



# SPEC® MPIM2007 Result

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## IBM Corporation

SPECmpiM\_peak2007 = 5.26

IBM BladeCenter JS22 Express (4 GHz, 8x4 core)

SPECmpiM\_base2007 = 4.68

MPI2007 license: 0005

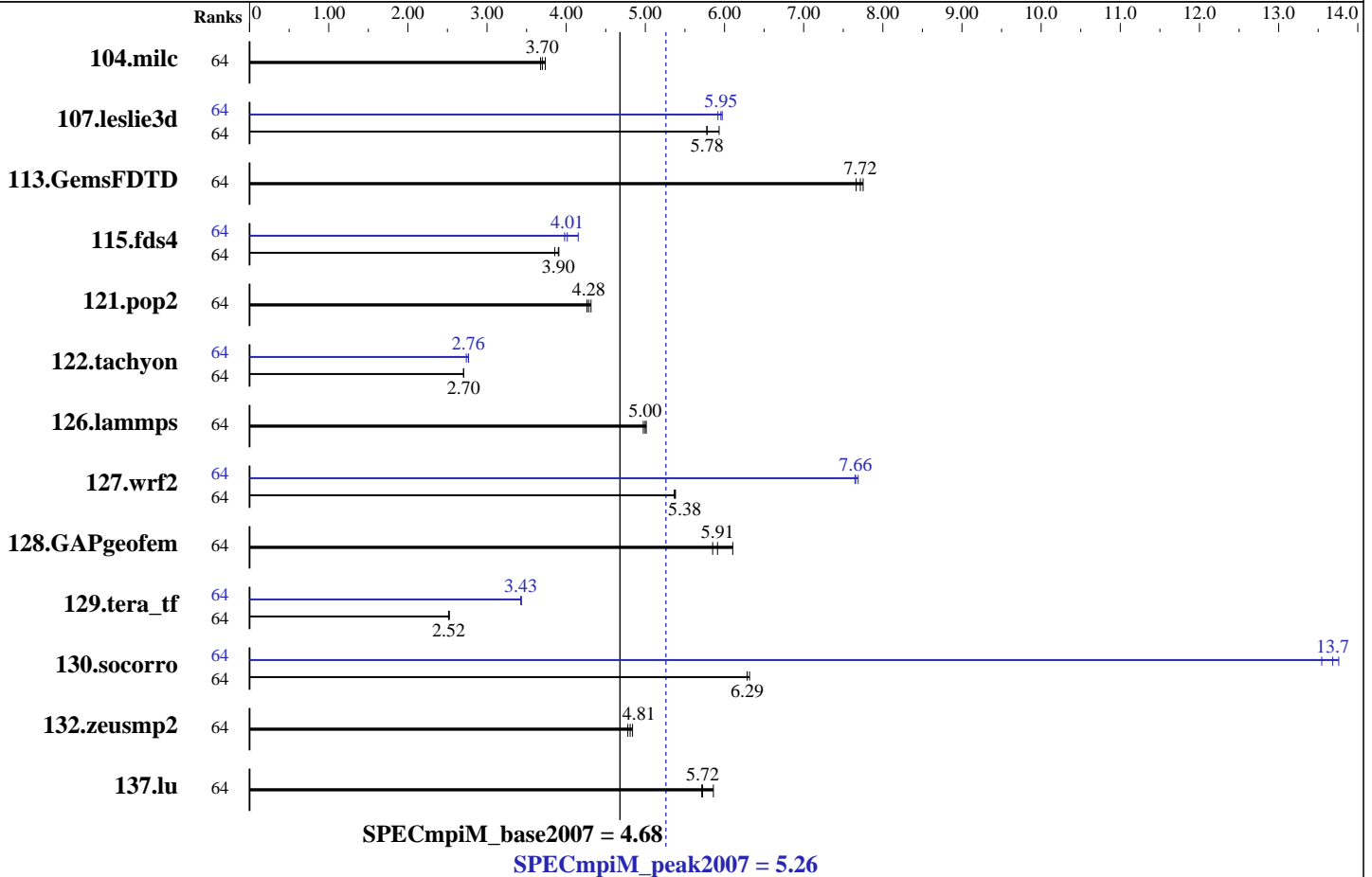
Test date: Oct-2008

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	64	426	3.68	419	3.74	<b>423</b>	<b>3.70</b>	64	426	3.68	419	3.74	<b>423</b>	<b>3.70</b>		
107.leslie3d	64	880	5.93	904	5.78	<b>903</b>	<b>5.78</b>	64	<b>877</b>	<b>5.95</b>	882	5.92	874	5.97		
113.GemsFDTD	64	<b>818</b>	<b>7.72</b>	814	7.75	823	7.66	64	<b>818</b>	<b>7.72</b>	814	7.75	823	7.66		
115.fds4	64	499	3.91	506	3.86	<b>500</b>	<b>3.90</b>	64	<b>486</b>	<b>4.01</b>	490	3.98	470	4.15		
121.pop2	64	957	4.31	968	4.26	<b>963</b>	<b>4.28</b>	64	957	4.31	968	4.26	<b>963</b>	<b>4.28</b>		
122.tachyon	64	1034	2.71	1035	2.70	<b>1034</b>	<b>2.70</b>	64	1022	2.74	<b>1012</b>	<b>2.76</b>	1011	2.77		
126.lammps	64	582	5.01	<b>583</b>	<b>5.00</b>	586	4.97	64	582	5.01	<b>583</b>	<b>5.00</b>	586	4.97		
127.wrf2	64	<b>1450</b>	<b>5.38</b>	1453	5.36	1449	5.38	64	<b>1018</b>	<b>7.66</b>	1014	7.69	1019	7.65		
128.GAPgeofem	64	353	5.85	338	6.10	<b>349</b>	<b>5.91</b>	64	353	5.85	338	6.10	<b>349</b>	<b>5.91</b>		
129.tera_tf	64	<b>1100</b>	<b>2.52</b>	1101	2.51	1096	2.52	64	808	3.43	<b>807</b>	<b>3.43</b>	806	3.43		

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	64	604	6.32	<b>607</b>	<b>6.29</b>	607	6.29	64	282	13.5	<b>279</b>	<b>13.7</b>	277	13.8		
132.zeusmp2	64	641	4.84	649	4.78	<b>645</b>	<b>4.81</b>	64	641	4.84	649	4.78	<b>645</b>	<b>4.81</b>		
137.lu	64	<b>642</b>	<b>5.72</b>	627	5.86	644	5.71	64	<b>642</b>	<b>5.72</b>	627	5.86	644	5.71		

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: 8  
 Total Chips: 16  
 Total Cores: 32  
 Total Threads: 64  
 Total Memory: 144 GB  
 Base Ranks Run: 64  
 Minimum Peak Ranks: 64  
 Maximum Peak Ranks: 64

#### 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 mpiblares mpiblares1 mpiblares2 mpiblares3 mpiblares4 mpiblares5 mpiblares6 mpiblares7 mpiblares8
starttrpdomain mpiblares
cd /usr/lpp/ppe.poe/samples/nrt
make
chmod 4755 nrt_api
shutdown -rF
su spec
cd mpiblares.64ranks.load
../nrt_api -l
```

### Node Description: IBM System JS22

Hardware	
Number of nodes:	7
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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Test sponsor: IBM Corporation

Hardware Availability: Nov-2008

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 2-8 for Blade[2]-Blade[8]:

```

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	Software
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	

### Interconnect Description: Ethernet

	Hardware	Software
Vendor:	IBM Corporation	
Model:	4-port Gigabit Ethernet	

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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                = 64
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 -btextsize:64K

C++ benchmarks:

126.lammps: -bmaxdata:0x80000000 -O5

Fortran benchmarks:

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

Benchmarks using both Fortran and C:

-bmaxdata:0x80000000 -O5 -D\_ILS\_MACROS -bdatapsize:64K  
-bstacksize:64K -btextsize: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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For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

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