Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant BL460c Gen10  
(2.10 GHz, Intel Xeon Silver 4116)  

SPECint®2006 = Not Run  
SPECint_base2006 = 59.9

**Hardware**

- **CPU Name:** Intel Xeon Silver 4116  
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.00 GHz  
- **CPU MHZ:** 2100  
- **FPU:** Integrated  
- **CPU(s) enabled:** 24 cores, 2 chips, 12 cores/chip  
- **CPU(s) orderable:** 1, 2 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:** 16.5 MB I+D on chip per chip  
- **Other Cache:** None  
- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)  
- **Disk Subsystem:** 1 x 480 GB SATA SSD, RAID 0  
- **Other Hardware:** None

**Software**

- **Operating System:** Red Hat Enterprise Linux Server release 7.4 (Maipo)  
- **Kernel:** 3.10.0-693.el7.x86_64  
- **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

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Standard Performance Evaluation Corporation  
info@spec.org  
http://www.spec.org/
SPEC CINT2006 Result

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CPU2006 license: 3
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base</th>
<th>Peak</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Seconds</td>
<td>Ratio</td>
</tr>
<tr>
<td>400.perlbench</td>
<td>260</td>
<td>37.5</td>
</tr>
<tr>
<td>401.bzip2</td>
<td>419</td>
<td>23.0</td>
</tr>
<tr>
<td>403.gcc</td>
<td>227</td>
<td>35.5</td>
</tr>
<tr>
<td>429.mcf</td>
<td>137</td>
<td>66.5</td>
</tr>
<tr>
<td>445.gobmk</td>
<td>390</td>
<td>26.9</td>
</tr>
<tr>
<td>456.hmmer</td>
<td>119</td>
<td>78.3</td>
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<tr>
<td>458.sjeng</td>
<td>403</td>
<td>30.0</td>
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<tr>
<td>462.libquantum</td>
<td>3.67</td>
<td>5650</td>
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<tr>
<td>464.h264ref</td>
<td>398</td>
<td>55.6</td>
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<tr>
<td>471.omnetpp</td>
<td>238</td>
<td>26.2</td>
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<tr>
<td>473.astar</td>
<td>223</td>
<td>31.5</td>
</tr>
<tr>
<td>483.xalancbmk</td>
<td>106</td>
<td>65.1</td>
</tr>
</tbody>
</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
irqbalance disabled with "systemctl stop irqbalance"
tuned profile set with "tuned-adm profile throughput-performance"

Platform Notes

BIOS Configuration:
Intel Hyper-Threading 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
Uncore Frequency Scaling set to Auto
Sysinfo program /home/cpu2006/config/sysinfo.rev6993
Revision 6993 of 2015-11-06 (b5e8d4b4eb51edd8d7f98696cbe290c1)
running on BL460c_RHEL7.4BL460c_RHEL7.4BL460c_RHEL7.4BL460c_RHEL7.4BL460c_RHEL7.4BL460c_R Fri Dec 8 12:38:22 2017

This section contains SUT (System Under Test) info as seen by some common utilities. To remove or add to this section, see:

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CPU2006 license: 3  
Test date:  Dec-2017  
Hardware Availability:  Nov-2017  
Software Availability:  Apr-2017

Platform Notes (Continued)

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

From /proc/cpuinfo  
  model name : Intel(R) Xeon(R) Silver 4116 CPU @ 2.10GHz  
  2 "physical id"s (chips)  
  24 "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 : 12  
  siblings : 12  
  physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13  
  physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13  
  cache size : 16896 KB

From /proc/meminfo  
  MemTotal: 197750808 kB  
  HugePages_Total: 0  
  Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*  
  os-release:  
    NAME="Red Hat Enterprise Linux Server"  
    VERSION="7.4 (Maipo)"  
    ID="rhel"  
    ID_LIKE="fedora"  
    VARIANT="Server"  
    VARIANT_ID="server"  
    VERSION_ID="7.4"  
    PRETTY_NAME="Red Hat Enterprise Linux Server 7.4 (Maipo)"  
    redhat-release: Red Hat Enterprise Linux release 7.4 (Maipo)  
    system-release: Red Hat Enterprise Linux release 7.4 (Maipo)  
    system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server  

  uname -a:  
    Linux BL460c_RHEL7.4BL460c_RHEL7.4BL460c_RHEL7.4BL460c_RHEL7.4BL460c_R  
    3.10.0-693.e17.x86_64 #1 SMP Thu Jul 6 19:56:57 EDT 2017 x86_64 x86_64 x86_64  
    GNU/Linux

  run-level 3 Dec 8 12:34

  SPEC is set to: /home/cpu2006  
  Filesystem Type Size Used Avail Use% Mounted on  
  /dev/sdb4 xfs 442G 57G 386G 13% /

  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 HPE I41 11/14/2017

Continued on next page
### Platform Notes (Continued)

Memory:
- 4x UNKNOWN NOT AVAILABLE
- 12x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666 MHz, configured at 2400 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 = "/home/cpu2006/lib/ia32:/home/cpu2006/lib/intel64:/home/cpu2006/sh10.2"
- OMP_NUM_THREADS = "24"

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

No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

No: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.

No: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

This benchmark result is intended to provide perspective on past performance using the historical hardware and/or software described on this result page.

The system as described on this result page was formerly generally available. At the time of this publication, it may not be shipping, and/or may not be supported, and/or may fail to meet other tests of General Availability described in the SPEC OSG Policy document, http://www.spec.org/osg/policy.htm.

This measured result may not be representative of the result that would be measured were this benchmark run with hardware and software available as of the publication date.

### Base Compiler Invocation

C benchmarks:
- icc -m64

C++ benchmarks:
- icpc -m64
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Test date: Dec-2017 
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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 -O3 -no-prec-div -parallel -qopt-prefetch  
-auto-p32

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-revH.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-revH.xml
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**Test sponsor:** HPE  
**Tested by:** HPE