Hewlett-Packard Company

ProLiant DL580 Gen9
(2.50 GHz, Intel Xeon E7-8890 v3)

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

Test date: Apr-2015
Hardware Availability: May-2015
Software Availability: Oct-2014

SPECint®2006 = 62.6
SPECint_base2006 = 60.6

400.perlbench 43.6
401.bzip2 38.1 33.1
403.gcc 32.6
429.mcf 53.3
445.gobmk 27.4
456.hmmer 65.0
458.sjeng 32.2
462.libquantum 32.1
464.h264ref 43.7
471.omnetpp 51.8
473.astar 31.6
483.xalancbmk 62.0

Hardware

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon E7-8890 v3</td>
</tr>
<tr>
<td>CPU Characteristics</td>
<td>Intel Turbo Boost Technology up to 3.30 GHz</td>
</tr>
<tr>
<td>CPU MHz</td>
<td>2500</td>
</tr>
<tr>
<td>FPU</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled</td>
<td>36 cores, 2 chips, 18 cores/chip</td>
</tr>
<tr>
<td>CPU(s) orderable</td>
<td>2.4 chip</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>45 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other Cache</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>256 GB (16 x 16 GB 2Rx4 PC4-2133P-R, running at 1600 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>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>SUSE Linux Enterprise Server 12 (x86_64)</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/L++: Version 15.0.0.0.90 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>
Hewlett-Packard Company

ProLiant DL580 Gen9
(2.50 GHz, Intel Xeon E7-8890 v3)

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

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>
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<tbody>
<tr>
<td>400.perlbench</td>
<td>256</td>
<td>38.2</td>
<td>257</td>
<td>38.1</td>
<td>257</td>
<td>38.0</td>
<td>225</td>
<td>43.5</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>421</td>
<td>22.9</td>
<td>420</td>
<td>23.0</td>
<td>423</td>
<td>22.8</td>
<td>418</td>
<td>23.1</td>
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<tr>
<td>403.gcc</td>
<td>247</td>
<td>32.6</td>
<td>248</td>
<td>32.5</td>
<td>247</td>
<td>32.6</td>
<td><strong>240</strong></td>
<td><strong>33.5</strong></td>
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<tr>
<td>429.mcf</td>
<td>171</td>
<td><strong>53.3</strong></td>
<td>172</td>
<td>52.9</td>
<td>171</td>
<td>53.4</td>
<td><strong>171</strong></td>
<td><strong>53.3</strong></td>
</tr>
<tr>
<td>445.gobmk</td>
<td><strong>383</strong></td>
<td>27.4</td>
<td>383</td>
<td>27.4</td>
<td>384</td>
<td>27.3</td>
<td><strong>383</strong></td>
<td>27.4</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>144</td>
<td>65.0</td>
<td><strong>143</strong></td>
<td><strong>65.0</strong></td>
<td>143</td>
<td>65.1</td>
<td>144</td>
<td>65.0</td>
</tr>
<tr>
<td>458.sjeng</td>
<td><strong>377</strong></td>
<td>32.1</td>
<td>377</td>
<td>32.1</td>
<td>378</td>
<td>32.0</td>
<td>376</td>
<td>32.2</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>2.60</td>
<td>7980</td>
<td>2.62</td>
<td>7920</td>
<td><strong>2.61</strong></td>
<td><strong>7940</strong></td>
<td>2.60</td>
<td>7980</td>
</tr>
<tr>
<td>464.h264ref</td>
<td><strong>507</strong></td>
<td>43.7</td>
<td>506</td>
<td>43.7</td>
<td>508</td>
<td>43.5</td>
<td><strong>507</strong></td>
<td>43.7</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>145</td>
<td>43.1</td>
<td><strong>150</strong></td>
<td><strong>41.6</strong></td>
<td>150</td>
<td>41.6</td>
<td>119</td>
<td>52.7</td>
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<tr>
<td>473.astar</td>
<td><strong>224</strong></td>
<td>31.4</td>
<td>220</td>
<td>31.9</td>
<td>226</td>
<td>31.1</td>
<td>221</td>
<td>31.7</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td><strong>111</strong></td>
<td>62.0</td>
<td>111</td>
<td>62.2</td>
<td>111</td>
<td>61.9</td>
<td><strong>111</strong></td>
<td><strong>62.0</strong></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
Power Profile set to Custom
Power Regulator set to Static High Performance Mode
Minimum Processor Idle Power Core C-State set to C6 State
Minimum Processor Idle Power Package C-State set to No Package State
Energy/Performance Bias set to Maximum Performance
Collaborative Power Control set to Enabled
Thermal Configuration set to Maximum Cooling
Processor Power and Utilization Monitoring set to Disabled
Memory Refresh Rate set to 1x Refresh
Intel Hyperthreading Options set to Disabled
Sysinfo program /cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 **e3fbb8667b5a285932ceab81e28219e1** running on linux-t8cw Thu Apr 30 20:41:26 2015

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
ProLiant DL580 Gen9
(2.50 GHz, Intel Xeon E7-8890 v3)

SPECint2006 = 62.6
SPECint_base2006 = 60.6

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

Platform Notes (Continued)

From /proc/cpuinfo
model name : Intel(R) Xeon(R) CPU E7-8890 v3 @ 2.50GHz
  2 "physical id"s (chips)
  36 "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 : 18
siblings  : 18
physical 0: cores 0 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
cache size : 46080 KB

From /proc/meminfo
MemTotal:       264557160 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-t8cw 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 Apr 30 16:55

SPEC is set to: /cpu2006
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda3      xfs  371G  6.6G  364G   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.
**SPEC CINT2006 Result**

**Hewlett-Packard Company**

ProLiant DL580 Gen9 (2.50 GHz, Intel Xeon E7-8890 v3)

| SPECint2006 = | 62.6 |
| SPECint_base2006 = | 60.6 |

**CPU2006 license:** 3  
**Test sponsor:** Hewlett-Packard Company  
**Tested by:** Hewlett-Packard Company  
**Test date:** Apr-2015  
**Hardware Availability:** May-2015  
**Software Availability:** Oct-2014

**Platform Notes (Continued)**

BIOS HP U17 03/13/2015  
Memory:  
- 80x UNKNOWN NOT AVAILABLE  
- 16x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2133 MHz, configured at 1600 MHz

(End of data from sysinfo program)  
Regarding the sysinfo display about the memory installed, the correct amount of memory is 256 GB and the dmidecode description should have one line reading as:  
- 16x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2133 MHz, configured at 1600 MHz

**General Notes**

Environment variables set by runspec before the start of the run:  
- KMP_AFFINITY = "granularity=fine,compact"  
- LD_LIBRARY_PATH = "/cpu2006/libs/32:/cpu2006/libs/64:/cpu2006/sh"  
- OMP_NUM_THREADS = "36"

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
Hewlett-Packard Company
ProLiant DL580 Gen9
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Hardware Availability: May-2015
Software Availability: Oct-2014

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/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.xalanbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
**Hewlett-Packard Company**  
ProLiant DL580 Gen9  
(2.50 GHz, Intel Xeon E7-8890 v3)

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| SPECint_base2006 = | 60.6 |

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

**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`

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

- 483.xalancbmk: `basepeak = yes`

**Peak Other Flags**

**C benchmarks:**

- 403.gcc: `Dalloca=_alloca`
Hewlett-Packard Company
ProLiant DL580 Gen9
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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 other inquiries, please contact webmaster@spec.org.

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