



SPEC® MPIM2007 Result

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Dell, QLogic, ClusterVision,

SPECmpiM_peak2007 = Not Run

U. of Cambridge HPC Cluster Darwin,
QLogic InfiniBand Interconnect

SPECmpiM_base2007 = 33.3

MPI2007 license: 0018

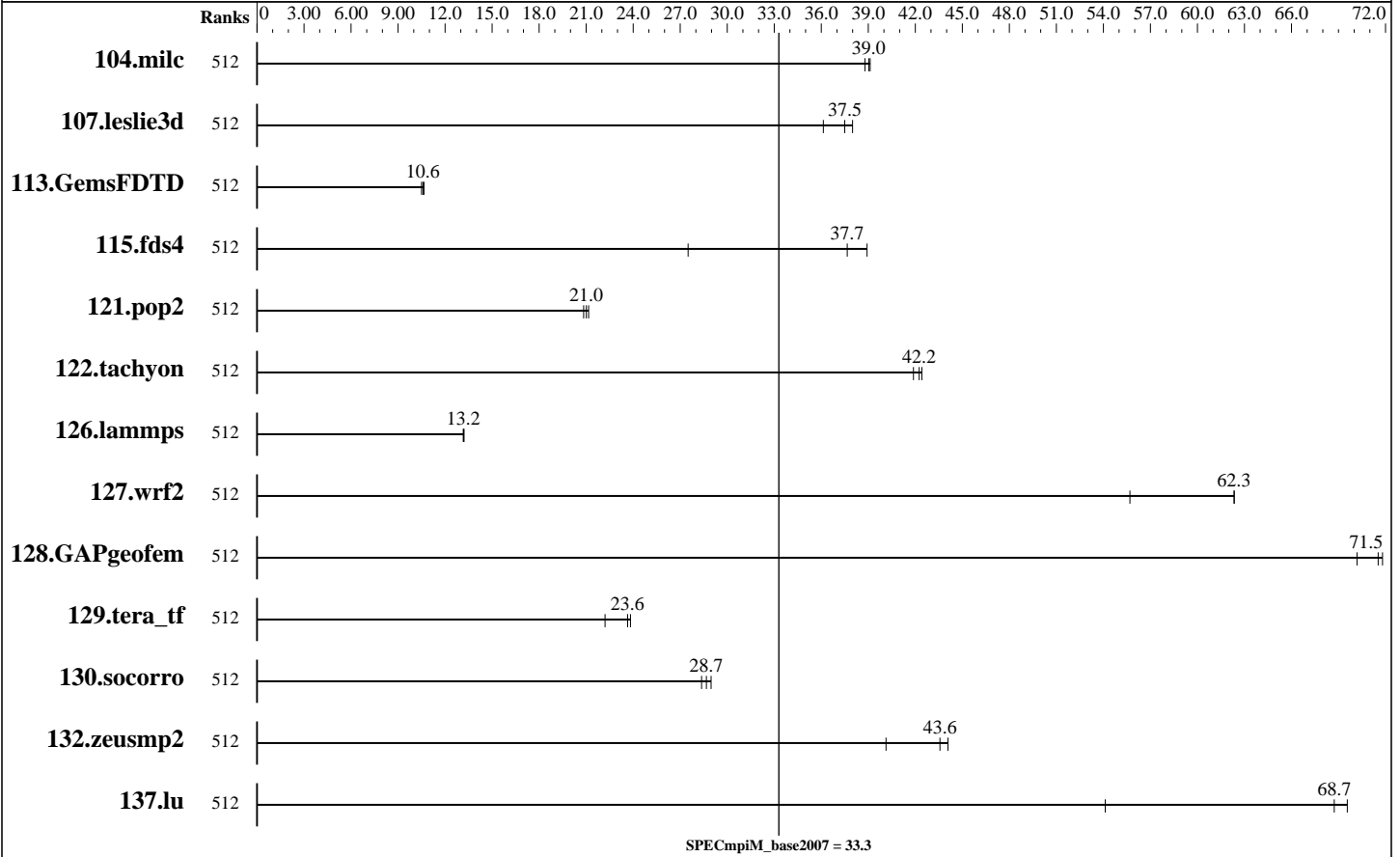
Test date: May-2007

Test sponsor: QLogic Corporation

Hardware Availability: Jul-2006

Tested by: QLogic Performance Engineering

Software Availability: Feb-2007



Results Table

Benchmark	Base								Peak							
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
104.milc	512	40.3	38.8	40.0	39.1	40.1	39.0									
107.leslie3d	512	144	36.1	139	37.5	137	38.0									
113.GemsFDTD	512	592	10.7	601	10.5	596	10.6									
115.fds4	512	51.8	37.7	50.1	38.9	70.9	27.5									
121.pop2	512	198	20.8	195	21.2	196	21.0									
122.tachyon	512	65.9	42.4	66.2	42.2	66.8	41.9									
126.lammps	512	221	13.2	221	13.2	221	13.2									
127.wrf2	512	125	62.4	125	62.3	140	55.7									
128.GAPgeofem	512	28.9	71.5	28.8	71.8	29.4	70.2									
129.tera_tf	512	117	23.6	116	23.8	125	22.2									

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	512	<u>133</u>	<u>28.7</u>	135	28.4	132	29.0							
132.zeusmp2	512	77.3	40.1	<u>71.2</u>	<u>43.6</u>	70.4	44.1							
137.lu	512	<u>53.5</u>	<u>68.7</u>	52.8	69.6	67.9	54.1							

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: Dell PowerEdge 1950
 Interconnects: QLogic InfiniBand HCAs and switches
 Ethernet Network for File Server Access
 File Server Node: Dell PowerVault MD1000
 Head Node: Dell PowerEdge 1950
 Total Compute Nodes: 128
 Total Chips: 256
 Total Cores: 512
 Total Threads: 512
 Total Memory: 1 TB
 Base Ranks Run: 512
 Minimum Peak Ranks: --
 Maximum Peak Ranks: --

Software Summary

C Compiler: QLogic PathScale C Compiler 3.0
 C++ Compiler: QLogic PathScale C++ Compiler 3.0
 Fortran Compiler: QLogic PathScale Fortran Compiler 3.0
 Base Pointers: 64-bit
 Peak Pointers: 64-bit
 MPI Library: QLogic InfiniPath MPI 2.0
 Other MPI Info: None
 Pre-processors: No
 Other Software: None

Node Description: Dell PowerEdge 1950

Hardware

Number of nodes: 128
 Uses of the node: compute, head
 Vendor: Dell
 Model: Dell PowerEdge 1950
 CPU Name: Intel Xeon 5160
 CPU(s) orderable: 1-2 chips
 Chips enabled: 2
 Cores enabled: 4
 Cores per chip: 2
 Threads per core: 1
 CPU Characteristics: 1333 MHz system bus
 CPU MHz: 3000
 Primary Cache: 32 KB I + 32 KB D on chip per core
 Secondary Cache: 4 MB I+D on chip per chip
 L3 Cache: None
 Other Cache: None
 Memory: 8 GB (8 x 1 GB PC2-5300F)
 Disk Subsystem: SAS, 73 GB, 15000 RPM
 Other Hardware: None
 Adapter: QLogic InfiniPath QLE7140
 Number of Adapters: 1
 Slot Type: PCIe x8

Software

Adapter: QLogic InfiniPath QLE7140
 Adapter Driver: InfiniPath 2.0
 Adapter Firmware: None
 Operating System: ClusterVisionOS 2.1
 Based on Scientific Linux SL release 4.3 (Beryllium)
 Local File System: Linux/ext3
 Shared File System: NFS
 System State: Multi-User
 Other Software: Torque 2.1.2

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Software Availability: Feb-2007

Node Description: Dell PowerEdge 1950

Data Rate: InfiniBand 4x SDR
Ports Used: 1
Interconnect Type: InfiniBand

Node Description: Dell PowerVault MD1000

Hardware

Number of nodes: 1
Uses of the node: file server
Vendor: Dell
Model: Dell PowerEdge 1950
CPU Name: Intel Xeon 5160
CPU(s) orderable: 1-2 chip
Chips enabled: 2
Cores enabled: 4
Cores per chip: 2
Threads per core: 1
CPU Characteristics: 1333 MHz system bus
CPU MHz: 3000
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 4 MB I+D on chip per chip
L3 Cache: None
Other Cache: None
Memory: 4 GB (4 x 1 GB PC2-5300F)
Disk Subsystem: 13.5 TB: 3 x 15 x 300 GB, SAS, 10000 RPM
3 Dell PowerVault MD1000 Disk Arrays, each one has 15 disks.
Other Hardware: None
Adapter: Chelsio T310 10GBASE-SR RNIC (rev 3)
Number of Adapters: 1
Slot Type: PCIe x8 MSI-X
Data Rate: 10 Gbps Ethernet
Ports Used: 1
Interconnect Type: Ethernet

Software

Adapter: Chelsio T310 10GBASE-SR RNIC (rev 3)
Adapter Driver: cxgb3 1.0.078
Adapter Firmware: T 3.3.0
Operating System: ClusterVisionOS 2.1
Based on Scientific Linux SL release 4.3 (Beryllium)
Local File System: Linux/ext3
Shared File System: NFS
System State: Multi-User
Other Software: None

General Notes

A separate node handling login and resources management is not listed as it is not performance related.

Interconnect Description: QLogic InfiniBand HCAs and switches

Hardware

Vendor: QLogic
Model: InfiniPath adapters and Silverstorm switches

Software

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Hardware Availability: Jul-2006

Tested by: QLogic Performance Engineering

Software Availability: Feb-2007

Interconnect Description: QLogic InfiniBand HCAs and switches

Switch Model:	QLogic SilverStorm 9080 Fabric Director (InfiniBand switch)
Number of Switches:	2
Number of Ports:	96
Data Rate:	InfiniBand 4x SDR and InfiniBand 4x DDR
Firmware:	3.4.0.1.3
Switch Model:	QLogic SilverStorm 9240 InfiniBand switch
Number of Switches:	1
Number of Ports:	288
Data Rate:	InfiniBand 4x SDR and InfiniBand 4x DDR
Firmware:	3.4.0.1.3
Topology:	Constant Bisectional Bandwidth, Fat-Tree, Max 5 switch-chip hops.
Primary Use:	MPI traffic

General Notes

Two CUs (Computational Unit, 65 nodes) were involved, so two SilverStorm 9080 switches and the 9240 core switch were used on this run.

The data rate between InifniPath HCAs and SilverStorm switches is SDR. However, DDR is used for inter-switch links.

Interconnect Description: Ethernet Network for File Server Access

Hardware	
Vendor:	Chelsio, Nortel
Model:	Chelsio T310 adapters and Nortel 5530 5510 8610 switches
Switch Model:	Nortel Ethernet Routing Switch 5510-24T
Number of Switches:	1
Number of Ports:	24
Data Rate:	1 Gbps Ethernet
Firmware:	1.0.0.16
Switch Model:	Nortel Ethernet Routing Switch 5510-48T
Number of Switches:	3
Number of Ports:	48
Data Rate:	1 Gbps Ethernet
Firmware:	1.0.0.16
Switch Model:	Nortel Ethernet Routing Switch 5530-24TFD
Number of Switches:	2
Number of Ports:	26
Data Rate:	1 Gbps Ethernet (24 ports) and 10 Gbps Ethernet (2 ports)
Firmware:	4.2.0.12
Switch Model:	Nortel Passport 8610 switch 4.1.0.0
Number of Switches:	1
Number of Ports:	24

Software

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Test date: May-2007

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Hardware Availability: Jul-2006

Tested by: QLogic Performance Engineering

Software Availability: Feb-2007

Interconnect Description: Ethernet Network for File Server Access

Data Rate: 10 Gbps Ethernet
 Firmware: Optivity Switch Manager version 4.1
 Topology: Three CUs are connected with six Ethernet Routing switches 5530-24TFD, 5510-24T and 5510-48T as a ring. Each of two 5530-24TFD switches is connected to the Nortel Passport 8610 switch through two 10Gbit ports. See Slide 10 of NortelEthernetSwitchDiagram.pdf for a network diagram.
 Primary Use: file system traffic

Base Compiler Invocation

C benchmarks:

```
/usr/bin/mpicc -cc=pathcc
```

C++ benchmarks:

```
126.lammps: /usr/bin/mpicxx -CC=pathCC
```

Fortran benchmarks:

```
107.leslie3d: /usr/bin/mpif90 -f90=pathf90
```

```
113.GemsFDTD: /usr/bin/mpif90 -f90=pathf90
```

```
115.fds4: /usr/bin/mpif90 -f90=pathf90
```

```
129.tera_tf: /usr/bin/mpif90 -f90=pathf90
```

```
132.zeusmp2: /usr/bin/mpif90 -f90=pathf90
```

```
137.lu: /usr/bin/mpif90 -f90=pathf90
```

Benchmarks using both Fortran and C (except as noted below):

```
/usr/bin/mpicc -cc=pathcc /usr/bin/mpif90 -f90=pathf90
```

Base Portability Flags

```
104.milc: -DSPEC_MPI_LP64
121.pop2: -DSPEC_MPI_DOUBLE_UNDERSCORE -DSPEC_MPI_LP64
122.tachyon: -DSPEC_MPI_LP64
127.wrf2: -DF2CSTYLE -DSPEC_MPI_DOUBLE_UNDERSCORE -DSPEC_MPI_LINUX
        -DSPEC_MPI_LP64
128.GAPgeofem: -DSPEC_MPI_LP64
130.socorro: -fno-second-underscore -DSPEC_MPI_LP64
```



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Base Optimization Flags

C benchmarks:

-march=core -Ofast

C++ benchmarks:

126.lammps: -march=core -O3 -OPT:Ofast -CG:local_fwd_sched=on

Fortran benchmarks:

107.leslie3d: -march=core -O3 -OPT:Ofast -OPT:malloc_alg=1
-LANG:copyinout=off

113.GemsFDTD: -march=core -O3 -OPT:Ofast -OPT:malloc_alg=1
-LANG:copyinout=off

115.fds4: -march=core -O3 -OPT:Ofast -OPT:malloc_alg=1
-LANG:copyinout=off

129.tera_tf: -march=core -O3 -OPT:Ofast -OPT:malloc_alg=1
-LANG:copyinout=off

132.zeusmp2: -march=core -O3 -OPT:Ofast -OPT:malloc_alg=1
-LANG:copyinout=off

137.lu: -march=core -O3 -OPT:Ofast -OPT:malloc_alg=1
-LANG:copyinout=off

Benchmarks using both Fortran and C:

121.pop2: -march=core -Ofast -O3 -OPT:Ofast -OPT:malloc_alg=1
-LANG:copyinout=off

127.wrf2: Same as 121.pop2

128.GAPgeofem: Same as 121.pop2

130.socorro: Same as 121.pop2

Base Other Flags

C benchmarks:

-IPA:max_jobs=4

C++ benchmarks:

126.lammps: -IPA:max_jobs=4

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Base Other Flags (Continued)

Fortran benchmarks:

107.leslie3d: -IPA:max_jobs=4

113.GemsFDTD: -IPA:max_jobs=4

115.fds4: -IPA:max_jobs=4

129.tera_tf: -IPA:max_jobs=4

132.zeusmp2: -IPA:max_jobs=4

137.lu: -IPA:max_jobs=4

Benchmarks using both Fortran and C (except as noted below):

-IPA:max_jobs=4

The flags file that was used to format this result can be browsed at

http://www.spec.org/mpi2007/flags/MPI2007_flags.20070717.00.html

You can also download the XML flags source by saving the following link:

http://www.spec.org/mpi2007/flags/MPI2007_flags.20070717.00.xml

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Tested with SPEC MPI2007 v58.

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