



# SPEC<sup>®</sup> MPIM2007 Result

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IBM Corporation

SPECmpiM\_peak2007 = 2.79

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

SPECmpiM\_base2007 = 2.44

MPI2007 license: 0005

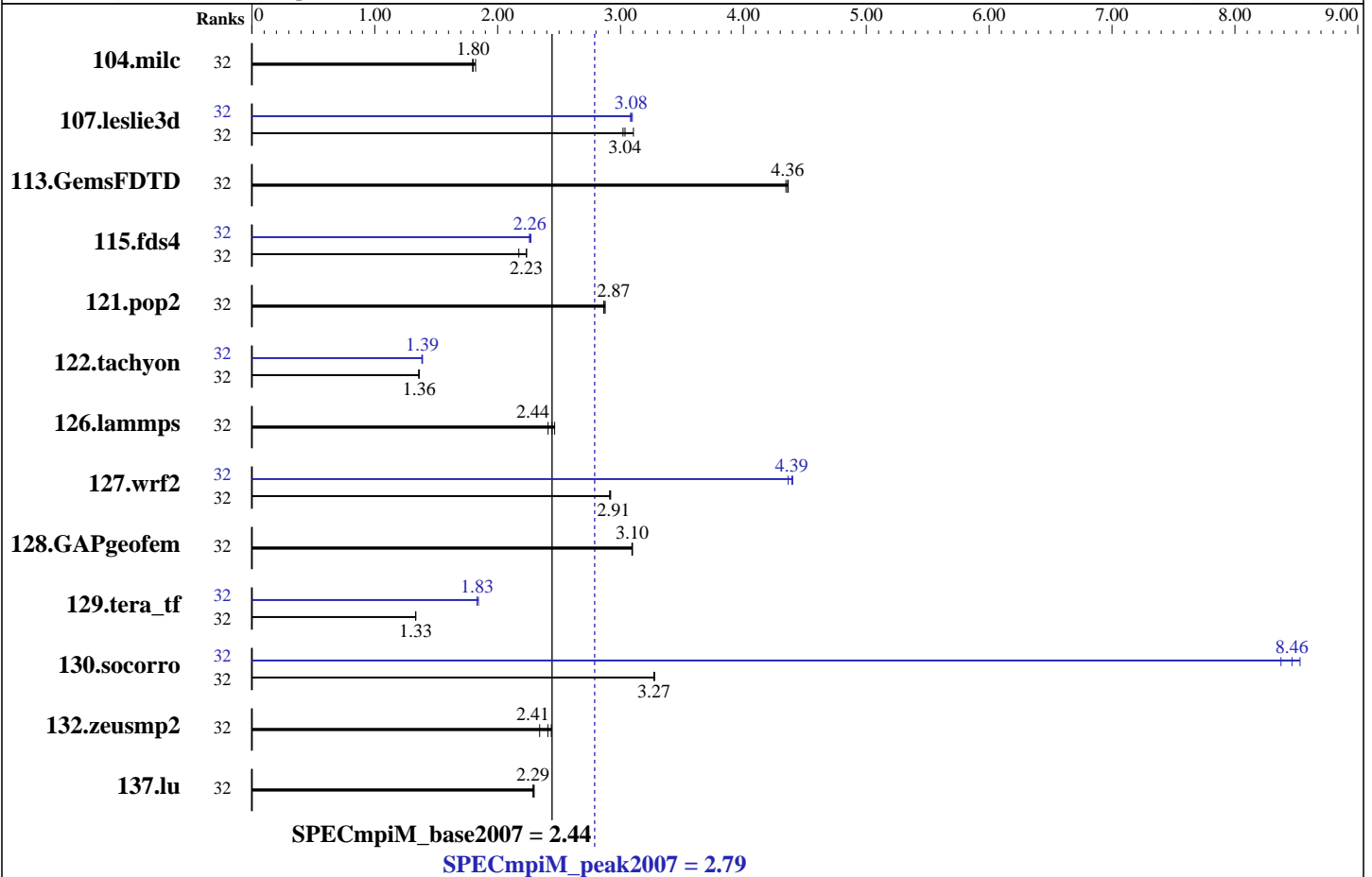
Test date: Oct-2008

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	32	860	1.82	871	1.80	<b>869</b>	<b>1.80</b>	32	860	1.82	871	1.80	<b>869</b>	<b>1.80</b>		
107.leslie3d	32	1681	3.11	<b>1719</b>	<b>3.04</b>	1728	3.02	32	<b>1692</b>	<b>3.08</b>	1694	3.08	1686	3.10		
113.GemsFDTD	32	<b>1447</b>	<b>4.36</b>	1445	4.36	1451	4.35	32	<b>1447</b>	<b>4.36</b>	1445	4.36	1451	4.35		
115.fds4	32	<b>873</b>	<b>2.23</b>	898	2.17	873	2.24	32	863	2.26	859	2.27	<b>863</b>	<b>2.26</b>		
121.pop2	32	<b>1440</b>	<b>2.87</b>	1436	2.88	1441	2.86	32	<b>1440</b>	<b>2.87</b>	1436	2.88	1441	2.86		
122.tachyon	32	<b>2056</b>	<b>1.36</b>	2059	1.36	2055	1.36	32	2015	1.39	2022	1.38	<b>2016</b>	<b>1.39</b>		
126.lammps	32	1183	2.46	1209	2.41	<b>1194</b>	<b>2.44</b>	32	1183	2.46	1209	2.41	<b>1194</b>	<b>2.44</b>		
127.wrf2	32	<b>2675</b>	<b>2.91</b>	2670	2.92	2677	2.91	32	<b>1774</b>	<b>4.39</b>	1786	4.36	1771	4.40		
128.GAPgeofem	32	<b>667</b>	<b>3.10</b>	668	3.09	667	3.10	32	<b>667</b>	<b>3.10</b>	668	3.09	667	3.10		
129.tera_tf	32	2077	1.33	<b>2077</b>	<b>1.33</b>	2076	1.33	32	<b>1510</b>	<b>1.83</b>	1511	1.83	1501	1.84		

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	32	1165	3.28	1166	3.27	<b>1166</b>	<b>3.27</b>	32	<b>451</b>	<b>8.46</b>	447	8.53	456	8.37		
132.zeusmp2	32	1273	2.44	1325	2.34	<b>1288</b>	<b>2.41</b>	32	1273	2.44	1325	2.34	<b>1288</b>	<b>2.41</b>		
137.lu	32	1607	2.29	1600	2.30	<b>1604</b>	<b>2.29</b>	32	1607	2.29	1600	2.30	<b>1604</b>	<b>2.29</b>		

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: 4  
 Total Chips: 8  
 Total Cores: 16  
 Total Threads: 32  
 Total Memory: 80 GB  
 Base Ranks Run: 32  
 Minimum Peak Ranks: 32  
 Maximum Peak Ranks: 32

#### 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)

#### 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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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 (CFH) 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
preprnode mpibladel
mkrpdomain mpiblades mpibladel mpiblade2 mpiblade3 mpiblade4
startdomain 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:	3
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

Software	
Adapter:	4X InfiniBand DDR Expansion Card (CFH) 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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Tested by: IBM Corporation

Software Availability: Nov-2008

### 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

Each blade runs the following commands to compose the cluster, where \$CLUSTER\_INDEX is 2-4 for Blade[2]-Blade[4]:

```

mkdev -c management -s infiniband -t icm
/usr/sbin/mkiba -a 192.1.10.$CLUSTER_INDEX -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
preprnode mpibladel
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

**Software**

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Hardware Availability: Nov-2008

Tested by: IBM Corporation

Software Availability: Nov-2008

## 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                = 32
CWD                  = /spec/mpi2007
MEMORY_AFFINITY     = MCM
XLFRT_OPTS          = intrinths=1
MP_PGM_MODEL        = 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_RES              = 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

```

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## 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  
-bstacksize:64K -btextpsize:64K

C++ benchmarks:

126.lammps: -bmaxdata:0x80000000 -O5

Fortran benchmarks:

-bmaxdata:0x80000000 -O4 -qstrict -qalias=nostd -qhot=level=0 -qsave  
-bdatapsize:64K -bstacksize:64K -btextpsize:64K

Benchmarks using both Fortran and C:

-bmaxdata:0x80000000 -O5 -D\_ILS\_MACROS -bdatapsize:64K  
-bstacksize:64K -btextpsize:64K -O4 -qstrict -qalias=nostd  
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## 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 -bstacksize:64K  
-btextpsize:64K -q64

C++ benchmarks:

126.lammps: basepeak = yes

Fortran benchmarks:

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

113.GemsFDTD: basepeak = yes

129.tera\_tf: -O5 -qessl -lessl -bdatapsize:64K -bstacksize:64K  
-btextpsize:64K

137.lu: basepeak = yes

Benchmarks using both Fortran and C:

115.fds4: -O5 -lessl -D\_ILS\_MACROS -bdatapsize:64K -bstacksize: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 -bstacksize:64K  
-btextpsize:64K -qessl -bmaxdata:0x80000000

132.zeusmp2: basepeak = yes



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## 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/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/MPI2007_flags.20081105.xml)

<http://www.spec.org/mpi2007/flags/IBM-XL.xml>

<http://www.spec.org/mpi2007/flags/IBM-AIX.xml>

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