# SPEC CPU®2017 Floating Point Rate Result

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## Hewlett Packard Enterprise

(Test Sponsor: HPE)

### ProLiant DL385 Gen11
(3.65 GHz, AMD EPYC 9475F)

$SPECrate®2017\_fp\_base = 1570$

$SPECrate®2017\_fp\_peak = 1580$

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Nov-2024

**Hardware Availability:** Jan-2025

**Software Availability:** Sep-2024

| Copies | |
|---|---|
| 503.bwaves_r | 192 | 7110 / 7160 |
| 507.cactuBSSN_r | 192 | 1990 |
| 508.namd_r | 192 | 1050 |
| 510.parest_r | 192 | 1130 / 1130 |
| 511.povray_r | 192 | 1450 / 1470 |
| 519.lbm_r | 192 | 761 / 761 |
| 521.wrf_r | 192 | 1240 / 1240 |
| 526.blender_r | 192 | 1490 / 1510 |
| 527.cam4_r | 192 | 1620 / 1620 |
| 538.imagick_r | 192 | 5080 |
| 544.nab_r | 192 | 2420 / 2470 |
| 549.fotonik3d_r | 192 | 719 / 728 |
| 554.roms_r | 192 | 709 / 717 |

—— **SPECrate®2017_fp_base (1570)**      ------ **SPECrate®2017_fp_peak (1580)**

## Hardware

CPU Name: AMD EPYC 9475F
Max MHz: 4800
Nominal: 3650
Enabled: 96 cores, 2 chips, 2 threads/core
Orderable: 1,2 chips
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 / 6 cores
Other: None
Memory: 768 GB (24 x 32 GB 2Rx8 PC5-6400B-R, running at 6000)
Storage: 1 x 480 GB SATA 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 v2.20 10/31/2024 released Oct-2024
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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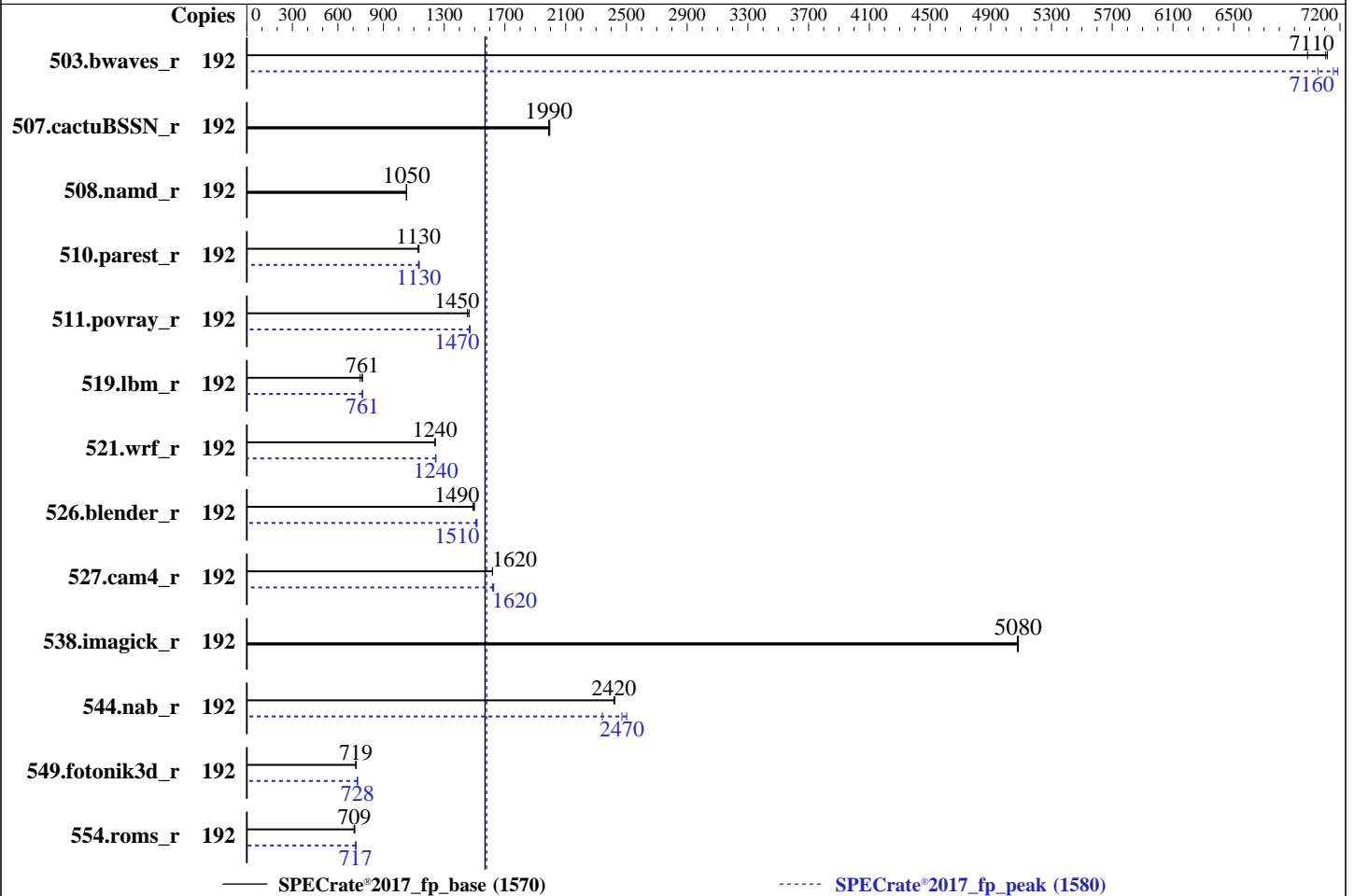
SPECrate®2017_fp_peak = 1580

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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 | 192 | 276 | 6990 | 271 | 7120 | **271** | **7110** | 192 | **269** | **7160** | 273 | 7050 | 268 | 7190 |
| 507.cactuBSSN_r | 192 | **122** | **1990** | 122 | 1990 | 122 | 2000 | 192 | **122** | **1990** | 122 | 1990 | 122 | 2000 |
| 508.namd_r | 192 | 173 | 1050 | **173** | **1050** | 174 | 1050 | 192 | 173 | 1050 | **173** | **1050** | 174 | 1050 |
| 510.parest_r | 192 | **445** | **1130** | 443 | 1130 | 445 | 1130 | 192 | 442 | 1140 | 444 | 1130 | **443** | **1130** |
| 511.povray_r | 192 | 308 | 1450 | **308** | **1450** | 306 | 1460 | 192 | 306 | 1470 | 305 | 1470 | **305** | **1470** |
| 519.lbm_r | 192 | 266 | 761 | 271 | 747 | **266** | **761** | 192 | 266 | 761 | **266** | **761** | 266 | 761 |
| 521.wrf_r | 192 | **347** | **1240** | 347 | 1240 | 347 | 1240 | 192 | 345 | 1240 | **346** | **1240** | 346 | 1240 |
| 526.blender_r | 192 | 195 | 1500 | 196 | 1490 | **196** | **1490** | 192 | 194 | 1510 | 193 | 1520 | **193** | **1510** |
| 527.cam4_r | 192 | 207 | 1620 | **207** | **1620** | 208 | 1620 | 192 | 207 | 1620 | 207 | 1630 | **207** | **1620** |
| 538.imagick_r | 192 | 94.1 | 5070 | **94.0** | **5080** | 94.0 | 5080 | 192 | 94.1 | 5070 | **94.0** | **5080** | 94.0 | 5080 |
| 544.nab_r | 192 | 134 | 2420 | **134** | **2420** | 133 | 2420 | 192 | 138 | 2340 | **131** | **2470** | 129 | 2500 |
| 549.fotonik3d_r | 192 | **1041** | **719** | 1042 | 718 | 1041 | 719 | 192 | 1028 | 728 | 1026 | 729 | **1027** | **728** |
| 554.roms_r | 192 | 429 | 711 | **430** | **709** | 432 | 706 | 192 | 424 | 719 | 426 | 716 | **425** | **717** |
| **SPECrate®2017_fp_base =** | **1570** | | | | | | | | | | | | |
| **SPECrate®2017_fp_peak =** | **1580** | | | | | | | | | | | | |

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,
```

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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_new/amd_rate_aocc500_znver5_A_lib/lib:/home/cpu2017_new/amd_rate_aocc500_znver5_A_lib/l
     ib32:"
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
ACPI CST C2 Latency set to 18 microseconds
Thermal Configuration set to Maximum Cooling
NUMA memory domains per socket set to Four memory domains per socket
Last-Level Cache (LLC) as NUMA Node set to Enabled
Workload Profile set to Custom
 Power Regulator set to OS Control Mode
The reference code/AGESA version used in this ROM is version Turin-PI 1.0.0.2

Sysinfo program /home/cpu2017_new/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Wed Nov 20 10:35:55 2024

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
```

*(Continued on next page)*

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## Platform Notes (Continued)

```
   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
  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/lp)
     x86_64 x86_64 x86_64 GNU/Linux

     ------------------------------------------------------------
   2. w
      10:35:55 up 1 min,  3 users,  load average: 7.62, 4.53, 1.75
      USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
      root     pts/0    172.17.1.96      10:35   19.00s  0.79s  0.09s /bin/bash ./amd_rate_aocc500_znver5_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) 3094436
     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) 3094436
     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@pts/0
     -bash
     python3 ./run_fprate.py
```

**(Continued on next page)**

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## Platform Notes (Continued)

```
 /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
   $SPEC/tmp/CPU2017.008/templogs/preenv.fprate.008.0.log --lognum 008.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /home/cpu2017_new


 --------------------------------------------------------------
 6. /proc/cpuinfo
    model name      : AMD EPYC 9475F 48-Core Processor
    vendor_id       : AuthenticAMD
    cpu family      : 26
    model           : 2
    stepping        : 1
    microcode       : 0xb00211a
    bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
    TLB size        : 192 4K pages
    cpu cores       : 48
    siblings        : 96
    2 physical ids (chips)
    192 processors (hardware threads)
    physical id 0: core ids 0-5,8-13,16-21,24-29,32-37,40-45,48-53,56-61
    physical id 1: core ids 0-5,8-13,16-21,24-29,32-37,40-45,48-53,56-61
    physical id 0: apicids 0-11,16-27,32-43,48-59,64-75,80-91,96-107,112-123
    physical id 1: apicids 128-139,144-155,160-171,176-187,192-203,208-219,224-235,240-251
 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 9475F 48-Core Processor
  BIOS Model name:        AMD EPYC 9475F 48-Core Processor          CPU @ 3.6GHz
  BIOS CPU family:        107
  CPU family:             26
  Model:                  2
  Thread(s) per core:     2
  Core(s) per socket:     48
  Socket(s):              2
  Stepping:               1
  Frequency boost:        enabled
  CPU(s) scaling MHz:     101%
  CPU max MHz:            3650.0000
  CPU min MHz:            1500.0000
  BogoMIPS:               7288.30
  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
```

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## Platform Notes (Continued)

```
                           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 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
                           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
  Virtualization:          AMD-V
  L1d cache:               4.5 MiB (96 instances)
  L1i cache:               3 MiB (96 instances)
  L2 cache:                96 MiB (96 instances)
  L3 cache:                512 MiB (16 instances)
  NUMA node(s):            8
  NUMA node0 CPU(s):       0-11,96-107
  NUMA node1 CPU(s):       12-23,108-119
  NUMA node2 CPU(s):       24-35,120-131
  NUMA node3 CPU(s):       36-47,132-143
  NUMA node4 CPU(s):       48-59,144-155
  NUMA node5 CPU(s):       60-71,156-167
  NUMA node6 CPU(s):       72-83,168-179
  NUMA node7 CPU(s):       84-95,180-191
  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; PBRSB-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     512M   16 Unified          3 32768        1             64

    -----------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 8 nodes (0-7)
    node 0 cpus: 0-11,96-107
    node 0 size: 96446 MB
    node 0 free: 95943 MB
    node 1 cpus: 12-23,108-119
```

(Continued on next page)

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## Platform Notes (Continued)

```
   node 1 size: 96761 MB
   node 1 free: 96369 MB
   node 2 cpus: 24-35,120-131
   node 2 size: 96723 MB
   node 2 free: 96365 MB
   node 3 cpus: 36-47,132-143
   node 3 size: 96761 MB
   node 3 free: 96301 MB
   node 4 cpus: 48-59,144-155
   node 4 size: 96761 MB
   node 4 free: 96311 MB
   node 5 cpus: 60-71,156-167
   node 5 size: 96761 MB
   node 5 free: 96409 MB
   node 6 cpus: 72-83,168-179
   node 6 size: 96761 MB
   node 6 free: 96407 MB
   node 7 cpus: 84-95,180-191
   node 7 size: 96662 MB
   node 7 free: 96147 MB
   node distances:
   node   0   1   2   3   4   5   6   7
     0:  10  12  12  12  32  32  32  32
     1:  12  10  12  12  32  32  32  32
     2:  12  12  10  12  32  32  32  32
     3:  12  12  12  10  32  32  32  32
     4:  32  32  32  32  10  12  12  12
     5:  32  32  32  32  12  10  12  12
     6:  32  32  32  32  12  12  10  12
     7:  32  32  32  32  12  12  12  10


   ----------------------------------------------------------
9. /proc/meminfo
   MemTotal:       792206724 kB


   ----------------------------------------------------------
10. who -r
   run-level 5 Nov 20 10:35


   ----------------------------------------------------------
11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)
   Default Target  Status
   graphical       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 nscd 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 ipmievd
                   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
```

**(Continued on next page)**

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## Platform Notes (Continued)

```
                    systemd-timesyncd tuned udisks2 update-system-flatpaks upower vncserver@ wpa_supplicant@
  indirect          pcscd 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=9579ceda-034d-4a9c-a590-1ac3c83e5f78
    splash=silent
    mitigations=auto
    quiet
    security=apparmor


  ----------------------------------------------------------
  14. cpupower frequency-info
    analyzing CPU 144:
      current policy: frequency should be within 1.50 GHz and 3.65 GHz.
                      The governor "performance" may decide which speed to use
                      within this range.
    boost state support:
      Supported: yes
      Active: yes


  ----------------------------------------------------------
  15. tuned-adm active
    It seems that tuned daemon is not running, preset profile is not activated.
    Preset 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 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
```

(Continued on next page)

## Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL385 Gen11
(3.65 GHz, AMD EPYC 9475F)

$SPECrate®2017\_fp\_base = 1570$

$SPECrate®2017\_fp\_peak = 1580$

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

**Test Date:** Nov-2024
**Hardware Availability:** Jan-2025
**Software Availability:** Sep-2024

## Platform Notes (Continued)

```
    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_new
      Filesystem     Type   Size  Used Avail Use% Mounted on
      /dev/sdd2      btrfs  447G   33G  411G   8% /home

    ----------------------------------------------------------------
    21. /sys/devices/virtual/dmi/id
        Vendor:        HPE
        Product:       ProLiant DL385 Gen11
        Product Family: ProLiant
        Serial:        DL385G11-003

    ----------------------------------------------------------------
    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:
        24x Hynix HMCG88AHBRA471N 32 GB 2 rank 6400, configured at 6000


    ----------------------------------------------------------------
    23. BIOS
    (This section combines info from /sys/devices and dmidecode.)
        BIOS Vendor:       HPE
        BIOS Version:      2.20
        BIOS Date:         10/31/2024
        BIOS Revision:     2.20
        Firmware Revision: 1.63
```

## 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
```

**(Continued on next page)**

# SPEC CPU®2017 Floating Point Rate Result

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## Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL385 Gen11
(3.65 GHz, AMD EPYC 9475F)

SPECrate®2017_fp_base = 1570

SPECrate®2017_fp_peak = 1580

## Compiler Version Notes (Continued)

```
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
------------------------------------------------------------------------------------------


==============================================================================================
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
------------------------------------------------------------------------------------------
```

# SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL385 Gen11
(3.65 GHz, AMD EPYC 9475F)

**SPECrate®2017_fp_base = 1570**

**SPECrate®2017_fp_peak = 1580**

| | | | |
|---|---|---|---|
| **CPU2017 License:** 3 | | **Test Date:** | Nov-2024 |
| **Test Sponsor:** | HPE | **Hardware Availability:** | Jan-2025 |
| **Tested by:** | HPE | **Software Availability:** | Sep-2024 |

## 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`

## 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`

**(Continued on next page)**

Standard Performance Evaluation Corporation (info@spec.org) https://www.spec.org/

Hewlett Packard Enterprise
(Test Sponsor: HPE)

SPECrate®2017_fp_base = 1570

ProLiant DL385 Gen11
(3.65 GHz, AMD EPYC 9475F)

SPECrate®2017_fp_peak = 1580

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

**Test Date:** Nov-2024  
**Hardware Availability:** Jan-2025  
**Software Availability:** Sep-2024  

# Base Optimization Flags (Continued)

C benchmarks (continued):
```
-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
```

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
```

**(Continued on next page)**

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL385 Gen11
(3.65 GHz, AMD EPYC 9475F)

SPECrate®2017_fp_base = 1570

SPECrate®2017_fp_peak = 1580

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

**Test Date:** Nov-2024
**Hardware Availability:** Jan-2025
**Software Availability:** Sep-2024

# Base Optimization Flags (Continued)

Benchmarks using both C and C++ (continued):
```
-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
```

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
```

**(Continued on next page)**

## Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL385 Gen11
(3.65 GHz, AMD EPYC 9475F)

SPECrate®2017_fp_base = 1570

SPECrate®2017_fp_peak = 1580

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

**Test Date:** Nov-2024
**Hardware Availability:** Jan-2025
**Software Availability:** Sep-2024

# Peak Compiler Invocation (Continued)

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:

```
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: basepeak = yes
```

```
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
```

**(Continued on next page)**

Hewlett Packard Enterprise
(Test Sponsor: HPE)

SPECrate®2017_fp_base = 1570

ProLiant DL385 Gen11
(3.65 GHz, AMD EPYC 9475F)

SPECrate®2017_fp_peak = 1580

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

**Test Date:** Nov-2024
**Hardware Availability:** Jan-2025
**Software Availability:** Sep-2024

# Peak Optimization Flags (Continued)

C++ benchmarks:

508.namd_r: basepeak = yes

510.parest_r: -m64 -std=c++14 -flto -Wl,-mllvm -Wl,-suppress-fmas
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math
-mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc -ldl

Fortran benchmarks:

503.bwaves_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 -zopt -lamdlibm
-lamdalloc -ldl -lflang

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: Same as 503.bwaves_r

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: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver5 -fveclib=AMDLIBM -ffast-math -flto

**(Continued on next page)**

# SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)

ProLiant DL385 Gen11
(3.65 GHz, AMD EPYC 9475F)

SPECrate®2017_fp_base = 1570

SPECrate®2017_fp_peak = 1580

| | | | |
|---|---|---|---|
| **CPU2017 License:** 3 | | **Test Date:** | Nov-2024 |
| **Test Sponsor:** | HPE | **Hardware Availability:** | Jan-2025 |
| **Tested by:** | HPE | **Software Availability:** | Sep-2024 |

## Peak Optimization Flags (Continued)

527.cam4_r (continued):
```
-fstruct-layout=7 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays
-mllvm -reduce-array-computations=3 -zopt -Mrecursive
-funroll-loops -mllvm -lsr-in-nested-loop
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc
-ldl -lflang
```

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
```

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
```

**(Continued on next page)**

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL385 Gen11
(3.65 GHz, AMD EPYC 9475F)

SPECrate®2017_fp_base = 1570

SPECrate®2017_fp_peak = 1580

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

**Test Date:** Nov-2024
**Hardware Availability:** Jan-2025
**Software Availability:** Sep-2024

# Peak 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`

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-rev1.0.html
http://www.spec.org/cpu2017/flags/aocc500-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-Turin-rev1.0.xml
http://www.spec.org/cpu2017/flags/aocc500-flags.xml

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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