# SPEC® MPIM2007 Result



## IBM Corporation

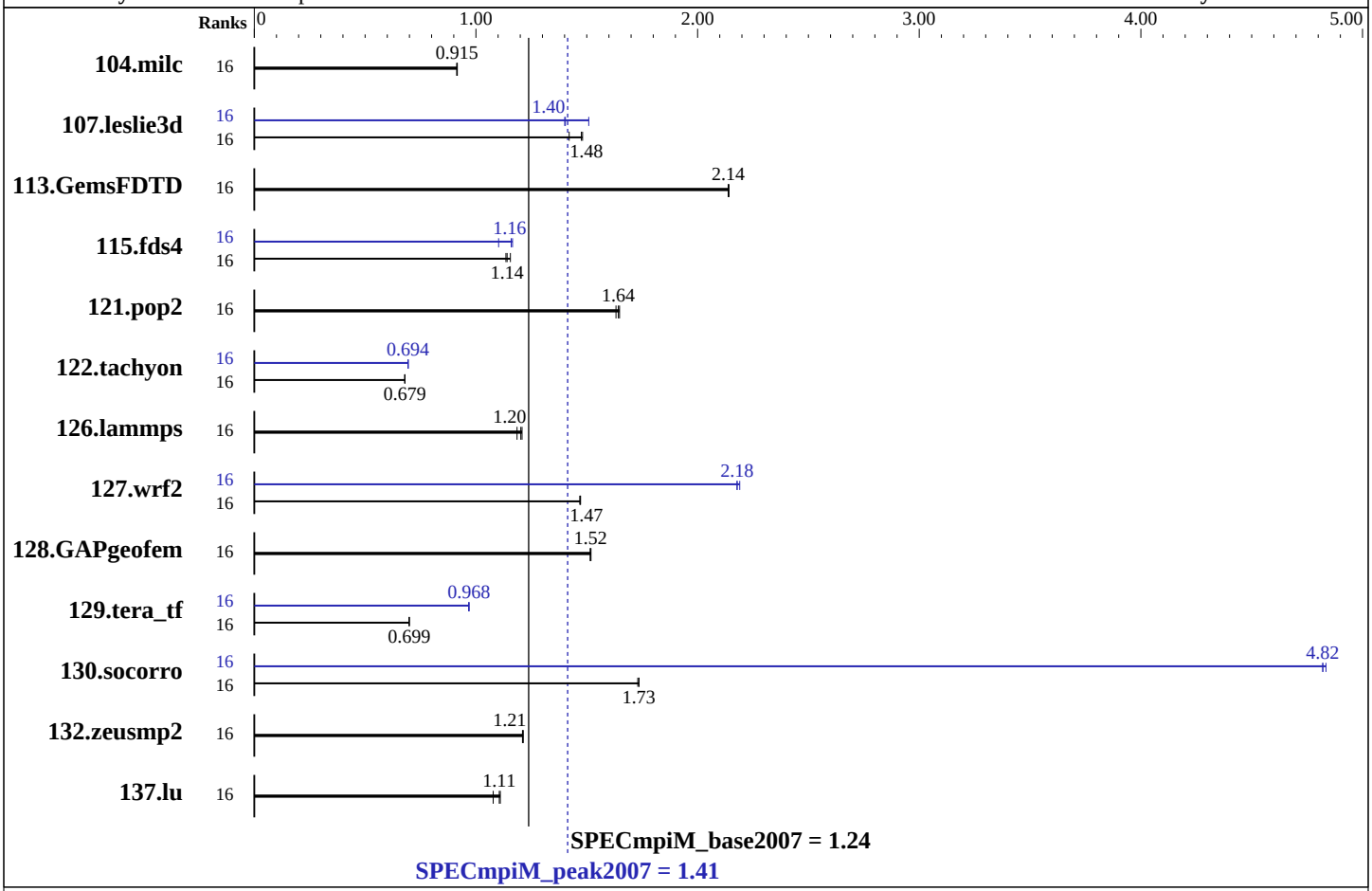
IBM BladeCenter JS22 Express (4 GHz, 2x4 core)

SPECmpiM_peak2007 = 1.41

SPECmpiM_base2007 = 1.24

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

**Test date:** Oct-2008
**Hardware Availability:** Nov-2008
**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.

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**Test date:** Oct-2008
**Hardware Availability:** Nov-2008
**Software Availability:** Nov-2008

## 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<br>IBM System JS22 |
| Interconnects: | InfiniBand<br>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<br>Voltaire 4X InfiniBand Pass-thru Module (P/N 43W4419) |

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### 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

| | |
|---|---|
| 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 |

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### 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<br>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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## 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/results/flags/MPI2007_flags.20100413.html
http://www.spec.org/mpi2007/results/flags/IBM-XL.html
http://www.spec.org/mpi2007/results/flags/IBM-AIX.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/mpi2007/results/flags/MPI2007_flags.20100413.xml
http://www.spec.org/mpi2007/results/flags/IBM-XL.xml
http://www.spec.org/mpi2007/results/flags/IBM-AIX.xml



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

Tested with SPEC MPI2007 v1.1.
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