### SPEC® CPU2017 Floating Point Rate Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant ML110 Gen10  
(1.90 GHz, Intel Xeon Bronze 3204)

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Apr-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Feb-2019</td>
</tr>
</tbody>
</table>

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

#### Software

- **OS:** SUSE Linux Enterprise Server 15 (x86_64)  
- **Kernel:** 4.12.14-23-default  
- **Compiler:** C/C++: Version 19.0.2.187 of Intel C/C++  
  Compiler Build 20190117 for Linux;  
  Fortran: Version 19.0.2.187 of Intel Fortran  
  Compiler Build 20190117 for Linux  
- **Parallel:** No  
- **Firmware:** HPE BIOS Version U33 02/02/2019 released Apr-2019  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** None

#### Hardware

- **CPU Name:** Intel Xeon Bronze 3204  
- **Max MHz.:** 1900  
- **Nominal:** 1900  
- **Enabled:** 6 cores, 1 chip  
- **Orderable:** 1 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:** 96 GB (6 x 16 GB 2Rx8 PC4-2666V-R, running at 2133)  
- **Storage:** 1 x 400 GB SAS SSD, RAID 0  
- **Other:** None

#### SpecRate2017_fp_base = 27.2  
SpecRate2017_fp_peak = Not Run
SPEC CPU2017 Floating Point Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML110 Gen10
(1.90 GHz, Intel Xeon Bronze 3204)

SPECrate2017_fp_base = 27.2
SPECrate2017_fp_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>6</td>
<td>546</td>
<td>110</td>
<td>544</td>
<td>111</td>
<td>545</td>
<td>110</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>6</td>
<td>394</td>
<td>19.3</td>
<td>395</td>
<td>19.2</td>
<td>392</td>
<td>19.4</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>6</td>
<td>377</td>
<td>15.1</td>
<td>376</td>
<td>15.1</td>
<td>384</td>
<td>14.9</td>
</tr>
<tr>
<td>510.parest_r</td>
<td>6</td>
<td>879</td>
<td>17.9</td>
<td>887</td>
<td>17.7</td>
<td>882</td>
<td>17.8</td>
</tr>
<tr>
<td>511.povray_r</td>
<td>6</td>
<td>590</td>
<td>23.7</td>
<td>584</td>
<td>24.0</td>
<td>585</td>
<td>23.9</td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>6</td>
<td>259</td>
<td>24.4</td>
<td>262</td>
<td>24.2</td>
<td>259</td>
<td>24.4</td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>6</td>
<td>460</td>
<td>29.2</td>
<td>460</td>
<td>29.2</td>
<td>461</td>
<td>29.2</td>
</tr>
<tr>
<td>526.blender_r</td>
<td>6</td>
<td>435</td>
<td>21.0</td>
<td>436</td>
<td>21.0</td>
<td>434</td>
<td>21.0</td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>6</td>
<td>496</td>
<td>21.1</td>
<td>498</td>
<td>21.1</td>
<td>497</td>
<td>21.1</td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>6</td>
<td>296</td>
<td>50.5</td>
<td>311</td>
<td>48.1</td>
<td>305</td>
<td>49.0</td>
</tr>
<tr>
<td>544.nab_r</td>
<td>6</td>
<td>350</td>
<td>28.8</td>
<td>351</td>
<td>28.7</td>
<td>350</td>
<td>28.8</td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>6</td>
<td>607</td>
<td>38.5</td>
<td>605</td>
<td>38.6</td>
<td>606</td>
<td>38.6</td>
</tr>
<tr>
<td>554.roms_r</td>
<td>6</td>
<td>494</td>
<td>19.3</td>
<td>494</td>
<td>19.3</td>
<td>493</td>
<td>19.3</td>
</tr>
</tbody>
</table>

SPECRate2017_fp_base = 27.2
SPECRate2017_fp_peak = Not Run

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

Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset 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
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
  sync; echo 3 > /proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
  numactl --interleave=all runcpu <etc>

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017_u2/lib/ia32:/home/cpu2017_u2/lib/intel64"

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant ML110 Gen10  
(1.90 GHz, Intel Xeon Bronze 3204)  

<table>
<thead>
<tr>
<th><strong>CPU2017 License:</strong> 3</th>
<th><strong>Test Date:</strong> Apr-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Test Sponsor:</strong> HPE</td>
<td><strong>Hardware Availability:</strong> Apr-2019</td>
</tr>
<tr>
<td><strong>Tested by:</strong> HPE</td>
<td><strong>Software Availability:</strong> Feb-2019</td>
</tr>
</tbody>
</table>

**SPECrate2017_fp_base = 27.2**  
**SPECrate2017_fp_peak = Not Run**

---

**General Notes (Continued)**

Yes: 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.

Yes: 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.

---

**Platform Notes**

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  
Workload Profile set to Custom  
Energy/Performance Bias set to Balanced Performance

Sysinfo program /home/cpu2017_u2/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f299c33d61f64985e45859ea9
running on ml110-sles15 Tue Apr 23 22:18:49 2019

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 3204 CPU @ 1.90GHz
  1 "physical id"s (chips)
  6 "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
```

From lscpu:

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 6
On-line CPU(s) list: 0-5
Thread(s) per core: 1
Core(s) per socket: 6
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
```
**SPEC CPU2017 Floating Point Rate Result**

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant ML110 Gen10  
(1.90 GHz, Intel Xeon Bronze 3204)

<table>
<thead>
<tr>
<th>CPU2017 License: 3</th>
<th>Test Date: Apr-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: HPE</td>
<td>Hardware Availability: Apr-2019</td>
</tr>
<tr>
<td>Tested by: HPE</td>
<td>Software Availability: Feb-2019</td>
</tr>
</tbody>
</table>

**SPECrate2017_fp_base = 27.2**  
**SPECrate2017_fp_peak = Not Run**

---

**Platform Notes (Continued)**

| Model name: Intel(R) Xeon(R) Bronze 3204 CPU @ 1.90GHz  |
| Stepping: 6 |
| CPU MHz: 1900.000 |
| BogoMIPS: 3800.00 |
| Virtualization: VT-x |
| L1d cache: 32K |
| L1i cache: 32K |
| L2 cache: 1024K |
| L3 cache: 8448K |
| NUMA node0 CPU(s): 0-5 |

| 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 cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pclid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_p8 intel_p6 ccx tm2 ssse3 sse2 msr pke lmu pkix dmb stpx tpr_shadow vmerit vsnmi fmarith mpx cmov strcmp stm宵 cmovx stmx vpxm cmovd stmxp stmxm cmovq stmxq stfpx cmovs stmxs cmovb |

```plaintext
From /proc/cpuinfo cache data
cache size : 8448 KB
```

```plaintext
From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 1 nodes (0)
node 0 cpus: 0 1 2 3 4 5
node 0 size: 96326 MB
node 0 free: 95819 MB
node distances:
node 0
0: 10
```

```plaintext
From /proc/meminfo
MemTotal: 98638088 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

```plaintext
From /etc/*release* /etc/*version*
```

```plaintext
os-release:
NAME="SLES"
VERSION="15"
VERSION_ID="15"
PRETTY_NAME="SUSE Linux Enterprise Server 15"
ID="sles"
```

(Continued on next page)
Platform Notes (Continued)

ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15"

uname -a:
    Linux ml110-sles15 4.12.14-23-default #1 SMP Tue May 29 21:04:44 UTC 2018 (cd0437b)
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2017-5754 (Meltdown): Not affected
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

run-level 3 Apr 23 22:15

SPEC is set to: /home/cpu2017_u2
   Filesystem     Type Size Used Avail Use% Mounted on
   /dev/sda3       xfs  313G   26G  287G   9% /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 U33 02/02/2019
   Memory:
         6x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666, configured at 2133

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
   Version 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

CXXC 508.namd_r(base) 510.parest_r(base)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
   Version 19.0.2.187 Build 20190117

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML110 Gen10
(1.90 GHz, Intel Xeon Bronze 3204)

SPECraten2017_fp_base = 27.2
SPECraten2017_fp_peak = Not Run

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

Compiler Version Notes (Continued)

Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

==============================================================================
CC 511.povray_r(base) 526.blender_r(base)
==============================================================================
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

==============================================================================
FC 507.cactuBSSN_r(base)
==============================================================================
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

==============================================================================
FC 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
==============================================================================
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

==============================================================================
CC 521.wrf_r(base) 527.cam4_r(base)
==============================================================================
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.


### SPEC CPU2017 Floating Point Rate Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant ML110 Gen10  
(1.90 GHz, Intel Xeon Bronze 3204)  

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
<th>27.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

<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>
<tr>
<td>Test Date:</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Feb-2019</td>
</tr>
</tbody>
</table>

### Base Compiler Invocation

**C benchmarks:**

```
icc -m64 -std=c11
```

**C++ benchmarks:**

```
icpc -m64
```

**Fortran benchmarks:**

```
ifort -m64
```

**Benchmarks using both Fortran and C:**

```
ifort -m64 icc -m64 -std=c11
```

**Benchmarks using both C and C++:**

```
icpc -m64 icc -m64 -std=c11
```

**Benchmarks using Fortran, C, and C++:**

```
icpc -m64 icc -m64 -std=c11 ifort -m64
```

### Base Portability Flags

- 503.bwaves_r: `-DSPEC_LP64`
- 507.cactuBSSN_r: `-DSPEC_LP64`
- 508.namd_r: `-DSPEC_LP64`
- 510.parest_r: `-DSPEC_LP64`
- 511.povray_r: `-DSPEC_LP64`
- 519.ibm_r: `-DSPEC_LP64`
- 521.wrf_r: `-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian`
- 526.blender_r: `-DSPEC_LP64 -DSPEC_LINUX -funsigned-char`
- 527.cam4_r: `-DSPEC_LP64 -DSPEC_CASE_FLAG`
- 538.imagick_r: `-DSPEC_LP64`
- 544.nab_r: `-DSPEC_LP64`
- 549.fotonik3d_r: `-DSPEC_LP64`
- 554.roms_r: `-DSPEC_LP64`

### Base Optimization Flags

**C benchmarks:**

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4
```

**C++ benchmarks:**

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
```

(Continued on next page)
**SPEC CPU2017 Floating Point Rate Result**

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant ML110 Gen10  
(1.90 GHz, Intel Xeon Bronze 3204)  

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>3</th>
<th>Test Date:</th>
<th>Apr-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>HPE</td>
<td>Hardware Availability:</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Tested by:</td>
<td>HPE</td>
<td>Software Availability:</td>
<td>Feb-2019</td>
</tr>
</tbody>
</table>

**SPECrate2017_fp_base = 27.2**  
**SPECrate2017_fp_peak = Not Run**

---

### Base Optimization Flags (Continued)

**C++ benchmarks (continued):**
- `-qopt-mem-layout-trans=4`

**Fortran benchmarks:**
- `-xCORE-AVX2`  
- `-ipo`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=4`  
- `-auto`  
- `-nostandard-realloc-lhs`  
- `-align array32byte`

**Benchmarks using both Fortran and C:**
- `-xCORE-AVX2`  
- `-ipo`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=4`  
- `-auto`  
- `-nostandard-realloc-lhs`  
- `-align array32byte`

**Benchmarks using both C and C++:**
- `-xCORE-AVX2`  
- `-ipo`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=4`

**Benchmarks using Fortran, C, and C++:**
- `-xCORE-AVX2`  
- `-ipo`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=4`  
- `-auto`  
- `-nostandard-realloc-lhs`  
- `-align array32byte`

---

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-CLX-revA.html](http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-CLX-revA.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-CLX-revA.xml](http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-CLX-revA.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 v1.0.5 on 2019-04-23 12:48:48-0400.  
Originally published on 2019-06-11.