



# SPEC CPU®2017 Floating Point Speed Result

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## Hewlett Packard Enterprise

(Test Sponsor: HPE)

### ProLiant DL380 Gen11

(2.00 GHz, Intel Xeon Gold 5416S)

SPECspeed®2017\_fp\_base = 208

SPECspeed®2017\_fp\_peak = 208

CPU2017 License: 3

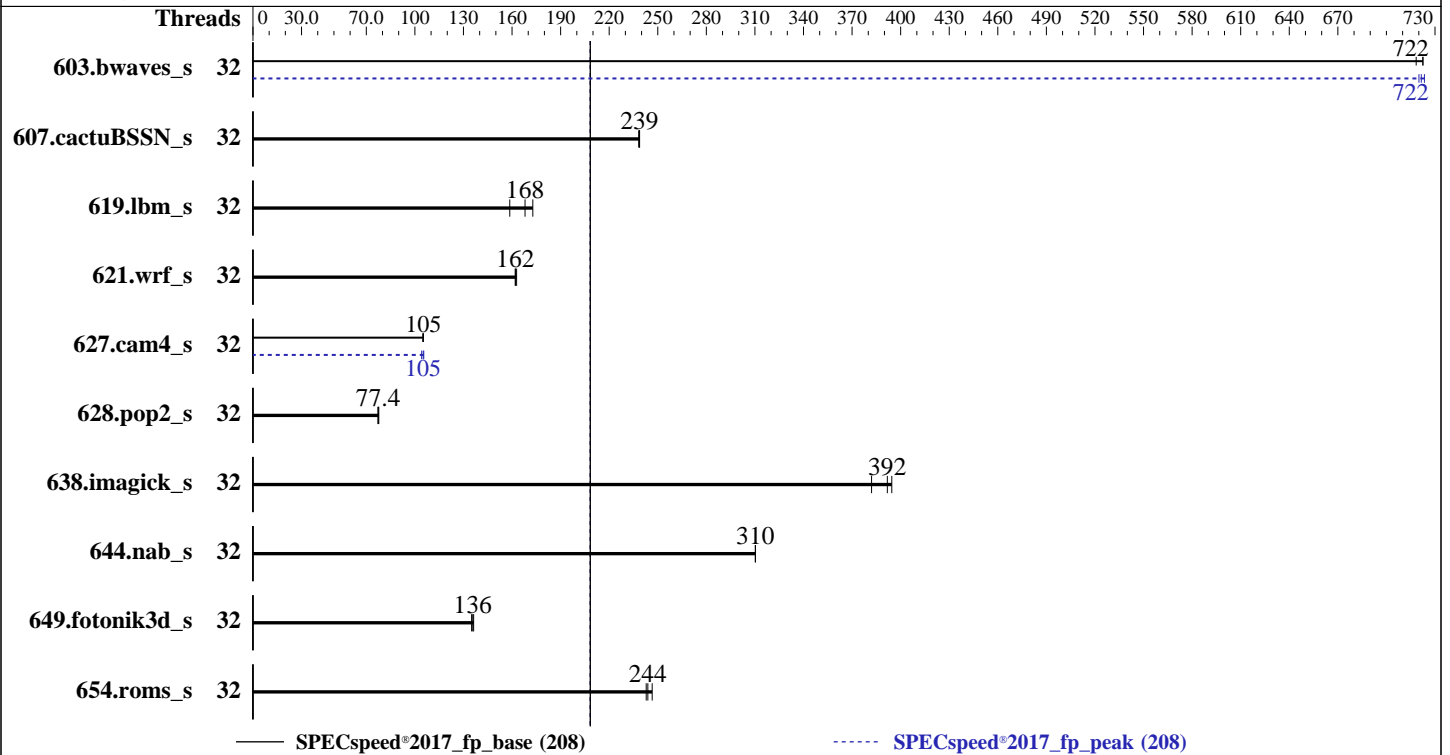
Test Sponsor: HPE

Tested by: HPE

Test Date: Apr-2023

Hardware Availability: Apr-2023

Software Availability: Dec-2022



### Hardware

CPU Name: Intel Xeon Gold 5416S  
 Max MHz: 4000  
 Nominal: 2000  
 Enabled: 32 cores, 2 chips  
 Orderable: 1, 2 chip(s)  
 Cache L1: 32 KB I + 48 KB D on chip per core  
 L2: 2 MB I+D on chip per core  
 L3: 30 MB I+D on chip per chip  
 Other: None  
 Memory: 512 GB (16 x 32 GB 2Rx8 PC5-4800B-R, running at 4400)  
 Storage: 1 x 960 GB SATA SSD  
 Other: None

### Software

OS: Red Hat Enterprise Linux release 9.0 (Plow)  
 Kernel 5.14.0-70.13.1.el9\_0.x86\_64  
 Compiler: C/C++: Version 2023.0 of Intel oneAPI DPC++/C++ Compiler for Linux;  
 Fortran: Version 2023.0 of Intel Fortran Compiler for Linux  
 Parallel: Yes  
 Firmware: HPE BIOS Version v1.30 03/01/2023 released Mar-2023  
 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  
 Power Management: BIOS and OS set to prefer performance at the cost of additional power usage



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## Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	32	82.1	718	<b>81.7</b>	<b>722</b>	81.6	723	32	<b>81.8</b>	<b>722</b>	81.9	720	81.5	723
607.cactuBSSN_s	32	69.8	239	70.0	238	<b>69.8</b>	<b>239</b>	32	69.8	239	70.0	238	<b>69.8</b>	<b>239</b>
619.lbm_s	32	33.0	159	30.3	173	<b>31.2</b>	<b>168</b>	32	33.0	159	30.3	173	<b>31.2</b>	<b>168</b>
621.wrf_s	32	81.6	162	81.2	163	<b>81.6</b>	<b>162</b>	32	81.6	162	81.2	163	<b>81.6</b>	<b>162</b>
627.cam4_s	32	84.2	105	<b>84.2</b>	<b>105</b>	84.5	105	32	84.0	105	85.1	104	<b>84.3</b>	<b>105</b>
628.pop2_s	32	154	77.2	<b>153</b>	<b>77.4</b>	153	77.7	32	154	77.2	<b>153</b>	<b>77.4</b>	153	77.7
638.imagick_s	32	36.6	395	<b>36.8</b>	<b>392</b>	37.8	382	32	36.6	395	<b>36.8</b>	<b>392</b>	37.8	382
644.nab_s	32	56.3	310	<b>56.3</b>	<b>310</b>	56.3	310	32	56.3	310	<b>56.3</b>	<b>310</b>	56.3	310
649.fotonik3d_s	32	<b>67.2</b>	<b>136</b>	66.9	136	67.5	135	32	<b>67.2</b>	<b>136</b>	66.9	136	67.5	135
654.roms_s	32	64.8	243	<b>64.6</b>	<b>244</b>	63.9	247	32	64.8	243	<b>64.6</b>	<b>244</b>	63.9	247

SPECSpeed®2017\_fp\_base = **208**

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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>  
tuned-adm profile was set to Throughput-Performance using "tuned-adm profile throughput-performance"

## Environment Variables Notes

Environment variables set by runcpu before the start of the run:  
KMP\_AFFINITY = "granularity=fine,compact"  
LD\_LIBRARY\_PATH = "/home/cpu2017\_19/lib/intel64:/home/cpu2017\_19/je5.0.1-64"  
MALLOC\_CONF = "retain:true"  
OMP\_STACKSIZE = "192M"

## General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using Red Hat Enterprise Linux 8.0  
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.

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## General Notes (Continued)

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 sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

## Platform Notes

The system ROM used for this result contains Intel microcode version 0x2b0001b0 for the Intel Xeon Gold 5416S processor.

BIOS Configuration:

Workload Profile set to General Peak Frequency Compute  
Thermal Configuration set to Maximum Cooling  
Intel Hyper-Threading set to Disabled  
Memory Patrol Scrubbing set to Disabled  
Last Level Cache (LLC) Prefetch set to Enabled  
Last Level Cache (LLC) Dead Line Allocation set to Disabled  
Enhanced Processor Performance Profile set to Aggressive  
Dead Block Predictor set to Enabled  
Workload Profile set to Custom  
Intel DMI Link Frequency set to Gen2 Speed  
Adjacent Sector Prefetch set to Disabled  
Minimum Processor Idle Power Package C-State set to No Package State

Sysinfo program /home/cpu2017\_19/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
running on localhost.localdomain Wed Apr 19 10:27:51 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. numactl --hardware
  9. /proc/meminfo
  10. who -r
  11. Systemd service manager version: systemd 250 (250-6.el9\_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
- -----

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## 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 x86\_64 GNU/Linux

2. `w`  
10:27:51 up 0 min, 0 users, load average: 0.07, 0.03, 0.01  
USER TTY LOGIN@ IDLE JCPU PCPU WHAT

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) 2062860  
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) 2062860  
virtual memory (kbytes, -v) unlimited  
file locks (-x) unlimited

5. `sysinfo process ancestry`  
/usr/lib/systemd/systemd --switched-root --system --deserialize 28  
sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups  
sshd: root [priv]  
sshd: root@notty  
bash -c cd \$SPEC/ && \$SPEC/fpspeed\_spr.sh  
runcpu --nobuild --action validate --define default-platform-flags -c  
ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=32 --tune base,peak -o all --define drop\_caches fpspeed  
runcpu --nobuild --action validate --define default-platform-flags --configfile  
ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=32 --tune base,peak --output\_format all  
--define drop\_caches --nopower --runmode speed --tune base:peak --size refspeed fpspeed --nopreenv  
--note-preenv --logfile \$SPEC/tmp/CPU2017.001/templogs/preenv.fpspeed.001.0.log --lognum 001.0  
--from\_runcpu 2  
specperl \$SPEC/bin/sysinfo  
\$SPEC = /home/cpu2017\_19

6. `/proc/cpuinfo`  
model name : Intel(R) Xeon(R) Gold 5416S  
vendor\_id : GenuineIntel  
cpu family : 6  
model : 143  
stepping : 8  
microcode : 0x2b0001b0  
bugs : spectre\_v1 spectre\_v2 spec\_store\_bypass swapgs

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## Platform Notes (Continued)

cpu cores : 16  
siblings : 16  
2 physical ids (chips)  
32 processors (hardware threads)  
physical id 0: core ids 0-15  
physical id 1: core ids 0-15  
physical id 0: apicids 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30  
physical id 1: apicids 128,130,132,134,136,138,140,142,144,146,148,150,152,154,156,158  
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): 32
On-line CPU(s) list: 0-31
Vendor ID: GenuineIntel
BIOS Vendor ID: Intel(R) Corporation
Model name: Intel(R) Xeon(R) Gold 5416S
BIOS Model name: Intel(R) Xeon(R) Gold 5416S
CPU family: 6
Model: 143
Thread(s) per core: 1
Core(s) per socket: 16
Socket(s): 2
Stepping: 8
BogoMIPS: 4000.00
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 art 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 3dnowprefetch cpuid_fault epb cat_l3 cat_l2 cdp_l3
invpcid_single cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow
vmx flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 avx2 smep bmi2
erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma
clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec
xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
split_lock_detect avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts
avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni vaes vpclmulqdq
avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid bus_lock_detect
cldemote movdiri movdir64b enqcmd fsrm md_clear serialize tsxldtrk pconfig
arch_lbr avx512_fp16 amx_tile flush_lld arch_capabilities
VT-x
Virtualization: VT-x
L1d cache: 1.5 MiB (32 instances)
L1i cache: 1 MiB (32 instances)
L2 cache: 64 MiB (32 instances)
L3 cache: 60 MiB (2 instances)
NUMA node(s): 2
NUMA node0 CPU(s): 0-7,16-23
NUMA node1 CPU(s): 8-15,24-31
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected
```

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## Platform Notes (Continued)

Vulnerability Meltdown: Not affected  
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl  
Vulnerability Spectre v1: Mitigation; usercopy/swaps barriers and \_\_user pointer sanitization  
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling  
Vulnerability Srbds: Not affected  
Vulnerability Tsx 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	30M	60M	15	Unified	3	32768	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: 0-7,16-23
node 0 size: 257720 MB
node 0 free: 256831 MB
node 1 cpus: 8-15,24-31
node 1 size: 258033 MB
node 1 free: 257411 MB
node distances:
node  0  1
  0: 10 20
  1: 20 10
```

9. /proc/meminfo

```
MemTotal: 528132640 kB
```

10. who -r

```
run-level 3 Apr 19 10:27
```

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 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 upower
enabled-runtime	systemd-remount-fs
disabled	blk-availability canberra-system-bootup canberra-system-shutdown canberra-system-shutdown-reboot chrony-wait chronyd console-getty cpupower debug-shell hwloc-dump-hwdata kvm_stat man-db-restart-cache-update nftables powertop rdisc rhsm rhsm-facts rpmdm-rebuild serial-getty@ sshd-keygen@ systemd-boot-check-no-failures systemd-pstore systemd-sysex
indirect	sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo

13. Linux kernel boot-time arguments, from /proc/cmdline

```
BOOT_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-70.13.1.el9_0.x86_64
```

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## Platform Notes (Continued)

```
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+madvice [madvice] never
enabled        [always] madvice never
hpage_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
```

```
-----
19. OS release
From /etc/*-release /etc/*-version
```

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## Platform Notes (Continued)

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\_19  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/mapper/rhel-home xfs 819G 346G 473G 43% /home

### 21. /sys/devices/virtual/dmi/id

Vendor: HPE  
Product: ProLiant DL380 Gen11  
Product Family: ProLiant  
Serial: CNX21000G7

### 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:  
5x Hynix HMC88AEBRA168N 32 GB 2 rank 4800, configured at 4400  
8x Hynix HMC88MEBRA113N 32 GB 2 rank 4800, configured at 4400  
3x Hynix HMC88MEBRA115N 32 GB 2 rank 4800, configured at 4400

### 23. BIOS

(This 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: 1.30

## Compiler Version Notes

C | 619.lbm\_s(base, peak) 638.imagick\_s(base, peak) 644.nab\_s(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.

C++, C, Fortran | 607.cactuBSSN\_s(base, peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201  
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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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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201  
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## Compiler Version Notes (Continued)

Fortran | 603.bwaves\_s(base, peak) 649.fotonik3d\_s(base, peak) 654.roms\_s(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 | 621.wrf\_s(base, peak) 627.cam4\_s(base, peak) 628.pop2\_s(base, peak)

-----  
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201  
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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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## Base Compiler Invocation

C benchmarks:

icx

Fortran benchmarks:

ifx

Benchmarks using both Fortran and C:

ifx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifx

## Base Portability Flags

603.bwaves\_s: -DSPEC\_LP64  
607.cactuBSSN\_s: -DSPEC\_LP64  
619.lbm\_s: -DSPEC\_LP64  
621.wrf\_s: -DSPEC\_LP64 -DSPEC\_CASE\_FLAG -convert big\_endian  
627.cam4\_s: -DSPEC\_LP64 -DSPEC\_CASE\_FLAG  
628.pop2\_s: -DSPEC\_LP64 -DSPEC\_CASE\_FLAG -convert big\_endian  
-assume byterecl  
638.imagick\_s: -DSPEC\_LP64  
644.nab\_s: -DSPEC\_LP64  
649.fotonik3d\_s: -DSPEC\_LP64  
654.roms\_s: -DSPEC\_LP64



# SPEC CPU®2017 Floating Point Speed Result

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**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

ProLiant DL380 Gen11

(2.00 GHz, Intel Xeon Gold 5416S)

SPECspeed®2017\_fp\_base = 208

SPECspeed®2017\_fp\_peak = 208

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

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

## Base Optimization Flags

C benchmarks:

```
-m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -Wno-implicit-int -mprefer-vector-width=512
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Fortran benchmarks:

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

Benchmarks using both Fortran and C:

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

Benchmarks using Fortran, C, and C++:

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

## Peak Compiler Invocation

C benchmarks:

icx

Fortran benchmarks:

ifx

Benchmarks using both Fortran and C:

ifx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifx



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SPECspeed®2017\_fp\_peak = 208

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Apr-2023

**Hardware Availability:** Apr-2023

**Software Availability:** Dec-2022

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

619.lbm\_s: basepeak = yes

638.imagick\_s: basepeak = yes

644.nab\_s: basepeak = yes

Fortran benchmarks:

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

649.fotonik3d\_s: basepeak = yes

654.roms\_s: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf\_s: basepeak = yes

```
627.cam4_s: -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP
-Wno-implicit-int -mprefer-vector-width=512
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

628.pop2\_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

607.cactuBSSN\_s: basepeak = yes



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**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Apr-2023

**Hardware Availability:** Apr-2023

**Software Availability:** Dec-2022

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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