**SPEC CPU®2017 Floating Point Rate Result**

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL110 Gen10 Plus  
(2.30 GHz, Intel Xeon Gold 5320T)  

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>157</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak</td>
<td>163</td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Gold 5320T  
- **Max MHz:** 3500  
- **Nominal:** 2300  
- **Enabled:** 20 cores, 1 chip, 2 threads/core  
- **Orderable:** 1 chip  
- **Cache L1:** 32 KB I + 48 KB D on chip per core  
- **L2:** 1.25 MB I+D on chip per core  
- **L3:** 30 MB I+D on chip per core  
- **Other:** None  
- **Memory:** 512 GB (8 x 64 GB 2Rx4 PC4-3200AA-R, running at 2933)  
- **Storage:** 1 x 480 GB NVMe SSD, RAID 0  
- **Other:** None  

**Software**

- **OS:** Red Hat Enterprise Linux 8.3 (Ootpa)  
  Kernel 4.18.0-240.el8.x86_64  
- **Compiler:** C/C++: Version 2021.1 of Intel oneAPI DPC++/C++  
  Compiler Build 20201113 for Linux;  
  Fortran: Version 2021.1 of Intel Fortran Compiler  
  Classic Build 20201112 for Linux;  
- **Parallel:** No  
- **Firmware:** HPE BIOS Version U56 v1.50 05/13/2021 released May-2021  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** jemalloc memory allocator V5.0.1  

(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL110 Gen10 Plus
(2.30 GHz, Intel Xeon Gold 5320T)

SPECrate®2017_fp_base = 157
SPECrate®2017_fp_peak = 163

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

Software (Continued)
Power Management: BIOS set to prefer performance at the cost of additional power usage

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>
<th>Base</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>40</td>
<td>1187</td>
<td>338</td>
<td>1188</td>
<td>338</td>
<td>1188</td>
<td>338</td>
<td>40</td>
<td>1187</td>
<td>338</td>
<td>1188</td>
<td>338</td>
<td>1188</td>
<td>338</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>40</td>
<td>234</td>
<td>216</td>
<td>234</td>
<td>216</td>
<td>236</td>
<td>215</td>
<td>40</td>
<td>234</td>
<td>216</td>
<td>234</td>
<td>216</td>
<td>236</td>
<td>215</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>40</td>
<td>348</td>
<td>109</td>
<td>349</td>
<td>109</td>
<td>349</td>
<td>109</td>
<td>40</td>
<td>348</td>
<td>109</td>
<td>349</td>
<td>109</td>
<td>349</td>
<td>109</td>
</tr>
<tr>
<td>510.parest_r</td>
<td>40</td>
<td>1189</td>
<td>88.0</td>
<td>1187</td>
<td>88.1</td>
<td>1187</td>
<td>88.2</td>
<td>20</td>
<td>521</td>
<td>100</td>
<td>522</td>
<td>100</td>
<td>521</td>
<td>100</td>
</tr>
<tr>
<td>511.povray_r</td>
<td>40</td>
<td>574</td>
<td>163</td>
<td>574</td>
<td>163</td>
<td>576</td>
<td>162</td>
<td>40</td>
<td>500</td>
<td>187</td>
<td>500</td>
<td>187</td>
<td>500</td>
<td>187</td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>40</td>
<td>330</td>
<td>128</td>
<td>330</td>
<td>128</td>
<td>330</td>
<td>128</td>
<td>40</td>
<td>330</td>
<td>128</td>
<td>330</td>
<td>128</td>
<td>330</td>
<td>128</td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>40</td>
<td>592</td>
<td>151</td>
<td>590</td>
<td>152</td>
<td>596</td>
<td>150</td>
<td>40</td>
<td>592</td>
<td>151</td>
<td>590</td>
<td>152</td>
<td>596</td>
<td>150</td>
</tr>
<tr>
<td>526.blender_r</td>
<td>40</td>
<td>405</td>
<td>150</td>
<td>405</td>
<td>150</td>
<td>404</td>
<td>151</td>
<td>40</td>
<td>405</td>
<td>150</td>
<td>404</td>
<td>151</td>
<td>404</td>
<td>151</td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>40</td>
<td>442</td>
<td>158</td>
<td>445</td>
<td>157</td>
<td>439</td>
<td>159</td>
<td>40</td>
<td>442</td>
<td>158</td>
<td>445</td>
<td>157</td>
<td>439</td>
<td>159</td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>40</td>
<td>256</td>
<td>388</td>
<td>257</td>
<td>387</td>
<td>256</td>
<td>389</td>
<td>40</td>
<td>256</td>
<td>388</td>
<td>257</td>
<td>387</td>
<td>256</td>
<td>389</td>
</tr>
<tr>
<td>544.nab_r</td>
<td>40</td>
<td>271</td>
<td>249</td>
<td>267</td>
<td>252</td>
<td>268</td>
<td>252</td>
<td>40</td>
<td>263</td>
<td>256</td>
<td>264</td>
<td>255</td>
<td>263</td>
<td>256</td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>40</td>
<td>1534</td>
<td>102</td>
<td>1533</td>
<td>102</td>
<td>1532</td>
<td>102</td>
<td>40</td>
<td>1534</td>
<td>102</td>
<td>1532</td>
<td>102</td>
<td>1532</td>
<td>102</td>
</tr>
<tr>
<td>554.roms_r</td>
<td>40</td>
<td>944</td>
<td>67.4</td>
<td>946</td>
<td>67.2</td>
<td>943</td>
<td>67.4</td>
<td>20</td>
<td>388</td>
<td>81.9</td>
<td>390</td>
<td>81.4</td>
<td>387</td>
<td>82.1</td>
</tr>
</tbody>
</table>

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
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
sync; echo 3 > /proc/sys/vm/drop_caches

Environment Variables Notes
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/cpu2017/lib/intel64:/cpu2017/je5.0.1-64"
MALLOC_CONF = "retain:true"
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL110 Gen10 Plus
(2.30 GHz, Intel Xeon Gold 5320T)

SPECrate®2017_fp_base = 157
SPECrate®2017_fp_peak = 163

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
memory using Red Hat Enterprise Linux 8.1
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.
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.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

[jemalloc]

Submitted_by: "Bhatnagar, Prateek" <prateek.bhatnagar@hpe.com>
Submitted: Mon Jul 19 06:05:07 EDT 2021
Submission: cpu2017-20210719-28178.sub

Platform Notes

The system ROM used for this result contains Intel microcode version 0xd0002a0 for
the Intel Xeon Gold 5320T processor.

BIOS Configuration:
Workload Profile set to General Throughput Compute
Memory Patrol Scrubbing set to Disabled
Advanced Memory Protection set to Advanced ECC
Last Level Cache (LLC) Prefetch set to Enabled
Last Level Cache (LLC) Dead Line Allocation set to Disabled
Enhanced Processor Performance set to Enabled
Enhanced Processor Performance Profile set to Aggressive
Thermal Configuration set to Maximum Cooling
Workload Profile set to Custom
   DCU Stream Prefetcher set to Disabled
   XPT Remote Prefetcher set to Enabled
   Energy/Performance Bias set to Balanced Performance

Sysinfo program /cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca6c64d
running on localhost.localdomain Wed Jul 7 00:51:39 2021

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 5320T CPU @ 2.30GHz

(Continued on next page)
Hewlett Packard Enterprise

ProLiant DL110 Gen10 Plus
(2.30 GHz, Intel Xeon Gold 5320T)

SPECrater®2017_fp_base = 157
SPECrater®2017_fp_peak = 163

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

Test Date: Jul-2021
Hardware Availability: Jun-2021
Software Availability: Dec-2020

Platform Notes (Continued)

1  "physical id"s (chips)
40 "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 : 20
siblings : 40
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

From lscpu from util-linux 2.32.1:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 2
Core(s) per socket: 20
Socket(s): 1
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 5320T CPU @ 2.30GHz
Stepping: 6
CPU MHz: 2469.297
BogoMIPS: 4600.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 30720K
NUMA node0 CPU(s): 0-9,20-29
NUMA node1 CPU(s): 10-19,30-39
Flags: fpu vme de pse tsc msr pae mce cs cdx8 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 art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrm 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 invpcid_single ssbd
mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnci flexpriority ept vpid ept_ad
fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq
rdseed adx smap avx512ffcma clflushopt clwb intel_pt avx512cd sha ni avx512bw
avx512vl xsaveopt xsavec xgetbv1 xsaveas cqm_llc cqm_occup_llc cqm_mbb_total
cqm_mmb_local split_lock_detect wbinvd dtherm ida arat pin pts avx512vbm umip pk
ospkex avx512_vbmi2 gfni vaes vpcm1ldqd avx512_vnni avx512_bitalg tme
avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities

(Continued on next page)
### SPEC CPU®2017 Floating Point Rate Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL110 Gen10 Plus  
(2.30 GHz, Intel Xeon Gold 5320T)  

<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>

**SPECrate®2017_fp_base = 157**  
**SPECrate®2017_fp_peak = 163**

---

**Cache size:** 30720 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 6 7 8 9 20 21 22 23 24 25 26 27 28 29
- **node 0 size:** 251984 MB
- **node 0 free:** 256953 MB
- **node 1 cpus:** 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
- **node 1 size:** 252158 MB
- **node 1 free:** 256990 MB

**Node distances:**

- **node 0 1**
- **0:** 10 20
- **1:** 20 10

From `/proc/meminfo`

- **MemTotal:** 528049920 kB
- **HugePages_Total:** 0
- **Hugepagesize:** 2048 kB

/sbin/tuned-adm active

- **Current active profile:** throughput-performance

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

- **os-release:**
  - **NAME:** "Red Hat Enterprise Linux"
  - **VERSION:** "8.3 (Ootpa)"
  - **ID:** "rhel"
  - **ID_LIKE:** "fedora"
  - **VERSION_ID:** "8.3"
  - **PLATFORM_ID:** "platform:el8"
  - **PRETTY_NAME:** "Red Hat Enterprise Linux 8.3 (Ootpa)"
  - **ANSI_COLOR:** "0;31"

```
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga
```

uname -a:

```
Linux localhost.localdomain 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020
x86_64 x86_64 x86_64 GNU/Linux
```

**Kernel self-reported vulnerability status:**

- **CVE-2018-12207 (iTLB Multihit):** Not affected
- **CVE-2018-3620 (L1 Terminal Fault):** Not affected
- **Microarchitectural Data Sampling:** Not affected

---

(Continued on next page)
Platform Notes (Continued)

CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swaps barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

SPEC is set to: /cpu2017
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/nvme1n1p4 xfs   442G  146G  296G  33% /

From /sys/devices/virtual/dmi/id
Vendor:         HPE
Product:        ProLiant DL110 Gen10 Plus
Product Family: ProLiant
Serial:         T912PP0032

Additional information from dmidecode 3.2 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.
Memory: 8x Micron 36ASF8G72PZ-3G2B2 64 GB 2 rank 3200, configured at 2933

BIOS:
  BIOS Vendor:   HPE
  BIOS Version:  U56
  BIOS Date:     05/13/2021
  BIOS Revision: 1.50
  Firmware Revision: 2.40

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
| 519.lbm_r(base, peak) 538.imagick_r(base, peak) |
| 544.nab_r(base, peak)  |
==============================================================================

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL110 Gen10 Plus
(2.30 GHz, Intel Xeon Gold 5320T)

SPECrate®2017_fp_base = 157
SPECrate®2017_fp_peak = 163

Compiler Version Notes (Continued)

Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64,
Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64,
Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64,
Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64,
Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64,
Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64,
Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64,
Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64,
Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64,
Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64,
Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64,
Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64,
Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64,
Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64,
Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64,
Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64,
Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64,
Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64,
Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL110 Gen10 Plus
(2.30 GHz, Intel Xeon Gold 5320T)

SPEC CPU®2017 Floating Point Rate Result
Copyright 2017-2021 Standard Performance Evaluation Corporation

SPECrate®2017_fp_base = 157
SPECrate®2017_fp_peak = 163

Compiler Version Notes (Continued)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

C++, C, Fortran | 507.cactuBSSN_r(base, peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Fortran | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
| 554.roms_r(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Fortran, C | 521.wrf_r(base, peak) 527.cam4_r(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL110 Gen10 Plus
(2.30 GHz, Intel Xeon Gold 5320T)

SPECrates®2017_fp_base = 157
SPECrates®2017_fp_peak = 163

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

Base Compiler Invocation

C benchmarks:
  icx

C++ benchmarks:
  icpx

Fortran benchmarks:
  ifort

Benchmarks using both Fortran and C:
  ifort icx

Benchmarks using both C and C++:
  icpx icx

Benchmarks using Fortran, C, and C++:
  icpx icx ifort

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.lbm_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:
  -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
  -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
  -mbranches-within-32B-boundaries -ljemalloc
  -L/usr/local/jemalloc64-5.0.1/lib

(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result  
Copyright 2017-2021 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL110 Gen10 Plus  
(2.30 GHz, Intel Xeon Gold 5320T)

SPECrate®2017_fp_base = 157  
SPECrate®2017_fp_peak = 163

Base Optimization Flags (Continued)

C++ benchmarks:
- `-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto`
- `-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
- `-mbranches-within-32B-boundaries -ljemalloc`
- `-L/usr/local/jemalloc64-5.0.1/lib`

Fortran benchmarks:
- `-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div`
- `-qopt-prefetch -ffinite-math-only`
- `-qopt-multiple-gather-scatter-by-shuffles -qopt-mem-layout-trans=4`
- `-nostandard-realloc-lhs -align array32byte -auto`
- `-mbranches-within-32B-boundaries -ljemalloc`
- `-L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both Fortran and C:
- `-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math`
- `-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo`
- `-no-prec-div -qopt-prefetch -ffinite-math-only`
- `-qopt-multiple-gather-scatter-by-shuffles`
- `-mbranches-within-32B-boundaries -nostandard-realloc-lhs`
- `-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both C and C++:
- `-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math`
- `-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
- `-mbranches-within-32B-boundaries -ljemalloc`
- `-L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using Fortran, C, and C++:
- `-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math`
- `-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3`
- `-no-prec-div -qopt-prefetch -ffinite-math-only`
- `-qopt-multiple-gather-scatter-by-shuffles`
- `-mbranches-within-32B-boundaries -nostandard-realloc-lhs`
- `-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

Peak Compiler Invocation

C benchmarks:
- `icx`

C++ benchmarks:
- `icpx`

(Continued on next page)
### Peak Compiler Invocation ( Continued )

Fortran benchmarks:
```
ifort
```

Benchmarks using both Fortran and C:
```
ifort icx
```

Benchmarks using both C and C++:
```
511.povray_r: icpc icc
526.blender_r: icpx icx
```

Benchmarks using Fortran, C, and C++:
```
icpx icx ifort
```

### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

#### C benchmarks:
```
519.lbm_r: basepeak = yes
538.imagick_r: basepeak = yes
```
```
544.nab_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -qopt-mem-layout-trans=4
-fimf-accuracy-bits=14:sqrt
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

#### C++ benchmarks:
```
508.namd_r: basepeak = yes
```
```
510.parest_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL110 Gen10 Plus
(2.30 GHz, Intel Xeon Gold 5320T)

SPECrate®2017_fp_base = 157
SPECrate®2017_fp_peak = 163

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

Test Date: Jul-2021
Hardware Availability: Jun-2021
Software Availability: Dec-2020

Peak Optimization Flags (Continued)

Fortran benchmarks:

503.bwaves_r: basepeak = yes
549.fotonik3d_r: basepeak = yes
554.roms_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs
-align array32byte -auto -mbranches-within-32B-boundaries
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both Fortran and C:

521.wrf_r: basepeak = yes
527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3
-ipo -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactusBSSN_r: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.0-ICX-revE.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.0-ICX-revE.xml
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
### SPEC CPU®2017 Floating Point Rate Result

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_base</td>
<td>157</td>
</tr>
<tr>
<td>SPECrate®2017_fp_peak</td>
<td>163</td>
</tr>
</tbody>
</table>

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL110 Gen10 Plus  
(2.30 GHz, Intel Xeon Gold 5320T)  

**SPEC CPU®2017 License:** 3  
**Test Sponsor:** HPE  
**Tested by:** HPE  

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Date:</td>
<td>Jul-2021</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Jun-2021</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2020</td>
</tr>
</tbody>
</table>

SPEC CPU and SPECrate are registered trademarks 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 CPU®2017 v1.1.8 on 2021-07-07 01:51:39-0400.  
Report generated on 2021-08-04 18:42:16 by CPU2017 PDF formatter v6442.  
Originally published on 2021-08-03.