



# SPEC<sup>®</sup> MPIL2007 Result

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## Dell Inc.

PowerEdge M420 (Intel Xeon E5-2470, 2.30 GHz)  
DDR3-1600 MHz

SPECmpiL\_peak2007 = Not Run

SPECmpiL\_base2007 = 18.9

MPI2007 license: 25

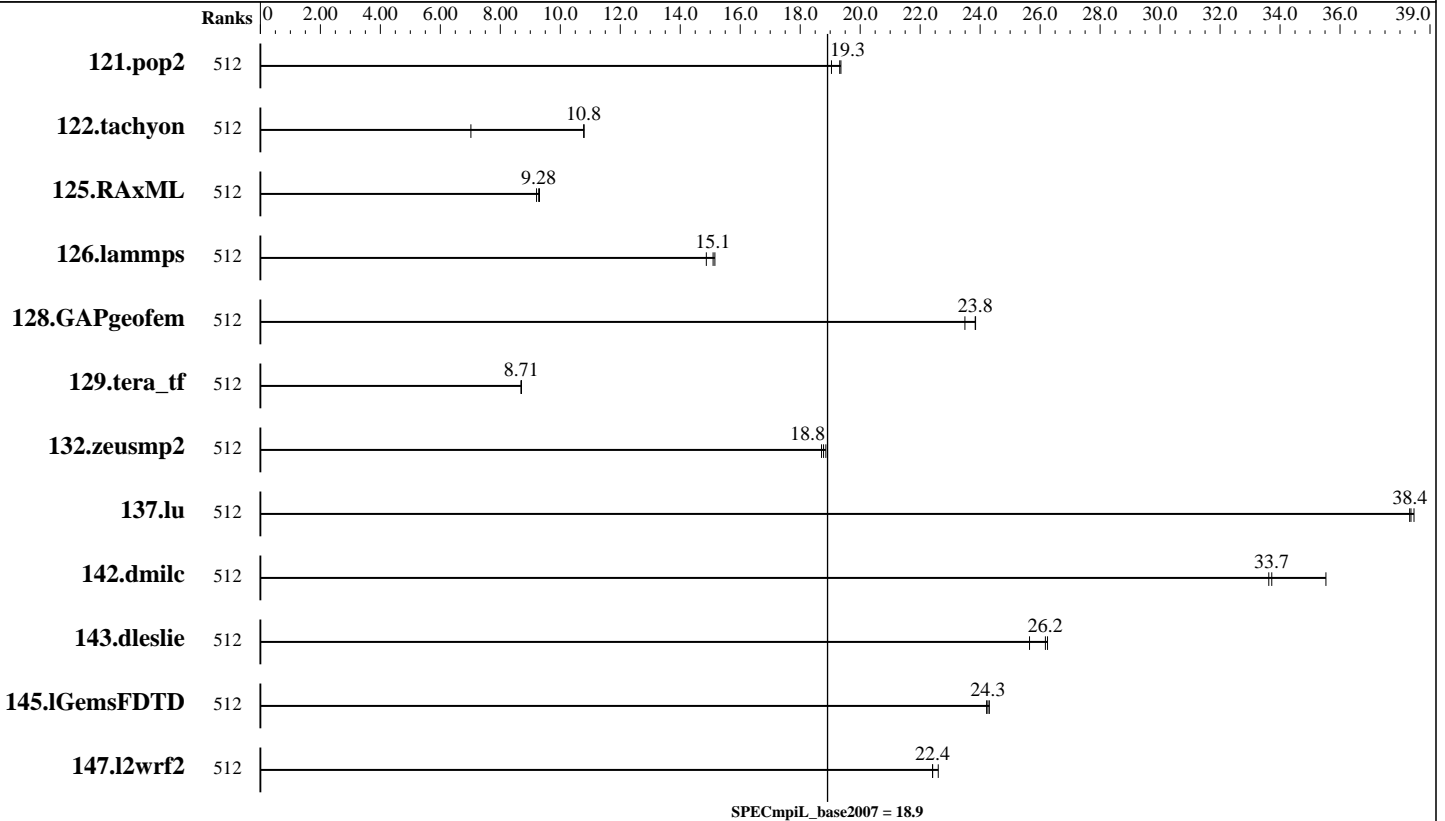
Test sponsor: Dell Inc.

Tested by: Dell Inc.

Test date: Oct-2012

Hardware Availability: Jun-2012

Software Availability: Sep-2011



## Results Table

Benchmark	Base							Peak						
	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Ranks	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
121.pop2	512	204	19.0	<u>201</u>	<u>19.3</u>	201	19.4							
122.tachyon	512	277	7.02	<u>180</u>	<u>10.8</u>	180	10.8							
125.RAxML	512	314	9.31	317	9.21	<u>315</u>	<u>9.28</u>							
126.lammps	512	<u>163</u>	<u>15.1</u>	162	15.2	165	14.9							
128.GAPgeofem	512	249	23.8	<u>249</u>	<u>23.8</u>	253	23.5							
129.tera_tf	512	126	8.69	126	8.71	<u>126</u>	<u>8.71</u>							
132.zeusmp2	512	112	18.9	113	18.7	<u>113</u>	<u>18.8</u>							
137.lu	512	110	38.3	<u>110</u>	<u>38.4</u>	109	38.5							
142.dmilc	512	110	33.6	104	35.5	<u>109</u>	<u>33.7</u>							
143.dleslie	512	121	25.6	118	26.2	<u>118</u>	<u>26.2</u>							
145.lGemsFDTD	512	182	24.2	181	24.3	<u>182</u>	<u>24.3</u>							
147.l2wrf2	512	<u>366</u>	<u>22.4</u>	363	22.6	366	22.4							

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Standard Performance Evaluation Corporation

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### Hardware Summary

Type of System: Homogeneous  
 Compute Node: PowerEdge M420  
 Interconnects: IB Switch  
 Gigabit Ethernet  
 File Server Node: PowerEdge R620  
 Total Compute Nodes: 32  
 Total Chips: 64  
 Total Cores: 512  
 Total Threads: 512  
 Total Memory: 1536 GB  
 Base Ranks Run: 512  
 Minimum Peak Ranks: --  
 Maximum Peak Ranks: --

### Software Summary

C Compiler: Intel C++ Composer XE 2011 for Linux, Version 12.0.5.220 Build 20110719  
 C++ Compiler: Intel C++ Composer XE 2011 for Linux, Version 12.0.5.220 Build 20110719  
 Fortran Compiler: Intel Fortran Composer XE 2011 for Linux, Version 12.0.5.220 Build 20110719  
 Base Pointers: 64-bit  
 Peak Pointers: 64-bit  
 MPI Library: Intel MPI Library 4.0.3.008 Build 20110824 for Linux  
 Other MPI Info: None  
 Pre-processors: No  
 Other Software: None

## Node Description: PowerEdge M420

### Hardware

Number of nodes: 32  
 Uses of the node: compute  
 Vendor: Dell  
 Model: PowerEdge M420 installed in PowerEdge M1000e blade chassis  
 CPU Name: Intel Xeon E5-2470  
 CPU(s) orderable: 1-2 chips  
 Chips enabled: 2  
 Cores enabled: 16  
 Cores per chip: 8  
 Threads per core: 1  
 CPU Characteristics: Intel Turbo Boost Technology up to 3.10 GHz, 8.0 GT/s QPI, Hyper-Threading disabled  
 CPU MHz: 2300  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 256 KB I+D on chip per core  
 L3 Cache: 20 MB I+D on chip per chip, 20 MB shared / 8 cores  
 Other Cache: None  
 Memory: 48 GB (6 x 8 GB 2Rx4 PC3-12800R-11, ECC)  
 Disk Subsystem: Seagate 146 GB SAS ST9146803SS  
 Other Hardware: None  
 Adapter: Onboard Broadcom Dual Port 10Gb Ethernet (BCM57810S) Ethernet Controller  
 Number of Adapters: 1  
 Slot Type: PCI-Express x8  
 Data Rate: 10GbE  
 Ports Used: 1  
 Interconnect Type: Ethernet  
 Adapter: Mellanox ConnectX-3 SFF FDR10  
 Number of Adapters: 1  
 Slot Type: PCIe x8 Gen3  
 Data Rate: InfiniBand 4x 10Gbps FDR10  
 Ports Used: 1

### Software

Adapter: Onboard Broadcom Dual Port 10Gb Ethernet (BCM57810S) Ethernet Controller  
 Adapter Driver: 1.70.00-0  
 Adapter Firmware: 7.2.23  
 Adapter: Mellanox ConnectX-3 SFF FDR10  
 Adapter Driver: MLNX\_OFED\_LINUX-1.5.3-3.0.0-rhel6.2-x86\_64  
 Adapter Firmware: 2.10.4562  
 Operating System: Red Hat EL 6.2, kernel 2.6.32-220.el6.x86\_64  
 Local File System: Linux/ext2  
 Shared File System: NFS  
 System State: Multi-User  
 Other Software: None

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### Node Description: PowerEdge M420

Interconnect Type: InfiniBand

### Node Description: PowerEdge R620

#### Hardware

Number of nodes: 1  
 Uses of the node: fileserver  
 Vendor: Intel  
 Model: PowerEdge R620  
 CPU Name: Intel Xeon CPU E5-2680  
 CPU(s) orderable: 1-2 chips  
 Chips enabled: 2  
 Cores enabled: 16  
 Cores per chip: 8  
 Threads per core: 2  
 CPU Characteristics: 2.7GHz  
 CPU MHz: 2700  
 Primary Cache: 32 KB I + 32 KB D on chip per core  
 Secondary Cache: 256 KB I+D on chip per core  
 L3 Cache: 20 MB I+D on chip per chip  
 Other Cache: None  
 Memory: 64 GB  
 Disk Subsystem: 5 disks, 146GB 15K SAS (RAID 0)  
 Other Hardware: None  
 Adapter: Quad port Intel I350 Gigabit Network Controller Ethernet Controller  
 Number of Adapters: 1  
 Slot Type: Integrated  
 Data Rate: 1Gbps Ethernet  
 Ports Used: 1  
 Interconnect Type: Ethernet

#### Software

Adapter: Quad port Intel I350 Gigabit Network Controller Ethernet Controller  
 Adapter Driver: 3.0.6-k  
 Adapter Firmware: 1.5-6  
 Operating System: Red Hat EL 6.2, kernel 2.6.32-220.el6.x86\_64  
 Local File System: None  
 Shared File System: NFS  
 System State: Multi-User  
 Other Software: None

### Interconnect Description: IB Switch

#### Hardware

Vendor: Mellanox  
 Model: Mellanox M4001F  
 Switch Model: Mellanox M4001F Installed in PowerEdge M1000e blade chassis (Installed in slot B1 and C1)  
 Number of Switches: 2  
 Number of Ports: 16  
 Data Rate: InfiniBand FDR10  
 Firmware: 9.1.3180  
 Topology: Fat tree  
 Primary Use: MPI traffic

#### Software



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## Interconnect Description: Gigabit Ethernet

Hardware		Software
Vendor:	Dell Inc.	
Model:	Onboard Broadcom Dual Port 10Gb Ethernet(BCM57810S)	
Switch Model:	PowerConnect M6220 (Modular Layer 3 blade switch for PowerEdge M1000e blade chassis) in slot A1 and A2	
Number of Switches:	2	
Number of Ports:	40	
Data Rate:	1Gbps Ethernet	
Firmware:	4.2.0.4	
Topology:	Fat tree	
Primary Use:	Cluster File System	

## Submit Notes

The config file option 'submit' was used.

## General Notes

MPI startup command:

`mpiexec.hydra` command was used to start MPI jobs.

BIOS settings:

Intel Hyper-Threading Technology (SMT): Disabled (default is Enabled)

Intel Turbo Boost Technology (Turbo) : Enabled (default is Enabled)

RAM configuration:

Compute nodes have 1x8-GB RDIMM on each memory channel.

Network:

Two 20-port switch

Compute Node Environment:

`ulimit -s = unlimited`

`ulimit -l = unlimited`

File `"/etc/modprobe.d/mlx4_core.conf"` modified to contain `"options mlx4_core log_mtts_per_seg=5"`



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## Base Compiler Invocation

C benchmarks:  
    mpiicc

C++ benchmarks:  
    126.lammps: mpiicpc

Fortran benchmarks:  
    mpiifort

Benchmarks using both Fortran and C:  
    mpiicc mpiifort

## Base Portability Flags

121.pop2: -DSPEC\_MPI\_CASE\_FLAG  
126.lammps: -DMPICH\_IGNORE\_CXX\_SEEK

## Base Optimization Flags

C benchmarks:  
    -O3 -xAVX -no-prec-div

C++ benchmarks:  
    126.lammps: -O3 -xAVX -no-prec-div

Fortran benchmarks:  
    -O3 -xAVX -no-prec-div

Benchmarks using both Fortran and C:  
    -O3 -xAVX -no-prec-div

The flags file that was used to format this result can be browsed at  
[http://www.spec.org/mpi2007/flags/EM64T\\_Intel121\\_flags.html](http://www.spec.org/mpi2007/flags/EM64T_Intel121_flags.html)

You can also download the XML flags source by saving the following link:  
[http://www.spec.org/mpi2007/flags/EM64T\\_Intel121\\_flags.xml](http://www.spec.org/mpi2007/flags/EM64T_Intel121_flags.xml)



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For questions about this result, please contact the tester.  
For other inquiries, please contact [webmaster@spec.org](mailto:webmaster@spec.org).

Tested with SPEC MPI2007 v2.0.1.  
Report generated on Tue Jul 22 13:46:22 2014 by SPEC MPI2007 PS/PDF formatter v1463.  
Originally published on 27 December 2012.