## SPEC® CINT2006 Result

### Hewlett Packard Enterprise

*(Test Sponsor: HPE)*

ProLiant DL580 Gen9

*(2.80 GHz, Intel Xeon E7-8891 v4)*

| SPECint®2006 = | 73.3 |
| SPECint_base2006 = | 71.2 |

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

### Hardware

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon E7-8891 v4</td>
</tr>
<tr>
<td>CPU Characteristics</td>
<td>Intel Turbo Boost Technology up to 3.50 GHz</td>
</tr>
<tr>
<td>CPU MHz</td>
<td>2800</td>
</tr>
<tr>
<td>FPU</td>
<td>Integrated</td>
</tr>
<tr>
<td>CPU(s) enabled</td>
<td>40 cores, 4 chips, 10 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>60 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 PC4-2400T-R, running at 1600 MHz)</td>
</tr>
<tr>
<td>Disk Subsystem</td>
<td>1 x 800 GB NVMe PCIe SSD, RAID 0</td>
</tr>
<tr>
<td>Other Hardware</td>
<td>DL580 Gen9 NVMe SSD Express Bay Enablement Kit</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>SUSE Linux Enterprise Server 12 SP1 (x86_64)</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/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>
**SPEC CINT2006 Result**

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(Test Sponsor: HPE)  
ProLiant DL580 Gen9  
(2.80 GHz, Intel Xeon E7-8891 v4)

SPECint2006 = 73.3  
SPECint_base2006 = 71.2

<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>240</td>
<td>40.8</td>
<td>239</td>
<td>40.9</td>
<td>240</td>
<td>40.8</td>
<td>218</td>
<td>44.7</td>
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<tr>
<td>401.bzip2</td>
<td>391</td>
<td>24.7</td>
<td>391</td>
<td>24.7</td>
<td>390</td>
<td>24.8</td>
<td>385</td>
<td>25.1</td>
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<tr>
<td>403.gcc</td>
<td>209</td>
<td>38.5</td>
<td>209</td>
<td>38.5</td>
<td>209</td>
<td>38.5</td>
<td>209</td>
<td>38.5</td>
</tr>
<tr>
<td>429.mcf</td>
<td>347</td>
<td>30.7</td>
<td>347</td>
<td>30.7</td>
<td>348</td>
<td>30.7</td>
<td>347</td>
<td>30.7</td>
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<tr>
<td>456.hmmer</td>
<td>109</td>
<td>85.7</td>
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<td>85.9</td>
<td>109</td>
<td>86.0</td>
<td>109</td>
<td>85.9</td>
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<tr>
<td>458.sjeng</td>
<td>351</td>
<td>34.5</td>
<td>350</td>
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<td>34.5</td>
<td>347</td>
<td>34.9</td>
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<tr>
<td>462.libquantum</td>
<td>2.05</td>
<td>10100</td>
<td>2.04</td>
<td>10100</td>
<td>2.05</td>
<td>10100</td>
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<td>10100</td>
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<tr>
<td>464.h264ref</td>
<td>372</td>
<td>59.5</td>
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<td>59.3</td>
<td>372</td>
<td>59.5</td>
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<td>59.5</td>
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<tr>
<td>471.omnetpp</td>
<td>123</td>
<td>50.9</td>
<td>123</td>
<td>50.9</td>
<td>127</td>
<td>49.1</td>
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<td>57.3</td>
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<tr>
<td>473.astar</td>
<td>192</td>
<td>36.5</td>
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<td>36.5</td>
<td>193</td>
<td>36.4</td>
<td>192</td>
<td>36.5</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>89.7</td>
<td>76.9</td>
<td>90.1</td>
<td>76.6</td>
<td>89.1</td>
<td>77.5</td>
<td>80.5</td>
<td>85.7</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:
- HP Power Profile set to Custom  
- HP Power Regulator to HP Static High Performance Mode  
- Minimum Processor Idle Power Core C-State set to C6 State  
- Minimum Processor Idle Power Package C-State set to Package C6 (retention) State  
- Energy/Performance Bias set to Maximum Performance  
- QPI Snoop Configuration set to Home Snoop  
- Collaborative Power Control set to Disabled  
- Thermal Configuration set to Maximum Cooling  
- Processor Power and Utilization Monitoring set to Disabled  
- Intel Hyperthreading set to Disabled

Sysinfo program /home/intel_binary/cpu2006/config/sysinfo.rev6914  
$Rev: 6914 $ $Date:: 2014-06-25 #$ e3fbb8667b5a285932ceab81e28219e1  
running on linux-vi0i Tue May 17 07:14:52 2016

This section contains SUT (System Under Test) info as seen by

Continued on next page
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ProLiant DL580 Gen9
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**CPU2006 license:** 3
**Test sponsor:** HPE
**Tested by:** HPE

**Test date:** May-2016
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**Software Availability:** Dec-2015

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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 E7-8891 v4 @ 2.80GHz
- 4 "physical id"s (chips)
- 40 "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 5 9 10 11 13 18 24 26 28 29
  - physical 1: cores 5 9 10 11 13 18 24 26 28 29
  - physical 2: cores 5 9 10 11 13 18 24 26 28 29
  - physical 3: cores 5 9 10 11 13 18 24 26 28 29
- cache size: 61440 KB

From `/proc/meminfo`

- MemTotal: 529321304 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

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

- SUSE-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:
  - Linux linux-vi0i 3.12.49-11-default #1 SMP Wed Nov 11 20:52:43 UTC 2015
    (8d714a0) x86_64 x86_64 x86_64 GNU/Linux

- run-level 3 May 17 07:10

- SPEC is set to: `/home/intel_binary/cpu2006`

Additional information from `dmidecode`:

**Warning:** Use caution when you interpret this section. The 'dmidecode' program

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Platform Notes (Continued)

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 U17 04/26/2016
Memory:
64x UNKNOWN NOT AVAILABLE
32x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 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 512 GB and the dmidecode description should have one line reading as:
32x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2400 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 = "/home/intel_binary/cpu2006/libs/32:/home/intel_binary/cpu2006/libs/64:/home/intel_binary/cpu2006/sh"
OMP_NUM_THREADS = "40"

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
483.xalancbmk: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX
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</tr>
<tr>
<td>Tested by:</td>
<td>Software Availability:</td>
<td>Dec-2015</td>
</tr>
</tbody>
</table>

## 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 -DSPEC_CPU_LINUX  
462.libquantum: -DSPEC_CPU_LP64 -DSPEC_CPU_LINUX  
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
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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  

Peak Other Flags  

C benchmarks:  

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**Peak Other Flags (Continued)**

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

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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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