Dell Inc.

PowerEdge R740 (Intel Xeon Gold 6146, 3.20 GHz)

SPECint®2006 = 85.4
SPECint_base2006 = 81.8

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

CPU Name: Intel Xeon Gold 6146
CPU Characteristics: Intel Turbo Boost Technology up to 4.20 GHz
CPU MHz: 3200
FPU: Integrated
CPU(s) enabled: 24 cores, 2 chips, 12 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: 24.75 MB I+D on chip per chip
Other Cache: None
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R)
Disk Subsystem: 1 x 960 GB SATA SSD
Other Hardware: None

Hardware

Operating System: SUSE Linux Enterprise Server 12 SP2 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: xfs
System State: Run level 3 (multi-user)
Base Pointers: 32/64-bit
Peak Pointers: 32/64-bit
Other Software: Microquill SmartHeap V10.2

Software

Dell Inc. PowerEdge R740 (Intel Xeon Gold 6146, 3.20 GHz)
Dell Inc.

PowerEdge R740 (Intel Xeon Gold 6146, 3.20 GHz)

**SPECint2006 = 85.4**

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---

**Results Table**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
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<tr>
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<td>52.8</td>
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<td>52.9</td>
<td>184</td>
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<td>59.9</td>
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<td>59.9</td>
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<td>401.bzip2</td>
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<td>31.7</td>
<td>307</td>
<td>31.4</td>
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<td>31.7</td>
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<tr>
<td>403.gcc</td>
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<td>43.0</td>
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<td>429.mcf</td>
<td>280</td>
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<td>445.gobmk</td>
<td>84.3</td>
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<td>462.libquantum</td>
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<td>2.86</td>
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<td>464.h264ref</td>
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<tr>
<td>471.omnetpp</td>
<td>168</td>
<td>37.1</td>
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<td>38.6</td>
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<td>473.astar</td>
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<td>43.4</td>
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<td>43.3</td>
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<td>483.xalancbmk</td>
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<td>88.5</td>
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<td>70.2</td>
<td>98.2</td>
<td>69.0</td>
<td>99.0</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 (b5e8d4b4eb51ed28d7f98696ece290c1)
- Running on linux-wwko Tue Jul 25 11:33:25 2017

Continued on next page
SPEC CINT2006 Result

Dell Inc.

PowerEdge R740 (Intel Xeon Gold 6146, 3.20 GHz)

<table>
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CPU2006 license: 55
Test sponsor: Dell Inc.
Tested by: Dell Inc.

Test date: Jul-2017
Hardware Availability: Aug-2017
Software Availability: Apr-2017

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 1 2 3 9 10 16 18 19 24 26 27
  - physical 1: cores 0 3 4 5 6 7 16 18 19 20 21 22
- cache size: 25344 KB

From /proc/meminfo
- MemTotal: 394868376 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
- SUSE Linux Enterprise Server 12 SP2

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 25 11:28 last=5

SPEC is set to: /root/cpu2006-1.2.ic17u3

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 892G 9.5G 883G 2% /

Continued on next page
SPEC CINT2006 Result

Dell Inc.
PowerEdge R740 (Intel Xeon Gold 6146, 3.20 GHz)

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Platform Notes (Continued)

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.

BIOS Dell Inc. 1.0.8 07/11/2017
Memory:
18x 00AD00B300AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666 MHz
6x 00CE063200CE M393A2K43BB1-CTD 16 GB 2 rank 2666 MHz

(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

Continued on next page
## SPEC CINT2006 Result

**Dell Inc.**

PowerEdge R740 (Intel Xeon Gold 6146, 3.20 GHz)  

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<td>Apr-2017</td>
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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)

<table>
<thead>
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<th>Benchmark</th>
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<td>456.hmmer</td>
<td>-DSPEC_CPU_LP64</td>
</tr>
<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>
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<td>-DSPEC_CPU_LP64</td>
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<tr>
<td>483.xalancbmk</td>
<td>-D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX</td>
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## Peak Optimization Flags

### C benchmarks:

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<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>
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<td>462.libquantum</td>
<td>basepeak = yes</td>
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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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