SPEC CPU®2017 Floating Point Rate Result
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ASUSTeK Computer Inc.

ASUS RS720A-E12-RS12
(2.55 GHz, AMD EPYC 9684X)

$SPECrate®2017\_fp\_base = 1630$

$SPECrate®2017\_fp\_peak = 1700$

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

Copies — scale: 0 300 600 900 1300 1700 2100 2500 2900 3300 3700 4100 4500 4900 5300 5700 6100 6500 6900 7700

Benchmark	Copies	Base	Peak
503.bwaves_r	384 / 48	1780	1780
507.cactuBSSN_r	384	1670	
508.namd_r	384	1440	
510.parest_r	384	2160	
511.povray_r	384	2090	
519.lbm_r	384 / 192	591	597
521.wrf_r	384 / 192	1300	1810
526.blender_r	384	2000	
527.cam4_r	384	2020	
538.imagick_r	384	7590	
544.nab_r	384	3130	
549.fotonik3d_r	384 / 192	573	577
554.roms_r	384 / 192	707	837

——— SPECrate®2017_fp_base (1630)   - - - - - SPECrate®2017_fp_peak (1700)

Hardware
CPU Name: AMD EPYC 9684X
 Max MHz: 3700
 Nominal: 2550
Enabled: 192 cores, 2 chips, 2 threads/core
Orderable: 1,2 chips
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 1152 MB I+D on chip per chip,
 96 MB shared / 8 cores
 Other: None
Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 4.0 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 0902 released Apr-2023
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.

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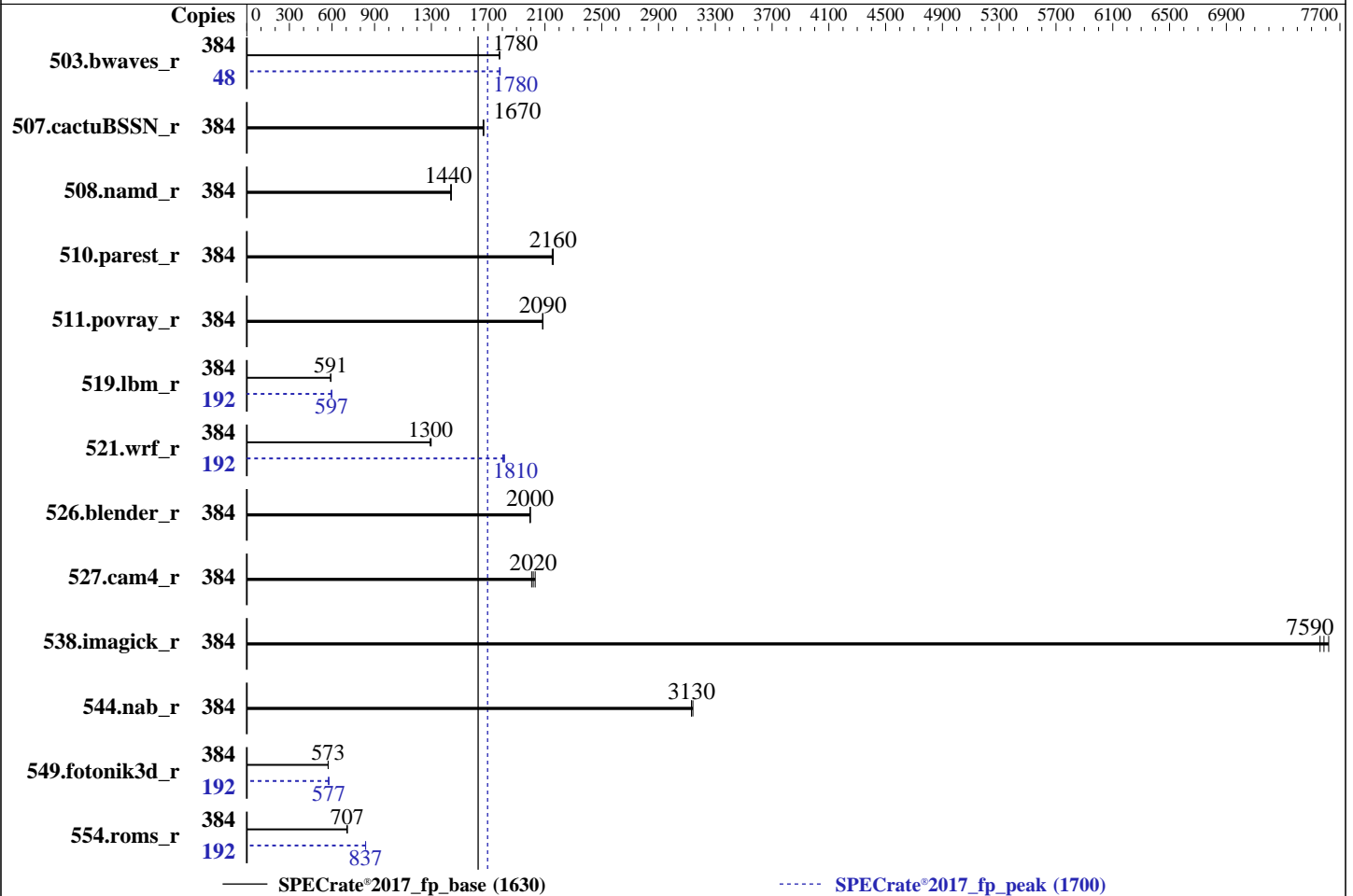| **CPU2017 License:** 9016		**Test Date:** Sep-2023
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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	384	2162	1780	2164	1780	**2164**	**1780**	48	270	1780	270	1790	**270**	**1780**
507.cactuBSSN_r	384	292	1660	291	1670	**292**	**1670**	384	292	1660	291	1670	**292**	**1670**
508.namd_r	384	**253**	**1440**	253	1440	254	1440	384	**253**	**1440**	253	1440	254	1440
510.parest_r	384	465	2160	**466**	**2160**	467	2150	384	465	2160	**466**	**2160**	467	2150
511.povray_r	384	**430**	**2090**	430	2090	430	2080	384	**430**	**2090**	430	2090	430	2080
519.lbm_r	384	684	591	**685**	**591**	685	591	192	**339**	**597**	338	598	339	597
521.wrf_r	384	662	1300	666	1290	**664**	**1300**	192	237	1820	**238**	**1810**	239	1800
526.blender_r	384	293	1990	**293**	**2000**	293	2000	384	293	1990	**293**	**2000**	293	2000
527.cam4_r	384	331	2030	**333**	**2020**	335	2010	384	331	2030	**333**	**2020**	335	2010
538.imagick_r	384	126	7560	**126**	**7590**	125	7620	384	126	7560	**126**	**7590**	125	7620
544.nab_r	384	**206**	**3130**	206	3130	206	3140	384	**206**	**3130**	206	3130	206	3140
549.fotonik3d_r	384	2609	574	2612	573	**2611**	**573**	192	1297	577	**1297**	**577**	1298	577
554.roms_r	384	866	705	862	708	**863**	**707**	192	365	837	365	837	**365**	**837**

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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
 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.
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
```

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Operating System Notes (Continued)

```
'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 = "/aocczn4/amd_rate_aocc400_znver4_A_lib/lib:/aocczn4/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 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
BMC Configuration:
Fan mode = Full speed mode

 Sysinfo program /aocczn4/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Fri Sep 15 23:42:04 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
```

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Platform Notes (Continued)

```
 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
    23:42:04 up 11:53,  2 users,  load average: 44.56, 139.78, 191.62
   USER      TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                11:50   11:51m  1.39s  0.23s /bin/bash ./amd_rate_aocc400_znver4_A1.sh
   root     tty2     -                11:53   11:46m  0.02s  0.02s -bash


 -----------------------------------------------------------
 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) 6190535
   max locked memory       (kbytes, -l) 2097152
   max memory size         (kbytes, -m) unlimited
   open files                      (-n) 1024
   pipe size            (512 bytes, -p) 8
   POSIX message queues     (bytes, -q) 819200
   real-time priority              (-r) 0
   stack size              (kbytes, -s) unlimited
   cpu time               (seconds, -t) unlimited
   max user processes              (-u) 6190535
   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_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
```

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Platform Notes (Continued)

```
 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/CPU2017.159/templogs/preenv.fprate.159.0.log --lognum 159.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /aocczn4


 -------------------------------------------------------------
6. /proc/cpuinfo
    model name      : AMD EPYC 9684X 96-Core Processor
    vendor_id       : AuthenticAMD
    cpu family      : 25
    model           : 17
    stepping        : 2
    microcode       : 0xa101203
    bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
    TLB size        : 3584 4K pages
    cpu cores       : 96
    siblings        : 192
    2 physical ids (chips)
    384 processors (hardware threads)
    physical id 0: core ids 0-95
    physical id 1: core ids 0-95
    physical id 0: apicids 0-191
    physical id 1: apicids 256-447
 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):                 384
  On-line CPU(s) list:    0-383
  Vendor ID:              AuthenticAMD
  Model name:             AMD EPYC 9684X 96-Core Processor
  CPU family:             25
  Model:                  17
  Thread(s) per core:     2
  Core(s) per socket:     96
  Socket(s):              2
  Stepping:               2
  Frequency boost:        enabled
  CPU max MHz:            3715.4290
  CPU min MHz:            1500.0000
  BogoMIPS:               5092.58
  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
```

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Platform Notes (Continued)

```
                           avx512_bf16 clzero irperf xsaveerptr rdpru wbnoinvd amd_ppin arat npt lbrv
                           svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists
                           pausefilter pfthreshold avic v_vmsave_vmload vgif v_spec_ctrl avx512vbmi
                           umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
                           avx512_vpopcntdq la57 rdpid overflow_recov succor smca fsrm flush_l1d
   Virtualization:         AMD-V
   L1d cache:              6 MiB (192 instances)
   L1i cache:              6 MiB (192 instances)
   L2 cache:               192 MiB (192 instances)
   L3 cache:               2.3 GiB (24 instances)
   NUMA node(s):           8
   NUMA node0 CPU(s):      0-23,192-215
   NUMA node1 CPU(s):      24-47,216-239
   NUMA node2 CPU(s):      48-71,240-263
   NUMA node3 CPU(s):      72-95,264-287
   NUMA node4 CPU(s):      96-119,288-311
   NUMA node5 CPU(s):      120-143,312-335
   NUMA node6 CPU(s):      144-167,336-359
   NUMA node7 CPU(s):      168-191,360-383
   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       6M    8 Data              1    64      1              64
     L1i      32K       6M    8 Instruction       1    64      1              64
     L2        1M     192M    8 Unified           2  2048      1              64
     L3       96M     2.3G   16 Unified           3 98304      1              64


   ------------------------------------------------------------
 8. numactl --hardware
 NOTE: a numactl 'node' might or might not correspond to a physical chip.
   available: 8 nodes (0-7)
   node 0 cpus: 0-23,192-215
   node 0 size: 193255 MB
   node 0 free: 189248 MB
   node 1 cpus: 24-47,216-239
   node 1 size: 193519 MB
   node 1 free: 192051 MB
   node 2 cpus: 48-71,240-263
   node 2 size: 193519 MB
   node 2 free: 192084 MB
   node 3 cpus: 72-95,264-287
   node 3 size: 193485 MB
   node 3 free: 191963 MB
   node 4 cpus: 96-119,288-311
   node 4 size: 193519 MB
   node 4 free: 192021 MB
   node 5 cpus: 120-143,312-335
   node 5 size: 193519 MB
   node 5 free: 192032 MB
   node 6 cpus: 144-167,336-359
```

(Continued on next page)

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Platform Notes (Continued)

```
   node 6 size: 193519 MB
   node 6 free: 192091 MB
   node 7 cpus: 168-191,360-383
   node 7 size: 193317 MB
   node 7 free: 191850 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


   --------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       1584801844 kB


   --------------------------------------------------------------
10. who -r
   run-level 3 Sep 15 11:50


   --------------------------------------------------------------
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 hwloc-dump-hwdata 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=bd4eeb48-8f2c-47c9-ae06-b7241b1d0eb7
   splash=silent
   mitigations=auto
   quiet
   security=apparmor


   --------------------------------------------------------------
14. cpupower frequency-info
   analyzing CPU 0:
     current policy: frequency should be within 1.50 GHz and 2.55 GHz.
                     The governor "performance" may decide which speed to use
```

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Platform Notes (Continued)

```
                      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: throughput-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
      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: /aocczn4
      Filesystem    Type  Size  Used Avail Use% Mounted on
      /dev/nvme0n1p4 xfs   2.0T  204G  1.8T  10% /
```

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```
   ----------------------------------------------------------
   21. /sys/devices/virtual/dmi/id
      Vendor:         ASUSTeK COMPUTER INC.
      Product:        RS720A-E12-RS12
      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:
       24x Samsung M321R8GA0BB0-CQKDG 64 GB 2 rank 4800



   ----------------------------------------------------------
   23. BIOS
   (This section combines info from /sys/devices and dmidecode.)
      BIOS Vendor:        American Megatrends Inc.
      BIOS Version:       0902
      BIOS Date:          04/12/2023
      BIOS Revision:      9.2
```

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
------------------------------------------------------------------------------


==============================================================================
```

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ASUSTeK Computer Inc.

ASUS RS720A-E12-RS12
(2.55 GHz, AMD EPYC 9684X)

SPECrate®2017_fp_base = 1630

SPECrate®2017_fp_peak = 1700

CPU2017 License: 9016

Test Sponsor: ASUSTeK Computer Inc.

Tested by: ASUSTeK Computer Inc.

Test Date: Sep-2023

Hardware Availability: Jun-2023

Software Availability: Nov-2022

Compiler Version Notes (Continued)

```
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
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
```

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS720A-E12-RS12
(2.55 GHz, AMD EPYC 9684X)

SPECrate®2017_fp_base = 1630

SPECrate®2017_fp_peak = 1700

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

Test Date: Sep-2023
Hardware Availability: Jun-2023
Software Availability: Nov-2022

Base Compiler Invocation (Continued)

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
```

ASUSTeK Computer Inc.

ASUS RS720A-E12-RS12
(2.55 GHz, AMD EPYC 9684X)

SPECrate®2017_fp_base = 1630

SPECrate®2017_fp_peak = 1700

CPU2017 License: 9016		**Test Date:**	Sep-2023
Test Sponsor:	ASUSTeK Computer Inc.	**Hardware Availability:**	Jun-2023
Tested by:	ASUSTeK Computer Inc.	**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 RS720A-E12-RS12
(2.55 GHz, AMD EPYC 9684X)

SPECrate®2017_fp_base = 1630

SPECrate®2017_fp_peak = 1700

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

Test Date: Sep-2023
Hardware Availability: Jun-2023
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
```

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

Test Date: Sep-2023
Hardware Availability: Jun-2023
Software Availability: Nov-2022

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: `basepeak = yes`

C++ benchmarks:

508.namd_r: `basepeak = yes`

510.parest_r: `basepeak = yes`

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
```

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Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

SPEC CPU®2017 Floating Point Rate Result

ASUSTeK Computer Inc.

ASUS RS720A-E12-RS12
(2.55 GHz, AMD EPYC 9684X)

SPECrate®2017_fp_base = 1630

SPECrate®2017_fp_peak = 1700

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

Test Date: Sep-2023
Hardware Availability: Jun-2023
Software Availability: Nov-2022

Peak Optimization Flags (Continued)

521.wrf_r (continued):
```
-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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SPECrate®2017_fp_base = 1630

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

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

http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-AMD-K14-V1.4.html
http://www.spec.org/cpu2017/flags/aocc400-flags-asusv01.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-AMD-K14-V1.4.xml
http://www.spec.org/cpu2017/flags/aocc400-flags-asusv01.xml

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