Dell Inc. PowerEdge C6420 (Intel Xeon Bronze 3104, 1.70 GHz)

**SPECint**\_rate2006 = 286

**SPECint**\_rate\_base2006 = 275

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System: SUSE Linux Enterprise Server 12 SP2 (x86_64) 4.4.21-69-default</td>
<td>CPU Name: Intel Xeon Bronze 3104</td>
</tr>
<tr>
<td>Compiler: C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux</td>
<td>CPU Characteristics:</td>
</tr>
<tr>
<td>Auto Parallel: Yes</td>
<td>CPU MHZ: 1700</td>
</tr>
<tr>
<td>File System: ext4</td>
<td>FPU: Integrated</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
<td>CPU(s) enabled: 12 cores, 2 chips, 6 cores/chip</td>
</tr>
<tr>
<td>Base Pointers: 32-bit</td>
<td>CPU(s) orderable: 1,2 chip</td>
</tr>
<tr>
<td>Peak Pointers: 32/64-bit</td>
<td>Primary Cache: 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Other Software: Microquill SmartHeap V10.2</td>
<td>Secondary Cache: 1 MB I+D on chip per core</td>
</tr>
<tr>
<td></td>
<td>L3 Cache: 8.25 MB I+D on chip per chip</td>
</tr>
<tr>
<td></td>
<td>Other Cache: None</td>
</tr>
<tr>
<td></td>
<td>Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2133 MT/s)</td>
</tr>
<tr>
<td></td>
<td>Disk Subsystem: 1 x 960 GB SATA SSD</td>
</tr>
<tr>
<td></td>
<td>Other Hardware: None</td>
</tr>
</tbody>
</table>

**CPU2006 license:** 55

**Test date:** Jul-2017

**Test sponsor:** Dell Inc.

**Hardware Availability:** Apr-2017

**Tested by:** Dell Inc.

**Software Availability:** Jul-2017

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info@spec.org

http://www.spec.org/
Dell Inc.

PowerEdge C6420 (Intel Xeon Bronze 3104, 1.70 GHz)

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

PECint_rate2006 = 286
PECint_rate_base2006 = 275

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>400.perlbench</td>
<td>12</td>
<td>649</td>
<td>181</td>
<td>653</td>
<td>180</td>
<td>649</td>
<td>181</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>12</td>
<td>491</td>
<td>197</td>
<td>486</td>
<td>199</td>
<td>492</td>
<td>196</td>
</tr>
<tr>
<td>403.gcc</td>
<td>12</td>
<td>429</td>
<td>124</td>
<td>428</td>
<td>123</td>
<td>428</td>
<td>123</td>
</tr>
<tr>
<td>429.mcf</td>
<td>12</td>
<td>238</td>
<td>471</td>
<td>236</td>
<td>475</td>
<td>239</td>
<td>469</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>12</td>
<td>1095</td>
<td>133</td>
<td>1096</td>
<td>132</td>
<td>1093</td>
<td>133</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>12</td>
<td>28</td>
<td>471</td>
<td>236</td>
<td>475</td>
<td>239</td>
<td>469</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>12</td>
<td>80.4</td>
<td>3090</td>
<td>79.8</td>
<td>3120</td>
<td>79.9</td>
<td>3110</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>12</td>
<td>702</td>
<td>378</td>
<td>705</td>
<td>377</td>
<td>704</td>
<td>377</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>12</td>
<td>435</td>
<td>172</td>
<td>432</td>
<td>174</td>
<td>422</td>
<td>178</td>
</tr>
<tr>
<td>473.astar</td>
<td>12</td>
<td>511</td>
<td>164</td>
<td>514</td>
<td>164</td>
<td>515</td>
<td>163</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>12</td>
<td>210</td>
<td>395</td>
<td>212</td>
<td>390</td>
<td>211</td>
<td>393</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
System Profile set to Custom
CPU Performance set to Maximum Performance
C States set to autonomous
C1E disabled
Uncore Frequency set to Dynamic
Energy Efficiency Policy set to Performance
Memory Patrol Scrub disabled
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-38mh Sun Jul 2 02:30:23 2017

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:
Continued on next page
Dell Inc.

PowerEdge C6420 (Intel Xeon Bronze 3104, 1.70 GHz)

SPECint_rate2006 = 286
SPECint_rate_base2006 = 275

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

Platform Notes (Continued)

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

From /proc/cpuinfo
  model name : Intel(R) Xeon(R) Bronze 3104 CPU @ 1.70GHz
    2 "physical id"s (chips)
    12 "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 : 6
    physical 0: cores 0 1 2 3 4 5
    physical 1: cores 0 1 2 3 4 5
  cache size : 8448 KB

From /proc/meminfo
  MemTotal:       197461768 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:
    (9464f67) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jul 1 03:22

SPEC is set to: /root/cpu2006-1.2_ic17u3
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/sda2      ext4  915G  8.6G  906G  1% /

Additional information from dmidecode:

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

Continued on next page
SPEC CINT2006 Result

Dell Inc.
PowerEdge C6420 (Intel Xeon Bronze 3104, 1.70 GHz)

SPECint_rate2006 = 286
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CPU2006 license: 55
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Test date: Jul-2017
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Software Availability: Apr-2017

Platform Notes (Continued)

BIOS Dell Inc. 1.0.6 06/22/2017
Memory:
12x 002C00B3002C 18ASF2G72PDZ-2G6D1 16 GB 2 rank 2666 MHz, configured at 2133 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:
LD_LIBRARY_PATH = "/root/cpu2006-1.2_ic17u3/lib/ia32:/root/cpu2006-1.2_ic17u3/lib/intel64:/root/cpu2006-1.2_ic17u3/sh10.2"

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

Base Compiler Invocation

C benchmarks:
icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

C++ benchmarks:
icpc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

Base Portability Flags

400.perlbench: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX_IA32
401.bzip2: -D_FILE_OFFSET_BITS=64
403.gcc: -D_FILE_OFFSET_BITS=64
429.mcf: -D_FILE_OFFSET_BITS=64
445.gobmk: -D_FILE_OFFSET_BITS=64
456.hmmer: -D_FILE_OFFSET_BITS=64
458.sjeng: -D_FILE_OFFSET_BITS=64
462.libquantum: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
464.h264ref: -D_FILE_OFFSET_BITS=64
471.omnetpp: -D_FILE_OFFSET_BITS=64
473.astar: -D_FILE_OFFSET_BITS=64
483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
### Dell Inc. PowerEdge C6420 (Intel Xeon Bronze 3104, 1.70 GHz)

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<th>286</th>
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</tr>
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</table>

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

#### Base Optimization Flags

C benchmarks:
- `-xCORE-AVX2`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-qopt-mem-layout-trans=3`

C++ benchmarks:
- `-xCORE-AVX2`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-qopt-mem-layout-trans=3`  
- `-Wl,-z,muldefs`  
- `-L/sh10.2`  
- `-lsmartheap`

#### Base Other Flags

C benchmarks:
- `403.gcc`: `-Dalloca=_alloca`

#### Peak Compiler Invocation

C benchmarks (except as noted below):
- `icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32`
- `400.perlbench`: `icc -m64`
- `401.bzip2`: `icc -m64`
- `456.hmmer`: `icc -m64`
- `458.sjeng`: `icc -m64`

C++ benchmarks:
- `icpc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32`

#### Peak Portability Flags

- `400.perlbench`: `-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX_X64`
- `401.bzip2`: `-DSPEC_CPU_LP64`
- `403.gcc`: `-D_FILE_OFFSET_BITS=64`
- `429.mcf`: `-D_FILE_OFFSET_BITS=64`
- `445.gobmk`: `-D_FILE_OFFSET_BITS=64`
- `456.hmmer`: `-DSPEC_CPU_LP64`
- `458.sjeng`: `-DSPEC_CPU_LP64`
- `462.libquantum`: `-D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX`
- `464.h264ref`: `-D_FILE_OFFSET_BITS=64`
- `471.omnetpp`: `-D_FILE_OFFSET_BITS=64`
- `473.astar`: `-D_FILE_OFFSET_BITS=64`
Dell Inc. PowerEdge C6420 (Intel Xeon Bronze 3104, 1.70 GHz)

Dell Inc.

CPU2006 license: 55
Test sponsor: Dell Inc.
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SPECCint_rate2006 = 286
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Peak Portability Flags (Continued)

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) -auto-ilp32 -qopt-mem-layout-trans=3

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(pass 2) -qopt-prefetch -auto-ilp32
  -qopt-mem-layout-trans=3

403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div
  -qopt-mem-layout-trans=3

429.mcf: basepeak = yes

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) -qopt-mem-layout-trans=3

456.hmmer: -xCORE-AVX2 -ipo -O3 -no-prec-div -unroll2 -auto-ilp32
  -qopt-mem-layout-trans=3

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 -auto-ilp32
  -qopt-mem-layout-trans=3

462.libquantum: basepeak = yes

464.h264ref: -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) -unroll2 -qopt-mem-layout-trans=3

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
  -qopt-mem-layout-trans=3 -Wl,-z,muldefs
  -L/sh10.2 -lsmartheap

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Dell Inc.

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Peak Optimization Flags (Continued)

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-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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