SPEC® MPIM2007 Result

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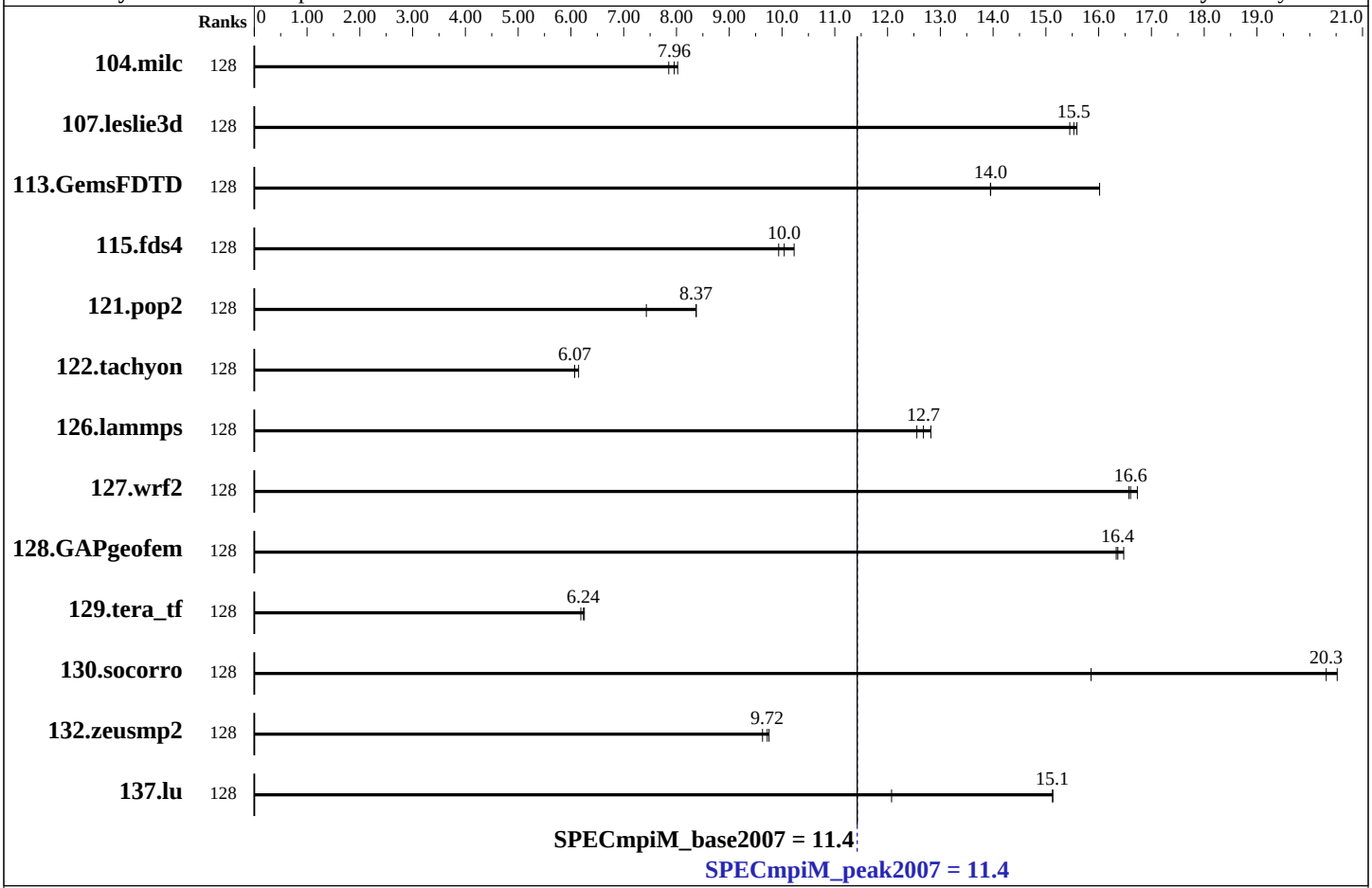
IBM Corporation
IBM Power 575

SPECmpiM_peak2007 = 11.4

SPECmpiM_base2007 = 11.4

MPI2007 license: 0005
Test sponsor: IBM Corporation
Tested by: IBM Corporation

Test date: Jun-2008
Hardware Availability: May-2008
Software Availability: May-2008



Results Table

Benchmark	Base							Peak						
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
104.milc	128	199	7.85	**197**	**7.96**	195	8.02	128	199	7.85	**197**	**7.96**	195	8.02
107.leslie3d	128	**336**	**15.5**	335	15.6	338	15.5	128	**336**	**15.5**	335	15.6	338	15.5
113.GemsFDTD	128	452	13.9	394	16.0	**452**	**14.0**	128	452	13.9	394	16.0	**452**	**14.0**
115.fds4	128	196	9.94	**194**	**10.0**	191	10.2	128	196	9.94	**194**	**10.0**	191	10.2
121.pop2	128	493	8.37	556	7.43	**493**	**8.37**	128	493	8.37	556	7.43	**493**	**8.37**
122.tachyon	128	461	6.07	455	6.15	**461**	**6.07**	128	461	6.07	455	6.15	**461**	**6.07**
126.lammps	128	227	12.8	**230**	**12.7**	232	12.6	128	227	12.8	**230**	**12.7**	232	12.6
127.wrf2	128	**469**	**16.6**	466	16.7	470	16.6	128	**469**	**16.6**	466	16.7	470	16.6
128.GAPgeofem	128	**126**	**16.4**	126	16.3	125	16.5	128	**126**	**16.4**	126	16.3	125	16.5
129.tera_tf	128	447	6.19	**444**	**6.24**	443	6.25	128	447	6.19	**444**	**6.24**	443	6.25

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	**188**	**20.3**	241	15.9	186	20.5	128	**188**	**20.3**	241	15.9	186	20.5
132.zeusmp2	128	318	9.75	**319**	**9.72**	322	9.63	128	318	9.75	**319**	**9.72**	322	9.63
137.lu	128	243	15.1	**243**	**15.1**	304	12.1	128	243	15.1	**243**	**15.1**	304	12.1

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

Hardware Summary

Type of System:	Homogeneous
Compute Nodes:	IBM Power 575 IBM Power 575
Interconnects:	InfiniBand Gigabit Ethernet
File Server Node:	IBM Power 575
Head Node:	IBM Power 575
Total Compute Nodes:	2
Total Chips:	32
Total Cores:	64
Total Threads:	128
Total Memory:	256 GB
Base Ranks Run:	128
Minimum Peak Ranks:	128
Maximum Peak Ranks:	128

Software Summary

C Compiler:	IBM XL C/C++ Enterprise Edition V9.0 Updated with the Oct2007 PTF
C++ Compiler:	IBM XL C/C++ Enterprise Edition V9.0 Updated with the Oct2007 PTF
Fortran Compiler:	IBM XL Fortran Enterprise Edition V11.1 Updated with the Oct2007 PTF
Base Pointers:	64-bit
Peak Pointers:	64-bit
MPI Library:	IBM Parallel Environment for AIX V4.3.2.2
Other MPI Info:	--
Pre-processors:	--
Other Software:	None

Node Description: IBM Power 575

Hardware

Number of nodes:	1
Uses of the node:	compute, head, fileserver
Vendor:	IBM Corporation
Model:	IBM Power 575
CPU Name:	POWER6
CPU(s) orderable:	32 cores
Chips enabled:	16
Cores enabled:	32
Cores per chip:	2
Threads per core:	2
CPU Characteristics:	
CPU MHz:	4700
Primary Cache:	64 KB I + 64 KB D on chip per core
Secondary Cache:	4 MB I+D on chip per core
L3 Cache:	32 MB I+D off chip per chip
Other Cache:	None
Memory:	128 GB (64x2 GB) DDR2 533 MHz
Disk Subsystem:	1x146 GB SFF SAS, 10K RPM
Other Hardware:	None
Adapter:	Integrated
Number of Adapters:	1

Continued on next page

Software

Adapter:	Integrated
Adapter Driver:	fileset devices.chrp.IBM.lhea.rte 5.3.8.2
Adapter Firmware:	--
Adapter:	IBM Dual 2-port 4x DDR Host Channel Adapter
Adapter Driver:	fileset devices.common.IBM.ib.rte 5.3.8.2
Adapter Firmware:	--
Operating System:	IBM AIX V5.3 with the 5300-08-02 Technology Level
Local File System:	AIX/JFS2
Shared File System:	NFS over ethernet
System State:	Multi-user
Other Software:	APAR IZ26983 software update for InfiniBand adapter drivers IBM LoadLeveler for AIX V3.4.3.2

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Test date: Jun-2008
Hardware Availability: May-2008
Software Availability: May-2008

Node Description: IBM Power 575

Slot Type:	--
Data Rate:	1 Gbps
Ports Used:	1
Interconnect Type:	Gigabit Ethernet
Adapter:	IBM Dual 2-port 4x DDR Host Channel Adapter
Number of Adapters:	2
Slot Type:	GX++
Data Rate:	4x DDR 20 Gbps
Ports Used:	4
Interconnect Type:	DDR InfiniBand

Node Description: IBM Power 575

Hardware

Number of nodes:	1
Uses of the node:	compute
Vendor:	IBM Corporation
Model:	IBM Power 575
CPU Name:	POWER6
CPU(s) orderable:	32 cores
Chips enabled:	16
Cores enabled:	32
Cores per chip:	2
Threads per core:	2
CPU Characteristics:	
CPU MHz:	4700
Primary Cache:	64 KB I + 64 KB D on chip per core
Secondary Cache:	4 MB I+D on chip per core
L3 Cache:	32 MB I+D off chip per chip
Other Cache:	None
Memory:	128 GB (64x2 GB) DDR2 533 MHz
Disk Subsystem:	1x146 GB SFF SAS, 10K RPM
Other Hardware:	None
Adapter:	Integrated
Number of Adapters:	1
Slot Type:	--
Data Rate:	1 Gbps
Ports Used:	1
Interconnect Type:	Gigabit Ethernet
Adapter:	IBM Dual 2-port 4x DDR Host Channel Adapter
Number of Adapters:	2
Slot Type:	GX++
Data Rate:	4x DDR 20 Gbps
Ports Used:	4
Interconnect Type:	DDR InfiniBand

Software

Adapter:	Integrated
Adapter Driver:	fileset devices.chrp.IBM.lhea.rte 5.3.8.2
Adapter Firmware:	--
Adapter:	IBM Dual 2-port 4x DDR Host Channel Adapter
Adapter Driver:	fileset devices.common.IBM.ib.rte 5.3.8.2
Adapter Firmware:	--
Operating System:	IBM AIX V5.3 with the 5300-08-02 Technology Level
Local File System:	AIX/JFS2
Shared File System:	NFS over ethernet
System State:	Multi-user
Other Software:	APAR IZ26983 software update for InfiniBand adapter drivers IBM LoadLeveler for AIX V3.4.3.2

Interconnect Description: InfiniBand

Hardware		Software
Vendor:	QLogic	
Model:	--	
Switch Model:	QLogic SilverStorm 9024	
Number of Switches:	2	
Number of Ports:	24	
Data Rate:	InfiniBand 4x DDR 20 Gbps	
Firmware:	4.2.1.1.1	
Topology:	linear	
Primary Use:	MPI Communication	

Interconnect Description: Gigabit Ethernet

Hardware		Software
Vendor:	IBM Corporation	
Model:	Cisco Systems WS-C6509-E Catalyst 6500 9-slot Chassis System	
Switch Model:	Cisco Systems WS-X6748-GE-TX CEF720 48 port 10/100/1000mb Ethernet card Cisco Systems WS-SUP720-3B 2 ports Supervisor Engine 720 Rev. 5.2	
Number of Switches:	1	
Number of Ports:	48	
Data Rate:	1 Gbps	
Firmware:	01ES330_034_034	
Topology:	--	
Primary Use:	File system	

General Notes

```
113.GemsFDTD (base): Applied maxprocandstop src.alt
129.tera_tf (base): Applied fixbuffer src.alt
127.wrf2 (base): Applied fixcalling src.alt
all ulimits set to unlimited
"petaskbind.sh" script used to bind each task to a unique processor
POE Environment variables set before executing benchmarks:
 CWD       =/specmpi/mpi2007-1.0
 MP_ADAPTER_USE      =shared
 MP_EUILIB           =us
 MP_EUIDEVICE        =sn_all
 MP_SHARED_MEMORY  =yes
 MP_SINGLE_THREAD  =yes
 MP_WAIT_MODE        =poll
 MP_EAGER_LIMIT      =65536
 MP_BUFFER_MEM       =67108864
 MP_POLLING_INTERVAL =80000000
 MP_USE_BULK_XFER    =yes
```

Continued on next page

General Notes (Continued)

```
 MP_BULK_MIN_MSG_SIZE=65536
 MP_STDINMODE         =none
 MP_LABELIO           =no
 MP_HOSTFILE          =$CWD/r35.128-2node
Other Environment variables
 MEMORY_AFFINITY      =MCM
 LDR_CNTRL        =DATAPSIZE=64K@TEXTPSIZE=64K@STACKPSIZE=64K
 XLFRTEOTPS           =intrinthds=1
submit command uses petaskbind.sh script to bind logical processors to ranks
 poe $CWD/petaskbind.sh $command -procs $ranks
The Gigabit ethernet switch is shared among many nodes, not just the cluster used in this benchmark.
```

Base Compiler Invocation

C benchmarks:
`/usr/bin/mpcc_r`

C++ benchmarks:

126.lammps: `/usr/bin/mpCC_r`

Fortran benchmarks:
`/usr/bin/mpxlf95_r`

Benchmarks using both Fortran and C:
`/usr/bin/mpcc_r /usr/bin/mpxlf95_r`

Base Portability Flags

107.leslie3d: `-qfixed`
115.fds4: `-DSPEC_MPI_LC_NO_TRAILING_UNDERSCORE -qfixed`
121.pop2: `-DSPEC_MPI_AIX`
127.wrf2: `-DNOUNDERSCORE -DSPEC_MPI_AIX`
130.socorro: `-DSPEC_NO_UNDERSCORE -qcpluscmt`
132.zeusmp2: `-qfixed -DSPEC_SINGLE_UNDERSCORE`
137.lu: `-qfixed`

Base Optimization Flags

C benchmarks:
`-O4 -qarch=pwr6 -qtune=pwr6 -q64`

C++ benchmarks:

126.lammps: `-O4 -qarch=pwr6 -qtune=pwr6 -qstrict -q64`

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Base Optimization Flags (Continued)

Fortran benchmarks:
`-O4 -qarch=pwr6 -qtune=pwr6 -qalias=nostd -q64`

Benchmarks using both Fortran and C:
`-O4 -qarch=pwr6 -qtune=pwr6 -qalias=nostd -q64`

Base Other Flags

C benchmarks:
`-w -qsuppress=1500-036 -qipa=noobject -qipa=threads`

C++ benchmarks:

126.lammps: `-w -qsuppress=1500-036 -qipa=noobject -qipa=threads`

Fortran benchmarks:
`-w -qsuppress=1500-036 -qsuppress=cmpmsg -qipa=noobject -qipa=threads`

Benchmarks using both Fortran and C:
`-w -qsuppress=1500-036 -qsuppress=cmpmsg -qipa=noobject -qipa=threads`

Peak Optimization Flags

C benchmarks:

104.milc: `basepeak = yes`

122.tachyon: `basepeak = yes`

C++ benchmarks:

126.lammps: `basepeak = yes`

Fortran benchmarks:

107.leslie3d: `basepeak = yes`

113.GemsFDTD: `basepeak = yes`

129.tera_tf: `basepeak = yes`

137.lu: `basepeak = yes`

Benchmarks using both Fortran and C:

Continued on next page

Peak Optimization Flags (Continued)

115.fds4: `basepeak = yes`

121.pop2: `basepeak = yes`

127.wrf2: `basepeak = yes`

128.GAPgeofem: `basepeak = yes`

130.socorro: `basepeak = yes`

132.zeusmp2: `basepeak = yes`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/mpi2007/flags/MPI2007_flags.20080828.html`
`http://www.spec.org/mpi2007/flags/MPI2007_flags.0.20080828.html`
`http://www.spec.org/mpi2007/flags/MPI2007_flags.1.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/mpi2007/flags/MPI2007_flags.20080828.xml`
`http://www.spec.org/mpi2007/flags/MPI2007_flags.0.20080828.xml`
`http://www.spec.org/mpi2007/flags/MPI2007_flags.1.xml`

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Tested with SPEC MPI2007 v1.0.
Report generated on Tue Jul 22 13:34:43 2014 by SPEC MPI2007 PS/PDF formatter v1463.
Originally published on 27 August 2008.