# SPEC CPU®2017 Floating Point Speed Result

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## Hewlett Packard Enterprise

(Test Sponsor: HPE)
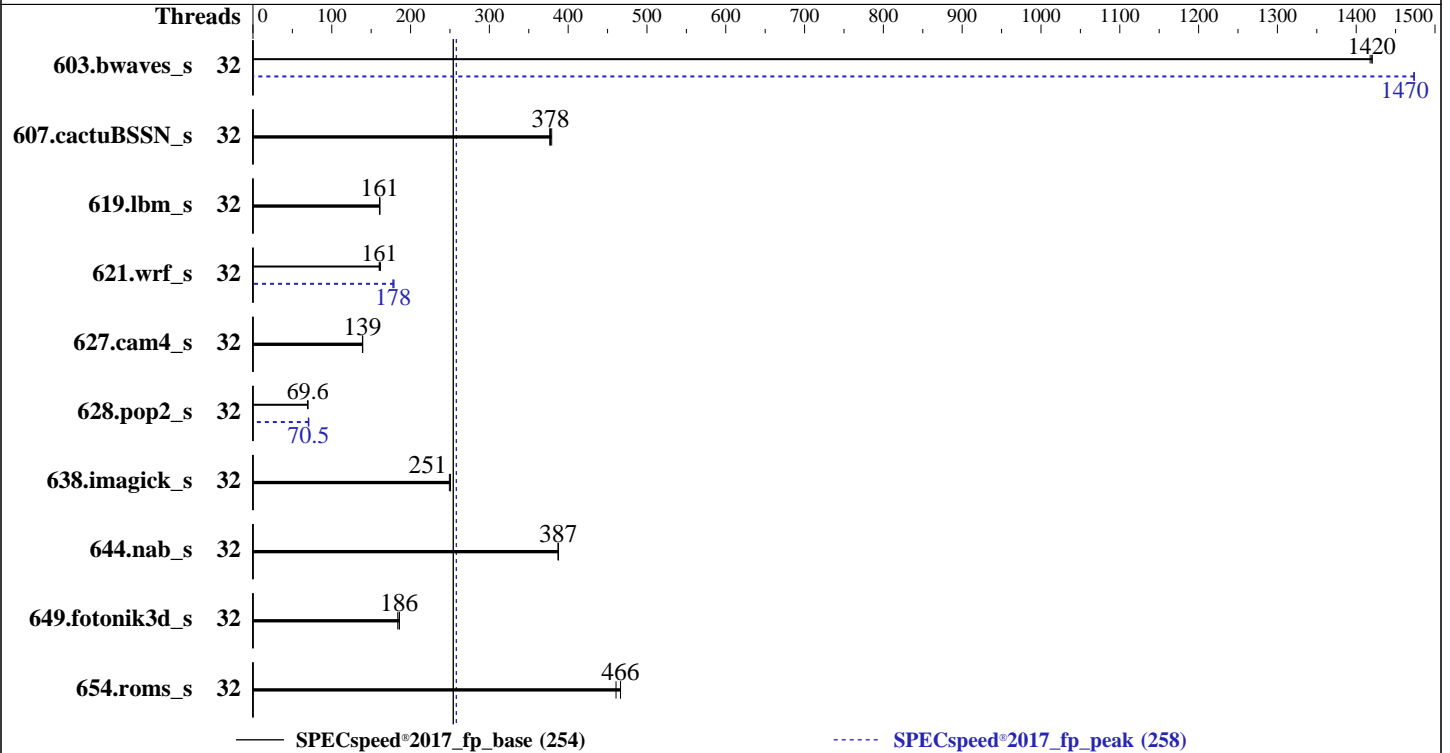
ProLiant DL365 Gen11
(3.55 GHz, AMD EPYC 9184X)

$SPECspeed®2017\_fp\_base = 254$

$SPECspeed®2017\_fp\_peak = 258$

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

**Test Date:** Oct-2023  
**Hardware Availability:** Oct-2023  
**Software Availability:** Apr-2023

Threads

| Benchmark | Threads | Value |
|---|---|---|
| 603.bwaves_s | 32 | 1420 (base), 1470 (peak) |
| 607.cactuBSSN_s | 32 | 378 |
| 619.lbm_s | 32 | 161 |
| 621.wrf_s | 32 | 161 (base), 178 (peak) |
| 627.cam4_s | 32 | 139 |
| 628.pop2_s | 32 | 69.6 (base), 70.5 (peak) |
| 638.imagick_s | 32 | 251 |
| 644.nab_s | 32 | 387 |
| 649.fotonik3d_s | 32 | 186 |
| 654.roms_s | 32 | 466 |

SPECspeed®2017_fp_base (254)     SPECspeed®2017_fp_peak (258)

## Hardware

CPU Name: AMD EPYC 9184X  
Max MHz: 4200  
Nominal: 3550  
Enabled: 32 cores, 2 chips  
Orderable: 1,2 chips  
Cache L1: 32 KB I + 32 KB D on chip per core  
L2: 1 MB I+D on chip per core  
L3: 768 MB I+D on chip per chip,  
    96 MB shared / 2 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: Yes  
Firmware: HPE BIOS Version v1.50 10/04/2023 released  
    Oct-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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| | |
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## Results Table

| Benchmark | Base | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 603.bwaves_s | 32 | 41.6 | 1420 | **41.6** | **1420** | 41.5 | 1420 | 32 | 40.0 | 1470 | 40.0 | 1470 | **40.0** | **1470** |
| 607.cactuBSSN_s | 32 | 44.3 | 377 | 44.0 | 379 | **44.1** | **378** | 32 | 44.3 | 377 | 44.0 | 379 | **44.1** | **378** |
| 619.lbm_s | 32 | 32.6 | 161 | 32.5 | 161 | **32.6** | **161** | 32 | 32.6 | 161 | 32.5 | 161 | **32.6** | **161** |
| 621.wrf_s | 32 | 81.7 | 162 | 82.6 | 160 | **82.3** | **161** | 32 | **74.4** | **178** | 74.4 | 178 | 73.9 | 179 |
| 627.cam4_s | 32 | **63.7** | **139** | 63.6 | 139 | 63.8 | 139 | 32 | **63.7** | **139** | 63.6 | 139 | 63.8 | 139 |
| 628.pop2_s | 32 | 170 | 69.8 | **171** | **69.6** | 171 | 69.2 | 32 | 169 | 70.2 | **168** | **70.5** | 167 | 70.9 |
| 638.imagick_s | 32 | 57.9 | 249 | **57.6** | **251** | 57.6 | 251 | 32 | 57.9 | 249 | **57.6** | **251** | 57.6 | 251 |
| 644.nab_s | 32 | **45.1** | **387** | 45.1 | 387 | 45.1 | 388 | 32 | **45.1** | **387** | 45.1 | 387 | 45.1 | 388 |
| 649.fotonik3d_s | 32 | 49.0 | 186 | 49.6 | 184 | **49.1** | **186** | 32 | 49.0 | 186 | 49.6 | 184 | **49.1** | **186** |
| 654.roms_s | 32 | **33.8** | **466** | 33.8 | 466 | 34.2 | 461 | 32 | **33.8** | **466** | 33.8 | 466 | 34.2 | 461 |
| **SPECspeed®2017_fp_base =** | **254** | | | | | | | | | | | | |
| **SPECspeed®2017_fp_peak =** | **258** | | | | | | | | | | | | |

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

## Compiler Notes

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

## Submit Notes

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

## Operating System Notes

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

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

To limit dirty cache to 8% of memory, 'sysctl -w vm.dirty_ratio=8' run as root.
To limit swap usage to minimum necessary, 'sysctl -w vm.swappiness=1' run as root.
To free node-local memory and avoid remote memory usage,
'sysctl -w vm.zone_reclaim_mode=1' run as root.
To clear filesystem caches, 'sync; sysctl -w vm.drop_caches=3' run as root.
To disable address space layout randomization (ASLR) to reduce run-to-run
variability, 'sysctl -w kernel.randomize_va_space=0' run as root.

To enable Transparent Hugepages (THP) for all allocations,
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.
To always enable THP for peak runs of:
603.bwaves_s, 607.cactuBSSN_s, 619.lbm_s, 627.cam4_s, 628.pop2_s, 638.imagick_s, 644.nab_s, 649.fotonik3d_s:
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled; echo always > /sys/kernel/mm/transparent_hugepage/defrag'
run as root.
To disable THP for peak runs of 621.wrf_s:
```

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ProLiant DL365 Gen11
(3.55 GHz, AMD EPYC 9184X)

$SPECspeed^{®}2017\_fp\_base = 254$

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**CPU2017 License:** 3
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## Operating System Notes (Continued)

```
'echo never > /sys/kernel/mm/transparent_hugepage/enabled; echo always > /sys/kernel/mm/transparent_hugepage/defrag'
run as root.
To enable THP only on request for peak runs of 654.roms_s:
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled; echo madvise > /sys/kernel/mm/transparent_hugepage/defrag'
run as root.
```

## Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-31"
LD_LIBRARY_PATH = "/home/cpu2017_new/amd_speed_aocc400_znver4_A_lib/lib:"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOC_CONF = "oversize_threshold:0,retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "32"

Environment variables set by runcpu during the 603.bwaves_s peak run:
GOMP_CPU_AFFINITY = "0-31"

Environment variables set by runcpu during the 621.wrf_s peak run:
GOMP_CPU_AFFINITY = "0-31"

Environment variables set by runcpu during the 628.pop2_s peak run:
GOMP_CPU_AFFINITY = "0-31"
```

## General Notes

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

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
is mitigated in the system as tested and documented.
```

## Platform Notes

```
 BIOS Configuration
  Workload Profile set to General Peak Frequency Compute
  Determinism Control set to Manual
  Performance Determinism set to Power Deterministic
  AMD SMT Option set to Disabled
  Memory Patrol Scrubbing set to Disabled
  Last-Level Cache (LLC) as NUMA Node set to Enabled
  ACPI CST C2 Latency set to 18 microseconds
  Memory PStates set to Disabled
  Thermal Configuration set to Maximum Cooling
  Workload Profile set to Custom
    Power Regulator set to OS Control Mode
 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
```

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## Platform Notes (Continued)

```
ROM is version Genoa-XPI 1.0.0.9

Sysinfo program /home/cpu2017_new/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on dhcp-10-30-21-52 Mon Oct 30 19:42:41 2023

SUT (System Under Test) info as seen by some common utilities.

-----------------------------------------------------------
Table of contents
-----------------------------------------------------------
 1. uname -a
 2. w
 3. Username
 4. ulimit -a
 5. sysinfo process ancestry
 6. /proc/cpuinfo
 7. lscpu
 8. numactl --hardware
 9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 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 dhcp-10-30-21-52 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022
  (49db222) x86_64 x86_64 x86_64 GNU/Linux


-----------------------------------------------------------
2. w
  19:42:42 up  4:25,  1 user,  load average: 2.36, 0.99, 0.38
  USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
  root     pts/0    10.30.195.94     29Apr22 33.00s  1.20s  0.10s /bin/bash ./amd_speed_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) 3094800
  max locked memory       (kbytes, -l) 2097152
  max memory size         (kbytes, -m) unlimited
```

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## Platform Notes (Continued)

```
  open files                (-n) 1024
  pipe size          (512 bytes, -p) 8
  POSIX message queues     (bytes, -q) 819200
  real-time priority        (-r) 0
  stack size            (kbytes, -s) unlimited
  cpu time             (seconds, -t) unlimited
  max user processes        (-u) 3094800
  virtual memory        (kbytes, -v) unlimited
  file locks                (-x) unlimited


  -----------------------------------------------------------
  5. sysinfo process ancestry
  /usr/lib/systemd/systemd --switched-root --system --deserialize 30
  sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
  sshd: root@pts/0
  -bash
  python3 ./run_fpspeed.py
  /bin/bash ./amd_speed_aocc400_znver4_A1.sh
  runcpu --config amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 fpspeed
  runcpu --configfile amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
    --runmode speed --tune base:peak --size test:train:refspeed fpspeed --nopreenv --note-preenv --logfile
    $SPEC/tmp/CPU2017.005/templogs/preenv.fpspeed.005.0.log --lognum 005.0 --from_runcpu 2
  specperl $SPEC/bin/sysinfo
  $SPEC = /home/cpu2017_new


  -----------------------------------------------------------
  6. /proc/cpuinfo
      model name      : AMD EPYC 9184X 16-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       : 16
      siblings        : 16
      2 physical ids (chips)
      32 processors (hardware threads)
      physical id 0: core ids 0-15
      physical id 1: core ids 0-15
      physical id 0: apicids 0-15
      physical id 1: apicids 16-31
   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):                   32
  On-line CPU(s) list:      0-31
  Vendor ID:                AuthenticAMD
  Model name:               AMD EPYC 9184X 16-Core Processor
  CPU family:               25
  Model:                    17
```

**(Continued on next page)**

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## Platform Notes (Continued)

```
   Thread(s) per core:          1
   Core(s) per socket:          16
   Socket(s):                   2
   Stepping:                    2
   Frequency boost:             enabled
   CPU max MHz:                 3550.0000
   CPU min MHz:                 1500.0000
   BogoMIPS:                    7089.20
   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 movbe popcnt aes
                                xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a
                                misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext perfctr_core
                                perfctr_nb bpext perfctr_llc mwaitx cpb cat_l3 cdp_l3 invpcid_single
                                hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbase bmi1 avx2 smep bmi2
                                erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma
                                clflushopt clwb avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec xgetbv1
                                xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local avx512_bf16
                                clzero irperf xsaveerptr rdpru wbnoinvd amd_ppin arat npt lbrv svm_lock
                                nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter
                                pfthreshold avic v_vmsave_vmload vgif v_spec_ctrl avx512vbmi umip pku
                                ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
                                avx512_vpopcntdq la57 rdpid overflow_recov succor smca fsrm flush_l1d
   Virtualization:              AMD-V
   L1d cache:                   1 MiB (32 instances)
   L1i cache:                   1 MiB (32 instances)
   L2 cache:                    32 MiB (32 instances)
   L3 cache:                    1.5 GiB (16 instances)
   NUMA node(s):                16
   NUMA node0 CPU(s):           0,1
   NUMA node1 CPU(s):           2,3
   NUMA node2 CPU(s):           4,5
   NUMA node3 CPU(s):           6,7
   NUMA node4 CPU(s):           8,9
   NUMA node5 CPU(s):           10,11
   NUMA node6 CPU(s):           12,13
   NUMA node7 CPU(s):           14,15
   NUMA node8 CPU(s):           16,17
   NUMA node9 CPU(s):           18,19
   NUMA node10 CPU(s):          20,21
   NUMA node11 CPU(s):          22,23
   NUMA node12 CPU(s):          24,25
   NUMA node13 CPU(s):          26,27
   NUMA node14 CPU(s):          28,29
   NUMA node15 CPU(s):          30,31
   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 disabled, RSB
                                filling
   Vulnerability Srbds:         Not affected
   Vulnerability Tsx async abort: Not affected

 From lscpu --cache:
     NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL  SETS PHY-LINE COHERENCY-SIZE
     L1d       32K       1M   8 Data             1    64        1             64
```

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## Platform Notes (Continued)

```
    L1i         32K       1M     8 Instruction    1    64       1            64
    L2           1M      32M     8 Unified        2  2048       1            64
    L3          96M     1.5G    16 Unified        3 98304       1            64


    ------------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 16 nodes (0-15)
    node 0 cpus: 0-1
    node 0 size: 48072 MB
    node 0 free: 47526 MB
    node 1 cpus: 2-3
    node 1 size: 48383 MB
    node 1 free: 48247 MB
    node 2 cpus: 4-5
    node 2 size: 48383 MB
    node 2 free: 48265 MB
    node 3 cpus: 6-7
    node 3 size: 48383 MB
    node 3 free: 48297 MB
    node 4 cpus: 8-9
    node 4 size: 48383 MB
    node 4 free: 48243 MB
    node 5 cpus: 10-11
    node 5 size: 48383 MB
    node 5 free: 48319 MB
    node 6 cpus: 12-13
    node 6 size: 48383 MB
    node 6 free: 48332 MB
    node 7 cpus: 14-15
    node 7 size: 48383 MB
    node 7 free: 48321 MB
    node 8 cpus: 16-17
    node 8 size: 48383 MB
    node 8 free: 48181 MB
    node 9 cpus: 18-19
    node 9 size: 48348 MB
    node 9 free: 48197 MB
    node 10 cpus: 20-21
    node 10 size: 48383 MB
    node 10 free: 48231 MB
    node 11 cpus: 22-23
    node 11 size: 48383 MB
    node 11 free: 48308 MB
    node 12 cpus: 24-25
    node 12 size: 48383 MB
    node 12 free: 48250 MB
    node 13 cpus: 26-27
    node 13 size: 48320 MB
    node 13 free: 48178 MB
    node 14 cpus: 28-29
    node 14 size: 48383 MB
    node 14 free: 48321 MB
    node 15 cpus: 30-31
    node 15 size: 48383 MB
    node 15 free: 48261 MB
    node distances:
    node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
      0:  10  11  11  11  11  11  11  11  32  32  32  32  32  32  32  32
      1:  11  10  11  11  11  11  11  11  32  32  32  32  32  32  32  32
```

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## Platform Notes (Continued)

```
   2:  11  11  10  11  11  11  11  11  32  32  32  32  32  32  32  32
   3:  11  11  11  10  11  11  11  11  32  32  32  32  32  32  32  32
   4:  11  11  11  11  10  11  11  11  32  32  32  32  32  32  32  32
   5:  11  11  11  11  11  10  11  11  32  32  32  32  32  32  32  32
   6:  11  11  11  11  11  11  10  11  32  32  32  32  32  32  32  32
   7:  11  11  11  11  11  11  11  10  32  32  32  32  32  32  32  32
   8:  32  32  32  32  32  32  32  32  10  11  11  11  11  11  11  11
   9:  32  32  32  32  32  32  32  32  11  10  11  11  11  11  11  11
  10:  32  32  32  32  32  32  32  32  11  11  10  11  11  11  11  11
  11:  32  32  32  32  32  32  32  32  11  11  11  10  11  11  11  11
  12:  32  32  32  32  32  32  32  32  11  11  11  11  10  11  11  11
  13:  32  32  32  32  32  32  32  32  11  11  11  11  11  10  11  11
  14:  32  32  32  32  32  32  32  32  11  11  11  11  11  11  10  11
  15:  32  32  32  32  32  32  32  32  11  11  11  11  11  11  11  10

    -----------------------------------------------------------
 9. /proc/meminfo
   MemTotal:       792294516 kB


    -----------------------------------------------------------
 10. who -r
   run-level 5 Apr 29 17:30


    -----------------------------------------------------------
 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 getty@ haveged irqbalance iscsi issue-generator kbdsettings klog
                     lvm2-monitor nscd postfix purge-kernels rollback rsyslog smartd sshd 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
                     appstream-sync-cache 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 gpm grub2-once
                     haveged-switch-root hwloc-dump-hwdata ipmi ipmievd iscsi-init iscsid iscsiuio
                     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-sysext
                     systemd-time-wait-sync systemd-timesyncd tuned udisks2 upower wpa_supplicant@
   indirect          pcscd saned@ wickedd
    -----------------------------------------------------------
 13. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
   root=UUID=91b15b95-5164-421e-a750-9b28f78d5e7c
   splash=silent
   mitigations=auto
   quiet
   security=apparmor


    -----------------------------------------------------------
 14. cpupower frequency-info
   analyzing CPU 0:
```

**(Continued on next page)**

# SPEC CPU®2017 Floating Point Speed Result

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## Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL365 Gen11
(3.55 GHz, AMD EPYC 9184X)

$SPECspeed^{®}2017\_fp\_base = 254$

$SPECspeed^{®}2017\_fp\_peak = 258$

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

**Test Date:** Oct-2023
**Hardware Availability:** Oct-2023
**Software Availability:** Apr-2023

## Platform Notes (Continued)

```
     current policy: frequency should be within 1.50 GHz and 3.55 GHz.
                     The governor "performance" may decide which speed to use
                     within this range.
   boost state support:
     Supported: yes
     Active: yes


   ----------------------------------------------------------------
15. tuned-adm active
   It seems that tuned daemon is not running, preset profile is not activated.
   Preset profile: latency-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
   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_new
   Filesystem      Type   Size  Used Avail Use% Mounted on
```

**(Continued on next page)**

Hewlett Packard Enterprise

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## Platform Notes (Continued)

```
   /dev/sdb3      btrfs  445G   89G  355G  20% /home


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


   ----------------------------------------------------------
 22. dmidecode
    Additional information from dmidecode 3.2 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:
      4x Hynix HMCG88AEBRA168N 32 GB 2 rank 4800
      18x Hynix HMCG88MEBRA113N 32 GB 2 rank 4800
      2x Hynix HMCG88MEBRA115N 32 GB 2 rank 4800


   ----------------------------------------------------------
 23. BIOS
 (This section combines info from /sys/devices and dmidecode.)
      BIOS Vendor:       HPE
      BIOS Version:      1.50
      BIOS Date:         10/04/2023
      BIOS Revision:     1.50
      Firmware Revision: 1.50
```

## Compiler Version Notes

```
========================================================================================
C              | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)
----------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
----------------------------------------------------------------------------------------


========================================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
----------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
----------------------------------------------------------------------------------------


========================================================================================
```

**(Continued on next page)**

# SPEC CPU®2017 Floating Point Speed Result

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## Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL365 Gen11
(3.55 GHz, AMD EPYC 9184X)

$SPECspeed^{®}2017\_fp\_base = 254$

$SPECspeed^{®}2017\_fp\_peak = 258$

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

**Test Date:** Oct-2023
**Hardware Availability:** Oct-2023
**Software Availability:** Apr-2023

## Compiler Version Notes (Continued)

```
Fortran      | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak)
------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
------------------------------------------------------------------------------------------

==========================================================================================
Fortran, C   | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)
------------------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
------------------------------------------------------------------------------------------
```

## Base Compiler Invocation

C benchmarks:
`clang`

Fortran benchmarks:
`flang`

Benchmarks using both Fortran and C:
`flang clang`

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

## Base Portability Flags

603.bwaves_s: `-DSPEC_LP64`
607.cactuBSSN_s: `-DSPEC_LP64`
619.lbm_s: `-DSPEC_LP64`
621.wrf_s: `-DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64`
627.cam4_s: `-DSPEC_CASE_FLAG -DSPEC_LP64`
628.pop2_s: `-DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64`
638.imagick_s: `-DSPEC_LP64`
644.nab_s: `-DSPEC_LP64`
649.fotonik3d_s: `-DSPEC_LP64`
654.roms_s: `-DSPEC_LP64`

# SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

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

ProLiant DL365 Gen11
(3.55 GHz, AMD EPYC 9184X)

SPECspeed®2017_fp_base = 254

SPECspeed®2017_fp_peak = 258

| | | | |
|---|---|---|---|
| **CPU2017 License:** | 3 | **Test Date:** | Oct-2023 |
| **Test Sponsor:** | HPE | **Hardware Availability:** | Oct-2023 |
| **Tested by:** | HPE | **Software Availability:** | Apr-2023 |

# Base Optimization Flags

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

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

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

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

# SPEC CPU®2017 Floating Point Speed Result

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## Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL365 Gen11
(3.55 GHz, AMD EPYC 9184X)

SPECspeed®2017_fp_base = 254

SPECspeed®2017_fp_peak = 258

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Oct-2023

**Hardware Availability:** Oct-2023

**Software Availability:** Apr-2023

# Base Other Flags

C benchmarks:
```
-Wno-return-type -Wno-unused-command-line-argument
```

Fortran benchmarks:
```
-Wno-unused-command-line-argument
```

Benchmarks using both Fortran and C:
```
-Wno-return-type -Wno-unused-command-line-argument
```

Benchmarks using Fortran, C, and C++:
```
-Wno-return-type -Wno-unused-command-line-argument
```

# Peak Compiler Invocation

C benchmarks:
```
clang
```

Fortran benchmarks:
```
flang
```

Benchmarks using both Fortran and C:
```
flang clang
```

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

# Peak Portability Flags

```
Same as Base Portability Flags
```

# Peak Optimization Flags

C benchmarks:

619.lbm_s: `basepeak = yes`

638.imagick_s: `basepeak = yes`

644.nab_s: `basepeak = yes`

**(Continued on next page)**

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

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL365 Gen11
(3.55 GHz, AMD EPYC 9184X)

$SPECspeed®2017\_fp\_base = 254$

$SPECspeed®2017\_fp\_peak = 258$

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

**Test Date:** Oct-2023
**Hardware Availability:** Oct-2023
**Software Availability:** Apr-2023

# Peak Optimization Flags (Continued)

Fortran benchmarks:

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

649.fotonik3d_s: basepeak = yes

654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:

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

627.cam4_s: basepeak = yes

628.pop2_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-Mrecursive -fvector-transform -fscalar-transform
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes

# SPEC CPU®2017 Floating Point Speed Result

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| | |
|---|---|
| **CPU2017 License:** 3 | **Test Date:** Oct-2023 |
| **Test Sponsor:** HPE | **Hardware Availability:** Oct-2023 |
| **Tested by:** HPE | **Software Availability:** Apr-2023 |

# Peak Other Flags

C benchmarks:

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

Fortran benchmarks:

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

Benchmarks using both Fortran and C:

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

Benchmarks using Fortran, C, and C++:

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

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

http://www.spec.org/cpu2017/flags/aocc400-flags-A1.2.html
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-Genoa-X-rev1.5.html

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

http://www.spec.org/cpu2017/flags/aocc400-flags-A1.2.xml
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-Genoa-X-rev1.5.xml

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