SPEC CPU®2017 Floating Point Rate Result

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Inspur Electronic Information Industry Co., Ltd. (IEI)

Inspur NF5280A7 (AMD EPYC 9174F)

$SPECrate®2017\_fp\_base = 594$

$SPECrate®2017\_fp\_peak = 603$

CPU2017 License: 3358
Test Sponsor: Inspur Electronic Information Industry Co., Ltd. (IEI)
Tested by: Inspur Electronic Information Industry Co., Ltd. (IEI)

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

Benchmark	Copies	base	peak
503.bwaves_r	64	1590	1710
507.cactuBSSN_r	64	684	
508.namd_r	64	319	
510.parest_r	64	617	618
511.povray_r	64	467	
519.lbm_r	64	440	
521.wrf_r	64	575	619
526.blender_r	64	455	458
527.cam4_r	64	480	
538.imagick_r	64	1730	
544.nab_r	64	692	
549.fotonik3d_r	64	476	489
554.roms_r	64	366	374

SPECrate®2017_fp_base (594)
SPECrate®2017_fp_peak (603)

Hardware

CPU Name: AMD EPYC 9174F
  Max MHz: 4400
  Nominal: 4100
Enabled: 32 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: 256 MB I+D on chip per chip, 32 MB shared / 2 cores
  Other: None
Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 1 TB NVME SSD
Other: None

Software

OS: Red Hat Enterprise Linux release 9 (Plow) 5.14.0-70.22.1.el9_0.x86_64
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: No
Firmware: Version 04.02.14 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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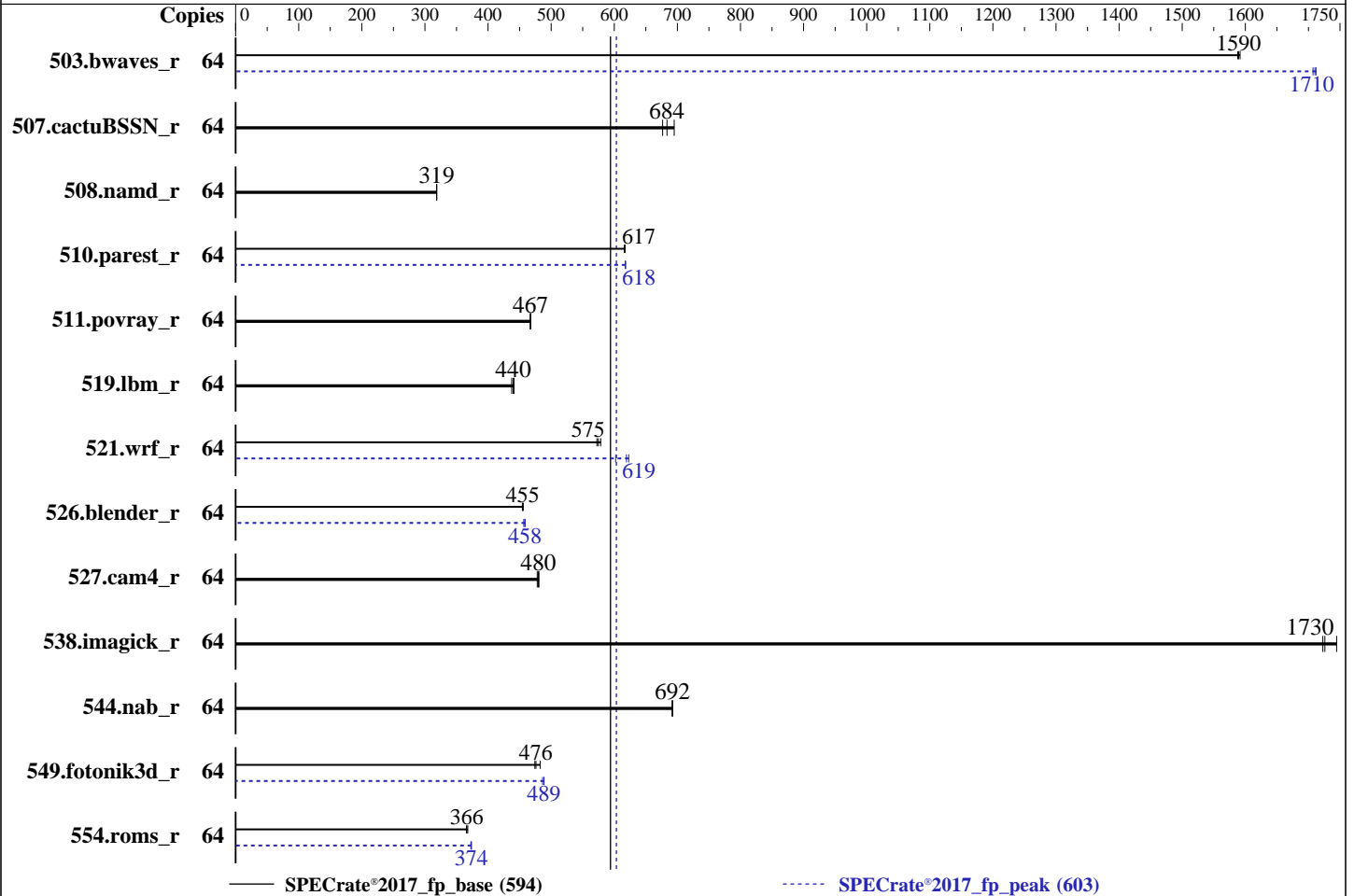
CPU2017 License: 3358	**Test Date:** Mar-2023
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Results Table

Benchmark	Base						Peak					
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	64	**404**	**1590**	403	1590	404	1590	64	**375**	**1710**	376	1710	375	1710
507.cactuBSSN_r	64	**119**	**684**	117	695	120	677	64	**119**	**684**	117	695	120	677
508.namd_r	64	191	319	191	319	**191**	**319**	64	191	319	191	319	**191**	**319**
510.parest_r	64	**271**	**617**	271	617	272	616	64	**271**	**618**	271	617	271	618
511.povray_r	64	320	467	320	467	**320**	**467**	64	320	467	320	467	**320**	**467**
519.lbm_r	64	**153**	**440**	154	437	153	441	64	**153**	**440**	154	437	153	441
521.wrf_r	64	248	579	**249**	**575**	250	573	64	230	623	**231**	**619**	238	602
526.blender_r	64	214	456	**214**	**455**	215	454	64	213	457	**213**	**458**	212	459
527.cam4_r	64	233	481	234	478	**233**	**480**	64	233	481	234	478	**233**	**480**
538.imagick_r	64	**92.2**	**1730**	92.4	1720	91.2	1740	64	**92.2**	**1730**	92.4	1720	91.2	1740
544.nab_r	64	156	692	**156**	**692**	156	692	64	156	692	**156**	**692**	156	692
549.fotonik3d_r	64	517	483	526	474	**524**	**476**	64	510	489	**510**	**489**	513	486
554.roms_r	64	278	366	**278**	**366**	276	368	64	272	374	**272**	**374**	273	373

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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

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,
```

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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 =
     "/home/CPU2017/amd_rate_aocc400_genoa_B_lib/lib:/home/CPU2017/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:
 SVM Mode = disable
 DRAM Scrub time = disable
 NUMA nodes per socket = NPS4
 Determinism Slider = Power
 cTDP = 400
 Package Power Limit = 400

 Sysinfo program /home/CPU2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost.localdomain Thu Mar 23 10:22:40 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 250 (250-6.el9_0)
 12. Failed units, from systemctl list-units --state=failed
 13. Services, from systemctl list-unit-files
```

(Continued on next page)

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Platform Notes (Continued)

```
 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 localhost.localdomain 5.14.0-70.22.1.el9_0.x86_64 #1 SMP PREEMPT Tue Aug 2 10:02:12 EDT 2022 x86_64
   x86_64 x86_64 GNU/Linux


    -----------------------------------------------------------
 2. w
    10:22:40 up  4:10,  1 user,  load average: 41.62, 58.52, 61.81
   USER     TTY         LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1        06:26    3:56m  1.12s  0.17s /bin/bash ./amd_rate_aocc400_genoa_B1.sh


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


    -----------------------------------------------------------
 4. ulimit -a
   real-time non-blocking time  (microseconds, -R) unlimited
   core file size              (blocks, -c) 0
   data seg size               (kbytes, -d) unlimited
   scheduling priority             (-e) 0
   file size                   (blocks, -f) unlimited
   pending signals                 (-i) 6191130
   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) 6191130
   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
  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/CPU2017.002/templogs/preenv.fprate.002.0.log --lognum 002.0 --from_runcpu 2
  specperl $SPEC/bin/sysinfo
  $SPEC = /home/CPU2017
```

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Platform Notes (Continued)

```
     ----------------------------------------------------------
  6. /proc/cpuinfo
     model name      : AMD EPYC 9174F 16-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
     TLB size        : 3584 4K pages
     cpu cores       : 16
     siblings        : 32
     2 physical ids (chips)
     64 processors (hardware threads)
     physical id 0: core ids 0-1,8-9,16-17,24-25,32-33,40-41,48-49,56-57
     physical id 1: core ids 0-1,8-9,16-17,24-25,32-33,40-41,48-49,56-57
     physical id 0: apicids 0-3,16-19,32-35,48-51,64-67,80-83,96-99,112-115
     physical id 1: apicids 128-131,144-147,160-163,176-179,192-195,208-211,224-227,240-243
   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 2.37.4:
     Architecture:            x86_64
     CPU op-mode(s):          32-bit, 64-bit
     Address sizes:           52 bits physical, 57 bits virtual
     Byte Order:              Little Endian
     CPU(s):                  64
     On-line CPU(s) list:     0-63
     Vendor ID:               AuthenticAMD
     BIOS Vendor ID:          Advanced Micro Devices, Inc.
     Model name:              AMD EPYC 9174F 16-Core Processor
     BIOS Model name:         AMD EPYC 9174F 16-Core Processor
     CPU family:              25
     Model:                   17
     Thread(s) per core:      2
     Core(s) per socket:      16
     Socket(s):               2
     Stepping:                1
     Frequency boost:         enabled
     CPU max MHz:             4408.2998
     CPU min MHz:             1500.0000
     BogoMIPS:                8199.98
     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
```

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Platform Notes (Continued)

```
                          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:              1 MiB (32 instances)
  L1i cache:              1 MiB (32 instances)
  L2 cache:               32 MiB (32 instances)
  L3 cache:               512 MiB (16 instances)
  NUMA node(s):           16
  NUMA node0 CPU(s):      0,1,32,33
  NUMA node1 CPU(s):      2,3,34,35
  NUMA node2 CPU(s):      4,5,36,37
  NUMA node3 CPU(s):      6,7,38,39
  NUMA node4 CPU(s):      8,9,40,41
  NUMA node5 CPU(s):      10,11,42,43
  NUMA node6 CPU(s):      12,13,44,45
  NUMA node7 CPU(s):      14,15,46,47
  NUMA node8 CPU(s):      16,17,48,49
  NUMA node9 CPU(s):      18,19,50,51
  NUMA node10 CPU(s):     20,21,52,53
  NUMA node11 CPU(s):     22,23,54,55
  NUMA node12 CPU(s):     24,25,56,57
  NUMA node13 CPU(s):     26,27,58,59
  NUMA node14 CPU(s):     28,29,60,61
  NUMA node15 CPU(s):     30,31,62,63
  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
  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     512M   16 Unified          3 32768        1             64


  --------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 16 nodes (0-15)
  node 0 cpus: 0-1,32-33
  node 0 size: 96577 MB
  node 0 free: 96146 MB
  node 1 cpus: 2-3,34-35
  node 1 size: 96761 MB
  node 1 free: 96293 MB
  node 2 cpus: 4-5,36-37
  node 2 size: 96761 MB
  node 2 free: 96294 MB
  node 3 cpus: 6-7,38-39
  node 3 size: 96761 MB
  node 3 free: 96304 MB
  node 4 cpus: 8-9,40-41
  node 4 size: 96724 MB
```

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Platform Notes (Continued)

```
    node 4 free: 96214 MB
    node 5 cpus: 10-11,42-43
    node 5 size: 96761 MB
    node 5 free: 96195 MB
    node 6 cpus: 12-13,44-45
    node 6 size: 96761 MB
    node 6 free: 96355 MB
    node 7 cpus: 14-15,46-47
    node 7 size: 96761 MB
    node 7 free: 96275 MB
    node 8 cpus: 16-17,48-49
    node 8 size: 96761 MB
    node 8 free: 96302 MB
    node 9 cpus: 18-19,50-51
    node 9 size: 96761 MB
    node 9 free: 96293 MB
    node 10 cpus: 20-21,52-53
    node 10 size: 96761 MB
    node 10 free: 96294 MB
    node 11 cpus: 22-23,54-55
    node 11 size: 96761 MB
    node 11 free: 96291 MB
    node 12 cpus: 24-25,56-57
    node 12 size: 96761 MB
    node 12 free: 96282 MB
    node 13 cpus: 26-27,58-59
    node 13 size: 96761 MB
    node 13 free: 96308 MB
    node 14 cpus: 28-29,60-61
    node 14 size: 96761 MB
    node 14 free: 96287 MB
    node 15 cpus: 30-31,62-63
    node 15 size: 96689 MB
    node 15 free: 96215 MB
    node distances:
    node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
      0:  10  11  12  12  12  12  12  12  32  32  32  32  32  32  32  32
      1:  11  10  12  12  12  12  12  12  32  32  32  32  32  32  32  32
      2:  12  12  10  11  12  12  12  12  32  32  32  32  32  32  32  32
      3:  12  12  11  10  12  12  12  12  32  32  32  32  32  32  32  32
      4:  12  12  12  12  10  11  12  12  32  32  32  32  32  32  32  32
      5:  12  12  12  12  11  10  12  12  32  32  32  32  32  32  32  32
      6:  12  12  12  12  12  12  10  11  32  32  32  32  32  32  32  32
      7:  12  12  12  12  12  12  11  10  32  32  32  32  32  32  32  32
      8:  32  32  32  32  32  32  32  32  10  11  12  12  12  12  12  12
      9:  32  32  32  32  32  32  32  32  11  10  12  12  12  12  12  12
     10:  32  32  32  32  32  32  32  32  12  12  10  11  12  12  12  12
     11:  32  32  32  32  32  32  32  32  12  12  11  10  12  12  12  12
     12:  32  32  32  32  32  32  32  32  12  12  12  12  10  11  12  12
     13:  32  32  32  32  32  32  32  32  12  12  12  12  11  10  12  12
     14:  32  32  32  32  32  32  32  32  12  12  12  12  12  12  10  11
     15:  32  32  32  32  32  32  32  32  12  12  12  12  12  12  11  10

    ----------------------------------------------------------
    9. /proc/meminfo
       MemTotal:       1585036012 kB


    ----------------------------------------------------------
    10. who -r
       run-level 3 Mar 23 06:11
```

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Platform Notes (Continued)

```
     ----------------------------------------------------------
  11. Systemd service manager version: systemd 250 (250-6.el9_0)
    Default Target  Status
    multi-user      degraded

     ----------------------------------------------------------
  12. Failed units, from systemctl list-units --state=failed
      UNIT                              LOAD    ACTIVE SUB    DESCRIPTION
    * NetworkManager-wait-online.service loaded failed failed Network Manager Wait Online

     ----------------------------------------------------------
  13. Services, from systemctl list-unit-files
    STATE             UNIT FILES
    enabled           NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd chronyd crond
                      dbus-broker firewalld getty@ irqbalance kdump lvm2-monitor mdmonitor microcode
                      nis-domainname rhsmcertd rsyslog selinux-autorelabel-mark sshd sssd
                      systemd-network-generator udisks2 upower
    enabled-runtime   systemd-remount-fs
    disabled          blk-availability canberra-system-bootup canberra-system-shutdown
                      canberra-system-shutdown-reboot chrony-wait console-getty cpupower debug-shell
                      hwloc-dump-hwdata kvm_stat man-db-restart-cache-update nftables rdisc rhsm rhsm-facts
                      rpmdb-rebuild serial-getty@ sshd-keygen@ systemd-boot-check-no-failures systemd-pstore
                      systemd-sysext
    indirect          sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo

     ----------------------------------------------------------
  14. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=(hd0,gpt2)/vmlinuz-5.14.0-70.22.1.el9_0.x86_64
    root=/dev/mapper/rhel-root
    ro
    resume=/dev/mapper/rhel-swap
    rd.lvm.lv=rhel/root
    rd.lvm.lv=rhel/swap

     ----------------------------------------------------------
  15. cpupower frequency-info
    analyzing CPU 0:
      current policy: frequency should be within 1.50 GHz and 4.10 GHz.
                      The governor "performance" may decide which speed to use
                      within this range.
      boost state support:
        Supported: yes
        Active: yes
        Boost States: 0
        Total States: 3
        Pstate-P0:  4100MHz

     ----------------------------------------------------------
  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
```

(Continued on next page)

Inspur Electronic Information Industry Co., Ltd. (IEI)

Inspur NF5280A7 (AMD EPYC 9174F)

SPECrate®2017_fp_base = 594

SPECrate®2017_fp_peak = 603

CPU2017 License: 3358
Test Sponsor: Inspur Electronic Information Industry Co., Ltd. (IEI)
Tested by: Inspur Electronic Information Industry Co., Ltd. (IEI)

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

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     Red Hat Enterprise Linux 9.0 (Plow)
   redhat-release Red Hat Enterprise Linux release 9.0 (Plow)
   system-release Red Hat Enterprise Linux release 9.0 (Plow)


   ----------------------------------------------------------
20. Disk information
SPEC is set to: /home/CPU2017
   Filesystem            Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel-home xfs   819G  9.2G  810G   2% /home


   ----------------------------------------------------------
21. /sys/devices/virtual/dmi/id
     Vendor:        Inspur
     Product:       NF5280A7
     Product Family: Not specified
     Serial:        000000000


   ----------------------------------------------------------
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:
     1x Samsung M321R8GA0BB0-CQKDS 64 GB 2 rank 4800
     23x Samsung M321R8GA0BB0-CQKMG 64 GB 2 rank 4800



   ----------------------------------------------------------
   23. BIOS
```

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Platform Notes (Continued)

```
   (This section combines info from /sys/devices and dmidecode.)
     BIOS Vendor:       American Megatrends International, LLC.
     BIOS Version:      04.02.14
     BIOS Date:         12/29/2022
```

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#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)
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)
```

(Continued on next page)

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Inspur NF5280A7 (AMD EPYC 9174F)

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Test Date: Mar-2023
Hardware Availability: Feb-2023
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, 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`

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`

(Continued on next page)

Inspur Electronic Information Industry Co., Ltd. (IEI)

Inspur NF5280A7 (AMD EPYC 9174F)

SPECrate®2017_fp_base = 594

SPECrate®2017_fp_peak = 603

CPU2017 License: 3358

Test Sponsor: Inspur Electronic Information Industry Co., Ltd. (IEI)

Tested by: Inspur Electronic Information Industry Co., Ltd. (IEI)

Test Date: Mar-2023

Hardware Availability: Feb-2023

Software Availability: Nov-2022

Base Portability Flags (Continued)

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`

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`

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SPEC CPU®2017 Floating Point Rate Result

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Inspur Electronic Information Industry Co., Ltd. (IEI)

Inspur NF5280A7 (AMD EPYC 9174F)

SPECrate®2017_fp_base = 594

SPECrate®2017_fp_peak = 603

CPU2017 License: 3358		**Test Date:**	Mar-2023
Test Sponsor:	Inspur Electronic Information Industry Co., Ltd. (IEI)	**Hardware Availability:**	Feb-2023
Tested by:	Inspur Electronic Information Industry Co., Ltd. (IEI)	**Software Availability:**	Nov-2022

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):
```
-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
```

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
```

(Continued on next page)

Inspur Electronic Information Industry Co., Ltd. (IEI)

Inspur NF5280A7 (AMD EPYC 9174F)

SPECrate®2017_fp_base = 594

SPECrate®2017_fp_peak = 603

CPU2017 License: 3358

Test Sponsor: Inspur Electronic Information Industry Co., Ltd. (IEI)

Tested by: Inspur Electronic Information Industry Co., Ltd. (IEI)

Test Date: Mar-2023

Hardware Availability: Feb-2023

Software Availability: Nov-2022

Base Other Flags (Continued)

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
```

Peak Optimization Flags

C benchmarks:

519.lbm_r: `basepeak = yes`

538.imagick_r: `basepeak = yes`

544.nab_r: `basepeak = yes`

C++ benchmarks:

(Continued on next page)

Inspur Electronic Information Industry Co., Ltd. (IEI)

SPECrate®2017_fp_base = 594

Inspur NF5280A7 (AMD EPYC 9174F)

SPECrate®2017_fp_peak = 603

CPU2017 License: 3358		**Test Date:**	Mar-2023
Test Sponsor:	Inspur Electronic Information Industry Co., Ltd. (IEI)	**Hardware Availability:**	Feb-2023
Tested by:	Inspur Electronic Information Industry Co., Ltd. (IEI)	**Software Availability:**	Nov-2022

Peak Optimization Flags (Continued)

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
-lflang

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

(Continued on next page)

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Test Date: Mar-2023

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Peak Optimization Flags (Continued)

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++:

507.cactuBSSN_r: `basepeak = yes`

Peak Other Flags

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

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

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

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

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

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

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2017/flags/aocc400-flags.html`
`http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-amd-V3.0.html`

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/aocc400-flags.xml
http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-amd-V3.0.xml

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

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