



# SPEC CPU®2017 Floating Point Rate Result

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## Hewlett Packard Enterprise

(Test Sponsor: HPE)

### ProLiant DL385 Gen11

(2.55 GHz, AMD EPYC 9684X)

SPECrate®2017\_fp\_base = 1540

SPECrate®2017\_fp\_peak = 1600

CPU2017 License: 3

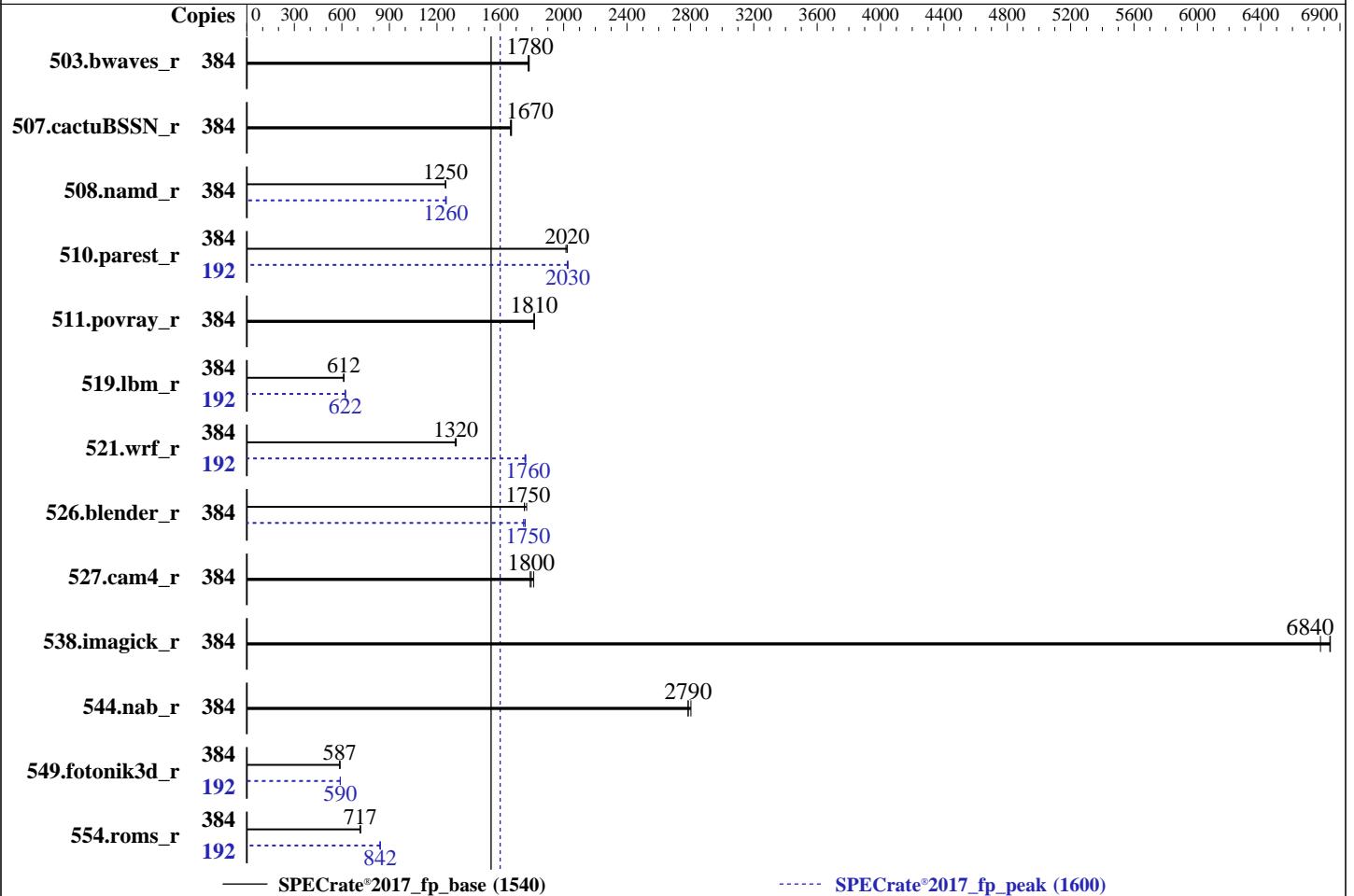
Test Sponsor: HPE

Tested by: HPE

Test Date: Aug-2023

Hardware Availability: Sep-2023

Software Availability: Apr-2023



### Hardware

CPU Name: AMD EPYC 9684X  
 Max MHz: 3700  
 Nominal: 2550  
 Enabled: 192 cores, 2 chips, 2 threads/core  
 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: 1152 MB I+D on chip per chip,  
 96 MB shared / 8 cores  
 Other: None  
 Memory: 768 GB (24 x 32 GB 2Rx8 PC5-4800B-R)  
 Storage: 1 x 480 GB SATA SSD  
 Other: None

### Software

OS: SUSE Linux Enterprise Server 15 SP4  
 Kernel 5.14.21-150400.22-default  
 Compiler: C/C++/Fortran: Version 4.0.0 of AOCC  
 Parallel: No  
 Firmware: HPE BIOS Version v1.40 07/12/2023 released Jul-2023  
 File System: btrfs  
 System State: Run level 5 (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						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	384	2169	1780	<u>2163</u>	<u>1780</u>	2160	1780	384	2169	1780	<u>2163</u>	<u>1780</u>	2160	1780
507.cactuBSSN_r	384	<u>291</u>	<u>1670</u>	291	1670	292	1660	384	<u>291</u>	<u>1670</u>	291	1670	292	1660
508.namd_r	384	291	1250	<u>291</u>	<u>1250</u>	290	1260	384	291	1250	<u>290</u>	<u>1260</u>	290	1260
510.parest_r	384	<u>497</u>	<u>2020</u>	499	2010	497	2020	192	<u>248</u>	<u>2030</u>	248	2030	248	2020
511.povray_r	384	<u>494</u>	<u>1810</u>	494	1810	494	1820	384	<u>494</u>	<u>1810</u>	494	1810	494	1820
519.lbm_r	384	662	611	661	613	<u>662</u>	<u>612</u>	192	<u>325</u>	<u>622</u>	326	620	325	623
521.wrf_r	384	654	1320	651	1320	<u>652</u>	<u>1320</u>	192	245	1760	<u>245</u>	<u>1760</u>	244	1760
526.blender_r	384	334	1750	331	1770	<u>334</u>	<u>1750</u>	384	335	1750	<u>333</u>	<u>1750</u>	333	1760
527.cam4_r	384	371	1810	<u>374</u>	<u>1800</u>	376	1790	384	371	1810	<u>374</u>	<u>1800</u>	376	1790
538.imagick_r	384	141	6780	140	6840	<u>140</u>	<u>6840</u>	384	141	6780	140	6840	<u>140</u>	<u>6840</u>
544.nab_r	384	<u>232</u>	<u>2790</u>	231	2800	232	2790	384	<u>232</u>	<u>2790</u>	231	2800	232	2790
549.fotonik3d_r	384	2546	588	2554	586	<u>2548</u>	<u>587</u>	192	1268	590	1268	590	<u>1268</u>	<u>590</u>
554.roms_r	384	<u>852</u>	<u>717</u>	851	717	852	716	192	363	840	362	843	<u>362</u>	<u>842</u>

SPECrate®2017\_fp\_base = **1540**

SPECrate®2017\_fp\_peak = **1600**

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,

(Continued on next page)



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## Operating System Notes (Continued)

```
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.
```

## Environment Variables Notes

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

```
LD_LIBRARY_PATH =
"/home/cpu2017/amd_rate_aocc400_znver4_A_lib/lib:/home/cpu2017/amd_rate_aocc400_znver4_A_lib/lib32:"
MALLOC_CONF = "retain:true"
```

## 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 Throughput Compute  
Determinism Control set to Manual  
Performance Determinism set to Power Deterministic  
Memory Patrol Scrubbing set to Disabled  
Last-Level Cache (LLC) as NUMA Node set to Enabled  
NUMA memory domains per socket set to Four memory domains per socket  
ACPI CST C2 Latency set to 18 microseconds  
Thermal Configuration set to Maximum Cooling  
Workload Profile set to Custom  
Power Regulator set to OS Control Mode  
L2 HW Prefetcher set to Disabled

The system ROM used for this result contains microcode version 0xa10123e for the AMD EPYC 9nn4X family of processors. The reference code/AGESA version used in this ROM is version Genoa-XPI 1.0.0.8

Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
running on localhost Tue Aug 8 19:48:23 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

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## Platform Notes (Continued)

```

6. /proc/cpuinfo
7. lscpu
8. numactl --hardware
9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
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 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222/lp)
x86_64 x86_64 x86_64 GNU/Linux

```

```

-----
2. w
19:48:23 up 14 min, 3 users, load average: 0.17, 1.35, 2.90
USER      TTY      FROM            LOGIN@   IDLE   JCPU   PCPU WHAT
root      :        :                19:35   ?xdm?  4:50   0.02s gdm-session-worker [pam/gdm-password]
root      :1       :1              19:35   ?xdm?  4:50   0.03s /usr/lib/gdm/gdm-x-session
--register-session --run-script gnome
root      pts/1    172.16.0.100    19:36   15.00s  1.29s  0.16s /bin/bash ./amd_rate_aocc400_znver4_A1.sh

```

```

-----
3. Username
From environment variable $USER: root

```

```

-----
4. ulimit -a
core file size          (blocks, -c) unlimited
data seg size           (kbytes, -d) unlimited
scheduling priority     (-e) 0
file size                (blocks, -f) unlimited
pending signals         (-i) 3094179
max locked memory       (kbytes, -l) 2097152
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) 3094179
virtual memory           (kbytes, -v) unlimited
file locks               (-x) unlimited

```

```

-----
5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 30

```

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## Platform Notes (Continued)

```

sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
sshd: root@pts/1
-bash
python3 ./run_fprate_znver4_A1.py
/bin/bash ./amd_rate_aocc400_znver4_A1.sh
runcpu --config amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 fprate
runcpu --configfile amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
--runmode rate --tune base:peak --size test:train:refrate fprate --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.036/temlogs/preenv.fprate.036.0.log --lognum 036.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017

```

```

-----
6. /proc/cpuinfo
model name      : AMD EPYC 9684X 96-Core Processor
vendor_id      : AuthenticAMD
cpu family     : 25
model          : 17
stepping       : 2
microcode      : 0xa10123e
bugs           : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
TLB size      : 3584 4K pages
cpu cores     : 96
siblings      : 192
2 physical ids (chips)
384 processors (hardware threads)
physical id 0: core ids 0-95
physical id 1: core ids 0-95
physical id 0: apicids 0-191
physical id 1: apicids 256-447

```

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 2.37.2:

```

Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Address sizes:         52 bits physical, 57 bits virtual
Byte Order:            Little Endian
CPU(s):                384
On-line CPU(s) list:  0-383
Vendor ID:             AuthenticAMD
Model name:            AMD EPYC 9684X 96-Core Processor
CPU family:            25
Model:                 17
Thread(s) per core:   2
Core(s) per socket:   96
Socket(s):             2
Stepping:              2
Frequency boost:      enabled
CPU max MHz:           2550.0000
CPU min MHz:           1500.0000
BogoMIPS:              5092.25
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

```

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## Platform Notes (Continued)

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 nrp\_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: 6 MiB (192 instances)  
L1i cache: 6 MiB (192 instances)  
L2 cache: 192 MiB (192 instances)  
L3 cache: 2.3 GiB (24 instances)

NUMA node(s): 24  
NUMA node0 CPU(s): 0-7,192-199  
NUMA node1 CPU(s): 8-15,200-207  
NUMA node2 CPU(s): 16-23,208-215  
NUMA node3 CPU(s): 24-31,216-223  
NUMA node4 CPU(s): 32-39,224-231  
NUMA node5 CPU(s): 40-47,232-239  
NUMA node6 CPU(s): 48-55,240-247  
NUMA node7 CPU(s): 56-63,248-255  
NUMA node8 CPU(s): 64-71,256-263  
NUMA node9 CPU(s): 72-79,264-271  
NUMA node10 CPU(s): 80-87,272-279  
NUMA node11 CPU(s): 88-95,280-287  
NUMA node12 CPU(s): 96-103,288-295  
NUMA node13 CPU(s): 104-111,296-303  
NUMA node14 CPU(s): 112-119,304-311  
NUMA node15 CPU(s): 120-127,312-319  
NUMA node16 CPU(s): 128-135,320-327  
NUMA node17 CPU(s): 136-143,328-335  
NUMA node18 CPU(s): 144-151,336-343  
NUMA node19 CPU(s): 152-159,344-351  
NUMA node20 CPU(s): 160-167,352-359  
NUMA node21 CPU(s): 168-175,360-367  
NUMA node22 CPU(s): 176-183,368-375  
NUMA node23 CPU(s): 184-191,376-383

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 and seccomp  
Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and \_\_user pointer sanitization  
Vulnerability Spectre v2: Mitigation; Retpolines, IBPB conditional, IBRS\_FW, STIBP always-on, 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	6M	8	Data	1	64	1	64
L1i	32K	6M	8	Instruction	1	64	1	64
L2	1M	192M	8	Unified	2	2048	1	64
L3	96M	2.3G	16	Unified	3	98304	1	64

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## Platform Notes (Continued)

8. numactl --hardware

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

```

available: 24 nodes (0-23)
node 0 cpus: 0-7,192-199
node 0 size: 31941 MB
node 0 free: 31299 MB
node 1 cpus: 8-15,200-207
node 1 size: 32251 MB
node 1 free: 32067 MB
node 2 cpus: 16-23,208-215
node 2 size: 32251 MB
node 2 free: 31899 MB
node 3 cpus: 24-31,216-223
node 3 size: 32251 MB
node 3 free: 32090 MB
node 4 cpus: 32-39,224-231
node 4 size: 32251 MB
node 4 free: 32126 MB
node 5 cpus: 40-47,232-239
node 5 size: 32251 MB
node 5 free: 32116 MB
node 6 cpus: 48-55,240-247
node 6 size: 32251 MB
node 6 free: 32094 MB
node 7 cpus: 56-63,248-255
node 7 size: 32217 MB
node 7 free: 32072 MB
node 8 cpus: 64-71,256-263
node 8 size: 32251 MB
node 8 free: 32131 MB
node 9 cpus: 72-79,264-271
node 9 size: 32251 MB
node 9 free: 31873 MB
node 10 cpus: 80-87,272-279
node 10 size: 32251 MB
node 10 free: 31919 MB
node 11 cpus: 88-95,280-287
node 11 size: 32251 MB
node 11 free: 31959 MB
node 12 cpus: 96-103,288-295
node 12 size: 32251 MB
node 12 free: 32039 MB
node 13 cpus: 104-111,296-303
node 13 size: 32251 MB
node 13 free: 31942 MB
node 14 cpus: 112-119,304-311
node 14 size: 32251 MB
node 14 free: 31987 MB
node 15 cpus: 120-127,312-319
node 15 size: 32251 MB
node 15 free: 32036 MB
node 16 cpus: 128-135,320-327
node 16 size: 32251 MB
node 16 free: 32052 MB
node 17 cpus: 136-143,328-335
node 17 size: 32251 MB
node 17 free: 32038 MB
node 18 cpus: 144-151,336-343
node 18 size: 32251 MB
node 18 free: 32126 MB

```

(Continued on next page)



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## Platform Notes (Continued)

```

node 19 cpus: 152-159,344-351
node 19 size: 32251 MB
node 19 free: 32123 MB
node 20 cpus: 160-167,352-359
node 20 size: 32251 MB
node 20 free: 32130 MB
node 21 cpus: 168-175,360-367
node 21 size: 32251 MB
node 21 free: 32122 MB
node 22 cpus: 176-183,368-375
node 22 size: 32251 MB
node 22 free: 32134 MB
node 23 cpus: 184-191,376-383
node 23 size: 32121 MB
node 23 free: 31964 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
0:  10 11 11 12 12 12 12 12 12 12 12 12 32 32 32 32 32 32 32 32 32 32 32 32
1:  11 10 11 12 12 12 12 12 12 12 12 12 32 32 32 32 32 32 32 32 32 32 32 32
2:  11 11 10 12 12 12 12 12 12 12 12 12 32 32 32 32 32 32 32 32 32 32 32 32
3:  12 12 12 10 10 11 11 12 12 12 12 12 32 32 32 32 32 32 32 32 32 32 32 32
4:  12 12 12 11 10 11 12 12 12 12 12 12 32 32 32 32 32 32 32 32 32 32 32 32
5:  12 12 12 11 11 10 12 12 12 12 12 12 32 32 32 32 32 32 32 32 32 32 32 32
6:  12 12 12 12 12 12 10 11 11 12 12 12 32 32 32 32 32 32 32 32 32 32 32 32
7:  12 12 12 12 12 12 11 10 11 12 12 12 32 32 32 32 32 32 32 32 32 32 32 32
8:  12 12 12 12 12 12 11 11 10 12 12 12 32 32 32 32 32 32 32 32 32 32 32 32
9:  12 12 12 12 12 12 12 12 12 12 10 11 11 32 32 32 32 32 32 32 32 32 32 32
10: 12 12 12 12 12 12 12 12 12 12 11 10 11 32 32 32 32 32 32 32 32 32 32 32
11: 12 12 12 12 12 12 12 12 12 12 11 11 10 32 32 32 32 32 32 32 32 32 32 32
12: 32 32 32 32 32 32 32 32 32 32 32 32 10 11 11 12 12 12 12 12 12 12 12 12
13: 32 32 32 32 32 32 32 32 32 32 32 32 11 10 11 12 12 12 12 12 12 12 12 12
14: 32 32 32 32 32 32 32 32 32 32 32 32 11 11 10 12 12 12 12 12 12 12 12 12
15: 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 10 11 11 12 12 12 12 12 12
16: 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 11 10 11 12 12 12 12 12 12
17: 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 11 11 10 12 12 12 12 12 12
18: 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12 12 12 10 11 11 12 12 12
19: 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12 12 12 11 10 11 12 12 12
20: 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12 12 12 11 11 10 12 12 12
21: 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12 12 12 12 12 12 10 11 11
22: 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12 12 12 12 12 12 11 10 11
23: 32 32 32 32 32 32 32 32 32 32 32 32 12 12 12 12 12 12 12 12 12 11 11 10

```

```

-----
9. /proc/meminfo
   MemTotal:      792135632 kB

```

```

-----
10. who -r
    run-level 5 Aug 8 19:35

```

```

-----
11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
    Default Target   Status
    graphical        running

```

```

-----
12. Services, from systemctl list-unit-files
STATE UNIT FILES
enabled ModemManager YaST2-Firstboot YaST2-Second-Stage apparmor auditd bluetooth cron
display-manager firewalld getty@ haveged irqbalance iscsi issue-generator kbdsettings klog

```

(Continued on next page)





# SPEC CPU®2017 Floating Point Rate Result

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**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

**ProLiant DL385 Gen11**

**(2.55 GHz, AMD EPYC 9684X)**

**SPECrate®2017\_fp\_base = 1540**

**SPECrate®2017\_fp\_peak = 1600**

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Aug-2023

**Hardware Availability:** Sep-2023

**Software Availability:** Apr-2023

## Platform Notes (Continued)

```

enabled-runtime  lvm2-monitor nscd postfix purge-kernels rollback rsyslog smartd sshd wicked wickedd-auto4
disabled        wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny wpa_supplicant
                 systemd-remount-fs
NetworkManager NetworkManager-dispatcher NetworkManager-wait-online accounts-daemon
appstream-sync-cache autofs autoyast-initscripts blk-availability bluetooth-mesh
boot-sysctl ca-certificates chrony-wait chronyd console-getty cups cups-browsed
debug-shell dmraid-activation dnsmasq ebttables exchange-bmc-os-info gpm grub2-once
haveged-switch-root hwloc-dump-hwdata ipmi ipmievd iscsi-init iscsid iscsiuiio
issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blkmap
nm-cloud-setup nmb openvpn@ ostree-remount pppoe pppoe-server rdisc rpcbind rpmconfigcheck
rsyncd rtkit-daemon serial-getty@ smartd_generate_opts smb snmpd snmptrapd
speech-dispatcherd systemd-boot-check-no-failures systemd-network-generator systemd-sysex
systemd-time-wait-sync systemd-timesyncd tuned udisks2 upower wpa_supplicant@
indirect        pcsd saned@ wickedd

```

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

```

BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
root=UUID=e710f57a-f290-46a0-a58f-3ef44ale3f08
splash=silent
mitigations=auto
quiet
security=apparmor

```

### 14. cpupower frequency-info

```

analyzing CPU 0:
  current policy: frequency should be within 1.50 GHz and 2.55 GHz.
                  The governor "performance" may decide which speed to use
                  within this range.

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      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

```

(Continued on next page)



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## Hewlett Packard Enterprise

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Hardware Availability: Sep-2023

Software Availability: Apr-2023

## Platform Notes (Continued)

```

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 SUSE Linux Enterprise Server 15 SP4

```

```

20. Disk information
SPEC is set to: /home/cpu2017
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sdb2       btrfs 445G  99G 346G  23% /home

```

```

21. /sys/devices/virtual/dmi/id
Vendor:         HPE
Product:        ProLiant DL385 Gen11
Product Family: ProLiant
Serial:         DL385G11-006

```

```

22. dmidecode
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:
  9x Samsung M321R4GA3BB0-CQKDG 32 GB 2 rank 4800
 15x Samsung M321R4GA3BB6-CQKDG 32 GB 2 rank 4800

```

```

23. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor:      HPE
BIOS Version:     1.40
BIOS Date:        07/12/2023
BIOS Revision:    1.40
Firmware Revision: 1.40

```

## Compiler Version Notes

```

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

```

(Continued on next page)



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## Compiler Version Notes (Continued)

-----  
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++ | 508.namd\_r(base, peak) 510.parest\_r(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 | 511.povray\_r(base, peak) 526.blender\_r(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  
-----

=====  
C++, C, Fortran | 507.cactuBSSN\_r(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  
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Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin  
-----

=====  
Fortran | 503.bwaves\_r(base, peak) 549.fotonik3d\_r(base, peak) 554.roms\_r(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  
-----

=====  
Fortran, C | 521.wrf\_r(base, peak) 527.cam4\_r(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  
-----

(Continued on next page)



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**Tested by:** HPE

**Test Date:** Aug-2023

**Hardware Availability:** Sep-2023

**Software Availability:** Apr-2023

## Compiler Version Notes (Continued)

```

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

C++ benchmarks:

clang++

Fortran benchmarks:

flang

Benchmarks using both Fortran and C:

flang clang

Benchmarks using both C and C++:

clang++ clang

Benchmarks using Fortran, C, and C++:

clang++ clang flang

## 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_CASE_FLAG -Mbyteswapio -DSPEC_LP64
526.blender_r: -funsigned-char -DSPEC_LP64
527.cam4_r: -DSPEC_CASE_FLAG -DSPEC_LP64
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

```



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**Tested by:** HPE

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

## Base Optimization Flags

### C benchmarks:

```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather -O3
-march=znver4 -fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -lamdlibm -lamdalloc -lflang
```

### C++ benchmarks:

```
-m64 -flto -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 -mllvm -unroll-threshold=100
-finline-aggressive -mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lamdalloc
-lflang
```

### Fortran benchmarks:

```
-m64 -flto -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 -Kieee -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm -lamdalloc
-lflang
```

### Benchmarks using both Fortran and C:

```
-m64 -flto -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 -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -Kieee -Mrecursive -funroll-loops -mllvm -lsr-in-nested-loop
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc -lflang
```

### Benchmarks using both C and C++:

```
-m64 -flto -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 -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -lamdlibm -lamdalloc -lflang
```

(Continued on next page)



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**Hardware Availability:** Sep-2023

**Software Availability:** Apr-2023

## Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:

```
-m64 -flto -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 -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -Kieee -Mrecursive
-funroll-loops -mllvm -lsr-in-nested-loop
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc -lflang
```

## Base Other Flags

C benchmarks:

-Wno-unused-command-line-argument

C++ benchmarks:

-Wno-unused-command-line-argument

Fortran benchmarks:

-Wno-unused-command-line-argument

Benchmarks using both Fortran and C:

-Wno-unused-command-line-argument

Benchmarks using both C and C++:

-Wno-unused-command-line-argument

Benchmarks using Fortran, C, and C++:

-Wno-unused-command-line-argument

## Peak Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

(Continued on next page)



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**Test Date:** Aug-2023

**Hardware Availability:** Sep-2023

**Software Availability:** Apr-2023

## Peak Compiler Invocation (Continued)

Fortran benchmarks:

flang

Benchmarks using both Fortran and C:

flang clang

Benchmarks using both C and C++:

clang++ clang

Benchmarks using Fortran, C, and C++:

clang++ clang flang

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

```
519.lbm_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-fstruct-layout=7 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc
```

538.imagick\_r: basepeak = yes

544.nab\_r: basepeak = yes

C++ benchmarks:

```
508.namd_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-fininline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc
```

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## Peak Optimization Flags (Continued)

```
510.parest_r: -m64 -flto -Wl,-mllvm -Wl,-suppress-fmas
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc
```

Fortran benchmarks:

503.bwaves\_r: basepeak = yes

```
549.fotonik3d_r: -m64 -flto -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 -Kieee
-Mrecursive -mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -fvector-transform
-fscalar-transform -lamdlibm -lamdalloc -lflang
```

```
554.roms_r: -m64 -flto -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 -Mrecursive
-mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm
-lamdalloc -lflang
```

Benchmarks using both Fortran and C:

```
521.wrf_r: -m64 -flto -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
-fstruct-layout=7 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -Mrecursive
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc
-lflang
```

527.cam4\_r: basepeak = yes

Benchmarks using both C and C++:

(Continued on next page)





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## Peak Optimization Flags (Continued)

511.povray\_r: basepeak = yes

```

526.blender_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-fstruct-layout=7 -mllvm -unroll-threshold=50
-freemap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt
-finline-aggressive -mllvm -unroll-threshold=100 -lamdlibm
-lamdallic

```

Benchmarks using Fortran, C, and C++:

507.cactuBSSN\_r: basepeak = yes

## Peak Other Flags

C benchmarks:

-Wno-unused-command-line-argument

C++ benchmarks:

-Wno-unused-command-line-argument

Fortran benchmarks:

-Wno-unused-command-line-argument

Benchmarks using both Fortran and C:

-Wno-unused-command-line-argument

Benchmarks using both C and C++:

-Wno-unused-command-line-argument

Benchmarks using Fortran, C, and C++:

-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-Genoa-X-rev1.0.html>

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



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

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

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

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