



# SPEC CPU®2017 Floating Point Speed Result

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## Hewlett Packard Enterprise

(Test Sponsor: HPE)

### ProLiant DL365 Gen11

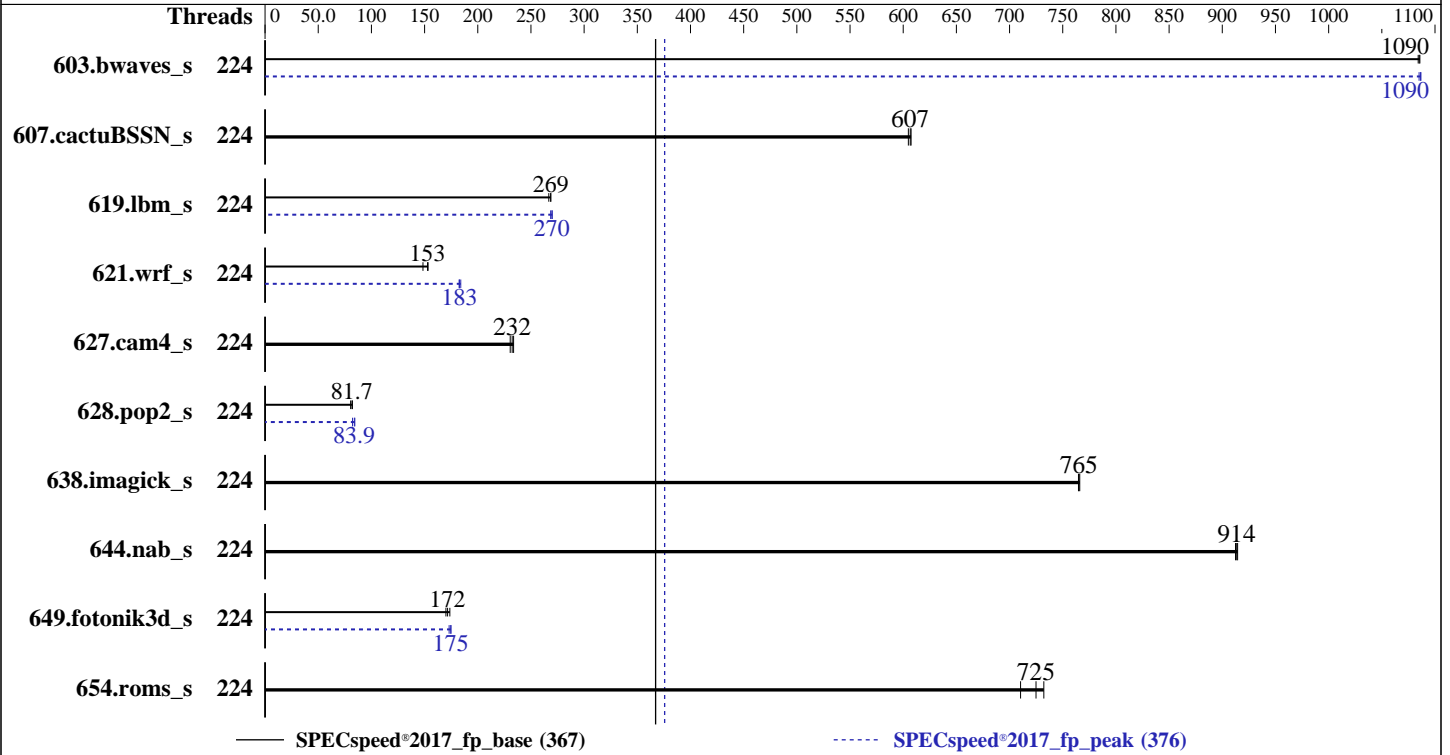
(2.20 GHz, AMD EPYC 9734)

SPECspeed®2017\_fp\_base = 367

SPECspeed®2017\_fp\_peak = 376

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

Test Date: Jun-2023  
Hardware Availability: Sep-2023  
Software Availability: Apr-2023



### Hardware

CPU Name: AMD EPYC 9734  
 Max MHz: 3000  
 Nominal: 2200  
 Enabled: 224 cores, 2 chips  
 Orderable: 1,2 chips  
 Cache L1: 32 KB I + 32 KB D on chip per core  
 L2: 1 MB I+D on chip per core  
 L3: 256 MB I+D on chip per chip,  
 16 MB shared / 7 cores  
 Other: None  
 Memory: 768 GB (12 x 64 GB 2Rx4 PC5-4800B-R)  
 Storage: 1 x 960 GB SATA SSD  
 Other: None

### Software

OS: Red Hat Enterprise Linux 9.0 (Plow)  
 Kernel 5.14.0-70.13.1.el9\_0.x86\_64  
 Compiler: C/C++/Fortran: Version 4.0.0 of AOCC  
 Parallel: Yes  
 Firmware: HPE BIOS Version v1.30 03/06/2023 released  
 Mar-2023  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 64-bit  
 Other: None  
 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	224	54.3	1090	54.4	1080	<b>54.4</b>	<b>1090</b>	224	54.3	1090	54.4	1090	<b>54.3</b>	<b>1090</b>
607.cactuBSSN_s	224	27.6	605	27.4	607	<b>27.5</b>	<b>607</b>	224	27.6	605	27.4	607	<b>27.5</b>	<b>607</b>
619.lbm_s	224	<b>19.5</b>	<b>269</b>	19.6	267	19.5	269	224	19.5	268	<b>19.4</b>	<b>270</b>	19.4	270
621.wrf_s	224	89.1	148	<b>86.6</b>	<b>153</b>	86.3	153	224	71.9	184	72.5	182	<b>72.4</b>	<b>183</b>
627.cam4_s	224	38.5	231	<b>38.1</b>	<b>232</b>	37.9	234	224	38.5	231	<b>38.1</b>	<b>232</b>	37.9	234
628.pop2_s	224	<b>145</b>	<b>81.7</b>	145	82.1	148	80.4	224	141	84.4	144	82.2	<b>141</b>	<b>83.9</b>
638.imagick_s	224	18.8	766	18.9	765	<b>18.9</b>	<b>765</b>	224	18.8	766	18.9	765	<b>18.9</b>	<b>765</b>
644.nab_s	224	19.1	912	<b>19.1</b>	<b>914</b>	19.1	914	224	19.1	912	<b>19.1</b>	<b>914</b>	19.1	914
649.fotonik3d_s	224	52.5	174	53.6	170	<b>53.1</b>	<b>172</b>	224	52.1	175	<b>52.2</b>	<b>175</b>	52.7	173
654.roms_s	224	21.5	732	22.2	710	<b>21.7</b>	<b>725</b>	224	21.5	732	22.2	710	<b>21.7</b>	<b>725</b>

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

## Compiler Notes

The AMD64 AOCC Compiler Suite is available at <http://developer.amd.com/amd-aocc/>

## Submit Notes

The config file option 'submit' was used.  
'numactl' was used to bind copies to the cores.  
See the configuration file for details.

## Operating System Notes

'ulimit -s unlimited' was used to set environment stack size limit  
'ulimit -l 2097152' was used to set environment locked pages in memory limit

runcpu command invoked through numactl i.e.:  
numactl --interleave=all runcpu <etc>

To limit dirty cache to 8% of memory, 'sysctl -w vm.dirty\_ratio=8' run as root.  
To limit swap usage to minimum necessary, 'sysctl -w vm.swappiness=1' run as root.  
To free node-local memory and avoid remote memory usage,  
'sysctl -w vm.zone\_reclaim\_mode=1' run as root.  
To clear filesystem caches, 'sync; sysctl -w vm.drop\_caches=3' run as root.  
To disable address space layout randomization (ASLR) to reduce run-to-run  
variability, 'sysctl -w kernel.randomize\_va\_space=0' run as root.

To enable Transparent Hugepages (THP) for all allocations,  
'echo always > /sys/kernel/mm/transparent\_hugepage/enabled' and  
'echo always > /sys/kernel/mm/transparent\_hugepage/defrag' run as root.  
To always enable THP for peak runs of:  
603.bwaves\_s, 607.cactuBSSN\_s, 619.lbm\_s, 627.cam4\_s, 628.pop2\_s, 638.imagick\_s, 644.nab\_s, 649.fotonik3d\_s:  
'echo madvise > /sys/kernel/mm/transparent\_hugepage/enabled; echo always > /sys/kernel/mm/transparent\_hugepage/defrag'  
run as root.  
To disable THP for peak runs of 621.wrf\_s:

(Continued on next page)



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## Operating System Notes (Continued)

```
'echo never > /sys/kernel/mm/transparent_hugepage/enabled; echo always > /sys/kernel/mm/transparent_hugepage/defrag'
run as root.
```

To enable THP only on request for peak runs of 654.roms\_s:

```
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled; echo madvise > /sys/kernel/mm/transparent_hugepage/defrag'
run as root.
```

## Environment Variables Notes

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

GOMP\_CPU\_AFFINITY = "0-223"

LD\_LIBRARY\_PATH = "/home/new\_cpu2017/amd\_speed\_aocc400\_znver4\_A\_lib/lib:"

LIBOMP\_NUM\_HIDDEN\_HELPER\_THREADS = "0"

MALLOC\_CONF = "oversize\_threshold:0,retain:true"

OMP\_DYNAMIC = "false"

OMP\_SCHEDULE = "static"

OMP\_STACKSIZE = "128M"

OMP\_THREAD\_LIMIT = "224"

Environment variables set by runcpu during the 603.bwaves\_s peak run:

GOMP\_CPU\_AFFINITY = "0-223"

Environment variables set by runcpu during the 619.lbm\_s peak run:

GOMP\_CPU\_AFFINITY = "0-223"

Environment variables set by runcpu during the 621.wrf\_s peak run:

GOMP\_CPU\_AFFINITY = "0-223"

Environment variables set by runcpu during the 628.pop2\_s peak run:

GOMP\_CPU\_AFFINITY = "0-223"

Environment variables set by runcpu during the 649.fotonik3d\_s peak run:

GOMP\_CPU\_AFFINITY = "0-223"

PGHPPF\_ZMEM = "yes"

## General Notes

Binaries were compiled on a system with 2x AMD EPYC 9174F CPU + 1.5TiB Memory using RHEL 8.6

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.

## Platform Notes

BIOS Configuration

Workload Profile set to General Peak Frequency Compute

AMD SMT Option set to Disabled

Determinism Control set to Manual

Performance Determinism set to Power Deterministic

Last-Level Cache (LLC) as NUMA Node set to Enabled

ACPI CST C2 Latency set to 18 microseconds

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## Platform Notes (Continued)

Thermal Configuration set to Maximum Cooling

Sysinfo program /home/new\_cpu2017/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
running on localhost.localdomain Fri Jun 30 16:29:18 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.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

```
1. uname -a
Linux localhost.localdomain 5.14.0-70.13.1.e19_0.x86_64 #1 SMP PREEMPT Thu Apr 14 12:42:38 EDT 2022 x86_64
x86_64 x86_64 GNU/Linux
```

```
2. w
16:29:18 up 1 min, 0 users, load average: 16.57, 10.34, 4.04
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) 6191103
max locked memory (kbytes, -l) 2097152
max memory size (kbytes, -m) unlimited
```

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## Platform Notes (Continued)

```

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) 6191103
virtual memory            (kbytes, -v) unlimited
file locks                (-x) unlimited

```

### 5. sysinfo process ancestry

```

/usr/lib/systemd/systemd --switched-root --system --deserialize 30
sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
sshd: root [priv]
sshd: root@notty
bash -c cd $SPEC/ && $SPEC/fpspeed.sh
python3 ./run_fpspeed.py
/bin/bash ./amd_speed_aocc400_znver4_A1.sh
runcpu --config amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 fpspeed
runcpu --configfile amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
--runmode speed --tune base:peak --size test:train: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/new_cpu2017

```

### 6. /proc/cpuinfo

```

model name      : AMD EPYC 9734 112-Core Processor
vendor_id      : AuthenticAMD
cpu family     : 25
model         : 160
stepping      : 2
bugs          : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
TLB size      : 3584 4K pages
cpu cores     : 112
siblings      : 112
2 physical ids (chips)
224 processors (hardware threads)
physical id 0: core ids
0-6,16-22,32-38,48-54,64-70,80-86,96-102,112-118,128-134,144-150,160-166,176-182,192-198,208-214,224-230,
240-246
physical id 1: core ids
0-6,16-22,32-38,48-54,64-70,80-86,96-102,112-118,128-134,144-150,160-166,176-182,192-198,208-214,224-230,
240-246
physical id 0: apicids
0-6,16-22,32-38,48-54,64-70,80-86,96-102,112-118,128-134,144-150,160-166,176-182,192-198,208-214,224-230,
240-246
physical id 1: apicids
256-262,272-278,288-294,304-310,320-326,336-342,352-358,368-374,384-390,400-406,416-422,432-438,448-454,4
64-470,480-486,496-502
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

```

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## Platform Notes (Continued)

```

Address sizes:          52 bits physical, 57 bits virtual
Byte Order:            Little Endian
CPU(s):                224
On-line CPU(s) list:   0-223
Vendor ID:             AuthenticAMD
BIOS Vendor ID:        Advanced Micro Devices, Inc.
Model name:            AMD EPYC 9734 112-Core Processor
BIOS Model name:       AMD EPYC 9734 112-Core Processor
CPU family:            25
Model:                 160
Thread(s) per core:    1
Core(s) per socket:    112
Socket(s):             2
Stepping:              2
BogoMIPS:              4393.34
Flags:                 fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
                        clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp lm
                        constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid aperfmperf rapl
                        pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe
                        popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy
                        abm sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext
                        perfctr_core perfctr_nb bpext perfctr_llc mwaitx cpb cat_l3 cdp_l3
                        invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbase bmi1
                        avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap
                        avx512ifma clflushopt clwb avx512cd sha_ni avx512bw avx512vl xsaveopt
                        xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
                        avx512_bf16 clzero irperf xsaveerptr rdpru wbnoinvd amd_ppin arat npt lbrv
                        svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists
                        pausefilter pfthreshold avic v_vmsave_vmload vgif v_spec_ctrl avx512vbmi
                        umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
                        avx512_vpopcntdq la57 rdpid overflow_recov succor smca fsrm flush_l1d
AMD-V
Virtualization:
L1d cache:             7 MiB (224 instances)
L1i cache:             7 MiB (224 instances)
L2 cache:              224 MiB (224 instances)
L3 cache:              512 MiB (32 instances)
NUMA node(s):         32
NUMA node0 CPU(s):    0-6
NUMA node1 CPU(s):    7-13
NUMA node2 CPU(s):    56-62
NUMA node3 CPU(s):    63-69
NUMA node4 CPU(s):    28-34
NUMA node5 CPU(s):    35-41
NUMA node6 CPU(s):    84-90
NUMA node7 CPU(s):    91-97
NUMA node8 CPU(s):    42-48
NUMA node9 CPU(s):    49-55
NUMA node10 CPU(s):   98-104
NUMA node11 CPU(s):   105-111
NUMA node12 CPU(s):   14-20
NUMA node13 CPU(s):   21-27
NUMA node14 CPU(s):   70-76
NUMA node15 CPU(s):   77-83
NUMA node16 CPU(s):   112-118
NUMA node17 CPU(s):   119-125
NUMA node18 CPU(s):   168-174
NUMA node19 CPU(s):   175-181
NUMA node20 CPU(s):   140-146
NUMA node21 CPU(s):   147-153
NUMA node22 CPU(s):   196-202

```

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## Platform Notes (Continued)

```

NUMA node23 CPU(s):          203-209
NUMA node24 CPU(s):          154-160
NUMA node25 CPU(s):          161-167
NUMA node26 CPU(s):          210-216
NUMA node27 CPU(s):          217-223
NUMA node28 CPU(s):          126-132
NUMA node29 CPU(s):          133-139
NUMA node30 CPU(s):          182-188
NUMA node31 CPU(s):          189-195
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf:          Not affected
Vulnerability Mds:           Not affected
Vulnerability Meltdown:     Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
Vulnerability Spectre v1:    Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2:    Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP disabled, 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	32K	7M	8	Data	1	64	1	64
L1i	32K	7M	8	Instruction	1	64	1	64
L2	1M	224M	8	Unified	2	2048	1	64
L3	16M	512M	16	Unified	3	16384	1	64

8. numactl --hardware

NOTE: a numactl 'node' might or might not correspond to a physical chip.

available: 32 nodes (0-31)

```

node 0 cpus: 0-6
node 0 size: 48136 MB
node 0 free: 47923 MB
node 1 cpus: 7-13
node 1 size: 48382 MB
node 1 free: 48066 MB
node 2 cpus: 14-20
node 2 size: 48382 MB
node 2 free: 48200 MB
node 3 cpus: 21-27
node 3 size: 48382 MB
node 3 free: 48041 MB
node 4 cpus: 28-34
node 4 size: 48382 MB
node 4 free: 48210 MB
node 5 cpus: 35-41
node 5 size: 48382 MB
node 5 free: 48019 MB
node 6 cpus: 42-48
node 6 size: 48382 MB
node 6 free: 47993 MB
node 7 cpus: 49-55
node 7 size: 48382 MB
node 7 free: 48232 MB
node 8 cpus: 56-62
node 8 size: 48382 MB
node 8 free: 48023 MB
node 9 cpus: 63-69
node 9 size: 48382 MB

```

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## Platform Notes (Continued)

```

node 9 free: 48203 MB
node 10 cpus: 98-104
node 10 size: 48382 MB
node 10 free: 48223 MB
node 11 cpus: 105-111
node 11 size: 48382 MB
node 11 free: 48242 MB
node 12 cpus: 14-20
node 12 size: 48382 MB
node 12 free: 48144 MB
node 13 cpus: 21-27
node 13 size: 48382 MB
node 13 free: 48218 MB
node 14 cpus: 70-76
node 14 size: 48382 MB
node 14 free: 48221 MB
node 15 cpus: 77-83
node 15 size: 48382 MB
node 15 free: 48229 MB
node 16 cpus: 112-118
node 16 size: 48382 MB
node 16 free: 48228 MB
node 17 cpus: 119-125
node 17 size: 48382 MB
node 17 free: 48284 MB
node 18 cpus: 168-174
node 18 size: 48382 MB
node 18 free: 48280 MB
node 19 cpus: 175-181
node 19 size: 48382 MB
node 19 free: 48219 MB
node 20 cpus: 140-146
node 20 size: 48382 MB
node 20 free: 48233 MB
node 21 cpus: 147-153
node 21 size: 48382 MB
node 21 free: 48224 MB
node 22 cpus: 196-202
node 22 size: 48382 MB
node 22 free: 48281 MB
node 23 cpus: 203-209
node 23 size: 48382 MB
node 23 free: 48284 MB
node 24 cpus: 154-160
node 24 size: 48382 MB
node 24 free: 48222 MB
node 25 cpus: 161-167
node 25 size: 48345 MB
node 25 free: 48253 MB
node 26 cpus: 210-216
node 26 size: 48382 MB
node 26 free: 48229 MB
node 27 cpus: 217-223
node 27 size: 48309 MB
node 27 free: 48154 MB
node 28 cpus: 126-132
node 28 size: 48382 MB
node 28 free: 48274 MB
node 29 cpus: 133-139
node 29 size: 48382 MB

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## Platform Notes (Continued)

node 29 free: 48195 MB  
node 30 cpus: 182-188  
node 30 size: 48382 MB  
node 30 free: 48210 MB  
node 31 cpus: 189-195  
node 31 size: 48382 MB  
node 31 free: 48222 MB  
node distances:

node	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25	26	27	28	29	30	31																				
0:	10	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	32	32	32	32	32	32	32	32	32	32
32	32	32	32	32	32	32	32																			
1:	11	10	11	11	11	11	11	11	11	11	11	11	11	11	11	11	32	32	32	32	32	32	32	32	32	32
32	32	32	32	32	32	32	32																			
2:	11	11	10	11	11	11	11	11	11	11	11	11	11	11	11	11	32	32	32	32	32	32	32	32	32	32
32	32	32	32	32	32	32	32																			
3:	11	11	11	10	11	11	11	11	11	11	11	11	11	11	11	11	32	32	32	32	32	32	32	32	32	32
32	32	32	32	32	32	32	32																			
4:	11	11	11	11	10	11	11	11	11	11	11	11	11	11	11	11	32	32	32	32	32	32	32	32	32	32
32	32	32	32	32	32	32	32																			
5:	11	11	11	11	11	11	10	11	11	11	11	11	11	11	11	11	32	32	32	32	32	32	32	32	32	32
32	32	32	32	32	32	32	32																			
6:	11	11	11	11	11	11	10	11	11	11	11	11	11	11	11	11	32	32	32	32	32	32	32	32	32	32
32	32	32	32	32	32	32	32																			
7:	11	11	11	11	11	11	11	10	11	11	11	11	11	11	11	11	32	32	32	32	32	32	32	32	32	32
32	32	32	32	32	32	32	32																			
8:	11	11	11	11	11	11	11	11	10	11	11	11	11	11	11	11	32	32	32	32	32	32	32	32	32	32
32	32	32	32	32	32	32	32																			
9:	11	11	11	11	11	11	11	11	11	10	11	11	11	11	11	11	32	32	32	32	32	32	32	32	32	32
32	32	32	32	32	32	32	32																			
10:	11	11	11	11	11	11	11	11	11	11	10	11	11	11	11	11	32	32	32	32	32	32	32	32	32	32
32	32	32	32	32	32	32	32																			
11:	11	11	11	11	11	11	11	11	11	11	10	11	11	11	11	11	32	32	32	32	32	32	32	32	32	32
32	32	32	32	32	32	32	32																			
12:	11	11	11	11	11	11	11	11	11	11	11	10	11	11	11	11	32	32	32	32	32	32	32	32	32	32
32	32	32	32	32	32	32	32																			
13:	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	11	32	32	32	32	32	32	32	32	32	32
32	32	32	32	32	32	32	32																			
14:	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	11	32	32	32	32	32	32	32	32	32	32
32	32	32	32	32	32	32	32																			
15:	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	11	32	32	32	32	32	32	32	32	32	32
32	32	32	32	32	32	32	32																			
16:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	10	11	11	11	11	11	11	11	11
11	11	11	11	11	11	11	11																			
17:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	11	10	11	11	11	11	11	11	11
11	11	11	11	11	11	11	11																			
18:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	11	11	10	11	11	11	11	11	11
11	11	11	11	11	11	11	11																			
19:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	11	11	11	10	11	11	11	11	11
11	11	11	11	11	11	11	11																			
20:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	11	11	11	11	10	11	11	11	11
11	11	11	11	11	11	11	11																			
21:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	11	11	11	11	11	10	11	11	11
11	11	11	11	11	11	11	11																			
22:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	11	11	11	11	11	11	10	11	11
11	11	11	11	11	11	11	11																			
23:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	11	11	11	11	11	11	11	10	11
11	11	11	11	11	11	11	11																			
24:	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	11	11	11	11	11	11	11	11	10
11	11	11	11	11	11	11	11																			

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# SPEC CPU®2017 Floating Point Speed Result

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**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

**ProLiant DL365 Gen11**

(2.20 GHz, AMD EPYC 9734)

**SPECspeed®2017\_fp\_base = 367**

**SPECspeed®2017\_fp\_peak = 376**

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

**Test Date:** Jun-2023  
**Hardware Availability:** Sep-2023  
**Software Availability:** Apr-2023

## Platform Notes (Continued)

```

25: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 11 11 11 11 11 11 11 11 11
10 11 11 11 11 11 11 11
26: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 11 11 11 11 11 11 11 11 11
11 10 11 11 11 11 11
27: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 11 11 11 11 11 11 11 11 11
11 11 10 11 11 11 11
28: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 11 11 11 11 11 11 11 11 11
11 11 11 10 11 11 11
29: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 11 11 11 11 11 11 11 11 11
11 11 11 11 10 11 11
30: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 11 11 11 11 11 11 11 11 11
11 11 11 11 11 10 11
31: 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 32 11 11 11 11 11 11 11 11 11
11 11 11 11 11 11 10

```

```

-----
9. /proc/meminfo
   MemTotal:      1585029248 kB

```

```

-----
10. who -r
    run-level 3 Jun 30 16:27

```

```

-----
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 rdisc rhsm rhsm-facts
                  rpmdb-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
    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
    Boost States: 0

```

(Continued on next page)



# SPEC CPU®2017 Floating Point Speed Result

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**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

**ProLiant DL365 Gen11**

(2.20 GHz, AMD EPYC 9734)

**SPECspeed®2017\_fp\_base = 367**

**SPECspeed®2017\_fp\_peak = 376**

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

**Test Date:** Jun-2023  
**Hardware Availability:** Sep-2023  
**Software Availability:** Apr-2023

## Platform Notes (Continued)

Total States: 3  
Pstate-P0: 2200MHz

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

-----  
16. sysctl  
kernel.numa\_balancing 1  
kernel.randomize\_va\_space 0  
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 8  
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 1  
vm.watermark\_boost\_factor 15000  
vm.watermark\_scale\_factor 10  
vm.zone\_reclaim\_mode 1

-----  
17. /sys/kernel/mm/transparent\_hugepage  
defrag [always] defer+madvise madvise never  
enabled [always] madvise 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  
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/new\_cpu2017  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/mapper/rhel-home xfs 372G 21G 352G 6% /home  
-----

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# SPEC CPU®2017 Floating Point Speed Result

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## Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL365 Gen11

(2.20 GHz, AMD EPYC 9734)

SPECspeed®2017\_fp\_base = 367

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**Tested by:** HPE

**Test Date:** Jun-2023  
**Hardware Availability:** Sep-2023  
**Software Availability:** Apr-2023

## Platform Notes (Continued)

21. /sys/devices/virtual/dmi/id  
Vendor: HPE  
Product: ProLiant DL365 Gen11  
Product Family: ProLiant  
Serial: DL365G11-003

### 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:

18x Hynix HMCG94AEBRA103N 64 GB 2 rank 4800  
5x Hynix HMCG94MEBRA121N 64 GB 2 rank 4800  
1x Hynix HMCG94MEBRA123N 64 GB 2 rank 4800

### 23. BIOS

(This section combines info from /sys/devices and dmidecode.)

BIOS Vendor: HPE  
BIOS Version: 1.30  
BIOS Date: 03/06/2023  
BIOS Revision: 1.30  
Firmware Revision: 1.40

## Compiler Version Notes

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

AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#434 2022\_10\_28) (based on LLVM Mirror.Version.14.0.6)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin  
=====

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

AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#434 2022\_10\_28) (based on LLVM Mirror.Version.14.0.6)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin  
AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#434 2022\_10\_28) (based on LLVM Mirror.Version.14.0.6)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin  
AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#434 2022\_10\_28) (based on LLVM Mirror.Version.14.0.6)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin  
=====

=====  
Fortran | 603.bwaves\_s(base, peak) 649.fotonik3d\_s(base, peak) 654.roms\_s(base, peak)  
=====

AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#434 2022\_10\_28) (based on LLVM Mirror.Version.14.0.6)

(Continued on next page)



# SPEC CPU®2017 Floating Point Speed Result

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**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

ProLiant DL365 Gen11

(2.20 GHz, AMD EPYC 9734)

SPECspeed®2017\_fp\_base = 367

SPECspeed®2017\_fp\_peak = 376

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

**Test Date:** Jun-2023  
**Hardware Availability:** Sep-2023  
**Software Availability:** Apr-2023

## Compiler Version Notes (Continued)

Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

-----  
Fortran, C | 621.wrf\_s(base, peak) 627.cam4\_s(base, peak) 628.pop2\_s(base, peak)  
-----

AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#434 2022\_10\_28) (based on LLVM Mirror.Version.14.0.6)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin  
AMD clang version 14.0.6 (CLANG: AOCC\_4.0.0-Build#434 2022\_10\_28) (based on LLVM Mirror.Version.14.0.6)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin  
-----

## Base Compiler Invocation

C benchmarks:  
clang

Fortran benchmarks:  
flang

Benchmarks using both Fortran and C:  
flang clang

Benchmarks using Fortran, C, and C++:  
clang++ clang flang

## Base Portability Flags

603.bwaves\_s: -DSPEC\_LP64  
607.cactuBSSN\_s: -DSPEC\_LP64  
619.lbm\_s: -DSPEC\_LP64  
621.wrf\_s: -DSPEC\_CASE\_FLAG -Mbyteswapio -DSPEC\_LP64  
627.cam4\_s: -DSPEC\_CASE\_FLAG -DSPEC\_LP64  
628.pop2\_s: -DSPEC\_CASE\_FLAG -Mbyteswapio -DSPEC\_LP64  
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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ProLiant DL365 Gen11

(2.20 GHz, AMD EPYC 9734)

SPECspeed®2017\_fp\_base = 367

SPECspeed®2017\_fp\_peak = 376

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Jun-2023

**Hardware Availability:** Sep-2023

**Software Availability:** Apr-2023

## Base Optimization Flags

### C benchmarks:

```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-freemap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang
```

### Fortran benchmarks:

```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -Mrecursive
-funroll-loops -mllvm -lsr-in-nested-loop
-mllvm -reduce-array-computations=3 -zopt -fopenmp=libomp -lomp
-lamdlibm -lamdalloc -lflang
```

### Benchmarks using both Fortran and C:

```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-freemap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang
```

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

```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-freemap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang
```



# SPEC CPU®2017 Floating Point Speed Result

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ProLiant DL365 Gen11

(2.20 GHz, AMD EPYC 9734)

SPECspeed®2017\_fp\_base = 367

SPECspeed®2017\_fp\_peak = 376

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Jun-2023

**Hardware Availability:** Sep-2023

**Software Availability:** Apr-2023

## Base Other Flags

C benchmarks:

-Wno-return-type -Wno-unused-command-line-argument

Fortran benchmarks:

-Wno-unused-command-line-argument

Benchmarks using both Fortran and C:

-Wno-return-type -Wno-unused-command-line-argument

Benchmarks using Fortran, C, and C++:

-Wno-return-type -Wno-unused-command-line-argument

## Peak Compiler Invocation

C benchmarks:

clang

Fortran benchmarks:

flang

Benchmarks using both Fortran and C:

flang clang

Benchmarks using Fortran, C, and C++:

clang++ clang flang

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

619.lbm\_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast  
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp  
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50  
-fremap-arrays -fstrip-mining  
-mllvm -inline-threshold=1000

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# SPEC CPU®2017 Floating Point Speed Result

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**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

ProLiant DL365 Gen11

(2.20 GHz, AMD EPYC 9734)

SPECspeed®2017\_fp\_base = 367

SPECspeed®2017\_fp\_peak = 376

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Jun-2023

Hardware Availability: Sep-2023

Software Availability: Apr-2023

## Peak Optimization Flags (Continued)

619.lbm\_s (continued):

```
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

638.imagick\_s: basepeak = yes

644.nab\_s: basepeak = yes

Fortran benchmarks:

```
603.bwaves_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP
-Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math
-fopenmp -Mrecursive -mllvm -reduce-array-computations=3
-fvector-transform -fscalar-transform -fopenmp=libomp
-lomp -lamdlibm -lamdalloc -lflang
```

```
649.fotonik3d_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP
-Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math
-fopenmp -flto -Mrecursive
-mllvm -reduce-array-computations=3 -zopt -fopenmp=libomp
-lomp -lamdlibm -lamdalloc -lflang
```

654.roms\_s: basepeak = yes

Benchmarks using both Fortran and C:

```
621.wrf_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-freemap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-O3 -Mrecursive -funroll-loops -mllvm -lsr-in-nested-loop
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

627.cam4\_s: basepeak = yes

```
628.pop2_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
```

(Continued on next page)





# SPEC CPU®2017 Floating Point Speed Result

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**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

ProLiant DL365 Gen11

(2.20 GHz, AMD EPYC 9734)

SPECspeed®2017\_fp\_base = 367

SPECspeed®2017\_fp\_peak = 376

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Jun-2023

Hardware Availability: Sep-2023

Software Availability: Apr-2023

## Peak Optimization Flags (Continued)

628.pop2\_s (continued):

```
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-Mrecursive -fvector-transform -fscalar-transform
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

Benchmarks using Fortran, C, and C++:

607.cactuBSSN\_s: basepeak = yes

## Peak Other Flags

C benchmarks:

```
-Wno-return-type -Wno-unused-command-line-argument
```

Fortran benchmarks:

```
-Wno-unused-command-line-argument
```

Benchmarks using both Fortran and C:

```
-Wno-return-type -Wno-unused-command-line-argument
```

Benchmarks using Fortran, C, and C++:

```
-Wno-return-type -Wno-unused-command-line-argument
```

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-Bergamo-rev1.0.html>

<http://www.spec.org/cpu2017/flags/aocc400-flags.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-Bergamo-rev1.0.xml>

<http://www.spec.org/cpu2017/flags/aocc400-flags.xml>

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