# Dell Inc.

## PowerEdge C6420 (Intel Xeon Gold 6142, 2.60 GHz)

<table>
<thead>
<tr>
<th>SPECint&lt;sup&gt;®&lt;/sup&gt; &lt;sub&gt;rate&lt;/sub&gt;2006</th>
<th>1700</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECint&lt;sup&gt;®&lt;/sup&gt; &lt;sub&gt;rate_base&lt;/sub&gt;2006</td>
<td>1620</td>
</tr>
</tbody>
</table>

### CPU2006 license:
55

### Test sponsor:
Dell Inc.

### Tested by:
Dell Inc.

### Test date:
Jul-2017

### Hardware

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon Gold 6142</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU MHZ:</td>
<td>2600</td>
</tr>
<tr>
<td>FPU:</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled:</td>
<td>32 cores, 2 chips, 16 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>22 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other Cache:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>192 GB (12 x 16 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>

### Software

<table>
<thead>
<tr>
<th>Operating System:</th>
<th>SUSE Linux Enterprise Server 12 SP2 (x86_64) 4.4.21-69-default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler:</td>
<td>C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux</td>
</tr>
<tr>
<td>Auto Parallel:</td>
<td>Yes</td>
</tr>
<tr>
<td>File System:</td>
<td>xfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers:</td>
<td>32-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>

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Dell Inc.

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info@spec.org

http://www.spec.org/
Dell Inc. PowerEdge C6420 (Intel Xeon Gold 6142, 2.60 GHz)

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

### 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>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>64</td>
<td>519</td>
<td>1200</td>
<td>519</td>
<td>1200</td>
<td>64</td>
<td>432</td>
<td>1450</td>
<td>421</td>
<td>1490</td>
<td>424</td>
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<tr>
<td>401.bzip2</td>
<td>64</td>
<td>868</td>
<td>711</td>
<td>548</td>
<td>448</td>
<td>64</td>
<td>820</td>
<td>753</td>
<td>820</td>
<td>753</td>
<td>816</td>
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<tr>
<td>403.gcc</td>
<td>64</td>
<td>451</td>
<td>1140</td>
<td>448</td>
<td>1150</td>
<td>448</td>
<td>1150</td>
<td>446</td>
<td>1150</td>
<td>447</td>
<td>1150</td>
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<tr>
<td>429.mcf</td>
<td>64</td>
<td>691</td>
<td>2150</td>
<td>272</td>
<td>2150</td>
<td>272</td>
<td>2150</td>
<td>272</td>
<td>2150</td>
<td>272</td>
<td>2150</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>64</td>
<td>691</td>
<td>972</td>
<td>689</td>
<td>974</td>
<td>692</td>
<td>970</td>
<td>691</td>
<td>971</td>
<td>693</td>
<td>968</td>
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<tr>
<td>456.hmmer</td>
<td>64</td>
<td>272</td>
<td>1140</td>
<td>263</td>
<td>1150</td>
<td>262</td>
<td>1140</td>
<td>262</td>
<td>1140</td>
<td>262</td>
<td>1140</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>64</td>
<td>472</td>
<td>1050</td>
<td>740</td>
<td>1050</td>
<td>742</td>
<td>1040</td>
<td>688</td>
<td>1130</td>
<td>686</td>
<td>1130</td>
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<tr>
<td>462.libquantum</td>
<td>64</td>
<td>761</td>
<td>1860</td>
<td>768</td>
<td>1850</td>
<td>770</td>
<td>1840</td>
<td>748</td>
<td>1890</td>
<td>744</td>
<td>1900</td>
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<tr>
<td>464.h264ref</td>
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<td>237</td>
<td>1870</td>
<td>237</td>
<td>1860</td>
<td>239</td>
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<td>237</td>
<td>1860</td>
<td>239</td>
<td>1850</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>64</td>
<td>503</td>
<td>795</td>
<td>500</td>
<td>794</td>
<td>503</td>
<td>795</td>
<td>472</td>
<td>848</td>
<td>469</td>
<td>852</td>
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<tr>
<td>473.astar</td>
<td>64</td>
<td>498</td>
<td>903</td>
<td>497</td>
<td>904</td>
<td>497</td>
<td>903</td>
<td>498</td>
<td>904</td>
<td>498</td>
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<tr>
<td>483.xalancbmk</td>
<td>64</td>
<td>237</td>
<td>1870</td>
<td>237</td>
<td>1860</td>
<td>239</td>
<td>1850</td>
<td>237</td>
<td>1860</td>
<td>239</td>
<td>1850</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 enabled  
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  
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-xp0h Wed Jul 5 02:51:47 2017
Dell Inc. PowerEdge C6420 (Intel Xeon Gold 6142, 2.60 GHz)  
SPECint_rate2006 = 1700  
SPECint_rate_base2006 = 1620

CPU2006 license: 55  
Test sponsor: Dell Inc.  
Tested by: Dell Inc.  
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 6142 CPU @ 2.60GHz
- 2 "physical id"s (chips)
- 64 "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: 16
  - siblings: 32
  - physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  - physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
- cache size: 22528 KB

From /proc/meminfo
- MemTotal: 196687088 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-xp0h 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 Jul 5 01:49

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

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 930G 8.7G 921G 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
Dell Inc.
PowerEdge C6420 (Intel Xeon Gold 6142, 2.60 GHz)

Specint_rate2006 = 1700
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CPU2006 license: 55
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Platform Notes (Continued)

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:
12x 00CE063200CE M393A2K43BB1-CTD 16 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:
LD_LIBRARY_PATH = "/root/cpu2006-1.2.1ic17u3/lib/ia32:/root/cpu2006-1.2.1ic17u3/lib/intel64:/root/cpu2006-1.2.1ic17u3/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.perlbmk: -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 Gold 6142, 2.60 GHz)

SPECint_rate2006 $= 1700$

SPECint_rate_base2006 $= 1620$

**Base Optimization Flags**

C benchmarks:
- `-xCORE-AVX512`  
- `-ipo`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-qopt-mem-layout-trans=3`

C++ benchmarks:
- `-xCORE-AVX512`  
- `-ipo`  
- `-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`

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Dell Inc.
PowerEdge C6420 (Intel Xeon Gold 6142, 2.60 GHz)

SPECint_rate2006 = 1700
SPECint_rate_base2006 = 1620

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

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-AVX512(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-AVX512(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-AVX512 -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-AVX512(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-AVX512 -ipo -O3 -no-prec-div -unroll12 -auto-ilp32
    -qopt-mem-layout-trans=3

458.sjeng: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
    -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
    -no-prec-div(pass 2) -unroll14 -auto-ilp32
    -qopt-mem-layout-trans=3

462.libquantum: basepeak = yes

464.h264ref: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(pass 2)
    -par-num-threads=1(pass 1) -ipo(pass 2) -O3(pass 2)
    -no-prec-div(pass 2) -unroll12 -qopt-mem-layout-trans=3

C++ benchmarks:
471.omnetpp: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512(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

Continued on next page
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