## SPEC CPU® 2017 Floating Point Rate Result

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### Hewlett Packard Enterprise

(Test Sponsor: HPE)

**ProLiant DL365 Gen11**

(3.00 GHz, AMD EPYC 9124)

**SPECrate® 2017_fp_base = 453**

**SPECrate® 2017_fp_peak = 456**

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

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**Hardware**

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
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<tbody>
<tr>
<td>CPU Name</td>
<td>AMD EPYC 9124</td>
</tr>
<tr>
<td>Max MHz</td>
<td>3700</td>
</tr>
<tr>
<td>Nominal</td>
<td>3000</td>
</tr>
<tr>
<td>Enabled</td>
<td>32 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable</td>
<td>1,2 chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td></td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3</td>
<td>64 MB I+D on chip per chip, 16 MB shared /4 cores</td>
</tr>
<tr>
<td>Other</td>
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<tr>
<td>Memory</td>
<td>1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)</td>
</tr>
<tr>
<td>Storage</td>
<td>2 x 480 GB SATA SSD</td>
</tr>
<tr>
<td>Other</td>
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**Software**

<table>
<thead>
<tr>
<th>Component</th>
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</thead>
<tbody>
<tr>
<td>OS</td>
<td>Ubuntu 22.04.1 LTS</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/C++/Fortran: Version 4.0.0 of AOCC</td>
</tr>
<tr>
<td>Parallel</td>
<td>No</td>
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<tr>
<td>Firmware</td>
<td>HPE BIOS Version v1.10 10/18/2022 released Oct-2022</td>
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<tr>
<td>File System</td>
<td>ext4</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 5 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>64-bit</td>
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<tr>
<td>Peak Pointers</td>
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<tr>
<td>Other</td>
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<tr>
<td>Power Management</td>
<td>BIOS and OS set to prefer performance at the cost of additional power usage</td>
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</tbody>
</table>

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

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<table>
<thead>
<tr>
<th>SPEC Component</th>
<th>Result</th>
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<tbody>
<tr>
<td>503.bwaves_r</td>
<td>64</td>
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<tr>
<td>507.cacluBSSN_r</td>
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<tr>
<td>508.namd_r</td>
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<tr>
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<td>511.povray_r</td>
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</tr>
<tr>
<td>519.lbm_r</td>
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<tr>
<td>521.wrf_r</td>
<td>64</td>
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<tr>
<td>526.blender_r</td>
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<td>527.cam4_r</td>
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<tr>
<td>538.imagick_r</td>
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<td>544.nab_r</td>
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<tr>
<td>554.roms_r</td>
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**Copies**

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**SPECrate® 2017_fp_base**

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**SPECrate® 2017_fp_peak**

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Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL365 Gen11
(3.00 GHz, AMD EPYC 9124)

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

Results Table

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</tbody>
</table>

SPECrate®2017_fp_base = 453
SPECrate®2017_fp_peak = 456

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.

(Continued on next page)
**SPEC CPU®2017 Floating Point Rate Result**

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)
ProLiant DL365 Gen11
(3.00 GHz, AMD EPYC 9124)

<table>
<thead>
<tr>
<th>CPU2017 License: 3</th>
<th>Test Date:</th>
<th>Nov-2022</th>
</tr>
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<tbody>
<tr>
<td>Test Sponsor: HPE</td>
<td>Hardware Availability:</td>
<td>Dec-2022</td>
</tr>
<tr>
<td>Tested by: HPE</td>
<td>Software Availability:</td>
<td>Nov-2022</td>
</tr>
</tbody>
</table>

**SPECrate®2017_fp_base = 453**
**SPECrate®2017_fp_peak = 456**

**Operating System Notes (Continued)**

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.

**Environment Variables Notes**

Environment variables set by runcpu before the start of the run:

LD_LIBRARY_PATH =
"/home/cpu2017_new/amd_rate_aocc400_genoa_B_lib/lib:/home/cpu2017_new/amd_rate_aocc400_genoa_B_lib/lib32:"
MALLOC_CONF = "retain:true"

**General Notes**

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

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

**Platform Notes**

BIOS Configuration
Workload Profile set to General Throughput Compute
Determinism Control set to Manual
Performance Determinism set to Power Deterministic
Last-Level Cache (LLC) as NUMA Node set to Enabled
NUMA memory domains per socket set to Four memory domains per socket
ACPI C2 Latency set to 18 microseconds
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 0x0A10110e for the AMD EPYC 9nn4X family of processors. The reference code/AGESA version used in this

(Continued on next page)
Platform Notes (Continued)

ROM is version GenoaPI 1.0.0.1-L3

Sysinfo program /home/cpu2017_new/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891e0e16acaf64d
running on admin1 Tue Jun 28 00:12:04 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 9124 16-Core Processor
      2 "physical id"s (chips)
       64 "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: 16
       siblings: 32
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

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): 64
On-line CPU(s) list: 0-63
Vendor ID: AuthenticAMD
Model name: AMD EPYC 9124 16-Core Processor
CPU family: 25
Model: 17
Thread(s) per core: 2
Core(s) per socket: 16
Socket(s): 2
Stepping: 1
Frequency boost: enabled
CPU max MHz: 3713.0000
CPU min MHz: 400.0000
BogoMIPS: 5991.19
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
        pdtelgb rdtsscp lm constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid
        aperfmperf rafi 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 3dnoprefetch osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb
        bpxext perfctr_l1c mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs

(Continued on next page)
Hewlett Packard Enterprise

(spec)

ProLiant DL365 Gen11

(3.00 GHz, AMD EPYC 9124)

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Test Sponsor: HPE
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SPEClrate®2017_fp_base = 453

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

Platform Notes (Continued)

ibpb stibp vmmcall fsqsbqe stibp bm11 avx2 smep bmi2 erms invpcid cqm rdt_a avx512f
avx512dq rdseed adx smap avx512ifma clflushopt clwb avx512cd sha ni avx512bw
avx512vl xsaveopt xsaves xgetbv1 xsaves cqm llc cqm occp llc cqm mbm total
cqm mbm local avx512 bf16 clzero iropfr xsaveerpr rdprr wpniovd amd_ppin cppc arat
npt lbrv svm lock nrip save tsc scale vmcb clean flushbyasid decodeassists
pausefilter pfthreshold avic v_vmsave_vmlast vgfl v spec ctrl avx512v bmi umip pku
ospe avx512 v bmi2 gfi vaes vpcmem uldq avx512 vnini avx512 bitalg avx512_vpopcntdq
la57 rdpdr overflow_recover succor smca farm 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: 128 MiB (8 instances)
NUMA node(s): 8
NUMA node0 CPU(s): 0-3, 32-35
NUMA node1 CPU(s): 8-11, 40-43
NUMA node2 CPU(s): 12-15, 44-47
NUMA node3 CPU(s): 4-7, 36-39
NUMA node4 CPU(s): 16-19, 48-51
NUMA node5 CPU(s): 24-27, 56-59
NUMA node6 CPU(s): 28-31, 60-63
NUMA node7 CPU(s): 20-23, 52-55

Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Mmio stale data: Not affected
Vulnerability Retbleed: 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 always-on, RSB filling, PBRSE-eIBRS Not affected
Vulnerability Srbds: Not affected
Vulnerability Txs 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
L1i 32K 1M 8 Instruction 1 64 1 64
L2 1M 32M 8 Unified 2 2048 1 64
L3 16M 128M 16 Unified 3 16384 1 64

/proc/cpuinfo cache data
cache size : 1024 KB

(Continued on next page)
Hewlett Packard Enterprise
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ProLiant DL365 Gen11
(3.00 GHz, AMD EPYC 9124)

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SPECrate®2017_fp_peak = 456

Platform Notes (Continued)

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 8 nodes (0-7)
  node 0 cpus: 0 1 2 3 32 33 34 35
  node 0 size: 193223 MB
  node 0 free: 192975 MB
  node 1 cpus: 8 9 10 11 40 41 42 43
  node 1 size: 193533 MB
  node 1 free: 193275 MB
  node 2 cpus: 12 13 14 15 44 45 46 47
  node 2 size: 193533 MB
  node 2 free: 193311 MB
  node 3 cpus: 4 5 6 7 36 37 38 39
  node 3 size: 193533 MB
  node 3 free: 193299 MB
  node 4 cpus: 16 17 18 19 48 49 50 51
  node 4 size: 193498 MB
  node 4 free: 193235 MB
  node 5 cpus: 24 25 26 27 56 57 58 59
  node 5 size: 193533 MB
  node 5 free: 193260 MB
  node 6 cpus: 28 29 30 31 60 61 62 63
  node 6 size: 193533 MB
  node 6 free: 193297 MB
  node 7 cpus: 20 21 22 23 52 53 54 55
  node 7 size: 193490 MB
  node 7 free: 193242 MB
  node distances:
  node  0  1  2  3  4  5  6  7
  0:  10 12 12 12 32 32 32 32
  1:  12 10 12 12 32 32 32 32
  2:  12 12 10 12 32 32 32 32
  3:  12 12 12 10 32 32 32 32
  4:  32 32 32 32 10 12 12 12
  5:  32 32 32 32 12 10 12 12
  6:  32 32 32 32 12 12 10 12
  7:  32 32 32 32 12 12 12 10

From /proc/meminfo
  MemTotal: 1585030992 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

/sbin/tuned-adm active
  Current active profile: balanced
/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has

(Continued on next page)
Spec CPU®2017 Floating Point Rate Result
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Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL365 Gen11
(3.00 GHz, AMD EPYC 9124)

SPECrade®2017_fp_base = 453
SPECrade®2017_fp_peak = 456

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

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

Platform Notes (Continued)

```
performance

/usr/bin/lsb_release -d
Ubuntu 22.04.1 LTS

From /etc/*release* /etc/*version*
debian_version: bookworm/sid
os-release:
    PRETTY_NAME="Ubuntu 22.04.1 LTS"
    NAME="Ubuntu"
    VERSION_ID="22.04"
    VERSION="22.04.1 LTS (Jammy Jellyfish)"
    VERSION_CODENAME=jammy
    ID=ubuntu
    ID_LIKE=debian
    HOME_URL="https://www.ubuntu.com/

uname -a:
    Linux admin1 5.15.0-50-generic #56-Ubuntu SMP Tue Sep 20 13:23:26 UTC 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
mmio_stale_data: Not affected
retbleed: Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swaps barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Retpolines, IBPB: conditional, IBRS_FW, STIBP: always-on, RSB filling, PBRSB-eIBRS: Not affected
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 5 Jun 28 00:00

SPEC is set to: /home/cpu2017_new
Filesystem Type Size Used Avail Use% Mounted on
/dev mapper/ubuntu--vg-ubuntu--lv ext4 437G 155G 264G 38% /

(Continued on next page)
Platform Notes (Continued)

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

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:
24x Hynix HMCG94AEBRA103N 64 GB 2 rank 4800

BIOS:
BIOS Vendor:       HPE
BIOS Version:      1.10
BIOS Date:         10/18/2022
BIOS Revision:     1.10
Firmware Revision: 1.10

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
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<th>519.lbm_r(base, peak) 538.imagick_r(base, peak)</th>
<th>544.nab_r(base, peak)</th>
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<tr>
<td>AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07)</td>
<td>(based on LLVM Mirror.Version.14.0.6)</td>
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<tr>
<td>Target: x86_64-unknown-linux-gnu</td>
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<td></td>
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<tr>
<td>Thread model: posix</td>
<td></td>
<td></td>
</tr>
<tr>
<td>InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin</td>
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<td></td>
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</tbody>
</table>

==============================================================================
| C++              | 508.namd_r(base, peak) 510.parest_r(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)
Compiler Version Notes (Continued)

C++, C | 511.povray_r(base, peak) 526.blender_r(base, peak)
---------------------------
AMD clang version 14.0.6 (CLANG: A0CC_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
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AMD clang version 14.0.6 (CLANG: A0CC_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 | 507.cactuBSSN_r(base, peak)
---------------------------
AMD clang version 14.0.6 (CLANG: A0CC_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
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AMD clang version 14.0.6 (CLANG: A0CC_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 | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
554.roms_r(base, peak)
---------------------------
AMD clang version 14.0.6 (CLANG: A0CC_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)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL365 Gen11
(3.00 GHz, AMD EPYC 9124)

SPECrater®2017_fp_base = 453
SPECrater®2017_fp_peak = 456

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

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

Compiler Version Notes (Continued)

Fortran, C | 521.wrf_r(base, peak) 527.cam4_r(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

APM 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

C++ benchmarks:
clang++

Fortran benchmarks:
flang

Benchmarks using both Fortran and C:
flang clang

Benchmarks using both C and C++:
clang++ clang

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

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64

(Continued on next page)
**SPEC CPU®2017 Floating Point Rate Result**

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)
ProLiant DL365 Gen11
(3.00 GHz, AMD EPYC 9124)

**SPECrate®2017_fp_base = 453**
**SPECrate®2017_fp_peak = 456**

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

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**Base Portability Flags (Continued)**

526.blender_r: -funsigned-char -DSPEC_LP64
527.cam4_r: -DSPEC_CASE_FLAG -DSPEC_LP64
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

---

**Base Optimization Flags**

C benchmarks:
-m64 -flto -Wl,-mlllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mlllvm -Wl,-reduce-array-computations=3
-Wl,-mlllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather -O3
-march=znver4 -fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mlllvm -unroll-threshold=50 -mlllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mlllvm -reduce-array-computations=3
-zopt -lamdlibm -lamdalloc -liflang

C++ benchmarks:
-m64 -flto -Wl,-mlllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mlllvm -Wl,-reduce-array-computations=3
-Wl,-mlllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -mlllvm -unroll-threshold=100
-finline-aggressive -mlllvm -loop-unschedule=200000
-mlllvm -reduce-array-computations=3 -zopt -lamdlibm -lamdalloc
-mlllvm -reduce-array-computations=3
-zopt -lamdlibm -lamdalloc -liflang

Fortran benchmarks:
-m64 -flto -Wl,-mlllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mlllvm -Wl,-reduce-array-computations=3
-Wl,-mlllvm -Wl,-enable-X86-prefetching -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -Kieee -Mrecursive -funroll-loops
-mlllvm -lsr-in-nested-loop -mlllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm -lamdalloc
-mlllvm -reduce-array-computations=3
-zopt -lamdlibm -lamdalloc -liflang

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

---

(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL365 Gen11
(3.00 GHz, AMD EPYC 9124)

SPECrate®2017_fp_base = 453
SPECrate®2017_fp_peak = 456

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

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

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):
- fepilog-vectorization-of-inductions -lamdllibm -lamdalloc -lflang

Benchmarks using both C and C++:
- m64 -fiso C -Wl,-align-all-nofallthru-blocks=6
- Wl, -mllvm -Wl,-reduce-array-computations=3
- Wl, -mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4
- fvecclib=AMDLIBBM -ffast-math -fstruct-layout=7
- mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
- freemap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
- zopt -mllvm -unroll-threshold=100 -finline-aggressive
- mllvm -loop-unswitch-threshold=200000 -lamdllibm -lamdalloc -lflang

Benchmarks using Fortran, C, and C++:
- m64 -fiso C -Wl,-align-all-nofallthru-blocks=6
- Wl, -mllvm -Wl,-reduce-array-computations=3
- Wl, -mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4
- fvecclib=AMDLIBBM -ffast-math -fstruct-layout=7
- mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
- freemap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
- zopt -mllvm -unroll-threshold=100 -finline-aggressive
- mllvm -loop-unswitch-threshold=200000 -Kieee -Mrecursive
- funroll-loops -mllvm -lsr-in-nested-loop
- fepilog-vectorization-of-inductions -lamdllibm -lamdalloc -lflang

Base Other Flags

C benchmarks:
- Wno-unused-command-line-argument

C++ benchmarks:
- Wno-unused-command-line-argument

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

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

Benchmarks using both C and C++:
- Wno-unused-command-line-argument

Benchmarks using Fortran, C, and C++:
- Wno-unused-command-line-argument
SPEC CPU®2017 Floating Point Rate Result  

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL365 Gen11  
(3.00 GHz, AMD EPYC 9124)  

| SPECrate®2017_fp_base = 453 |
| SPECrate®2017_fp_peak = 456 |

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Peak Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++

Fortran benchmarks:
flang

Benchmarks using both Fortran and C:
flang clang

Benchmarks using both C and C++:
clang++ clang

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

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
519.lbm_r: basepeak = yes
538.imagick_r: basepeak = yes

C++ benchmarks:
508.namd_r: basepeak = yes

(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL365 Gen11
(3.00 GHz, AMD EPYC 9124)

SPECrate®2017_fp_base = 453
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

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

Peak Optimization Flags (Continued)

510.parest_r: basepeak = yes

Fortran benchmarks:

503.bwaves_r: -m64 -flto -W1,-mlllvm -Wl,-align-all-nofallthru-blocks=6
-W1,-mlllvm -Wl,-reduce-array-computations=3
-W1,-mlllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -Mrecursive
-mlllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm
-lamdalloc -lflang

549.fotonik3d_r: -m64 -flto -W1,-mlllvm -Wl,-align-all-nofallthru-blocks=6
-W1,-mlllvm -Wl,-reduce-array-computations=3
-W1,-mlllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -KIEEE
-Mrecursive -mlllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -fvector-transform
-fscalar-transform -lamdlibm -lamdalloc -lflang

554.roms_r: Same as 503.bwaves_r

Benchmarks using both Fortran and C:

521.wrf_r: -m64 -flto -W1,-mlllvm -Wl,-align-all-nofallthru-blocks=6
-W1,-mlllvm -Wl,-reduce-array-computations=3
-W1,-mlllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-ffast-math -fstruct-layout=7 -mlllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mlllvm -inline-threshold=1000
-mlllvm -reduce-array-computations=3 -zopt -Mrecursive
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc
-lflang

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: basepeak = yes

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

(Continued on next page)
**SPEC CPU®2017 Floating Point Rate Result**

**Hewlett Packard Enterprise**
*(Test Sponsor: HPE)*
**ProLiant DL365 Gen11**
*(3.00 GHz, AMD EPYC 9124)*

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**Tested by:**
*HPE*

**SPECrate®2017_fp_base = 453**

**SPECrate®2017_fp_peak = 456**

---

**Peak Optimization Flags (Continued)**

507.cactuBSSN_r: basepeak = yes

---

**Peak Other Flags**

 **C benchmarks:**
 - `-Wno-unused-command-line-argument`

 **C++ benchmarks:**
 - `-Wno-unused-command-line-argument`

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

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

 **Benchmarks using both C and C++:**
 - `-Wno-unused-command-line-argument`

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

---

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

http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-Genoa-rev2.0.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-rev2.0.xml

http://www.spec.org/cpu2017/flags/aocc400-flags.xml

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

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