Dell Inc.

PowerEdge C6420 (Intel Xeon Gold 6128, 3.40 GHz)

<table>
<thead>
<tr>
<th>SPECint®2006</th>
<th>74.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECint_base2006</td>
<td>70.8</td>
</tr>
</tbody>
</table>

Test date: Jun-2017
Hardware Availability: Jul-2017
Test sponsor: Dell Inc.
Software Availability: Nov-2016
Tested by: Dell Inc.

**SPECint2006 Result**

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
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<tbody>
<tr>
<td>perlbench</td>
<td>53.0</td>
</tr>
<tr>
<td>bzip2</td>
<td>28.0</td>
</tr>
<tr>
<td>gcc</td>
<td>28.3</td>
</tr>
<tr>
<td>mcf</td>
<td>74.9</td>
</tr>
<tr>
<td>gobmk</td>
<td>77.4</td>
</tr>
<tr>
<td>hmemer</td>
<td>77.4</td>
</tr>
<tr>
<td>sjeng</td>
<td>36.8</td>
</tr>
<tr>
<td>libquantum</td>
<td>5260</td>
</tr>
<tr>
<td>h264ref</td>
<td>71.5</td>
</tr>
<tr>
<td>omnetpp</td>
<td>30.3</td>
</tr>
<tr>
<td>astar</td>
<td>38.4</td>
</tr>
<tr>
<td>xalancbmk</td>
<td>38.2</td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Gold 6128
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.70 GHz
- **CPU MHz:** 3400
- **FPU:** Integrated
- **CPU(s) enabled:** 12 cores, 2 chips, 6 cores/chip, 2 threads/core
- **CPU(s) orderable:** 1.2 chip
- **Primary Cache:** 32 KB I + 32 KB D on chip per core
- **Secondary Cache:** 1 MB I+D on chip per core
- **L3 Cache:** 19.25 MB I+D on chip per chip
- **Other Cache:** None
- **Memory:** 384 GB (12 x 32 GB 2Rx8 PC4-2666V-R)
- **Disk Subsystem:** 1 x 960 GB SATA SSD
- **Other Hardware:** None

**Software**

- **Operating System:** SUSE Linux Enterprise Server 12 SP2 (x86_64) 4.4.21-69-default
- **Compiler:** C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux
- **Auto Parallel:** Yes
- **File System:** ext4
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 32/64-bit
- **Peak Pointers:** 32/64-bit
- **Other Software:** Microquill SmartHeap V10.2
Dell Inc.
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SPECint2006 = 74.5
SPECint_base2006 = 70.8

CPU2006 license: 55
Test sponsor: Dell Inc.
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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>
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</thead>
<tbody>
<tr>
<td>400.perlbench</td>
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<td>46.5</td>
<td>211</td>
<td>46.3</td>
<td><strong>210</strong></td>
<td><strong>46.5</strong></td>
<td><strong>184</strong></td>
<td><strong>53.0</strong></td>
<td>184</td>
<td>53.0</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>345</td>
<td>28.0</td>
<td>344</td>
<td>28.0</td>
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<td>342</td>
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<td><strong>342</strong></td>
<td><strong>28.3</strong></td>
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<tr>
<td>403.gcc</td>
<td>194</td>
<td>41.5</td>
<td>194</td>
<td>41.5</td>
<td>194</td>
<td>41.6</td>
<td>196</td>
<td>41.1</td>
<td><strong>195</strong></td>
<td><strong>41.3</strong></td>
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<tr>
<td>429.mcf</td>
<td>122</td>
<td>75.0</td>
<td><strong>122</strong></td>
<td><strong>74.9</strong></td>
<td>124</td>
<td>73.8</td>
<td>125</td>
<td>72.9</td>
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<tr>
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<td>315</td>
<td>33.3</td>
<td>316</td>
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<td><strong>33.3</strong></td>
<td><strong>311</strong></td>
<td><strong>33.7</strong></td>
<td>311</td>
<td>33.7</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>95.6</td>
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<td><strong>97.4</strong></td>
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<tr>
<td>458.sjeng</td>
<td>329</td>
<td>36.8</td>
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<td>36.7</td>
<td>329</td>
<td>36.8</td>
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<tr>
<td>462.libquantum</td>
<td>3.94</td>
<td>5260</td>
<td>4.14</td>
<td>5010</td>
<td>3.92</td>
<td>5290</td>
<td><strong>3.94</strong></td>
<td><strong>5260</strong></td>
<td>4.14</td>
<td>5010</td>
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<tr>
<td>464.h264ref</td>
<td>309</td>
<td>71.5</td>
<td>310</td>
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<tr>
<td>471.omnetpp</td>
<td>208</td>
<td>30.0</td>
<td>200</td>
<td>31.2</td>
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<td><strong>30.3</strong></td>
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<td>41.6</td>
<td>149</td>
<td>41.9</td>
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<tr>
<td>473.astar</td>
<td>183</td>
<td>38.4</td>
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<td>38.4</td>
<td>184</td>
<td>38.1</td>
<td><strong>184</strong></td>
<td><strong>38.2</strong></td>
<td>184</td>
<td>38.2</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>91.5</td>
<td>75.4</td>
<td>91.1</td>
<td>75.8</td>
<td>91.6</td>
<td>75.3</td>
<td>79.4</td>
<td>86.9</td>
<td>79.9</td>
<td>86.4</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:
Sub NUMA Cluster disabled
Virtualization Technology disabled
System Profile set to Custom
CPU Performance 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
Logical Processor enabled
CPU Interconnect Bus Link Power Management disabled
PCI ASPM L1 Link Power Management disabled
Sysinfo program /root/cpu2006-1.2_ic17u3/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on linux-fx60 Wed Jun 21 15:33:55 2017
Continued on next page
## Dell Inc.

PowerEdge C6420 (Intel Xeon Gold 6128, 3.40 GHz)

<table>
<thead>
<tr>
<th>CPU2006 license:</th>
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| SPECint2006 = | 74.5 |
| SPECint_base2006 = | 70.8 |

| Test date:     | Jun-2017 |
| Hardware Availability: | Jul-2017 |
| Software Availability: | Nov-2016 |

### Platform Notes (Continued)

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

```plaintext
model name : Intel(R) Xeon(R) Gold 6128 CPU @ 3.40GHz
2 "physical id"s (chips)
24 "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 : 6
  siblings : 12
  physical 0: cores 0 6 9 10 11 13
  physical 1: cores 0 6 9 10 11 13
  cache size : 19712 KB
```

From /proc/meminfo

```plaintext
MemTotal:       394868380 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

From /etc/*release* /etc/*version*

SuSE-release:

```plaintext
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 2
```

# 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:

```plaintext
NAME="SLES"
VERSION="12-SP2"
VERSION_ID="12.2"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp2"
```

uname -a:

```plaintext
Linux linux-fx60 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016
(9464f67) x86_64 x86_64 x86_64 GNU/Linux
run-level 3 Jun 21 15:31
```

SPEC is set to: /root/cpu2006-1.2_ic17u3

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 ext4 909G 8.7G 900G 1% /

Warning: Use caution when you interpret this section. The 'dmidecode' program
Continued on next page
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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. 1.1.1 06/05/2017
Memory:
  2x 002C00B3002C 36ASF4G72PZ-2G6D1 32 GB 2 rank 2666 MHz
  10x 002C0632002C 36ASF4G72PZ-2G6D1 32 GB 2 rank 2666 MHz
  4x 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_ic17u3/lib/ia32:/root/cpu2006-1.2_ic17u3/lib/intel64:/root/cpu2006-1.2_ic17u3/sh10.2"
OMP_NUM_THREADS = "12"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.2
Transparent Huge Pages enabled by default.
Filesystem page cache cleared with:
  shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run

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
  464.4h264ref: -DSPEC_CPU_LP64
  471.omnetpp: -DSPEC_CPU_LP64
  473.astar: -DSPEC_CPU_LP64

Continued on next page
## SPEC CINT2006 Result

### Dell Inc.
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**Software Availability:** Nov-2016

### Base Portability Flags (Continued)

- **483.xalancbmk:** -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX

### Base Optimization Flags

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

**C++ benchmarks:**
- -xCORE-AVX2  
- -ipo  
- -O3  
- -no-prec-div  
- -qopt-prefetch  
- -auto-p32  
- -Wl,-z,muldefs  
- -L/sh10.2 -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_2017/linux/lib/ia32
- 445.gobmk: icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

**C++ benchmarks (except as noted below):**
- icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

- 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: -D_FILE_OFFSET_BITS=64
- 456.hmmer: -DSPEC_CPU_LP64
- 458.sjeng: -DSPEC_CPU_LP64

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SPEC CINT2006 Result

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Peak Portability Flags (Continued)

462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
464.h264ref: -DSPEC_CPU_LP64
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: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -qopt-prefetch

401.bzip2: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div -auto-ilp32 -qopt-prefetch

403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div -inline-calloc
-qopt-malloc-options=3 -auto-ilp32

429.mcf: -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel
-qopt-prefetch -auto-p32

445.gobmk: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2)

456.hmmer: basepeak = yes

458.sjeng: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -unroll4

462.libquantum: basepeak = yes

464.h264ref: basepeak = yes

C++ benchmarks:

471.omnetpp: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX2(pass 2)
-par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
-no-prec-div(pass 2) -qopt-ra-region-strategy=block
-Wl,-z,muldefs -L/sh10.2 -lsmartheap

473.astar: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-auto-p32 -Wl,-z,muldefs -L/sh10.2 -lsmartheap64

Continued on next page
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Peak Optimization Flags (Continued)

483.xalancbmk: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-Wl,-z,muldefs -L/sh10.2 -lsmartheap

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-ic17.0-official-linux64-revF.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revF.xml

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

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