# SPEC CPU®2017 Floating Point Rate Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL320 Gen11  
(2.10 GHz, Intel Xeon Gold 6448Y)  

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU Name:</strong> Intel Xeon Gold 6448Y</td>
<td><strong>OS:</strong> Red Hat Enterprise Linux 9.0 (Plow)</td>
</tr>
<tr>
<td><strong>Max MHz:</strong> 4100</td>
<td><strong>Kernel:</strong> 5.14.0-70.13.1.el9_0.x86_64</td>
</tr>
<tr>
<td><strong>Nominal:</strong> 2100</td>
<td><strong>Compiler:</strong> C/C++: Version 2023.0 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2023.0 of Intel Fortran Compiler for Linux;</td>
</tr>
<tr>
<td><strong>Enabled:</strong> 32 cores, 1 chip, 2 threads/core</td>
<td><strong>Parallel:</strong> No</td>
</tr>
<tr>
<td><strong>Orderable:</strong> 1 Chip</td>
<td><strong>Firmware:</strong> HPE BIOS Version v1.30 03/01/2023 released Mar-2023</td>
</tr>
<tr>
<td><strong>Cache L1:</strong> 32 KB I + 48 KB D on chip per core</td>
<td><strong>File System:</strong> xfs</td>
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<tr>
<td><strong>L2:</strong> 2 MB I+D on chip per core</td>
<td><strong>System State:</strong> Run level 3 (multi-user)</td>
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<tr>
<td><strong>L3:</strong> 60 MB I+D on chip per chip</td>
<td><strong>Base Pointers:</strong> 64-bit</td>
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<tr>
<td><strong>Other:</strong> None</td>
<td><strong>Peak Pointers:</strong> 64-bit</td>
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<tr>
<td><strong>Memory:</strong> 256 GB (8 x 32 GB 2Rx8 PC5-4800B-R)</td>
<td><strong>Other:</strong> jemalloc memory allocator V5.0.1</td>
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<tr>
<td><strong>Storage:</strong> 1 x 480 GB SATA SSD</td>
<td><strong>Power Management:</strong> BIOS and OS set to prefer performance at the cost of additional power usage</td>
</tr>
</tbody>
</table>

**SPECrate®2017_fp_base = 360**  
**SPECrate®2017_fp_peak = 374**

- **CPU2017 License:** 3  
  **Test Date:** Apr-2023  
  **Test Sponsor:** HPE  
- **Tested by:** HPE  
  **Hardware Availability:** Apr-2023  
- **Software Availability:** Dec-2022  
- **Test Date:** Apr-2023  
- **Test Sponsor:** HPE  
- **Hardware Availability:** Apr-2023  
- **Tested by:** HPE  
- **Software Availability:** Dec-2022

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**Hewlett Packard Enterprise**  
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ProLiant DL320 Gen11  
(2.10 GHz, Intel Xeon Gold 6448Y)

## SPECrate® 2017_fp_base = 360  
SPECrate® 2017_fp_peak = 374

### Results Table

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</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  
runcpu command invoked through numactl i.e.:
  
numactl --interleave=all runcpu <etc>  
IRQ balance service was stopped using "systemctl stop irqbalance.service"  
tuned-adm profile was set to Throughput-Performance using "tuned-adm profile throughput-performance"  
perf-bias for all the CPUs is set using "cpupower set -b 0"

## Environment Variables Notes

Environment variables set by runcpu before the start of the run:  
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"  
MALLOC_CONF = "retain:true"
SPEC CPU®2017 Floating Point Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL320 Gen11
(2.10 GHz, Intel Xeon Gold 6448Y)

SPECrate®2017_fp_base = 360
SPECrate®2017_fp_peak = 374

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General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using Red Hat Enterprise Linux 8.4
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 Red Hat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

The system ROM used for this result contains Intel microcode version 0x2b0001b0 for
the Intel Xeon Gold 6448Y processor.
BIOS Configuration:
Workload Profile set to General Throughput Compute
Thermal Configuration set to Maximum Cooling
Enhanced Processor Performance Profile set to Aggressive
Last Level Cache (LLC) Dead Line Allocation set to Disabled
Memory Patrol Scrubbing set to Disabled
Workload Profile set to Custom
DCU Stream Prefetcher set to Disabled
Adjacent Sector Prefetch set to Disabled
Minimum Processor Idle Power Package C-State set to Package C6 (non-retention) State

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b9ed5c36ae2c92cc097bec197
running on localhost.localdomain Thu Apr 27 09:31:49 2023

SUT (System Under Test) info as seen by some common utilities.

Table of contents

1. uname -a
2. w
3. Username
4. ulimit -a
5. sysinfo process ancestry
6. /proc/cpuinfo
7. lscpu
8. numaclt ----hardware
9. /proc/meminfo
10. who --r
11. systemd service manager version: systemd 250 (250-6.e19_0)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. tuned-adm active
16. sysctl
17. /sys/kernel/mm/transparent_hugepage
18. /sys/kernel/mm/transparent_hugepage/khugepaged
19. OS release
20. Disk information
21. /sys/devices/virtual/dmi/id
22. dmidecode
23. BIOS

(Continued on next page)
Platform Notes (Continued)

1. uname -a
   Linux localhost.localdomain 5.14.0-70.13.1.el9_0.x86_64 #1 SMP PREEMPT Thu Apr 14 12:42:38 EDT 2022 x86_64 x86_64 GNU/Linux

2. w
   09:31:49 up 18:13, 2 users, load average: 0.00, 0.00, 0.00
   USER   TTY        LOGIN@   IDLE    JCPU    PCPU WHAT
   root   tty1      Wed15   18:08m  0.00s  0.00s -bash
   root   pts/0     Wed15   12.00s  0.77s  0.00s -bash

3. Username
   From environment variable $USER: root

4. ulimit -a
   real-time non-blocking time (microseconds, -R) unlimited
   core file size (blocks, -c) 0
   data seg size (kbytes, -d) unlimited
   scheduling priority (-e) 0
   file size (blocks, -f) unlimited
   pending signals (-i) 1030642
   max locked memory (kbytes, -l) 64
   max memory size (kbytes, -m) unlimited
   open files (-n) 1024
   pipe size (512 bytes, -p) 8
   POSIX message queues (bytes, -q) 819200
   real-time priority (-r) 0
   stack size (kbytes, -s) unlimited
   cpu time (seconds, -t) unlimited
   max user processes (-u) 1030642
   virtual memory (kbytes, -v) unlimited
   file locks (-x) unlimited

5. sysinfo process ancestry
   /usr/sbin/sshd -D [listener] 0 of 10-100 startups
   sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
   sshd: root [priv]
   sshd: root@pts/0
   -bash
   --switched-root --system --deserialize 30
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=32 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base,peak -o all fprate
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define smt-on --define cores=32 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --nopower
   --runmode rate --tune base:peak --size reflare fprate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.007/templogs/preenv.fprate.007.0.log --lognum 007.0 --from_runcpu 2
   specperl $SPEC/bin/sysinfo
   $SPEC = /home/cpu2017
   /usr/lib/systemd/systemd

6. /proc/cpuinfo
   model name : Intel(R) Xeon(R) Gold 6448Y
Platform Notes (Continued)

```
vendor_id       : GenuineIntel
cpu family      : 6
model           : 143
stepping        : 8
microcode       : 0x2b0001b0
bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores       : 32
siblings        : 64
1 physical ids (chips)
64 processors (hardware threads)
physical id 0: core ids 0-31
physical id 0: apicids 0-63
Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for virtualized systems. Use the above data carefully.

7. lscpu
```

From lscpu from util-linux 2.37.4:
```
Architecture:                    x86_64
CPU op-mode(s):                  32-bit, 64-bit
Address sizes:                   46 bits physical, 57 bits virtual
Byte Order:                      Little Endian
CPU(s):                          64
On-line CPU(s) list:             0-63
Vendor ID:                       GenuineIntel
BIOS Vendor ID:                  Intel(R) Corporation
Model name:                      Intel(R) Xeon(R) Gold 6448Y
CPU family:                      6
Model:                           143
Thread(s) per core:              2
Core(s) per socket:              32
Socket(s):                       1
Stepping:                        8
BogoMIPS:                        4200.00
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 pcid dca sse4_1
                             sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand
                             lahf_lm abm 3nowprefetch cpuid_fault epb cat_13 cat_12 cdp_13
                             invpcid_single cdp_12 ssbd mba ibrs ibpb ibrs_enhanced tpr_shadow
                             vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bm12 aemp bm12
                             erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma
                             clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsave
                             xsavec xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local
                             split_lock_detect avx_vnni avx512_bf16 wboinvd dtherm ida arat pln pts
                             avx512v bmi umip pk pu ospke waitkg avx512_ vbinv2 gfn vaes vpcmiulqdq
                             avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid bus_lock_detect
                             cldemote movdiri movdir64b enqcmd farsd md_clear serialize tsxidtrk pconf
                             arch_lbr avx512_fp16 amx_tile flush_l1d arch_capabilities
Virtualization:                  VT-x
L1d cache:                       1.5 MiB (32 instances)
L1i cache:                       1.5 MiB (32 instances)
L2 cache:                        64 MiB (32 instances)
L3 cache:                        60 MiB (1 instance)
NUMA node(s):                    2
NUMA node0 CPU(s):               0-15,32-47
```
SPEC CPU®2017 Floating Point Rate Result
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Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL320 Gen11
(2.10 GHz, Intel Xeon Gold 6448Y)

SPECrate®2017_fp_base = 360
SPECrate®2017_fp_peak = 374

Platform Notes (Continued)

NUMA node1 CPU(s): 16-31,48-63
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spectre v1: Mitigation; Speculative Store Bypass disabled via prctl
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
Vulnerability Srbds: Not affected
Vulnerability Tsc async abort: Not affected

From lscpu --cache:

NAME ONE-SIZE ALL-SIZE WAYS TYPE LEVEL SETS PHY-LINE COHERENCY-SIZE
L1d 48K 1.5M 12 Data 1 64 1 64
L1i 32K 1M 8 Instruction 1 64 1 64
L2 2M 64M 16 Unified 2 2048 1 64
L3 60M 60M 15 Unified 3 65536 1 64

------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
available: 2 nodes (0-1)
node 0 cpus: 0-15,32-47
node 0 size: 128694 MB
node 0 free: 112280 MB
node 1 cpus: 16-31,48-63
node 1 size: 129006 MB
node 1 free: 114718 MB
node distances:
node   0   1
0:  10  20
1:  20  10
------------------------------
9. /proc/meminfo
MemTotal: 263885320 kB
------------------------------
10. who -r
run-level 3 Apr 26 15:18
------------------------------
11. Systemd service manager version: systemd 250 (250-6.el9_0)
Default Target Status
multi-user running
------------------------------
12. Services, from systemctl list-unit-files
STATE UNIT FILES
enabled NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd chrony crond
dbus-broker firewalld getty@ irqbalance kdump lvm2-monitor mdmonitor microcode
nis-domainname rhsmcertd rsyslog selinux-autorelabel-mark sshd sssd
systemd-network-generator tuned udisks2
enabled-runtime systemd-remount-fs
disabled blk-availability chrony-wait console-getty cpupower debug-shell kvm_stat
man-db-restart-cache-update nftables powertop rdisc rhsm rhsm-facts rpmdb-rebuild
serial-getty@ sshd-keygen@ systemd-boot-check-no-failures systemd-patore systemd-sysext
indirect sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo

(Continued on next page)
Platform Notes (Continued)

13. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-70.13.1.e19_0.x86_64
   root=/dev/mapper/rhel-root
   ro
   resume=/dev/mapper/rhel-swap
   rd.lvm.lv=rhel/root
   rd.lvm.lv=rhel/swap

------------------------------------------------------------
14. cpupower frequency-info
   analyzing CPU 0:
   Unable to determine current policy
   boost state support:
   Supported: yes
   Active: yes

------------------------------------------------------------
15. tuned-adm active
   Current active profile: throughput-performance

------------------------------------------------------------
16. sysctl
   kernel.numa_balancing               1
   kernel.randomize_va_space           2
   vm.compaction_proactiveness         20
   vm.dirty_background_bytes           0
   vm.dirty_background_ratio           10
   vm.dirty_bytes                      0
   vm.dirty_expire_centisecs           3000
   vm.dirty_ratio                      40
   vm.dirty_writeback_centisecs       500
   vm.dirtytime_expire_seconds        43200
   vm.extfrag_threshold               500
   vm.min_unmapped_ratio               1
   vm.nr_hugepages                    0
   vm.nr_hugepages_mempolicy          0
   vm.nr_overcommit_hugepages         0
   vm.swappiness                      10
   vm.watermark_boost_factor          15000
   vm.watermark_scale_factor          10
   vm.zone_reclaim_mode               0

------------------------------------------------------------
17. /sys/kernel/mm/transparent_hugepage
   defrag always defer defer+madvise [madvise] never
   enabled [always] madvise never
   hpaget_pmd_size 2097152
   shmem_enabled always within_size advise [never] deny force

------------------------------------------------------------
18. /sys/kernel/mm/transparent_hugepage/khugepaged
   alloc_sleep_millisecs 60000
   defrag 1
   max_ptes_none 511
   max_ptes_shared 256
   max_ptes_swap 64
   pages_to_scan 4096
   scan_sleep_millisecs 10000

(Continued on next page)
Hewlett Packard Enterprise

ProLiant DL320 Gen11
(2.10 GHz, Intel Xeon Gold 6448Y)

SPEC CPU®2017 Floating Point Rate Result

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SPECrate®2017_fp_peak = 374
SPECrate®2017_fp_base = 360

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL320 Gen11
(2.10 GHz, Intel Xeon Gold 6448Y)

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

Test Date: Apr-2023
Hardware Availability: Apr-2023
Software Availability: Dec-2022

Platform Notes (Continued)

19. OS release
From /etc/*-release /etc/*-version
os-release Red Hat Enterprise Linux 9.0 (Plow)
redhat-release Red Hat Enterprise Linux release 9.0 (Plow)
system-release Red Hat Enterprise Linux release 9.0 (Plow)

20. Disk information
SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 372G 126G 246G 34% /home

21. /sys/devices/virtual/dmi/id
Vendor: ProLiant DL320 Gen11
Product: ProLiant
Serial: CNX2210H28

22. dmidecode
Additional information from dmidecode 3.3 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:
4x Hynix HMCGB88AEBA168N 32 GB 2 rank 4800
4x Hynix HMCGB88EBBA13N 32 GB 2 rank 4800

23. BIOS
(BThis section combines info from /sys/devices and dmidecode.)
BIOS Vendor: HPE
BIOS Version: 1.30
BIOS Date: 03/01/2023
BIOS Revision: 1.30
Firmware Revision: 1.20

Compiler Version Notes

<table>
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<tr>
<th>C</th>
<th>519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak)</th>
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(Continued on next page)
Hewlett Packard Enterprise
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ProLiant DL320 Gen11
(2.10 GHz, Intel Xeon Gold 6448Y)

Compiler Version Notes (Continued)

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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
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C++, C, Fortran | 507.cactuBSSN_r(base, peak)
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Fortran | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Fortran, C | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

Benchmarks using both C and C++:
icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifx
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL320 Gen11
(2.10 GHz, Intel Xeon Gold 6448Y)

SPECCPU®2017 Floating Point Rate Result

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HPE

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

HPE

Hardware Availability: Apr-2023
Software Availability: Dec-2022

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_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 -xsapphirerapids -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -mprefer-vector-width=512 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

C++ benchmarks:
-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mprefer-vector-width=512 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both Fortran and C:
-w -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -mprefer-vector-width=512 -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both C and C++:
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL320 Gen11
(2.10 GHz, Intel Xeon Gold 6448Y)

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<td>Hardware Availability</td>
<td>Apr-2023</td>
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<td>Tested by</td>
<td>HPE</td>
<td>Software Availability</td>
<td>Dec-2022</td>
</tr>
</tbody>
</table>

**SPECrate®2017_fp_base = 360**

**SPECrate®2017_fp_peak = 374**

### Base Optimization Flags (Continued)

Benchmarks using both C and C++ (continued):
- `ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using Fortran, C, and C++:
- `-w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast`
- `-ffast-math -flto -mfpmath=sse -funroll-loops`
- `-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512`
- `-nostandard-realloc-lhs -align array32byte -auto -ljemalloc`
- `-L/usr/local/jemalloc64-5.0.1/lib`

### Peak Compiler Invocation

**C benchmarks:**
- `icx`

**C++ benchmarks:**
- `icpx`

**Fortran benchmarks:**
- `ifx`

Benchmarks using both Fortran and C:
- `ifx icx`

Benchmarks using both C and C++:
- `icpx icx`

Benchmarks using Fortran, C, and C++:
- `icpx icx ifx`

### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

**C benchmarks:**
- `519.lbm_r: basepeak = yes`

*(Continued on next page)*
Peak Optimization Flags (Continued)

538.imagick_r: basepeak = yes

544.nab_r: basepeak = yes

C++ benchmarks:

508.namd_r: basepeak = yes


Fortran benchmarks:

503.bwaves_r: basepeak = yes

549.fotonik3d_r: basepeak = yes


Benchmarks using both Fortran and C:


527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: -w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1) -fprofile-use=default.profdata(pass 2) -xCORE-AVX2(pass 1) -flto -Ofast -xCORE-AVX512 -ffast-math -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512 -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

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

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL320 Gen11
(2.10 GHz, Intel Xeon Gold 6448Y)

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

SPECrate®2017_fp_base = 360
SPECrate®2017_fp_peak = 374
Test Date: Apr-2023
Hardware Availability: Apr-2023
Software Availability: Dec-2022

Peak Optimization Flags (Continued)

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:
-w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-SPR-rev1.2.html
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-SPR-rev1.2.xml
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml

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