**SPEC® CINT2006 Result**

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)

**ProLiant BL460c Gen10**  
(2.10 GHz, Intel Xeon Silver 4116)

**SPECint®_rate2006 = Not Run**  
**SPECint_rate_base2006 = 1010**

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<th>Hewlett Packard Enterprise</th>
<th>Test date:</th>
<th>Dec-2017</th>
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<td>Software Availability:</td>
<td>Apr-2017</td>
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**CPU2006 license:** 3  
**Tested by:** HPE

| 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, 2 threads/core  
| 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  

| Operating System:         | SUSE Linux Enterprise Server 12 (x86_64) SP3  
| Compiler:                 | C/C++: Version 17.0.3.191 of Intel C/C++ Compiler for Linux  
| Auto Parallel:            | No  
| File System:              | xfs  
| System State:             | Run level 3 (multi-user)  
| Base Pointers:            | 32-bit  
| Peak Pointers:            | Not Applicable  
| Other Software:           | Microquill SmartHeap V10.2  

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## Results Table

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

## Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

## 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
runspec command invoked through numactl i.e.:
numactl --interleave=all runspec <etc>
```

irqbalance disabled with "systemctl stop irqbalance"

VM Dirty ratio was set to 40 using "echo 40 > /proc/sys/vm/dirty_ratio"

Numa balancing was disabled using "echo 0 > /proc/sys/kernel/numa_balancing"

## BIOS Configuration:

- Thermal Configuration set to Maximum Cooling
- Memory Patrol Scrubbing set to Disabled
- LLC Prefetch set to Enabled
- LLC Dead Line Allocation set to Disabled
- Workload Profile set to General Throughput Compute
- Minimum Processor Idle Power Core C-State set to C1E State
- Workload Profile set to Custom

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

Sub-NUMA Clustering set to Disabled  
Sysinfo program /home/cpu2006/config/sysinfo.rev6993  
Revision 6993 of 2015-11-06 (b5e8d4b4eb51ed28d7f98696cbe290c1)  
running on bl460c107 Sat Dec 9 07:05:51 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

From /proc/cpuinfo  
model name : Intel(R) Xeon(R) Silver 4116 CPU @ 2.10GHz  
2 "physical id"s (chips)  
48 "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 : 24  
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: 197746480 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*  
SuSE-release:  
SUSE Linux Enterprise Server 12 (x86_64)  
VERSION = 12  
PATCHLEVEL = 3  
# 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-SP3"  
VERSION_ID="12.3"  
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"  
ID="sles"  
ANSI_COLOR="0;32"  
CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:  
Linux bl460c107 4.4.73-5-default #1 SMP Tue Jul 4 15:33:39 UTC 2017 (b7ce4e4)  
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Dec 9 07:04

SPEC is set to: /home/cpu2006  
Filesystem Type Size Used Avail Use% Mounted on

Continued on next page
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Hardware Availability: Nov-2017
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Platform Notes (Continued)
/dev/sda4      xfs   300G  137G  164G  46%  /home
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
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:
LD_LIBRARY_PATH = "/home/cpu2006/lib/ia32:/home/cpu2006/lib/intel64:/home/cpu2006/sh10.2"

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

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.
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Base Compiler Invocation

C benchmarks:
    icc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

C++ benchmarks:
    icpc -m32 -L/opt/intel/compilers_and_libraries_2017/linux/lib/ia32

Base Portability Flags

400.perlbench: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX_IA32
401.bzip2: -D_FILE_OFFSET_BITS=64
403.gcc: -D_FILE_OFFSET_BITS=64
429.mcf: -D_FILE_OFFSET_BITS=64
445.gobmk: -D_FILE_OFFSET_BITS=64
456.hmmer: -D_FILE_OFFSET_BITS=64
458.sjeng: -D_FILE_OFFSET_BITS=64
462.libquantum: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX
464.h264ref: -D_FILE_OFFSET_BITS=64
471.omnetpp: -D_FILE_OFFSET_BITS=64
473.astar: -D_FILE_OFFSET_BITS=64
483.xalancbmk: -D_FILE_OFFSET_BITS=64 -DSPEC_CPU_LINUX

Base Optimization Flags

C benchmarks:
    -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
    -qopt-mem-layout-trans=3

C++ benchmarks:
    -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
    -qopt-mem-layout-trans=3 -Wl,-z,muldefs -L/sh10.2 -lsmartheap

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