SPEC® CINT2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL560 Gen9
(2.20 GHz, Intel Xeon E5-4669 v4)

<table>
<thead>
<tr>
<th>SPECint®2006</th>
<th>= 65.3</th>
</tr>
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<tbody>
<tr>
<td>SPECint_base2006</td>
<td>= 63.4</td>
</tr>
</tbody>
</table>

| CPU2006 license: | 3 |
| Test sponsor: | HPE |
| Tested by: | HPE |
| Test date: | May-2016 |
| Hardware Availability: | Jun-2016 |
| Software Availability: | Dec-2015 |

### Software
- Operating System: SUSE Linux Enterprise Server 12 (x86_64) SP1
- Kernel 3.12.49-11-default
- Compiler: C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux
- Auto Parallel: Yes
- File System: xfs
- System State: Run level 3 (multi-user)
- Base Pointers: 32-bit
- Peak Pointers: 32/64-bit
- Other Software: Microquill SmartHeap V10.2

### Hardware
- CPU Name: Intel Xeon E5-4669 v4
- CPU Characteristics: Intel Turbo Boost Technology up to 3.00 GHz
- CPU MHZ: 2200
- FPU: Integrated
- CPU(s) enabled: 88 cores, 4 chips, 22 cores/chip
- CPU(s) orderable: 2.4 chip
- Primary Cache: 32 KB I + 32 KB D on chip per core
- Secondary Cache: 256 KB I+D on chip per core
- L3 Cache: 55 MB I+D on chip per chip
- Other Cache: None
- Memory: 512 GB (32 x 16 GB 2Rx4 PC4-2400T-R)
- Disk Subsystem: 1 x 400 GB SAS SSD, RAID 0
- Other Hardware: None

### SPECint2006 Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECint2006</th>
<th>SPECint_base2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench</td>
<td>38.7</td>
<td>35.3</td>
</tr>
<tr>
<td>bzip2</td>
<td>21.7</td>
<td>21.3</td>
</tr>
<tr>
<td>gcc</td>
<td>24.2</td>
<td>24.2</td>
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<tr>
<td>mcf</td>
<td>34.2</td>
<td>38.1</td>
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<tr>
<td>gobmk</td>
<td>57.3</td>
<td>56.0</td>
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<tr>
<td>hmer</td>
<td>73.6</td>
<td>73.6</td>
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<tr>
<td>sjeng</td>
<td>30.4</td>
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<tr>
<td>libquantum</td>
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<tr>
<td>h264ref</td>
<td>60.4</td>
<td>59.5</td>
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<tr>
<td>omnetpp</td>
<td>50.5</td>
<td>44.6</td>
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<tr>
<td>astar</td>
<td>31.5</td>
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<tr>
<td>xalancbmk</td>
<td>74.0</td>
<td>68.2</td>
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### SPECint2006 Summary
- SPECint2006 = 65.3
- SPECint_base2006 = 63.4
# SPEC CINT2006 Result

## Hewlett Packard Enterprise

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**SPECint2006 =** 65.3  
**SPECint_base2006 =** 63.4

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</tr>
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### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<th>Seconds</th>
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<tbody>
<tr>
<td>400.perlbench</td>
<td>276</td>
<td>35.4</td>
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<tr>
<td>401.bzip2</td>
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<td>21.3</td>
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<td>456</td>
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<td>456.hmmer</td>
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<td>439</td>
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<tr>
<td>473.astar</td>
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<td>102</td>
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</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Submit Notes

The config file option 'submit' was used.

## Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
Transparent Huge Pages enabled with:
echo always > /sys/kernel/mm/transparent_hugepage/enabled

## Platform Notes

BIOS Configuration:
- HP Power Profile set to Custom
- HP Power Regulator to HP Static High Performance Mode
- Minimum Processor Idle Power Core C-State set to C6 State
- Minimum Processor Idle Power Package C-State set to Package C6 (retention) State
- Energy/Performance Bias set to Maximum Performance
- QPI Snoo Configuration set to Home Snoo
- Collaborative Power Control set to Disabled
- Thermal Configuration set to Maximum Cooling
- Processor Power and Utilization Monitoring set to Disabled
- Intel Hyperthreading set to Disabled

Sysinfo program /home/intel_binary/cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-ca6i Thu May 26 23:21:09 2016

This section contains SUT (System Under Test) info as seen by
Continued on next page
Hewlett Packard Enterprise
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SPECint2006 = 65.3
SPECint_base2006 = 63.4

CPU2006 license: 3
Test sponsor: HPE
Tested by: HPE

Platform Notes (Continued)

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) CPU E5-4669 v4 @ 2.20GHz
  4 "physical id" s (chips)
    88 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The
following excerpts from /proc/cpuinfo might not be reliable. Use with
cautions.)
  cpu cores : 22
  siblings : 22
  physical 0: cores 0 2 3 4 8 10 11 12 16 17 18 19 20 21 24 25 26 27 28
  physical 1: cores 0 2 3 4 8 10 11 12 16 17 18 19 20 21 24 25 26 27 28
  physical 2: cores 0 2 3 4 8 10 11 12 16 17 18 19 20 21 24 25 26 27 28
  physical 3: cores 0 2 3 4 8 10 11 12 16 17 18 19 20 21 24 25 26 27 28
  cache size : 56320 KB

From /proc/meminfo
  MemTotal:       529306204 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB

From /etc/*release*/etc/*version*
  SuSE-release:
    SUSE Linux Enterprise Server 12 (x86_64)
    VERSION = 12
    PATCHLEVEL = 1
    # 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-SP1"
    VERSION_ID="12.1"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP1"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12:sp1"

uname -a:
  Linux linux-ca6i 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
    (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 May 26 23:09

SPEC is set to: /home/intel_binary/cpu2006
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda4 xfs 331G 12G 319G 4% /home

Additional information from dmidecode:

Warning: Use caution when you interpret this section. The 'dmidecode' program
Continued on next page
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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 HP P85 05/05/2016
Memory:
  16x UNKNOWN NOT AVAILABLE
  32x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz

(End of data from sysinfo program)
Regarding the sysinfo display about the memory installed, the correct amount of
memory is 512 GB and the dmidecode description should have one line reading as:
  32x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 MHz

General Notes

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/intel_binary/cpu2006/libs/32:/home/intel_binary/cpu2006/libs/64:/home/intel_binary/cpu2006/sh"
OMP_NUM_THREADS = "88"

Binaries compiled on a system with 1x Intel Core i5-4670K CPU + 32GB
memory using RedHat EL 7.1

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
473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
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Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -auto-p32
C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch -auto-p32
-Wl,-z,muldefs -L/sh -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_2016/linux/compiler/lib/ia32_lin

C++ benchmarks (except as noted below):
icpc -m32 -L/opt/intel/compilers_and_libraries_2016/linux/compiler/lib/ia32_lin
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: -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: -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: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
                   -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
                   -par-num-threads=1(pass 1) -prof-use(pass 2) -opt-prefetch
                   -ansi-alias

401.bzip2: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
             -ipo(pass 2) -O3(pass 2) -no-prec-div
             -par-num-threads=1(pass 1) -prof-use(pass 2) -auto-ilp32
             -opt-prefetch -ansi-alias

403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div -inline-cALLOC
          -opt-malloc-options=3 -auto-ilp32

429.mcf: -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel
          -opt-prefetch -auto-p32

445.gobmk: basepeak = yes

456.hmmer: basepeak = yes

458.sjeng: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
            -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
            -par-num-threads=1(pass 1) -prof-use(pass 2) -unroll4

462.libquantum: basepeak = yes

464.h264ref: basepeak = yes

C++ benchmarks:

471.omnetpp: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
              -ipo(pass 2) -O3(pass 2) -no-prec-div(pass 2)
              -par-num-threads=1(pass 1) -prof-use(pass 2)
              -opt-ra-region-strategy=block -ansi-alias
              -Wl,-z,muldefs -L/sh -lsmartheap

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

483.xalancbmk: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
                -ansi-alias -Wl,-z,muldefs -L/sh -lsmartheap

Peak Other Flags

C benchmarks:

Continued on next page
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Peak Other Flags (Continued)

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-ic16.0-official-linux64.html
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic16.0-official-linux64.xml
http://www.spec.org/cpu2006/flags/HP-Platform-Flags-Intel-V1.2-HSW-revE.xml

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

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