SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL325 Gen11
(2.90 GHz, AMD EPYC 9254)

$SPECspeed^{®}2017\_fp\_base = 201$
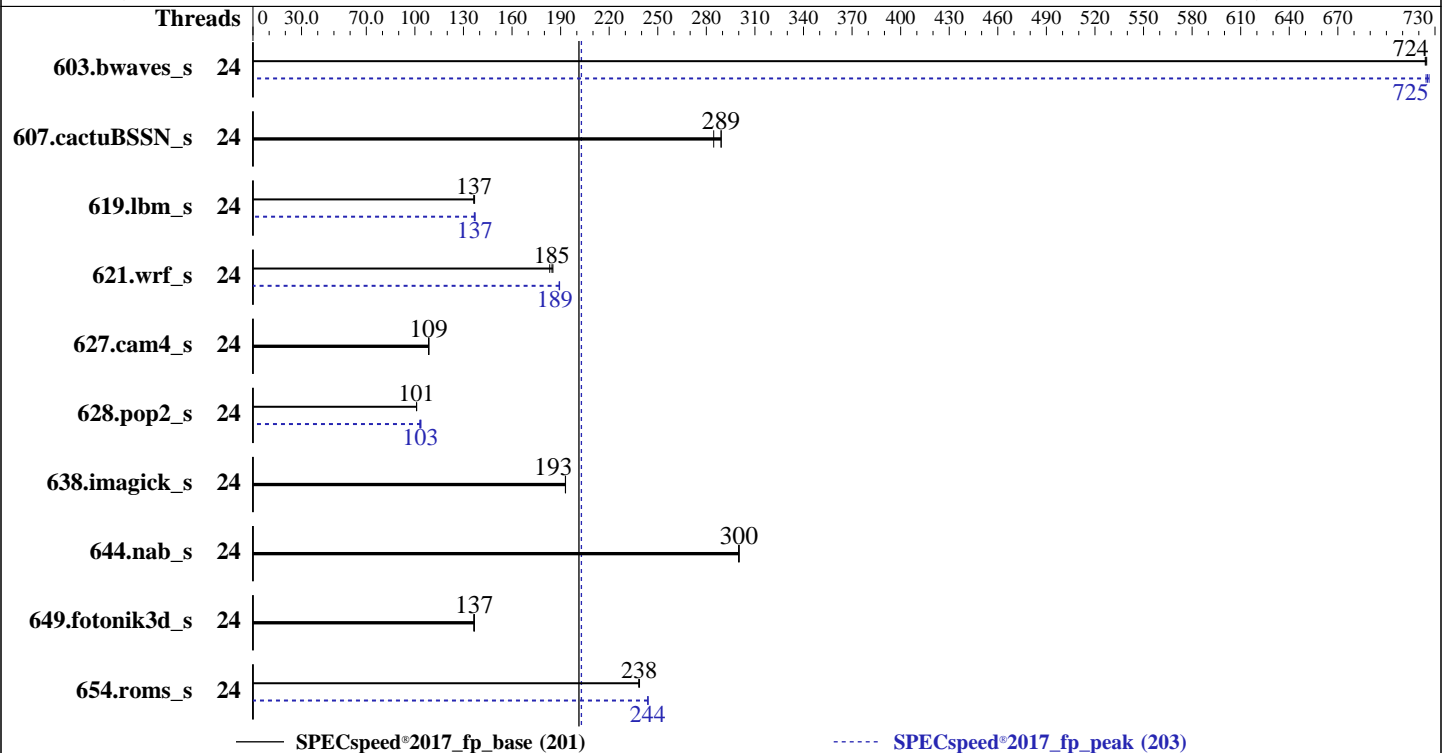
$SPECspeed^{®}2017\_fp\_peak = 203$

CPU2017 License: 3	**Test Date:**	Dec-2022
Test Sponsor: HPE	**Hardware Availability:**	Dec-2022
Tested by: HPE	**Software Availability:**	Nov-2022

Threads

- 603.bwaves_s 24 — 724 / 725
- 607.cactuBSSN_s 24 — 289
- 619.lbm_s 24 — 137 / 137
- 621.wrf_s 24 — 185 / 189
- 627.cam4_s 24 — 109
- 628.pop2_s 24 — 101 / 103
- 638.imagick_s 24 — 193
- 644.nab_s 24 — 300
- 649.fotonik3d_s 24 — 137
- 654.roms_s 24 — 238 / 244

SPECspeed®2017_fp_base (201)   SPECspeed®2017_fp_peak (203)

Hardware

CPU Name: AMD EPYC 9254
Max MHz: 4150
Nominal: 2900
Enabled: 24 cores, 1 chip
Orderable: 1 chip
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 128 MB I+D on chip per chip,
32 MB shared / 6 cores
Other: None
Memory: 768 GB (12 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 960 GB SATA SSD
Other: None

Software

OS: Red Hat Enterprise Linux 9.0 (Plow)
Kernel 5.14.0-70.13.1.el9_0.x86_64
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: Yes
Firmware: HPE BIOS Version v1.12 11/24/2022 released
Nov-2022
File System: xfs
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

SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL325 Gen11
(2.90 GHz, AMD EPYC 9254)

SPECspeed®2017_fp_base = 201

SPECspeed®2017_fp_peak = 203

CPU2017 License: 3	**Test Date:** Dec-2022
Test Sponsor: HPE	**Hardware Availability:** Dec-2022
Tested by: HPE	**Software Availability:** Nov-2022

Results Table

Benchmark	Base						Peak					
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	24	**81.5**	**724**	81.4	725	81.5	724	24	81.2	726	81.4	724	**81.3**	**725**
607.cactuBSSN_s	24	57.7	289	58.6	285	**57.7**	**289**	24	57.7	289	58.6	285	**57.7**	**289**
619.lbm_s	24	38.4	136	38.3	137	**38.3**	**137**	24	38.2	137	**38.2**	**137**	38.3	137
621.wrf_s	24	71.4	185	**71.6**	**185**	72.2	183	24	**69.9**	**189**	69.8	189	69.9	189
627.cam4_s	24	**81.7**	**109**	81.7	108	81.6	109	24	**81.7**	**109**	81.7	108	81.6	109
628.pop2_s	24	**117**	**101**	118	101	117	101	24	**115**	**103**	114	104	115	103
638.imagick_s	24	74.7	193	**74.7**	**193**	74.8	193	24	74.7	193	**74.7**	**193**	74.8	193
644.nab_s	24	58.2	300	**58.2**	**300**	58.3	300	24	58.2	300	**58.2**	**300**	58.3	300
649.fotonik3d_s	24	66.7	137	**66.7**	**137**	66.8	136	24	66.7	137	**66.7**	**137**	66.8	136
654.roms_s	24	66.1	238	**66.0**	**238**	66.0	239	24	64.5	244	**64.6**	**244**	64.6	244
SPECspeed®2017_fp_base =		**201**										
SPECspeed®2017_fp_peak =		**203**										

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.
```

(Continued on next page)

Hewlett Packard Enterprise
(Test Sponsor: HPE)

$SPECspeed^{®}2017\_fp\_base = 201$

ProLiant DL325 Gen11
(2.90 GHz, AMD EPYC 9254)

$SPECspeed^{®}2017\_fp\_peak = 203$

CPU2017 License:	3	**Test Date:**	Dec-2022
Test Sponsor:	HPE	**Hardware Availability:**	Dec-2022
Tested by:	HPE	**Software Availability:**	Nov-2022

Operating System Notes (Continued)

```
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:
'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 = "0-23"
LD_LIBRARY_PATH = "/home/cpu2017_speed/amd_speed_aocc400_genoa_B_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 = "24"

Environment variables set by runcpu during the 603.bwaves_s peak run:
GOMP_CPU_AFFINITY = "0-23"

Environment variables set by runcpu during the 619.lbm_s peak run:
GOMP_CPU_AFFINITY = "0-23"

Environment variables set by runcpu during the 621.wrf_s peak run:
GOMP_CPU_AFFINITY = "0-23"

Environment variables set by runcpu during the 628.pop2_s peak run:
GOMP_CPU_AFFINITY = "0-23"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0 12 1 13 2 14 3 15 4 16 5 17 6 18 7 19 8 20 9 21 10 22
      11 23"
```

SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL325 Gen11
(2.90 GHz, AMD EPYC 9254)

$SPECspeed®2017\_fp\_base = 201$

$SPECspeed®2017\_fp\_peak = 203$

CPU2017 License: 3		**Test Date:**	Dec-2022
Test Sponsor: HPE		**Hardware Availability:**	Dec-2022
Tested by: HPE		**Software Availability:**	Nov-2022

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
 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 0xa10110e for the
AMD EPYC 9nn4X family of processors. The reference code/AGESA version used in this
ROM is version GenoaPI 1.0.0.1-L6

 Sysinfo program /home/cpu2017_speed/bin/sysinfo
 Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
 running on localhost.localdomain Thu Apr  7 05:31:06 2022

 SUT (System Under Test) info as seen by some common utilities.
 For more information on this section, see
    https://www.spec.org/cpu2017/Docs/config.html#sysinfo

 From /proc/cpuinfo
    model name : AMD EPYC 9254 24-Core Processor
       1  "physical id"s (chips)
       24 "processors"
    cores, siblings (Caution: counting these is hw and system dependent. The following
    excerpts from /proc/cpuinfo might not be reliable.  Use with caution.)
       cpu cores : 24
       siblings  : 24
       physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
```

(Continued on next page)

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL325 Gen11
(2.90 GHz, AMD EPYC 9254)

$SPECspeed®2017\_fp\_base = 201$

$SPECspeed®2017\_fp\_peak = 203$

CPU2017 License:	3	**Test Date:**	Dec-2022
Test Sponsor:	HPE	**Hardware Availability:**	Dec-2022
Tested by:	HPE	**Software Availability:**	Nov-2022

Platform Notes (Continued)

```
From lscpu from util-linux 2.37.4:
      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):                      24
      On-line CPU(s) list:         0-23
      Vendor ID:                   AuthenticAMD
      BIOS Vendor ID:              Advanced Micro Devices, Inc.
      Model name:                  AMD EPYC 9254 24-Core Processor
      BIOS Model name:             AMD EPYC 9254 24-Core Processor
      CPU family:                  25
      Model:                       17
      Thread(s) per core:          1
      Core(s) per socket:          24
      Socket(s):                   1
      Stepping:                    1
      Frequency boost:             enabled
      CPU max MHz:                 4151.7568
      CPU min MHz:                 1500.0000
      BogoMIPS:                    5791.17
      Flags:                       fpu vme de pse tsc msr pae mce cx8 apic sep mtrr
    pge mca cmov pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt
    pdpe1gb rdtscp lm constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid
    aperfmperf rapl pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe
    popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy 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:                   768 KiB (24 instances)
      L1i cache:                   768 KiB (24 instances)
      L2 cache:                    24 MiB (24 instances)
      L3 cache:                    128 MiB (4 instances)
      NUMA node(s):                4
      NUMA node0 CPU(s):           0-5
      NUMA node1 CPU(s):           12-17
      NUMA node2 CPU(s):           18-23
      NUMA node3 CPU(s):           6-11
      Vulnerability Itlb multihit:   Not affected
```

(Continued on next page)

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL325 Gen11
(2.90 GHz, AMD EPYC 9254)

$SPECspeed^®2017\_fp\_base = 201$

$SPECspeed^®2017\_fp\_peak = 203$

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

Test Date: Dec-2022
Hardware Availability: Dec-2022
Software Availability: Nov-2022

Platform Notes (Continued)

```
      Vulnerability L1tf:               Not affected
      Vulnerability Mds:                Not affected
      Vulnerability Meltdown:           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; 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     768K    8 Data            1     64        1             64
      L1i       32K     768K    8 Instruction     1     64        1             64
      L2         1M      24M    8 Unified         2   2048        1             64
      L3        32M     128M   16 Unified         3  32768        1             64

  /proc/cpuinfo cache data
     cache size : 1024 KB

  From numactl --hardware
  WARNING: a numactl 'node' might or might not correspond to a physical chip.
    available: 4 nodes (0-3)
    node 0 cpus: 0 1 2 3 4 5
    node 0 size: 193288 MB
    node 0 free: 192890 MB
    node 1 cpus: 12 13 14 15 16 17
    node 1 size: 193498 MB
    node 1 free: 193171 MB
    node 2 cpus: 18 19 20 21 22 23
    node 2 size: 193488 MB
    node 2 free: 193242 MB
    node 3 cpus: 6 7 8 9 10 11
    node 3 size: 193534 MB
    node 3 free: 192961 MB
    node distances:
    node   0   1   2   3
      0:  10  11  11  11
      1:  11  10  11  11
      2:  11  11  10  11
      3:  11  11  11  10

  From /proc/meminfo
     MemTotal:       792380292 kB
     HugePages_Total:        0
```

(Continued on next page)

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL325 Gen11
(2.90 GHz, AMD EPYC 9254)

$SPECspeed®2017\_fp\_base = 201$

$SPECspeed®2017\_fp\_peak = 203$

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

Test Date: Dec-2022
Hardware Availability: Dec-2022
Software Availability: Nov-2022

Platform Notes (Continued)

```
    Hugepagesize:           2048 kB

 /sbin/tuned-adm active
     Current active profile: throughput-performance

 /sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has
    performance

 From /etc/*release* /etc/*version*
    os-release:
       NAME="Red Hat Enterprise Linux"
       VERSION="9.0 (Plow)"
       ID="rhel"
       ID_LIKE="fedora"
       VERSION_ID="9.0"
       PLATFORM_ID="platform:el9"
       PRETTY_NAME="Red Hat Enterprise Linux 9.0 (Plow)"
       ANSI_COLOR="0;31"
    redhat-release: Red Hat Enterprise Linux release 9.0 (Plow)
    system-release: Red Hat Enterprise Linux release 9.0 (Plow)
    system-release-cpe: cpe:/o:redhat:enterprise_linux:9::baseos

 uname -a:
    Linux localhost.localdomain 5.14.0-70.13.1.el9_0.x86_64 #1 SMP PREEMPT Thu Apr 14
    12:42:38 EDT 2022 x86_64 x86_64 x86_64 GNU/Linux

 Kernel self-reported vulnerability status:

 CVE-2018-12207 (iTLB Multihit):                 Not affected
 CVE-2018-3620 (L1 Terminal Fault):              Not affected
 Microarchitectural Data Sampling:               Not affected
 CVE-2017-5754 (Meltdown):                       Not affected
 CVE-2018-3639 (Speculative Store Bypass):       Mitigation: Speculative Store
                                                 Bypass disabled via prctl
 CVE-2017-5753 (Spectre variant 1):              Mitigation: usercopy/swapgs
                                                 barriers and __user pointer
                                                 sanitization
 CVE-2017-5715 (Spectre variant 2):              Mitigation: Retpolines, IBPB:
                                                 conditional, IBRS_FW, STIBP:
                                                 disabled, RSB filling
 CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
 CVE-2019-11135 (TSX Asynchronous Abort):        Not affected

 run-level 3 Apr 7 05:30

 SPEC is set to: /home/cpu2017_speed
    Filesystem              Type  Size  Used Avail Use% Mounted on
```

(Continued on next page)

SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL325 Gen11
(2.90 GHz, AMD EPYC 9254)

SPECspeed®2017_fp_base = 201

SPECspeed®2017_fp_peak = 203

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

Test Date: Dec-2022
Hardware Availability: Dec-2022
Software Availability: Nov-2022

Platform Notes (Continued)

```
     /dev/mapper/rhel-home xfs    819G    61G   758G    8% /home

 From /sys/devices/virtual/dmi/id
     Vendor:           HPE
     Product:          ProLiant DL325 Gen11
     Product Family:   ProLiant
     Serial:           DL325G11-010

 Additional information from dmidecode 3.3 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:
     10x Hynix HMCG94AEBRA103N 64 GB 2 rank 4800
     2x Hynix HMCG94MEBRA121N 64 GB 2 rank 4800

 BIOS:
     BIOS Vendor:       HPE
     BIOS Version:      1.12
     BIOS Date:         11/24/2022
     BIOS Revision:     1.12
     Firmware Revision: 1.10

 (End of data from sysinfo program)
```

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#389 2022_10_07) (based on
  LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------


==============================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on
  LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
```

(Continued on next page)

SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL325 Gen11
(2.90 GHz, AMD EPYC 9254)

SPECspeed®2017_fp_base = 201

SPECspeed®2017_fp_peak = 203

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

Test Date: Dec-2022
Hardware Availability: Dec-2022
Software Availability: Nov-2022

Compiler Version Notes (Continued)

```
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on
  LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on
  LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------


==============================================================================
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#389 2022_10_07) (based on
  LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/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#389 2022_10_07) (based on
  LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on
  LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
```
clang
```

Fortran benchmarks:
```
flang
```

(Continued on next page)

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL325 Gen11
(2.90 GHz, AMD EPYC 9254)

SPECspeed®2017_fp_base = 201

SPECspeed®2017_fp_peak = 203

CPU2017 License: 3	**Test Date:** Dec-2022
Test Sponsor: HPE	**Hardware Availability:** Dec-2022
Tested by: HPE	**Software Availability:** Nov-2022

Base Compiler Invocation (Continued)

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=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
```

(Continued on next page)

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL325 Gen11
(2.90 GHz, AMD EPYC 9254)

SPECspeed®2017_fp_base = 201

SPECspeed®2017_fp_peak = 203

CPU2017 License: 3		**Test Date:**	Dec-2022
Test Sponsor:	HPE	**Hardware Availability:**	Dec-2022
Tested by:	HPE	**Software Availability:**	Nov-2022

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:
```
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -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
```

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
```

(Continued on next page)

Hewlett Packard Enterprise
(Test Sponsor: HPE)

ProLiant DL325 Gen11
(2.90 GHz, AMD EPYC 9254)

SPECspeed®2017_fp_base = 201

SPECspeed®2017_fp_peak = 203

CPU2017 License: 3		**Test Date:**	Dec-2022
Test Sponsor:	HPE	**Hardware Availability:**	Dec-2022
Tested by:	HPE	**Software Availability:**	Nov-2022

Peak Compiler Invocation (Continued)

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: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -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
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

```
638.imagick_s: basepeak = yes
```

```
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=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
```

(Continued on next page)

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL325 Gen11
(2.90 GHz, AMD EPYC 9254)

SPECspeed®2017_fp_base = 201

SPECspeed®2017_fp_peak = 203

CPU2017 License: 3		**Test Date:**	Dec-2022
Test Sponsor:	HPE	**Hardware Availability:**	Dec-2022
Tested by:	HPE	**Software Availability:**	Nov-2022

Peak Optimization Flags (Continued)

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=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`

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`

(Continued on next page)

Hewlett Packard Enterprise
(Test Sponsor: HPE)

SPECspeed®2017_fp_base = 201

ProLiant DL325 Gen11
(2.90 GHz, AMD EPYC 9254)

SPECspeed®2017_fp_peak = 203

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

Test Date: Dec-2022
Hardware Availability: Dec-2022
Software Availability: Nov-2022

Peak Other Flags (Continued)

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-Genoa-rev2.1.html
http://www.spec.org/cpu2017/flags/aocc400-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-Genoa-rev2.1.xml
http://www.spec.org/cpu2017/flags/aocc400-flags.xml

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

Tested with SPEC CPU®2017 v1.1.8 on 2022-04-06 20:01:06-0400.
Report generated on 2023-02-15 10:32:26 by CPU2017 PDF formatter v6442.
Originally published on 2023-02-14.