Hewlett-Packard Company

ProLiant DL120 Gen9
(2.60 GHz, Intel Xeon E5-2660 v3)

| SPECint®2006 | 60.9 |
| SPECint_base2006 | 58.6 |

**CPU2006 license:** 3
**Test sponsor:** Hewlett-Packard Company
**Tested by:** Hewlett-Packard Company

**Hardware**

<table>
<thead>
<tr>
<th>CPU Name</th>
<th>Intel Xeon E5-2660 v3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Characteristics</td>
<td>Intel Turbo Boost Technology up to 3.30 GHz</td>
</tr>
<tr>
<td>CPU MHz</td>
<td>2600</td>
</tr>
<tr>
<td>FPU</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled</td>
<td>10 cores, 1 chip, 10 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 core</td>
</tr>
<tr>
<td>Other Cache</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>128 GB (8 x 16 GB 2Rx4 PC4-2133P-R)</td>
</tr>
<tr>
<td>Disk Subsystem</td>
<td>1 x 1 TB SATA, 7200 RPM, RAID 0</td>
</tr>
<tr>
<td>Other Hardware</td>
<td>None</td>
</tr>
</tbody>
</table>

**Software**

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Red Hat Enterprise Linux Server release 7.0 (Maipo)</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>
SPEC CINT2006 Result

Hewlett-Packard Company
ProLiant DL120 Gen9
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SPECint2006 = 60.9
SPECint_base2006 = 58.6

CPU2006 license: 3
Test sponsor: Hewlett-Packard Company
Tested by: Hewlett-Packard Company
Test date: Nov-2014
Hardware Availability: Sep-2014
Software Availability: Sep-2014

---

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>400.perlbench</td>
<td>254</td>
<td>38.5</td>
<td>255</td>
<td>38.4</td>
<td>254</td>
<td>38.5</td>
<td>220</td>
<td>44.5</td>
<td>220</td>
<td>44.5</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>407</td>
<td>23.7</td>
<td>411</td>
<td>23.5</td>
<td>408</td>
<td>23.6</td>
<td>408</td>
<td>23.7</td>
<td>407</td>
<td>23.7</td>
</tr>
<tr>
<td>403.gcc</td>
<td>234</td>
<td>34.4</td>
<td>235</td>
<td>34.3</td>
<td>235</td>
<td>34.3</td>
<td>227</td>
<td>35.4</td>
<td>228</td>
<td>35.3</td>
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<tr>
<td>429.mcf</td>
<td>144</td>
<td>63.3</td>
<td>142</td>
<td>64.1</td>
<td>146</td>
<td>62.5</td>
<td>144</td>
<td>63.3</td>
<td>142</td>
<td>64.1</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>383</td>
<td>27.4</td>
<td>384</td>
<td>27.4</td>
<td>384</td>
<td>27.3</td>
<td>383</td>
<td>27.4</td>
<td>384</td>
<td>27.4</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>143</td>
<td>65.3</td>
<td>143</td>
<td>65.0</td>
<td>143</td>
<td>65.3</td>
<td>143</td>
<td>65.3</td>
<td>143</td>
<td>65.3</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>369</td>
<td>32.8</td>
<td>369</td>
<td>32.8</td>
<td>369</td>
<td>32.8</td>
<td>367</td>
<td>33.0</td>
<td>367</td>
<td>33.0</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>5.15</td>
<td>40.30</td>
<td>5.15</td>
<td>40.30</td>
<td>5.15</td>
<td>40.20</td>
<td>5.15</td>
<td>40.30</td>
<td>5.15</td>
<td>40.20</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>467</td>
<td>47.4</td>
<td>466</td>
<td>47.5</td>
<td>465</td>
<td>47.6</td>
<td>467</td>
<td>47.4</td>
<td>466</td>
<td>47.5</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>182</td>
<td>34.4</td>
<td>183</td>
<td>34.2</td>
<td>182</td>
<td>34.4</td>
<td>136</td>
<td>46.1</td>
<td>137</td>
<td>45.8</td>
</tr>
<tr>
<td>473.astar</td>
<td>222</td>
<td>31.6</td>
<td>223</td>
<td>31.5</td>
<td>222</td>
<td>31.7</td>
<td>222</td>
<td>31.6</td>
<td>223</td>
<td>31.5</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>102</td>
<td>67.6</td>
<td>103</td>
<td>67.3</td>
<td>102</td>
<td>68.0</td>
<td>102</td>
<td>67.6</td>
<td>103</td>
<td>67.3</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/redhat_transparent_hugepage/enable

Platform Notes

BIOS Configuration:
Intel Hyperthreading Options set to Disabled
HP Power Profile set to Custom
HP Power Regulator set to HP Static High Performance Mode
Minimum Processor Idle Power Package C-State set to No Package State
Energy/Performance Bias set to Maximum Performance
QPI Snoop Configuration set to Early Snoop
Thermal Configuration set to Maximum Cooling
Processor Power and Utilization Monitoring set to Disabled
Memory Refresh Rate set to 1x Refresh

Sysinfo program /cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 $ e3fbb8667b5a285932ceab81e28219e1
running on localhost.localdomain Thu Nov 20 13:21:25 2014

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:
Continued on next page
Hewlett-Packard Company

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Platform Notes (Continued)

http://www.spec.org/cpu2006/Docs/config.html#sysinfo

From /proc/cpuinfo

model name : Intel(R) Xeon(R) CPU E5-2660 v3 @ 2.60GHz
  1 "physical id"s (chips)
  10 "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 : 10
siblings : 10
  physical 0: cores 0 2 3 4 8 9 10 11 12
cache size : 25600 KB

From /proc/meminfo
MemTotal: 131735260 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*

NAME="Red Hat Enterprise Linux Server"
VERSION="7.0 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="7.0"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.0 (Maipo)"
ANSI_COLOR="0;31"
CPE_NAME="cpe:/o:redhat:enterprise_linux:7.0:GA:server"
redhat-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.0 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.0:ga:server

uname -a:
Linux localhost.localdomain 3.10.0-123.el7.x86_64 #1 SMP Mon May 5 11:16:57
EDT 2014 x86_64 x86_64 x86_64 GNU/Linux
run-level 3 Nov 19 16:23

SPEC is set to: /cpu2006
Filesystem     Type    Size  Used Avail Use% Mounted on
/dev/sda4      xfs    927G  11G  917G  2%   /

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 HP P86 08/27/2014
Memory:
8x HP 752369-081 16 GB 2 rank 2133 MHz
Continued on next page
Hewlett-Packard Company

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Platform Notes (Continued)

(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 = "/cpu2006/libs/32:/cpu2006/libs/64:/cpu2006/sh"
OMP_NUM_THREADS = "10"

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

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

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -03 -no-prec-div -parallel -opt-prefetch -auto-p32

C++ benchmarks:
-xCORE-AVX2 -ipo -03 -no-prec-div -opt-prefetch -auto-p32
-Wl,-z,muldefs -L/sh -lsmartheap64
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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

401.bzip2: -xCORE-AVX2(pass 2) -prof-gen(pass 1) -ipo(pass 2)
   -O3(pass 2) -no-prec-div -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

Continued on next page
Peaks Optimization Flags (Continued)

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)
-03(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)
-03(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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SPECint\textsubscript{2006} = 60.9
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\begin{tabular}{ll}
CPU\textsubscript{2006} license: & 3
\hline
Test sponsor: & Hewlett-Packard Company
\hline
Tested by: & Hewlett-Packard Company
\hline
Test date: & Nov-2014
\hline
Hardware Availability: & Sep-2014
\hline
Software Availability: & Sep-2014
\end{tabular}