



SPEC® MPIM2007 Result

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Dell, QLogic, ClusterVision,

U. of Cambridge HPC Cluster Darwin,
QLogic InfiniBand Interconnect

SPECmpiM_peak2007 = Not Run

SPECmpiM_base2007 = NC

MPI2007 license: 0018

Test sponsor: QLogic Corporation

Tested by: QLogic Performance Engineering

Test date: May-2007

Hardware Availability: Jul-2006

Software Availability: Feb-2007

Ranks
104.milc
107.leslie3d
113.GemsFDTD
115.fds4
121.pop2
122.tachyon
126.lammps
127.wrf2
128.GAPgeofem
129.tera_tf
130.socorro
132.zeusmp2
137.lu

Results Table

Benchmark	Base							Peak						
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
104.milc	256	NC	NC	NC	NC	NC	NC							
107.leslie3d	256	NC	NC	NC	NC	NC	NC							
113.GemsFDTD	256	NC	NC	NC	NC	NC	NC							
115.fds4	256	NC	NC	NC	NC	NC	NC							
121.pop2	256	NC	NC	NC	NC	NC	NC							
122.tachyon	256	NC	NC	NC	NC	NC	NC							
126.lammps	256	NC	NC	NC	NC	NC	NC							
127.wrf2	256	NC	NC	NC	NC	NC	NC							
128.GAPgeofem	256	NC	NC	NC	NC	NC	NC							

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		
129.tera_tf	256	NC	NC	NC	NC	NC	NC									
130.socorro	256	NC	NC	NC	NC	NC	NC									
132.zeusmp2	256	NC	NC	NC	NC	NC	NC									
137.lu	256	NC	NC	NC	NC	NC	NC									

Results appear in the order in which they were run. Bold underlined text indicates 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: 64
 Total Chips: 128
 Total Cores: 256
 Total Threads: 256
 Total Memory: 512 GB
 Base Ranks Run: 256
 Minimum Peak Ranks: --
 Maximum Peak Ranks: --

Software Summary

Compiler: QLogic PathScale C Compiler 3.0
 C++ Compiler: QLogic PathScale C++ Compiler 3.0
 Fortran Compiler: QLogic PathScale Fortran Compiler 3.0
 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: 64
 Uses of the node: compute, head
 Vendor: Dell
 Model: Dell PowerEdge 1950
 CPU Name: Intel Xeon 5160
 CPU(s) on node: 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

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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Node Description: Dell PowerEdge 1950

Number of Adapters: 1
Slot Type: PCIe x8
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; 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 Driver: Chelsio T310 10GBASE-SR RNIC (rev 3)
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.



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Interconnect Description: QLogic InfiniBand HCAs and switches

Hardware	Software
Vendor: QLogic Model: InfiniPath adapters and Silverstorm switches Switch Model: QLogic SilverStorm 9080 Fabric Director (InfiniBand switch) Number of Switches: 1 Number of Ports: 96 Data Rate: InfiniBand 4x SDR and InfiniBand 4x DDR Firmware: 3.4.0.1.3 Topology: Full Bisectional Bandwidth, Fat-Tree, Max 3 switch-chip hops. Primary Use: MPI traffic	

General Notes

The 64 nodes used are from one CU (Computational Unit, 65 nodes) of the 9 CUs in the Darwin cluster. Jobs within one CU use one SilverStorm 9080 switch.
 The data rate between InfiniPath HCAs and SilverStorm switches is SDR. However, DDR is used for inter-switch links.

Interconnect Description: Ethernet Network for File Server Access

Hardware	Software
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: 10 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	

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Test date: May-2007

Hardware Availability: Jul-2006

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

`107.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`

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Base Portability Flags (Continued)

130.socorro: -fno-second-underscore -DSPEC_MPI_LP64

Base Optimization Flags

C benchmarks:

-march=core -Ofast

C++ benchmarks:

126.lammps: -march=core -O3 -OPT:Ofast -CG:local_frd_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.GA3geofem: Same as 121.pop2

130.socorro: Same as 121.pop2



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Base Other Flags

C benchmarks:

-IPA:max_jobs=4

C++ benchmarks:

126.lammps: -IPA:max_jobs=4

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.html

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

http://www.spec.org/mpi2007/flags/MPI2007_flags.20070717.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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