Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10 Plus
(2.30 GHz, Intel Xeon Silver 4316)

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

SPECrater®2017_fp_base = 291
SPECrater®2017_fp_peak = 303

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

Hardware

CPU Name: Intel Xeon Silver 4316
Max MHz: 3400
Nominal: 2300
Enabled: 40 cores, 2 chips, 2 threads/core
Orderable: 1, 2 chip(s)
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 chip
Other: None
Memory: 2 TB (32 x 64 GB 2Rx4 PC4-3200AA-R, running at 2666)
Storage: 1 x 800 GB SAS 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;
C/C++: Version 2021.1 of Intel C/C++ Compiler
Classic Build 20201112 for Linux
Parallel: No
Firmware: HPE BIOS Version U46 v1.42 05/16/2021 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)
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL380 Gen10 Plus  
(2.30 GHz, Intel Xeon Silver 4316)  

CPU2017 License: 3  
Test Sponsor: HPE  
Tested by: HPE  
Test Date: Jul-2021  
Hardware Availability: Jun-2021  
Software Availability: Dec-2020  

SPECrate®2017_fp_base = 291  
SPECrate®2017_fp_peak = 303

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base</th>
<th>Copy</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Copy</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>80</td>
<td>1337</td>
<td>600</td>
<td></td>
<td>1337</td>
<td>600</td>
<td>1336</td>
<td>600</td>
<td></td>
<td>80</td>
<td>1337</td>
<td>600</td>
<td>1336</td>
<td>600</td>
<td>1336</td>
<td>600</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>80</td>
<td>253</td>
<td>400</td>
<td></td>
<td>254</td>
<td>399</td>
<td>253</td>
<td>400</td>
<td></td>
<td>80</td>
<td>253</td>
<td>400</td>
<td>254</td>
<td>399</td>
<td>253</td>
<td>400</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>80</td>
<td>363</td>
<td>210</td>
<td></td>
<td>361</td>
<td>210</td>
<td>363</td>
<td>209</td>
<td></td>
<td>80</td>
<td>363</td>
<td>210</td>
<td>361</td>
<td>210</td>
<td>363</td>
<td>209</td>
</tr>
<tr>
<td>510.parest_r</td>
<td>80</td>
<td>1323</td>
<td>158</td>
<td></td>
<td>1316</td>
<td>159</td>
<td>1323</td>
<td>158</td>
<td></td>
<td>40</td>
<td>550</td>
<td>190</td>
<td>549</td>
<td>191</td>
<td>549</td>
<td>191</td>
</tr>
<tr>
<td>511.povray_r</td>
<td>80</td>
<td>590</td>
<td>317</td>
<td></td>
<td>592</td>
<td>316</td>
<td>590</td>
<td>317</td>
<td></td>
<td>80</td>
<td>513</td>
<td>364</td>
<td>515</td>
<td>363</td>
<td>512</td>
<td>365</td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>80</td>
<td>389</td>
<td>216</td>
<td></td>
<td>389</td>
<td>216</td>
<td>389</td>
<td>216</td>
<td></td>
<td>80</td>
<td>390</td>
<td>216</td>
<td>389</td>
<td>217</td>
<td>389</td>
<td>216</td>
</tr>
<tr>
<td>521.wrf_r</td>
<td>80</td>
<td>648</td>
<td>276</td>
<td></td>
<td>650</td>
<td>275</td>
<td>653</td>
<td>274</td>
<td></td>
<td>80</td>
<td>648</td>
<td>276</td>
<td>650</td>
<td>275</td>
<td>653</td>
<td>274</td>
</tr>
<tr>
<td>526.blender_r</td>
<td>80</td>
<td>420</td>
<td>290</td>
<td></td>
<td>419</td>
<td>291</td>
<td>420</td>
<td>290</td>
<td></td>
<td>80</td>
<td>420</td>
<td>290</td>
<td>419</td>
<td>291</td>
<td>420</td>
<td>290</td>
</tr>
<tr>
<td>527.cam4_r</td>
<td>80</td>
<td>463</td>
<td>302</td>
<td></td>
<td>464</td>
<td>302</td>
<td>464</td>
<td>301</td>
<td></td>
<td>80</td>
<td>463</td>
<td>302</td>
<td>464</td>
<td>302</td>
<td>464</td>
<td>301</td>
</tr>
<tr>
<td>538.imagick_r</td>
<td>80</td>
<td>285</td>
<td>697</td>
<td></td>
<td>273</td>
<td>728</td>
<td>273</td>
<td>728</td>
<td></td>
<td>80</td>
<td>285</td>
<td>697</td>
<td>273</td>
<td>728</td>
<td>273</td>
<td>728</td>
</tr>
<tr>
<td>544.nab_r</td>
<td>80</td>
<td>277</td>
<td>486</td>
<td></td>
<td>278</td>
<td>485</td>
<td>278</td>
<td>484</td>
<td></td>
<td>80</td>
<td>272</td>
<td>494</td>
<td>273</td>
<td>493</td>
<td>273</td>
<td>493</td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
<td>80</td>
<td>1655</td>
<td>188</td>
<td></td>
<td>1655</td>
<td>188</td>
<td>1655</td>
<td>188</td>
<td></td>
<td>80</td>
<td>1655</td>
<td>188</td>
<td>1655</td>
<td>188</td>
<td>1655</td>
<td>188</td>
</tr>
<tr>
<td>554.roms_r</td>
<td>80</td>
<td>1021</td>
<td>124</td>
<td></td>
<td>1019</td>
<td>125</td>
<td>1018</td>
<td>125</td>
<td></td>
<td>40</td>
<td>432</td>
<td>147</td>
<td>433</td>
<td>147</td>
<td>432</td>
<td>147</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.

Environment Variables Notes

Environment variables set by runcpu before the start of the run:

LD_LIBRARY_PATH = 
    "./home/cpu2017_1.1.8/lib/intel64:/home/cpu2017_1.1.8/je5.0.1-64"
MALLOC_CONF = "retain:true"

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

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL380 Gen10 Plus  
(2.30 GHz, Intel Xeon Silver 4316)  

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base = 291</th>
<th>SPECrate®2017_fp_peak = 303</th>
</tr>
</thead>
</table>

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

---

**General Notes (Continued)**

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  

Submitted by: "Bhatnagar, Prateek" <prateek.bhatnagar@hpe.com>  
Submitted: Mon Jul 19 06:10:26 EDT 2021  
Submission: cpu2017-20210719-28196.sub

---

**Platform Notes**

The system ROM used for this result contains Intel microcode version 0xd0002a0 for the Intel Xeon Silver 4316 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 /home/cpu2017_1.1.8/bin/sysinfo  
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca6c6d4  
running on localhost.localdomain Fri Jun 22 16:46:00 2018

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) Silver 4316 CPU @ 2.30GHz  
- 2 "physical id"s (chips)  
- 80 "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

(Continued on next page)
Platform Notes (Continued)

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
physical 1: 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): 80
On-line CPU(s) list: 0-79
Thread(s) per core: 2
Core(s) per socket: 20
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Silver 4316 CPU @ 2.30GHz
Stepping: 6
CPU MHz: 800.179
BogoMIPS: 4600.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 30720K
NUMA node0 CPU(s): 0-9,40-49
NUMA node1 CPU(s): 10-19,50-59
NUMA node2 CPU(s): 20-29,60-69
NUMA node3 CPU(s): 30-39,70-79
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 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 pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
  avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_13 invpcid_single ssbd
  mba ibrs ibpb ibrs_enhanced tpr_shadow vmmi flexpriority ept vpid ept_ad
  fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ets invpcid cqm rdt_a intel_pt avx512_vbmi
  rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw
  avx512vl xsaveopt xsavec xsaveopt xsavec xgetbv1 xsavec xsave xsmem cqm_llc cqm_occurp_llc
  cqm_mbb_total cqm_mbb_local split_lock_detect wbinvd dtherm ida arat pin pts avx512vbm umip pku
  ospke avx512_vbmi2 gfnl vaes vpclmulqdq dtherm avx512_vnni avx512_bitalg tme
  avx512_vpopcntdq la57 rdrid md_clear pconfig flush_l1d arch_capabilities

/proc/cpuinfo cache data
  cache size : 30720 KB

(Continued on next page)
Hewlett Packard Enterprise
(2.30 GHz, Intel Xeon Silver 4316)

SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

SPECrate®2017_fp_base = 291
SPECrate®2017_fp_peak = 303

Platform Notes (Continued)

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 40 41 42 43 44 45 46 47 48 49
node 0 size: 506146 MB
node 0 free: 515284 MB
node 1 cpus: 10 11 12 13 14 15 16 17 18 19 50 51 52 53 54 55 56 57 58 59
node 1 size: 506392 MB
node 1 free: 515460 MB
node 2 cpus: 20 21 22 23 24 25 26 27 28 29 60 61 62 63 64 65 66 67 68 69
node 2 size: 506748 MB
node 2 free: 515618 MB
node 3 cpus: 30 31 32 33 34 35 36 37 38 39 70 71 72 73 74 75 76 77 78 79
node 3 size: 506826 MB
node 3 free: 515728 MB
node distances:
node  0   1   2   3
0:  10  20  30  30
1:  20  10  30  30
2:  30  30  10  20
3:  30  30  20  10

From /proc/meminfo
MemTotal: 2113484204 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

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

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

run-level 3 Jun 22 16:42

SPEC is set to: /home/cpu2017_1.1.8

From /sys/devices/virtual/dmi/id

- Vendor: HPE
- Product: ProLiant DL380 Gen10 Plus
- Product Family: ProLiant
- Serial: CN70490X8B

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:
  - 32x Micron 36ASF8G72PZ-3G2B2 64 GB 2 rank 3200, configured at 2666

BIOS:
- BIOS Vendor: HPE
- BIOS Version: U46
- BIOS Date: 05/16/2021
- BIOS Revision: 1.42
- Firmware Revision: 2.50

(End of data from sysinfo program)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10 Plus
(2.30 GHz, Intel Xeon Silver 4316)

SPECrate®2017_fp_base = 291
SPECrate®2017_fp_peak = 303

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

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

Compiler Version Notes

==============================================================================
<table>
<thead>
<tr>
<th>C</th>
<th>519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,</td>
<td></td>
</tr>
<tr>
<td>Version 2021.1 Build 20201113</td>
<td></td>
</tr>
<tr>
<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
<td></td>
</tr>
<tr>
<td>EOF</td>
<td></td>
</tr>
<tr>
<td>EOF</td>
<td></td>
</tr>
<tr>
<td>EOF</td>
<td></td>
</tr>
<tr>
<td>EOF</td>
<td></td>
</tr>
<tr>
<td>EOF</td>
<td></td>
</tr>
<tr>
<td>EOF</td>
<td></td>
</tr>
<tr>
<td>EOF</td>
<td></td>
</tr>
<tr>
<td>EOF</td>
<td></td>
</tr>
<tr>
<td>EOF</td>
<td></td>
</tr>
<tr>
<td>EOF</td>
<td></td>
</tr>
<tr>
<td>EOF</td>
<td></td>
</tr>
<tr>
<td>EOF</td>
<td></td>
</tr>
<tr>
<td>EOF</td>
<td></td>
</tr>
</tbody>
</table>

(Covered on next page)
**Compiler Version Notes (Continued)**

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

---

**C++, C**

| 511.povray_r(base) 526.blender_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.

---

**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.

---

**Fortran**

| 503.bwaves_r(base, peak) 549.fotonik3d_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.
Hewlett Packard Enterprise  
ProLiant DL380 Gen10 Plus  
(2.30 GHz, Intel Xeon Silver 4316)  

<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>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>

### 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.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:
- `-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/lib -ljemalloc64-5.0.1/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 DL380 Gen10 Plus

(2.30 GHz, Intel Xeon Silver 4316)

---

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>291</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak</td>
<td>303</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>
</tbody>
</table>

---

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

Copyright 2017-2021 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10 Plus
(2.30 GHz, Intel Xeon Silver 4316)

**SPECrate®2017_fp_base = 291**

**SPECrate®2017_fp_peak = 303**

<table>
<thead>
<tr>
<th>CPU2017 License: 3</th>
<th>Test Date:</th>
<th>Jul-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>HPE</td>
<td></td>
</tr>
<tr>
<td>Tested by:</td>
<td>HPE</td>
<td></td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Jun-2021</td>
<td></td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2020</td>
<td></td>
</tr>
</tbody>
</table>

**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
-1jemalloc -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 -1jemalloc

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_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
<table>
<thead>
<tr>
<th>Test Sponsor: HPE</th>
<th>Test Date: Jul-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested by: HPE</td>
<td>Hardware Availability: Jun-2021</td>
</tr>
<tr>
<td>CPU2017 License: 3</td>
<td>Software Availability: Dec-2020</td>
</tr>
</tbody>
</table>

Hewlett Packard Enterprise
ProLiant DL380 Gen10 Plus
(2.30 GHz, Intel Xeon Silver 4316)

SPECrate®2017_fp_base = 291
SPECrate®2017_fp_peak = 303

Copyright 2017-2021 Standard Performance Evaluation Corporation

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 2018-06-22 07:16:00-0400.
Report generated on 2021-08-04 18:43:19 by CPU2017 PDF formatter v6442.
Originally published on 2021-08-03.