### Dell Inc. PowerEdge R520 (Intel Xeon E5-2403, 1.80 GHz)

**SPECint\textsuperscript{c}_rate2006 = 174**  
**SPECint\_rate\_base2006 = 167**

#### Hardware

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon E5-2403</td>
</tr>
<tr>
<td>CPU Characteristics</td>
<td></td>
</tr>
<tr>
<td>CPU MHz</td>
<td>1800</td>
</tr>
<tr>
<td>FPU</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled</td>
<td>8 cores, 2 chips, 4 cores/chip</td>
</tr>
<tr>
<td>CPU(s) orderable</td>
<td>1.2 chip</td>
</tr>
<tr>
<td>Primary Cache</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Secondary Cache</td>
<td>256 KB I+D on chip per core</td>
</tr>
<tr>
<td>L2 Cache</td>
<td>10 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other Cache</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>48 GB (6 x 8 GB 2Rx4 PC3-12800R-11, ECC, running at 1066 MHz)</td>
</tr>
<tr>
<td>Disk Subsystem</td>
<td>2 x 600 GB 15000 RPM SAS, RAID 1</td>
</tr>
<tr>
<td>Other Hardware</td>
<td>None</td>
</tr>
</tbody>
</table>

#### Software

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>SUSE Linux Enterprise Server 11 SP2 (x86_64) 3.0.13-0.9-default</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/C++: Version 12.1.0.225 of Intel C++ Studio XE for Linux</td>
</tr>
<tr>
<td>Auto Parallel</td>
<td>No</td>
</tr>
<tr>
<td>File System</td>
<td>ext3</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (add definition here)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>32-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Other Software</td>
<td>Microquill SmartHeap V9.01</td>
</tr>
</tbody>
</table>

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SPEC\textsuperscript{c}_int2006 = 174  
SPEC\_int\_base2006 = 167
Dell Inc.

PowerEdge R520 (Intel Xeon E5-2403, 1.80 GHz)

SPEC CINT2006 Result

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SPECint_rate2006 = 174
SPECint_rate_base2006 = 167

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

Test date: Mar-2012
Hardware Availability: May-2012
Software Availability: Feb-2012

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>400.perlbench</td>
<td>8</td>
<td>652</td>
<td>120</td>
<td>652</td>
<td>120</td>
<td>650</td>
<td>120</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>8</td>
<td>910</td>
<td>84.8</td>
<td>905</td>
<td>85.3</td>
<td><strong>908</strong></td>
<td><strong>85.0</strong></td>
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<tr>
<td>403.gcc</td>
<td>8</td>
<td><strong>466</strong></td>
<td>138</td>
<td>466</td>
<td>138</td>
<td>466</td>
<td>138</td>
</tr>
<tr>
<td>429.mcf</td>
<td>8</td>
<td>253</td>
<td>288</td>
<td>253</td>
<td>288</td>
<td><strong>253</strong></td>
<td><strong>288</strong></td>
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<tr>
<td>445.gobmk</td>
<td>8</td>
<td>790</td>
<td>106</td>
<td>790</td>
<td>106</td>
<td><strong>790</strong></td>
<td><strong>106</strong></td>
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<tr>
<td>456.hmmer</td>
<td>8</td>
<td>362</td>
<td>206</td>
<td>364</td>
<td>205</td>
<td><strong>363</strong></td>
<td><strong>206</strong></td>
</tr>
<tr>
<td>458.sjeng</td>
<td>8</td>
<td>845</td>
<td>115</td>
<td>845</td>
<td>115</td>
<td><strong>845</strong></td>
<td><strong>115</strong></td>
</tr>
<tr>
<td>462.libquantum</td>
<td>8</td>
<td>158</td>
<td>1050</td>
<td>159</td>
<td>1040</td>
<td><strong>159</strong></td>
<td><strong>1040</strong></td>
</tr>
<tr>
<td>464.h264ref</td>
<td>8</td>
<td>805</td>
<td>220</td>
<td>797</td>
<td>222</td>
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</tr>
<tr>
<td>471.omnetpp</td>
<td>8</td>
<td>483</td>
<td>104</td>
<td><strong>482</strong></td>
<td><strong>104</strong></td>
<td>482</td>
<td>104</td>
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<tr>
<td>473.astar</td>
<td>8</td>
<td><strong>584</strong></td>
<td><strong>96.1</strong></td>
<td>585</td>
<td>96.1</td>
<td>582</td>
<td>96.5</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>8</td>
<td>281</td>
<td>196</td>
<td><strong>281</strong></td>
<td><strong>196</strong></td>
<td>280</td>
<td>197</td>
</tr>
<tr>
<td>Peak</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></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

CPU Power Management set to Maximum Performance
Memory Frequency set to Maximum Performance
Turbo Boost set to Enabled
C States/C1E set to Enabled
Sysinfo program /root/CPU2006-1.2/config/sysinfo.rev6800
$Rev: 6800 $ $Date:: 2011-10-11 #$ 6f2ebdff5032aaa42e583f96b07f99d3
running on Silk-2P Fri Mar 16 12:46:05 2012

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 E5-2403 0 @ 1.80GHz
    2 "physical id"s (chips)
    8 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The
Continued on next page
SPEC CINT2006 Result

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Platform Notes (Continued)

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:  49381468 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 = 2

uname -a:
  Linux Silk-2P 3.0.13-0.9-default #1 SMP Mon Jan 16 17:33:03 UTC 2012
    (54ddfaf) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Mar 16 12:45 last=S

SPEC is set to: /root/CPU2006-1.2
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/sda1      ext3  266G   11G  242G   5% /

Additional information from dmidecode:
(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"

Binaries compiled on a system with 1x Core i7-860 CPU + 8GB memory using RHEL5.5
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
runspec command invoked through numactl i.e.:
numactl --interleave=all runspec <etc>
The Dell PowerEdge R520 and the Bull NovaScale R450 F3 models are electronically equivalent.

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General Notes (Continued)

The results have been measured on a Dell PowerEdge R520 model.

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:
exSSE4.2  -ipo  -O3  -no-prec-div  -opt-prefetch  -opt-mem-layout-trans=3

C++ benchmarks:
exSSE4.2  -ipo  -O3  -no-prec-div  -opt-prefetch  -opt-mem-layout-trans=3  
-Wl,-z,muldefs -L/smartheap -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  
456.hmmer: icc  -m64

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Peak Compiler Invocation (Continued)

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: basepeak = yes
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)

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/smartheap -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-ic12.1-official-linux64.20111122.html
http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revA.20120410.00.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic12.1-official-linux64.20111122.xml
http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revA.20120410.00.xml

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

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