SPEC® MPIM2007 Result

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AMD, QLogic Corporation, Rackable Systems, IWILL

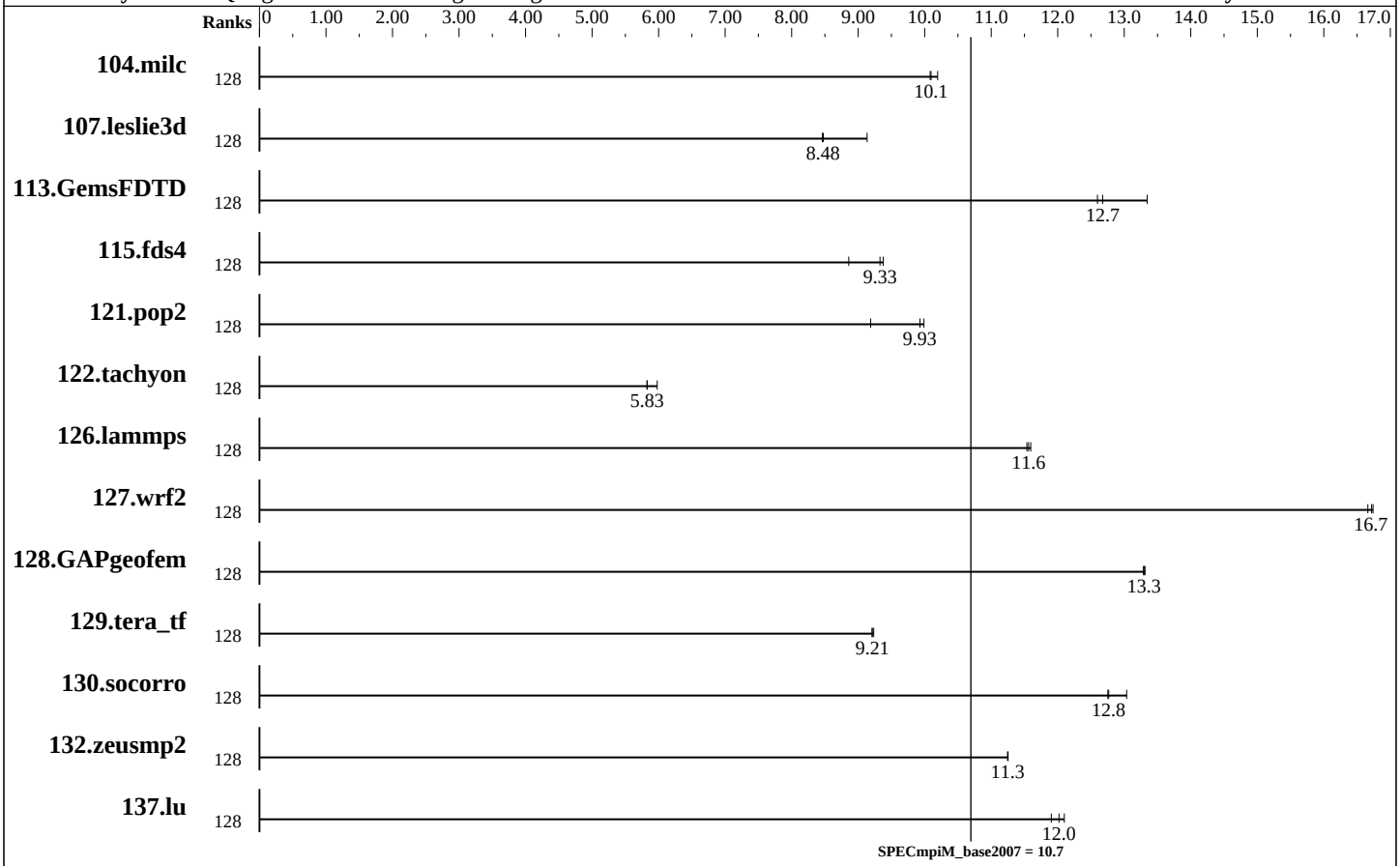
AMD Emerald Cluster: AMD Opteron CPUs, QLogic InfiniPath/SilverStorm Interconnect

SPECmpiM_peak2007 = Not Run

SPECmpiM_base2007 = 10.7

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

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



Results Table

Benchmark	Base							Peak						
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
104.milc	128	154	10.2	155	10.1	**155**	**10.1**							
107.leslie3d	128	617	8.46	**616**	**8.48**	571	9.13							
113.GemsFDTD	128	473	13.3	501	12.6	**498**	**12.7**							
115.fds4	128	208	9.38	**209**	**9.33**	220	8.86							
121.pop2	128	413	9.99	449	9.19	**416**	**9.93**							
122.tachyon	128	**480**	**5.83**	480	5.83	468	5.98							
126.lammps	128	251	11.6	**252**	**11.6**	253	11.5							
127.wrf2	128	**466**	**16.7**	468	16.7	466	16.7							
128.GAPgeofem	128	**155**	**13.3**	155	13.3	155	13.3							
129.tera_tf	128	**300**	**9.21**	300	9.23	301	9.21							

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	128	**299**	**12.8**	293	13.0	299	12.8							
132.zeusmp2	128	276	11.2	276	11.3	**276**	**11.3**							
137.lu	128	304	12.1	**306**	**12.0**	309	11.9							

Results appear in the order in which they were run. Bold underlined text indicates a 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:	32
Total Chips:	64
Total Cores:	128
Total Threads:	128
Total Memory:	256 GB
Base Ranks Run:	128
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 2.1
Other MPI Info:	None
Pre-processors:	No
Other Software:	None

Node Description: Rackable, IWILL, AMD

Hardware

Number of nodes:	32
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:	4
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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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 (S4882) 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

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General Notes

```
"other" purposes of this node: login, compile, job submission
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:	N/A	
Topology:	Single switch (star)	
Primary Use:	file system traffic	

Base Compiler Invocation

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

C++ benchmarks:

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

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Base Compiler Invocation (Continued)

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

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:

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

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

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

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Base Optimization Flags (Continued)

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

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

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

Benchmarks using both Fortran and C:

121.pop2: `-march=opteron -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`

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.20070717.01.html

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

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

Tested with SPEC MPI2007 v58.
Report generated on Tue Jul 22 13:32:27 2014 by SPEC MPI2007 PS/PDF formatter v1463.
Originally published on 16 July 2007.