Dell Inc.
PowerEdge M420 (Intel Xeon E5-2403 v2, 1.80 GHz)

SPEClnt_rate2006 = 185
SPEClnt_rate_base2006 = 179

CPU2006 license: 55
Test sponsor: Dell Inc.
Tested by: Dell Inc.

Test date: Dec-2013
Hardware Availability: Jan-2014
Software Availability: Sep-2013

CPU Name: Intel Xeon E5-2403 v2
FPU: Integrated
CPU(s) enabled: 8 cores, 2 chips, 4 cores/chip
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 256 KB I+D on chip per core
L3 Cache: None

Memory: 96 GB (6 x 16 GB 2Rx4 PC3L-12800R-11, ECC)
Disk Subsystem: 2 x 50 GB SATA SSD, RAID 0
Other Hardware: None

Operating System: SUSE Linux Enterprise Server 11 (x86_64)
Compiler: C/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
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### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds Base</th>
<th>Ratio</th>
<th>Seconds Peak</th>
<th>Ratio</th>
<th>Seconds Base</th>
<th>Ratio</th>
<th>Seconds Peak</th>
<th>Ratio</th>
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<tbody>
<tr>
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<td>8</td>
<td>619</td>
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<td>126</td>
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<tr>
<td>401.bzip2</td>
<td>8</td>
<td>863</td>
<td>862</td>
<td>89.6</td>
<td>862</td>
<td>89.6</td>
<td>862</td>
<td>89.6</td>
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<tr>
<td>403.gcc</td>
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<td>440</td>
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<td>146</td>
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<tr>
<td>445.gobmk</td>
<td>8</td>
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<td>325</td>
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<tr>
<td>458.sjeng</td>
<td>8</td>
<td>797</td>
<td>797</td>
<td>121</td>
<td>797</td>
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<tr>
<td>462.libquantum</td>
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<td>138</td>
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<td>138</td>
<td>1200</td>
<td>138</td>
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<td>464.h264ref</td>
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<td>236</td>
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<td>750</td>
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<tr>
<td>471.omnetpp</td>
<td>8</td>
<td>457</td>
<td>462</td>
<td>109</td>
<td>462</td>
<td>109</td>
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<td>473.astar</td>
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<td>544</td>
<td>103</td>
<td>544</td>
<td>103</td>
<td>544</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>8</td>
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<td>255</td>
<td>217</td>
<td>255</td>
<td>217</td>
<td>255</td>
<td>217</td>
<td>255</td>
</tr>
</tbody>
</table>

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

### 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.

### Operating System Notes

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

### Platform Notes

**BIOS settings:**
- 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 Thu Dec 12 11:51:41 2013

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](http://www.spec.org/cpu2006/Docs/config.html#sysinfo)

From /proc/cpuinfo
- model name : Intel(R) Xeon(R) CPU E5-2403 v2 @ 1.80GHz
  - 2 "physical id"s (chips)
  - 8 "processors"

Continued on next page
Platform Notes (Continued)

cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
  cpu cores : 4
  siblings : 4
  physical 0: cores 0 1 2 3
  physical 1: cores 0 1 2 3
  cache size : 10240 KB

From /proc/meminfo
  MemTotal: 99123324 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 3.0.70-0.9-default #1 SMP Tue Apr 2 13:01:38 UTC 2013 (25ae5d2)
    x86_64 x86_64 x86_64 GNU/Linux

  run-level 3 Dec 12 11:51 last=S

SPEC is set to: /root/cpu2006-1.2
  Filesystem  Type  Size  Used  Avail  Use%  Mounted on
  /dev/sda2 ext2  83G  7.7G  74G  10%  /

Additional information from dmidecode:
  BIOS Dell Inc. 2.0.22 09/23/2013
  Memory:
    6x 00CE04B300CE M393B2G70BH0-YK0 16 GB 1333 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:
    echo 1> /proc/sys/vm/drop_caches

Continued on next page
Dell Inc.  
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- **Test date:** Dec-2013  
- **Hardware Availability:** Jan-2014  
- **Software Availability:** Sep-2013

**General Notes (Continued)**

- `runcspec` command invoked through `numactl` i.e.:
  - `numactl --interleave=all runcspec <etc>`

**Base Compiler Invocation**

- **C benchmarks:**
  - `icc -m32`
- **C++ benchmarks:**
  - `icpc -m32`

**Base Portability Flags**

- 400.perlb anch: `-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.perlb anch: `icc -m64`
  - 401.bzip2: `icc -m64`

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#### Peak Compiler Invocation (Continued)

<table>
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<th>Compiler Invocation</th>
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<tr>
<td>456.hmmer</td>
<td>icc -m64</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>icc -m64</td>
</tr>
</tbody>
</table>

**C++ benchmarks:**

<table>
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<th>Benchmark</th>
<th>Compiler</th>
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<tbody>
<tr>
<td>icpc</td>
<td>-m32</td>
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</table>

#### Peak Portability Flags

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<th>Flags</th>
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<td>-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>-DSPEC_CPU_LP64</td>
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#### Peak Optimization Flags

**C benchmarks:**

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<td>-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</td>
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<tr>
<td>401.bzip2</td>
<td>-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</td>
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<tr>
<td>403.gcc</td>
<td>basepeak = yes</td>
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<tr>
<td>429.mcf</td>
<td>basepeak = yes</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>-xSSE4.2(pass 2) -prof-gen(pass 1) -prof-use(pass 2) -ansi-alias -opt-mem-layout-trans=3</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>-xSSE4.2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>-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</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>basepeak = yes</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>-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</td>
</tr>
</tbody>
</table>

Continued on next page
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-revB.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-revB.xml

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

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