# SPEC® CINT2006 Result

## Hewlett-Packard Company

ProLiant BL660c Gen9  
(1.90 GHz, Intel Xeon E5-4640 v3)  

SPEC®2006 = 47.6  
SPECint_base2006 = 46.0

### Hardware

<table>
<thead>
<tr>
<th>Test date:</th>
<th>May-2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2006 license:</td>
<td>3</td>
</tr>
<tr>
<td>Test sponsor:</td>
<td>Hewlett-Packard Company</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Hewlett-Packard Company</td>
</tr>
<tr>
<td>CPU Name:</td>
<td>Intel Xeon E5-4640 v3</td>
</tr>
<tr>
<td>CPU Characteristics:</td>
<td>Intel Turbo Boost Technology up to 2.60 GHz</td>
</tr>
<tr>
<td>CPU MHz:</td>
<td>1900</td>
</tr>
<tr>
<td>FPU:</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled:</td>
<td>48 cores, 4 chips, 12 cores/chip</td>
</tr>
<tr>
<td>CPU(s) orderable:</td>
<td>2,4 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>30 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 (32 x 16 GB 2Rx4 PC4-2133P-R, running at 1866 MHz)</td>
</tr>
<tr>
<td>Disk Subsystem:</td>
<td>1 x 400 GB SAS SSD, RAID 0</td>
</tr>
<tr>
<td>Other Hardware:</td>
<td>None</td>
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</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Operating System:</th>
<th>SUSE Linux Enterprise Server 12 (x86_64)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler:</td>
<td>C/C++: Version 15.0.0.090 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 V10.0</td>
</tr>
</tbody>
</table>
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CPU2006 license: 3
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</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>
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</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>327</td>
<td>29.8</td>
<td>331</td>
<td>29.5</td>
<td>329</td>
<td>29.7</td>
<td>287</td>
<td>34.1</td>
<td>287</td>
<td>34.0</td>
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<tr>
<td>401.bzip2</td>
<td>541</td>
<td>17.8</td>
<td>539</td>
<td>17.9</td>
<td>540</td>
<td>17.9</td>
<td>541</td>
<td>17.8</td>
<td>539</td>
<td>17.9</td>
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<tr>
<td>403.mcf</td>
<td>333</td>
<td>24.2</td>
<td>332</td>
<td>24.2</td>
<td>333</td>
<td>24.2</td>
<td>324</td>
<td>24.8</td>
<td>326</td>
<td>24.7</td>
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<td>429.gcc</td>
<td>204</td>
<td>44.8</td>
<td>200</td>
<td>45.7</td>
<td>197</td>
<td>46.3</td>
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<td>44.8</td>
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<td>456.hmmer</td>
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<td>51.1</td>
<td>182</td>
<td>51.2</td>
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<tr>
<td>458.sjeng</td>
<td>470</td>
<td>25.7</td>
<td>470</td>
<td>25.7</td>
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<td>25.7</td>
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<td>25.9</td>
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<td>25.8</td>
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<tr>
<td>462.libquantum</td>
<td>4.20</td>
<td>4930</td>
<td>4.32</td>
<td>4790</td>
<td>4.36</td>
<td>4750</td>
<td>4.20</td>
<td>4930</td>
<td>4.32</td>
<td>4790</td>
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<tr>
<td>464.h264ref</td>
<td>649</td>
<td>34.1</td>
<td>651</td>
<td>34.0</td>
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<td>34.2</td>
<td>649</td>
<td>34.1</td>
<td>651</td>
<td>34.0</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>223</td>
<td>28.0</td>
<td>228</td>
<td>27.4</td>
<td>220</td>
<td>28.4</td>
<td>171</td>
<td>36.6</td>
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<td>473.astar</td>
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<td>24.4</td>
<td>284</td>
<td>24.7</td>
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<td>24.4</td>
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<td>24.4</td>
<td>284</td>
<td>24.7</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>146</td>
<td>47.2</td>
<td>144</td>
<td>48.0</td>
<td>143</td>
<td>48.2</td>
<td>146</td>
<td>47.2</td>
<td>144</td>
<td>48.0</td>
</tr>
</tbody>
</table>

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 Options set to Disabled
HP Power Profile set to Custom
HP Power Regulator to HP Static High Performance Mode
Minimum Processor Idle Power Core State set to C6 State
Energy/Performance Bias set to Maximum Performance
Collaborative Power Control set to Disabled
Thermal Configuration set to Maximum Cooling
Processor Power and Utilization Monitoring set to Disabled
Memory Refresh Rate set to 1x Refresh
Sysinfo program /root/cpu2006/config/sysinfo.rev6914
running on linux-wzg5 Mon May 25 06:16:49 2015

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
Continued on next page
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Test date: May-2015
Hardware Availability: Jun-2015
Software Availability: Oct-2014

Platform Notes (Continued)

From /proc/cpuinfo
model name : Intel(R) Xeon(R) CPU E5-4640 v3 @ 1.90GHz
4 "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
cautions.)
cpu cores : 12
siblings : 12
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13
physical 2: cores 0 1 2 3 4 5 8 9 10 11 12 13
physical 3: cores 0 1 2 3 4 5 8 9 10 11 12 13
cache size : 30720 KB

From /proc/meminfo
MemTotal: 529178648 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

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

uname -a:
   Linux linux-wzg5 3.12.28-4-default #1 SMP Thu Sep 25 17:02:34 UTC 2014
   (9879bd4) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 May 24 23:55

SPEC is set to: /root/cpu2006
Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb4 xfs 300G 8.8G 292G 3% /

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
Continued on next page
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### Platform Notes (Continued)

- BIOS HP I38 03/05/2015
- Memory: 32x HP 752369-081 16 GB 2 rank 2133 MHz, configured at 1866 MHz

(End of data from sysinfo program)

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### General Notes

- Environment variables set by runspec before the start of the run:
  - KMP_AFFINITY = "granularity=fine,scatter"
  - LD_LIBRARY_PATH = "/root/cpu2006/libs/32:/root/cpu2006/libs/64:/root/cpu2006/sh"
  - OMP_NUM_THREADS = "48"

- Binaries compiled on a system with 1x Core i5-4670K CPU + 16GB memory using RedHat EL 7.0

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### Base Compiler Invocation

- **C benchmarks:**
  - icc -m64

- **C++ benchmarks:**
  - icpc -m64

---

### Base Portability Flags

- **C benchmarks:**
  - 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

---

### Base Optimization Flags

- **C benchmarks:**
  - -xCORE-AVX2 -ipo -O3 -no-prec-div -parallel -opt-prefetch -auto-p32

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Base Optimization Flags (Continued)

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/composer_xe_2015/lib/ia32

C++ benchmarks (except as noted below):
icpc -m64
471.omnetpp: icpc -m32 -L/opt/intel/composer_xe_2015/lib/ia32

Peak Portability Flags

400.perlbench: -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
473.astar: -DSPEC_CPU_LP64
483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX

Peak Optimization Flags

C benchmarks:
400.perlbench: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
-O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)
-opt-prefetch -ansi-alias

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Peak Optimization Flags (Continued)

401.bzip2: basepeak = yes  
403.gcc: -xCORE-AVX2 -ipo -O3 -no-prec-div -inline-calloc  
  -opt-malloc-options=3 -auto-ilp32  
429.mcf: basepeak = yes  
445.gobmk: basepeak = yes  
456.hmmer: basepeak = yes  
458.sjeng: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
  -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)  
  -unroll4  
462.libquantum: basepeak = yes  
464.h264ref: basepeak = yes

C++ benchmarks:

471.omnetpp: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)  
  -O3(pass 2) -no-prec-div(pass 2) -prof-use(pass 2)  
  -opt-ra-region-strategy=block -ansi-alias  
  -Wl,-z,muldefs -L/sh -lsmartheap  
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-ic15.0-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-ic15.0-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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