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

Non-Compliant

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

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:	64
Uses of the node:	compute, NFS
Vendor:	Dell
Model:	Dell PowerEdge 1950
CPU Name:	Intel Xeon 5160
CPU(s) orderable:	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

Continued on next page

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

Non-Compliant

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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 b
CPU MHz:	3000
Primary Cache:	32 KB I + 32 KB D on chip p core
Secondary Cache:	4 MB I+D on chip pe hip
L3 Cache:	None
Other Cache:	None
Memory:	4 GB (4 1 G PC2-5300F)
Disk Subsystem:	13.5 TB 5 x 15 x 300 SAS, 10000 RPM 3 Dell Po Vault MD10 Disk Arrays, each one has 15 disks.
Other Hardware:	N
Adapter:	Chelsi 310 10 BASE-SR RNIC (rev 3)
Number of Adapters:	1
Slot Type:	PCIe x8 M SI-X
Data Rate:	Gbps thernet
Ports Used:	1
Interconnect Type:	Ethernet

Software

pter:	Chelsio T310 10GBASE-SR RNIC (rev 3)
Ada r Driver:	cxgb3 1.0.078
Adapt Firmware:	T 3.3.0
erati System:	ClusterVisionOS 2.1
	Based on Scientific Linux SL release 4.3 (Beryllium)
Lo al File System:	Linux/ext3
hared File System:	NFS
System State:	Multi-User
Other Software:	None

General Notes

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

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Software Availability: Feb-2007

Interconnect Description: QLogic InfiniBand HCAs and switches

Hardware

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 swith-chip hops.
Primary Use:	MPI traffic

Software

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 InifnPath 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, [illegible]
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

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Software

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Test sponsor: QLogic Corporation
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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

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Base Compiler Invocation

C benchmarks:
`/usr/bin/mpicc -cc=pathcc`

C++ benchmarks:

126.lammps: `/usr/bin/mpic[illegible] -CC=pathCC`

Fortran benchmarks:

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

113.GemsFDTD: `/usr/bin/mpif[illegible] -f90=pathf90`

115.fds4: `/usr/bin/mp[illegible]f90 -f90=pathf90`

129.tera_tf: `/usr/bi[illegible]/mpif90 -f90=pathf90`

132.zeusmp2: `/usr/[illegible]in/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`

Continued on next page

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_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`

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Hardware Availability: Jul-2006
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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=`

137.lu: `-IPA:max_jobs=`

Benchmarks using both Fortran and C (ex 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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