SiliconGraphics
Computer Systems

IRIX™ 5.2

Silicon Graphics Multiprocessor, Multi-threaded, UNIX® Operating System

Introducing IRIX 5.2

IRIX™ 5.2 is an upwardly compatible revision of IRIX 5 which incorporates substantial functionality from UNIX® System V, Release 4.1 and 4.2. IRIX 5.2 converges all supported Silicon Graphics® platforms to the same version of IRIX. It also preserves customer software investments by providing binary compatibility with applications developed under earlier versions of IRIX 4 or 5.

With System V Release 4 (SVR4) as its base, IRIX 5.2 is firmly placed in the mainstream of the UNIX community. SVR4 has gained broad industry acceptance as the standard UNIX environment. IRIX 5.2 is also the reference platform for the MIPS® Application Binary Interface (ABI).

BENEFITS TO END USERS

Indigo Magic™ User Environment

The Indigo Magic User Environment not only replaces, but goes far beyond the capabilities of the previous WorkSpace environment. Indigo Magic is a complete family of tools available only for Silicon Graphics Workstations. From desktop utilities to digital media applications to collaborative tools, Indigo Magic provides all that is necessary for both the novice and the experienced user to take advantage of the power of visual computing.

Some of the key benefits of Indigo Magic are:

Intuitive Iconic Interface

Icons represent not only files and applications, but also peripherals (such as printers and CD players), other computers on the network, even people in your organization. Icons are intelligent; they change their appearance to indicate a change in state, such as whether the CD player has an audio or software CD inserted, or the printer is out of paper.

Indigo Magic also supports "drag and drop". For example, an application can be launched by clicking on its icon, or by dragging the icon of an appropriate data file and dropping it on the application. Icons can also be placed on the background for quick access.

Efficient File Management

The file manager provides an easy graphical way to navigate through the file system and view directories. Multiple viewing options are provided, including a thumbnail view for image files.

Customizable Desks

Desks are a mechanism for organizing tasks and adding space to crowded screens. Each desk represents a full screen with its own windows, active applications, and customizations. You can switch between multiple desks instantaneously, and move windows from one desk to another.

Superior Digital Media Tools

Showcase™ 3.2 is a greatly enhanced presentation authoring tool that enables users to create sophisticated visual presentations. You can create anything from basic text slides to interactive presentations with integrated audio, video, and 3D graphics. Other media tools include audio editor, digital movie editor, video capture, image processing tools, and more. In addition, Kodak Photo CD™ support is built into the desktop, so no additional software is needed for viewing or managing the files.

DATA SHEET

BENEFITS TO END USERS (continued)

MediaMail™

MediaMail is a full-fledged multimedia electronic mail package developed cooperatively by Silicon Graphics and Z-Code Software. MediaMail is MIME compliant, and can send and receive text, graphics, Showcase, video and audio files.

Network Search Capabilities

Indigo Magic provides tools to find not only files, but also systems, peripherals, and people on a network. For example, you can search for all color printers available on the network. When located, the item can then be dragged to other areas of the desktop for immediate accessibility.

Simplified Printing and Printer Management

Installing a local printer or mounting a remote one is accomplished through a simple graphic control panel. The Impressario™ client software is now included with Indigo Magic to provide support for many different printers. Printing is as easy as dragging the document's icon and dropping it onto the printer icon.

On-Line Help and Information

Indigo Magic has a context sensitive help system that is always available. IRIS InSight™ provides a complete set of on-line manuals and documentation, with quick access linking, cross-references, full text search, and integrated audio, video, and graphics.

Support for InPerson™ Desktop Conferencing

InPerson is a low cost, desktop conferencing software product from Silicon Graphics that enables interactive collaboration. It features shared whiteboard and audio and video conferencing capabilities, and requires no additional hardware.

Internationalization and Localization

IRIX 5.2 supports internationalization (I18N) and localization (L10N). Through the use of language modules (available separately), users interact with applications in their local language.

BENEFITS TO SYSTEMS ADMINISTRATORS

New Setup and System Administration Tools

A new set of System Administration tools greatly simplifies a wide range of system setup and administration tasks.

System Monitor

The system now informs the user of critical system problems (such as file systems becoming full) via a notifier which appears on the user's current Desk. Whenever possible, solutions are suggested and hyperlinks into the InSight on-line library and system tools are provided.

System Security

IRIX 5.2 incorporates technology originally developed for Trusted IRIX/B1 to provide identification, authentication, and auditing. These features are designed to support the C2 level of trust, and include auditing, shadow passwords, expanded login options, and password aging. (Note: the US Government agency charged with system certification no longer conducts C2 level certifications).

Loadable Drivers

IRIX 5.2 supports loadable device drivers and STREAMS modules. Loadable device drivers and STREAMS modules can be linked into the kernel while it is running, and removed at a later time, without rebooting the system.

Kernel Tuning

A new tool has been introduced that automates much of the kernel tuning process. For further information, refer to the manual pages for systune (1M) in IRIX 5.2.

Swap to Files in a Local or NFS Mounted Filesystem

A feature present in SVR4 and new to IRIX 5.2 is the ability to swap to a "regular" file in a file system in addition to the raw swap partition. This allows swap space to be added without shutting down the system or repartitioning your disk.

Directory Reorganization

The locations of various configuration files and architecture and machine independent files have been moved to facilitate sharing and diskless systems. This directory reorganization is consistent with that of other major workstation vendors, simplifying administration of heterogeneous networks.

Processor Sets

IRIX 5.2 supports processor sets, allowing the partitioning of multiple processors on a single system. This enables enforcement of decisions about who and which applications may be run on a particular set.

BENEFITS TO PROGRAMMERS

OpenGL™

OpenGL is an industry standard graphics software library that allows programmers to create interactive 3D applications. The OpenGL Application Programmers Interface (API) is governed by the Architecture Review Board, an industry consortium whose role it is to ensure multi-platform compatibility of OpenGL based applications. Additional information can be found in the on-line "OpenGL Reference Manual" and "OpenGL Programming Guide."

X11 Release 5 and IRIX IM 1.2

IRIX 5.2 includes the latest releases of the X11 Release 5 Window System and IRIX IM, the Silicon Graphics enhanced version of the OSF/Motif™ Release 1.2.3 Graphic User Interface. The new versions of these industry-standard packages include numerous enhancements, notably in the I18N/L10N support. Silicon Graphics has incorporated new technology for the management of fonts that reduces the font storage requirements for individual workstations.

Dynamic Shared Objects

Dynamic Shared Objects (DSOs) are a flexible run-time linking facility. DSOs dynamically bind applications to shared libraries at execution time. This allows libraries to be upgraded without application recompilation. Furthermore, applications can also select different implementations of a given programming interface at run-time. DSOs allow more shared code, resulting in disk space and system memory savings.

Real Time Programming

IRIX 5.2 kernel adds new, efficient, and easy-to-use methods for CPU scheduling. CPU time allocations within elapsed time segments can now be specified. Additional facilities permit processes to block waiting for the CPU time allocation, or to yield the CPU if the required work is completed before the allocation has been used.

Queued Signal Support

IRIX 5.2 provides the queued signal interface specified in POSIX 1003.4 Draft 12. This provides reliable queued signals with data passing between processes.

Asynchronous I/O

IRIX 5.2 supports asynchronous I/O in accordance with the specification in POSIX 1003.4 Draft 12, allowing a user to queue read(2) and write(2) requests to a device, and optionally receive a queued signal when the request completes. A process can simultaneously queue a number of requests without waiting for any of them to complete.

Direct I/O

Direct I/O allows an application to bypass the kernel buffer cache and gain I/O performance when reading and writing large files on a Silicon Graphics Extent File System (EFS). When used in conjunction with asynchronous I/O, this allows an application to do its own buffer cache management.

Mutual Exclusion Primitives

The parallel programming primitives, detailed in section 3P of the programming manual, have been expanded to include support for the R4000®MP synchronization instructions. Other additions include recursive semaphores, more flexibility in configuring arenas, and more re-entrant or thread-safe routines in the standard libc. A new set of low level, lightweight, atomic operators has been added, including test_and_set(3P),test_then_add(3P), etc. The thread libraries are fully integrated into the main system libc so that no special library is required.

MIPS ABI and API Support

The standard IRIX 5.2 development environment supports the MIPS ABI and API, including ANSI, XOPEN/XPG3, POSIX90, SVID3 and most of the SVR4 API. Some of the standard interfaces are:

- Message catalogues
- Wide character support
- Argument positioning in printf(3S)
- Interfaces to the runtime linker
- Expanded signal passing and process wait primitives
- Expanded number of open file descriptors
- Page level granularity in protection and mappings
- SVR4 networking interfaces(TLI)
- SVR4 packaging utilities
- SVR4 STREAMS API

IRIX 4 AND IRIX 5 COMPATIBILITY

Binary Compatibility Between IRIX 4 and IRIX 5

Nearly all IRIX 4 binaries can run under IRIX 5.There may be rare cases in which application code must be recompiled, or even less likely, recoded to take advantage of IRIX 5.2 enhancements.

Object Compatibility Between IRIX 4 and IRIX 5

IRIX 5 objects are produced using the Extended Linkage Format (ELF), which replaces the ECOFF format used in IRIX 4. However, existing third party ECOFF libraries and objects can be linked with ECOFF objects using the IRIX 4 Compatibility Environment under IRIX 5.

SYSTEM CHARACTERISTICS

Technology:
UNIX SVR4, Symmetric Multiprocessor (SMP) multi-threaded, with fine grained kernel locking

Product Span:
Single OS for all products, desktop to datacenter

Suggested Memory:
24MB or greater

File Systems:
VFS (vnode) interface, Extent File System support for 8GB file systems, NFS†; lv for striping, Volume Manager† for mirroring; FAT (MSDOS) and HFS (Macintosh) support on removable devices; CD support for ISO9660 and Rockridge format

Loadable Device Drivers
SVR4.0 MP DDI/DKI, loadable drivers

Terminal Support:
STREAMS, international support

IPC:
SVR4 messages, semaphores, shared memory, FIFOs; BSD sockets

Real Time Support:
Preemptable kernel, non-degrading priorities, memory lockdown, high resolution timers, multi-threaded application support, queued signals, deadline scheduling

User MP Facilities:
Lightweight process parallelism, memory based synchronization, processor affinity, parallelizing compilers (C and Fortran)†

Distributed Computing:
ONC 4.1† (NFS, NIS, RPC, automount, lockd, etc.)

Networking:
Sockets TCP/IP stack, TLI, DLPI driver interface; Ethernet, SLIP, PPP, HIPPI†,FDDI† interfaces supported

Network Management:
SNMP with MIB II. NetVisualyzer™†, Cabletron SPECTRUM® Network Management System†

Connectivity Products:
SNA (3270, LU6.2)†, DECnet™†, LAT†, OSI Transport†

System Administration:
Visual system administration toolchest, graphic system monitor

Security:
Auditing, shadow passwords, password aging, expanded login options, B1 version available†

Backup/Restore:
Dump/restore, bru, cpio, tar; Epoch Enterprise Backup™†, Networker™ for IRIX†

Printing Support:
Lpd, lpsched, IRIS Impressario™ printer management system†

Internationalization:
XPG3 compliant message catalogs locale support for currency, date, etc., wide character support, country kits†

Graphics Support:
OpenGL, X11R5, PEX, IRIX™ IM™, Display PostScript®

Software Development:
CASEVision™/Workshop†, ANSI C†, C++†, Fortran 77†, Pascal†, ADA†

Usability Features:
Indigo Magic™ user environment, Showcase™ presentation authoring tool, IRIS Explorer™ visualization framework, IRIS Inventor™, IRIS InSight™ SGML document reader and on-line documents, 4Dgifts††: extensive demos and sample code††

† - denotes unbundled product
†† - part of development option

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