Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen9
(2.20 GHz, Intel Xeon E5-2699 v4)

SPECint®2006 = 72.9
SPECint_base2006 = 71.2

CPU2006 license: 3
Tested by: HPE

CPU Characteristics:
- Intel Xeon E5-2699 v4
- Intel Turbo Boost Technology up to 3.60 GHz
- 44 cores, 2 chips, 22 cores/chip, 2 threads/core
- 1, 2 chips
- 32 KB I + 32 KB D on chip per core
- 256 KB I+D on chip per core
- 55 MB I+D on chip per chip
- None
- 256 GB (8 x 32 GB 2Rx4 PC4-2400T-R)
- 1 x 400 GB SAS SSD, RAID 0

Software
- Operating System: SUSE Linux Enterprise Server 12 (x86_64) Kernel 3.12.43-52.6-default
- Compiler: C/C++: Version 16.0.0.101 of Intel C++ Studio XE for Linux
- Auto Parallel: Yes
- File System: btrfs
- System State: Run level 3 (multi-user)
- Base Pointers: 32/64-bit
- Peak Pointers: 32/64-bit
- Other Software: Microquill SmartHeap V10.2
## 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>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>400.perlbench</td>
<td>232</td>
<td>42.0</td>
<td>233</td>
<td>42.0</td>
<td>234</td>
<td>41.7</td>
<td>213</td>
<td>45.8</td>
<td>213</td>
<td>45.9</td>
<td>213</td>
<td>45.8</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>284</td>
<td>25.1</td>
<td>383</td>
<td>25.2</td>
<td>384</td>
<td>25.1</td>
<td>384</td>
<td>25.1</td>
<td>384</td>
<td>25.2</td>
<td>384</td>
<td>25.1</td>
</tr>
<tr>
<td>403.gcc</td>
<td>212</td>
<td>38.0</td>
<td>212</td>
<td>38.0</td>
<td>211</td>
<td>38.1</td>
<td>213</td>
<td>37.7</td>
<td>210</td>
<td>38.3</td>
<td>208</td>
<td>38.6</td>
</tr>
<tr>
<td>429.mcf</td>
<td>141</td>
<td>64.7</td>
<td>144</td>
<td>63.3</td>
<td>141</td>
<td>64.5</td>
<td>141</td>
<td>64.7</td>
<td>144</td>
<td>63.3</td>
<td>141</td>
<td>64.5</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>340</td>
<td>30.9</td>
<td>341</td>
<td>30.8</td>
<td>340</td>
<td>30.9</td>
<td>340</td>
<td>30.9</td>
<td>340</td>
<td>30.9</td>
<td>340</td>
<td>30.9</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>107</td>
<td>87.4</td>
<td>107</td>
<td>87.0</td>
<td>107</td>
<td>87.0</td>
<td>107</td>
<td>87.0</td>
<td>107</td>
<td>87.0</td>
<td>107</td>
<td>87.0</td>
</tr>
<tr>
<td>458.sjeng</td>
<td>342</td>
<td>35.4</td>
<td>343</td>
<td>35.3</td>
<td>341</td>
<td>35.5</td>
<td>333</td>
<td>36.4</td>
<td>333</td>
<td>36.3</td>
<td>332</td>
<td>36.4</td>
</tr>
<tr>
<td>462.libquantum</td>
<td>2.64</td>
<td>7850</td>
<td>2.58</td>
<td>8030</td>
<td>2.79</td>
<td>7430</td>
<td>2.64</td>
<td>7850</td>
<td>2.58</td>
<td>8030</td>
<td>2.79</td>
<td>7430</td>
</tr>
<tr>
<td>464.h264ref</td>
<td>282</td>
<td>57.9</td>
<td>382</td>
<td>57.8</td>
<td>383</td>
<td>57.8</td>
<td>382</td>
<td>57.9</td>
<td>382</td>
<td>57.9</td>
<td>383</td>
<td>57.8</td>
</tr>
<tr>
<td>471.omnetpp</td>
<td>122</td>
<td>51.2</td>
<td>123</td>
<td>51.0</td>
<td>122</td>
<td>51.3</td>
<td>112</td>
<td>55.6</td>
<td>111</td>
<td>56.1</td>
<td>112</td>
<td>55.7</td>
</tr>
<tr>
<td>473.astar</td>
<td>189</td>
<td>37.2</td>
<td>190</td>
<td>37.0</td>
<td>189</td>
<td>37.1</td>
<td>189</td>
<td>37.2</td>
<td>190</td>
<td>37.0</td>
<td>189</td>
<td>37.1</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>86.6</td>
<td>79.6</td>
<td>86.5</td>
<td>79.8</td>
<td>86.7</td>
<td>79.6</td>
<td>80.0</td>
<td>86.3</td>
<td>79.6</td>
<td>86.7</td>
<td>79.7</td>
<td>86.6</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
  - 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 /cpu2006/config/sysinfo.rev6914
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1
running on linux-mk6j Tue Mar 1 14:46:25 2016

This section contains SUT (System Under Test) info as seen by
Continued on next page
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL380 Gen9  
(2.20 GHz, Intel Xeon E5-2699 v4)  

| SPECint2006 = | 72.9 |
| SPECint_base2006 = | 71.2 |

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

Test date: Mar-2016  
Hardware Availability: Mar-2016  
Software Availability: Aug-2015

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 E5-2699 v4 @ 2.20GHz  
2 "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 caution.)  
cpu cores : 22  
siblings : 44  
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28  
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28  
cache size : 56320 KB

From /proc/meminfo
MemTotal: 264408828 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

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

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-mk6j 3.12.43-52.6-default #1 SMP Wed May 20 12:44:39 UTC 2015  
(fc0ceac) x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Mar 1 14:43

SPEC is set to: /cpu2006

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda3</td>
<td>btrfs</td>
<td>369G</td>
<td>225G</td>
<td>144G</td>
<td>62%</td>
<td>/</td>
</tr>
</tbody>
</table>

Continued on next page
SPEC CINT2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen9
(2.20 GHz, Intel Xeon E5-2699 v4)

SPECint2006 = 72.9
SPECint_base2006 = 71.2

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

Platform Notes (Continued)

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 P89 02/22/2016
Memory:
16x UNKNOWN NOT AVAILABLE
8x 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 256 GB and the dmidecode description should have one line reading as:
8x 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 = "/cpu2006/libs/32:/cpu2006/libs/64:/cpu2006/sh"
OMP_NUM_THREADS = "44"

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

Continued on next page
SPEC CINT2006 Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen9
(2.20 GHz, Intel Xeon E5-2699 v4)

SPECint2006 = 72.9
SPECint_base2006 = 71.2

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

Base Portability Flags (Continued)

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
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

Continued on next page
SPEC CINT2006 Result
Copyright 2006-2016 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen9
(2.20 GHz, Intel Xeon E5-2699 v4)

SPECint2006 = 72.9
SPECint_base2006 = 71.2

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

Test date: Mar-2016
Hardware Availability: Mar-2016
Software Availability: Aug-2015

Peak Portability Flags (Continued)

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)
-prof-use(pass 2) -opt-prefetch
-par-num-threads=1(pass 1) -ansi-alias

401.bzip2: -xCORE-AVX2(pass 2) -prof-gen:threadsafe(pass 1)
-par-num-threads=1(pass 1) -prof-use(pass 2) -auto-ilp32
-ipo(pass 2) -O3(pass 2) -no-prec-div
-parallel=unroll4

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:threadsafe(pass 1)
-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)
-par-num-threads=1(pass 1) -prof-use(pass 2)
-parallel=unroll4 -opt-prec-div -no-prec-div
-parallel-strategy=block
-Wl,-z,muldefs -L/sh -lsmartheap

473.astar: basepeak = yes
483.xalancbmk: -xCORE-AVX2 -ipo -O3 -no-prec-div -opt-prefetch
-ansi-alias -Wl,-z,muldefs -L/sh -lsmartheap
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen9
(2.20 GHz, Intel Xeon E5-2699 v4)

SPECint2006 = 72.9
SPECint_base2006 = 71.2

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

Test date: Mar-2016
Hardware Availability: Mar-2016
Software Availability: Aug-2015

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-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

SPEC and SPECint are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU2006 v1.2.
Originally published on 19 April 2016.