



# SPEC CPU®2017 Floating Point Rate Result

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**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

**ProLiant Compute DL345 Gen12**

(2.30 Ghz, AMD EPYC 9645)

**SPECrate®2017\_fp\_base = 894**

**SPECrate®2017\_fp\_peak = 949**

**CPU2017 License:** 3

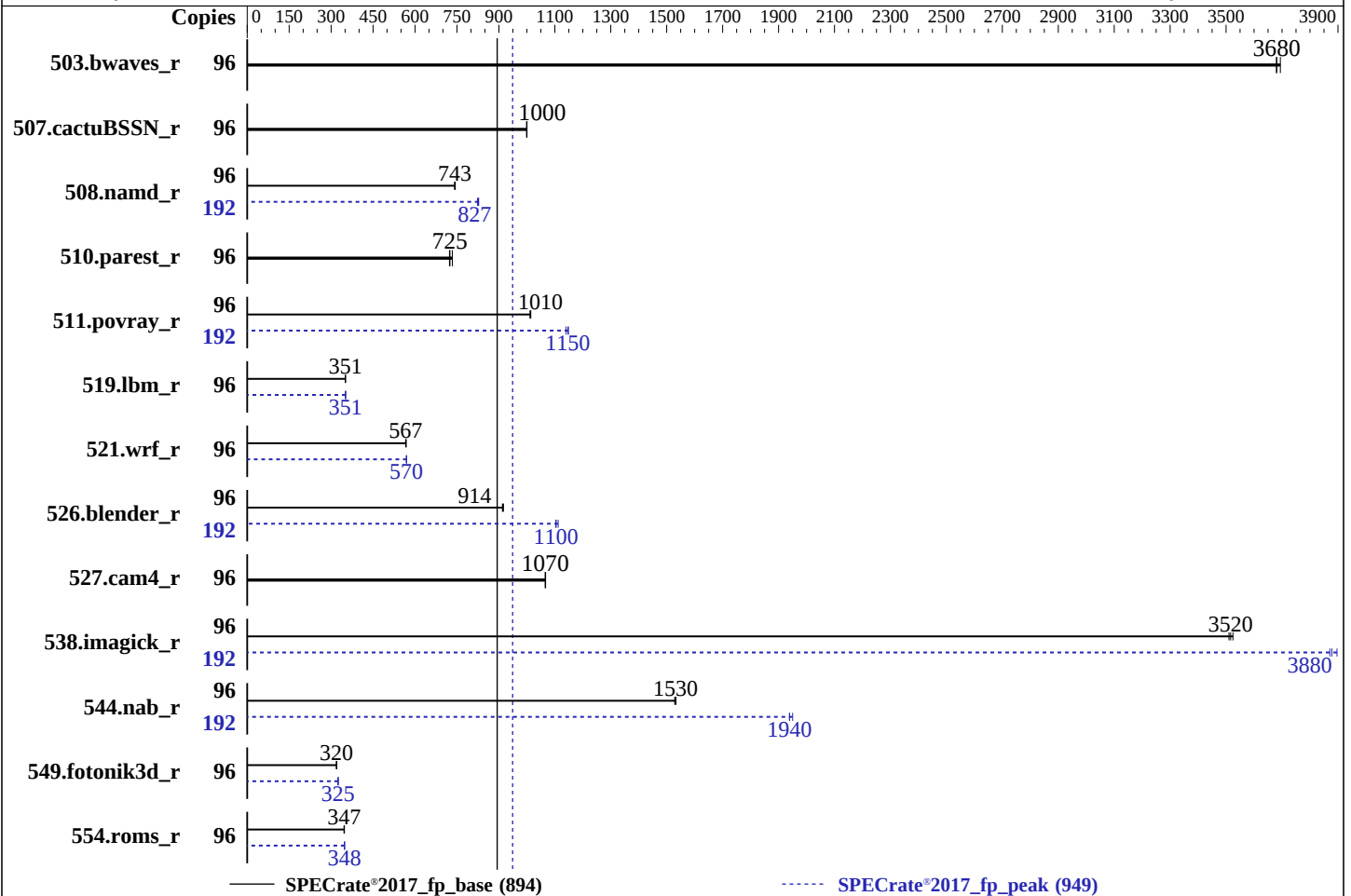
**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Dec-2025

**Hardware Availability:** Jul-2025

**Software Availability:** Oct-2025



## Hardware

CPU Name: AMD EPYC 9645  
Max MHz: 3700  
Nominal: 2300  
Enabled: 96 cores, 1 chip, 2 threads/core  
Orderable: 1 Chip  
Cache L1: 32 KB I + 48 KB D on chip per core  
L2: 1 MB I+D on chip per core  
L3: 256 MB I+D on chip per chip,  
32 MB shared / 12 cores  
Other: None  
Memory: 384 GB (12 x 32 GB 2Rx4 PC5-6400B-R, running at 5200)  
Storage: 1 x 1.6 TB NVMe SSD  
Other: CPU Cooling: Air

## Software

OS: SUSE Linux Enterprise Server 15 SP6  
Kernel 6.4.0-150600.21-default  
Compiler: C/C++/Fortran: Version 5.0.0 of AOCC  
Parallel: No  
Firmware: HPE BIOS Version v1.34 11/28/2025 released Nov-2025  
File System: xfs  
System State: Run level 3 (multi-user)  
Base Pointers: 64-bit  
Peak Pointers: 64-bit  
Other: None  
Power Management: BIOS is 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    | 96     | 262        | 3680        | <u>262</u>  | <u>3680</u> | 261         | 3690       | 96     | 262         | 3680        | <u>262</u> | <u>3680</u> | 261        | 3690        |
| 507.cactuBSSN_r | 96     | 121        | 1000        | <u>122</u>  | <u>1000</u> | 122         | 999        | 96     | 121         | 1000        | <u>122</u> | <u>1000</u> | 122        | 999         |
| 508.namd_r      | 96     | <u>123</u> | <u>743</u>  | 123         | 741         | 123         | 744        | 192    | <u>221</u>  | <u>827</u>  | 220        | 827         | 221        | 823         |
| 510.parest_r    | 96     | <u>346</u> | <u>725</u>  | 342         | 733         | 347         | 723        | 96     | <u>346</u>  | <u>725</u>  | 342        | 733         | 347        | 723         |
| 511.povray_r    | 96     | <u>221</u> | <u>1010</u> | 221         | 1010        | 222         | 1010       | 192    | <u>391</u>  | <u>1150</u> | 390        | 1150        | 393        | 1140        |
| 519.lbm_r       | 96     | <u>288</u> | <u>351</u>  | 288         | 351         | 288         | 351        | 96     | <u>288</u>  | <u>351</u>  | 288        | 351         | 287        | 352         |
| 521.wrf_r       | 96     | 378        | 569         | <u>379</u>  | <u>567</u>  | 380         | 567        | 96     | <u>378</u>  | <u>570</u>  | 377        | 570         | 378        | 569         |
| 526.blender_r   | 96     | <u>160</u> | <u>914</u>  | 160         | 916         | 160         | 912        | 192    | <u>265</u>  | <u>1100</u> | 265        | 1100        | 263        | 1110        |
| 527.cam4_r      | 96     | <u>158</u> | <u>1070</u> | 157         | 1070        | 158         | 1070       | 96     | <u>158</u>  | <u>1070</u> | 157        | 1070        | 158        | 1070        |
| 538.imagick_r   | 96     | 68.0       | 3510        | <u>67.9</u> | <u>3520</u> | 67.7        | 3520       | 192    | 123         | 3900        | 123        | 3870        | <u>123</u> | <u>3880</u> |
| 544.nab_r       | 96     | 106        | 1530        | <u>105</u>  | <u>1530</u> | 105         | 1530       | 192    | 166         | 1950        | 167        | 1940        | <u>167</u> | <u>1940</u> |
| 549.fotonik3d_r | 96     | 1173       | 319         | 1170        | 320         | <u>1171</u> | <u>320</u> | 96     | <u>1151</u> | <u>325</u>  | 1151       | 325         | 1151       | 325         |
| 554.roms_r      | 96     | 441        | 346         | <u>440</u>  | <u>347</u>  | 439         | 348        | 96     | 438         | 348         | <u>438</u> | <u>348</u>  | 439        | 347         |

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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,

(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\_aocc500\_znver5\_A\_lib/lib:/home/cpu2017/amd\_rate\_aocc500\_znver5\_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  
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 Configurations : Parameters are selected in the order shown below

Workload Profile set to High Performance Compute (HPC)

Determinism Control set to Manual

AMD Core Performance Boost set to Enabled

Determinism Control set to Manual

NUMA memory domains per socket set to Four memory domains per socket

Memory Patrol Scrubbing set to Disabled

Thermal Configuration set to Maximum Cooling

Power Regulator set to Static High Performance Mode

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197

running on localhost Mon Jan 5 13:11:54 2026

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 254 (254.10+suse.84.ge8d77af424)
12. Services, from systemctl list-unit-files

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## Platform Notes (Continued)

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 6.4.0-150600.21-default #1 SMP PREEMPT\_DYNAMIC Thu May 16 11:09:22 UTC 2024 (36c1e09)  
x86\_64 x86\_64 x86\_64 GNU/Linux

2. w  
13:11:54 up 6 min, 7 users, load average: 0.18, 0.22, 0.13  
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT  
root tty1 - 23:46 ? 0.02s 0.02s -bash  
root pts/0 172.16.0.100 23:46 ? 0.02s 0.02s -bash

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) 1546154  
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) 1546154  
virtual memory (kbytes, -v) unlimited  
file locks (-x) unlimited

5. sysinfo process ancestry  
/usr/lib/systemd/systemd --switched-root --system --deserialize=42  
sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups  
sshd: root [priv]  
sshd: root@notty  
bash -c cd \$SPEC/ && \$SPEC/run\_fprate\_sh.sh  
python3 ./run\_fprate.py  
/bin/bash ./amd\_rate\_aocc500\_znver5\_A1.sh  
runcpu --config amd\_rate\_aocc500\_znver5\_A1.cfg --tune all --reportable --iterations 3 fprate  
runcpu --configfile amd\_rate\_aocc500\_znver5\_A1.cfg --tune all --reportable --iterations 3 --nopower  
--runmode rate --tune base:peak --size test:train:refrate fprate --nopreenv --note-preenv --logfile

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## Platform Notes (Continued)

```
$SPEC/tmp/CPU2017.001/temlogs/preenv.fprate.001.0.log --lognum 001.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017
```

### 6. /proc/cpuinfo

```
model name      : AMD EPYC 9645 96-Core Processor
vendor_id       : AuthenticAMD
cpu family      : 26
model           : 17
stepping        : 0
microcode       : 0xb101054
bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
TLB size        : 192 4K pages
cpu cores       : 96
siblings        : 192
1 physical ids (chips)
192 processors (hardware threads)
physical id 0:  core ids 0-11,16-27,32-43,48-59,64-75,80-91,96-107,112-123
physical id 0:  apicids 0-23,32-55,64-87,96-119,128-151,160-183,192-215,224-247
```

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 2.39.3:

```
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):             192
On-line CPU(s) list: 0-191
Vendor ID:          AuthenticAMD
BIOS Vendor ID:     Advanced Micro Devices, Inc.
Model name:         AMD EPYC 9645 96-Core Processor
BIOS Model name:    AMD EPYC 9645 96-Core Processor
BIOS CPU family:    107
CPU family:         26
Model:              17
Thread(s) per core: 2
Core(s) per socket: 96
Socket(s):          1
Stepping:           0
BogoMIPS:           4593.18
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 amd_lbr_v2 nopl nonstop_tsc cpuid
                  extd_apicid aperfmperf rapl pni pclmulqdq monitor ssse3 fma cx16 pcid
                  sse4_1 sse4_2 movbe popcnt aes xsave avx f16c rdrand lahf_lm
                  cmp_legacy extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch
                  osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb bpxt
                  perfctr_llc mwaitx cpb cat_l3 cdp_l3 hw_pstate ssbd mba perfmon_v2
                  ibrs ibpb stibp ibrs_enhanced vmmcall fsgsbase tsc_adjust 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 user_shstk avx_vnni avx512_bf16 clzero irperf
                  xsaveerptr rdpru wbnoinvd amd_ppin cppc arat npt lbrv svm_lock
                  nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter
```

CPU @ 2.3GHz

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## Platform Notes (Continued)

pfthreshold avic v\_vmsave\_vmload vgif x2avic v\_spec\_ctrl vnmi  
avx512vbmi umip pku ospke avx512\_vbmi2 gfni vaes vpclmulqdq  
avx512\_vnni avx512\_bitalg avx512\_vpopcntdq la57 rdpid bus\_lock\_detect  
movdiri movdir64b overflow\_recov succor smca fsrm avx512\_vp2intersect  
flush\_l1d debug\_swap  
4.5 MiB (96 instances)  
3 MiB (96 instances)  
96 MiB (96 instances)  
256 MiB (8 instances)  
4  
0-23,96-119  
24-47,120-143  
48-71,144-167  
72-95,168-191  
Vulnerability Gather data sampling: Not affected  
Vulnerability Itlb multihit: Not affected  
Vulnerability L1tf: Not affected  
Vulnerability Mds: Not affected  
Vulnerability Meltdown: Not affected  
Vulnerability Mmio stale data: Not affected  
Vulnerability Reg file data sampling: Not affected  
Vulnerability Retbleed: Not affected  
Vulnerability Spec rstack overflow: 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; Enhanced / Automatic IBRS; IBPB conditional; STIBP  
always-on; RSB filling; PBRSE-eIBRS Not affected; BHI Not affected  
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      | 4.5M     | 12   | Data        | 1     | 64    | 1        | 64             |
| L1i  | 32K      | 3M       | 8    | Instruction | 1     | 64    | 1        | 64             |
| L2   | 1M       | 96M      | 16   | Unified     | 2     | 1024  | 1        | 64             |
| L3   | 32M      | 256M     | 16   | Unified     | 3     | 32768 | 1        | 64             |

8. numactl --hardware

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

available: 4 nodes (0-3)  
node 0 cpus: 0-23,96-119  
node 0 size: 96440 MB  
node 0 free: 95973 MB  
node 1 cpus: 24-47,120-143  
node 1 size: 96755 MB  
node 1 free: 96358 MB  
node 2 cpus: 48-71,144-167  
node 2 size: 96755 MB  
node 2 free: 95669 MB  
node 3 cpus: 72-95,168-191  
node 3 size: 96617 MB  
node 3 free: 95231 MB  
node distances:  
node 0 1 2 3  
0: 10 12 12 12  
1: 12 10 12 12  
2: 12 12 10 12  
3: 12 12 12 10

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## Platform Notes (Continued)

9. /proc/meminfo

MemTotal: 395846400 kB

10. who -r

run-level 3 Jan 5 23:45

11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)

Default Target Status  
multi-user running

12. Services, from systemctl list-unit-files

STATE UNIT FILES

enabled ModemManager YaST2-Firstboot YaST2-Second-Stage apparmor appstream-sync-cache auditd  
bluetooth cron display-manager getty@ irqbalance issue-generator kbdsettings klog  
lvm2-monitor nsd nvme-fc-boot-connections nvme-autoconnect postfix purge-kernels rollback  
rsyslog smartd sshd systemd-pstore wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6  
wickedd-nanny wpa\_supplicant  
enabled-runtime systemd-remount-fs  
disabled NetworkManager NetworkManager-dispatcher NetworkManager-wait-online accounts-daemon autofs  
autoyast-initscripts blk-availability bluetooth-mesh boot-sysctl ca-certificates  
chrony-wait chronyd console-getty cups cups-browsed debug-shell dnsmasq ebtables  
exchange-bmc-os-info firewalld fsidd gpm grub2-once haveged hwloc-dump-hwdata ipmi ipmievdev  
issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blkmap nmb openvpn@  
ostree-remount rpcbind rpmconfigcheck rsyncd rtkit-daemon serial-getty@  
smartd-generate-opts smb snmpd snmptrapd speech-dispatcherd systemd-boot-check-no-failures  
systemd-confext systemd-network-generator systemd-sysext systemd-time-wait-sync  
systemd-timesyncd tuned udisks2 update-system-flatpaks upower vncserver@ wpa\_supplicant@  
indirect pcsd saned@ systemd-userdbd wickedd

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

BOOT\_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default  
root=UUID=746a4155-55ec-4c48-a13e-850efb759531  
splash=silent  
resume=/dev/disk/by-uuid/384c6bdc-d791-4998-be8b-2385a724cb49  
mitigations=auto  
quiet  
security=apparmor

14. cpupower frequency-info

analyzing CPU 54:  
Unable to determine current policy  
boost state support:  
Supported: yes  
Active: yes

15. tuned-adm active

No current active profile.

16. sysctl

kernel.numa\_balancing 1  
kernel.randomize\_va\_space 0  
vm.compaction\_proactiveness 20

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## Platform Notes (Continued)

```
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 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 SP6
```

```
-----
20. Disk information
SPEC is set to: /home/cpu2017
Filesystem      Type      Size      Used Avail Use% Mounted on
/dev/nvme0n1p3  xfs       695G      21G   674G   3% /home
```

```
-----
21. /sys/devices/virtual/dmi/id
Vendor:      HPE
Product:     HPE ProLiant Compute DL345 Gen12
Product Family: ProLiant
Serial:      I2DZ4HNF1Y
```

```
-----
22. dmidecode
Additional information from dmidecode 3.4 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:
12x Hynix HMC688AHBRA471N 32 GB 2 rank 6400, configured at 5200
```

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# SPEC CPU®2017 Floating Point Rate Result

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**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

**ProLiant Compute DL345 Gen12**

(2.30 Ghz, AMD EPYC 9645)

**SPECrate®2017\_fp\_base = 894**

**SPECrate®2017\_fp\_peak = 949**

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Dec-2025

**Hardware Availability:** Jul-2025

**Software Availability:** Oct-2025

## Platform Notes (Continued)

### 23. BIOS

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

BIOS Vendor: HPE  
BIOS Version: 1.34  
BIOS Date: 11/28/2025  
BIOS Revision: 1.34  
Firmware Revision: 1.18

## Compiler Version Notes

=====  
C | 519.lbm\_r(base, peak) 538.imagick\_r(base, peak) 544.nab\_r(base, peak)  
=====

AMD clang version 17.0.6 (CLANG: AOCC\_5.0.0-Build#1316 2024\_09\_09)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin  
=====

=====  
C++ | 508.namd\_r(base, peak) 510.parest\_r(base, peak)  
=====

AMD clang version 17.0.6 (CLANG: AOCC\_5.0.0-Build#1316 2024\_09\_09)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin  
=====

=====  
C++, C | 511.povray\_r(base, peak) 526.blender\_r(base, peak)  
=====

AMD clang version 17.0.6 (CLANG: AOCC\_5.0.0-Build#1316 2024\_09\_09)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin  
AMD clang version 17.0.6 (CLANG: AOCC\_5.0.0-Build#1316 2024\_09\_09)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin  
=====

=====  
C++, C, Fortran | 507.cactuBSSN\_r(base, peak)  
=====

AMD clang version 17.0.6 (CLANG: AOCC\_5.0.0-Build#1316 2024\_09\_09)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin  
AMD clang version 17.0.6 (CLANG: AOCC\_5.0.0-Build#1316 2024\_09\_09)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin  
AMD clang version 17.0.6 (CLANG: AOCC\_5.0.0-Build#1316 2024\_09\_09)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin

(Continued on next page)



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**SPECrate®2017\_fp\_base = 894**

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**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Dec-2025

**Hardware Availability:** Jul-2025

**Software Availability:** Oct-2025

## Compiler Version Notes (Continued)

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

AMD clang version 17.0.6 (CLANG: AOCC\_5.0.0-Build#1316 2024\_09\_09)

Target: x86\_64-unknown-linux-gnu

Thread model: posix

InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin  
=====

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

AMD clang version 17.0.6 (CLANG: AOCC\_5.0.0-Build#1316 2024\_09\_09)

Target: x86\_64-unknown-linux-gnu

Thread model: posix

InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/bin

AMD clang version 17.0.6 (CLANG: AOCC\_5.0.0-Build#1316 2024\_09\_09)

Target: x86\_64-unknown-linux-gnu

Thread model: posix

InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-5.0.0-4925-1316/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

(Continued on next page)



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**Test Date:** Dec-2025

**Hardware Availability:** Jul-2025

**Software Availability:** Oct-2025

## Base Portability Flags (Continued)

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

## Base Optimization Flags

C benchmarks:

-m64 -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=znver5 -fveclib=AMDLIBM -ffast-math -fno-PIE -no-pie -flto  
-fstruct-layout=7 -mllvm -unroll-threshold=50  
-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining  
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lamdalloc  
-lflang -ldl

C++ benchmarks:

-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3  
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Wl,-mllvm -Wl,-extra-inliner  
-O3 -march=znver5 -fveclib=AMDLIBM -ffast-math -flto  
-mllvm -unroll-threshold=100 -mllvm -loop-unswitch-threshold=200000  
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lamdalloc  
-lflang -ldl

Fortran benchmarks:

-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3  
-Wl,-mllvm -Wl,-enable-X86-prefetching  
-Wl,-mllvm -Wl,-enable-aggressive-gather=true  
-Wl,-mllvm -Wl,-enable-masked-gather-sequence=false -O3 -march=znver5  
-fveclib=AMDLIBM -ffast-math -flto -Mrecursive -funroll-loops  
-mllvm -lsr-in-nested-loop -mllvm -reduce-array-computations=3  
-fepilog-vectorization-of-inductions -zopt -lamdlibm -lamdalloc  
-lflang -ldl

(Continued on next page)



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**ProLiant Compute DL345 Gen12**

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**SPECrate®2017\_fp\_base = 894**

**SPECrate®2017\_fp\_peak = 949**

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Dec-2025

**Hardware Availability:** Jul-2025

**Software Availability:** Oct-2025

## Base Optimization Flags (Continued)

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
-Wl,-mllvm -Wl,-enable-aggressive-gather=true
-Wl,-mllvm -Wl,-enable-masked-gather-sequence=false -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -fno-PIE -no-pie -flto
-fstruct-layout=7 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining
-mllvm -reduce-array-computations=3 -zopt -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fepilog-vectorization-of-inductions
-lamdlibm -lamdalloc -lflang -ldl
```

Benchmarks using both C and C++:

```
-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Wl,-mllvm -Wl,-extra-inliner
-O3 -march=znver5 -fveclib=AMDLIBM -ffast-math -fno-PIE -no-pie
-flto -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
-mllvm -loop-unswitch-threshold=200000 -lamdlibm -lamdalloc -lflang
-ldl
```

Benchmarks using Fortran, C, and C++:

```
-m64 -std=c++14 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Wl,-mllvm -Wl,-extra-inliner
-O3 -march=znver5 -fveclib=AMDLIBM -ffast-math -fno-PIE -no-pie
-flto -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
-mllvm -loop-unswitch-threshold=200000 -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fepilog-vectorization-of-inductions
-lamdlibm -lamdalloc -lflang -ldl
```

## Base Other Flags

C benchmarks:

-Wno-unused-command-line-argument

C++ benchmarks:

-Wno-unused-command-line-argument

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**ProLiant Compute DL345 Gen12**

(2.30 Ghz, AMD EPYC 9645)

**SPECrate®2017\_fp\_base = 894**

**SPECrate®2017\_fp\_peak = 949**

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Dec-2025

**Hardware Availability:** Jul-2025

**Software Availability:** Oct-2025

## Base Other Flags (Continued)

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++

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:

(Continued on next page)



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ProLiant Compute DL345 Gen12

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SPECrate®2017\_fp\_base = 894

SPECrate®2017\_fp\_peak = 949

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Dec-2025

Hardware Availability: Jul-2025

Software Availability: Oct-2025

## Peak Optimization Flags (Continued)

519.lbm\_r: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast  
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto  
-fstruct-layout=7 -mllvm -unroll-threshold=50  
-fremap-arrays -fstrip-mining  
-mllvm -inline-threshold=1000  
-mllvm -reduce-array-computations=3 -zopt -lamdlibm  
-lamdalloc -ldl

538.imagick\_r: Same as 519.lbm\_r

544.nab\_r: -m64 -flto -Wl,-mllvm -Wl,-ldist-scalar-expand  
-fenable-aggressive-gather -Ofast -march=znver5  
-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 -ldl

C++ benchmarks:

508.namd\_r: -m64 -std=c++14  
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3  
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast  
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto  
-mllvm -unroll-threshold=100  
-mllvm -reduce-array-computations=3 -zopt -lamdlibm  
-lamdalloc -ldl

510.parest\_r: basepeak = yes

Fortran benchmarks:

503.bwaves\_r: basepeak = yes

549.fotonik3d\_r: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast  
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto  
-Mrecursive -mllvm -reduce-array-computations=3  
-fepilog-vectorization-of-inductions -fvector-transform  
-fscalar-transform -lamdlibm -lamdalloc -ldl -lflang

554.roms\_r: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast  
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto

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**ProLiant Compute DL345 Gen12**

(2.30 Ghz, AMD EPYC 9645)

**SPECrate®2017\_fp\_base = 894**

**SPECrate®2017\_fp\_peak = 949**

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Dec-2025

**Hardware Availability:** Jul-2025

**Software Availability:** Oct-2025

## Peak Optimization Flags (Continued)

554.roms\_r (continued):

-Mrecursive -mllvm -reduce-array-computations=3  
-fepilog-vectorization-of-inductions -zopt -lamdlibm  
-lamdalloc -ldl -lflang

Benchmarks using both Fortran and C:

521.wrf\_r: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast  
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto  
-fstruct-layout=7 -mllvm -unroll-threshold=50  
-fremap-arrays -fstrip-mining  
-mllvm -inline-threshold=1000  
-mllvm -reduce-array-computations=3 -zopt -Mrecursive  
-funroll-loops -mllvm -lsr-in-nested-loop  
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc  
-ldl -lflang

527.cam4\_r: basepeak = yes

Benchmarks using both C and C++:

511.povray\_r: -m64 -std=c++14  
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3  
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false  
-Wl,-mllvm -Wl,-extra-inliner -Ofast -march=znver5  
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=7  
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000  
-fremap-arrays -mllvm -reduce-array-computations=3 -zopt  
-mllvm -unroll-threshold=100  
-mllvm -loop-unswitch-threshold=200000 -lamdlibm  
-lamdalloc -ldl

526.blender\_r: -m64 -std=c++14  
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3  
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast  
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto  
-fstruct-layout=7 -mllvm -unroll-threshold=50  
-fremap-arrays -fstrip-mining  
-mllvm -inline-threshold=1000  
-mllvm -reduce-array-computations=3 -zopt  
-mllvm -unroll-threshold=100 -lamdlibm -lamdalloc -ldl

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**ProLiant Compute DL345 Gen12**

(2.30 Ghz, AMD EPYC 9645)

**SPECrate®2017\_fp\_base = 894**

**SPECrate®2017\_fp\_peak = 949**

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Dec-2025

**Hardware Availability:** Jul-2025

**Software Availability:** Oct-2025

## Peak Optimization Flags (Continued)

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-Turin-rev1.10.html>

<http://www.spec.org/cpu2017/flags/aocc500-flags.2024-10-10.html>

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

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-Turin-rev1.10.xml>

<http://www.spec.org/cpu2017/flags/aocc500-flags.2024-10-10.xml>

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