**Dell Inc.**

PowerEdge R830 (Intel Xeon E5-4620 v4, 2.10 GHz)

<table>
<thead>
<tr>
<th>Test sponsor</th>
<th>Dell Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2006 license</td>
<td>55</td>
</tr>
<tr>
<td>Tested by</td>
<td>Dell Inc.</td>
</tr>
<tr>
<td>CPU(s) enabled</td>
<td>40 cores, 4 chips, 10 cores/chip, 2 threads/core</td>
</tr>
<tr>
<td>CPU(s) orderable</td>
<td>2,4 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>L3 Cache</td>
<td>25 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other Cache</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>512 GB (32 x 16 GB 2Rx8 PC4-2400T-R, running at 2133 MHz)</td>
</tr>
<tr>
<td>Disk Subsystem</td>
<td>1 x 800 GB SATA SSD</td>
</tr>
<tr>
<td>Other Hardware</td>
<td>None</td>
</tr>
<tr>
<td>Operating System</td>
<td>SUSE Linux Enterprise Server 12 SP1 3.12.49-11-default</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux</td>
</tr>
<tr>
<td>Auto Parallel</td>
<td>Yes</td>
</tr>
<tr>
<td>File System</td>
<td>btrfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Other Software</td>
<td>Microquill SmartHeap V10.2</td>
</tr>
</tbody>
</table>

**SPEC® CINT2006 Result**

**Dell Inc.**

PowerEdge R830 (Intel Xeon E5-4620 v4, 2.10 GHz)

| SPECint®2006 = | 53.7 |
| SPECint_base2006 = | 51.0 |

**Hardware**

- **CPU Name:** Intel Xeon E5-4620 v4
- **CPU Characteristics:** Intel Turbo Boost Technology up to 2.60 GHz
- **CPU MHz:** 2100
- **FPU:** Integrated
- **CPU(s) enabled:** 40 cores, 4 chips, 10 cores/chip, 2 threads/core
- **CPU(s) orderable:** 2,4 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:** 25 MB I+D on chip per chip
- **Other Cache:** None
- **Memory:** 512 GB (32 x 16 GB 2Rx8 PC4-2400T-R, running at 2133 MHz)
- **Disk Subsystem:** 1 x 800 GB SATA SSD
- **Other Hardware:** None

**Software**

- **Operating System:** SUSE Linux Enterprise Server 12 SP1 3.12.49-11-default
- **Compiler:** C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux
- **Auto Parallel:** Yes
- **File System:** btrfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 32/64-bit
- **Peak Pointers:** 32/64-bit
- **Other Software:** Microquill SmartHeap V10.2
SPEC CINT2006 Result

Dell Inc.

PowerEdge R830 (Intel Xeon E5-4620 v4, 2.10 GHz)

SPECint2006 = 53.7
SPECint_base2006 = 51.0

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

Test date: May-2016
Hardware Availability: Jun-2016
Software Availability: Dec-2015

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>317</td>
<td>30.8</td>
<td>319</td>
<td>30.6</td>
<td>317</td>
<td>30.8</td>
<td>291</td>
<td>33.5</td>
<td>291</td>
<td>33.5</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>505</td>
<td>19.1</td>
<td>505</td>
<td>19.1</td>
<td>503</td>
<td>19.2</td>
<td>498</td>
<td>19.4</td>
<td>498</td>
<td>19.4</td>
</tr>
<tr>
<td>403.gcc</td>
<td>282</td>
<td>28.5</td>
<td>281</td>
<td>28.7</td>
<td>280</td>
<td>28.7</td>
<td>282</td>
<td>28.5</td>
<td>281</td>
<td>28.7</td>
</tr>
<tr>
<td>429.mcf</td>
<td>174</td>
<td>52.3</td>
<td>169</td>
<td>54.0</td>
<td>172</td>
<td>52.9</td>
<td>174</td>
<td>52.3</td>
<td>169</td>
<td>54.0</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>464</td>
<td>22.6</td>
<td>465</td>
<td>22.5</td>
<td>465</td>
<td>22.6</td>
<td>464</td>
<td>22.6</td>
<td>465</td>
<td>22.6</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>147</td>
<td>63.5</td>
<td>147</td>
<td>63.5</td>
<td>147</td>
<td>63.6</td>
<td>147</td>
<td>63.5</td>
<td>147</td>
<td>63.6</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>4.25</td>
<td>4880</td>
<td>4.2</td>
<td>4930</td>
<td>4.22</td>
<td>4910</td>
<td>4.25</td>
<td>4880</td>
<td>4.2</td>
<td>4930</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>500</td>
<td>44.3</td>
<td>499</td>
<td>44.4</td>
<td>498</td>
<td>44.4</td>
<td>500</td>
<td>44.3</td>
<td>499</td>
<td>44.4</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>227</td>
<td>27.5</td>
<td>229</td>
<td>27.2</td>
<td>225</td>
<td>27.8</td>
<td>155</td>
<td>40.4</td>
<td>150</td>
<td>41.8</td>
</tr>
<tr>
<td>473.astar</td>
<td>251</td>
<td>28.0</td>
<td>251</td>
<td>28.0</td>
<td>251</td>
<td>28.0</td>
<td>251</td>
<td>28.0</td>
<td>251</td>
<td>28.0</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>125</td>
<td>55.2</td>
<td>125</td>
<td>55.4</td>
<td>126</td>
<td>54.8</td>
<td>112</td>
<td>61.8</td>
<td>110</td>
<td>62.8</td>
</tr>
</tbody>
</table>

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

Submit Notes

The config file option 'submit' was used.

Operating System Notes

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

Platform Notes

BIOS settings:
Snoop Mode set to Home Snoop
Virtualization Technology disabled
System Profile set to custom
CPU Power Management set to Maximum Performance
C States set to Autonomous
C1E disabled
Energy Efficient Turbo disabled
Uncore Frequency set to Dynamic
Energy Efficiency Policy set to Performance
Memory Patrol Scrub disabled
Sysinfo program /root/cpu2006-1.2/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-t2sb Mon May 16 01:40:25 2016

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

Continued on next page
Dell Inc.  

PowerEdge R830 (Intel Xeon E5-4620 v4, 2.10 GHz)  

**SPECint2006** = 53.7  
**SPECint_base2006** = 51.0  

CPU2006 license: 55  
Test sponsor: Dell Inc.  
Tested by: Dell Inc.  
Test date: May-2016  
Hardware Availability: Jun-2016  
Software Availability: Dec-2015  

---  

**Platform Notes (Continued)**  

From /proc/cpuinfo  
model name : Intel(R) Xeon(R) CPU E5-4620 v4 @ 2.10GHz  
  4 "physical id"s (chips)  
  80 "processors"  
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 : 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 : 25600 KB  

From /proc/meminfo  
MemTotal: 529326748 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB  

/usr/bin/lsb_release -d  
SUSE Linux Enterprise Server 12 SP1  

From /etc/*release* /etc/*version*  
SuSE-release:  
  SUSE Linux Enterprise Server 12 (x86_64)  
  VERSION = 12  
  PATCHLEVEL = 1  
  # This file is deprecated and will be removed in a future service pack or release.  
  # Please check /etc/os-release for details about this release.  
os-release:  
  NAME="SLES"  
  VERSION="12-SP1"  
  VERSION_ID="12.1"  
  PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"  
  ID="sles"  
  ANSI_COLOR="0;32"  
  CPE_NAME="cpe:/o:suse:sles:12:sp1"  

uname -a:  
  Linux linux-t2sb 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015  
  (8d714a0) x86_64 x86_64 x86_64 GNU/Linux  

run-level 3 May 16 01:37  
SPEC is set to: /root/cpu2006-1.2  
Files systematic Type Size Used Avail Use% Mounted on  
/dev/sda3 btrfs 461G 9.5G 449G 3% /  
Additional information from dmidecode:  

Warning: Use caution when you interpret this section. The 'dmidecode' program
Dell Inc.

PowerEdge R830 (Intel Xeon E5-4620 v4, 2.10 GHz)

SPECint2006 = 53.7
SPECint_base2006 = 51.0

Platform Notes (Continued)

reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

BIOS Dell Inc. 1.0.0 04/26/2016
Memory:
  31x 00AD063200AD HMA82GR7MFR8N-UH 16 GB 2 rank 2400 MHz, configured at 2133 MHz
  1x 00CE00B300CE M393A2K43BB1-CRC 16 GB 2 rank 2400 MHz, configured at 2133 MHz
  16x Not Specified Not Specified

(End of data from sysinfo program)

General Notes

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/root/cpu2006-1.2/libs/32:/root/cpu2006-1.2/libs/64:/root/cpu2006-1.2/sh"
OMP_NUM_THREADS = "40"

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB memory using RedHat EL 7.1
Transparent Huge Pages enabled with:
echo always > /sys/kernel/mm/transient_hugepage/enabled

Base Compiler Invocation

C benchmarks:
  icc -m64

C++ benchmarks:
  icpc -m64

Base Portability Flags

400.perlbench: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64
  401.bzip2: -DSPEC_CPU_LP64
  403.gcc: -DSPEC_CPU_LP64
  429.mcf: -DSPEC_CPU_LP64
  445.gobmk: -DSPEC_CPU_LP64
  456.hmmer: -DSPEC_CPU_LP64
  458.sjeng: -DSPEC_CPU_LP64
  462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
  464.h264ref: -DSPEC_CPU_LP64
  471.omnetpp: -DSPEC_CPU_LP64

Continued on next page

Standard Performance Evaluation Corporation
info@spec.org
http://www.spec.org/
 SPEC CINT2006 Result

Dell Inc.

PowerEdge R830 (Intel Xeon E5-4620 v4, 2.10 GHz)

SPECint2006 = 53.7
SPECint_base2006 = 51.0

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

Test date: May-2016
Hardware Availability: Jun-2016
Software Availability: Dec-2015

Base Portability Flags (Continued)

473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -auto-p32

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-Wl,-z,muldefs -L/sh -lsmartheap64

Base Other Flags

C benchmarks:
403.gcc: -Dalloca=_alloca

Peak Compiler Invocation

C benchmarks (except as noted below):
icc -m64
400.perlbench: icc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin

C++ benchmarks (except as noted below):
icpc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin
473.astar: icpc -m64

Peak Portability Flags

400.perlbench: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX_IA32
401.bzip2: -DSPEC_CPU_LP64
403.gcc: -DSPEC_CPU_LP64
429.mcf: -DSPEC_CPU_LP64
445.gobmk: -DSPEC_CPU_LP64
456.hmmer: -DSPEC_CPU_LP64
458.sjeng: -DSPEC_CPU_LP64
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
464.h264ref: -DSPEC_CPU_LP64

Continued on next page
Dell Inc.

PowerEdge R830 (Intel Xeon E5-4620 v4, 2.10 GHz)

<table>
<thead>
<tr>
<th>SPECint2006</th>
<th>53.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECint_base2006</td>
<td>51.0</td>
</tr>
</tbody>
</table>

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

Test date: May-2016
Hardware Availability: Jun-2016
Software Availability: Dec-2015

### Peak Portability Flags (Continued)

- 471.omnetpp: -D_FILE_OFFSET_BITS=64
- 473.astar: -DSPEC_CPU_LP64
- 483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX

### Peak Optimization Flags

**C benchmarks:**

- 400.perlbench: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -prof-use(pass 2) -opt-prefetch -ansi-alias
- 401.bzip2: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div -par-num-threads=1(pass 1) -prof-use(pass 2) -auto-ilp32 -opt-prefetch -ansi-alias
- 403.gcc: basepeak = yes
- 429.mcf: basepeak = yes
- 445.gobmk: basepeak = yes
- 456.hmmer: basepeak = yes
- 458.sjeng: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4
- 462.libquantum: basepeak = yes
- 464.h264ref: basepeak = yes

**C++ benchmarks:**

- 471.omnetpp: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1) -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2) -par-num-threads=1(pass 1) -prof-use(pass 2) -opt-ra-region-strategy=block -ansi-alias -Wl,-z,muldefs -L/sh -lsmartheap
- 473.astar: basepeak = yes
- 483.xalancbmk: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -ansi-alias -Wl,-z,muldefs -L/sh -lsmartheap
Dell Inc.  
PowerEdge R830 (Intel Xeon E5-4620 v4, 2.10 GHz)  

| SPECint2006 = | 53.7 |
| SPECint_base2006 = | 51.0 |

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

| Test date: | May-2016 |
| Hardware Availability: | Jun-2016 |
| Software Availability: | Dec-2015 |

**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-ic16.0-official-linux64.html  

You can also download the XML flags sources by saving the following links:  
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml  
http://www.spec.org/cpu2006/flags/Dell-Platform-Settings-V1.2-revD.20151006.xml