SGI® Altix® 3000 Servers and Superclusters

64-Bit Linux® Systems for Technical Applications

Features

- Breakthrough performance in a standards-based environment
- Global shared memory across large, 256-processor cluster nodes
- Built-in 64 Gigabyte/second cluster interconnect fabric
- High-productivity computing optimization with industry-standard Linux

Breakthrough Performance in a Standards-Based Environment

For technical users seeking to achieve breakthrough performance with open-source computing, the SGI Altix 3000 family brings a revolutionary capability to Linux OS-based clusters— global shared memory. SGI Altix 3000 superclusters provide stunning increases in performance and capability over traditional Linux clusters, scaling to hundreds—and eventually thousands—of Intel® Itanium® 2 processors in a 64-bit environment that is specifically optimized for technical applications.

Global Shared Memory across Large, 256-Processor Cluster Nodes

SGI Altix 3000 superclusters dramatically reduce the time and resources required to run technical applications by managing extremely large data sets in a single, system-wide, shared-memory space. Global shared memory allows applications to access both in-node and out-of-node memory. By holding more complex geometries or complete workflows in memory, SGI Altix 3000 also enables new application breakthroughs that traditional Linux clusters can't tackle. The third-generation SGI® NUMAflex™ architecture spans terabytes of global shared memory across large nodes that are uniquely scalable and configurable. Each node can scale from four to 256 Itanium 2 processors per Linux operating system image, reducing software and administration costs. With global shared memory across powerful nodes, SGI Altix 3000 delivers breakthrough performance in an easy-to-manage, standards-based environment.

Built-In Interconnect Fabric up to 200 Times Faster than Conventional Switches

The high-bandwidth SGI® NUMAlink™ interconnect fabric of the SGI Altix 3000 family delivers both memory and networking information among cluster nodes up to 200 times faster than standard cluster switches. Data crosses over an SGI NUMAlink switch, round-trip, in as little as 50 nanoseconds—faster than most supercomputers' local memory access time— enabling balanced, sustained application performance on technical workloads.

High-Productivity Computing Optimization with Industry-Standard Linux

SGI Altix 3000 superclusters use an industry-standard, 64-bit Linux environment that is fully optimized for superior data handling, system administration, and resource management. SGI Altix 3000 works with the distributed, high-performance CXFS™ filesystem, providing data access across a heterogeneous network at local filesystem speeds. Advanced hierarchical storage management solutions and the XVM enhanced volume manager support exabyte-scale data sets and eliminate I/O bottlenecks. And unique tools like Performance Co-Pilot™, CPU sets, and Message Passing Toolkit enable streamlined performance over large systems. Only SGI provides these levels of high-productivity optimization in a fully supported, standard Linux environment.

SGI® Altix® 3700 Superclusters Technical Specifications

Scalable to hundreds of processors, with up to 256-processors per node, SGI Altix 3700 superclusters are housed in tall (40U) standard 19" racks that have integral power supplies and are cooled by ambient computer room air. The interconnect topology used in the SGI Altix 3700 supercluster is a dual-plane, fat-tree topology, which uses SGI® NUMAlink™ 3 routers running at 3.2GB/sec bidirectional on each link for a total aggregate bandwidth of 6.4 GB/sec.

SGI® Altix® 3300 Servers Technical Specifications

SGI Altix 3300 servers have 4, 8, or 12 processors housed in a short (17U) standard 19" rack. The rack has an integral I/O brick and power supply and is cooled by ambient computer room air. The interconnect topology used in SGI Altix 3300 is a single-plane, routerless ring topology, which uses SGI® NUMAlink™ 4 protocol running at 6.4GB/sec bidirectional on each link. Storage for the SGI Altix 3300 server is housed external to the compute cabinet.

SGI® Altix® 3000 Servers and Superclusters

SGI Altix 3000 Series Specifications1

NUMAflex 8-Port Router Interconnect Module (R-Brick) (Model 3700 only)
- Router:
Enables shared-memory configurations from 8 to 256 processors
- Metarouter:
Enables large shared-memory configurations above 64 processors, up to thousands of processors

Compute Module, 4P and up to 32GB Memory (C-Brick)
- Processors:
Model 3700: 4 1.3 GHz or 4 1.5 GHz Itanium 2 processors
Model 3300: 4 1.3 GHz or 4 1.5 GHz Itanium 2 processors
- Processor caches:
1.3 GHz CPU: On-die L3 cache, 3MB per processor 1.5 GHz CPU (Model 3700 only): On-die L3 cache, 6MB per processor
- Memory:
Up to 64GB DDR ECC
Memory options:
  - PC2700 166 MHz, 512MB DIMMs
  - PC2700 166 MHz, 1GB DIMMs
  - PC2100 133 MHz, 2GB DIMMs
- Memory kits:
4GB, 8GB and 16GB
- Memory controller:
5-port crossbar per node board
- Memory bandwidth:
Max. 20.4GB/sec aggregate per C-brick

Memory Expansion Module, up to 64GB Memory (M-Brick)
- Memory: Up to 64GB DDR ECC
- Memory kits: 4GB, 8GB and 16GB
- Memory controller:
5-port crossbar per node board
- Memory bandwidth:
Max. 20.4GB/sec aggregate per M-brick

Base System I/O Module with PCI-X (IX-Brick)
- 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, DVD-ROM

- Disk interface: Ultra160 SCSI
- I/O interface: 5 64-bit/133 MHz PCI-X buses with 10 available slots, 1 64-bit/66 MHz PCI slot
- Total I/O bandwidth:
2.4GB/sec peak per brick (dual ported IX-brick at 4.8GB/sec peak)

PCI-X Expansion Module (PX-Brick) (Model 3700 only)
- Interface:
64-bit/133 MHz PCI-X buses, 3.3 V and Universal 64-bit/66 MHz PCI-compatible
- Number of buses: 6
- Number of slots:12 (2/bus) full length; max. 1/bus for 133 MHz PCI-X cards
- Total I/O bandwidth: 2.4GB/sec peak per brick (dual-ported PX-brick at 4.8GB/sec peak)

JBOD Disk Expansion Module[2] (D-Brick2)
- Interface: 66 MHz/2Gb or 133 MHz/2Gb Fibre Channel
- Drive bays:
16 hot-plug, 3.5" power 110/220 V, redundant power supplies standard
- Maximum bandwidth: 200MB/sec peak
- Device capacity: 36GB (10K RPM), 73GB (10K or 15K RPM), 146GB (10K RPM) drive options

Power Bay (Power Expansion Module)
- Power requirements:
220–240 VAC external source
- Power distribution: 48 VDC internally distributed to all bricks
- Model 3700: Side-mounted vertically for space saving

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) D-brick2 (2Gb Fibre Channel) (Model 3700 only)

- RAID:
SGI® TP9100 (2Gb Fibre Channel)
SGI® TP9300 (2Gb Fibre Channel)
SGI® TP9500 (2Gb Fibre Channel)
SGI® TP9500S (Serial ATA)
- Data servers:
SGI® File Server 830 and SGI® File Server 850 (Gigabit Ethernet)
SGI SAN Server™ 1000 (2Gb Fibre Channel)
- Tape and libraries:
STK L20, L40, L80, L180, L700, L5500, 9310. ADIC® Scalar® 24, Scalar® 100, Scalar® 1000, and Scalar® 10000 Libraries. STK T9840B, T9940B, IBM® 3560, LTO, SDLT, and AIT Tape Drives

Dimensions and Weights
- Tall rack:
75" H, 53" D, 30" W; 40U internal usable space; 1,375 lb max.
- Short rack:
36" H, 42" D, 26" W; 17U internal usable space; 496 lb max.
- I/O rack:
75" H, 53" D, 30" W; 40U internal usable space; 1,225 lb max.
- RAID/JBOD rack:
75" H, 31" D, 24" W; 38U internal usable space; 1,265 lb max.

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

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

Electrical and Power
- Voltage:180–254 VAC single phase
180–254 VAC, 3 phase (North America/Japan) (Model 3700 only)
360–440 VAC, 3 phase (International) (Model 3700 only)

- Power/heat
Tall rack (max. per rack)
6.37kw/21.72kBtu
Short rack (max. per rack)
2.57kw/8.77kBtu
I/O rack (max. per rack)
2.14kw/7.30kBtu

Software
- System software:
SGI Advanced Linux™ Environment with SGI ProPack™
- Also available: SuSE Linux Enterprise Server 8
- Networking:
TCP/IP, NFS V2/V3, DHCP, SNMP management, SNMP MIB,NIS/ONC+
- Available server software
XFS® 64-bit journaled filesystem, CXFS™ shared filesystem, Performance Co-Pilot system and network monitoring, SGI® Linux FailSafe™, DMF, TMF
- Compilers:
Intel® Itanium® Processor Family compilers: C/C++, Fortran
GNU compilers: C, Fortran 77
- Tools:
Libraries: MPT, Array Services, CPU sets, SCSL, FFIO, and Intel® Math Kernel Library
Debuggers: Etnus® TotalView®, Intel® idb, GNU gdb (with Fortran extensions)
Performance analysis:
Intel® VTune™, Intel Trace Analyzer (formerly Vampir™), Intel Trace Collector (formerly Vampirtrace™), SGI® Histx
System analysis:
pfmon and Performance Co-Pilot
- Interoperability
Samba® environments for PC
- Partitioning
Support for system partitioning up to 512P based on maximum 256-processor Linux partitions

Support and Services
SGI also offers appropriate services to implement and integrate Linux applications in your environment. For more information on available services, please see www.sgi.com/support.

PCI Adapters

A variety of PCI and PCI-X cards are supported by SGI as described in table below. Additional PCI and PCI-X cards with Linux drivers are available from and supported by third-party suppliers.

N/T = not tested
N/A = not applicable

PCI Card Name	PCI		PCI-X		
	33 MHz	66 MHz	66 MHz	100 MHz	133 MHz
10/100/1000 Ethernet Tigon3 (1-port)	Yes	Yes	Yes	Yes	Yes
FC QLA2200 (Fibre Channel copper)	N/T	Yes	N/A	N/A	N/A
FC QLA2310 (Fibre Channel optical)	Yes	Yes	Yes	N/A	N/A
IO9 Base IO	N/T	Yes	N/A	N/A	N/A
SCSI QLA1240	Yes	N/A	N/A	N/A	N/A

[1]Additional JBOD disk expansion options available

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