SPEC CPU®2017 Floating Point Rate Result

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Epsylon Sp. z o.o. Sp. Komandytowa

eterio 127 RZ3 (AMD EPYC 9124, 3.00 GHz)

SPECrate®2017_fp_base = 228

SPECrate®2017_fp_peak = 231
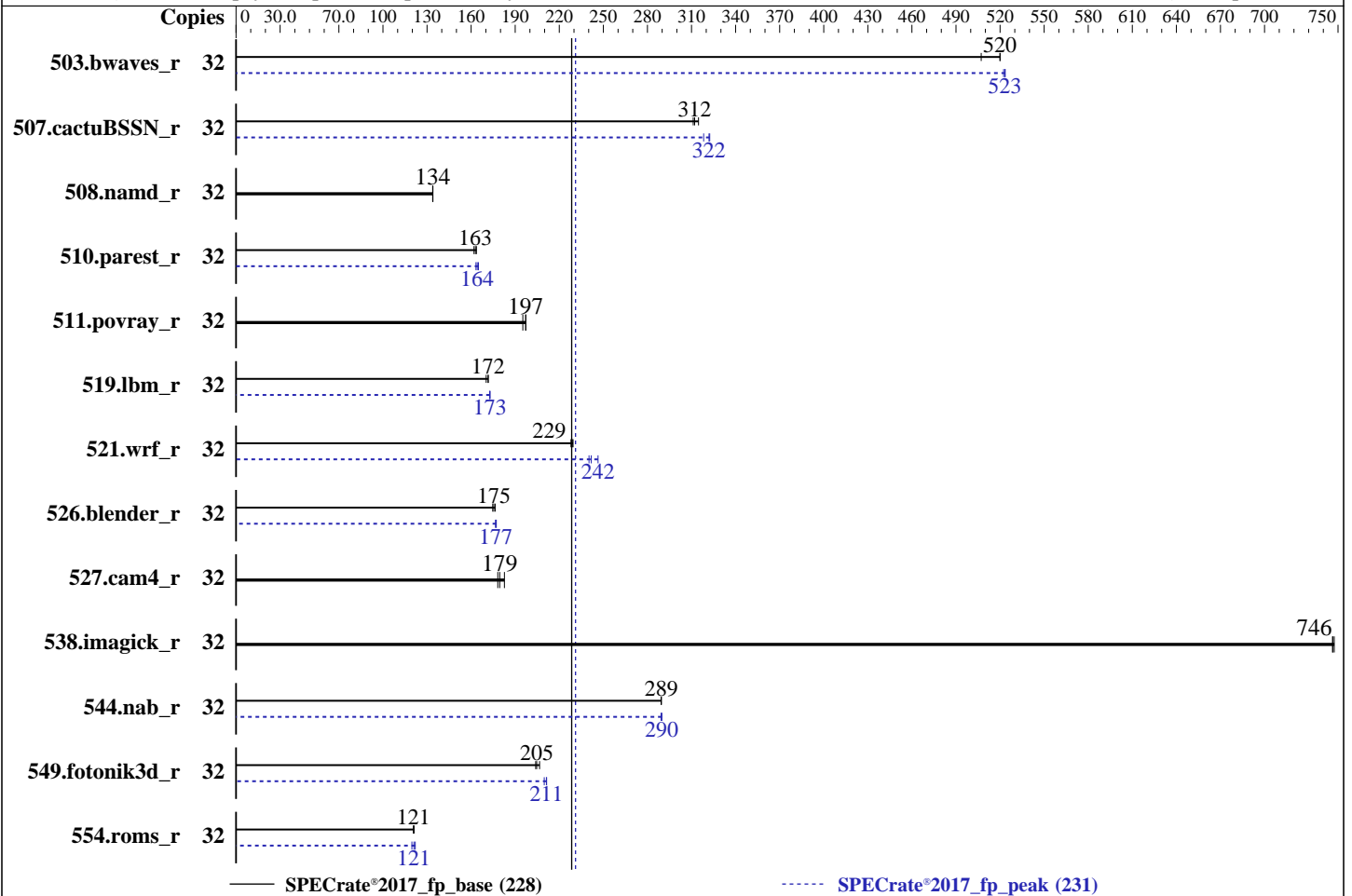
CPU2017 License: 9081
Test Sponsor: Epsylon Sp. z o.o. Sp. Komandytowa
Tested by: Epsylon Sp. z o.o. Sp. Komandytowa

Test Date: Oct-2023
Hardware Availability: Dec-2023
Software Availability: Sep-2023

Copies			
503.bwaves_r	32	520	523
507.cactuBSSN_r	32	312	322
508.namd_r	32	134	
510.parest_r	32	163	164
511.povray_r	32	197	
519.lbm_r	32	172	173
521.wrf_r	32	229	242
526.blender_r	32	175	177
527.cam4_r	32	179	
538.imagick_r	32	746	
544.nab_r	32	289	290
549.fotonik3d_r	32	205	211
554.roms_r	32	121	121

SPECrate®2017_fp_base (228)   SPECrate®2017_fp_peak (231)

Hardware

CPU Name: AMD EPYC 9124
 Max MHz: 3700
 Nominal: 3000
Enabled: 16 cores, 1 chip, 2 threads/core
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: 64 MB I+D on chip per chip, 16 MB shared / 4 cores
 Other: None
Memory: 384 GB (12 x 32 GB 2Rx8 PC5-4800B-R)
Storage: 1 x 960 GB SATA III SSD
Other: None

Software

OS: Ubuntu 22.04.2 LTS
 Kernel 5.15.0-86-generic x86_64
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: No
Firmware: BIOS Version 1201 released Aug-2023
File System: ext4
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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Results Table

Benchmark	Base						Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	32	633	507	**617**	**520**	617	520	32	**613**	**523**	614	522	613	523
507.cactuBSSN_r	32	129	315	130	311	**130**	**312**	32	127	318	126	322	**126**	**322**
508.namd_r	32	227	134	**227**	**134**	227	134	32	227	134	**227**	**134**	227	134
510.parest_r	32	**514**	**163**	512	164	517	162	32	513	163	507	165	**510**	**164**
511.povray_r	32	379	197	383	195	**379**	**197**	32	379	197	383	195	**379**	**197**
519.lbm_r	32	198	170	196	172	**197**	**172**	32	195	173	195	173	**195**	**173**
521.wrf_r	32	314	228	313	229	**313**	**229**	32	**297**	**242**	291	246	298	240
526.blender_r	32	279	175	**278**	**175**	276	176	32	**276**	**177**	275	177	276	177
527.cam4_r	32	314	178	306	183	**312**	**179**	32	314	178	306	183	**312**	**179**
538.imagick_r	32	**107**	**746**	107	746	106	747	32	**107**	**746**	107	746	106	747
544.nab_r	32	186	289	186	289	**186**	**289**	32	186	290	186	289	**186**	**290**
549.fotonik3d_r	32	604	207	**609**	**205**	612	204	32	**590**	**211**	594	210	590	211
554.roms_r	32	**421**	**121**	421	121	420	121	32	417	122	**420**	**121**	425	120

SPECrate®2017_fp_base = **228**

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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
'sync; sysctl -w vm.drop_caches=3' was used to clear filesystem caches
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,

(Continued on next page)

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

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$SPECrate^{®}2017\_fp\_base = 228$

$SPECrate^{®}2017\_fp\_peak = 231$

Operating System Notes (Continued)

```
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
     "/cpu2017.1.1.9/amd_rate_aocc400_znver4_A_lib/lib:/cpu2017.1.1.9/amd_rate_aocc400_znver4_A_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 settings:
 SR-IOV Support = Disabled
 SVM Mode = Disabled
 NUMA nodes per socket = NPS4
 Determinism Control = Manual
 Determinism Enable = Power
 TDP Control = Manual
 TDP = 240
 PPT Control = Manual
 PPT = 240
 IOMMU = Disabled
 SMT Control = Auto

 BMC Configuration:
 Fan mode = Full speed mode


 Sysinfo program /cpu2017.1.1.9/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on sut Thu Oct 19 14:56:04 2023

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

 ------------------------------------------------------------
 Table of contents
 ------------------------------------------------------------
  1. uname -a
  2. w
  3. Username
```

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Platform Notes (Continued)

```
   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 (249.11-0ubuntu3.7)
  12. Failed units, from systemctl list-units --state=failed
  13. Services, from systemctl list-unit-files
  14. Linux kernel boot-time arguments, from /proc/cmdline
  15. cpupower frequency-info
  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 sut 5.15.0-86-generic #96-Ubuntu SMP Wed Sep 20 08:23:49 UTC 2023 x86_64 x86_64 x86_64 GNU/Linux


  ------------------------------------------------------------
  2. w
    14:56:04 up  4:57,  2 users,  load average: 21.74, 29.59, 31.13
   USER      TTY      FROM             LOGIN@   IDLE   JCPU    PCPU WHAT
   test      tty1     -                10:01    4:54m  0.60s  0.00s -bash
   test      pts/0    -                10:01    4:53m  1.13s  0.57s sudo -s


  ------------------------------------------------------------
  3. Username
    From environment variable $USER:  root
    From the command 'logname':       test


  ------------------------------------------------------------
  4. ulimit -a
    time(seconds)         unlimited
    file(blocks)          unlimited
    data(kbytes)          unlimited
    stack(kbytes)         unlimited
    coredump(blocks)      0
    memory(kbytes)        unlimited
    locked memory(kbytes) 2097152
    process               1546263
    nofiles               1024
    vmemory(kbytes)       unlimited
    locks                 unlimited
    rtprio                0


  ------------------------------------------------------------
  5. sysinfo process ancestry
  /sbin/init
  /bin/login -p --
  -bash
  sudo -s
  sudo -s
```

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Platform Notes (Continued)

```
 /bin/bash
 python3 ./run_amd_rate_aocc400_znver4_A1.py
 /bin/bash ./amd_rate_aocc400_znver4_A1.sh
 runcpu --config amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 fprate
 runcpu --configfile amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
   --runmode rate --tune base:peak --size test:train:refrate fprate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.002/templogs/preenv.fprate.002.0.log --lognum 002.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /cpu2017.1.1.9


-------------------------------------------------------------
6. /proc/cpuinfo
    model name       : AMD EPYC 9124 16-Core Processor
    vendor_id        : AuthenticAMD
    cpu family       : 25
    model            : 17
    stepping         : 1
    microcode        : 0xa10113e
    bugs             : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass srso
    TLB size         : 3584 4K pages
    cpu cores        : 16
    siblings         : 32
    1 physical ids (chips)
    32 processors (hardware threads)
    physical id 0: core ids 0-3,8-11,16-19,24-27
    physical id 0: apicids 0-7,16-23,32-39,48-55
  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 9124 16-Core Processor
  CPU family:               25
  Model:                    17
  Thread(s) per core:       2
  Core(s) per socket:       16
  Socket(s):                1
  Stepping:                 1
  Frequency boost:          enabled
  CPU max MHz:              3711.9141
  CPU min MHz:              1500.0000
  BogoMIPS:                 5990.53
  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
```

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Platform Notes (Continued)

```
                          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 cppc 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:              512 KiB (16 instances)
  L1i cache:              512 KiB (16 instances)
  L2 cache:               16 MiB (16 instances)
  L3 cache:               64 MiB (4 instances)
  NUMA node(s):           4
  NUMA node0 CPU(s):      0-3,16-19
  NUMA node1 CPU(s):      4-7,20-23
  NUMA node2 CPU(s):      8-11,24-27
  NUMA node3 CPU(s):      12-15,28-31
  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 Retbleed:            Not affected
  Vulnerability Spec rstack overflow: Mitigation; safe RET
  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, PBRSB-eIBRS 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       32K     512K    8 Data           1    64        1             64
    L1i       32K     512K    8 Instruction    1    64        1             64
    L2         1M      16M    8 Unified        2  2048        1             64
    L3        16M      64M   16 Unified        3 16384        1             64

    -------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 4 nodes (0-3)
  node 0 cpus: 0-3,16-19
  node 0 size: 96466 MB
  node 0 free: 95915 MB
  node 1 cpus: 4-7,20-23
  node 1 size: 96718 MB
  node 1 free: 96222 MB
  node 2 cpus: 8-11,24-27
  node 2 size: 96765 MB
  node 2 free: 96301 MB
  node 3 cpus: 12-15,28-31
  node 3 size: 96727 MB
  node 3 free: 96257 MB
  node distances:
  node   0   1   2   3
    0:  10  12  12  12
    1:  12  10  12  12
```

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Platform Notes (Continued)

```
     2:  12  12  10  12
     3:  12  12  12  10


  ------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       395959184 kB


  ------------------------------------------------------------
10. who -r
   run-level 5 Oct 19 10:00


  ------------------------------------------------------------
11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.7)
   Default Target  Status
   graphical       degraded


  ------------------------------------------------------------
12. Failed units, from systemctl list-units --state=failed
     UNIT                            LOAD   ACTIVE SUB   DESCRIPTION
   * systemd-networkd-wait-online.service loaded failed failed Wait for Network to be Configured


  ------------------------------------------------------------
13. Services, from systemctl list-unit-files
   STATE           UNIT FILES
   enabled         ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online apparmor
                   blk-availability cloud-config cloud-final cloud-init cloud-init-local console-setup
                   e2scrub_reap finalrd getty@ gpu-manager grub-common grub-initrd-fallback keyboard-setup
                   lvm2-monitor multipathd networkd-dispatcher open-iscsi pollinate secureboot-db setvtrgb
                   snapd ssh systemd-networkd systemd-networkd-wait-online systemd-pstore systemd-resolved
                   systemd-timesyncd thermald unattended-upgrades wpa_supplicant
   enabled-runtime netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
   disabled        console-getty debug-shell ipmievd iscsid serial-getty@ systemd-boot-check-no-failures
                   systemd-network-generator systemd-sysext systemd-time-wait-sync upower
                   wpa_supplicant-nl80211@ wpa_supplicant-wired@ wpa_supplicant@
   generated       apport cpufrequtils loadcpufreq openipmi
   masked          cryptdisks cryptdisks-early hwclock lvm2 multipath-tools-boot numad rc rcS screen-cleanup
                   sudo tuned x11-common


  ------------------------------------------------------------
14. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=/boot/vmlinuz-5.15.0-86-generic
   root=UUID=ca6cbc2c-44a5-484e-a5b4-38016e430e94
   ro


  ------------------------------------------------------------
15. cpupower frequency-info
   CPU scaling: 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
```

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Platform Notes (Continued)

```
   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 Ubuntu 22.04.2 LTS


   ----------------------------------------------------------------
20. Disk information
SPEC is set to: /cpu2017.1.1.9
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda2      ext4  879G   68G  766G   9% /


   ----------------------------------------------------------------
21. /sys/devices/virtual/dmi/id
     Vendor:         Epsylon
     Product:        eterio 127 RZ3
     Product Family: Server
     Serial:         02300449


   ----------------------------------------------------------------
22. dmidecode
   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:
     12x Samsung M321R4GA3BB6-CQKET 32 GB 2 rank 4800
     12x Unknown Unknown



   ----------------------------------------------------------------
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:      American Megatrends Inc.
```

(Continued on next page)

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Platform Notes (Continued)

```
    BIOS Version:      1201
    BIOS Date:         08/25/2023
    BIOS Revision:     12.1
```

Compiler Version Notes

```
==============================================================================
C                | 519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(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++              | 508.namd_r(base, peak) 510.parest_r(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           | 511.povray_r(base, peak) 526.blender_r(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
------------------------------------------------------------------------------


==============================================================================
C++, C, Fortran  | 507.cactuBSSN_r(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
------------------------------------------------------------------------------


==============================================================================
Fortran          | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(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
```

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Epsylon Sp. z o.o. Sp. Komandytowa

eterio 127 RZ3 (AMD EPYC 9124, 3.00 GHz)

SPECrate®2017_fp_base = 228

SPECrate®2017_fp_peak = 231

CPU2017 License: 9081   **Test Date:**   Oct-2023

Test Sponsor: Epsylon Sp. z o.o. Sp. Komandytowa   **Hardware Availability:** Dec-2023

Tested by: Epsylon Sp. z o.o. Sp. Komandytowa   **Software Availability:** Sep-2023

Compiler Version Notes (Continued)

```
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
-------------------------------------------------------------------------------------------

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

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`

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SPEC CPU®2017 Floating Point Rate Result

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Epsylon Sp. z o.o. Sp. Komandytowa

eterio 127 RZ3 (AMD EPYC 9124, 3.00 GHz)

SPECrate®2017_fp_base = 228

SPECrate®2017_fp_peak = 231

CPU2017 License: 9081
Test Sponsor: Epsylon Sp. z o.o. Sp. Komandytowa
Tested by: Epsylon Sp. z o.o. Sp. Komandytowa

Test Date: Oct-2023
Hardware Availability: Dec-2023
Software Availability: Sep-2023

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

C++ benchmarks:
```
-m64 -flto -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 -mllvm -unroll-threshold=100
-finline-aggressive -mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lamdalloc
-lflang
```

Fortran benchmarks:
```
-m64 -flto -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 -Kieee -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm -lamdalloc
-lflang
```

Benchmarks using both Fortran and C:
```
-m64 -flto -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 -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -Kieee -Mrecursive -funroll-loops -mllvm -lsr-in-nested-loop
```

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Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

SPEC CPU®2017 Floating Point Rate Result

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Epsylon Sp. z o.o. Sp. Komandytowa

eterio 127 RZ3 (AMD EPYC 9124, 3.00 GHz)

SPECrate®2017_fp_base = 228

SPECrate®2017_fp_peak = 231

CPU2017 License: 9081
Test Sponsor: Epsylon Sp. z o.o. Sp. Komandytowa
Tested by: Epsylon Sp. z o.o. Sp. Komandytowa

Test Date: Oct-2023
Hardware Availability: Dec-2023
Software Availability: Sep-2023

Base Optimization Flags (Continued)

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

Benchmarks using both C and C++:
```
-m64 -flto -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 -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -lamdlibm -lamdalloc -lflang
```

Benchmarks using Fortran, C, and C++:
```
-m64 -flto -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 -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -Kieee -Mrecursive
-funroll-loops -mllvm -lsr-in-nested-loop
-fepilog-vectorization-of-inductions -lamdlibm -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
```

Epsylon Sp. z o.o. Sp. Komandytowa

eterio 127 RZ3 (AMD EPYC 9124, 3.00 GHz)

SPECrate®2017_fp_base = 228

SPECrate®2017_fp_peak = 231

CPU2017 License: 9081		**Test Date:**	Oct-2023
Test Sponsor:	Epsylon Sp. z o.o. Sp. Komandytowa	**Hardware Availability:**	Dec-2023
Tested by:	Epsylon Sp. z o.o. Sp. Komandytowa	**Software Availability:**	Sep-2023

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

```
538.imagick_r: basepeak = yes
```

```
544.nab_r: -m64 -flto -Wl,-mllvm -Wl,-ldist-scalar-expand
-fenable-aggressive-gather -Ofast -march=znver4
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
```

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Epsilon Sp. z o.o. Sp. Komandytowa

eterio 127 RZ3 (AMD EPYC 9124, 3.00 GHz)

SPECrate®2017_fp_base = 228

SPECrate®2017_fp_peak = 231

CPU2017 License: 9081		**Test Date:**	Oct-2023
Test Sponsor:	Epsilon Sp. z o.o. Sp. Komandytowa	**Hardware Availability:**	Dec-2023
Tested by:	Epsilon Sp. z o.o. Sp. Komandytowa	**Software Availability:**	Sep-2023

Peak Optimization Flags (Continued)

544.nab_r (continued):
```
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc
```

C++ benchmarks:

508.namd_r: `basepeak = yes`

510.parest_r: `-m64 -flto -Wl,-mllvm -Wl,-suppress-fmas`
```
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc
```

Fortran benchmarks:

503.bwaves_r: `-m64 -flto -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 -Mrecursive
-mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm
-lamdalloc -lflang
```

549.fotonik3d_r: `-m64 -flto -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 -Kieee
-Mrecursive -mllvm -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 -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
-fstruct-layout=7 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -Mrecursive
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc
```

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Epsylon Sp. z o.o. Sp. Komandytowa

eterio 127 RZ3 (AMD EPYC 9124, 3.00 GHz)

SPECrate®2017_fp_base = 228

SPECrate®2017_fp_peak = 231

CPU2017 License: 9081
Test Sponsor: Epsylon Sp. z o.o. Sp. Komandytowa
Tested by: Epsylon Sp. z o.o. Sp. Komandytowa

Test Date: Oct-2023
Hardware Availability: Dec-2023
Software Availability: Sep-2023

Peak Optimization Flags (Continued)

521.wrf_r (continued):
```
-lflang
```

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: basepeak = yes

526.blender_r: `-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
```
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-fstruct-layout=7 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt
-finline-aggressive -mllvm -unroll-threshold=100 -lamdlibm
-lamdalloc
```

Benchmarks using Fortran, C, and C++:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast -march=znver4
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3 -zopt
-mllvm -unroll-threshold=100 -mllvm -loop-unswitch-threshold=200000
-finline-aggressive -faggressive-loop-transform -fvector-transform
-fscalar-transform -Mrecursive -fepilog-vectorization-of-inductions
-lamdlibm -lamdalloc -lflang
```

Peak Other Flags

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

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

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

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SPEC CPU®2017 Floating Point Rate Result

Epsylon Sp. z o.o. Sp. Komandytowa

eterio 127 RZ3 (AMD EPYC 9124, 3.00 GHz)

SPECrate®2017_fp_base = 228

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Tested by: Epsylon Sp. z o.o. Sp. Komandytowa

Test Date: Oct-2023
Hardware Availability: Dec-2023
Software Availability: Sep-2023

Peak Other Flags (Continued)

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/aocc400-flags-A1.2.html
http://www.spec.org/cpu2017/flags/Epsylon-Platform-Flags-RevD-OCT-2023-For-AMD-Genoa-Platform.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/Epsylon-Platform-Flags-RevD-OCT-2023-For-AMD-Genoa-Platform.xml

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

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