

    By default, Netscape Communicator version 4.78 will install the new N32 version of the browser. Any existing third-party plugins for the browser that are O32 will no longer function. Support for the Macromedia Flash plugin is also included. For more information, see http://browsers.netscape.com/browsers/main.tmpl.

Introduced in IRIX 6.5.13:

- The following products were updated with bug fixes only:
  - SGI Web Server, based on the Apache 1.3.20

    For details on how to change your default web server and configure and administer the SGI Web Server, see Caveats to Read After You Upgrade .
  - IRIX Interactive Desktop System Administration
  - Information Searching Execution Environment
  - InSight Online Doc Viewer 4.4
  - Netscape Communicator 4.77

    By default, Netscape Communicator version 4.77 will install the new N32 version of the browser. Any existing third-party plugins for the browser that are O32 will no longer function. Support for the Macromedia Flash plugin is also included. For more information, see http://browsers.netscape.com/browsers/main.tmpl.
- WebSetup 3.3 has been updated to support the SGI web server based on Apache 1.3.20 and an administration GUI has been added.

- Impressario 2.9.5 supports a new HP6300 Scanner driver and an Epson PPD bug fix.

Introduced in IRIX 6.5.12:

- SGI web server, based on the Apache web server version 1.3.17, replaces the Netscape FastTrack web server; for details on how to change your default web server and configure and administer the SGI web server, see Caveats to Read After You Upgrade.

- WebSetup 3.2 has been updated to support the SGI web server based on Apache

- NEdit version 5.1.1a has added extensions to the regular expression syntax, an improved international character set input, new macro subroutines, and improved syntax highlighting for several programming languages.

- Runtime Plug-in for IRIX, Java(TM) Edition 1.1.1b has added support for the Netscape N32 plugin and the O32 plugin.

- The following products from the Isogon Corporation have been removed: LicensePower/iFOR IS4.0.1 ARK and LicensePower/iFOR IS4.0.1 CRK. Sales and support has been divested to the Isogon Corporation at http://www.isogon.com. For more information on support modes, see the Support Policy page at Supportfolio Online.

- Impressario 2.8.5 supports two new HP printer drivers, HP4050 and HP8100

Introduced in IRIX 6.5.11 and earlier:

- NEdit version 5.1.1 has added extensions to the regular expression syntax, an improved international character set input, new macro subroutines, and improved syntax highlighting for several programming languages.

- Cosmo Player 2.1.5 release has added support for the Netscape N32 plugin

- CustomerLink Client Software will no longer be supported. Its key features have been migrated to the Supportfolio Online site.

- Customer Support Services Base Software will no longer be supported. Its key features have been migrated to the Supportfolio Online site.

- Impressario 2.6.5 has added 1000 new PPD files to the /usr/spool/lp/PPD_untested/ directory. The README file in this directory contains details on how to use the new drivers. The new PPD files include printers from the following manufacturers:

    - 3M
    - Adobe
    - Agfa
    - Apple
    - Autologic
    - Canon

    - Dataproducts
    - Epson
    - FujiPhotoFilm
    - Hitachi Koki Co., Ltd.
    - Hewlett-Packard
    - IBM
    - Kodak
    - Konica
    - Linotype
    - MGI
    - Mitsubishi
    - OKI
    - Optronics
    - PrePress
    - QMS
    - Ricoh
    - Samsung
    - Scitex
    - Shinko
    - Sony
    - Splash
    - Topmax
    - Tektronix
    - Xante
    - Xerox

- Netscape Communicator 4.76; by default, version 4.76 will install the new N32 version of the browser. Any existing third-party plugins for the browser that are O32 will no longer function. Support for the Macromedia Flash plugin is also included. For more information, see http://home.netscape.com/communicator/v4.5/tour/index.html

- Netscape FastTrack Server 3.03 contains an updated version of the Administration Server 3.52.

- NetWare Client 1.1.1 has added support for IP35.

- Runtime Plug-in for IRIX, Java(TM) Edition 1.1.1a has added support for the Netscape N32 plugin.

- SGImeeting Collaboration Environment with Extensions, 2.0, Net-based data-conferencing, application-sharing software. A 30-day evaluation license is included. The following enhancements are supported:

    - Enhanced NetMeeting 3.0 interoperability - enables offline selection of compatibility for sharing applications supported by NetMeeting 3.0. For more information, see the *SGImeeting Help and User's Guide*.
    - Speed dialing - enables creation of .cnf files and initiates calls from the command line
    - Background operation - provides selections for SGImeeting to minimize, remain actively

connected in the background, and pop up when you receive a call
  - Grouped window sharing - enables selecting all windows with a specific X class name to be treated as a single application and shared as a group
  - Response time performance improvement - redraws during application sharing are faster among other functional activities

  The SGImeeting Extensions also offer additional whiteboard tools as "plugins" that appear on the whiteboard tool palette. These tools are ideal for group discussions in CAD and image intensive industries. The following extensions are available:

  - A screen capture tool for dynamic or still whiteboard input
  - A video capture tool for dynamic or still whiteboard input
  - Customizable arrows and dimension markers for easy discussion pointing
  - Symbol palette for drag and drop images
  - SmartClear for clearing annotations when captured images update

  For more information on SGImeeting, see http://www.sgi.com/software/sgimeeting. For additional assistance, contact your local SGI sales representative.

- WebViewer Library Execution only Environment 3.0 release

- Xinet Macintosh Connectivity Software, also referred to as Xinet Appletalk, now includes K-AShare, K-FS, and K-Spool software. These products provide enhancements for Macintosh file sharing, file serving, and printing connectivity with IRIX systems. These Xinet products were updated to version 10.02 in the IRIX 6.5.9 release. Version 10.02 is only the demonstration version; **no** license is included. Any licenses from previous versions of Xinet software will not work with version 10.02. For more information on Xinet products, see http://www.xinet.com. For technical or sales questions, please contact Xinet at sales@xinet.com or 1.510.845.0555.

IRIX OS Bundled Software

- Out of Box Experience (OOBE) CD has been removed.
- Hot Mix CD has been removed.

  For more information about the bundled software that is included with this release, see CD Contents and the Bundled Software and Licenses web page that you can access from the Welcome web page.

Freeware CD

The contents of the IRIX Freeware CDs and the versions of the applications included on the CDs is updated for each IRIX release. For information about the freeware that is included with the current release, see http://freeware.sgi.com/. For a listing of contents of the IRIX Freeware CDs, see the IRIX CD Contents page.

Documentation

Manuals in the the IRIX Admin document set are updated when necessary to document new features at each IRIX release. The front of each manual includes a description of new features and major documentation changes for the current revision, as well as a record of when the manual was revised. The most recent version of an IRIX Admin document available on the Technical Publications Library includes information for features available in the current IRIX release.

The Tech. Pubs library is available at: http://techpubs.sgi.com

IRIX 6.5 Key Features

IRIX 6.5 feature categories:

Binary Compatibility

Desktop

Digital Media

Documentation Content and Delivery

Graphics

I/O

Networking

Hardware Support

Origin Database

Origin Enterprise System Management

Origin Reliability, Availability, Serviceability (RAS),

Origin Scalability

PC & Macintosh Interoperability

PCI

Personal System Management

Scheduling

Security

Software Distribution

Standards

X11/Motif

Binary Compatibility

Includes both a 32-bit and a 64-bit runtime environment. Systems that use the 64-bit runtime environment support both 32-bit and 64-bit applications; systems that use the 32-bit runtime environment, such as the O2, will only support 32-bit applications.

Systems that support a 32-bit runtime environment with 64-bit extensions*:

Systems that support a 64-bit runtime environment:

Challenge R4000

- Indigo R4000
- Indigo2
- Indy
- Challenge S/M R4000
- Indy/Challenge
- O2
- O2 R10000

**64-bit extensions include support for XFS filesystem and 64-bit long integers, excluding 64-bit address spaces.*

- Challenge R4000
- Onyx R4000
- Power Indigo2
- Power Challenge
- Power Onyx
- Indigo2 Extreme 10000
- Indigo2 Impact 10000
- Origin 200
- Origin 2000
- Origin 300
- Origin 3000
- Onyx 3000
- Onyx2
- Octane
- Octane2

Desktop

Products:

- Site Manager 1.1, for web content validation and version control, workflow support, 3D visualization, and server traffic statistics
- Adobe Acrobat 3.0, for viewing PDF documents
- Nedit, new default text editor; jot is also available
- Accessibility Panel, new graphical interface for AccessX software, allowing movement-impaired users to use the keyboard and mouse more efficiently
- WebViewer 3.0 now supports CSS1 Style sheets, Netscape plug-ins, JavaScript, history mechanism, animated GIFs (WebViewer is embedded in System Manager, File Manager, Software Manager, InfoSearch, EZ-setup, Site Manager, Out of Box Experience, and SGIHelp)
- Netscape Communicator 4.05 provides support for Navigator (browser), Messenger (e-mail), Composer (content creation), and Collabra (news reader); MediaMail no longer supported-see preinstallation caveat
- Netscape Communicator Lite 4.05 provides support for Navigator (browser) only

General Changes:

- Desktop now called IRIX Interactive Desktop (previously Indigo Magic)
- For security, ability to display applications that are running on other systems is now off by default (see the online *Desktop User's Guide*, "About the Remote Display Feature," for details)
- Performance improvements in application startup
- Impressario now supports PostScript Printer Description (PPD); HP and Lexmark PPD drivers are included with software

Digital Media

- Media Player now supports movies played to video output
- Movielib file now supports Quicktime MJPEG-A files
- Movielib, Media Player, and Movie Maker now support DV DIF files
- Sony DAT Qualification (LibDatAudio)
- Support new Audio Subcode I/O
- Hardware generated audio events, sample rate changes
- O2 and Octane Digital Media Buffers (dmbuffers) now support the same interface--the Octane 6.4 interface (for compatibility, the O2 IRIX 6.3 interface will continue to be supported)
- For compatibility, VL Buffers continues to be supported for IRIX 6.2 and earlier applications (dmbuffers are recommended for new application development)

Documentation Content and Delivery

- InfoSearch, new and improved online viewer and search engine for books, man pages, and Release Notes
- New on the Toolchest: Help > Quick Answers; Help > Hints and Shortcuts
- See the Resources section for comprehensive overview of useful information and support

Graphics

- Support for OpenGL 1.1 on all systems
- Imaging performance increased for O2
    - Increased performance for luminance (8 and 16-bit) and RGB images
    - Increased performance for general and separable convolves
    - Increased throughput through the imaging engine

I/O

- Guaranteed Rate I/O (GRIO) support
- Project quotas
- User space serial I/O
- Fibre channel Arbitrated Loop Topology (AL)

Networking

- Simple Network Management Protocol (SNMP) version 2
- (Origin systems only) HP-UX MIB/SNMP provides network manageability in enterprise environments
- Unified Name Service now supports yp services
- NFS for data-serving
- (Origin systems only) Distributed Computing Environment (DCE) Client for accessing shared resources in distributed computing DCE/DFS serving environments

Origin Database

- Database Accelerator (DBA)

Origin Reliability, Availability, Serviceability (RAS)

- SBE reporting mechanism
- Automatic disabling of failing components while booting
- Extended memory error handling

Origin Scalability Features

- Single system environment consisting of up to 128 processors
  - Single system image
  - Support for balanced batch and timeshare workloads
  - Single administrative entity
- Partitioned system environment consisting of up to 128 processors
  - Partitioned system image with firewalls between each origin partition
  - Application availability with Failsafe (option)
  - Administration through IRIS Console

PC & Macintosh Interoperability

- (O2 systems only) SoftWindows 95 for Windows 3.1 and Windows 95 terminal emulation on IRIX
- Xinet Appletalk for Macintosh file and print sharing
- Novell Netware
- SAMBA (on Freeware CD) provides interoperability with Server Message Block (SMB) clients

PCI

- Support for multifunction cards
- User-level PCI drivers can now be developed for Octane

Personal System Management

Products:

- New and improved personal system administration interactive guides and tools (accessible from the System Manager)
- Process Manager, graphical tool to manage processes
- Hosts Guide, graphical tool to setup your network

General Changes:

- Startup login screen is user configurable (for example, user icons can be replaced with any image)
- Support for personal filetypes--allows users to create custom icons for their desktops
- Keyword search now supported in System Manager
- Backup and Restore graphical tool now uses *cpio*

Scheduling

- (Origin systems, Onyx2 systems only) The worst-case interrupt response time is guaranteed to be less than one millisecond on properly configured Origin and Onyx2 systems with up to eight CPUs
- Miser predictive batch scheduler
- Share II resource manager (option)

Security

- Most features of the Commercial Security Pack are now bundled into IRIX 6.5
- Least Privilege (POSIX P1003.1e), which allows allocation of system privileges individually (rather than setuid)
- Access Control List
- Single Sign-on via Distributed Computing Environment (DCE)

Software Distribution Features

- Inst now supports ISO 9660 CDs

Standards

Standards compliance under IRIX 6.4 will be extended, with the addition of:

- Year 2000 compliance as defined by the X/Open group
- UNIX 95 Certified Single UNIX Specification - Spec 1170/UNIX 95
- DII-COE Kernel Version 3.2 available for development projects
- Full pthreads support, including system scope

X11/Motif

- Improved performance for X11 and Motif
- Thread-safe Xlib and Xt
- Support for X11R6.3 server and libraries (previously X11R6.1), including support for Low-Bandwidth X
- Continue to support Motif 1.2.4
- Improvements to the hardware colormap implementation minimizes colormap flashing for Impact and Octane graphics systems

Installation Caveats

This page provides information on the following topics:

- Caveats to Read Before You Upgrade

Caveats to Read Before You Up

These caveats make you aware of changes or potential problems that could significantly affect yo

Different caveats will be relevant for different types of users; scan the list for information th

This is not a complete list of all known bugs, workarounds, or changes, which are documented in individual product. In addition to reviewing this list, you may want to check the "Caveat and Rele current release at Supportfolio Online for any late-breaking information.

All-Platform Caveats to Read Before You Upgrade

   - **Updated version of Inst requires patch 5086**
     New installation features were used starting with IRIX 6.5.21 that necessitate an updated ve you plan to install using the miniroot, then you may do so by the usual method. However, if install to IRIX 6.5.21 or later, you may have to install a patch.

     If you wish to do a live install and are running 6.5.19 or earlier, then you must first install p can be found in the buildtools directory on CD1. Once the patch is installed, you must exit a beginning your upgrade. The patch will be removed automatically once the images have bee

     Failure to use the patch can result in the following errors during installation:

       - WARNING: Invalid filetype "X" ...

       - Warnings about corrupted images during initialization

       - Unexpectedly long lists of 'missing prerequisites' and 'incompatible with' lines in the

- **Confirm that the applications you rely on are supported.**
  (This is also Step 3 of the Preparation Checklist.)

  Note: An application supported on any release in the IRIX 6.5 family will run on all subsequent I Additionally, the application will be compatible with all prior releases of the IRIX 6.5 family, as l not utilize a new feature from a later 6.5.x release.

  Here are some examples *(not a complete list)* of applications that either need to be upgraded or ar

   - **DFS Domestic**

DFS Domestic version 1.2.2a (1275426100) is incompatible with IRIX 6.5.17. DFS Domes
compatible with IRIX 6.5.17. DFS Domestic users must remove DFS Domestic version 1.2
DFS Domestic version 1.2.2c after they upgrade.

- **Netscape Communicator or Navigator**
  By default, version 4.79 will install the new N32 version of the browser. Any existing third-
  are O32 will no longer function. If you require existing O32 plugins, you can install an O32
  netscape.sw.o32_client and netscape.o32_plugin.*. An O32 version of the Macromedia Fla
  N32/O32 version of the Macromedia Flash5 plugin planned for the near future. Real.com ha
  plugin. Check the third-party web sites for updates on the status of their plugins.

- **REACT/Pro**
  REACT/Pro>Version 3.2 is incompatible with IRIX 6.5.2 or later releases. REACT/Pro use
  run frame scheduler applications on IRIX 6.5.2 or later.

- **HIPPI**
  HIPPI Version 4.0 or later is needed to run on IRIX 6.5.9 or later. To find out how to upgra
  http://www.sgi.com/software/hippi/.

- **iFOR/LS**
  Contact the Isogon Corporation at http://www.isogon.com for the latest release of LicenseP
  iFOR/LS) that runs on IRIX 6.5.

- **Inventor**
  Version 2.1.6 or later is needed to run on IRIX 6.5.15. The Inventor overlay 2.1.6 is availab
  of IRIX 6.5.15 Overlays CD (3 of 4), February 2001. This overlay requires that the base Inv
  already, or with the overlay during the same install session. The Inventor overlay 2.1.6 can

  If you have Inventor 2.1.5 installed through some other mechanism, you will get a conflict
  release. If you get this conflict, you can resolve it by using the following set of commands.
  installation CDROM or a network distribution for it as part of the process. From within you
  following commands:

  ```
  open <Inventor 2.1.6+ from /CDROM/dist/inventor_657+>
  open <Inventor 2.1.4 from the base IRIX 6.5 CD>
  install inventor_eoe
  set neweroverride on
  ```

  Ensure that you have not selected any other downgrades before proceeding or an incorrect i
  check for other downgrades by using the following command:

  ```
  list i D
  ```

  If any subsystems other than `inventor_eoe` are listed, you must deselect them before you c

- **Intranet Junction**
  Version 1.0.2 or later is needed to run on IRIX 6.5.*x* releases.

- **ClearCase**

See the RATIONAL Software site for information on purchasing a version of ClearCase tha

- **Sybase**
  Contact Sybase, Inc. for information on purchasing a version of Sybase that runs on IRIX 6

Cumulative for 6.5 through 6.5.21, and still applicable for 6.5.22:

- **Installing GNU 1.1**

  The GNU 1.0 product is distributed on the base IRIX 6.5 CDs as a courtesy to customers who wis products. This product is not installed by default; it must be explicitly selected. The GNU 1.0 pac contain several bugs and known security holes. Version 1.1 of the GNU product is included with and removes all content from the GNU package, instead installing symbolic links to the correspon distribution.

  If you installed any of the GNU 1.0 subsystems and have not installed their freeware counterparts conflicts during installation. From within your installation session you may enter the following co GNU 1.0 distribution:

  ```
  keep gnu
  ```

  SGI recommends that you either download and install the prerequisite freeware packages from ht the upgrade or remove the GNU package entirely by entering the following command:

  ```
  remove gnu
  ```

- **Kodak CMM Color Management Removed in 6.5.15**

  Kodak CMM Color Management library has been removed from the cms_eoe and cms_dev produ upgrading from IRIX 6.5.14 or earlier and depend on color correction for scanning and image ren copy of /usr/lib/libcmm.so and /usr/lib32/libcmm.so prior to the upgrade. After the upgrade you c original locations.

- **CXFS upgrades: filesystem definitions**

  The structure of the CXFS filesystem configuration was changed with the release of IRIX 6.5.13f earlier versions is no longer maintained as of IRIX 6.5.14f, since all nodes in the cluster must be r releases.

  - If you are upgrading from IRIX 6.5.13f to 6.5.14f or later, there is no further impact.

  - If you are upgrading from 6.5.12f or earlier, you must perform a one-time manual conversio definitions.

  See *SGI InfiniteStorage CXFS Administration Guide* for more information.

- **CXFS upgrades: cluster nodes**

For CXFS customers, if you install IRIX 6.5.14f or later including sysadm_base on a cluster node of CXFS is installed, you will need to upgrade to the 6.5.14f or later version CXFS (sysadm_cxfs sysadm_cluster.

- **Installation of ftn_eoe.sw.lib from the MIPSpro 7.3 product downgrade conflict**

  Users who have installed ftn_eoe.sw.lib from the MIPSpro 7.3 product before installing the IRIX conflict with distribution subsystem ftn_eoe.sw.libeag when they install with the `install maint` original 6.5 Foundation-1 CD open when they do the installation.
  If this downgrade conflict occurs, you must specify the `keep ftn_eoe.sw.libeag` command. Th ftn_eoe.sw.libeag was replaced by the 7.3 ftn_eoe.sw.lib, and the install program logic with `inst` selects downgrades.

  Customers who have the MIPSpro 7.3 compilers installed or who will install MIPSpro 7.3 on R4(running IRIX 6.5.5 should install the new 7.3.1m runtime libraries that are available from Suppor

  Customers enrolled under a valid support contract who do not have web access can obtain these li charge upon request from their local support organization

- **Configuration files**

  If you have edited configuration files, check for changed versions at end of installation.
  Ideally, configuration file differences should be merged prior to restarting the system *at the end* o the system at the end of your installation, use the Inst command `admin config changed` to find c were modified since installation. You can find out more about this command by entering `help cc` compatibility problems, merge configuration files if new versions were created. The "Updating C versions(1M) man page describes configuration file updating, as does the online *IRIX Admin: Sof* guide.

  One example of a file that may need to be merged is the `/etc/group` file. If you have edited your group file now reinstalled caveat under Caveats to Read After Upgrading

- **XVM root filesystem**

  If you are running the 6.5.13f release leg of the IRIX operating system and are installing or upgra filesystem from under the miniroot, you will need to detach all mirror legs except for the one on t install command. Failure to do so could result in filesystem damage. The detached legs can then b complete and the system is booted

- **CXFS and IRIX FailSafe coexecution configuration**

  As of IRIX 6.5.12f, a cluster can be configured with a maximum of 48 nodes. All the nodes in the as 8 nodes can also run IRIS FailSafe (coexecution).

  CXFS 6.5.12f and later can install and run CXFS with IRIS FailSafe 2.1 or later, with applicable coexecution. However, CXFS cannot reside on the same system with earlier versions of IRIS Fail version of IRIS FailSafe, you must deinstall it before you can install CXFS, and vice versa). For r license, contact your SGI service provider.

- **The Fortran BLAS libraries packaged under ftn_eoe.sw.libblas (ftn_eoe.sw64.libblas on IR default installation**

  As a result of this packaging, you may receive the following conflict during installation if you dic

  ```
  Overlay product ftn_eoe.sw.libblas (1276765510) cannot be installed because o
  product ftn_eoe.sw.libblas (1274567300):

  1a. Do not install ftn_eoe.sw.libblas (1276765510)

  1b. Also install base product ftn_eoe.sw.libblas (1274567300) from an addition
  another CD or specify another software distribution
  ```

  You can resolve this conflict by either not installing libblas or by installing the base product from

- **System processor compatibility with XVM**

  XVM installed with CXFS is currently qualified on IP27 systems (Origin 200, Origin 2000, and (the SGI Origin 3000 server series.

- **Use the XVM give and steal commands with extreme caution**

  XVM runs in either the local domain or in the cluster domain, and XVM disks are classified acco the local domain, an active cluster domain, or a foreign domain. The XVM give and steal comma ownership of a list of XVM disks. Here are some guidelines to follow when using the give and st

  - If you are changing the domain ownership of XVM disks, you should use the give comman steal command is intended to be used only as a last resort when the give command cannot b
  - In general, an XVM probe command should be run after the give command. If the XVM di probe command is run on the new owner host. If the XVM disk was given to a new cluster, host that is a member of that cluster.
  - The give and steal commands should never be used so that a multidisk volume configuratio must ensure that the list of disks that will move from one domain to another is complete; th fully contained on this set of disks. The XVM show command can be used to examine the t volumes in the system, including the full set of disks that contain parts of these volumes.

- **The NUMA migration call migr_range_migrate() was not reporting a migration failure**

  The NUMA migration call migr_range_migrate() was not reporting a migration failure when the nonexistent node or an uninitialized policy module of an SGI Origin system. Beginning with the condition is now reported back to the user application as EINVAL. For more information, see the will affect the MediaBase application and it will be fixed in a subsequent release.

- **The fibre channel storage area network (SAN) port names may change**

  There has been a change in the way the final component of a fabric target's path will be generatec

port name in the final component may have that port name shortened to a single digit port numbe
to form SANs, this change **will** affect you. This name change will require you to update the confi
to fibre channel fabric devices, including the following files:

- `/etc/fstab`
- `/etc/failover.conf`

You are **not** impacted by this change if the paths to your SAN targets are similar to the following

```
/dev/dsk/5006094670006f7d/lun0s7/c4p1
```

You **may** be impacted by this change if the paths to your SAN targets are similar to the following

```
/dev/dsk/5006094670006f7d/lun0s7/c4p5006094670006f7d
```

The path name to the target might be shortened as follows:

```
/dev/dsk/5006094670006f7d/lun0s7/c4p1
```

- **Miser unable to schedule jobs during the transition from Daylight Savings Time to Standar**

  If the requested time of a submitted Miser job is such that the job, when scheduled, will be execu
  from Daylight Saving Time back to Standard time, Miser will not schedule the job until after the

- **Installing CXFS and XVM products**

  If you install the CXFS and XVM products, it is highly recommended that you check the "Caveat
  release at Supportfolio Online for information on the latest CXFS and XVM patches, CXFS and
  late-breaking caveats.

- **The miser_qinfo command only reports the first 250 scheduled jobs**

  This limitation is due to the Miser buffer limit and will be fixed in a subsequent release.

- **The miser_qinfo command rounds up the amount of reported available system memory**

  The amount of reported system memory available may be inaccurate by 0.5 gigabytes (GB) when
  1 gigabyte (GB) of memory.

- **Repacking stops scheduled Miser jobs if daemon is restarted**

  If scheduled Miser jobs are in a Miser queue that has a repack scheduling policy, after Miser has
  repacking stops for the existing jobs.

- **Submitting a large number of jobs to a Miser queue**

  If you submit a large number of jobs to a Miser queue, it may result in some of these jobs being h

- **Xservers file changes**

  Starting with 6.5, the file /var/X11/xdm/Xservers is no longer automatically replaced when ins
  x_eoe.sw.eoe. Instead, the new version is installed as Xservers.N. This allows most users to pres
  to their Xservers file without having to merge them back in with each new software upgrade.

  Also, the Xsgi command line argument *shmnumclients* is no longer supported, and will prevent th
  specified in the Xserver file. If you added the shmnumclients flag to the Xservers file, remove the
  upgrading to 6.5 or later.

- **"Filesystem too large for device" error message**

  If you have repartitioned your disk drive with fx but did not create a filesystem with mkfs, you m
  certain rare conditions) when booting the miniroot:

  ```
  "Mounting file systems:
  mount: /dev/dsk/dks0d1s0 on /root: Filesystem too large for device.
  mount: giving up on: /root
  Unable to mount partition: /dev/dsk/dks0d1s0 on /root.
  This is your system disk: without it we have nothing on which to install softw
  Please manually correct your configuration and try again.
  Press Enter to invoke C Shell csh:"
  ```

  This generally indicates that you need to run /sbin/mkfs on the named disk partition. Inside the
  (mrmkfsrc) is provided to run mkfs.

  For example, for the above failure, you could press Enter and do the following (only if the disk i
  this procedure will remove all the data on the disk):

  # mkfs /dev/dsk/dks0d1s0 *(if this is the system disk)*
  # exit *(to exit csh and have the miniroot script try to remount root.)*

- **Upgrade the flash PROM after installation on diskless systems** (see under O2-specific caveats

- **Obsolete software may cause installation conflicts**

  Starting with the 6.5.3 release, the installation process detects some additional software package
  incompatible with the 6.5 release family. During installation, you may see conflict messages caus
  these conflict messages, simply choose to remove the incompatible software or replace it with ne

- **MediaMail now replaced by Netscape mail**

  MediaMail is no longer available from SGI. The Netscape mail program, which is bundled with N
  default installed e-mail program for all SGI systems. SGI recommends a transition to Netscape e-
  have included software with Netscape that enables conversion of MediaMail mail to Netscape e-r

  When you transition from MediaMail to Netscape mail:

  - Be sure to check your home directory for a .forward file. If you have one that contains a li

/usr/lib/Zmail/bin/reassembler, remove or rename the .forward file immediately be
order to prevent problems with mail delivery to your account. On multi-user systems, each
their own home directory.

- To learn about getting started with Netscape Mail, see About Netscape Messenger (you can Find > WebTools from the Toolchest, and double-clicking the *AboutNetscapeMessenger* ic

Note: If you still require MediaMail, please contact NetManage, Inc. for product and sales inform (Note that NetManage's Z-Mail for UNIX product is the same as MediaMail.) Please be aware th supported on IRIX.

- **Appletalk will not work on diskless systems**

  Appletalk (Xinet Macintosh Connectivity) won't work on a diskless system because appletalk i

- **XFS filesystem is strongly recommended**

  To install this version of IRIX you should have an XFS filesystem. If you want to move a disk wi pre-6.5 system, use the -d unwritten=0 option when you run mkfs, or install the current XFS p

- **During miniroot installation: innocuous disk space error message**

  You may may ignore the following message if you see it during a miniroot installation:

  "/proc/pinfo/: no such file or directory"

- **The ftn_eoe.sw.libblas and ftn_eoe.sw64.libblas are no longer marked for default installatio**

  This caveat applies only to the IRIX 6.5 through IRIX 6.5.9 releases; it is not applicable to the IR require these subsystems, you must specifically select them during installation.

- **If you are upgrading from a pre-6.5 release or to a clean disk, you must open the core 6.5 C**

  The instructions in the Installation Instructions CD booklet will prompt you to do this at the right

Platform-Specific Caveats to Read Before You Upgrade

If you have an Indigo R4000, Indigo2, Octane, O2, Origin 2000, Origin 3000, or Silicon Graphics Ony relevant caveats below before you begin your installation.

Indigo R4000 and Indigo2 R4000 Systems

- **If the system you are upgrading has a separate filesystem for / must be at least 25MB in order to do the upgrade.**

  Systems shipped with IRIX 4.0.x were shipped with separate / fil which is too small for this version of IRIX.

To check, use the command "df -k /"

If the df -k / output looks similar to

```
Filesystem  Type  kbytes  use   avail  %use  Mounted on
/dev/root   efs   15275   9492  5783   62%   /
```

the disk will need to be backed up, and repartitioned with the *fx* c
installed.

To do this, refer to the online book *IRIX Admin: Software Installa*
Troubleshooting section, *Using fx to Restore the Swap Partition,* f
command. However, before you begin this procedure, make sure y
instead of the last step, `label/create/boot`, use the command `/r`
Enter in answer to the prompt:

"`fx/repartition/rootdrive: type of data partition = (`

Next, when you see

"`Warning: you will need to re-install all software an`
`backups after changing the partition layout. Changing`
`data on the drive to be lost. Be sure you have the dr`
`any user data. Continue?`"

press Enter.

The *kbytes* number should be at least 25600 in order to install IRI
at least 40MB, particularly on systems that support running 64 bit
where `uname -s` returns IRIX64, on systems running IRIX 6.2 an

Indigo2 Systems

- **The EISA Token Ring driver is not supported.**

Octane Systems

- **Upgrade the flash PROM after installation on diskless system**

  On diskless systems, the installation may fail if the flash PROM i
  PROM on an Octane, enter the following lines in a shell:

```
su
/usr/sbin/flash -P /usr/cpu/firmware
```

  You can compare the before and after results of `/usr/sbin/flas`
  change. Reboot afterward.

O2 Systems

- **Upgrade the flash PROM after installation on diskless system**

On diskless systems, the installation may fail if the flash PROM is
enter the following in a shell:

```
su
/sbin/flashinst -T -y -q /usr/cpu/firmware/ip32prom.i
```

You can compare the before and after results of `/sbin/flashins` change. Reboot afterward.

- **If you program device drivers for the O2 PCI expansion slot**, y (pciio_pio_*()) described in Chapter 22 of the *6.5 Device Driver I* section"PCI Drivers for the IP32 (O2) Platform," to perform PIO (use the pciio_pio_* routines for all PIO access to the device, inclu routines were made available in 6.3 via patch 2801 (if your PCI de routines then there is nothing more you need to do).

Origin 2000 Systems

- **Special upgrade instructions for SGI Origin 2000 systems with**

  There are special upgrade instructions for SGI Origin 2000 system titled *Upgrading an IRIX Operating System on a /target_roo*t. To instructions, please send a request to your local Customer Support `http://www.sgi.com/support/supportcenters.html`

- **System now reboots on panic without stopping at the PROM r**

  Rebooting on panic without stopping at the PROM menu is the ne the system during reboot by pressing the `Esc` key at the "`Startin`

  If the system panics during the reboot, the system will go into a pa happen, press the Esc key to break the loop.

  If you do not want the system to reboot on panic, you can override variable with the PROM variable rebound. To do this, enter the fo accessed via option 5 at the PROM menu:

  ```
  setenv rebound n
  ```

- **To get the MMSC version number, check the bottom line of th**

  MMSC version numbers for this version of IRIX operating system recommends that you upgrade to version 1.2.E if your version is lo

  A second way to get the version of all the MMSCs is to connect to MMSC and enter the following:

  ```
  ^T track * ver
  ```

- **Potential FLEXlm licensing problems**

The Flexible License Manager (FLEXlm) controls the use of certa asynchronous to the IRIX operating system.

A FLEXlm key is generated for each asynchronous software prod identifier. Because the Origin 2000 system does not have a unique host ID (lmhostid) of the first system module is used to create a Fl

If an Origin 2000 system is reconfigured, a different module with be located in the first position, causing a previously valid FLEXlm

If a license key problem arises after a system has been reconfigure generated. Contact the vendor of the software product in question (the FLEXlm host ID of the first module) of the reconfigured syst

SGI Origin 3000 server series

- **Partitioned Origin 3000 system change**

  If your Origin 3000 system is currently partitioned, or if you want must now install the eoe.sw.partition software package. Editing th no longer necessary when enabling system partitioning and should

- **Partitioned FLEXlm licensing change**

  Starting with the IRIX 6.5.15 release, each partition of a partitione new unique FLEXlm host ID (lmhostid). Any FLEXlm license ba lmhostid value will no longer work and a new license key must be page for additional details, http://www.sgi.com/support/licensing/

  - Contact the applicable software product vendor and provide partition to generate a new license key.

  - For nodelock licenses, provide the lmhostid for all partitions operating.

  - For software licensed by SGI, see the following web page fo http://www.sgi.com/support/licensing/partitionlic.html.

  - For email and telephone contact information, see the IRIX 6 the "Bundled software and licenses" link.

Silicon Graphics Onyx4 UltimateVision

If you upgrade to the Silicon Graphics Onyx4 Ultimatevision from an e encounter the following software differences:

- Onyx4 will introduce software differences that may require portin

  - IrisGL is being retired and will not be available.
  - Xfree86 has been selected as the X Windows server for this

- The following X server extensions will not be available on the On

- Adobe DPS
- ESA
- Multibuffering
- SGI-Multibuffering
- SGIFullScreenStereo

- The following executables are unavailable on the Onyx4 in IRIX (

    - /usr/sbin/showcase
      From: showcase (IRIX Showcase 3.4.3a)

    - /usr/sbin/iconsmith
      From: desktop_tools (Desktop Tools)

    - /usr/sbin/cosmocreate
      From: cosmocreate (CosmoCreate Authoring Environment 1

    - shared objects under /usr/lib/ImageVision/
      From: il_eoe (ImageVision Library Execution Only Environ

    - /usr/sbin/imgworks
      /usr/sbin/interp
      From: imgtools (ImageVision Tools, 3.2.2)

    - /etc/config/debugxserver
      /usr/bin/X11/Xsgi
      /usr/bin/X11/Xsgi_d
      From: x_eoe (X11 Execution Environment, based on X11R6

    - /usr/lib/X11/system.backgrounds
      From: desktop_eoe (IRIX Interactive Desktop)
      Note: A few desktop background designs do not appear on t
      Most desktop backgrounds do appear on the Onyx4.

    - /usr/sbin/cedit
      /usr/sbin/dialwarp
      /usr/sbin/loadmap
      /usr/sbin/makemap
      /usr/sbin/savemap
      /usr/sbin/showmap
      From: eoe.sw.gltools (Graphics Library Tools)

    - /usr/sbin/cycol
      /usr/sbin/palette
      From: eoe.sw.imagetools (Graphics Library Image Tools)

    - /usr/sbin/sysmeter
      From: eoe.sw.perf (Performance Measurement Utilities)

- /usr/sbin/confidence
  From: confidence (Confidence Tests)

- /usr/sbin/sitemgr
  From: sitemgr (Sitemgr)

- The Onyx4 does not support additional input devices beyond a ke

- The following features and applications function with the limitatio

  - SGI Motif: SgColorChooser sliders on the remote display do

  - Screensaver panel: monitor power save option is unavailable

  - SGImeeting: some features (such as application sharing) do

  - Locale support: ISO8859-15 locales do not work properly (C displaying correctly). The backgrounds CPU Eater, SGI Log on non-English locales.

- When running the Onyx4 on IRIX 6.5.22, you may see the follow

  ```
  WARNING: /hw/module/001c01/node/cpubus/0/a: UCE inter
  NOTICE: /hw/module/001c01/node/cpubus/0/a: User Data
  physical address 0xb2003ba (EPC 0x1006c098)
  ```

  This warning may be safely ignored.

Caveats to Read After You Upgr

These caveats make you aware of changes or potential problems that could significantly affect yo upgrade.

Different caveats will be relevant for different types of users; scan the list for information th

This is not a complete list of all known bugs, workarounds, or changes, which are documented in individual product. In addition to reviewing this list, you may want to check "Caveat and Release Supportfolio Online for any late-breaking information.

Cumulative for 6.5 through 6.5.21, and still applicable for 6.5.22:

- **Misconfigured CXFS cluster can yield repeated ioconfig and xvm probe commands**

  A misconfigured CXFS cluster can result in clconfd issuing repeated ioconfig and xvm probe com on multiprocessor machines, but a single processor machine may become unusable. If a CXFS fil mounted on a CXFS node which does not have a physical connection to the underlying volume, c the volume and issues an ioconfig command followed by an xvm probe of all the disks in an atter frequency at which this process occurs is not correctly controlled, which results in high system re tracked by SGI and will be resolved in a future release; support contract customers can contact th more information on the status of this issue.

CXFS clusters which correctly configured filesystems will not encounter this issue.

- **Cloning system disks with OpenSSH files**

  If the OpenSSH server software (openssh.sw.server) is installed on a system disk that you are cop should ensure that the system keys are not duplicated. The openssh keys should be unique for eac

  If the following files exist on your system disk, you should remove them from the copy of the dis system:

  ```
  /etc/openssh/ssh_random_seed
  /etc/openssh/ssh_host_dsa_key
  /etc/openssh/ssh_host_dsa_key.pub
  /etc/openssh/ssh_host_key
  /etc/openssh/ssh_host_key.pub
  /etc/openssh/ssh_host_rsa_key
  /etc/openssh/ssh_host_rsa_key.pub
  /etc/openssh/sshd.pid
  ```

- **OpenSSH server and Privilege Separation**

  The OpenSSH server software runs in Privilege Separation mode by default. To start the sshd dae unprivileged user and group named sshd or you will need to change the sshd_config file to disabl

- **DFS warning message**

  On systems that have DFS installed, an ld warning will occur when a new kernel image is configu installation of IRIX 6.5.19 and when kernel components are removed or installed. It may also occ parameter changes have been made. This warning is harmless and may be safely ignored. An exa

  ```
  ld: WARNING 15 : Multiply defined:(strrchr) in sgi.a(libc_src.o) and krpch.a(s
  ignored).
  ```

- **Do not Use XVM give and steal commands with XVM snapshot volumes**

  Use of the XVM give and steal commands with XVM snapshot volumes can cause loss of data ar

- **Reboot system to ensure correct vswap value for sadc/sar**

  For IRIX 6.5.17, a fix was implemented to ensure that sadc/sar will give a correct vswap value. T to the new kernel. If you do not reboot the system, sadc/sar will continue to work, but vswap num accuracy of the sadc/sar number is important, we recommend that you reboot as soon as possible

- **CXFS message**

In IRIX 6.5.15f, machines running CXFS may send a number of messages to the console similar t

```
NOTICE: cms_action_config: cell 0: reset remoteshutdown
```

This message is displayed as part of normal operations and should be ignored.

- **Supported usage of group quotas**

  Group quotas, new for the 6.5.15 release, are supported in the feature stream only. If you implem subsequently, mount that disk with the pquota mount option on a machine running the maintenan feature stream on which group quotas are not supported, the quota accounting could be corrupted.

- **SGI Origin 3000 Series of Servers**

  If you are an Origin 3000 customer (IP35 systems), you should install Patch 4332 on an IRIX 6.5 IRIX 6.5.13f system to avoid an intermittent reset problem with I/O bricks and the BASEIO PRO

- **Netscape FastTrack Personal Web Server replaced by the SGI Web Server based on Apach**

  The new default web server on the IRIX 6.5.12 Applications CD is the SGI web server based on t 1.3.17. Functionally, the SGI web server replaces the Netscape FastTrack web server. If you still through the chkconfig command, the new SGI web server will not start up. To enable the new SG following commands before you reboot your system:

```
# chkconfig nss_fasttrack off
# chkconfig sgi_apache on
```

  If you changed the default Netscape FastTrack configuration, you must manually move those cha For more information, see the SGI release notes about the SGI web server and the Apache web si

  If you use the Web Setup product, you must turn off the Netscape FastTrack version to run the SG commands before you reboot your system:

```
# chkconfig webface off
# chkconfig webface_apache on
```

  The SGI web server includes software that was developed by the Apache Software Foundation (h

  The Websetup 3.3 release contains a GUI administrator tool for Apache based on the Apache mo release. The Webmin framework has been configured to only run the Apache module and is acce Administration and then Webservers. The Apache administrator tool can also be accessed directl http://localhost:8184/

  The only caveat to doing this is that you must have an administrator account for Websetup create administrator tool since it will prompt you for a username and password.

  For information about the Apache module for Webmin, click on the following URL:

  http://www.swelltech.com/support/webminguide/server-apache.html

For general information about Webmin, click on the following URL:

http://www.webmin.com/webmin/

For information on how to configure and administer the Apache web server from the command li

httpd://httpd.apache.org/docs/

For a list of frequently asked questions about Apache, click on the following URL:

http://www.apache.org/foundation/FAQ.html

- **Downgrading using a live (non-miniroot) installation**

  If you are downgrading from feature stream 6.5.*x* to 6.5 using a live (non-miniroot) installation, *i* continue installing from the miniroot. The prompt is as follows:

```
This software must be installed from the miniroot. The system is about
to be shut down and automatically booted to the miniroot where the
installation will continue automatically. Okay to proceed?
```

  It is not necessary to perform this type of installation from the miniroot. To avoid this prompt, the "`live_install`" preference to "`on`" before typing go/pressing start.

  If you want to downgrade to an earlier 6.5.*x* version of the feature stream, use the following set o

```
set newoverride on
k *
install standard
install downgrades
install prereqs
keep incompleteoverlays
```

- **Default group file now reinstalled**

  With release 6.5.3, the default group file, `/etc/group`, is reinstalled. The original group file is sa if you have previously edited `/etc/group`. This update is necessary because some optional packa the group "`nobody`" to be present during the installation process.

  After installation, users who have defined new groups will have to merge the old group file into t please be sure to preserve the entry for "`nobody`."

  The Inst command `admin config change` and the post-installation command *versions changed* configuration files, including the `/etc/group` file. As mentioned in the Caveats to Read Before Y done before at the end of the installation process, but before you restart the system.

- **New file for setting NIS server**

  It is no longer possible to set the NIS server in the `/etc/config/ypbind.options` file. If your sy the file

`/var/yp/binding/<` *DOMAIN*`>/ypservers`

where < *DOMAIN*> is the NIS domain name. Type the NIS server on a new line in this file.

There were several other NIS-related changes in 6.5 that affect customers who upgrade from a pr
system. For example, the IRIX name services have been completely rewritten. Please refer to the
Changes and Additions) for details.

- **Remote host display now off by default**

  In the interest of security, the ability to display applications that are running on other systems is n
  few different ways you can re-enable the remote host display. For details, see "About the Remote
  the online *Desktop User's Guide.*

- **Printer may not be recognized if turned on after system**

  Even after a printer is configured, it may not function if you turn it on after turning on your syste
  is not present in the hardware graph. To work around this problem, perform the following comma

```
% su
# cd /dev
# ./MAKEDEV
# ioconfig -f /hw
# exit
```

- **Full hostname now used by default**

  For customers installing IRIX on new systems, or reconfiguring existing systems after IRIX is ins
  system administration tools now use the fully qualified hostname by default. This affects scripts t
  hostname is used. Scripts may need to be modified to use hostname -s rather than hostname. If yo
  default and use only the partial hostname.

- **Gang-scheduled graphics processes can cause graphics to hang**

  Graphics programs using the schedctl(2) system call to choose gang scheduling mode (SGS_GAN
  (Gang-scheduled processes that do not use graphics are not affected by this problem.)

Origin/Onyx System Caveats

The following caveat is for all large (64+ processers) Origin/Onyx systems.

- **Process Activity Reporter (par) sometimes hangs**

  Par hangs when the system-monitoring daemon, `rtmond`, produces a data stream that overloads th
  feed par, like padc, will discard events. If the *process exited* event is discarded by these clients, p
  see messages like the following in `/var/adm/SYSLOG`:

```
"rtmond[669]: (CPU 0) Client <local>:11:64505 events 1718 dropped (2%) 289 wri
```

```
bytes, 5 push buffers for 80 KB"
```

As shown in this example, you can tell that par has hung because the message tells you that the dı

IRIX 6.5.22 CDs

Are you upgrading a system running a pre-6.5 version of IRIX, or installing onto a clean disk?
If so, you need to install both the 6.5 and 6.5.22 CDs (except for the 6.5 Installation Tools CD).

Are you upgrading a system running 6.5 or later to IRIX 6.5.22?
Then you only need to install 6.5.22 CDs, unless you want to switch release streams. (To switch release streams, see the Installation Instructions CD booklet.)

1. **IRIX 6.5.22 Installation Tools and Overlays CD (1 of 3), November 2003**
   (Open First)
   Contains the miniroot and other components necessary to boot the system into the basic installation environment for operating system installs and upgrades. Contains the "installation tools support for overlays" patch, which is required for live upgrades on systems running 6.5 or later. Also contains the IRIX execution environment. Contains products for either the feature stream or the maintenance stream.

2. **IRIX 6.5.22 Overlays CDs (2 of 3 and 3 of 3), November 2003**
   (Must be Installed)
   Contains additional bug fixes, features for feature stream, performance tune ups, and updates for applications in the unbundled directory. Contains products for both the feature and the maintenance stream.

3. **IRIX Applications for 6.5.22 (1 of 2 and 2 of 2), November 2003**
   (Required for Workstations and Some Servers)
   Contains standard, bundled applications and related documentation. The applications on these CDs run on 6.5 and 6.5.*x* releases.

4. **CXFS IRIX Server and Client 3.0 for IRIX 6.5.22**
   (Required for CXFS feature support)
   Contains SGI InfiniteStorage CXFS software for the 6.5.22 maintenance and feature streams. This CD is only shipped to customers with a valid CXFS license and support contract.

5. **Base Documentation CD, May 2002**
   (Not for Installation)
   This CD lets you view release notes, online books, and man pages before you install or upgrade the operating system. It supersedes any earlier releases of the Base Documentation CD. See the Documentation CD page for details.

Other 6.5.22 CDs

In addition to the CDs listed above, you probably received other CDs with your IRIX 6.5.22 package. If you already have older versions of any of the products on these CDs installed, you should upgrade them during the operating system upgrade. If you do not open them, "conflict" messages (during the upgrade process) will prompt you to open them.

Each of these separate products come with their own installation instructions, and you can load any additional new products or subsystems after the initial operating system upgrade is finished and the system has restarted.

Core IRIX 6.5 CDs

Install the IRIX 6.5 CDs if you are:

- Upgrading to IRIX 6.5.22 from a pre-6.5 version of IRIX
- Or, installing onto a clean disk

Follow the procedure in the Installation Instructions CD booklet that came with your IRIX 6.5.22 software.

1. **IRIX 6.5 Installation Tools CD, June 98**
   (Use Only If Installing 6.5 Separately From 6.5.22)
   Contains the miniroot and other components necessary to boot the system into the basic installation environment for operating system installs and upgrades. Also contains patches.
   Note: To install both 6.5 and 6.5.22 at the same time, do not use the 6.5 Installation Tools CD. Follow the procedure in the Installation Instructions CD booklet.

2. **IRIX 6.5 Foundation 1 CD**
   (Must be Installed)
   Contains the base operating system, base networking, and Application Binary Interfaces (APIs). Includes execution environment ("eoe") components, which are necessary for the execution of most applications.

3. **IRIX 6.5 Foundation 2 CD**
   (Must be Installed)
   Contains additional base operating system/execution environment components.

4. **IRIX 6.5 Applications CD**
   (Required for Workstations and Some Servers)
   Contains standard, bundled applications and related documentation. See the IRIX 6.5 Applications page for more details.

5. **IRIX 6.5 Development Foundation CD**
   (For Developers)
   Contains products necessary for software development, including libraries, header files, a linker, assembler and other common tools required for hosting software development. This CD contains compiler components necessary for use with the MIPSpro C, C++, Fortran 77 and Fortran 90 compilers (which are purchased separately). See the IRIX Development Foundation (IDF) Release notes for compiler installation notes.

6. **IRIX 6.5 Development Libraries CD**
   (For Developers)
   Includes additional libraries, header files, sample source code, and documentation. You may need some of these products for compiling your own source code, while others simplify debugging or writing code. Scientific libraries are included as well as OpenGL and the popular ViewKit user interface library.
   Note: If you intend to use the compilers, dev.sw.lib (and dev.sw.lib64 for 64-bit development) must be installed.

7. **IRIX 6.5 Documentation CD**
   (Not for Installation)
   This CD lets you view release notes, online books, and man pages before you install or upgrade the operating system. See the Documentation CD page for details.

Other 6.5 CDs

In addition to the CDs listed above, you probably received other CDs with your IRIX 6.5 package, depending on your configuration. For example, there are separate CDs for NFS and demos. If you already have older versions of any of these products installed, you should upgrade them during the operating system upgrade. If you do not open them, "conflict" messages (during the upgrade process) will prompt you to open them.

Each of these separate products come with their own installation instructions, and you can load any additional new products or subsystems after the initial operating system upgrade is finished and the system has restarted.

Using the Base Documentation CD

About This CD

For customers with new systems that shipped with this release, new and updated documentation can be viewed offline using the IRIX 6.5 Base Documentation CD.

The IRIX 6.5 Base Documentation CD allows you to access standard release notes, online books, and man pages before you install the system software. You view the documentation directly from the CD; you do not use this CD to install documentation. No license is required to use the tools provided on the CD. (Documentation is installed, by default, with software CDs. To find out about accessing *installed* documentation see General Documentation.)

The IRIX 6.5 Base Documentation CD is not shipped with the IRIX 6.5.*x* Update Kits. Corresponding book documentation, release note, and man page information can be viewed by customers who have purchased SGI systems through the web on Supportfolio Online at http://support.sgi.com/irix/6.5 site.

Note: There is a duplicate copy of Start Here on the Base Documentation CD.

Tip: This CD is an ISO9660 standard CD, which means that it can be used in most CD-ROM drives. This allows your IRIX-based system to mount the CD from a variety of remote CD-ROM drives (as long as they are connected to operating systems that support exporting ISO9660 filesystems).

How to Use This CD

1. Login and insert the Base Documentation CD into your CD-ROM drive.

2. Open a shell:
   From the Toolchest, choose Desktop > Open Unix Shell.

3. Go to the CDROM directory:

   Use the `cd` command:
   ```
   % cd /CDROM
   ```

   Inside of the directory are the six different CD scripts, which you can see listed with the `ls` command:
   ```
   % ls
   CDgrelnotes   CDinsight CDrelnotes
   CDinfosearch  CDman     CDsgihelp
   ```

4. Use the CD scripts to access the documentation on the CD. To run any of the scripts, in a UNIX shell, enter **./** followed by the script name.

   For example:
   ```
   % ./CDgrelnotes
   ```

   What follows are descriptions of what each of the scripts do:

   - **./CDgrelnotes** - launches `[g]relnotes`, which you can use to view Release Notes. You can specify the product name in the command. For example, to view the release notes for Netscape you would enter: **./CDgrelnotes netscape**

   - **./CDman** – displays man pages when used like the `man` command. For example, to see the man page on `inst`, enter **./CDman inst**

   - **./CDinsight** – launches the online book viewer, `InSight`. Displays the online book library on the CD. **Note:** If you are running IRIX 6.2 on your workstation, you must have version 3.0 of InSight or higher in order for this to work.

   - **./CDsgihelp** – displays `instructions` for making `sgihelp` work with the content on the CD. (Involves setting a couple of X-resources in a local `.Xdefaults` file.)

   - **./CDinfosearch** – displays `instructions` for making Infosearch work with the content on the CD. (Involves editing some configuration files.) InfoSearch is used for searching and viewing all online books, release notes, and man pages. **You must already be running 6.5 for `CDinfosearch` to work with the content of this CD.**