Dell Inc. PowerEdge M820 (Intel Xeon E5-4640 v2, 2.20 GHz)

**IPC**: SPECint\_rate2006 = 1410
SPECint\_rate_base2006 = 1360

**CPU2006 license**: 55
**Test sponsor**: Dell Inc.
**Tested by**: Dell Inc.
**Test date**: Mar-2014
**Hardware Availability**: Mar-2014
**Software Availability**: Aug-2013

### Hardware

- **CPU Name**: Intel Xeon E5-4640 v2
- **CPU Characteristics**: Intel Turbo Boost Technology up to 2.70 GHz
- **CPU MHz**: 2200
- **FPU**: Integrated
- **CPU(s) enabled**: 40 cores, 4 chips, 10 cores/chip, 2 threads/core
- **CPU(s) orderable**: 4 chip
- **Primary Cache**: 32 KB I + 32 KB D on chip per core
- **Secondary Cache**: 256 KB I+D on chip per core
- **L2 Cache**: 20 MB I+D on chip per chip
- **Other Cache**: None
- **Memory**: 512 GB (32 x 16 GB 2Rx4 PC3-14900R-13, ECC)
- **Disk Subsystem**: 1 x 1TB 7200 RPM Near-Line SAS
- **Other Hardware**: None

### Software

- **Operating System**: SUSE Linux Enterprise Server 11 (x86_64) 3.0.76-0.11-default
- **Compiler**: C++ Version 14.0.0.080 of Intel C++ Studio XE for Linux
- **Auto Parallel**: No
- **File System**: ext2
- **System State**: Run level 3 (multi-user)
- **Base Pointers**: 32-bit
- **Peak Pointers**: 32/64-bit
- **Other Software**: Microquill SmartHeap V10.0
**SPEC CINT2006 Result**

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### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds Base</th>
<th>Seconds Ratio</th>
<th>Seconds Peak</th>
<th>Seconds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbnc</td>
<td>80</td>
<td>761</td>
<td>1030</td>
<td>761</td>
<td>1030</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>80</td>
<td>1076</td>
<td>717</td>
<td>1078</td>
<td>716</td>
</tr>
<tr>
<td>403.gcc</td>
<td>80</td>
<td>595</td>
<td>1080</td>
<td>594</td>
<td>1080</td>
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<tr>
<td>429.mcf</td>
<td>80</td>
<td>351</td>
<td>2080</td>
<td>352</td>
<td>2070</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>80</td>
<td>840</td>
<td>999</td>
<td>837</td>
<td>1000</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>80</td>
<td>406</td>
<td>1840</td>
<td>408</td>
<td>1830</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>80</td>
<td>967</td>
<td>1000</td>
<td>966</td>
<td>1000</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>80</td>
<td>182</td>
<td>9110</td>
<td>182</td>
<td>9100</td>
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<tr>
<td>464.h264ref</td>
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<td>1045</td>
<td>1690</td>
<td>1049</td>
<td>1690</td>
</tr>
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<td>471.onnetpp</td>
<td>80</td>
<td>656</td>
<td>763</td>
<td>655</td>
<td>763</td>
</tr>
<tr>
<td>473.astar</td>
<td>80</td>
<td>728</td>
<td>772</td>
<td>729</td>
<td>770</td>
</tr>
<tr>
<td>483.xalancbk</td>
<td>80</td>
<td>377</td>
<td>1470</td>
<td>376</td>
<td>1470</td>
</tr>
</tbody>
</table>

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

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### Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

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### Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

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### Platform Notes

Virtualization Technology disabled  
Execute Disable disabled  
Logical Processor enabled  
System Profile set to Performance  
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6818  
$Rev: 6818 $ $Date:: 2012-07-17 #$ e86d102572650a6e4d596a3cee98f191  
running on linux Mon Mar  3 02:08:56 2014

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:  
http://www.spec.org/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo  
model name : Intel(R) Xeon(R) CPU E5-4640 v2 @ 2.20GHz  
4 "physical id"s (chips)  
80 "processors"  
cores, siblings (Caution: counting these is hw and system dependent. The
Continued on next page
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Platform Notes (Continued)

following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
  cpu cores : 10
  siblings : 20
  physical 0: cores 0 1 2 3 4 8 9 10 11 12
  physical 1: cores 0 1 2 3 4 8 9 10 11 12
  physical 2: cores 0 1 2 3 4 8 9 10 11 12
  physical 3: cores 0 1 2 3 4 8 9 10 11 12
  cache size : 20480 KB

From /proc/meminfo
  MemTotal: 529392220 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
        SUSE Linux Enterprise Server 11 (x86_64)
From /etc/*release* /etc/*version*
  SuSE-release:
    SUSE Linux Enterprise Server 11 (x86_64)
    VERSION = 11
    PATCHLEVEL = 3

uname -a:
  Linux linux 3.0.76-0.11-default #1 SMP Fri Jun 14 08:21:43 UTC 2013 (ccab990)
  x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Mar 3 02:03 last=S

SPEC is set to: /root/cpu2006-1.2
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda2 ext2 909G 7.8G 900G 1% /

Additional information from dmidecode:
  BIOS Dell Inc. 2.0.24 01/21/2014
  Memory:
    32x 00CE00B300CE M393B2G70BH0-CMA 16 GB 1866 MHz

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:
  LD_LIBRARY_PATH = ""/root/cpu2006-1.2/libs/32:/root/cpu2006-1.2/libs/64:/root/cpu2006-1.2/sh"

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB memory using RedHat EL 6.4
Transparent Huge Pages enabled with:
echo always > /sys/kernel/mm/transparent_hugepage/enabled
Filesystem page cache cleared with:

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General Notes (Continued)

echo 1>/proc/sys/vm/drop_caches
runspec command invoked through numacl i.e.:
numactl --interleave=all runspec <etc>

Base Compiler Invocation

C benchmarks:
icc -m32

C++ benchmarks:
icpc -m32

Base Portability Flags

400.perlbench: -DSPEC_CPU_LINUX_IA32
462.libquantum: -DSPEC_CPU_LINUX
483.xalancbmk: -DSPEC_CPU_LINUX

Base Optimization Flags

C benchmarks:
-xSSE4.2 -ipo -O3 -no-prec-div -opt-prefetch -opt-mem-layout-trans=3

C++ benchmarks:
-xSSE4.2 -ipo -O3 -no-prec-div -opt-prefetch -opt-mem-layout-trans=3
-Wl,-z,muldefs -L/sh -lsmartheap

Base Other Flags

C benchmarks:
403.gcc: -Dalloca=_alloca

Peak Compiler Invocation

C benchmarks (except as noted below):
icc -m32

400.perlbench: icc -m64
401.bzip2: icc -m64

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**Peak Compiler Invocation (Continued)**

456.hmmer: icc -m64
458.sjeng: icc -m64

C++ benchmarks:
icpc -m32

**Peak Portability Flags**

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
401.bzip2: -DSPEC_CPU_LP64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LINUX
483.xalancbmk: -DSPEC_CPU_LINUX

**Peak Optimization Flags**

C benchmarks:

400.perlbench: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -auto-ilp32

401.bzip2: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -opt-prefetch -auto-ilp32 -ansi-alias

403.gcc: -xSSE4.2 -ipo -O3 -no-prec-div

429.mcf: basepeak = yes

445.gobmk: -xSSE4.2(pass 2) -prof-gen(pass 1) -prof-use(pass 2) -ansi-alias -opt-mem-layout-trans=3

456.hmmer: -xSSE4.2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32

458.sjeng: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll4 -auto-ilp32

462.libquantum: basepeak = yes

464.h264ref: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2) -unroll2 -ansi-alias

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Peak Optimization Flags (Continued)

C++ benchmarks:

471.omnetpp: -xSSE4.2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
   -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
   -ansi-alias -opt-ra-region-strategy=block -Wl,-z,muldefs
   -L/sh -lsmartheap

473.astar: basepeak = yes
483.xalancbmk: basepeak = yes

Peak Other Flags

C benchmarks:

403.gcc: -Dalloca=_alloca

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.html
http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revC.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic14.0-official-linux64.20140128.xml
http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revC.xml

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For other inquiries, please contact webmaster@spec.org.

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