SPEC® MPIM2007 Result

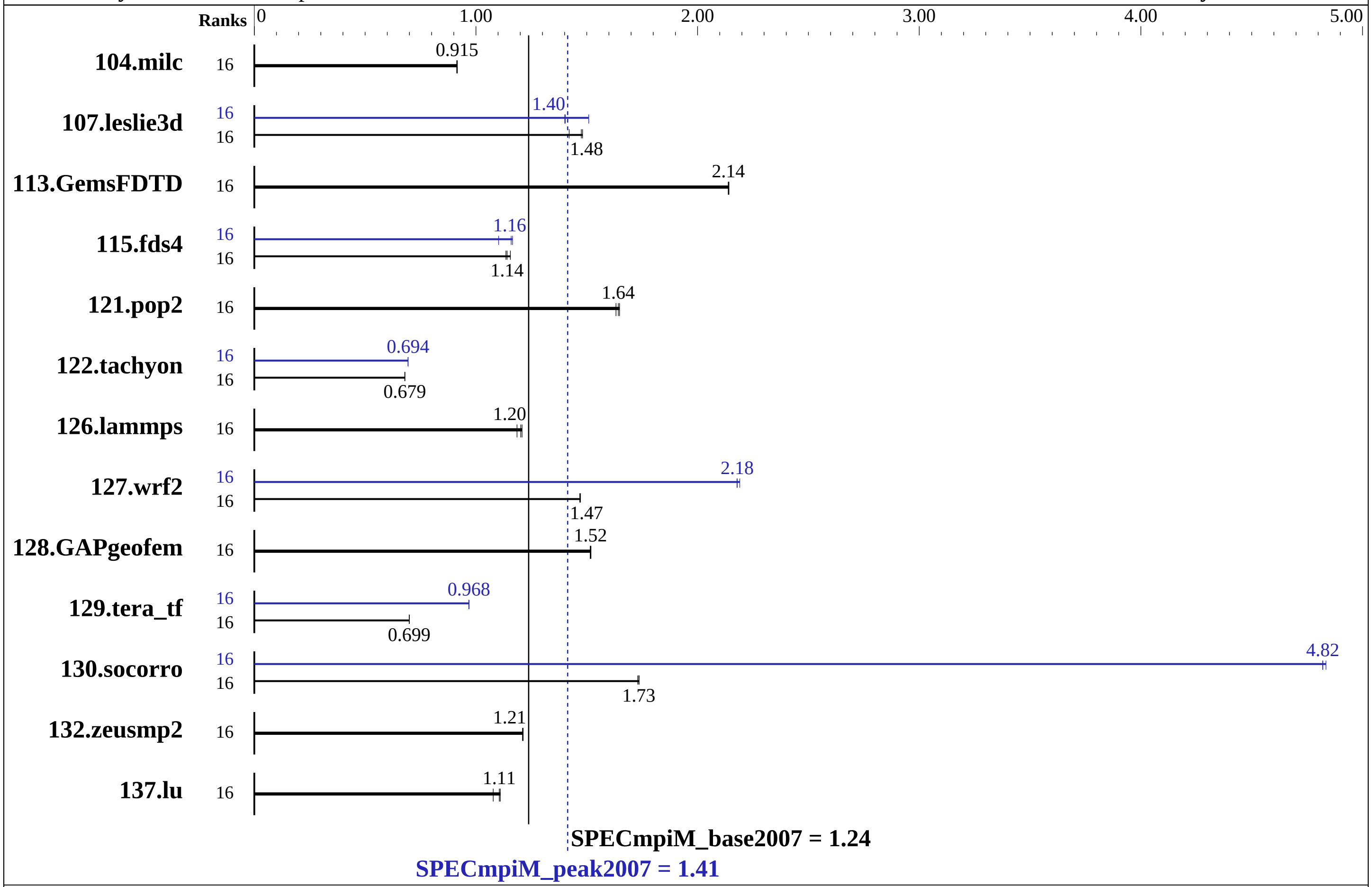
IBM Corporation

IBM BladeCenter JS22 Express (4 GHz, 2x4 core)

SPECmpiM_peak2007 = 1.41

SPECmpiM_base2007 = 1.24

MPI2007 license:	0005	**Test date:**	Oct-2008
Test sponsor:	IBM Corporation	**Hardware Availability:**	Nov-2008
Tested by:	IBM Corporation	**Software Availability:**	Nov-2008



Results Table

Benchmark	Base							Peak						
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
104.milc	16	1713	0.913	**1711**	**0.915**	1708	0.916	16	1713	0.913	**1711**	**0.915**	1708	0.916
107.leslie3d	16	3524	1.48	3674	1.42	**3538**	**1.48**	16	3459	1.51	3727	1.40	**3719**	**1.40**
113.GemsFDTD	16	2945	2.14	**2949**	**2.14**	2950	2.14	16	2945	2.14	**2949**	**2.14**	2950	2.14
115.fds4	16	1719	1.14	1689	1.16	**1710**	**1.14**	16	1770	1.10	**1683**	**1.16**	1675	1.17
121.pop2	16	2505	1.65	**2513**	**1.64**	2530	1.63	16	2505	1.65	**2513**	**1.64**	2530	1.63
122.tachyon	16	**4118**	**0.679**	4115	0.680	4119	0.679	16	4030	0.694	**4031**	**0.694**	4031	0.694
126.lammps	16	**2425**	**1.20**	2459	1.19	2413	1.21	16	**2425**	**1.20**	2459	1.19	2413	1.21
127.wrf2	16	5309	1.47	**5299**	**1.47**	5297	1.47	16	**3578**	**2.18**	3580	2.18	3559	2.19
128.GAPgeofem	16	**1361**	**1.52**	1359	1.52	1362	1.52	16	**1361**	**1.52**	1359	1.52	1362	1.52
129.tera_tf	16	3961	0.699	**3961**	**0.699**	3960	0.699	16	2857	0.969	**2859**	**0.968**	2861	0.968

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

Results Table (Continued)

Benchmark	Base							Peak						
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
130.socorro	16	2199	1.74	**2200**	**1.73**	2206	1.73	16	792	4.82	**792**	**4.82**	789	4.84
132.zeusmp2	16	2558	1.21	2564	1.21	**2559**	**1.21**	16	2558	1.21	2564	1.21	**2559**	**1.21**
137.lu	16	3312	1.11	3410	1.08	**3326**	**1.11**	16	3312	1.11	3410	1.08	**3326**	**1.11**

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

Hardware Summary

Type of System:	Heterogeneous
Compute Nodes:	IBM System JS22 IBM System JS22
Interconnects:	InfiniBand Ethernet
File Server Node:	IBM System JS22
Head Node:	IBM System JS22
Total Compute Nodes:	2
Total Chips:	4
Total Cores:	8
Total Threads:	16
Total Memory:	48 GB
Base Ranks Run:	16
Minimum Peak Ranks:	16
Maximum Peak Ranks:	16

Software Summary

C Compiler:	IBM XL C/C++ Enterprise Edition V9 for AIX Updated with the September 2008 Fix level
C++ Compiler:	IBM XL C/C++ Enterprise Edition V9 for AIX Updated with the September 2008 Fix level
Fortran Compiler:	IBM XL Fortran Enterprise Edition V11.1 for AIX Updated with the September 2008 Fix level
Base Pointers:	32-bit
Peak Pointers:	32/64-bit
MPI Library:	IBM Parallel Environment for AIX, Version 5 Release 1
Other MPI Info:	None
Pre-processors:	None
Other Software:	IBM Engineering and Scientific Subroutine Library (ESSL) for AIX Version 4 Release 3 Updated with PTF Set 3

Node Description: IBM System JS22

Hardware

Number of nodes:	1
Uses of the node:	compute, head, fileserver
Vendor:	IBM Corporation
Model:	IBM System JS22
CPU Name:	POWER6
CPU(s) orderable:	4 cores per blade
Chips enabled:	2
Cores enabled:	4
Cores per chip:	2
Threads per core:	2
CPU Characteristics:	
CPU MHz:	4000
Primary Cache:	64 KB I + 64 KB D on chip per core
Secondary Cache:	4 MB I+D on chip per core
L3 Cache:	None
Other Cache:	None
Memory:	32 GB (4x8 GB) DDR2 500 MHz
Disk Subsystem:	1x146 GB SAS 15K RPM
Other Hardware:	BladeCenter-H chassis Voltaire 4X InfiniBand Pass-thru Module (P/N 43W4419)

Continued on next page

Software

Adapter:	4X InfiniBand DDR Expansion Card (CFFh) for IBM BladeCenter (P/N 43W4423)
Adapter Driver:	devices.pciex.b3157862.rte 6.1.2.0
Adapter Firmware:	2.3.0
Operating System:	IBM AIX V6.1 with the 6100-02 Technology Level
Local File System:	AIX/JFS2
Shared File System:	NFSv3
System State:	Multi-user
Other Software:	None

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IBM BladeCenter JS22 Express (4 GHz, 2x4 core)

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Test sponsor:	IBM Corporation	**Hardware Availability:**	Nov-2008
Tested by:	IBM Corporation	**Software Availability:**	Nov-2008

Node Description: IBM System JS22

Adapter:	4X InfiniBand DDR Expansion Card (CFFh) for IBM BladeCenter (P/N 43W4423)
Number of Adapters:	1
Slot Type:	PCIe x8 Gen2
Data Rate:	4x DDR 20Gbps
Ports Used:	1
Interconnect Type:	InfiniBand

General Notes

```
Blade[1] runs the following commands to compose the cluster:
     mkdev -c management -s infiniband -t icm
   /usr/sbin/mkiba -a 192.1.10.1 -m 255.255.255.0 -i ib0 -A iba0 -p 1 -P 0xFFFF -M 65532 -q 4000 -k off -Q 0x1E -S up
     startsrc -s ctcas
     preprpnode mpiblade1
     mkrpdomain mpiblades mpiblade1 mpiblade2
     startrpdomain mpiblades
     cd /usr/lpp/ppe.poe/samples/nrt
     make
     chmod 4755 nrt_api
     shutdown -rF
     su spec
     cd mpiblades.64ranks.load
     ../nrt_api -l
```

Node Description: IBM System JS22

Hardware

Number of nodes:	1
Uses of the node:	compute
Vendor:	IBM Corporation
Model:	IBM System JS22
CPU Name:	POWER6
CPU(s) orderable:	4 cores per blade
Chips enabled:	2
Cores enabled:	4
Cores per chip:	2
Threads per core:	2
CPU Characteristics:	
CPU MHz:	4000
Primary Cache:	64 KB I + 64 KB D on chip per core
Secondary Cache:	4 MB I+D on chip per core
L3 Cache:	None
Other Cache:	None
Memory:	16 GB (4x4 GB) DDR2 667 MHz
Disk Subsystem:	1x146 GB SAS 15K RPM

Continued on next page

Software

Adapter:	4X InfiniBand DDR Expansion Card (CFFh) for IBM BladeCenter (P/N 43W4423)
Adapter Driver:	devices.pciex.b3157862.rte 6.1.2.0
Adapter Firmware:	2.3.0
Operating System:	IBM AIX V6.1 with the 6100-02 Technology Level
Local File System:	AIX/JFS2
Shared File System:	NFSv3
System State:	Multi-user
Other Software:	None

Node Description: IBM System JS22

Other Hardware:	BladeCenter-H chassis Voltaire 4X InfiniBand Pass-thru Module (P/N 43W4419)
Adapter:	4X InfiniBand DDR Expansion Card (CFFh) for IBM BladeCenter (P/N 43W4423)
Number of Adapters:	1
Slot Type:	PCIe x8 Gen2
Data Rate:	4x DDR 20Gbps
Ports Used:	1
Interconnect Type:	InfiniBand

General Notes

```
Blade[2] runs the following commands to compose the cluster:
     mkdev -c management -s infiniband -t icm
     /usr/sbin/mkiba -a 192.1.10.2 -m 255.255.255.0 -i ib0 -A iba0 -p 1 -P 0xFFFF -M 65532 -q 4000 -k off -Q 0x1E -S up
     startsrc -s ctcas
     preprpnode mpiblade1
     cd /usr/lpp/ppe.poe/samples/nrt
     make
     chmod 4755 nrt_api
     shutdown -rF
     su spec
     cd mpiblades.64ranks.load
     ../nrt_api -l
```

Interconnect Description: InfiniBand

Hardware

Vendor:	IBM Corporation
Model:	4x DDR InfiniBand
Switch Model:	QLogic SilverStorm 9024
Number of Switches:	1
Number of Ports:	24
Data Rate:	4x DDR 20Gbps
Firmware:	4.2.1.1.1
Topology:	single switch
Primary Use:	MPI Communication

Software

Interconnect Description: Ethernet

Hardware

Vendor:	IBM Corporation
Model:	4-port Gigabit Ethernet

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Software

IBM Corporation

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Interconnect Description: Ethernet

Switch Model:	IBM BladeCenter 4-port Gigabit Ethernet switch module (P/N 26K6483)
Number of Switches:	1
Number of Ports:	18
Data Rate:	1Gbps
Firmware:	1.08
Topology:	single switch
Primary Use:	File system

Compiler Invocation Notes

```
Blade[1], with 32GB of memory and 32GB of paging space, was used to compile the benchmarks.
```

Submit Notes

```
The config file option 'submit' was used.
    submit = poe task_stride.2level.32+64rank 4 2 8 $ranks $command -procs $ranks -hostfile /spec/MapFiles/ib0hosts.8x.1-8
```

General Notes

```
Environment settings:
    All ulimits set to unlimited
    ranks                  = 16
    CWD                    = /spec/mpi2007
    MEMORY_AFFINITY        = MCM
    XLFRTEOPTS             = intrinthds=1
    MP_PGMMODEL            = spmd
    MP_MSG_API             = mpi
    MP_DEVTYPE             = ib
    MP_CLOCK_SOURCE        = AIX
    MP_STDINMODE           = none
    MP_SHARED_MEMORY       = yes
    MP_SINGLE_THREAD       = yes
    MP_EUILIB              = us
    NRT_WINDOW_COUNT       = 1
    MP_RESD                = no
    MP_PULSE               = 0
    ADAPTER_USE            = shared
    EUIDEVICE              = sn_single
    MP_CSS_INTERRUPT       = no
    MP_BUFFER_MEM          = 67108864
    MP_USE_BULK_XFER       = yes
    MP_BULK_MIN_MSG_SIZE   = 8192
    MP_EAGER_LIMIT         = 65536
    MP_WAIT_MODE           = yield
    MP_INFOLEVEL           = 0
    MP_LABELIO             = no
```

Continued on next page

General Notes (Continued)

```
MP_STDOUTMODE          = unordered
MP_PMDLOG              = no
NRT_JOB_KEY            = 64
```

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`

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:
`-bmaxdata:0x80000000 -O5 -D_ILS_MACROS -bdatapsize:64K -bstackpsize:64K -btextpsize:64K`

C++ benchmarks:

126.lammps: `-bmaxdata:0x80000000 -O5`

Fortran benchmarks:
`-bmaxdata:0x80000000 -O4 -qstrict -qalias=nostd -qhot=level=0 -qsave -bdatapsize:64K -bstackpsize:64K -btextpsize:64K`

Benchmarks using both Fortran and C:
`-bmaxdata:0x80000000 -O5 -D_ILS_MACROS -bdatapsize:64K -bstackpsize:64K -btextpsize:64K -O4 -qstrict -qalias=nostd`

Continued on next page

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):
-qhot=level=0 -qsave

Peak Optimization Flags

C benchmarks:

104.milc: basepeak = yes

122.tachyon: -O5 -lessl -D_ILS_MACROS -bdatapsize:64K -bstackpsize:64K -btextpsize:64K -q64

C++ benchmarks:

126.lammps: basepeak = yes

Fortran benchmarks:

107.leslie3d: -O5 -bdatapsize:64K -bstackpsize:64K -btextpsize:64K -bmaxdata:0x70000000

113.GemsFDTD: basepeak = yes

129.tera_tf: -O5 -qessl -lessl -bdatapsize:64K -bstackpsize:64K -btextpsize:64K

137.lu: basepeak = yes

Benchmarks using both Fortran and C:

115.fds4: -O5 -lessl -D_ILS_MACROS -bdatapsize:64K -bstackpsize:64K -btextpsize:64K -qstrict -qalias=nostd -qhot=level=0 -qsave -q64

121.pop2: basepeak = yes

127.wrf2: -O5 -bmaxdata:0x80000000

128.GAPgeofem: basepeak = yes

130.socorro: -O5 -lessl -D_ILS_MACROS -bdatapsize:64K -bstackpsize:64K -btextpsize:64K -qessl -bmaxdata:0x80000000

132.zeusmp2: basepeak = yes

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 -qspillsize=32648`

Benchmarks using both Fortran and C:
`-w -qsuppress=1500-036 -qipa=noobject -qipa=threads -qsuppress=cmpmsg -qspillsize=32648`

The flags files that were used to format this result can be browsed at
http://www.spec.org/mpi2007/flags/MPI2007_flags.20081105.html
http://www.spec.org/mpi2007/flags/IBM-XL.html
http://www.spec.org/mpi2007/flags/IBM-AIX.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/mpi2007/flags/MPI2007_flags.20081105.xml
http://www.spec.org/mpi2007/flags/IBM-XL.xml
http://www.spec.org/mpi2007/flags/IBM-AIX.xml

Tested with SPEC MPI2007 v1.1.
Report generated on Tue Jul 22 13:35:05 2014 by SPEC MPI2007 PS/PDF formatter v1463.
Originally published on 19 November 2008.