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 date:**	May-2007
Test sponsor: QLogic Corporation	**Hardware Availability**	Jul-2006
Tested by: QLogic Performance Engineering	**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 | Ranks | Base | | | | | | Peak | | | | | | |
		Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
104.milc	32	NC	NC	NC	NC	NC	NC							
107.leslie3d	32	NC	NC	NC	NC	NC	NC							
113.GemsFDTD	32	NC	NC	NC	NC	NC	NC							
115.fds4	32	NC	NC	NC	NC	NC	NC							
121.pop2	32	NC	NC	NC	NC	NC	NC							
122.tachyon	32	NC	NC	NC	NC	NC	NC							
126.lammps	32	NC	NC	NC	NC	NC	NC							
127.wrf2	32	NC	NC	NC	NC	NC	NC							
128.GAPgeofem	32	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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Test date: May-2007
Hardware Availability: Jul-2006
Software Availability: Feb-2007

Results Table (Continued)

Benchmark	Ranks	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Ranks	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio
129.tera_tf	32	NC	NC	NC	NC	NC	NC							
130.socorro	32	NC	NC	NC	NC	NC	NC							
132.zeusmp2	32	NC	NC	NC	NC	NC	NC							
137.lu	32	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:	8
Total Chips:	16
Total Cores:	32
Total Threads:	32
Total Memory:	64 GB
Base Ranks Run:	32
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:	8
Uses of the node:	compute, head
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

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

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 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 10 GBASE-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 resouces management
is not listed as it is not performance related.

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Test sponsor:	QLogic Corporation	**Hardware Availability**	Jul-2006
Tested by:	QLogic Performance Engineering	**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 8 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, Nortel
Model:	Chelsio T310 adapter 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 sponsor:	QLogic Corporation	**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

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Non-Compliant

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Tested by:	QLogic Performance Engineering	**Software Availability:**	Feb-2007

Base Portability Flags (Continued)

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

Base Optimization Flags

C benchmarks:

-march=core -Ofast -OPT:malloc_alg=1

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 -OPT:malloc_alg=1 -O3 -OPT:Ofast
-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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Tested by:	QLogic Performance Engineering	**Software Availability:**	Feb-2007

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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