



# SPEC<sup>®</sup> MPIL2007 Result

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## SGI

SGI Altix ICE 8400EX  
(AMD Opteron 6282 SE, 2.6GHz)

SPECmpiL\_peak2007 = Not Run

SPECmpiL\_base2007 = 9.55

MPI2007 license: 4

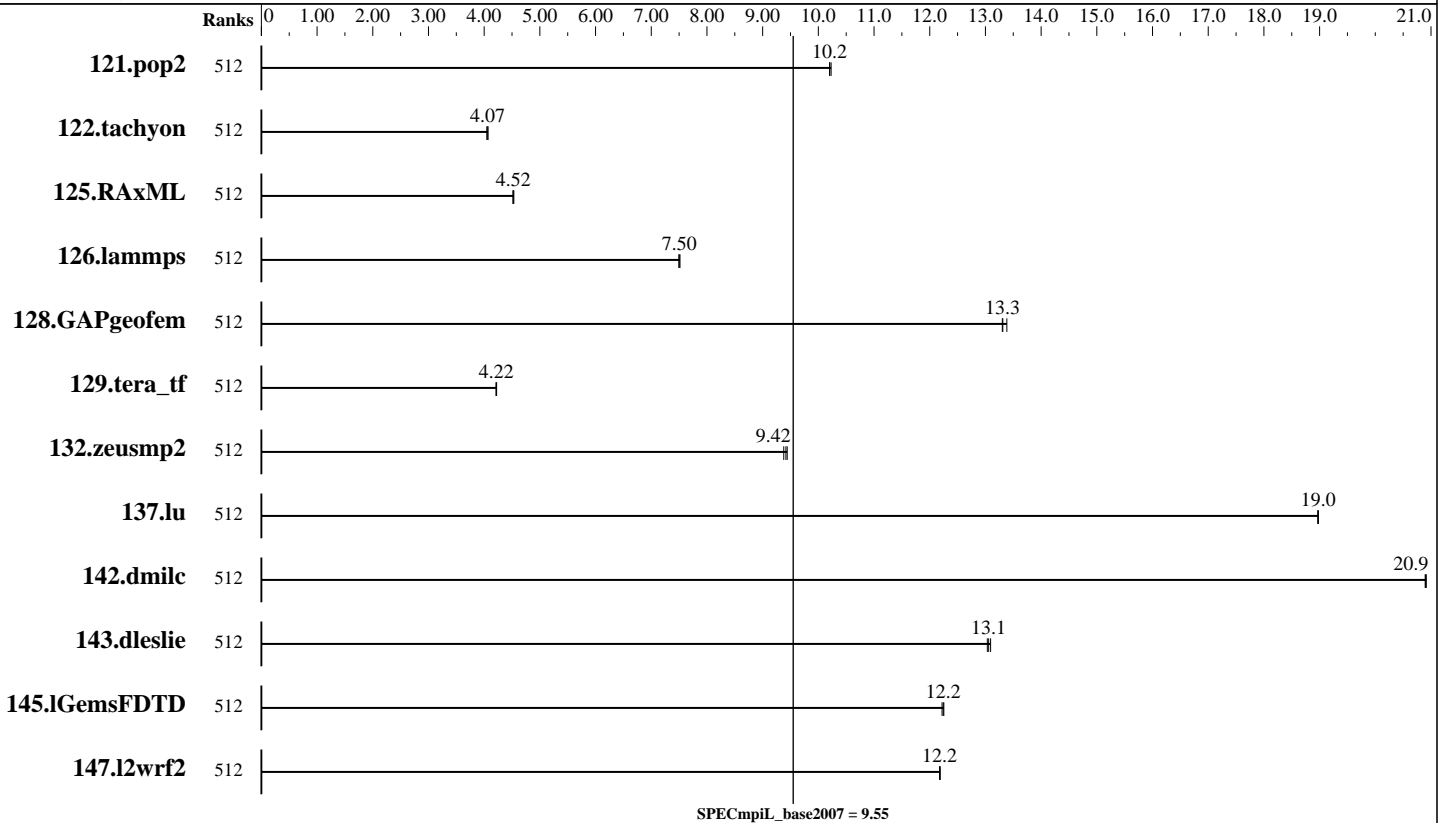
Test sponsor: SGI

Tested by: SGI

Test date: Jan-2012

Hardware Availability: Nov-2011

Software Availability: Nov-2011



## Results Table

Benchmark	Base								Peak							
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
121.pop2	512	380	10.2	<b><u>381</u></b>	<b><u>10.2</u></b>	381	10.2									
122.tachyon	512	480	4.05	<b><u>478</u></b>	<b><u>4.07</u></b>	478	4.07									
125.RAxML	512	644	4.53	<b><u>646</u></b>	<b><u>4.52</u></b>	646	4.52									
126.lammps	512	327	7.52	<b><u>328</u></b>	<b><u>7.50</u></b>	328	7.50									
128.GAPgeofem	512	443	13.4	<b><u>446</u></b>	<b><u>13.3</u></b>	446	13.3									
129.tera_tf	512	260	4.22	<b><u>261</u></b>	<b><u>4.22</u></b>	261	4.21									
132.zeusmp2	512	225	9.44	<b><u>225</u></b>	<b><u>9.42</u></b>	226	9.38									
137.lu	512	222	19.0	<b><u>221</u></b>	<b><u>19.0</u></b>	221	19.0									
142.dmilc	512	176	20.9	<b><u>176</u></b>	<b><u>20.9</u></b>	176	20.9									
143.dleslie	512	237	13.1	<b><u>237</u></b>	<b><u>13.1</u></b>	238	13.0									
145.lGemsFDTD	512	360	12.3	<b><u>360</u></b>	<b><u>12.2</u></b>	361	12.2									
147.l2wrf2	512	674	12.2	673	12.2	<b><u>674</u></b>	<b><u>12.2</u></b>									

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Standard Performance Evaluation Corporation

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http://www.spec.org/



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### Hardware Summary

Type of System: Homogeneous  
 Compute Node: SGI Altix ICE 8400EX Compute Node  
 Interconnect: InfiniBand (MPI and I/O)  
 File Server Node: SGI InfiniteStorage 4000  
 Total Compute Nodes: 16  
 Total Chips: 32  
 Total Cores: 512  
 Total Threads: 512  
 Total Memory: 2 TB  
 Base Ranks Run: 512  
 Minimum Peak Ranks: --  
 Maximum Peak Ranks: --

### Software Summary

C Compiler: Intel C++ Composer XE 2011 for Linux, Version 12.1.1.256 Build 20111011  
 C++ Compiler: Intel C++ Composer XE 2011 for Linux, Version 12.1.1.256 Build 20111011  
 Fortran Compiler: Intel Fortran Composer XE 2011 for Linux, Version 12.1.1.256 Build 20111011  
 Base Pointers: 64-bit  
 Peak Pointers: 64-bit  
 MPI Library: SGI MPT 2.05  
 Other MPI Info: OFED 1.5.2  
 Pre-processors: None  
 Other Software: None

## Node Description: SGI Altix ICE 8400EX Compute Node

### Hardware

Number of nodes: 16  
 Uses of the node: compute  
 Vendor: SGI  
 Model: SGI Altix ICE 8400EX (AMD Opteron 6282 SE, 2.6GHz)  
 CPU Name: AMD Opteron 6282 SE  
 CPU(s) orderable: 1-2 chips  
 Chips enabled: 2  
 Cores enabled: 32  
 Cores per chip: 16  
 Threads per core: 1  
 CPU Characteristics: 16 cores/chip, 2.6 GHz  
 AMD Turbo CORE technology up to 3.30 GHz  
 CPU MHz: 2600  
 Primary Cache: 512 KB I on chip per chip,  
 64 KB I shared / 2 cores;  
 16 KB D on chip per core  
 Secondary Cache: 16 MB I+D on chip per chip, 2 MB I+D on chip per core  
 L3 Cache: 16 MB I+D on chip per chip, 8 MB shared / 8 cores  
 Other Cache: None  
 Memory: 128 GB (16 x 8 GB 2Rx4 PC3-12800R-11, ECC)  
 Disk Subsystem: None  
 Other Hardware: None  
 Adapter: Mellanox MT26428 ConnectX IB QDR (PCIe x8 Gen2 5 GT/s)  
 Number of Adapters: 1  
 Slot Type: PCIe x8 Gen2  
 Data Rate: InfiniBand 4x QDR  
 Ports Used: 2  
 Interconnect Type: InfiniBand

### Software

Adapter: Mellanox MT26428 ConnectX IB QDR (PCIe x8 Gen2 5 GT/s)  
 Adapter Driver: OFED-1.5.2  
 Adapter Firmware: 2.7.0  
 Operating System: SUSE Linux Enterprise Server 11 SP1 (x86\_64) Kernel 2.6.32.46-0.3-default #1 SMP  
 Local File System: NFSv3  
 Shared File System: NFSv3 IPoIB  
 System State: Run level 3 (Multi-User)  
 Other Software: SGI Performance Suite 1.3, Build 705rp8.sles11-1111092106  
 SGI Tempo Compute Node 2.5, Build 705r10.sles11-11110192111



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### Node Description: SGI InfiniteStorage 4000

#### Hardware

Number of nodes: 1  
Uses of the node: fileserver  
Vendor: SGI  
Model: SGI Altix 450 (Intel Itanium 2, 1.6GHz)  
CPU Name: Intel Itanium 2 9030  
CPU(s) orderable: 2-38 chips  
Chips enabled: 2  
Cores enabled: 4  
Cores per chip: 2  
Threads per core: 1  
CPU Characteristics: 1.6GHz/8MB, 533MHz FSB  
CPU MHz: 1600  
Primary Cache: 16 KB I + 16 KB D on chip per core  
Secondary Cache: 1 MB I + 256 KB D on chip per core  
L3 Cache: 4 MB I+D on chip per core  
Other Cache: None  
Memory: 24 GB (12 x 2 GB, 2Rx4 PC2-3200-3, ECC)  
Disk Subsystem: 16 TB RAID 5  
32 x 500 GB SATA (Seagate Barracuda 7.2K)  
Other Hardware: None  
Adapter: Mellanox MT25208 InfiniHost III Ex (PCIe x8 Gen1 2.5 GT/s)  
Number of Adapters: 2  
Slot Type: PCIe x8 Gen1  
Data Rate: InfiniBand 4x DDR  
Ports Used: 2  
Interconnect Type: InfiniBand

#### Software

Adapter: Mellanox MT25208 InfiniHost III Ex (PCIe x8 Gen1 2.5 GT/s)  
Adapter Driver: OFED-1.4.2  
Adapter Firmware: 5.3.0  
Operating System: SUSE Linux Enterprise Server 11 SP1 (ia64) Kernel 2.6.32.12-0.7-default  
Local File System: xfs  
Shared File System: --  
System State: Run Level 3 (Multi-User)  
Other Software: SGI ProPack 7SP1 for Linux, Build 701r2.sles11-1005242307

### Interconnect Description: InfiniBand (MPI and I/O)

#### Hardware

Vendor: Mellanox Technologies and SGI  
Model: None  
Switch Model: SGI QDR\_1.5\_HYPR\_2454 with Mellanox Device 48438 (Infiniscale IV)  
Number of Switches: 4  
Number of Ports: 36  
Data Rate: InfiniBand 4x QDR  
Firmware: 5040005  
Topology: Enhanced Hypercube  
Primary Use: MPI and I/O traffic

#### Software



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## Submit Notes

The config file option 'submit' was used.

## General Notes

### Software environment:

```
export MPI_REQUEST_MAX=65536
export MPI_TYPE_MAX=32768
export MPI_BUFS_THRESHOLD=1
export MPI_IB_RAILS=2
ulimit -s unlimited
```

### BIOS settings:

AMI BIOS version 2.0

### Job Placement:

In the base run, each MPI job is assigned to a topologically compact set of nodes, i.e. the minimal needed number of switches was used for each job: 2 switch for up to 256 ranks, 4 switches for 512 ranks, 8 switches for 1024 ranks.

### Additional notes regarding interconnect:

The Infiniband network consists of two independent planes, with half the switches in the system allocated to each plane. I/O traffic is restricted to one plane, while MPI traffic can use both planes.

SGI manufactures its own switch blades using unmodified Mellanox switch ASICs. The test system has SGI QDR\_1.5\_HYPR\_2454 switch with Mellanox 36-port QDR Infiniband switch Device 48438 (InfiniScale IV).

## Base Compiler Invocation

### C benchmarks:

icc

### C++ benchmarks:

126.lammps: icpc

### Fortran benchmarks:

ifort

### Benchmarks using both Fortran and C:

icc ifort



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## Base Portability Flags

121.pop2: -DSPEC\_MPI\_CASE\_FLAG

## Base Optimization Flags

C benchmarks:

-O3 -xSSE2 -ipo -no-prec-div

C++ benchmarks:

126.lammps: -O3 -xSSE2 -ipo -no-prec-div -ansi-alias

Fortran benchmarks:

-O3 -xSSE2 -ipo -no-prec-div

Benchmarks using both Fortran and C:

-O3 -xSSE2 -ipo -no-prec-div

## Base Other Flags

C benchmarks:

-lmpi

C++ benchmarks:

126.lammps: -lmpi

Fortran benchmarks:

-lmpi

Benchmarks using both Fortran and C:

-lmpi

The flags file that was used to format this result can be browsed at

[http://www.spec.org/mpi2007/flags/SGI\\_x86\\_64\\_Intel12\\_flags.html](http://www.spec.org/mpi2007/flags/SGI_x86_64_Intel12_flags.html)

You can also download the XML flags source by saving the following link:

[http://www.spec.org/mpi2007/flags/SGI\\_x86\\_64\\_Intel12\\_flags.xml](http://www.spec.org/mpi2007/flags/SGI_x86_64_Intel12_flags.xml)



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For questions about this result, please contact the tester.  
For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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