SPEC® CPU2017 Integer Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant BL460c Gen10
(3.00 GHz, Intel Xeon Gold 6136)

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base = 8.71</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_int_peak = Not Run</td>
</tr>
</tbody>
</table>

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Dec-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Nov-2017</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Sep-2017</td>
</tr>
</tbody>
</table>

### Threads

<table>
<thead>
<tr>
<th>Spec Benchmark</th>
<th>Threads</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>24</td>
<td>6.15</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>24</td>
<td>8.87</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>24</td>
<td>10.9</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>24</td>
<td>6.33</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>24</td>
<td>9.36</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>24</td>
<td>11.7</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>24</td>
<td>5.04</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>24</td>
<td>4.32</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>24</td>
<td>13.3</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

---

### Hardware

CPU Name: Intel Xeon Gold 6136
Max MHz.: 3700
Nominal: 3000
Enabled: 24 cores, 2 chips
Orderable: 1, 2 chip(s)
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 24.75 MB I+D on chip per chip
Other: None
Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R)
Storage: 1 x 480 GB SATA SSD, RAID 0
Other: None

### Software

OS: Red Hat Enterprise Linux Server release 7.4 (Maipo)
Compiler: C/C++: Version 18.0.0.128 of Intel C/C++
Compiler for Linux: Fortran: Version 18.0.0.128 of Intel Fortran
Compiler for Linux: Yes
Firmware: HPE BIOS Version I41 11/14/2017 released Nov-2017
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: jemalloc memory allocator library V5.0.1
SPEC CPU2017 Integer Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant BL460c Gen10
(3.00 GHz, Intel Xeon Gold 6136)

SPECsdesign2017_int_base = 8.71
SPECspeed2017_int_peak = Not Run

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Dec-2017
Hardware Availability: Nov-2017
Software Availability: Sep-2017

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_s</td>
<td>24</td>
<td>288</td>
<td>6.15</td>
<td>286</td>
<td>6.21</td>
<td>291</td>
<td>6.11</td>
</tr>
<tr>
<td>gcc_s</td>
<td>24</td>
<td>448</td>
<td>8.88</td>
<td>450</td>
<td>8.86</td>
<td>449</td>
<td>8.87</td>
</tr>
<tr>
<td>mcf_s</td>
<td>24</td>
<td>425</td>
<td>11.1</td>
<td>433</td>
<td>10.9</td>
<td><strong>433</strong></td>
<td><strong>10.9</strong></td>
</tr>
<tr>
<td>omnetpp_s</td>
<td>24</td>
<td>258</td>
<td>6.33</td>
<td>262</td>
<td>6.23</td>
<td>258</td>
<td>6.33</td>
</tr>
<tr>
<td>xalancbmk_s</td>
<td>24</td>
<td>151</td>
<td>9.38</td>
<td>152</td>
<td>9.33</td>
<td><strong>151</strong></td>
<td><strong>9.36</strong></td>
</tr>
<tr>
<td>x264_s</td>
<td>24</td>
<td>151</td>
<td>9.38</td>
<td>151</td>
<td>9.33</td>
<td>150</td>
<td>9.36</td>
</tr>
<tr>
<td>deepsjeng_s</td>
<td>24</td>
<td>284</td>
<td>5.04</td>
<td>285</td>
<td>5.03</td>
<td><strong>284</strong></td>
<td><strong>5.04</strong></td>
</tr>
<tr>
<td>leela_s</td>
<td>24</td>
<td>395</td>
<td>4.32</td>
<td>395</td>
<td>4.32</td>
<td>394</td>
<td>4.33</td>
</tr>
<tr>
<td>exchange2_s</td>
<td>24</td>
<td>221</td>
<td>13.3</td>
<td><strong>221</strong></td>
<td><strong>13.3</strong></td>
<td>221</td>
<td>13.3</td>
</tr>
<tr>
<td>xz_s</td>
<td>24</td>
<td>296</td>
<td>20.9</td>
<td>296</td>
<td>20.9</td>
<td>298</td>
<td>20.7</td>
</tr>
</tbody>
</table>

SPECspeed2017_int_base = 8.71
SPECspeed2017_int_peak = Not Run

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 service stopped using "systemctl stop irqbalance.service"
Used throughput-performance profile for tuned-adm: "tuned-adm profile throughput-performance profile"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.4
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.

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant BL460c Gen10
(3.00 GHz, Intel Xeon Gold 6136)

SPEC speed2017_int_peak = Not Run
SPEC speed2017_int_base = 8.71

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Dec-2017
Hardware Availability: Nov-2017
Software Availability: Sep-2017

General Notes (Continued)

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.

jemalloc: configured and built at default for 32bit (i686) and 64bit (x86_64) targets; built with RedHat Enterprise 7.4, and the system compiler gcc 4.8.5; sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases

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
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on bl160c15 Mon Dec 18 16:40:41 2017

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see
https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo

model name : Intel(R) Xeon(R) Gold 6136 CPU @ 3.00GHz
  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 8 9 11 17 18 19 20
physical 1: cores 0 1 2 3 4 8 9 11 17 18 19 20

(Continued on next page)
**SPEC CPU2017 Integer Speed Result**

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)
ProLiant BL460c Gen10
(3.00 GHz, Intel Xeon Gold 6136)

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base</th>
<th>8.71</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 3  
**Test Sponsor:** HPE  
**Test Date:** Dec-2017  
**Hardware Availability:** Nov-2017  
**Tested by:** HPE  
**Software Availability:** Sep-2017  

**Platform Notes (Continued)**

From `lscpu`:
- **Architecture:** x86_64
- **CPU op-mode(s):** 32-bit, 64-bit
- **Byte Order:** Little Endian
- **CPU(s):** 24
- **On-line CPU(s) list:** 0-23
- **Thread(s) per core:** 12
- **Socket(s):** 2
- **NUMA node(s):** 2
- **Vendor ID:** GenuineIntel
- **CPU family:** 6
- **Model:** 85
- **Model name:** Intel(R) Xeon(R) Gold 6136 CPU @ 3.00GHz
- **Stepping:** 4
- **CPU MHz:** 3000.000
- **BogoMIPS:** 6000.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 25344K
- **NUMA node0 CPU(s):** 0-11
- **NUMA node1 CPU(s):** 12-23

**Flags:** fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperfmperf eagerfpu nni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave f16c rdrand lahf_lm abm 3dnowprefetch epb cat_l3 cdp_l3 intel_pt tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2  

From `/proc/cpuinfo` cache data  
- **cache size:** 25344 KB

From `numactl --hardware` WARNING: a numactl 'node' might or might not correspond to a physical chip.

From `/proc/meminfo`  
- **MemTotal:** 197750296 kB
- **HugePages_Total:** 0
- **Hugepagesize:** 2048 kB

From `/etc/*release* /etc/*version*`  
(Continued on next page)
Hewlett Packard Enterprise  
[Test Sponsor: HPE]  
ProLiant BL460c Gen10  
[3.00 GHz, Intel Xeon Gold 6136]  
SPECspeed2017_int_base = 8.71  
SPECspeed2017_int_peak = Not Run

### Platform Notes (Continued)

```
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 Server release 7.4 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server
```

```
uname -a:
Linux bl160c15 3.10.0-693.el7.x86_64 #1 SMP Thu Jul 6 19:56:57 EDT 2017 x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Dec 18 16:36

SPEC is set to: /home/cpu2017
```

```
Filesystem            Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs   839G   38G  802G   5% /home
```

Additional information from dmidecode follows. 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

(End of data from sysinfo program)

### Compiler Version Notes

```
==============================================================================
CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base)
   657.xz_s(base)
==============================================================================
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================
CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
```

(Continued on next page)
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant BL460c Gen10  
(3.00 GHz, Intel Xeon Gold 6136)  

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>HPE</td>
</tr>
<tr>
<td>Tested by:</td>
<td>HPE</td>
</tr>
</tbody>
</table>

**SPEC CPU2017 Integer Speed Result**

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base = 8.71</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_int_peak = Not Run</td>
</tr>
</tbody>
</table>

**Compiler Version Notes (Continued)**

641.leela_s(base)  
 icpc (ICC) 18.0.0 20170811  
 Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

FC 648.exchange2_s(base)  
 ifort (IFORT) 18.0.0 20170811  
 Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

**Base Compiler Invocation**

C benchmarks:

icc

C++ benchmarks:

icpc

Fortran benchmarks:

ifort

**Base Portability Flags**

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64  
602.gcc_s: -DSPEC_LP64  
605.mcf_s: -DSPEC_LP64  
620.omnetpp_s: -DSPEC_LP64  
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX  
625.x264_s: -DSPEC_LP64  
631.deepsjeng_s: -DSPEC_LP64  
641.leela_s: -DSPEC_LP64  
648.exchange2_s: -DSPEC_LP64  
657.xz_s: -DSPEC_LP64

**Base Optimization Flags**

C benchmarks:

-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-pref-div

(Continued on next page)
SPEC CPU2017 Integer Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant BL460c Gen10
(3.00 GHz, Intel Xeon Gold 6136)

| SPECspeed2017_int_base = 8.71 |
| SPECspeed2017_int_peak = Not Run |

HPE

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Dec-2017
Hardware Availability: Nov-2017
Software Availability: Sep-2017

Base Optimization Flags (Continued)

C benchmarks (continued):
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc

Base Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/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/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.xml

SPEC is a registered trademark 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 info@spec.org.

Tested with SPEC CPU2017 v1.0.2 on 2017-12-18 16:40:41-0500.