Dell Inc. 

PowerEdge C6420 (Intel Xeon Silver 4110, 2.10 GHz)

SPECint®2006 = 59.0
SPECint_base2006 = 56.5

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

CPU Name: Intel Xeon Silver 4110
CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz
CPU MHz: 2100
FPU: Integrated
CPU(s) enabled: 16 cores, 2 chips, 8 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: 11 MB I+D on chip per chip
Other Cache: None
Memory: 384 GB (12 x 32 GB 2Rx8 PC4-2666V-R, running at 2400 MT/s)
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
# SPEC CINT2006 Result

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

## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<th>Seconds</th>
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<td>37.6</td>
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<td>23.2</td>
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<td>23.3</td>
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<td>64.0</td>
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<td>62.8</td>
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<tr>
<td>462.libquantum</td>
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<td>4.52</td>
<td>4580</td>
<td>5.09</td>
<td>4070</td>
<td>4.54</td>
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<tr>
<td>464.b264ref</td>
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<tr>
<td>471.omnetpp</td>
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<td>30.5</td>
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<tr>
<td>483.xalancbmk</td>
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<td>60.9</td>
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<td>99.5</td>
<td>69.3</td>
<td>99.1</td>
<td>69.6</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 7 10:04:30 2017

Continued on next page
SPEC CINT2006 Result

Dell Inc.

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SPECint2006 = 59.0
SPECint_base2006 = 56.5

CPU2006 license: 55
Test sponsor: Dell Inc.
Test date: Jun-2017
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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) Silver 4110 CPU @ 2.10GHz
  2 "physical id"s (chips)
  32 "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 : 8
  siblings : 16
  physical 0: cores 0 1 2 3 4 5 6 7
  physical 1: cores 0 1 2 3 4 5 6 7
  cache size : 11264 KB

From /proc/meminfo
  MemTotal: 394868380 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-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 7 09:28

  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% /
  Additional information from dmidecode:

  Warning: Use caution when you interpret this section. The 'dmidecode' program
  Continued on next page
## SPEC CINT2006 Result

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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, configured at 2400 MHz  
10x 002C0632002C 36ASF4G72PZ-2G6D1 32 GB 2 rank 2666 MHz, configured at 2400 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 = "16"

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
```

Continued on next page
## SPEC CINT2006 Result

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PowerEdge C6420 (Intel Xeon Silver 4110, 2.10 GHz)

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### Base Portability Flags (Continued)

- `471.omnetpp`: `-DSPEC_CPU_LP64`  
- `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`

Continued on next page
### Peak Portability Flags (Continued)

- 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: `-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`  

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Peak Optimization Flags (Continued)

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

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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