SPEC CPU®2017 Floating Point Speed Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)
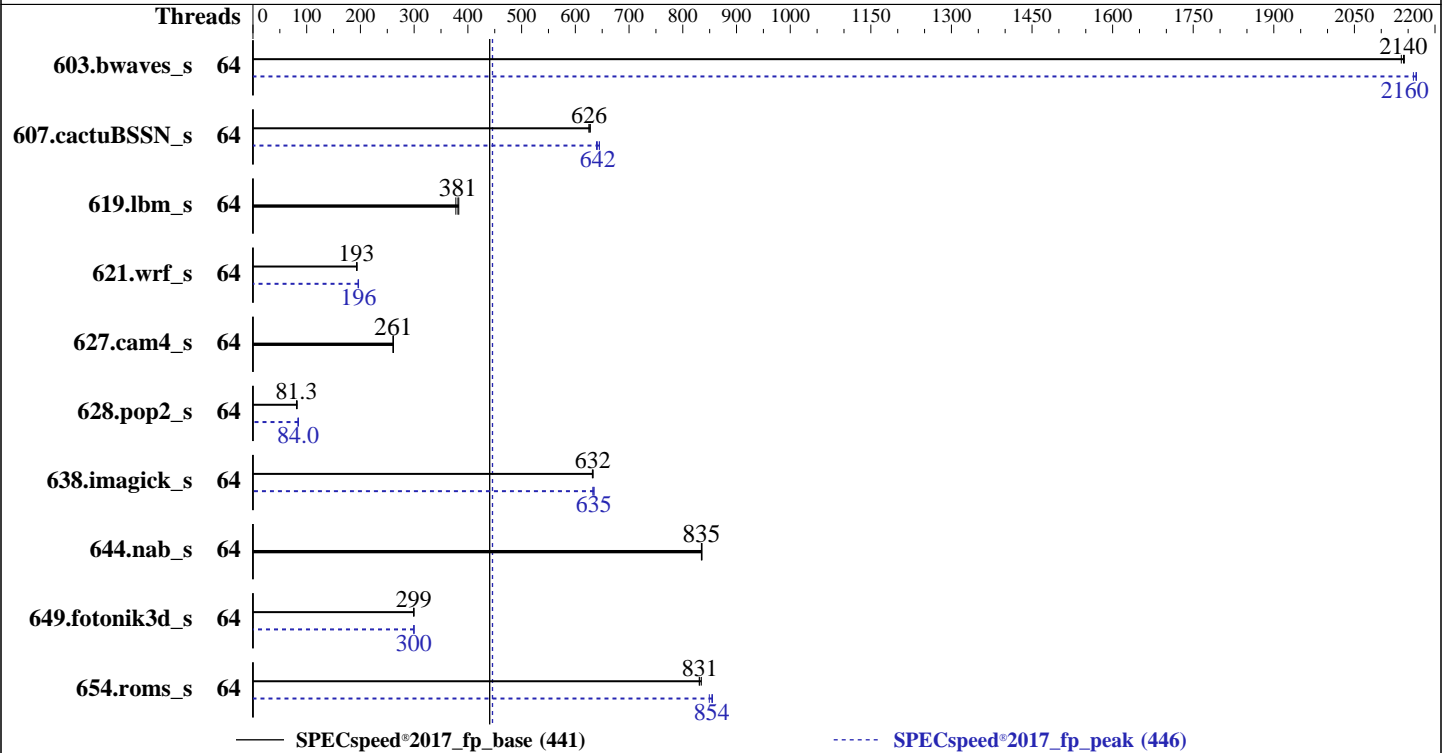
ProLiant DL365 Gen11
(3.55 GHz, AMD EPYC 9355)

$SPECspeed^{®}2017\_fp\_base = 441$

$SPECspeed^{®}2017\_fp\_peak = 446$

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Oct-2024

Hardware Availability: Nov-2024

Software Availability: Sep-2024

Threads

Benchmark	Threads	base	peak
603.bwaves_s	64	2140	2160
607.cactuBSSN_s	64	626	642
619.lbm_s	64	381	
621.wrf_s	64	193	196
627.cam4_s	64	261	
628.pop2_s	64	81.3	84.0
638.imagick_s	64	632	635
644.nab_s	64	835	
649.fotonik3d_s	64	299	300
654.roms_s	64	831	854

SPECspeed®2017_fp_base (441) — SPECspeed®2017_fp_peak (446)

Hardware

CPU Name: AMD EPYC 9355

 Max MHz: 4400

 Nominal: 3550

Enabled: 64 cores, 2 chips

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 / 4 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: Yes

Firmware: HPE BIOS Version v2.10 09/11/2024 released Sep-2024

File System: btrfs

System State: Run level 3 (multi-user)

Base Pointers: 64-bit

Peak Pointers: 64-bit

Other: None

Power Management: BIOS and OS set to prefer performance at the cost of additional power usage

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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	64	27.5	2140	27.6	2140	**27.6**	**2140**	64	27.3	2160	**27.3**	**2160**	27.2	2170
607.cactuBSSN_s	64	26.5	628	**26.6**	**626**	26.6	626	64	26.1	639	25.8	645	**26.0**	**642**
619.lbm_s	64	13.9	378	**13.7**	**381**	13.7	383	64	13.9	378	**13.7**	**381**	13.7	383
621.wrf_s	64	68.2	194	**68.5**	**193**	68.6	193	64	**67.3**	**196**	67.3	197	67.6	196
627.cam4_s	64	33.9	262	34.0	260	**33.9**	**261**	64	33.9	262	34.0	260	**33.9**	**261**
628.pop2_s	64	**146**	**81.3**	144	82.3	147	81.0	64	140	84.8	**141**	**84.0**	141	83.9
638.imagick_s	64	**22.8**	**632**	22.8	632	22.8	633	64	22.7	635	**22.7**	**635**	22.8	632
644.nab_s	64	20.9	836	20.9	835	**20.9**	**835**	64	20.9	836	20.9	835	**20.9**	**835**
649.fotonik3d_s	64	**30.4**	**299**	30.5	299	30.4	300	64	30.5	299	30.4	300	**30.4**	**300**
654.roms_s	64	18.9	835	19.0	831	**18.9**	**831**	64	18.4	855	**18.4**	**854**	18.5	849
SPECspeed®2017_fp_base =		**441**												
SPECspeed®2017_fp_peak =		**446**												

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.
```

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Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-63"
LD_LIBRARY_PATH =
     "/home/cpu2017/amd_speed_aocc500_znver5_A_lib/lib:/home/cpu2017/amd_speed_aocc500_znver5_A_lib/lib32:"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOC_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "64"

Environment variables set by runcpu during the 603.bwaves_s peak run:
GOMP_CPU_AFFINITY = "0-63"

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:
GOMP_CPU_AFFINITY = "0-63"

Environment variables set by runcpu during the 621.wrf_s peak run:
GOMP_CPU_AFFINITY = "0-63"

Environment variables set by runcpu during the 628.pop2_s peak run:
GOMP_CPU_AFFINITY = "0-63"

Environment variables set by runcpu during the 638.imagick_s peak run:
GOMP_CPU_AFFINITY = "0-63"

Environment variables set by runcpu during the 649.fotonik3d_s peak run:
GOMP_CPU_AFFINITY = "0-63"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0-63"
```

General Notes

```
Binaries were compiled on a system with 2x AMD EPYC 9D64 CPU + 500GiB Memory using Ubuntu 22.04

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
 Memory Patrol Scrubbing set to Disabled
 ACPI CST C2 Latency set to 18 microseconds
 Thermal Configuration set to Maximum Cooling
 AMD SMT Option set to Disabled
 Package Power Limit Control Mode set to Manual
 Package Power Limit Value set to 300
 Workload Profile set to Custom
```

(Continued on next page)

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Platform Notes (Continued)

```
 Power Regulator set to OS Control Mode
The reference code/AGESA version used in this ROM is version Turin-PI 1.0.0.0

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Fri Oct 25 03:16:43 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
  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. sysctl
 16. /sys/kernel/mm/transparent_hugepage
 17. /sys/kernel/mm/transparent_hugepage/khugepaged
 18. OS release
 19. Disk information
 20. /sys/devices/virtual/dmi/id
 21. dmidecode
 22. 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
    03:16:43 up 3 min,  1 user,  load average: 0.42, 1.11, 0.57
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     pts/0    172.17.1.109     03:15   15.00s  0.95s  0.26s /bin/bash ./amd_speed_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) 3094654
   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) 3094654
  virtual memory       (kbytes, -v) unlimited
  file locks                    (-x) unlimited


  ----------------------------------------------------------
  5. sysinfo process ancestry
  /usr/lib/systemd/systemd --switched-root --system --deserialize=31
  sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
  sshd: root [priv]
  sshd: root@pts/0
  -bash
  python3 ./run_fpspeed.py
  /bin/bash ./amd_speed_aocc500_znver5_A1.sh
  runcpu --config amd_speed_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 fpspeed
  runcpu --configfile amd_speed_aocc500_znver5_A1.cfg --tune all --reportable --iterations 3 --nopower
    --runmode speed --tune base:peak --size test:train:refspeed fpspeed --nopreenv --note-preenv --logfile
    $SPEC/tmp/CPU2017.001/templogs/preenv.fpspeed.001.0.log --lognum 001.0 --from_runcpu 2
  specperl $SPEC/bin/sysinfo
  $SPEC = /home/cpu2017


  ----------------------------------------------------------
  6. /proc/cpuinfo
     model name      : AMD EPYC 9355 32-Core Processor
     vendor_id       : AuthenticAMD
     cpu family      : 26
     model           : 2
     stepping        : 1
     microcode       : 0xb002116
     bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
     TLB size        : 192 4K pages
     cpu cores       : 32
     siblings        : 32
     2 physical ids (chips)
     64 processors (hardware threads)
     physical id 0: core ids 0-31
     physical id 1: core ids 0-31
     physical id 0: apicids 0-31
     physical id 1: apicids 32-63
   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):                      64
   On-line CPU(s) list:         0-63
   Vendor ID:                   AuthenticAMD
   BIOS Vendor ID:              Advanced Micro Devices, Inc.
   Model name:                  AMD EPYC 9355 32-Core Processor
```

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Platform Notes (Continued)

```
    BIOS Model name:                     AMD EPYC 9355 32-Core Processor          CPU @ 3.5GHz
    BIOS CPU family:                     107
    CPU family:                          26
    Model:                               2
    Thread(s) per core:                  1
    Core(s) per socket:                  32
    Socket(s):                           2
    Stepping:                            1
    Frequency boost:                     enabled
    CPU(s) scaling MHz:                  99%
    CPU max MHz:                         3550.0000
    CPU min MHz:                         1500.0000
    BogoMIPS:                            7089.51
    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 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:                           3 MiB (64 instances)
    L1i cache:                           2 MiB (64 instances)
    L2 cache:                            64 MiB (64 instances)
    L3 cache:                            512 MiB (16 instances)
    NUMA node(s):                        2
    NUMA node0 CPU(s):                   0-31
    NUMA node1 CPU(s):                   32-63
    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
                                         disabled; 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       3M   12 Data            1    64        1             64
```

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Platform Notes (Continued)

```
      L1i       32K      2M   8 Instruction   1   64       1          64
      L2         1M     64M  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: 2 nodes (0-1)
  node 0 cpus: 0-31
  node 0 size: 386744 MB
  node 0 free: 385799 MB
  node 1 cpus: 32-63
  node 1 size: 386944 MB
  node 1 free: 386160 MB
  node distances:
  node   0   1
    0:  10  32
    1:  32  10


   ----------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       792256868 kB


   ----------------------------------------------------------------
10. who -r
   run-level 3 Oct 25 03:13


   ----------------------------------------------------------------
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          apparmor auditd cron getty@ irqbalance issue-generator kbdsettings lvm2-monitor postfix
                    purge-kernels rollback sshd systemd-pstore wicked wickedd-auto4 wickedd-dhcp4
                    wickedd-dhcp6 wickedd-nanny
   enabled-runtime  systemd-remount-fs
   disabled         blk-availability boot-sysctl ca-certificates chrony-wait chronyd console-getty debug-shell
                    grub2-once haveged hwloc-dump-hwdata issue-add-ssh-keys kexec-load lunmask rpmconfigcheck
                    serial-getty@ systemd-boot-check-no-failures systemd-confext systemd-network-generator
                    systemd-sysext systemd-time-wait-sync systemd-timesyncd
   indirect         pcscd systemd-userdbd wickedd


   ----------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default
   root=UUID=4bcae1f8-16cc-4194-a8eb-e8f8705e985c
   splash=silent
   mitigations=auto
   quiet
   security=apparmor


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

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Platform Notes (Continued)

```
   boost state support:
     Supported: yes
     Active: yes


  ----------------------------------------------------------
15. 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


  ----------------------------------------------------------
16. /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


  ----------------------------------------------------------
17. /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


  ----------------------------------------------------------
18. OS release
  From /etc/*-release /etc/*-version
  os-release SUSE Linux Enterprise Server 15 SP6

  ----------------------------------------------------------
19. Disk information
SPEC is set to: /home/cpu2017
  Filesystem    Type   Size  Used Avail Use% Mounted on
  /dev/sda2     btrfs  445G   28G  414G   7% /home

  ----------------------------------------------------------
20. /sys/devices/virtual/dmi/id
     Vendor:        HPE
     Product:       ProLiant DL365 Gen11
     Product Family: ProLiant
     Serial:        DL365G11-001
```

(Continued on next page)

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Platform Notes (Continued)

```
        --------------------------------------------------------------
   21. 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


        --------------------------------------------------------------
   22. BIOS
   (This section combines info from /sys/devices and dmidecode.)
      BIOS Vendor:        HPE
      BIOS Version:       2.10
      BIOS Date:          09/11/2024
      BIOS Revision:      2.10
      Firmware Revision: 1.62
```

Compiler Version Notes

```
==============================================================================
C                | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(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, Fortran | 607.cactuBSSN_s(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          | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(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       | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)
```

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Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL365 Gen11
(3.55 GHz, AMD EPYC 9355)

SPECspeed®2017_fp_base = 441

SPECspeed®2017_fp_peak = 446

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

Test Date: Oct-2024
Hardware Availability: Nov-2024
Software Availability: Sep-2024

Compiler Version Notes (Continued)

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

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`

Base Optimization Flags

C benchmarks:
```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -fopenmp -DSPEC_OPENMP -flto
```

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Hewlett Packard Enterprise
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ProLiant DL365 Gen11
(3.55 GHz, AMD EPYC 9355)

SPECspeed®2017_fp_base = 441

SPECspeed®2017_fp_peak = 446

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

Base Optimization Flags (Continued)

C benchmarks (continued):
```
-fremap-arrays -fstrip-mining -fstruct-layout=7
-mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt -mrecip=none -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=znver5
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -funroll-loops
-mllvm -lsr-in-nested-loop -mllvm -reduce-array-computations=3
-Mrecursive -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=znver5
-fveclib=AMDLIBM -ffast-math -fopenmp -DSPEC_OPENMP -flto
-fremap-arrays -fstrip-mining -fstruct-layout=7
-mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt -funroll-loops
-mllvm -lsr-in-nested-loop -Mrecursive -mrecip=none -fopenmp=libomp
-lomp -lamdlibm -lamdalloc -lflang
```

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 -O3 -march=znver5
-fveclib=AMDLIBM -ffast-math -fopenmp -DSPEC_OPENMP -flto
-fremap-arrays -fstrip-mining -fstruct-layout=7
-mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt
-mllvm -loop-unswitch-threshold=200000 -mllvm -unroll-threshold=100
-funroll-loops -mllvm -lsr-in-nested-loop -Mrecursive -mrecip=none
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

Base Other Flags

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

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Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL365 Gen11
(3.55 GHz, AMD EPYC 9355)

SPECspeed®2017_fp_base = 441

SPECspeed®2017_fp_peak = 446

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

Test Date: Oct-2024
Hardware Availability: Nov-2024
Software Availability: Sep-2024

Base Other Flags (Continued)

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: `-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast`
`-march=znver5 -fveclib=AMDLIBM -ffast-math -fopenmp`
`-flto -DSPEC_OPENMP -fremap-arrays -fstrip-mining`
`-fstruct-layout=9 -mllvm -inline-threshold=1000`
`-mllvm -reduce-array-computations=3`
`-mllvm -unroll-threshold=50 -zopt -fopenmp=libomp -lomp`

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Hewlett Packard Enterprise
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ProLiant DL365 Gen11
(3.55 GHz, AMD EPYC 9355)

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CPU2017 License: 3
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Tested by: HPE

Test Date: Oct-2024
Hardware Availability: Nov-2024
Software Availability: Sep-2024

Peak Optimization Flags (Continued)

638.imagick_s (continued):
```
-lamdlibm -lamdalloc -lflang
```

644.nab_s: basepeak = yes

Fortran benchmarks:

603.bwaves_s: `-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP`
`-Ofast -march=znver5 -fveclib=AMDLIBM -ffast-math`
`-fopenmp -fscalar-transform -fvector-transform`
`-mllvm -reduce-array-computations=3 -Mrecursive`
`-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang`

649.fotonik3d_s: `-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP`
`-Ofast -march=znver5 -fveclib=AMDLIBM -ffast-math`
`-fopenmp -flto -mllvm -reduce-array-computations=3`
`-Mrecursive -zopt -fopenmp=libomp -lomp -lamdlibm`
`-lamdalloc -lflang`

654.roms_s: Same as 603.bwaves_s

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=znver5 -fveclib=AMDLIBM -ffast-math -fopenmp`
`-flto -DSPEC_OPENMP -fremap-arrays -fstrip-mining`
`-fstruct-layout=9 -mllvm -inline-threshold=1000`
`-mllvm -reduce-array-computations=3`
`-mllvm -unroll-threshold=50 -zopt -funroll-loops`
`-mllvm -lsr-in-nested-loop -Mrecursive -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=znver5 -fveclib=AMDLIBM -ffast-math -fopenmp`
`-flto -DSPEC_OPENMP -fremap-arrays -fstrip-mining`
`-fstruct-layout=9 -mllvm -inline-threshold=1000`

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SPEC CPU®2017 Floating Point Speed Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL365 Gen11
(3.55 GHz, AMD EPYC 9355)

SPECspeed®2017_fp_base = 441

SPECspeed®2017_fp_peak = 446

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

Peak Optimization Flags (Continued)

628.pop2_s (continued):
```
-mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt -fscalar-transform
-fvector-transform -Mrecursive -fopenmp=libomp -lomp
-lamdlibm -lamdalloc -lflang
```

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 -Ofast -march=znver5
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -DSPEC_OPENMP
-fremap-arrays -fstrip-mining -fstruct-layout=9
-mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3
-mllvm -unroll-threshold=50 -zopt -mllvm -unroll-threshold=100
-Mrecursive -fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

Peak Other Flags

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

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

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

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

The flags files that were used to format this result can be browsed at
  http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-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

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

SPEC CPU®2017 Floating Point Speed Result
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Hewlett Packard Enterprise
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ProLiant DL365 Gen11
(3.55 GHz, AMD EPYC 9355)

$SPECspeed®2017\_fp\_base = 441$

$SPECspeed®2017\_fp\_peak = 446$

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

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

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