SPEC CPU®2017 Floating Point Rate Result

ASUSTeK Computer Inc.

ASUS RS520A-E12-RS12U
(3.25 GHz, AMD EPYC 9354P)

$SPECrate^®2017\_fp\_base = 448$
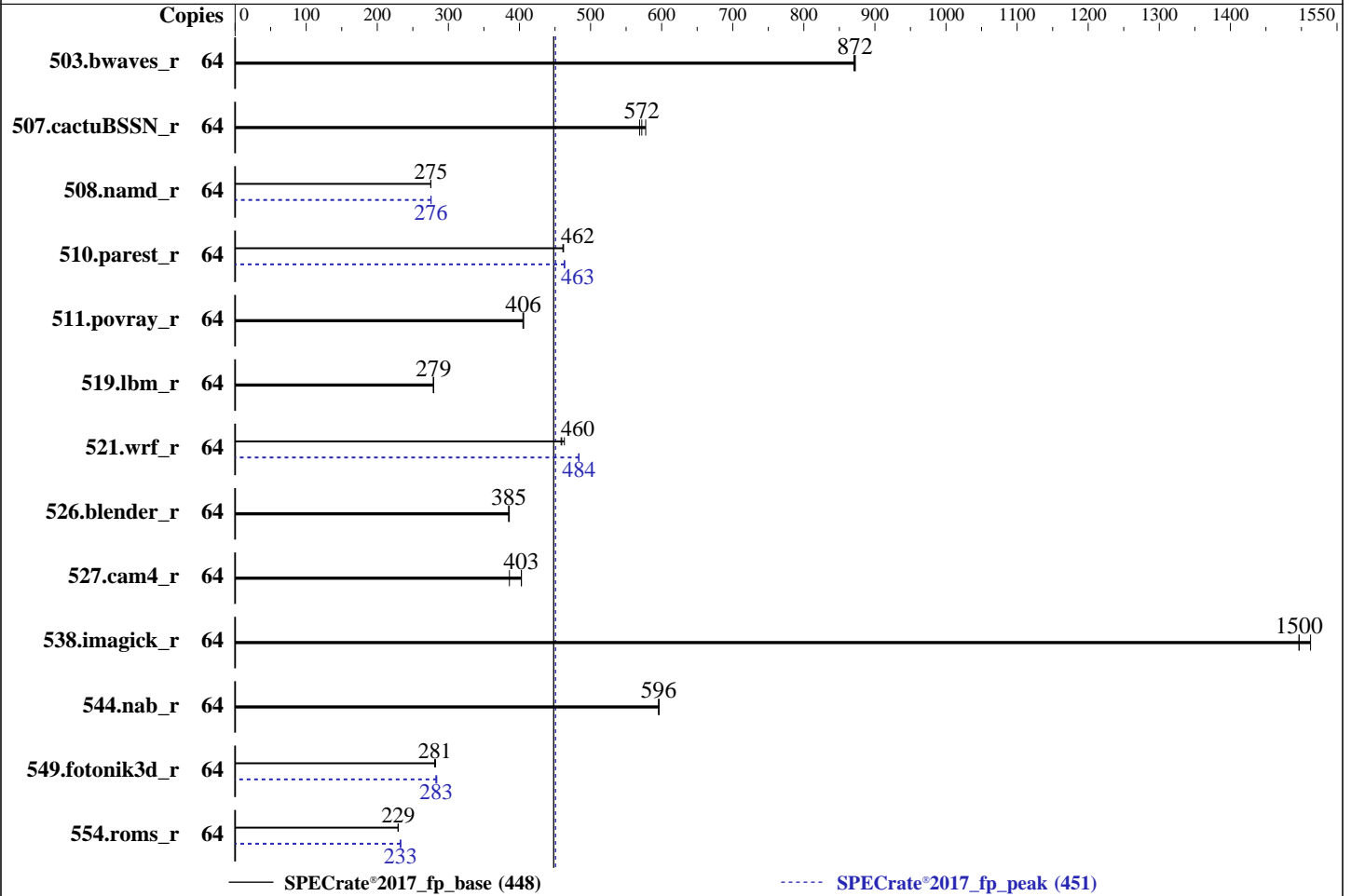
$SPECrate^®2017\_fp\_peak = 451$

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Mar-2023
Hardware Availability: Nov-2022
Software Availability: Nov-2022

Copies		0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1550
503.bwaves_r	64	872
507.cactuBSSN_r	64	572
508.namd_r	64	275 / 276
510.parest_r	64	462 / 463
511.povray_r	64	406
519.lbm_r	64	279
521.wrf_r	64	460 / 484
526.blender_r	64	385
527.cam4_r	64	403
538.imagick_r	64	1500
544.nab_r	64	596
549.fotonik3d_r	64	281 / 283
554.roms_r	64	229 / 233

—— **SPECrate®2017_fp_base (448)**   - - - - **SPECrate®2017_fp_peak (451)**

Hardware

CPU Name: AMD EPYC 9354P
 Max MHz: 3800
 Nominal: 3250
Enabled: 32 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: 256 MB I+D on chip per chip,
  32 MB shared / 4 cores
 Other: None
Memory: 768 GB (12 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 1.6 TB PCIE NVME SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4 (x86_64)
  Kernel 5.14.21-150400.22-default
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: No
Firmware: Version 0602 released Dec-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.

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

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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	64	737	871	**736**	**872**	736	872	64	737	871	**736**	**872**	736	872
507.cactuBSSN_r	64	142	569	140	578	**142**	**572**	64	142	569	140	578	**142**	**572**
508.namd_r	64	221	275	221	275	**221**	**275**	64	**221**	**276**	221	275	221	276
510.parest_r	64	363	461	362	462	**363**	**462**	64	361	463	361	464	**361**	**463**
511.povray_r	64	369	405	**369**	**406**	368	406	64	369	405	**369**	**406**	368	406
519.lbm_r	64	241	279	**242**	**279**	242	279	64	241	279	**242**	**279**	242	279
521.wrf_r	64	310	463	313	459	**312**	**460**	64	297	483	296	484	**296**	**484**
526.blender_r	64	253	385	253	386	**253**	**385**	64	253	385	253	386	**253**	**385**
527.cam4_r	64	290	386	278	403	**278**	**403**	64	290	386	278	403	**278**	**403**
538.imagick_r	64	**106**	**1500**	105	1510	106	1500	64	**106**	**1500**	105	1510	106	1500
544.nab_r	64	181	596	181	596	**181**	**596**	64	181	596	181	596	**181**	**596**
549.fotonik3d_r	64	888	281	885	282	**887**	**281**	64	882	283	**882**	**283**	879	284
554.roms_r	64	**443**	**229**	444	229	443	230	64	**437**	**233**	437	233	437	233
SPECrate®2017_fp_base =		**448**										
SPECrate®2017_fp_peak =		**451**										

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
 OS set to performance mode via cpupower frequency-set -g performance
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.

(Continued on next page)

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Operating System Notes (Continued)

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 =
      "/cpu119/amd_rate_aocc400_genoa_B_lib/lib:/cpu119/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:
SR-IOV Support = Disabled
SVM Mode = Disabled
NUMA nodes per socket = NPS4
Determinism Control = Manual
Determinism Enable = Power
Engine Boost = Aggressive
TDP Control = Manual
TDP = 400
PPT Control = Manual
PPT = 400
IOMMU = Disabled
BMC Configuration:
Fan mode = Full speed mode

(Continued on next page)

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Platform Notes (Continued)

```
 Sysinfo program /cpu119/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Thu Mar 16 03:03:41 2023

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

 --------------------------------------------------------------
 Table of contents
 --------------------------------------------------------------
  1. uname -a
  2. w
  3. Username
  4. ulimit -a
  5. sysinfo process ancestry
  6. /proc/cpuinfo
  7. lscpu
  8. numactl --hardware
  9. /proc/meminfo
 10. who -r
 11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
 12. Services, from systemctl list-unit-files
 13. Linux kernel boot-time arguments, from /proc/cmdline
 14. cpupower frequency-info
 15. tuned-adm active
 16. sysctl
 17. /sys/kernel/mm/transparent_hugepage
 18. /sys/kernel/mm/transparent_hugepage/khugepaged
 19. OS release
 20. Disk information
 21. /sys/devices/virtual/dmi/id
 22. dmidecode
 23. BIOS
 --------------------------------------------------------------


 --------------------------------------------------------------
 1. uname -a
  Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)
   x86_64 x86_64 x86_64 GNU/Linux


 --------------------------------------------------------------
 2. w
    03:03:41 up 16:23,  2 users,  load average: 40.77, 58.25, 61.69
    USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
    root     tty1     -                Wed10   16:22m  1.22s  0.21s /bin/bash ./amd_rate_aocc400_genoa_B1.sh
    root     tty2     -                        15:18   11:44m  0.02s  0.02s -bash
```

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Platform Notes (Continued)

```
   --------------------------------------------------------------
   3. Username
     From environment variable $USER:  root


   --------------------------------------------------------------
   4. ulimit -a
     core file size          (blocks, -c) unlimited
     data seg size           (kbytes, -d) unlimited
     scheduling priority             (-e) 0
     file size               (blocks, -f) unlimited
     pending signals                 (-i) 3095018
     max locked memory       (kbytes, -l) 2097152
     max memory size         (kbytes, -m) unlimited
     open files                      (-n) 1024000
     pipe size            (512 bytes, -p) 8
     POSIX message queues     (bytes, -q) 819200
     real-time priority              (-r) 0
     stack size              (kbytes, -s) unlimited
     cpu time               (seconds, -t) unlimited
     max user processes              (-u) 3095018
     virtual memory          (kbytes, -v) unlimited
     file locks                      (-x) unlimited


   --------------------------------------------------------------
   5. sysinfo process ancestry
    /usr/lib/systemd/systemd --switched-root --system --deserialize 30
    login -- root
    -bash
    /bin/bash ./rate.sh
    python3 ./run_amd_rate_aocc400_genoa_B1.py
    /bin/bash ./amd_rate_aocc400_genoa_B1.sh
    runcpu --config amd_rate_aocc400_genoa_B1.cfg --tune all --reportable --iterations 3 fprate
   runcpu --configfile amd_rate_aocc400_genoa_B1.cfg --tune all --reportable --iterations 3 --nopower --runmode
     rate --tune base:peak --size test:train:refrate fprate --nopreenv --note-preenv --logfile
      $SPEC/tmp/CPU2017.218/templogs/preenv.fprate.218.0.log --lognum 218.0 --from_runcpu 2
    specperl $SPEC/bin/sysinfo
   $SPEC = /cpu119


   --------------------------------------------------------------
   6. /proc/cpuinfo
       model name      : AMD EPYC 9354P 32-Core Processor
       vendor_id       : AuthenticAMD
       cpu family      : 25
       model           : 17
       stepping        : 1
       microcode       : 0xa101111
       bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
```

(Continued on next page)

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Platform Notes (Continued)

```
    TLB size          : 3584 4K pages
    cpu cores         : 32
    siblings          : 64
    1 physical ids (chips)
    64 processors (hardware threads)
    physical id 0: core ids 0-31
    physical id 0: apicids 0-63
  Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
   virtualized systems.  Use the above data carefully.


   -------------------------------------------------------------
7. lscpu

From lscpu from util-linux 2.37.2:
   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 9354P 32-Core Processor
   CPU family:                   25
   Model:                        17
   Thread(s) per core:           2
   Core(s) per socket:           32
   Socket(s):                    1
   Stepping:                     1
   Frequency boost:              enabled
   CPU max MHz:                  3799.0720
   CPU min MHz:                  1500.0000
   BogoMIPS:                     6499.65
   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
```

(Continued on next page)

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Platform Notes (Continued)

```
                               avx512_vpopcntdq la57 rdpid overflow_recov succor smca fsrm flush_l1d
  Virtualization:              AMD-V
  L1d cache:                   1 MiB (32 instances)
  L1i cache:                   1 MiB (32 instances)
  L2 cache:                    32 MiB (32 instances)
  L3 cache:                    256 MiB (8 instances)
  NUMA node(s):                4
  NUMA node0 CPU(s):           0-7,32-39
  NUMA node1 CPU(s):           8-15,40-47
  NUMA node2 CPU(s):           16-23,48-55
  NUMA node3 CPU(s):           24-31,56-63
  Vulnerability Itlb multihit: Not affected
  Vulnerability L1tf:          Not affected
  Vulnerability Mds:           Not affected
  Vulnerability Meltdown:      Not affected
  Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
  Vulnerability Spectre v1:        Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:        Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP always-on, RSB
                               filling
  Vulnerability Srbds:         Not affected
  Vulnerability Tsx async abort: Not affected

 From lscpu --cache:
     NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL   SETS PHY-LINE COHERENCY-SIZE
     L1d       32K       1M    8 Data           1     64        1             64
     L1i       32K       1M    8 Instruction    1     64        1             64
     L2         1M      32M    8 Unified        2   2048        1             64
     L3        32M     256M   16 Unified        3  32768        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: 0-7,32-39
  node 0 size: 193285 MB
  node 0 free: 192337 MB
  node 1 cpus: 8-15,40-47
  node 1 size: 193497 MB
  node 1 free: 192982 MB
  node 2 cpus: 16-23,48-55
  node 2 size: 193531 MB
  node 2 free: 192915 MB
  node 3 cpus: 24-31,56-63
  node 3 size: 193464 MB
  node 3 free: 192565 MB
  node distances:
  node   0   1   2   3
```

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Platform Notes (Continued)

```
      0:  10  12  12  12
      1:  12  10  12  12
      2:  12  12  10  12
      3:  12  12  12  10


   ------------------------------------------------------------
   9. /proc/meminfo
      MemTotal:       792350096 kB


   ------------------------------------------------------------
   10. who -r
      run-level 3 Mar 15 10:40


   ------------------------------------------------------------
   11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
      Default Target  Status
      multi-user      running


   ------------------------------------------------------------
   12. Services, from systemctl list-unit-files
      STATE             UNIT FILES
      enabled           YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron display-manager getty@ haveged
                        irqbalance issue-generator kbdsettings klog lvm2-monitor nscd nvmefc-boot-connections
                        postfix purge-kernels rollback rsyslog smartd sshd wicked wickedd-auto4 wickedd-dhcp4
                            wickedd-dhcp6 wickedd-nanny
      enabled-runtime   systemd-remount-fs
      disabled          autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
                        chronyd console-getty cups cups-browsed debug-shell ebtables exchange-bmc-os-info
                        firewalld gpm grub2-once haveged-switch-root ipmi ipmievd issue-add-ssh-keys kexec-load
                         lunmask man-db-create multipathd nfs nfs-blkmap nvmf-autoconnect rdisc rpcbind
                         rpmconfigcheck rsyncd serial-getty@ smartd_generate_opts snmpd snmptrapd svnserve
                            systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                            systemd-time-wait-sync systemd-timesyncd tuned udisks2
      indirect          wickedd


   ------------------------------------------------------------
   13. Linux kernel boot-time arguments, from /proc/cmdline
      BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
      root=UUID=9bcf0374-b29f-4a4c-932e-9c0e90fb0803
      splash=silent
      mitigations=auto
      quiet
     cgroup_disable=memory,cpu,cpuacct,blkio,hugetlb,pids,cpuset,perf_event,freezer,devices,net_cls,net_prio


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

(Continued on next page)

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Platform Notes (Continued)

```
     current policy: frequency should be within 1.50 GHz and 3.25 GHz.
                     The governor "performance" may decide which speed to use
                     within this range.
   boost state support:
     Supported: yes
     Active: yes


  ----------------------------------------------------------------
15. tuned-adm active
  It seems that tuned daemon is not running, preset profile is not activated.
  Preset profile: latency-performance


  ----------------------------------------------------------------
16. sysctl
  kernel.numa_balancing            1
  kernel.randomize_va_space        0
  vm.compaction_proactiveness      20
  vm.dirty_background_bytes        0
  vm.dirty_background_ratio        10
  vm.dirty_bytes                   0
  vm.dirty_expire_centisecs        3000
  vm.dirty_ratio                   8
  vm.dirty_writeback_centisecs     500
  vm.dirtytime_expire_seconds      43200
  vm.extfrag_threshold             500
  vm.min_unmapped_ratio            1
  vm.nr_hugepages                  0
  vm.nr_hugepages_mempolicy        0
  vm.nr_overcommit_hugepages       0
  vm.swappiness                    1
  vm.watermark_boost_factor        15000
  vm.watermark_scale_factor        10
  vm.zone_reclaim_mode             1


  ----------------------------------------------------------------
17. /sys/kernel/mm/transparent_hugepage
  defrag         [always] defer defer+madvise madvise never
  enabled        [always] madvise never
  hpage_pmd_size 2097152
  shmem_enabled  always within_size advise [never] deny force


  ----------------------------------------------------------------
18. /sys/kernel/mm/transparent_hugepage/khugepaged
  alloc_sleep_millisecs   60000
  defrag                  1
  max_ptes_none           511
  max_ptes_shared         256
```

(Continued on next page)

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Platform Notes (Continued)

```
  max_ptes_swap               64
  pages_to_scan               4096
  scan_sleep_millisecs      10000


  ----------------------------------------------------------------
 19. OS release
   From /etc/*-release /etc/*-version
   os-release SUSE Linux Enterprise Server 15 SP4


  ----------------------------------------------------------------
 20. Disk information
 SPEC is set to: /cpu119
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/nvme0n1p8 xfs   500G  102G  399G  21% /


  ----------------------------------------------------------------
 21. /sys/devices/virtual/dmi/id
     Vendor:          ASUSTeK COMPUTER INC.
     Product:         RS520A-E12-RS12U
     Product Family:  Server
     Serial:          123456789012


  ----------------------------------------------------------------
 22. dmidecode
   Additional information from dmidecode 3.2 follows.  WARNING: Use caution when you interpret this section.
   The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately
   determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the
   "DMTF SMBIOS" standard.
    Memory:
      12x Samsung M321R8GA0BB0-CQKVG 64 GB 2 rank 4800



  ----------------------------------------------------------------
 23. BIOS
 (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:      American Megatrends Inc.
    BIOS Version:     0602
    BIOS Date:        12/20/2022
    BIOS Revision:    6.2
```

Compiler Version Notes

```
==============================================================================
 C                | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
                  | 544.nab_r(base, peak)
  ----------------------------------------------------------------------------
```

(Continued on next page)

ASUSTeK Computer Inc.

SPECrate®2017_fp_base = 448

ASUS RS520A-E12-RS12U
(3.25 GHz, AMD EPYC 9354P)

SPECrate®2017_fp_peak = 451

CPU2017 License:	9016	**Test Date:**	Mar-2023
Test Sponsor:	ASUSTeK Computer Inc.	**Hardware Availability:**	Nov-2022
Tested by:	ASUSTeK Computer Inc.	**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
------------------------------------------------------------------------


==============================================================================
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
------------------------------------------------------------------------


==============================================================================
C++, C          | 511.povray_r(base, peak) 526.blender_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
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 | 507.cactuBSSN_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
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)
```

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SPECrate®2017_fp_base = 448

ASUS RS520A-E12-RS12U
(3.25 GHz, AMD EPYC 9354P)

SPECrate®2017_fp_peak = 451

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Mar-2023
Hardware Availability: Nov-2022
Software Availability: Nov-2022

Compiler Version Notes (Continued)

```
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: 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        | 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
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
```

C++ benchmarks:
```
clang++
```

Fortran benchmarks:
```
flang
```

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

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ASUSTeK Computer Inc.

ASUS RS520A-E12-RS12U
(3.25 GHz, AMD EPYC 9354P)

SPECrate®2017_fp_base = 448

SPECrate®2017_fp_peak = 451

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Mar-2023
Hardware Availability: Nov-2022
Software Availability: Nov-2022

Base Compiler Invocation (Continued)

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`
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
```

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ASUSTeK Computer Inc.

ASUS RS520A-E12-RS12U
(3.25 GHz, AMD EPYC 9354P)

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Test Date: Mar-2023
Hardware Availability: Nov-2022
Software Availability: Nov-2022

Base Optimization Flags (Continued)

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
-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
```

SPEC CPU®2017 Floating Point Rate Result

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ASUSTeK Computer Inc.

ASUS RS520A-E12-RS12U
(3.25 GHz, AMD EPYC 9354P)

SPECrate®2017_fp_base = 448

SPECrate®2017_fp_peak = 451

CPU2017 License: 9016
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Tested by: ASUSTeK Computer Inc.

Test Date: Mar-2023
Hardware Availability: Nov-2022
Software Availability: Nov-2022

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
```

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
```

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

ASUSTeK Computer Inc.

ASUS RS520A-E12-RS12U
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Test Date: Mar-2023
Hardware Availability: Nov-2022
Software Availability: Nov-2022

Peak Optimization Flags

C benchmarks:

 519.lbm_r: `basepeak = yes`

 538.imagick_r: `basepeak = yes`

 544.nab_r: `basepeak = yes`

C++ benchmarks:

 508.namd_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`
`-finline-aggressive -mllvm -unroll-threshold=100`
`-mllvm -reduce-array-computations=3 -zopt -lamdlibm`
`-lamdalloc`

 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: `basepeak = yes`

 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: `-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`

ASUSTeK Computer Inc.

ASUS RS520A-E12-RS12U
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Software Availability: Nov-2022

Peak Optimization Flags (Continued)

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
-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++:

```
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
```

SPEC CPU®2017 Floating Point Rate Result

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ASUS RS520A-E12-RS12U
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Test Sponsor: ASUSTeK Computer Inc.
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Test Date: Mar-2023
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The flags files that were used to format this result can be browsed at

http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-AMD-K14-V1.1.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/ASUSTekPlatform-Settings-AMD-K14-V1.1.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.

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