Dell Inc.

PowerEdge C6420 (Intel Xeon Gold 6148F, 2.40 GHz)

SPECint®2006 = 50.0
SPECint_base2006 = 45.1

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

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

Hardware

CPU Name: Intel Xeon Gold 6148F
CPU Characteristics: Intel Turbo Boost Technology up to 3.70 GHz
CPU MHZ: 2400
FPU: Integrated
CPU(s) enabled: 40 cores, 2 chips, 20 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: 27.5 MB I+D on chip per chip
Other Cache: None
Memory: 384 GB (12 x 32 GB 2Rx8 PC4-2666V-R)
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: btrfs
System State: Run level 3 (multi-user)
Base Pointers: 32/64-bit
Peak Pointers: 32/64-bit
Other Software: Microquill SmartHeap V10.2
Dell Inc.

PowerEdge C6420 (Intel Xeon Gold 6148F, 2.40 GHz)

SPECint2006 = 50.0
SPECint_base2006 = 45.1

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

Benchmark | Seconds | Ratio | Base | Seconds | Ratio | Peak | Seconds | Ratio | Seconds | Ratio
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
400.perlbench | 222 | 44.0 | 224 | 43.6 | 222 | 44.0 | 194 | 50.3 | 194 | 50.4 | 194 | 50.2
401.bzip2 | 348 | 27.7 | 348 | 27.7 | 349 | 27.7 | 347 | 27.8 | 346 | 27.9 | 346 | 27.9
403.gcc | 436 | 18.5 | 440 | 18.3 | 439 | 18.3 | 444 | 18.1 | 445 | 18.1 | 438 | 18.4
445.gobmk | 348 | 30.1 | 339 | 30.9 | 336 | 31.2 | 312 | 33.7 | 319 | 32.9 | 313 | 33.5
456.hmmer | 96.1 | 97.1 | 95.7 | 97.5 | 95.8 | 97.4 | 96.1 | 97.1 | 95.7 | 97.5 | 95.8 | 97.4
458.sjeng | 650 | 18.6 | 652 | 18.6 | 651 | 18.6 | 638 | 19.0 | 648 | 18.7 | 639 | 18.9
462.libquantum | 7.90 | 2620 | 8.73 | 2370 | 8.11 | 2550 | 7.90 | 2620 | 8.73 | 2370 | 8.11 | 2550
464.h264ref | 331 | 66.8 | 332 | 66.6 | 330 | 67.0 | 331 | 66.8 | 332 | 66.6 | 330 | 67.0
471.omnetpp | 750 | 8.33 | 769 | 8.13 | 746 | 8.38 | 364 | 17.2 | 384 | 16.3 | 371 | 16.8
473.astar | 208 | 33.8 | 203 | 34.6 | 206 | 34.2 | 214 | 32.8 | 218 | 32.3 | 214 | 32.8
483.xalancbmk | 155 | 44.6 | 157 | 44.0 | 156 | 44.2 | 109 | 63.3 | 107 | 64.7 | 112 | 61.3

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)
Continued on next page
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 6148F CPU @ 2.40GHz
  2 "physical id"s (chips)
  80 "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 : 20
siblings : 40
  physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
cache size : 28160 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:
  (9464f67) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Jun 28 11:21

SPEC is set to: /root/cpu2006-1.2_ic17u3
  Filesystem  Type  Size  Used Avail Use% Mounted on
  /dev/sda6  btrfs  272G  8.1G  264G  3% /
Additional information from dmidecode:

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

Dell Inc.

PowerEdge C6420 (Intel Xeon Gold 6148F, 2.40 GHz)

SPECint2006 = 50.0
SPECint_base2006 = 45.1

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

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

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 36ASF472PZ-2G6D1 32 GB 2 rank 2666 MHz
4x 002C0632002C 36ASF472PZ-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 = "40"

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
Dell Inc.  
PowerEdge C6420 (Intel Xeon Gold 6148F, 2.40 GHz)  

\[
\begin{aligned}
\text{SPECint2006} & = 50.0 \\
\text{SPECint\_base2006} & = 45.1 \\
\end{aligned}
\]

CPU2006 license: 55  
Test sponsor: Dell Inc.  
Tested by: Dell Inc.  
Test date: Jun-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
### Peak Portability Flags (Continued)

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

Continued on next page
Dell Inc.
PowerEdge C6420 (Intel Xeon Gold 6148F, 2.40 GHz)

SPECint2006 = 50.0
SPECint_base2006 = 45.1

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

Test date: Jun-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

SPEC and SPECint are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.2.
Originally published on 22 August 2017.