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SGI® Origin® 350

Features
- Modular scalability
- Customized configurations
- Operating environment optimized for high-productivity computing

Modular Scalability for Technical Computing

SGI Origin 350 technical servers are the only midrange systems that enable truly modular, single-system configurations, providing completely independent scalability of I/O bandwidth, system bandwidth, computational performance, memory, storage, and visualization capabilities. Using the revolutionary SGI® NUMAflex™ architecture, SGI Origin 350 technical servers deliver sustained, multidimensional performance in compact, affordable, rack-mountable components.

Customized Configurations

With its compact form factor and individually scalable modules, SGI Origin 350 is an ideal choice for solving big problems in a little package. Users select only the components that optimally solve their problems, and SGI Origin 350 scales easily to meet the challenge of more complex problems over time. Customized configurations are built with the following modules.

Base technical server and compute expansion	The base SGI Origin 350 compute module can be a stand-alone technical server with two or four processors, up to 8GB memory, four PCI-X slots[1], two drive bays, and integrated power, all in 3.5 inches of rack space. Cable in more compute modules for additional computational power.
I/O expansion	Choose between PCI-X and PCI expansion. The PCI-X expansion module brings in four additional 64-bit PCI-X slots in 3.5 inches of rack space. The PCI expansion module[2] has 12 64-bit PCI slots in 7 inches of rack height.
Memory expansion	The memory expansion module adds 8GB of additional memory capacity and four additional PCI-X slots in 3.5 inches.
Storage expansion	SGI Origin 350 supports connections to a variety of in-rack JBOD or external RAID storage devices in the SGI® Total Performance family of Fibre Channel storage systems.
Graphics options	SGI Origin 350 technical servers can be configured as SGI® Onyx® 350 visualization systems, with InfinitePerformance™ graphics cards inserted in dedicated slots in compute modules or with additional modules for InfiniteReality® graphics.
System scalability	The NUMAlink™ module provides additional system bandwidth and eight NUMAlink ports for larger system configurations. Using the NUMAlink module, users can easily create systems with as many as 32 processors, up to 64GB of memory, and up to 62 available PCI-X slots, all connected under a single IRIX® operating system image, with room in the rack left over for storage expansion.

High-Productivity Computing

Return on investment depends on productivity, and with SGI Origin 350 technical servers, the hardware and software are custom-designed for that purpose. The SGI® IRGO™ workflow-optimization features of the SGI® IRIX® operating system complement the modular scalability and customized configurations of SGI Origin 350, shortening end-to-end workflow. And SGI Origin 350 promotes the easy integration of HPC, visualization, and data management, optimizing productivity on the toughest challenges.

[1] One PCI-X slot in the first compute module of an SGI Origin 350 technical server contains a PCI card that provides system I/O functionality. Two PCI-X slots and one PCI slot are left available to the user. Subsequent compute modules in the same system leave all four PCI-X slots available.

[2] The PCI expansion module requires a separate power bay.

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Technical Specifications

Processor Data
· Microprocessor	64-bit MIPS® R16000™ 600 MHz
	64-bit MIPS R16000 700 MHz
· Primary caches	32KB two-way set-associative on-chip instruction cache
	32KB two-way set-associative on-chip data cache
· Secondary cache	4MB ECC cache/processor

Compute Module Configuration (2U)
· CPU capacity	2 or 4 CPUs per chassis
· Memory capacity	1GB to 8GB ECC protected per chassis
· Cache coherency	Fully in hardware
· Interleaving	4-way per bank
· I/O bandwidth	1.07GB/sec sustained, 2.4GB/sec peak
· Memory bandwidth	3.2GB/sec sustained, 3.2GB/sec peak
· I/O slots (Base compute module)	Four PCI-X/PCI slots on two buses (3.3 V/universal)
	– Two available 64-bit 100 MHz PCI-X slots on one bus
	– One available 64-bit 66 MHz PCI slot on one bus
	– IO9 card included in fourth slot
· I/O slots (Expansion compute module)	Four available PCI-X/PCI slots on two buses (3.3 V/universal)
· Internal SCSI	1 160MB/sec Ultra3 SCSI channel
· Storage bay	2 3.5" fixed-media hot-pluggable disk drive bays
	1 3.5" CD/DVD drive bay
· External SCSI	1 160MB/sec Ultra3 SCSI channel (VHDCI)
· Communication	1 10Base-T/1000Base-TX auto-sensing
	4 115.2 Kbaud serial ports
	1 NUMAlink™3 port, 1.6GB/sec each direction
	1 XIO™ port, 800MB/sec each direction
	(graphics or 2U PCI-X expansion or VME-usage only)
	1 RTO output (real-time interrupt)
	1 RTI input (real-time interrupt)
	2 PS2 ports (keyboard/mouse)
	1 L1 diagnostic port
· Redundancy	Hot-swappable redundant power supplies

NUMAlink Expansion Module (2U)
· System expansion	8 NUMAlink ports
· System bandwidth	3.2GB/sec per NUMAlink port
· Maximum system size	32 CPUs 64GB memory (ECC protected per module)
	– 1.2TB internal SCSI drives
	– 62 PCI-X slots

External MPX Expansion Module (2U)
· Bus type	64-bit/100 MHz PCI-X
· PCI-X	Additional 4 slots (2 slots per bus)
· PCI-X bandwidth	760MB/sec sustained, 770MB/sec peak
· Memory slots	8 slots (8GB max capacity)
· Connection	NUMAlink port

External PCI-X Expansion Module (2U)
· Bus type	64-bit/100 MHz PCI-X
· PCI-X	Additional 4 slots (2 slots per bus)
· PCI-X bandwidth	760MB/sec sustained, 770MB/sec peak
· Connection	XIO port

External PCI Expansion Module (4U)3
· Bus type	64-bit/66 MHz PCI
· PCI	Additional 12 slots (64-bit/66 MHz, hot pluggable)
· PCI bandwidth	420MB/sec sustained, 512MB/sec peak
· Connection	NUMAlink port

PCI/PCI-X Card Options
ATM OC3 (1 port), ATM OC12 (1 port), HVD differential SCSI (2 ports), LVD/single-ended Ultra3 SCSI (2 ports), audio (8 port), serial, Gigabit Ethernet — copper (1 port), Gigabit Ethernet – optical (1 port), Fibre Channel 2Gb — optical (1 port), Fibre Channel 2Gb — optical (2 ports), Myrinet 2000 (1 port)

Mass Storage
· Interfaces	Ultra3 SCSI and Fibre Channel (external only)
· Maximum bandwidth	160MB/sec Ultra3 SCSI, 200MB/sec Fibre Channel
· Device capacity	Ultra3 SCSI: 18GB, 73GB

Mass Storage (cont'd)
· Tape	DDS4 SCSI external
· DVD/CD-ROM	24x IDE internal DVD
· SCSI JBOD	SGI® TP900 SCSI JBOD storage system up to 8 Ultra3
	SCSI drives per encloser (18GB or 73GB)
· Fibre Channel RAID	SGI Total Performance family

Software
· System	IRIX® 6.5 Advanced Server Environment supports UNIX® 95,
	MIPS® ABI, Year 2000
· Networking	TCP/IP, NFS V2/V3, RSVP, DHCP, Bulk Data Service
	(BDSpro), SNMP, network load balancing software
· Real-time	REACT/pro™, guaranteed rate I/O
· Web server	Apache Web server
· Compilers & tools	ANSI C, C++, Fortran 77, Fortran 90, Ada95, Power Fortran
	Analyzer (PFA), Auto Parallelization Option (APO)
· Filesystems	XFS™ 64-bit journaled filesystem, CXFS shared filesystem for
	SANs, Network File System, Samba®
· Resource management	Platform Computing LSF, disk quotas, job limits, cpusets,
	comprehensive system accounting
· Reliability	Embedded Support Partner, checkpoint/restart, system partitions,
	Performance Co-Pilot™, CPU exclusion, live kernel dump
· High availability	IRIS FailSafe™

Dimensions and Weights
· Compute, MPX, and PCI-X	3.44" H, 27" D*, 17.06" W (fits industry-standard 19" racks)
	(8.74 cm H, 68.58 cm D, 43.33 cm W) with bezel;
	44.5 lb maximum (20.23 kg)
· NUMAlink	3.35" H, 27.5" D, 17.38" W
	(8.51 cm H, 69.85 cm D, 44.15 cm W); 18 lb maximum (8.18 kg)
· PCI	6.64" H, 27.74" D, 17.50" W (16.87 cm H, 70.46 cm D,
	44.45 cm W); 70 lb maximum (31.82 kg)

*An additional 8" front-end clearance is required for drive door to open properly.

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

Environmental (Operating)
· Temperature	+5°C to +45°C (5,000 MSL), +5°C to +35°C (10,000 MSL)
· Humidity	10% to 95% noncondensing
· Altitude	10,000 MSL
· Noise	48 dBa sound pressure, 6.1 bels sound power

Electrical and Power
· Voltage	120/240 V AC auto-sensing worldwide power supply
· Power supply	500 W TPS module
· Frequency	50/60 Hz
· Heat dissipation	1,315 BTU/hr, maximum
· Electrical service	100/240 VAC @15A, single-phase cord
· Service type	U.S., Japan, NEMA 5–15P (110 V), 6–15P (220 V)

Regulatory
SGI Origin 350 is classified FCC, CISPR, ICES, AS/NZS, VCCI, CNS Class A; CE, CSA NRTL, CSA CB

Services, Support and Warranty
· Warranty	One-year on-site hardware repair and parts replacement
	with next-business-day response time; 5x9 coverage
· Embedded Support Partner	7x24 proactive system monitoring and automatic rule-based
	failure notification to SGI support personnel.
· SGI® Supportfolio™	Easy access to online customer support information,
	publications, patches, and software downloads.
· SGI Knowledgebase	Online access to thousands of proven support solutions
· Services and Support	Broad range of services including customized, end-to-end
	integrated solutions based on SGI Origin 350. Managed
	Services range from installation and implementation to
	system tuning and system management. Support programs
	range from basic coverage to 7x24 accelerated response
	for mission-critical requirements.

3 Requires separate power bay (3U).