SPEC® MPIM2007 Result

AMD, QLogic Corporation, Rackable Systems, IWILL
AMD Emerald Cluster: AMD Opteron CPUs,
QLogic InfiniPath/SilverStorm Interconnect

SPECmpiM_peak2007 = NC

SPECmpiM_base2007 = NC

MPI2007 license: 0018
Test sponsor: QLogic Corporation
Tested by: QLogic Performance Engineering

Test date: May-2007
Hardware Availability: Nov-2006
Software Availability: Jul-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	32	NC	NC	NC	NC	NC	NC	32	NC	NC	NC	NC	NC	NC
107.leslie3d	32	NC	NC	NC	NC	NC	NC	32	NC	NC	NC	NC	NC	NC
113.GemsFDTD	32	NC	NC	NC	NC	NC	NC	32	NC	NC	NC	NC	NC	NC
115.fds4	32	NC	NC	NC	NC	NC	NC	32	NC	NC	NC	NC	NC	NC
121.pop2	32	NC	NC	NC	NC	NC	NC	32	NC	NC	NC	NC	NC	NC
122.tachyon	32	NC	NC	NC	NC	NC	NC	32	NC	NC	NC	NC	NC	NC
126.lammps	32	NC	NC	NC	NC	NC	NC	32	NC	NC	NC	NC	NC	NC
127.wrf2	32	NC	NC	NC	NC	NC	NC	32	NC	NC	NC	NC	NC	NC
128.GAPgeofem	32	NC	NC	NC	NC	NC	NC	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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Results Table (Continued)

Benchmark	Base							Peak						
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
129.tera_tf	32	NC	NC	NC	NC	NC	NC	32	NC	NC	NC	NC	NC	NC
130.socorro	32	NC	NC	NC	NC	NC	NC	32	NC	NC	NC	NC	NC	NC
132.zeusmp2	32	NC	NC	NC	NC	NC	NC	32	NC	NC	NC	NC	NC	NC
137.lu	32	NC	NC	NC	NC	NC	NC	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:	Homogenous
Compute Node:	Rackable, IWILL, AMD
Interconnects:	QLogic InfiniBand HCAs and switches Broadcom NICs, Force10 switches
File Server Node:	Headnode NFS filesystem
Head Node:	Rackable, IWILL, AMD
Other Node:	Headnode NFS filesystem
Total Compute Nodes:	8
Total Chips:	16
Total Cores:	32
Total Threads:	32
Total Memory:	64 GB
Base Ranks Run:	32
Minimum Peak Ranks:	32
Maximum Peak Ranks:	32

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 2.1
Other MPI Info:	None
Pre-processors:	No
Other Software:	None

Node Description: Rackable, IWILL, AMD

Hardware

Number of nodes:	8
Uses of the node:	compute, head
Vendor:	Rackable Systems, IWILL, AMD
Model:	Rackable Systems C1000 chassis, IWILL DK8-HTX motherboard
CPU Name:	AMD Opteron 290
CPU(s) orderable:	1-2 chips
Chips enabled:	2
Cores enabled:	
Cores per chip:	2
Threads per core:	1
CPU Characteristics:	--
CPU MHz:	2800
Primary Cache:	64 KB I + 64 KB D on chip per core
Secondary Cache:	1 MB I+D on chip per core
L3 Cache:	None
Other Cache:	None
Memory:	8 GB (8 x 1 GB DDR400)
Disk Subsystem:	250 GB, SATA

Continued on next page

Software

Adapter:	Intel 82541PI Gigabit Ethernet controller
Adapter Driver:	Part of Linux kernel modules
Adapter Firmware:	None
Adapter:	QLogic InfiniPath QHT7140
Adapter Driver:	InfiniPath 2.1
Adapter Firmware:	None
Operating System:	ClusterCorp Rocks 4.2.1 (Based on RedHat Enterprise Linux 4.0 Update 4)
Local File System:	Linux ext3
Shared File System:	NFS
System State:	Multi-User
Other Software:	Sun Grid Engine 6.0

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Test date: May-2007
Hardware Availability: Nov-2006
Software Availability: Jul-2007

Node Description: Rackable, IWILL AMD

Other Hardware:	Nodes custom-built by Rackable Systems. The Rackable C1000 chassis is half-depth with 450W, 48 VDC Power Supply. Integrated Gigabit Ethernet for admin/filesystem.
Adapter:	Intel 82541PI Gigabit Ethernet controller
Number of Adapters:	1
Slot Type:	integrated on motherboard
Data Rate:	1 Gbps Ethernet
Ports Used:	1
Interconnect Type:	Ethernet
Adapter:	QLogic InfiniPath QHT7140
Number of Adapters:	1
Slot Type:	HTX
Data Rate:	InfiniBand 4x SDR
Ports Used:	1
Interconnect Type:	InfiniBand

Node Description: Headnode NFS filesystem

Hardware

Number of nodes:	1
Uses of the node:	file server, other
Vendor:	Tyan
Model:	Thunder K8QSD Pro (S2882) motherboard
CPU Name:	AMD Opteron 885
CPU(s) orderable:	1-4 chips
Chips enabled:	4
Cores enabled:	8
Cores per chip:	2
Threads per core:	1
CPU Characteristics:	-
CPU MHz:	2600
Primary Cache:	64 KB I + 64 KB D on chip per core
Secondary Cache:	1 MB I+D on chip per core
L3 Cache:	None
Other Cache:	None
Memory:	16 GB (16 x 1 GB DDR400 dimms)
Disk Subsystem:	250 GB, SATA, 7200 RPM
Other Hardware:	None
Adapter:	Broadcom BCM5704C
Number of Adapters:	2
Slot Type:	integrated on motherboard
Data Rate:	1 Gbps Ethernet
Ports Used:	2
Interconnect Type:	Ethernet

Software

Adapter:	Broadcom BCM5704C
Adapter Driver:	Part of Linux kernel modules
Adapter Firmware:	None
Operating System:	ClusterCorp Rocks 4.2.1 (Based on RedHat Enterprise Linux 4.0 Update 4)
Local File System:	Linux ext3
Shared File System:	NFS
System State:	Multi-User
Other Software:	Sun Grid Engine 6.0

General Notes

"other" purposes of this node: login, compile, job submissio
and queuing.
This node assembled with a 2U chassis and 700 watt ATX 12V Power Supply.

Interconnect Description: QLogic InfiniBand HCAs and switches

Hardware		Software
Vendor:	QLogic	
Model:	InfiniPath and Silverstorm	
Switch Model:	QLogic SilverStorm 9120 Fabric Director	
Number of Switches:	1	
Number of Ports:	144	
Data Rate:	InfiniBand 4x SDR and InfiniBand 4x DDR	
Firmware:	3.4.0.5.2	
Topology:	Single switch (star)	
Primary Use:	MPI traffic	

General Notes

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

Interconnect Description: Broadcom NICs, Force10 switches

Hardware		Software
Vendor:	Force10	
Model:	E300	
Switch Model:	Force10 E300 Gig-E switch	
Number of Switches:	1	
Number of Ports:	288	
Data Rate:	1 Gbps Ethernet	
Firmware:	1.0	
Topology:	Single switch (star)	
Primary Use:	file system traffic	

Compiler Invocation

C benchmarks:

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

C++ benchmarks:

Continued on next page

Compiler Invocation (Continued)

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

Fortran benchmarks:
`/usr/bin/mpif90 -f90=pathf90`

Benchmarks using both Fortran and C:
`/usr/bin/mpicc -cc=pathcc /usr/bin/mpif90 -f90=pathf90`

Portability Flags

104.milc: `-DSPEC_MPI_LP64`
115.fds4: `-DSPEC_MPI_LC_TRAILING_DOUBLE_UNDERSCORE -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`
132.zeusmp2: `-DSPEC_MPI_LP64`

Base Optimization Flags

C benchmarks:
`-march=opteron -Ofast -OPT:malloc_alg=1`

C++ benchmarks:

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

Fortran benchmarks:
`-march=opteron -O3 -OPT:Ofast -OPT:malloc_alg=1 -LANG:copyinout=off`

Benchmarks using both Fortran and C:
`-march=opteron -Ofast -OPT:malloc_alg=1 -O3 -OPT:Ofast -LANG:copyinout=off`

Peak Optimization Flags

C benchmarks:

104.milc: `basepeak = yes`

Continued on next page

Peak Optimization Flags (Continued)

122.tachyon: basepeak = yes

C++ benchmarks:

126.lammps: basepeak = yes

Fortran benchmarks:

107.leslie3d: -march=opteron -Ofast -OPT:unroll_size=25

113.GemsFDTD: basepeak = yes

129.tera_tf: -march=opteron -O3 -OPT:Ofast -OPT:malloc_alg=1
-OPT:unroll_size=256

137.lu: basepeak = yes

Benchmarks using both Fortran and C:

115.fds4: basepeak = yes

121.pop2: basepeak = yes

127.wrf2: basepeak = yes

128.GAPgeofem: basepeak = yes

130.socorro: -march=opteron -Ofast -OPT:malloc_alg=1 -O3 -OPT:Ofast
-LANG:copying_gc=off
-L/net/files/tools/acml/x86_64/acml3.5.0/pathscale64/lib -lacml

132.zeusmp2: basepeak = yes

Other Flags

C benchmarks:
-IPA:max_jobs=4

C++ benchmarks:

126.lammps: -IPA:max_jobs=4

Fortran benchmarks:
-IPA:max_jobs=4

Benchmarks using both Fortran and C:
-IPA:max_jobs=4

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The flags file that was used to format this result can be browsed at
http://www.spec.org/mpi2007/flags/MPI2007_flags.20070717.01.xml

You can also download the XML flags source by saving the following link:
http://www.spec.org/mpi2007/flags/MPI2007_flags.20070717.01.xml

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

Tested with SPEC MPI2007 v60.
Report generated on Tue Jul 22 13:32:33 2014 by SPEC MPI2007 PS/PDF formatter v1463.
Originally published on 16 July 2007.