SPEC® MPIM2007 Result

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Intel Corporation

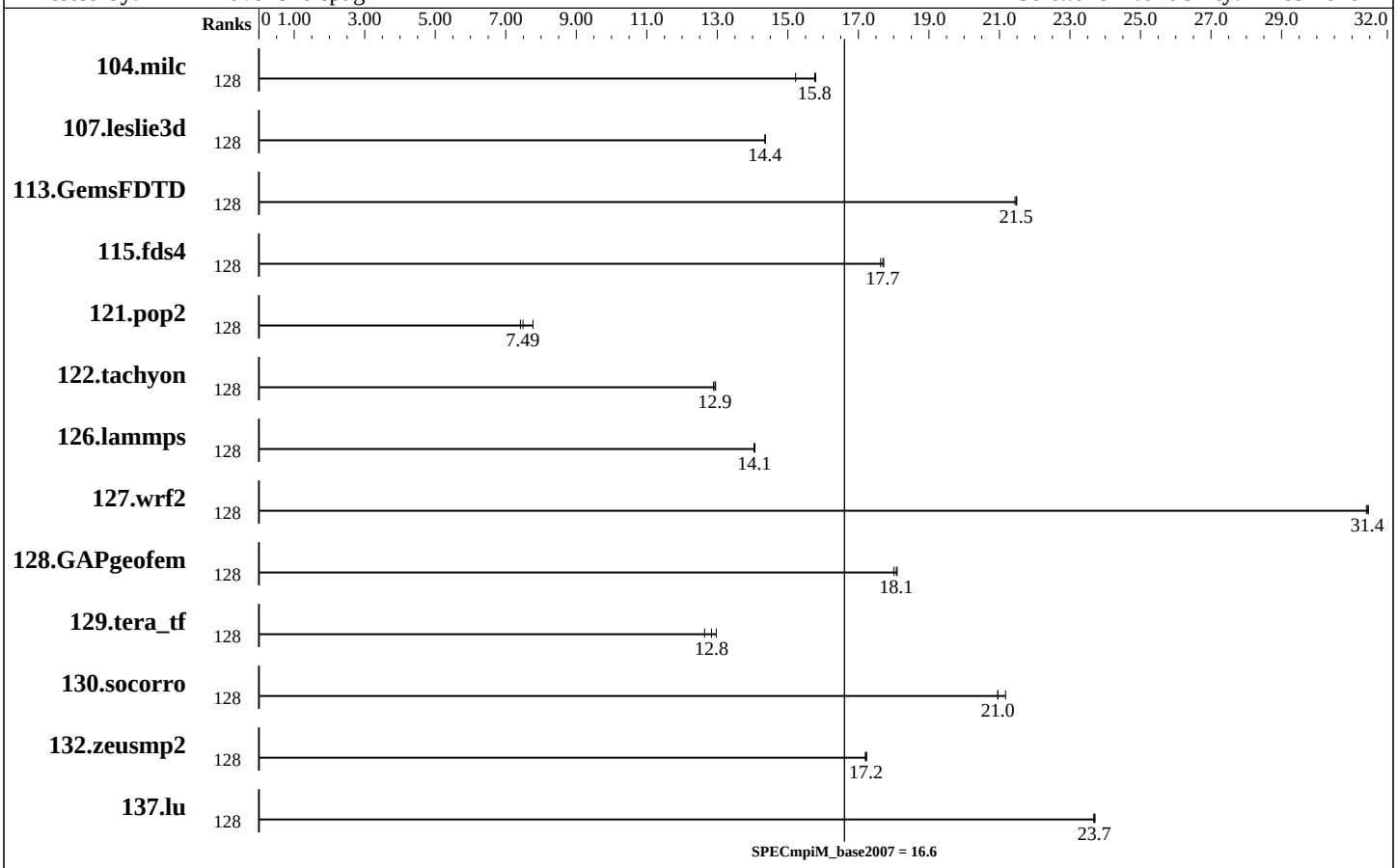
Discovery (Intel Xeon X7560, 2.27 GHz,
DDR3-1066 MHz, SMT off, Turbo on)

SPECmpiM_peak2007 = Not Run

SPECmpiM_base2007 = 16.6

MPI2007 license: 13
Test sponsor: Intel Corporation
Tested by: Pavel Shelepugin

Test date: Mar-2010
Hardware Availability: Mar-2010
Software Availability: Feb-2010



Results Table

Benchmark	Base							Peak						
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
104.milc	128	103	15.2	**99.3**	**15.8**	99.1	15.8							
107.leslie3d	128	364	14.4	**364**	**14.4**	364	14.4							
113.GemsFDTD	128	294	21.4	**294**	**21.5**	294	21.5							
115.fds4	128	110	17.7	**110**	**17.7**	111	17.6							
121.pop2	128	531	7.77	557	7.41	**551**	**7.49**							
122.tachyon	128	217	12.9	216	13.0	**216**	**12.9**							
126.lammps	128	**207**	**14.1**	207	14.1	208	14.0							
127.wrf2	128	248	31.5	248	31.4	**248**	**31.4**							
128.GAPgeofem	128	**114**	**18.1**	115	18.0	114	18.1							
129.tera_tf	128	**216**	**12.8**	219	12.6	213	13.0							

Table continues on next page. Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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Results Table (Continued)

Benchmark	Base							Peak						
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
130.socorro	128	182	21.0	**182**	**21.0**	180	21.2							
132.zeusmp2	128	180	17.2	**180**	**17.2**	180	17.2							
137.lu	128	155	23.7	155	23.7	**155**	**23.7**							

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

Hardware Summary

Type of System:	Homogeneous
Compute Node:	Discovery Node
Interconnects:	IB Switch Gigabit Ethernet
File Server Node:	HOME
Total Compute Nodes:	4
Total Chips:	16
Total Cores:	128
Total Threads:	128
Total Memory:	512 GB
Base Ranks Run:	128
Minimum Peak Ranks:	--
Maximum Peak Ranks:	--

Software Summary

C Compiler:	Intel C++ Compiler 11.1.064 for Linux
C++ Compiler:	Intel C++ Compiler 11.1.064 for Linux
Fortran Compiler:	Intel Fortran Compiler 11.1.064 for Linux
Base Pointers:	64-bit
Peak Pointers:	64-bit
MPI Library:	Intel MPI Library 3.2.2.006 for Linux
Other MPI Info:	None
Pre-processors:	No
Other Software:	None

Node Description: Discovery Node

Hardware

Number of nodes:	4
Uses of the node:	compute
Vendor:	Quanta
Model:	QSSC-S4R
CPU Name:	Intel Xeon X7560
CPU(s) orderable:	1-4 chips
Chips enabled:	4
Cores enabled:	32
Cores per chip:	8
Threads per core:	1
CPU Characteristics:	Intel Turbo Boost Technology up to 2.66 GHz, 6.4 GT/s QPI, Hyper-Threading disabled
CPU MHz:	2261
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	256 KB I+D on chip per core
L3 Cache:	24 MB I+D on chip per chip, 24 MB shared / 8 cores
Other Cache:	None
Memory:	128 GB (dual-rank RDIMM 32x4-GB DDR3-1066 MHz)
Disk Subsystem:	Seagate 400 GB ST3400755SS
Other Hardware:	None
Adapter:	Intel (ESB2) 82575EB Dual-Port Gigabit Ethernet Controller
Number of Adapters:	1
Slot Type:	PCI-Express x8

Continued on next page

Software

Adapter:	Intel (ESB2) 82575EB Dual-Port Gigabit Ethernet Controller
Adapter Driver:	e1000
Adapter Firmware:	None
Adapter:	Mellanox MHQH29-XTC
Adapter Driver:	OFED 1.4.2
Adapter Firmware:	2.7.000
Operating System:	Red Hat EL 5.4, kernel 2.6.18-164
Local File System:	Linux/ext2
Shared File System:	NFS
System State:	Multi-User
Other Software:	PBS Pro 10.1

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Software Availability: Feb-2010

Node Description: Discovery Node

Data Rate:	1Gbps Ethernet
Ports Used:	2
Interconnect Type:	Ethernet
Adapter:	Mellanox MHQH29-XTC
Number of Adapters:	1
Slot Type:	PCIe x8 Gen2
Data Rate:	InfiniBand 4x QDR
Ports Used:	1
Interconnect Type:	InfiniBand

Node Description: HOME

Hardware

Number of nodes:	1
Uses of the node:	fileserver
Vendor:	Intel
Model:	SSR212CC
CPU Name:	Intel Xeon CPU
CPU(s) orderable:	2 chips
Chips enabled:	2
Cores enabled:	2
Cores per chip:	1
Threads per core:	1
CPU Characteristics:	--
CPU MHz:	2800
Primary Cache:	12 KB I + 16 KB D on chip per chip
Secondary Cache:	1 MB I+D on chip per chip
L3 Cache:	None
Other Cache:	None
Memory:	6 GB
Disk Subsystem:	10 disks, 320GB/disk, 2.6TB total
Other Hardware:	None
Adapter:	Intel 82546GB Dual-Port Gigabit Ethernet Controller
Number of Adapters:	1
Slot Type:	PCI-Express x8
Data Rate:	1Gbps Ethernet
Ports Used:	1
Interconnect Type:	Ethernet

Software

Adapter:	Intel 82546GB Dual-Port Gigabit Ethernet Controller
Adapter Driver:	e1000
Adapter Firmware:	N/A
Operating System:	RedHat EL 4 Update 4
Local File System:	None
Shared File System:	NFS
System State:	Multi-User
Other Software:	None

Interconnect Description: IB Switch

Hardware

Vendor:	Mellanox
Model:	Mellanox MTS3600Q-1UNC

Software

Continued on next page

Interconnect Description: IB Switch

Switch Model:	Mellanox MTS3600Q-1UNC
Number of Switches:	46
Number of Ports:	36
Data Rate:	InfiniBand 4x QDR
Firmware:	7.1.000
Topology:	Fat tree
Primary Use:	MPI traffic

Interconnect Description: Gigabit Ethernet

Hardware		Software
Vendor:	Force10 Networks	
Model:	Force10 S50, Force10 C300	
Switch Model:	Force10 S50, Force10 C300	
Number of Switches:	15	
Number of Ports:	48	
Data Rate:	1Gbps Ethernet, 10Gbps Ethernet	
Firmware:	8.2.1.0	
Topology:	Fat tree	
Primary Use:	Cluster File System	

Submit Notes

```
The config file option 'submit' was used.
```

General Notes

```
MPI startup command:
  mpirun command was used to start MPI jobs. This command starts
  an independent ring of mpd daemons, launches an MPI job, and shuts
  down the mpd ring upon the job termination.

BIOS settings:
  Intel Hyper-Threading Technology (SMT): Disabled (default is Enabled)
  Intel Turbo Boost Technology (Turbo)  : Enabled (default is Enabled)

RAM configuration:
  Compute nodes have 2x4-GB RDIMM on each memory channel.

Network:
  Forty six 36-port switches: 18 core switches and 28 leaf switches.
  Each leaf has one link to each core. Remaining 18 ports on 25 of 28 leafs
  are used for compute nodes. On the remaining 3 leafs the ports are used
  for FS nodes and other peripherals.

Job placement:
```

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General Notes (Continued)

```
    Each MPI job was assigned to a topologically compact set of nodes, i.e.
    the minimal needed number of leaf switches was used for each job: 1 switch
    for 32/64/96/128 ranks.

  PBS Pro was used for job submission. It has no impact on performance.
    Can be found at: http://www.altair.com
```

Base Compiler Invocation

C benchmarks:
`mpiicc`

C++ benchmarks:

126.lammps: `mpiicpc`

Fortran benchmarks:
`mpiifort`

Benchmarks using both Fortran and C:
`mpiicc mpiifort`

Base Portability Flags

121.pop2: `-DSPEC_MPI_CASE_FLAG`
126.lammps: `-DMPICH_IGNORE_CXX_SEEK`
127.wrf2: `-DSPEC_MPI_CASE_FLAG -DSPEC_MPI_LINUX`

Base Optimization Flags

C benchmarks:
`-O3 -xSSE4.2 -no-prec-div`

C++ benchmarks:

126.lammps: `-O3 -xSSE4.2 -no-prec-div`

Fortran benchmarks:
`-O3 -xSSE4.2 -no-prec-div`

Benchmarks using both Fortran and C:
`-O3 -xSSE4.2 -no-prec-div`

The flags file that was used to format this result can be browsed at
http://www.spec.org/mpi2007/flags/EM64T_Intel111_flags.20100202.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/mpi2007/flags/EM64T_Intel111_flags.20100202.xml

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For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

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