# SPEC® MPIM2007 Result

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## Cray

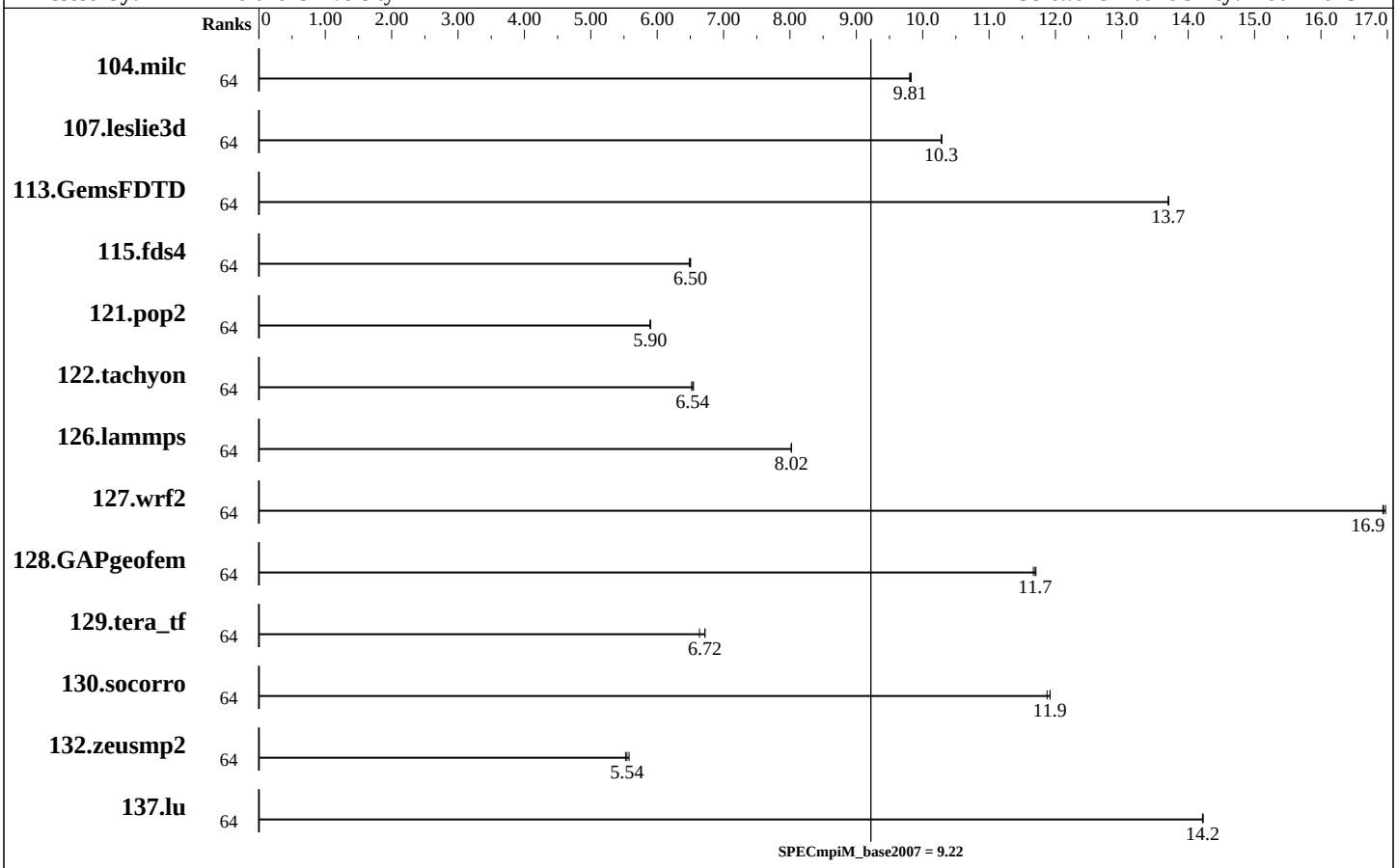
## Big Red II (AMD Opteron 6380, 2.5 GHz)

SPECmpiM_peak2007 = Not Run

SPECmpiM_base2007 = 9.22

**MPI2007 license:** 3440A
**Test sponsor:** Indiana University
**Tested by:** Indiana University

**Test date:** Mar-2015
**Hardware Availability:** Apr-2013
**Software Availability:** Jun-2013




## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ranks | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Ranks | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 104.milc | 64 | 160 | 9.80 | 159 | 9.83 | **160** | **9.81** | | | | | | | |
| 107.leslie3d | 64 | 507 | 10.3 | 508 | 10.3 | **508** | **10.3** | | | | | | | |
| 113.GemsFDTD | 64 | 460 | 13.7 | 460 | 13.7 | **460** | **13.7** | | | | | | | |
| 115.fds4 | 64 | **300** | **6.50** | 301 | 6.48 | 300 | 6.50 | | | | | | | |
| 121.pop2 | 64 | 700 | 5.89 | **700** | **5.90** | 700 | 5.90 | | | | | | | |
| 122.tachyon | 64 | 429 | 6.52 | 427 | 6.55 | **428** | **6.54** | | | | | | | |
| 126.lammps | 64 | 363 | 8.02 | **363** | **8.02** | 363 | 8.02 | | | | | | | |
| 127.wrf2 | 64 | 460 | 16.9 | 459 | 17.0 | **460** | **16.9** | | | | | | | |
| 128.GAPgeofem | 64 | **177** | **11.7** | 176 | 11.7 | 177 | 11.7 | | | | | | | |
| 129.tera_tf | 64 | **412** | **6.72** | 412 | 6.72 | 417 | 6.64 | | | | | | | |

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 | 320 | 11.9 | **320** | **11.9** | 321 | 11.9 | | | | | | | |
| 132.zeusmp2 | 64 | 556 | 5.58 | **560** | **5.54** | 562 | 5.52 | | | | | | | |
| 137.lu | 64 | **259** | **14.2** | 258 | 14.2 | 259 | 14.2 | | | | | | | |

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

### Hardware Summary

| | |
|---|---|
| Type of System: | Homogeneous |
| Compute Node: | Big Red II Node |
| Interconnects: | Infiniband (QDR)<br>Cray Gemini |
| File Server Node: | Data Capacitor II |
| Total Compute Nodes: | 4 |
| Total Chips: | 8 |
| Total Cores: | 128 |
| Total Threads: | 128 |
| Total Memory: | 256 GB |
| Base Ranks Run: | 64 |
| Minimum Peak Ranks: | -- |
| Maximum Peak Ranks: | -- |

### Software Summary

| | |
|---|---|
| C Compiler: | Intel C Composer XE 2013 for Linux, Version 13.1.3.192 Build 20130607 |
| C++ Compiler: | Intel C++ Composer XE 2013 for Linux, Version 13.1.3.192 Build 20130607 |
| Fortran Compiler: | Intel Fortran Composer XE 2013 for Linux, Version 13.1.3.192 Build 20130607 |
| Base Pointers: | 64-bit |
| Peak Pointers: | 64-bit |
| MPI Library: | Cray MPI (MPT) 7.1.2 |
| Other MPI Info: | None |
| Pre-processors: | No |
| Other Software: | None |

## Node Description: Big Red II Node

### Hardware

| | |
|---|---|
| Number of nodes: | 4 |
| Uses of the node: | compute |
| Vendor: | Cray |
| Model: | XE6 |
| CPU Name: | AMD Opteron 6380 |
| CPU(s) orderable: | 1-2 chips |
| Chips enabled: | 2 |
| Cores enabled: | 32 |
| Cores per chip: | 16 |
| Threads per core: | 1 |
| CPU Characteristics: | AMD Turbo CORE technology up to 3.40 GHz |
| CPU MHz: | 2500 |
| Primary Cache: | 512 KB I on chip per chip, 64 KB I shared / 2 cores; 16 KB D on chip per core |
| Secondary Cache: | 16 MB I+D on chip per chip, 2 MB shared / 2 cores |
| L3 Cache: | 16 MB I+D on chip per chip, 8 MB shared / 8 cores |
| Other Cache: | None |
| Memory: | 64 GB (8 x 8 GB 2Rx4 PC3L-12800R-11, ECC running at 1600 MHz and CL11) |
| Disk Subsystem: | None |
| Other Hardware: | None |
| Adapter: | Mellanox ConnectX MHQH29-XTC |
| Number of Adapters: | 1 |
| Slot Type: | PCIe x8 Gen 2 |

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### Software

| | |
|---|---|
| Adapter: | Mellanox ConnectX MHQH29-XTC |
| Adapter Driver: | 1.0-ofed1.5.4 |
| Adapter Firmware: | 2.9.1000 |
| Adapter: | Cray Gemini |
| Adapter Driver: | Proprietary Cray_kgni |
| Adapter Firmware: | 0.17 |
| Operating System: | SUSE Linux Enterprise Server 11 (x86_64),<br>Cray Linux Environment 4.2<br>Kernel 2.6.32.59-0.7.1_1.0402.7496-cray_gem_c |
| Local File System: | None |
| Shared File System: | lustre |
| System State: | Multi-User |
| Other Software: | TORQUE-2.5.7 |

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## Node Description: Big Red II Node

| | |
|---|---|
| Data Rate: | 40Gbps |
| Ports Used: | 1 |
| Interconnect Type: | 40 Gigabit Infiniband (QDR) |
| Adapter: | Cray Gemini |
| Number of Adapters: | 1 |
| Slot Type: | AMD HyperTransport 3 |
| Data Rate: | 76.8Gbps |
| Ports Used: | 1 |
| Interconnect Type: | Gemini |

## Node Description: Data Capacitor II

### Hardware

| | |
|---|---|
| Number of nodes: | 2 |
| Uses of the node: | fileserver |
| Vendor: | DDN |
| Model: | DDN SFA12K |
| CPU Name: | Intel Xeon CPU E5-2620 |
| CPU(s) orderable: | 1-2 chips |
| Chips enabled: | 2 |
| Cores enabled: | 12 |
| Cores per chip: | 6 |
| Threads per core: | 1 |
| CPU Characteristics: | Intel Turbo Boost Technology up to 2.50 GHz |
| CPU MHz: | 2000 |
| Primary Cache: | 32 KB I + 32 KB D on chip per core |
| Secondary Cache: | 256 KB I+D on chip per core |
| L3 Cache: | 15 MB I+D on chip per chip |
| Other Cache: | None |
| Memory: | 96 GB |
| Disk Subsystem: | 30 TB RAID 6, 10 (8 + 2) x 3 TB SATA (Hitachi, 7200RPM, 6.0Gbps) |
| Other Hardware: | None |
| Adapter: | Mellanox ConnectX MHQH29-XTC |
| Number of Adapters: | 1 |
| Slot Type: | PCIe x8 Gen 2 |
| Data Rate: | 40Gbps |
| Ports Used: | 1 |
| Interconnect Type: | 40 Gigabit Infiniband (QDR) |

### Software

| | |
|---|---|
| Adapter: | Mellanox ConnectX MHQH29-XTC |
| Adapter Driver: | 1.0-ofed1.5.4 |
| Adapter Firmware: | 2.9.1000 |
| Operating System: | CentOS 6.2 |
| Local File System: | Linux/ext4 |
| Shared File System: | lustre |
| System State: | Multi-User |
| Other Software: | None |

## Interconnect Description: Infiniband (QDR)

### Hardware

| | |
|---|---|
| Vendor: | DDN |
| Model: | Mellanox SX6506 |
| Switch Model: | Mellanox SX6506 |

### Software

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## Interconnect Description: Infiniband (QDR)

| | |
|---|---|
| Number of Switches: | 1 |
| Number of Ports: | 108 |
| Data Rate: | 56 Gbps |
| Firmware: | mellanox SX6506 |
| Topology: | switched |
| Primary Use: | Lustre fileserver |

## Interconnect Description: Cray Gemini

| Hardware | |
|---|---|
| Vendor: | Cray |
| Model: | Cray Gemini |
| Switch Model: | Cray Gemini |
| Number of Switches: | 264 |
| Number of Ports: | 48 |
| Data Rate: | 9.36 GB/s |
| Firmware: | 0.17 |
| Topology: | 3D Torus |
| Primary Use: | MPI traffic |

**Software**

## Submit Notes

```
The config file option 'submit' was used.
```

## General Notes

```
130.socorro (base): "nullify_ptrs" src.alt was used.

MPI startup command:
  aprun command was used to start MPI jobs. A flag below
  is used to place processes onto 16 cores out of 32 on a node:
  -cc 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30

export MPICH_NO_BUFFER_ALIAS_CHECK=true
  If set, the buffer alias error check for collectives is
  disabled. The MPI standard does not allow aliasing of type
  OUT or INOUT parameters on the same collective function
  call. The default is false.

Network:
  3D Torus

Job placement:
  PBS is used for job placement.
  Compute nodes are selected by PBS.
  No specific node selection is used.
```

## Base Compiler Invocation

C benchmarks:
cc

C++ benchmarks:

126.lammps: CC

Fortran benchmarks:
ftn

Benchmarks using both Fortran and C:
cc ftn

## Base Portability Flags

121.pop2: -DSPEC_MPI_CASE_FLAG
126.lammps: -DMPICH_IGNORE_CXX_SEEK
127.wrf2: -DSPEC_MPI_CASE_FLAG -DSPEC_MPI_LINUX
130.socorro: -assume nostd_intent_in

## Base Optimization Flags

C benchmarks:
-O3 -no-prec-div

C++ benchmarks:

126.lammps: -O3 -no-prec-div

Fortran benchmarks:
-O3 -no-prec-div

Benchmarks using both Fortran and C:
-O3 -no-prec-div

The flags file that was used to format this result can be browsed at
http://www.spec.org/mpi2007/flags/EM64T_Intel140_flags.20150429.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/mpi2007/flags/EM64T_Intel140_flags.20150429.xml

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

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