SGI® Origin® 3000

Engineered for High-Productivity Supercomputing

Features

- Deployable supercomputing
- SGI NUMAflex shared-memory architecture
- Customer-defined scalable performance
- IRGO: Optimized HPC workflow environment

Deployable Supercomputing

SGI Origin 3000 supercomputers are the most powerful systems on the planet, with more processors (up to 128), memory (up to 256GB), and application performance per rack than any other system. Using the unique SGI® NUMAflex™ memory architecture to combine up to 512 CPUs and 1TB of memory in a shared-memory image, SGI Origin 3000 systems enable breakthroughs that general-purpose business servers cannot address. Add a technical operating environment that is specifically engineered to optimize workflow for greater productivity, and your next breakthrough idea won't have to take up a lot of space.

SGI NUMAflex Shared-Memory Architecture

The SGI NUMAflex shared-memory architecture lets you run more complex models more frequently. Because the entire memory space is shared, large models fit into memory with no programming model restrictions. This allows system resources to be dynamically reassigned to more complex areas, resulting in faster time to solution—and insight.

Customer-Defined Scalable Performance

The SGI NUMAflex architecture is designed for the unique requirements of high-productivity computing. Every HPC application has its own criteria for real performance, so SGI Origin 3000 systems are designed with scalability in mind. With modular components for memory, compute, I/O bandwidth, and visualization tied to a high-bandwidth, low-latency interconnect, you can tailor and evolve your supercomputer to meet your unique performance requirements.

SGI® IRGO™: Optimized HPC Workflow Environment

SGI Origin 3000 supercomputers have unique SGI IRGO HPC workflow optimization features that give you even more control over your high-productivity supercomputing environment. IRGO provides tools for run-time optimization, development optimization, and workflow security that allow you to fully harness the power of your supercomputing resources and protect your HPC workflow. With IRGO you can produce better code that runs faster in a secure environment, so your breakthrough ideas come sooner. Put simply, the combination of IRGO and SGI NUMAflex on powerful SGI Origin 3000 supercomputers lets you do more.

SGI® Origin® 3000

SGI® Origin® 3000 Technical Specifications
Model SGI® Origin® 3900

R-Brick (NUMAflex Router Interconnect Module)
- Metarouter: Enables large shared-memory configurations up to 512 processors

CX-Brick (Compute Module, up to 16P and 32GB
- Processors: Up to 16 R16000™ or R16000A™
- Memory: Up to 32GB ECC SDRAM
- Memory kits: 1GB, 2GB
- Memory controller: 5-port crossbar per node board
- Memory bandwidth: Maximum 12.8GB/sec aggregate memory bandwidth
- Router: 8 port

IX-Brick (Base System I/O Module with PCI-X)
- Ports: 1-port SCSI, 1-port Gigabit Ethernet, 1-port RTI, 1-port RTO, 2 serial ports
- Internal devices: 1 system disk standard, optional redundant system disk, CD-ROM
- Disk interface: Ultra160 SCSI
- I/O interface: Six 64-bit/133 MHz PCI-X buses, 11 available slots
- Total I/O bandwidth: 2.4GB/sec peak (dual-ported IX-brick at 4.8GB/sec peak)
- Device capacity: 36GB (15K rpm)

PX-Brick (PCI-X Expansion Module)
- Interface: 64-bit/133 MHz PCI-X buses, 3.3V and universal 64-bit/66 MHz PCI-compatible
- Number of buses: 6
- Number of slots: 12 (2/bus) full length
- Total I/O bandwidth: 2.4GB/sec peak (dual-ported PX-brick at 4.8GB/sec peak)

X-Brick (XIO™ Expansion Module)
- Interface: XIO
- Number of slots: 4
- Total I/O bandwidth: 1.6GB/sec peak (dual-ported X-brick at 3.2GB/sec peak)

D-Brick2 (JBOD Disk Expansion Module)*
- Interface: Dual FC II (2Gb)
- Drive bays: 16 hot-plug, 3.5" power 110/220 V, redundant power supplies standard
- Maximum bandwidth: 800MB/sec peak when dual hosted
- Device capacity: 36GB (5K rpm), 73GB (15K rpm), 146GB (10K rpm) drive options

* Additional JBOD disk expansion options available

G-Brick (InfiniteReality® Family Graphics Module)
- 1–2 graphics pipelines per G-brick, up to 8 channels/pipe, up to 16 pipes/system
- First pipe: 1, 2, or 4 Raster Managers; second pipe: 1 or 2 Raster Managers
- Each pipe delivers:
  - Up to 1.3G pixels/sec of full-scene 8 subsample anti-aliased pixel fill
  - 1GB texture memory with support for 3D textures, paging, clip-mapping, detail texture, and texture lookup tables
  - 48-bit RGBA color, double-buffered with 24-bit Z buffer
  - Video format compiler with support for up to HDTV resolutions
  - Up to 8.3 million pixels/pipe
  - Base display: 2-channel RGBHV output, one S-video output, Genlock with internal or external sync, hardware swap synchronization
  - Display options: 6 additional RGBHV output channels (8 total), HD and SD graphics-to-video output with real-time colorspace conversion, digital-video multiplexer, hardware-in-the-loop interface
  - Pixel-accurate synchronization (Genlock) and swap synchronization
  - Interactive volume visualization
  - Image-Based Rendering

V-Brick (InfinitePerformance™ Graphics Module)
- 1–2 graphics pipes per brick, up to 2 channels/pipe, up to 8 pipes/system
- Each pipe delivers:
  - 128MB graphics memory, including up to 104MB texture memory
  - 2D and 3D textures with texture lookup tables, detail texture, and pixel texture
  - 48-bit RGBA color, double-buffered with 24-bit eye-space Z buffer
  - Flat, Gouraud, and specular shading
  - Video format compiler with support for up to 1600x1200 resolution
  - Analog RGB and TMDS video on a single DVI-I port
  - Quad-buffered stereo at 1280x1024 resolution
- Scalable Graphics Compositor
  - Combines 2 or 4 digital video inputs into a single digital or analog output
  - Zero latency compositing
  - Real-time dynamic load balancing

Power Bay (Power Expansion Module)
- Power requirements: 220–240 VAC external source
- Power distribution: 48 VDC internally distributed to all bricks

PCI Adapters
- 1-port 1Gb Fibre Channel optical
- 1-port 1Gb Fibre Channel copper
- 1-port 2Gb Fibre Channel optical
- 2-port 2Gb Fibre Channel optical
- 1-port ATMOC3
- 1-port ATMOC12
- 1-port Gigabit Ethernet optical
- 1-port Gigabit Ethernet copper
- 2-port Ultra SCSI differential
- 8-port digital audio
- PCI serial card
- Universal Myrinet-2000

XIO Adapters
- 1-port FDDI dual attach
- 1-port HIPPI 800 serial
- Digital video
- High-definition video
- 1-port GSN (half bandwidth)
- 1-port GSN (full bandwidth)
- VME 6U
- VME 9U
- 4-port ATMOC3
- 4-port Fast-Ethernet (100 Base-Tx)
- DMediaPro™ DM3-HD and SD video I/O

External Storage Options
- HBA interfaces: 2Gb Fibre Channel, 200MB/sec peak bandwidth; Ultra160 SCSI, 160MB/sec peak bandwidth; Gigabit Ethernet copper and optical
- JBOD: SGI® TP900 (Ultra160 SCSI)
- RAID: 2Gb SGI TP9100 (2Gb Fibre Channel); SGI® TP9400 (2Gb Fibre Channel); SGI® TP9500 (2Gb Fibre Channel)
- Data servers: SGI® File Server 830 and SGI® File Server 850 (Gigabit Ethernet); SGI SAN Server™ 1000 (1Gb Fibre Channel)
- Tape and libraries: StorageTek® L20, L40, L80, L700; StorageTek® 9840, 9940, LTO; ADIC® Scalar® 100, Scalar 1000, Scalar 10,000; ADIC AIT

Dimensions and Weights
- Tall rack: 74" H x 51" D x 30" W; 39U internal usable space; 1,225 lb. max.
- I/O rack: 74" H x 51" D x 30" W; 39U internal usable space; 1,225 lb. max.
- RAID/JBOD rack: 75" H x 31" D x 24" W; 38U internal usable space; 1,265 lb. max.

Environmental (Operating)
- Temperature: +5 to +35°C, altitude 5,000 MSL; +5 to +30°C, altitude 10,000 MSL
- Humidity: 10% to 90% noncondensing

Environmental (Nonoperating)
- Temperature: -40 to +60°C
- Humidity: 10% to 95% noncondensing
- Altitude: 40,000 MSL

Electrical and Power
- Voltage: 180–245 VAC single phase; 180–254 VAC, 3 phase (North America/Japan); 360–424 VAC, 3 phase (International)
- Power/Heat: Tall rack (max. per rack) 8.85kw/30.20kBtu; I/O rack (max. per rack) 2.14kw/7.30kBtu

Software
- System software: IRIX® 6.5 Advanced Server Environment, UNIX® 95, IEEE POSIX 1003.2, and 1003.1b, 1003.1c FIPS 151-2, UNIX System 4.4, 4.3 BSD extensions, MIPS® ABI, SVID issue 3, X11 R6, Motif® Window Manager 1.2, IRIS GL™, OpenGL®, Motif® 2.1
- Networking: TCP/IP, NFS V2/V3, RSVP, DHCP, Bulk Data Service (BDSpro), NetVisualyzer™, SNMP management, SNMP MIB, NIS/ONC+, OS bypass with Schedule Transfer (ST) protocol
- Server software: XFS™ 64-bit journaled filesystem with guaranteed rate I/O, Clustered XFS (CXFS™), Legato NetWorker®, Performance Co-Pilot™ system and network monitoring, System MIB software distribution (RoboInst™)
- Compilers: ANSI C (c99 compliant), C++, Fortran 77 and 90, APO (Automatic Parallelization Option)
- Interoperability: Samba™ environments for PC
- Security: Trusted IRIX™ LSPP certification, IRIX 6.5 CAPP certification, Commercial Security Pack (CSP)
- Partitioning: Support for system partitioning for up to 512p

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