## SPEC® CPU2017 Integer Speed Result

### Hewlett Packard Enterprise

**Test Sponsor:** HPE  
**ProLiant BL460c Gen10**  
**(1.70 GHz, Intel Xeon Bronze 3104)**

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_int_base</th>
<th>SPECspeed2017_int_peak</th>
</tr>
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<tbody>
<tr>
<td>0</td>
<td>2.82</td>
<td>Not Run</td>
</tr>
<tr>
<td>2</td>
<td>4.57</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>5.85</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>8.07</td>
<td></td>
</tr>
</tbody>
</table>

### Hardware
- **CPU Name:** Intel Xeon Bronze 3104  
- **Max MHz.:** 1700  
- **Nominal:** 1700  
- **Enabled:** 12 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:** 8.25 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2133)  
- **Storage:** 1 x 480 GB SATA SSD, RAID 0  
- **Other:** None

### Software
- **OS:** Red Hat Enterprise Linux Server release 7.3 (Maipo), Kernel 3.10.0-514.e17.x86_64  
- **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:**  
- **Parallel:** Yes  
- **Firmware:** HPE BIOS Version I41 09/29/2017 released Oct-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
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant BL460c Gen10
(1.70 GHz, Intel Xeon Bronze 3104)

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

SPECspeed2017_int_base = 4.03
SPECspeed2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
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</tr>
</tbody>
</table>

SPECspeed2017_int_base = 4.03
SPECspeed2017_int_peak = Not Run

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,scatter"
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.
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.

ejemalloc: 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:
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 /root/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bccc091c0f
running on localhost.localdomain Fri Dec 15 10:34:07 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) Bronze 3104 CPU @ 1.70GHz
  2 "physical id"s (chips)
  12 "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 : 6
siblings : 6
physical 0: cores 0 1 2 3 4 5
physical 1: cores 0 1 2 3 4 5

From lscpu:

(Continued on next page)
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(Test Sponsor: HPE)  
ProLiant BL460c Gen10  
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| CPU2017 License: | 3 |  
| Test Sponsor: | HPE |  
| Tested by: | HPE |  

**SPECspeed2017_int_base** = 4.03  
**SPECspeed2017_int_peak** = Not Run

### Platform Notes (Continued)

- **Architecture:** x86_64  
- **CPU op-mode(s):** 32-bit, 64-bit  
- **Byte Order:** Little Endian  
- **CPU(s):** 12  
- **On-line CPU(s) list:** 0-11  
- **Thread(s) per core:** 1  
- **Core(s) per socket:** 6  
- **Socket(s):** 2  
- **NUMA node(s):** 2  
- **Vendor ID:** GenuineIntel  
- **CPU family:** 6  
- **Model:** 85  
- **Model name:** Intel(R) Xeon(R) Bronze 3104 CPU @ 1.70GHz  
- **Stepping:** 4  
- **CPU MHz:** 1700.000  
- **BogoMIPS:** 3405.17  
- **Virtualization:** VT-x  
- **L1d cache:** 32K  
- **L1i cache:** 32K  
- **L2 cache:** 1024K  
- **L3 cache:** 8448K  
- **NUMA node0 CPU(s):** 0-5  
- **NUMA node1 CPU(s):** 6-11

/proc/cpuinfo cache data  
cache size : 8448 KB

From numactl --hardware  
WARNING: a numactl 'node' might or might not correspond to a physical chip.  
available: 2 nodes (0-1)  
node 0 cpus: 0 1 2 3 4 5  
node 0 size: 97964 MB  
node 0 free: 95170 MB  
node 1 cpus: 6 7 8 9 10 11  
node 1 size: 98303 MB  
node 1 free: 95983 MB  
node distances:  
node 0 1  
0: 10 21  
1: 21 10

From /proc/meminfo  
**MemTotal:** 197575964 kB  
**HugePages_Total:** 0  
**Hugepagesize:** 2048 kB

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

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Platform Notes (Continued)

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 localhost.localdomain 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 Dec 15 10:22

SPEC is set to: /root/cpu2017

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda4      xfs   442G   30G  413G   7% /

(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)
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<td>Oct-2017</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Sep-2017</td>
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</table>

#### Compiler Version Notes (Continued)

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

```plaintext
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-AVX2 -ipo -O3 -no-prec-div`

(Continued on next page)
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</table>

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:
-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-W1,-z,muldefs -xCORE-AVX2 -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

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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 2017-12-15 11:34:06-0500.
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