**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

ProLiant DL560 Gen10
(2.10 GHz, Intel Xeon Platinum 8176)

<table>
<thead>
<tr>
<th>SPECint®2006 =</th>
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<tr>
<td>SPECint_base2006 =</td>
<td>80.0</td>
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**CPU2006 license:** 3  
**Tested by:** HPE  
**Test sponsor:** HPE

**Test date:** Nov-2017  
**Hardware Availability:** Oct-2017  
**Software Availability:** Apr-2017

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<tr>
<th>SPECint2006</th>
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- **400.perlbench**
- **401.bzip2**
- **403.gcc**
- **429.mcf**
- **445.gobmk**
- **456.hmmer**
- **458.sjeng**
- **462.libquantum**
- **464.h264ref**
- **471.omnetpp**
- **473.astar**
- **483.xalancbmk**

**Software**

- Operating System: Red Hat Enterprise Linux Server release 7.3 (Maipo)  
- Compiler: C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux
- Auto Parallel: Yes  
- File System: xfs  
- System State: Run level 3 (multi-user)  
- Base Pointers: 32/64-bit  
- Peak Pointers: Not Applicable  
- Other Software: Microquill SmartHeap V10.2

**Hardware**

- CPU Name: Intel Xeon Platinum 8176  
- CPU Characteristics: Intel Turbo Boost Technology up to 3.80 GHz  
- CPU MHZ: 2100  
- FPU: Integrated  
- CPU(s) enabled: 112 cores, 4 chips, 28 cores/chip  
- CPU(s) orderable: 1, 2, 4 chip(s)  
- Primary Cache: 32 KB I + 32 KB D on chip per core  
- Secondary Cache: 1 MB I+D on chip per core  
- L3 Cache: 38.5 MB I+D on chip per chip  
- Other Cache: None  
- Memory: 768 GB (48 x 16 GB 2Rx8 PC4-2666V-R)  
- Disk Subsystem: 1 x 480 GB SATA SSD, RAID 0  
- Other Hardware: None
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Results Table

<table>
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<tr>
<th>Benchmark</th>
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<th>Ratio</th>
<th>Seconds</th>
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<tr>
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<tr>
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<tr>
<td>473.astar</td>
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<td>40.4</td>
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<td>40.3</td>
</tr>
<tr>
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<td>81.7</td>
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<td>81.8</td>
<td>84.3</td>
</tr>
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</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
Transparent Huge Pages enabled by default
Filesystem page cache cleared with:
shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run
IRQ balance service was stop using "service irqbalance stop"
Tuned-adm profile was set to Throughtput-Performance

Platform Notes

BIOS Configuration:
Intel Hyperthreading set to Disabled
Thermal Configuration set to Maximum Cooling
LLC Prefetch set to Enabled
LLC Dead Line Allocation set to Disabled
Memory Patrol Scrubbing set to Disabled
Workload Profile set to General Peak Frequency Compute
Energy/Performance Bias set to Maximum Performance
Workload Profile set to Custom
NUMA Group Size Optimization set to Flat
Sysinfo program /cpu2006/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)
running on DL560-Gen10 Fri Nov 17 11:35:59 2017

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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CPU2006 license: 3
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Tested by: HPE

Platform Notes (Continued)

From /proc/cpuinfo
model name : Intel(R) Xeon(R) Platinum 8176 CPU @ 2.10GHz
  4 "physical id"s (chips)
  112 "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 : 28
siblings : 28
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24
  25 26 27 28 29 30
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24
  25 26 27 28 29 30
physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24
  25 26 27 28 29 30
physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24
  25 26 27 28 29 30
cache size : 39424 KB

From /proc/meminfo
MemTotal: 792066452 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*
os-release:
  NAME="Red Hat Enterprise Linux Server"
  VERSION="7.3 (Maipo)"
  ID="rhel"
  ID_LIKE="fedora"
  VERSION_ID="7.3"
  PRETTY_NAME="Red Hat Enterprise Linux Server 7.3 (Maipo)"
  ANSI_COLOR="0;31"
  CPE_NAME="cpe:/o:redhat:enterprise_linux:7.3:GA:server"
redhat-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.3 (Maipo)

uname -a:
Linux DL560-Gen10 3.10.0-514.el7.x86_64 #1 SMP Wed Oct 19 11:24:13 EDT 2016
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Nov 17 11:33

SPEC is set to: /cpu2006
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda1 xfs 447G 41G 407G 9% /

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
**SPEC CINT2006 Result**

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**Platform Notes (Continued)**

- hardware, firmware, and the "DMTF SMBIOS" standard.
- BIOS HPE U34 09/29/2017
- Memory: 48x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666 MHz

(End of data from sysinfo program)

**General Notes**

Environment variables set by runspec before the start of the run:
- KMP_AFFINITY = "granularity=fine,compact"
- LD_LIBRARY_PATH = ":/cpu2006/lib/ia32:/cpu2006/lib/intel64:/cpu2006/sh10.2"
- OMP_NUM_THREADS = "112"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.2

**Base Compiler Invocation**

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

- **C++ benchmarks:**
  - `lcpc -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`
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- 462.libquantum: `-DSPEC_CPU_LP64 -DSPEC_CPU_LINUX`
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- 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 -qopt-prefetch -auto-p32`

Continued on next page
SPEC CINT2006 Result

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Base Optimization Flags (Continued)

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -auto-p32
-Wl,-z,muldefs -L/sh10.2 -lsmartheap64

Base 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-ic17.0-official-linux64-revF.html
http://www.spec.org/cpu2006/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revG.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2006/flags/Intel-ic17.0-official-linux64-revF.xml
http://www.spec.org/cpu2006/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revG.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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