**SPEC® CINT2006 Result**

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant ML350 Gen9  
(3.20 GHz, Intel Xeon E5-2667 v4)  

<table>
<thead>
<tr>
<th>SPECint®2006</th>
<th>72.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECint_base2006</td>
<td>68.4</td>
</tr>
</tbody>
</table>

**CPU2006 license:** 3  
**Test sponsor:** HPE  
**Tested by:** HPE  
**Test date:** Mar-2016  
**Hardware Availability:** Mar-2016  
**Software Availability:** Dec-2015

**Hardware**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon E5-2667 v4</td>
</tr>
<tr>
<td>CPU Characteristics</td>
<td>Intel Turbo Boost Technology up to 3.60 GHz</td>
</tr>
<tr>
<td>CPU MHZ</td>
<td>3200</td>
</tr>
<tr>
<td>CPU(s) enabled</td>
<td>16 cores, 2 chips, 8 cores/chip</td>
</tr>
<tr>
<td>CPU(s) orderable</td>
<td>1, 2 chips</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>256 KB I+D on chip per core</td>
</tr>
<tr>
<td>L3 Cache</td>
<td>25 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other Cache</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>512 GB (16 x 32 GB 2Rx4 PC4-2400T-R)</td>
</tr>
<tr>
<td>Disk Subsystem</td>
<td>1 x 800 GB SAS SSD, RAID 0</td>
</tr>
<tr>
<td>Other Hardware</td>
<td>None</td>
</tr>
</tbody>
</table>

**Software**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>SUSE Linux Enterprise Server 12 (x86_64) SP1</td>
</tr>
<tr>
<td>Compiler</td>
<td>C++: Version 16.0.0.101 of Intel C++ Studio XE 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>32/64-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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SPECint2006 = 72.4
SPECint_base2006 = 68.4

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

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds Base</th>
<th>Seconds Ratio</th>
<th>Seconds Base</th>
<th>Seconds Ratio</th>
<th>Seconds Base</th>
<th>Seconds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>230</td>
<td>42.5</td>
<td>230</td>
<td>42.5</td>
<td>230</td>
<td>42.4</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>371</td>
<td>26.0</td>
<td>370</td>
<td>26.1</td>
<td>371</td>
<td>26.0</td>
</tr>
<tr>
<td>403.mcf</td>
<td>205</td>
<td>39.2</td>
<td>205</td>
<td>39.2</td>
<td>205</td>
<td>39.2</td>
</tr>
<tr>
<td>429.gcc</td>
<td>336</td>
<td>31.2</td>
<td>336</td>
<td>31.2</td>
<td>336</td>
<td>31.2</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>105</td>
<td>88.4</td>
<td>105</td>
<td>88.4</td>
<td>105</td>
<td>88.4</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>341</td>
<td>35.4</td>
<td>341</td>
<td>35.4</td>
<td>341</td>
<td>35.4</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>3.47</td>
<td>5970</td>
<td>3.42</td>
<td>6070</td>
<td>3.48</td>
<td>5950</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>362</td>
<td>61.1</td>
<td>360</td>
<td>61.5</td>
<td>361</td>
<td>61.3</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>173</td>
<td>36.0</td>
<td>187</td>
<td>33.5</td>
<td>186</td>
<td>33.6</td>
</tr>
<tr>
<td>473.astar</td>
<td>184</td>
<td>38.1</td>
<td>184</td>
<td>38.1</td>
<td>184</td>
<td>38.1</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>88.8</td>
<td>77.7</td>
<td>89.6</td>
<td>77.0</td>
<td>89.6</td>
<td>77.0</td>
</tr>
</tbody>
</table>

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

Submit Notes
The 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:
- Intel Hyperthreading Option set to Disabled
- Power Profile set to Custom
- Power Regulator set to Static High Performance Mode
- Minimum Processor Idle Power Core C-State set to C1E State
- Minimum Processor Idle Power Package C-State set to No Package State
- Collaborative Power Control set to Disabled
- QPI Snoop Configuration set to Home Snoop
- Thermal Configuration set to Maximum Cooling
- Processor Power and Utilization Monitoring set to Disabled
- Memory Refresh Rate set to 1x Refresh
- Energy Performance Bias set to Maximum Performance

Sysinfo program /home/specuser/cpu2006/ic16/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-szds Tue Mar 1 23:34:12 2016

This section contains SUT (System Under Test) info as seen by
Continued on next page
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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 E5-2667 v4 @ 3.20GHz
   2 "physical id"s (chips)
   16 "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 : 8
   physical 0: cores 0 2 3 4 8 10 11 12
   physical 1: cores 0 2 3 4 8 10 11 12
   cache size : 25600 KB

From /proc/meminfo
   MemTotal:       529095464 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

/usr/bin/lsb_release -d
   SUSE Linux Enterprise Server 12 SP1

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:
      (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Mar 1 22:50

SPEC is set to: /home/specuser/cpu2006/ic16
   Filesystem Type Size Used Avail Use% Mounted on
   /dev/sda4 xfs 703G 185G 519G 27% /home
   Additional information from dmidecode:

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Platform Notes (Continued)

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 HP P92 02/22/2016
Memory:
8x UNKNOWN NOT AVAILABLE
16x UNKNOWN NOT AVAILABLE 32 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:
16x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2400 MHz

General Notes

Environment variables set by runspec before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/specuser/cpu2006/ic16/libs/32:/home/specuser/cpu2006/ic16/libs/64:/home/specuser/cpu2006/ic16/sh"
OMP_NUM_THREADS = "16"

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

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Base Portability Flags (Continued)
483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX

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

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Peak Portability Flags (Continued)

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: basepeak = yes

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

You can also download the XML flags sources by saving the following links:

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