Product Guide

# SGI™ Origin™ 200

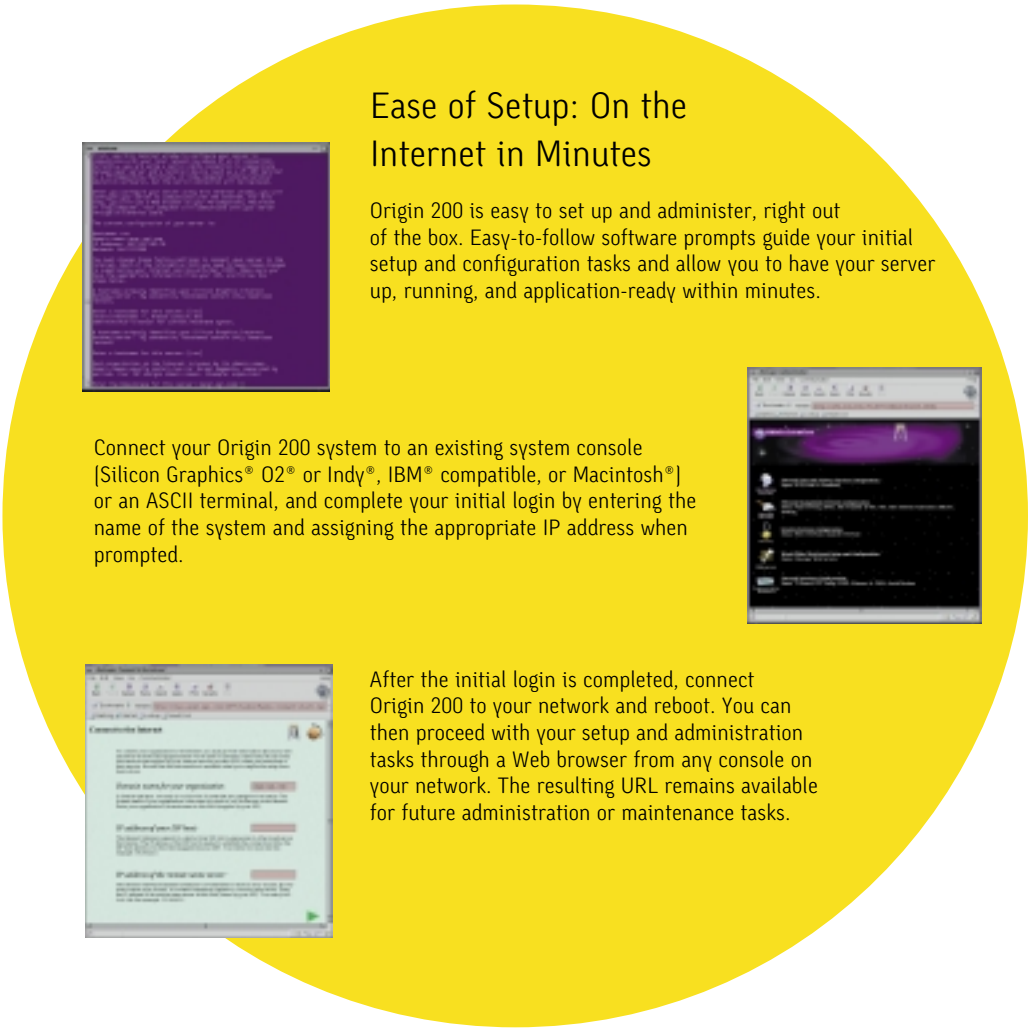
Scalable Multiprocessing Server

# Origin 200—In Partnership with You

Today's business climate requires servers that manage, serve, and support an ever-increasing number of clients and applications in a rapidly changing environment. Whether you use your server to enhance your presence on the Web, support a local workgroup or department, complete dedicated computation or analysis, or act as a core piece of your information management infrastructure, the Origin 200 server from SGI was designed to meet your needs and exceed your expectations. With pricing that starts on par with PC servers and performance that outstrips its competition, Origin 200 makes perfect business sense.

- The choice among several Origin 200 models allows a perfect match of power, speed, and performance for your applications
- The Origin 200 server has high-performance processors, buses, and scalable I/O to keep up with your most complex application demands
- The Origin 200 server was designed with embedded reliability, availability, and serviceability (RAS) so you can confidently trust your business to it
- The Origin 200 server is easily expandable and upgradable—keeping pace with your demanding and changing business requirements
- The Origin 200 server is a cost-effective business solution, both now and in the future

Origin 200 is a sound server investment for your most important applications and is the gateway to the scalable Origin™ and SGI™ server product families. SGI offers an evolving portfolio of complete, pre-packaged solutions to enhance your productivity and success in areas such as Internet applications, media distribution, multiprotocol file serving, multitiered database management, and performance-intensive scientific or technical computing. Consult with your sales representative for solutions packages that meet your needs.



## Ease of Setup: On the Internet in Minutes



Origin 200 is easy to set up and administer, right out of the box. Easy-to-follow software prompts guide your initial setup and configuration tasks and allow you to have your server up, running, and application-ready within minutes.



Connect your Origin 200 system to an existing system console (Silicon Graphics® O2® or Indy®, IBM® compatible, or Macintosh®) or an ASCII terminal, and complete your initial login by entering the name of the system and assigning the appropriate IP address when prompted.



After the initial login is completed, connect Origin 200 to your network and reboot. You can then proceed with your setup and administration tasks through a Web browser from any console on your network. The resulting URL remains available for future administration or maintenance tasks.

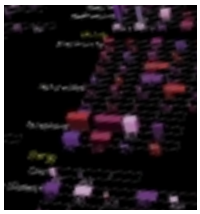

# Origin 200—Proven Business Solutions

### Web, Internet, and Intranet

Organizations have revolutionized the way they conduct business with an increasing reliance on e-commerce and on communicating and exchanging information over the Web, the Internet, and intranets. The high-performance Origin 200 server is the ultimate serving solution for your corporate electronic information needs.

### High Availability

Business success requires continuous availability for mission-critical IT resources. Preventing failures and curtailing the potential effects are crucial and complicated. Origin 200 servers clustered and deployed with IRIS FailSafe™ significantly reduce downtime without affecting system performance and guarantee the availability of the business resources you depend on most.



### Database

Your challenge is to maximize the effectiveness of the operational data you already have—making it available when and where it's needed and extracting from it a better sense of your business position and future. Origin 200 can easily support large database systems for interactive applications such as Web-based intranet solutions, decision support, PDM, or product design.

### Interoperable File Serving

Sharing resources, systems, and data is one of the founding principles of UNIX® systems. Origin 200 and SGI high-performance file-serving technology eliminate the unwieldy management and redundant replication of data, providing smooth interoperability and consistent access to information throughout a multiplatform organization.

### Media Serving

An Origin 200 server with award-winning SGI™ MediaBase software delivers high-quality video and audio streaming to meet the demand for media-rich content on the Web. Enhanced graphics, audio, and video enable more effective computer-based training and distance learning, support entertainment on demand, and streamline digital video archiving and retrieval.

### Storage Management

Origin and SGI servers are the ideal solution for managing very large data repositories containing your critical company information. Storage I/O capabilities are unparalleled in scalability, performance, reliability, and availability and easily support massive growth in your amount of data and number of clients.

### Graphic Arts and Publishing

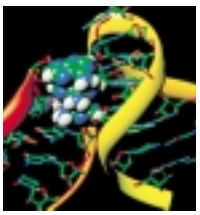
Origin 200 provides what today's print production managers are looking for in a server, including high-speed networking options; OPI; file and print serving; Macintosh, PC, and CEPS integration; image manipulation and archiving; and Web serving for intranet and Internet publishing applications.

### Real Time

Real-time simulation, signal processing, telemetry, and data acquisition applications require deterministic system performance. IRIX® operating system software with REACT™ provides guaranteed determinism and an extensive real-time development environment, making Origin 200 a superior alternative to board-level, real-time solutions.

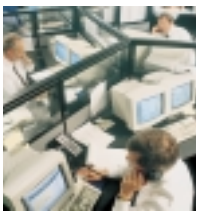
### Rendering

Already the platform of choice for creating 3D animation for feature films, SGI now provides a compelling and price-sensitive solution for animation rendering. Origin 200 offers a high-performance, cost-effective, rack-mounted solution package that meets your "render farm" production needs.



### High-Performance Computing

Improve your time-to-solution by deploying workgroup analysis jobs on the Origin 200 server. Origin 200 provides the fast compute, large memory, and large I/O necessary for analysis in areas such as high-energy physics, fluid dynamics, FEA, structural mechanics, and computational chemistry.



### PC Serving

Designed with multi-protocol serving in mind, Origin 200 supports Samba for IRIX and seamlessly interoperates with any PC client, providing powerful file, print, and application serving, as well as resource sharing among Windows® 98 and Windows NT®, OS/2®, NetWare™, Macintosh, and UNIX systems.

# Origin Scalable Servers

SGI is a pioneer in the development and delivery of shared-memory parallel processing systems. Since the deployment of the first symmetric multiprocessing (SMP) systems in 1988, SGI has grown to become the high-performance computing leader for your enterprise and continues to offer the most complete commercial and technical solutions.

Origin 200 is the entry point into the SGI line of UNIX servers. Scalable, powerful, and flexible, Origin and SGI servers easily adapt to changes in your evolving computational or business environment. They are built on ccNUMA architecture, allowing you to quickly grow or redeploy your computing assets as your needs change. Origin and SGI servers range from the one- or two-processor Origin 200 system to a 256-processor Origin™ 2000 and beyond, providing unequalled versatility and capacity.


Rack-mounted Origin 2000 and SGI servers are the industry's most powerful and flexible servers. You can connect multiple racks as a shared-memory powerhouse or redeploy those assets into multiple, tightly integrated departmental servers. Add IRIS FailSafe software to provide failover among systems, and Origin 2000 becomes the ultimate high-availability server for critical business solutions.

Deskside Origin and SGI servers are perfect for evolving applications requiring outstanding price/performance. You can expand the system as your requirements grow by incorporating multiple servers into an Origin 2000 rack.

As a dedicated system, Origin 200 delivers optimized solutions for Web, file, or media serving, database, and high-performance computation and analysis. It can also provide the processing and I/O demands of shared-use workgroup and departmental applications or mixed-platform client/server applications.

## Expand Your Server with Your Business

SGI Origin 200 servers are built on ccNUMA architecture to provide the most scalable, flexible, and modular servers in the world. The deskside tower is the primary building block of the Origin 200 family and can hold one or two MIPS® RI0000® or RI2000™ processors and up to 2GB of high-speed DRAM. Each tower supports three full-size industry-standard PCI slots for additional networking and peripheral attachment, providing 200MB per second sustained I/O bandwidth. For applications requiring more bandwidth than PCI offers, the GIGAchannel™ system provides five additional XIO slots and four PCI slots and supports the same high-performance XIO interconnect cards as the Origin 2000 servers. Each tower can internally hold up to six 3.5-inch hot-pluggable Ultra SCSI devices and two 5.25-inch devices, including CD-ROM, DAT, or a DLT.

One of the revolutionary features of Origin 200 is CrayLink™ Interconnect, which can connect two towers to form a large, four-CPU shared-memory system that can operate as a single system or as a high-availability cluster. By linking Origin 200 towers via CrayLink Interconnect, both CPU and I/O performance are doubled, thus scaling in all dimensions. Interconnected towers can operate as a single system or as independent systems, providing redundancy and a reliable high-availability solution. When operating independently, the two systems use the 1.15GB-per-second CrayLink Interconnect as a high-speed network connection between the two towers.

The modular design and CrayLink Interconnect allow you to start with a one- or two-processor system and build large, four-CPU server systems in high-availability configurations.

Origin 200 can be deployed as a deskside tower or mounted in an SGI or a standard 19-inch rack.

Easy expansion and increased system flexibility are offered by the Origin 200 GIGAchannel system, incorporating an additional five XIO slots and providing four PCI slots (seven total).

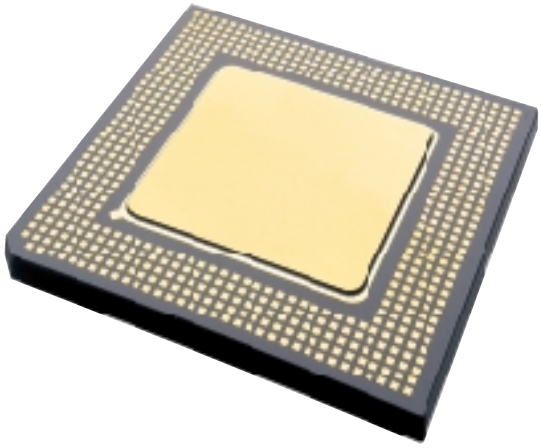
## High-Availability Solutions

RAS is designed into every Origin 200 server. Each has ECC memory, hot-pluggable disk drives, redundant cooling, environmental sensors, a system controller, and a remote diagnostics capability. A redundant power supply is also available, increasing the overall RAS of Origin 200 systems. If a system failure occurs in a dual-tower configuration, the surviving tower can be restarted independently of the failed tower, increasing application availability to your users. For critical applications, IRIS FailSafe software provides automatic failover of applications among towers, offering unmatched availability in an extremely efficient and affordable system. All these features give you the confidence to use Origin 200 systems for your critical business applications.

# Advanced Technology Extends Power

You can easily expand your Origin 200 system's capabilities by adding CPUs to the configuration. The Origin 200 R10000 or R12000 processors are implemented on logic carriers, allowing you to add or upgrade processors without replacing the entire system. This also extends the life of the system because advances in processor technology can be incorporated into your existing system. Logic carriers contain one or two high-performance MIPS R10000 or R12000 CPUs. The logic carrier holds up to 2GB of ECC memory, two Ultra SCSI channels for the internal peripherals, a 10Base-T/100Base-TX networking interface, parallel and serial ports, and the HUB.

The HUB, a 1.26GB-per-second crossbar switch, is the central component of the extensible ccNUMA architecture. It interconnects the CPUs, memory, I/O, and CrayLink Interconnect, providing high-bandwidth, low-latency communication. Hardware cache coherency is provided using onboard directory memory, which improves performance and scalability in high-performance multiprocessing systems. This combination of performance and scalability built into the Origin 200 system provides unmatched flexibility in building high-performance systems.



**MIPS RISC Processors**

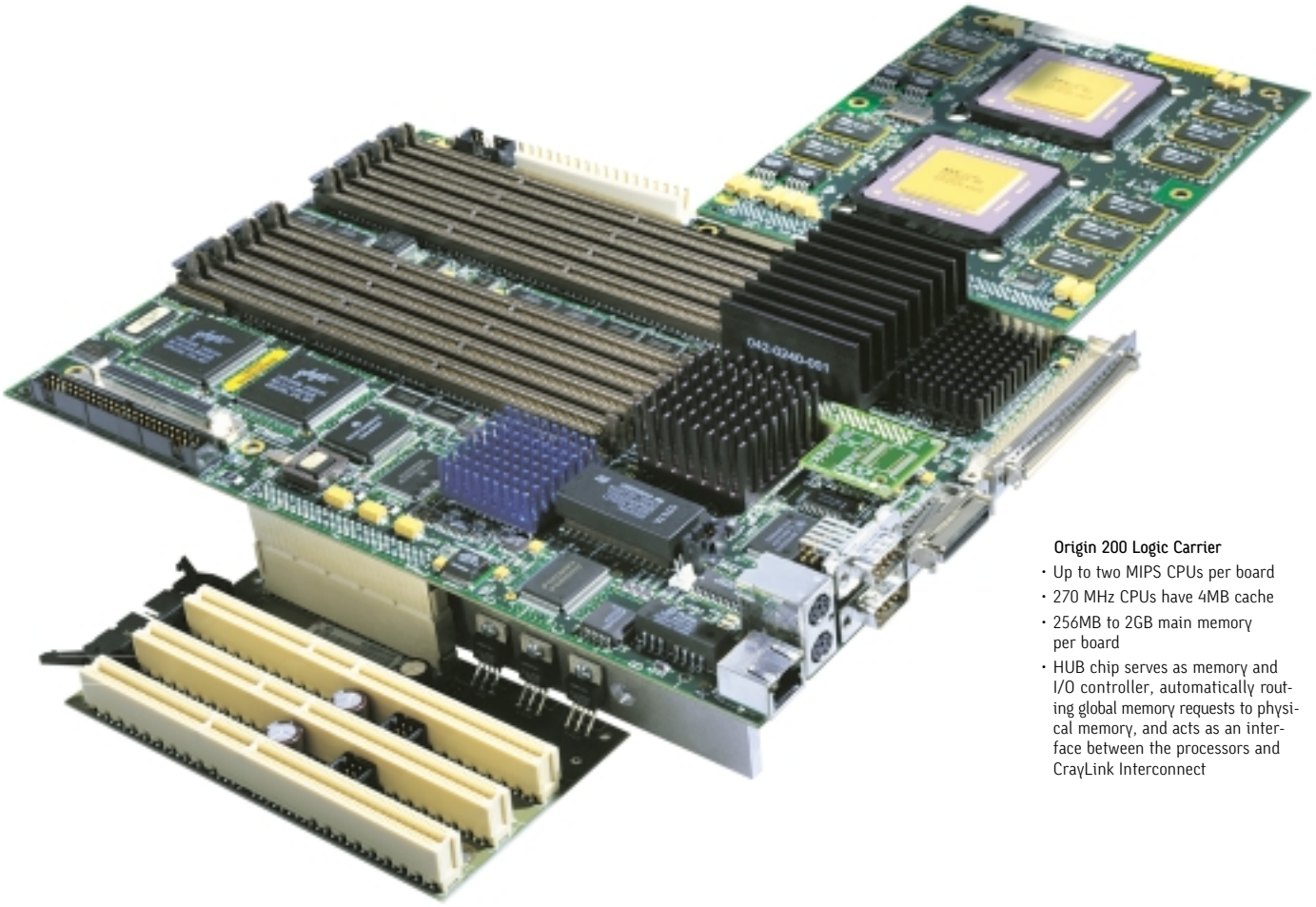
The superscalar R10000 or R12000 CPU supports advanced memory latency tolerance features such as out-of-order execution and advanced branch prediction to address real-world application demands.

**Support for PCI**

- Primary networking and peripheral interconnect technology in Origin 200
- Supports three industry-standard full-size PCI adapters
- Supports 64-bit and 32-bit PCI boards
- Sustained I/O transfer rate of 200MB/second per tower

**XIO Adapter**

- Support for most common peripheral and network interfaces
- High-performance 1.44GB/second peak I/O transfer rate per adapter
- GIGAchannel model adds five XIO slots



**Origin 200 Logic Carrier**

- Up to two MIPS CPUs per board
- 270 MHz CPUs have 4MB cache
- 256MB to 2GB main memory per board
- HUB chip serves as memory and I/O controller, automatically routing global memory requests to physical memory, and acts as an interface between the processors and CrayLink Interconnect

### GIGAchannel Model

Origin 200 GIGAchannel is an ideal fit for cost-sensitive, bandwidth-hungry, data-intensive applications. While the standard Origin 200 server is equipped with a 64-bit PCI bus and three PCI slots, Origin 200 GIGAchannel provides seven PCI slots spread between two 64-bit PCI busses and five XIO slots. Memory speed, I/O, and popular PCI or crossbar adapters can be balanced as necessary to achieve the best performance for your applications. The Origin 200 GIGAchannel model provides a coherent high-level bandwidth solution across the entire SGI server line and is the only server in this price class with gigabyte-per-second I/O channels.

### Comprehensive Storage Devices

Demanding, data-intensive applications require state-of-the-art, high-performance storage technologies. Complementary to Origin 200 is the Origin Vault storage enclosure. It holds up to six 3.5-inch hot-pluggable Ultra SCSI devices and two 5.25-inch devices. It is packaged in an enclosure identical to the Origin 200 server and can be purchased as a deskside unit or rack-mounted. Multiple Origin Vault units may be attached to an Origin 200 server, providing hundreds of gigabytes of inexpensive storage capacity.

The Origin 200 server supports 100MB-per-second Fibre Channel, the latest technology in high-performance, high-availability storage. Origin FibreVault enclosures are available as free-standing deskside expansion enclosures or can be rack-mounted. With internal and external storage, each tower supports more than 10TB of directly connected disk storage, which can be doubled with a dual tower configuration.

### Guarantee Data with RAID

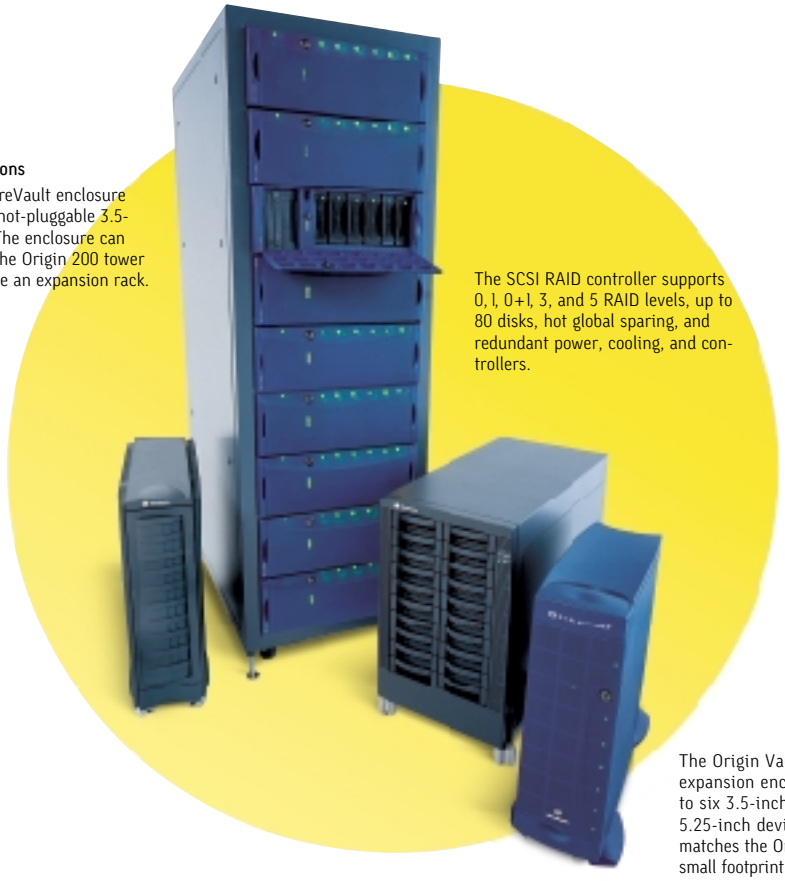
Protect important data with SGI RAID products. An external fiber disk array from SGI provides even higher levels of reliability. Each RAID controller supports RAID levels 0, 1, 0+1, 3, and 5, as well as global hot sparing across all disk drives. The information stored on the RAID array disk drives remains intact, even if a disk drive, power supply, RAID controller, or fan fails. There is no single point of failure in the RAID storage subsystem. The RAID array is available in a deskside unit or can be rack-mounted.

### Powerful, Familiar Operating Environment

Origin 200 servers use an advanced standards-based 64-bit UNIX operating system. IRIX 6.5 unites the upward scalability of an MPP system with the proven SGI IRIX SMP operating system, preserving existing investments in applications software and system administration. IRIX 6.5 also provides the advanced XFS™ journaled filesystem for the ultimate in I/O performance, high-speed networking to communicate across the enterprise, and enterprise system-management tools to allow consistent and easy system control.

### Origin 200—The Right Solution

Origin 200 servers are the perfect solution for your evolving computing requirements. They run the applications you need with an unmatched combination of performance, RAS, and I/O expandability, in a cost-effective package. Expansion and redeployment are simple and efficient as your business needs change.



**Storage Solutions**

The Origin FibreVault enclosure holds up to 10 hot-pluggable 3.5-inch devices. The enclosure can stand next to the Origin 200 tower or mount inside an expansion rack.

The SCSI RAID controller supports 0, 1, 0+1, 3, and 5 RAID levels, up to 80 disks, hot global sparing, and redundant power, cooling, and controllers.

The Origin Vault Ultra SCSI expansion enclosure holds up to six 3.5-inch devices and two 5.25-inch devices. Its styling matches the Origin 200 system for small footprint deployment in office environments. It can also be mounted in a 19-inch rack.

# SGI Origin 200
# Technical Specifications

## Processor Data

| | |
|---|---|
| • Microprocessor | 64-bit MIPS RISC R12000 |
| • Primary caches | 32KB two-way set-associative on-chip instruction cache<br>32KB two-way set-associative on-chip data cache |
| • Secondary cache | 225 MHz: 2MB ECC cache/processor<br>270 MHz: 4MB ECC cache/processor |

## Single-Tower Configuration

| | |
|---|---|
| • CPU capacity | 1 to 2 R10000 or R12000 CPUs per tower |
| • Memory capacity | 256MB to 2GB ECC protected |
| • Cache coherency | Fully in hardware |
| • Interleaving | 4-way per bank |
| • I/O bandwidth | 1.15GB/sec sustained, 1.44GB/sec peak |
| • Memory bandwidth | 630MB/sec sustained, 720MB/sec peak |
| • I/O slots | 3 full-size 32/64-bit 33 MHz 3.3/5 V PCI, 200MB/sec sustained<br>5 XIO, 7 PCI slots with GIGAchannel |
| • Internal storage | 1 40MB/sec Fast/Wide Ultra SCSI channels and 1 20MB/sec Fast/Narrow Ultra SCSI |
| • Storage capacity | 6 3.5" fixed media hot-pluggable drive bays, 2 5.25" removable media drive bays |
| • Communication | 1 10Base-T/100Base-TX, 2 460Kb/sec serial ports, 1 parallel port |
| • Cooling | 3 variable-speed fans |

*Dual-tower system also available*

## GIGAchannel

| | |
|---|---|
| • Bus type | XIO, PCI |
| • XIO | Additional 5 slots |
| • XIO bandwidth | 1.15GB/sec sustained, 1.44GB/sec peak |
| • PCI | Additional 4 slots |
| • PCI bandwidth | 200MB/sec sustained, 267MB/sec peak |

## PCI Options

Fast/Wide Ultra SCSI differential, Fast/Wide Ultra SCSI single-ended, 10Base-T/100Base-TX Ethernet, FDDI single and dual attach and UTP, Fibre Channel (for disk), ATM (third party), 8-port audio, Gigabit Ethernet, OC3, OC12

## XIO Option Cards

4-port Ultra SCSI, 2-port Fibre Channel (copper or fiber), 4-port 100Base-TX with 6 460Kb/sec serial ports, 4-port ATM OC3, HIPPI serial (200MB/sec full duplex), 6U and 9U VME, DIVO, GSN

## Mass Storage

| | |
|---|---|
| • Interfaces | Ultra SCSI and Fibre Channel |
| • Maximum bandwidth | 40MB/sec Ultra SCSI, 100MB/sec Fibre Channel |

## Mass Storage, *continued*

| | |
|---|---|
| • Device capacity | Ultra SCSI: 9.1GB, 18.2GB, Fibre Channel: 9.1GB, 18.2GB |
| • Tape | 8 mm, 4 mm DDS2 and DDS3, DLT |
| • CD-ROM | 32x internal |
| • SCSI RAID | Challenge® RAID, 20 x 3.5" devices, up to 4 drive arrays per rack (80 drives, 4.3GB or 8.8GB) |
| • Fibre Channel | Origin Fibre Vault, 10 x 3.5" devices |
| • RAID | Up to 11 Fibre Vaults per rack (110 drives, 9.1GB or 18.2GB) |
| • Maximum capacity | 1.5TB dual tower (Ultra SCSI)<br>11.9TB dual tower (Fibre Channel)<br>46.9TB dual tower (Fibre Channel RAID) |

## Software

| | |
|---|---|
| • System | IRIX 6.5 ASE, X/OPEN XPG4 BASE 95, IEEE POSIX 1003.2, and 1003.1b, 1003.1c FIPS 151-2, UNIX System V.4, 4.3 BSD extensions, MIPS ABI, SVID issue 3, X11R6, Motif™ Window Manager 1.2, IRIS GL™, OpenGL® |
| • Networking | TCP/IP, NFS™ V2/V3, RSVP, DHCP, Bulk Data Service (BDSpro), NetVisualyzer™ |
| • Server | XFS 64-bit journaled filesystem with guaranteed rate I/O, system MIB (Provision), software distribution |
| • Web server | Netscape® Enterprise server, Netscape FastTrack Web server, SGI Internet Gateway |
| • Propel | IRIS NetWorker, IRIXPro™ Systems Management Toolbox, Performance Co-Pilot™ system and network performance monitoring software |
| • Compilers | ANSI C, C++, Fortran 77, Ada, Pascal, Power C Accelerator (PCA), Power Fortran 77, Fortran 90, Power Fortran 90 |
| • PC/Macintosh Integration | Syntax TotalNET Advanced Server (TAS), supports Windows 98 and Windows NT (SMB), NetWare, AppleShare®, Samba for IRIX |
| • High availability | IRIS FailSafe (optional for dual tower) |

## Support and Warranty

One-year hardware warranty with advanced parts exchange; remote diagnostics support available

## Dimensions and Weights

| | |
|---|---|
| • Tower dimensions | 23" H, 26.5" D, 9" W (58.4 cm H, 67.3 cm D, 22.8 cm W) |
| • Rack-mountable | 19" customer supplied rack or SGI rack |
| • Rack-mounted dimensions | 6.8" H, 25" D, 17.4" W (17.3 cm H, 63.5 cm D, 44.2 cm W) |
| • Weight | 59 lb (27 kg) minimum |

## Environmental (Nonoperating)

| | |
|---|---|
| • Temperature | -20° to +60° C |
| • Humidity | 10% to 95% noncondensing |
| • Altitude | 40,000 MSL |

## Environmental (Operating)

| | |
|---|---|
| • Temperature | +5° to +35° C |
| • Humidity | 10% to 80% noncondensing |
| • Altitude | 10,000 MSL |
| • Noise | 55 dBa |

## Electrical and Power

| | |
|---|---|
| • Voltage | 110/220 VAC 1 Phase auto-sensing worldwide power supply |
| • Power supply | Standard 483 W<br>Optional Redundant Power Supply (RPS) |
| • Frequency | 50/60 Hz |
| • Heat dissipation | 2,300 BTU/hr, maximum |
| • Electrical service | 100/110 VAC @ 15A, 200/220 VAC @ 10A |
| • Service type | U.S., Japan, NEMA 5-15P (110 V), 6-15P (220 V) |

## Regulatory

Origin 200 is classified FCC Class A, CE, CSA, TUV, UL, CISPR A, and VCCI Class 2 certified

## Configuration Summary

| | Single-tower Origin 200 | Dual-tower Origin 200 |
|---|---|---|
| R10000 or R12000 | 1 to 2 | 2 to 4 |
| Physical memory, MB ECC | 256 to 2048 | 256 to 4096 |
| Disk capacity, internal | 109.2GB | 218.4GB |
| **Standard I/O** | | |
| 5.25" bays | 2 | 4 |
| 3.5" hot plug bays | 6 | 12 |
| **Base I/O** | | |
| • Serial ports | 2 | 4 |
| • Parallel ports | 1 | 2 |
| • 10Base-T/100Base-TX Ethernet | 1 | 2 |
| • Internal Fast/Wide Ultra SCSI, 40MB/sec | 1 | 2 |
| • Internal Fast/Narrow Ultra SCSI, 20MB/sec | 1 | 2 |
| • PCI 32/64-bit slots standard | 3 | 6 |
| **GIGAchannel** | | |
| PCI slots | 7 | 10/14* |
| XIO slots | 5 | 5/10* |

**Origin 200 GIGAchannel*

sgi™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