Dell Inc.

PowerEdge C6420 (Intel Xeon Gold 6146, 3.20 GHz)

**SPECint2006 =** 52.6

**SPECint_base2006 =** 47.1

**CPU2006 license:** 55

**Test date:** Jul-2017

**Test sponsor:** Dell Inc.

**Tested by:** Dell Inc.

**Hardware**

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>560.2</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>48.6</td>
</tr>
<tr>
<td>403.gcc</td>
<td>31.0</td>
</tr>
<tr>
<td>429.mcf</td>
<td>30.9</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>27.3</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>16.6</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>33.1</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>11.0</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>27.3</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>27.3</td>
</tr>
<tr>
<td>473.astar</td>
<td>19.7</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>19.3</td>
</tr>
</tbody>
</table>

**Software**

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECint_base2006 =</td>
<td>47.1</td>
</tr>
</tbody>
</table>

**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:** btrfs

**System State:** Run level 3 (multi-user)

**Base Pointers:** 32/64-bit

**Peak Pointers:** 32/64-bit

**Other Software:** Microquill SmartHeap V10.2

**Hardware**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Gold 6146</td>
</tr>
<tr>
<td>CPU Characteristics</td>
<td>Intel Turbo Boost Technology up to 4.20 GHz</td>
</tr>
<tr>
<td>CPU MHz</td>
<td>3200</td>
</tr>
<tr>
<td>FPU</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled</td>
<td>24 cores, 2 chips, 12 cores/chip, 2 threads/core</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>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3 Cache</td>
<td>24.75 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other Cache</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>384 GB (12 x 32 GB 2Rx8 PC4-2666V-R)</td>
</tr>
<tr>
<td>Disk Subsystem</td>
<td>1 x 960 GB SATA SSD</td>
</tr>
<tr>
<td>Other Hardware</td>
<td>None</td>
</tr>
</tbody>
</table>
Dell Inc.

PowerEdge C6420 (Intel Xeon Gold 6146, 3.20 GHz)

**SPECint2006 = 52.6**

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**CPU2006 license:** 55

**Test date:** Jul-2017

**Test sponsor:** Dell Inc.

**Hardware Availability:** Jul-2017

**Tested by:** Dell Inc.

**Software Availability:** Nov-2016

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>201</td>
<td>48.6</td>
<td>201</td>
<td>199</td>
<td>49.1</td>
<td></td>
<td>174</td>
<td>56.2</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>312</td>
<td>31.0</td>
<td>312</td>
<td>313</td>
<td>30.8</td>
<td></td>
<td>311</td>
<td>31.0</td>
</tr>
<tr>
<td>403.gcc</td>
<td>409</td>
<td>19.7</td>
<td>412</td>
<td>411</td>
<td>19.6</td>
<td></td>
<td>418</td>
<td>19.3</td>
</tr>
<tr>
<td>429.mcf</td>
<td>335</td>
<td>27.2</td>
<td>333</td>
<td>334</td>
<td>27.3</td>
<td></td>
<td>333</td>
<td>27.4</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>317</td>
<td>33.1</td>
<td>333</td>
<td>628</td>
<td>19.3</td>
<td></td>
<td>613</td>
<td>19.7</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>84.6</td>
<td>110</td>
<td>84.7</td>
<td>84.6</td>
<td>110</td>
<td></td>
<td>84.6</td>
<td>110</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>633</td>
<td>19.1</td>
<td>624</td>
<td>628</td>
<td>19.3</td>
<td></td>
<td>613</td>
<td>19.7</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>8.13</td>
<td>2550</td>
<td>8.04</td>
<td>8.13</td>
<td>2550</td>
<td></td>
<td>8.04</td>
<td>2580</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>288</td>
<td>76.8</td>
<td>289</td>
<td>289</td>
<td>76.7</td>
<td></td>
<td>288</td>
<td>76.8</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>910</td>
<td>6.87</td>
<td>886</td>
<td>899</td>
<td>6.95</td>
<td></td>
<td>467</td>
<td>13.4</td>
</tr>
<tr>
<td>473.astar</td>
<td>196</td>
<td>35.8</td>
<td>204</td>
<td>208</td>
<td>33.8</td>
<td></td>
<td>196</td>
<td>35.7</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>152</td>
<td>45.3</td>
<td>153</td>
<td>156</td>
<td>44.3</td>
<td></td>
<td>107</td>
<td>64.4</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-71na Wed Jul 5 13:29:02 2017

Continued on next page
Dell Inc.

PowerEdge C6420 (Intel Xeon Gold 6146, 3.20 GHz)

SPECint2006 = 52.6
SPECint_base2006 = 47.1

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

CPU2006 license: 55
Test date: Jul-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
model name : Intel(R) Xeon(R) Gold 6146 CPU @ 3.20GHz
2 "physical id"s (chips)
48 "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 : 12
siblings : 24
physical 0: cores 0 3 4 5 6 7 16 18 19 20 21 22
physical 1: cores 0 1 2 3 9 10 16 18 19 24 26 27
cache size : 25344 KB

From /proc/meminfo
MemTotal: 395642524 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*
SuSE-release:
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:
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:
Linux linux-7lna 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016
(x86_64) x86_64 x86_64 GNU/Linux

run-level 3 Jul 5 13:27

SPEC is set to: /root/cpu2006-1.2_ic17u3
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda6 btrfs 272G 8.1G 263G 3% /

Additional information from dmidecode:

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

PowerEdge C6420 (Intel Xeon Gold 6146, 3.20 GHz)

SPECint2006 = 52.6
SPECint_base2006 = 47.1

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. 1.0.6 06/22/2017
Memory:
  4x 002C00B3002C 36ASF4G72PZ-2G6D1 32 GB 2 rank 2666 MHz
  4x 002C0632002C 36ASF4G72PZ-2G6D1 32 GB 2 rank 2666 MHz
  4x 00AD063200AD HMA84GR7AFR4N-VK 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 = "24"

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.h264ref: -DSPEC_CPU_LP64
  471.omnetpp: -DSPEC_CPU_LP64

Continued on next page
SPEC CINT2006 Result

Dell Inc.
PowerEdge C6420 (Intel Xeon Gold 6146, 3.20 GHz)

SPECint2006 = 52.6
SPECint_base2006 = 47.1

CPU2006 license: 55
Test sponsor: Dell Inc.
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Test date: Jul-2017
Hardware Availability: Jul-2017
Software Availability: Nov-2016

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 -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

Continued on next page
## Dell Inc. PowerEdge C6420 (Intel Xeon Gold 6146, 3.20 GHz)

### SPEC CINT2006 Result

| SPECint2006 = | 52.6 |
| SPECint_base2006 = | 47.1 |

**CPU2006 license:** 55  
**Test date:** Jul-2017  
**Test sponsor:** Dell Inc.  
**Hardware Availability:** Jul-2017  
**Tested by:** Dell Inc.  
**Software Availability:** Nov-2016

### Peak Portability Flags (Continued)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>458.sjeng</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>-D_FILE_OFFSET_BITS=64</td>
</tr>
<tr>
<td>473.astar</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>-D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX</td>
</tr>
</tbody>
</table>

### Peak Optimization Flags

#### C benchmarks:

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>-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</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>-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</td>
</tr>
<tr>
<td>403.gcc</td>
<td>-xCORE-AVX2 -ipo -O3 -no-prec-div -inline-calloc -qopt-malloc-options=3 -auto-ilp32</td>
</tr>
<tr>
<td>429.mcf</td>
<td>-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -qopt-prefetch -auto-p32</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>-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)</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>basepeak = yes</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>-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</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>basepeak = yes</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>basepeak = yes</td>
</tr>
</tbody>
</table>

#### C++ benchmarks:

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>471.omnetpp</td>
<td>-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</td>
</tr>
<tr>
<td>473.astar</td>
<td>-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32 -Wl,-z,muldefs -L/sh10.2 -lsmartheap64</td>
</tr>
</tbody>
</table>
**SPEC CINT2006 Result**

**Dell Inc.**

PowerEdge C6420 (Intel Xeon Gold 6146, 3.20 GHz)

| SPECint2006 = | 52.6 |
| SPECint_base2006 = | 47.1 |

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

**Test date:** Jul-2017  
**Hardware Availability:** Jul-2017  
**Software Availability:** Nov-2016

---

**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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