SPEC CPU®2017 Floating Point Rate Result

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Inspur Electronic Information Industry Co., Ltd.

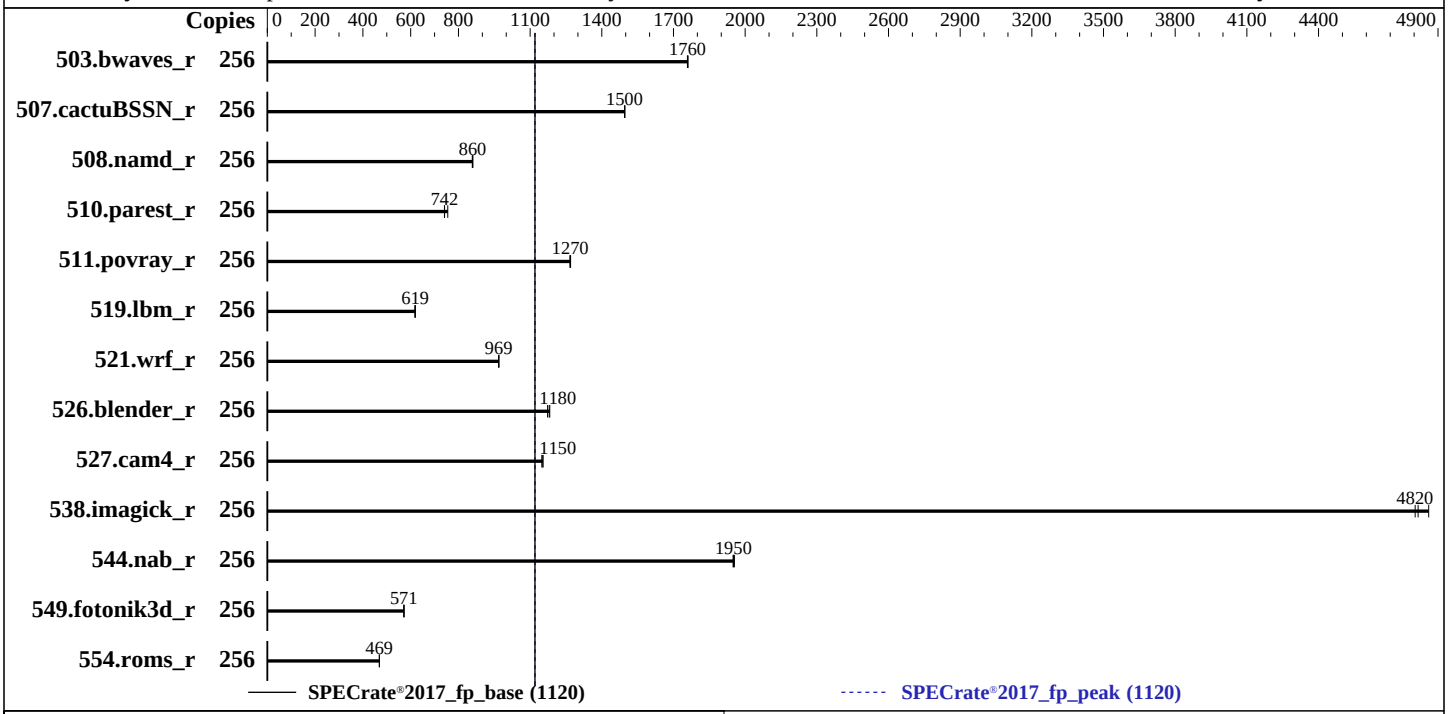
N5468A7 (AMD EPYC 9534)

SPECrate®2017_fp_base = 1120

SPECrate®2017_fp_peak = 1120

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

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



Hardware

CPU Name:	AMD EPYC 9534
Max MHz:	3700
Nominal:	2450
Enabled:	128 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 / 8 cores
Other:	None
Memory:	768 GB (24 x 32 GB 2Rx4 PC5-4800B-R)
Storage:	1 x 1 TB NVME SSD
Other:	None

Software

OS:	Red Hat Enterprise Linux release 9 (Plow) 5.14.0-70.13.1.el9_0.x86_64
Compiler:	C/C++/Fortran: Version 4.0.0 of AOCC
Parallel:	No
Firmware:	Version 01.09.0 released Jul-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.

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	256	**1459**	**1760**	1460	1760	1458	1760	256	**1459**	**1760**	1460	1760	1458	1760
507.cactuBSSN_r	256	217	1500	**217**	**1500**	217	1500	256	217	1500	**217**	**1500**	217	1500
508.namd_r	256	283	860	**283**	**860**	283	858	256	283	860	**283**	**860**	283	858
510.parest_r	256	**903**	**742**	887	755	903	741	256	**903**	**742**	887	755	903	741
511.povray_r	256	471	1270	**471**	**1270**	472	1270	256	471	1270	**471**	**1270**	472	1270
519.lbm_r	256	437	618	436	619	**436**	**619**	256	437	618	436	619	**436**	**619**
521.wrf_r	256	592	969	592	968	**592**	**969**	256	592	969	592	968	**592**	**969**
526.blender_r	256	330	1180	**331**	**1180**	332	1170	256	330	1180	**331**	**1180**	332	1170
527.cam4_r	256	**388**	**1150**	390	1150	388	1150	256	**388**	**1150**	390	1150	388	1150
538.imagick_r	256	131	4860	133	4800	**132**	**4820**	256	131	4860	133	4800	**132**	**4820**
544.nab_r	256	220	1960	**221**	**1950**	221	1950	256	220	1960	**221**	**1950**	221	1950
549.fotonik3d_r	256	1743	573	**1746**	**571**	1746	571	256	1743	573	**1746**	**571**	1746	571
554.roms_r	256	**867**	**469**	867	469	867	469	256	**867**	**469**	867	469	867	469

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SPECrate®2017_fp_peak = 1120

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 Tue Aug 22 03:16:26 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. Services, from systemctl list-unit-files
 13. Linux kernel boot-time arguments, from /proc/cmdline
```

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Platform Notes (Continued)

```
14. cpupower frequency-info
15. sysctl
16. /sys/kernel/mm/transparent_hugepage
17. /sys/kernel/mm/transparent_hugepage/khugepaged
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS
------------------------------------------------------------

------------------------------------------------------------
1. uname -a
  Linux localhost.localdomain 5.14.0-70.13.1.el9_0.x86_64 #1 SMP PREEMPT Thu Apr 14 12:42:38 EDT 2022 x86_64
  x86_64 x86_64 GNU/Linux

------------------------------------------------------------
2. w
   03:16:26 up  3:17,  2 users,  load average: 164.96, 231.70, 243.29
  USER     TTY        LOGIN@   IDLE   JCPU   PCPU WHAT
  root     tty1      07Jan23  2:56m  1.84s  0.49s /bin/bash ./amd_rate_aocc400_genoa_B1.sh
  root     tty2      00:23    2:52m  0.01s  0.01s -bash

------------------------------------------------------------
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) 3094476
  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) 3094476
  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 base --reportable --iterations 3 fprate
 runcpu --configfile amd_rate_aocc400_genoa_B1.cfg --tune base --reportable --iterations 3 --nopower
   --runmode rate --tune base --size test:train:refrate fprate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.027/templogs/preenv.fprate.027.0.log --lognum 027.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /home/CPU2017
```


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Platform Notes (Continued)

```
------------------------------------------------------------
6. /proc/cpuinfo
    model name      : AMD EPYC 9534 64-Core Processor
    vendor_id       : AuthenticAMD
    cpu family      : 25
    model           : 17
    stepping        : 1
    microcode       : 0xa101139
    bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
    TLB size        : 3584 4K pages
    cpu cores       : 64
    siblings        : 128
    2 physical ids (chips)
    256 processors (hardware threads)
    physical id 0: core ids 0-63
    physical id 1: core ids 0-63
    physical id 0: apicids 0-127
    physical id 1: apicids 128-255
  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):                          256
  On-line CPU(s) list:             0-255
  Vendor ID:                       AuthenticAMD
  BIOS Vendor ID:                  Advanced Micro Devices, Inc.
  Model name:                      AMD EPYC 9534 64-Core Processor
  BIOS Model name:                 AMD EPYC 9534 64-Core Processor
  CPU family:                      25
  Model:                           17
  Thread(s) per core:              2
  Core(s) per socket:              64
  Socket(s):                       2
  Stepping:                        1
  Frequency boost:                 enabled
  CPU max MHz:                     3718.0659
  CPU min MHz:                     1500.0000
  BogoMIPS:                        4899.88
  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:            4 MiB (128 instances)
  L1i cache:            4 MiB (128 instances)
  L2 cache:             128 MiB (128 instances)
  L3 cache:             512 MiB (16 instances)
  NUMA node(s):         16
  NUMA node0 CPU(s):    0-7,128-135
  NUMA node1 CPU(s):    8-15,136-143
  NUMA node2 CPU(s):    16-23,144-151
  NUMA node3 CPU(s):    24-31,152-159
  NUMA node4 CPU(s):    32-39,160-167
  NUMA node5 CPU(s):    40-47,168-175
  NUMA node6 CPU(s):    48-55,176-183
  NUMA node7 CPU(s):    56-63,184-191
  NUMA node8 CPU(s):    64-71,192-199
  NUMA node9 CPU(s):    72-79,200-207
  NUMA node10 CPU(s):   80-87,208-215
  NUMA node11 CPU(s):   88-95,216-223
  NUMA node12 CPU(s):   96-103,224-231
  NUMA node13 CPU(s):   104-111,232-239
  NUMA node14 CPU(s):   112-119,240-247
  NUMA node15 CPU(s):   120-127,248-255
  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       4M    8 Data            1    64        1             64
     L1i       32K       4M    8 Instruction     1    64        1             64
     L2         1M     128M    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: 0-7,128-135
  node 0 size: 48174 MB
  node 0 free: 47349 MB
  node 1 cpus: 8-15,136-143
  node 1 size: 48377 MB
  node 1 free: 47612 MB
  node 2 cpus: 16-23,144-151
  node 2 size: 48377 MB
  node 2 free: 47440 MB
  node 3 cpus: 24-31,152-159
  node 3 size: 48377 MB
  node 3 free: 47592 MB
  node 4 cpus: 32-39,160-167
  node 4 size: 48377 MB
```

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Platform Notes (Continued)

```
  node 4 free: 47589 MB
  node 5 cpus: 40-47,168-175
  node 5 size: 48377 MB
  node 5 free: 47594 MB
  node 6 cpus: 48-55,176-183
  node 6 size: 48340 MB
  node 6 free: 47549 MB
  node 7 cpus: 56-63,184-191
  node 7 size: 48377 MB
  node 7 free: 47605 MB
  node 8 cpus: 64-71,192-199
  node 8 size: 48377 MB
  node 8 free: 47542 MB
  node 9 cpus: 72-79,200-207
  node 9 size: 48377 MB
  node 9 free: 47577 MB
  node 10 cpus: 80-87,208-215
  node 10 size: 48377 MB
  node 10 free: 47577 MB
  node 11 cpus: 88-95,216-223
  node 11 size: 48377 MB
  node 11 free: 47589 MB
  node 12 cpus: 96-103,224-231
  node 12 size: 48377 MB
  node 12 free: 47528 MB
  node 13 cpus: 104-111,232-239
  node 13 size: 48377 MB
  node 13 free: 47493 MB
  node 14 cpus: 112-119,240-247
  node 14 size: 48377 MB
  node 14 free: 47595 MB
  node 15 cpus: 120-127,248-255
  node 15 size: 48305 MB
  node 15 free: 47530 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:       792293260 kB

------------------------------------------------------------
10. who -r
  run-level 3 Jan 7 20:25
```

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Platform Notes (Continued)

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

------------------------------------------------------------
12. 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 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

------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
  BOOT_IMAGE=(hd1,gpt2)/vmlinuz-5.14.0-70.13.1.el9_0.x86_64
  root=/dev/mapper/rhel00-root
  ro
  resume=/dev/mapper/rhel00-swap
  rd.lvm.lv=rhel00/root
  rd.lvm.lv=rhel00/swap

------------------------------------------------------------
14. cpupower frequency-info
  analyzing CPU 0:
    current policy: frequency should be within 1.50 GHz and 2.45 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:  2450MHz

------------------------------------------------------------
15. 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
```

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Platform Notes (Continued)

```
  vm.watermark_boost_factor       15000
  vm.watermark_scale_factor          10
  vm.zone_reclaim_mode                1

------------------------------------------------------------
16. /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

------------------------------------------------------------
17. /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

------------------------------------------------------------
18. 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)

------------------------------------------------------------
19. Disk information
SPEC is set to: /home/CPU2017
  Filesystem              Type  Size  Used Avail Use% Mounted on
  /dev/mapper/rhel00-home xfs   819G   16G  803G   2% /home

------------------------------------------------------------
20. /sys/devices/virtual/dmi/id
    Vendor:         Inspur
    Product:        NF5468-A7-A0-R0-00
    Product Family: Not specified
    Serial:         000000000

------------------------------------------------------------
21. 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:
    24x Samsung M321R4GA3BB6-CQKEG 32 GB 2 rank 4800


------------------------------------------------------------
22. BIOS
(This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor:       American Megatrends International, LLC.
   BIOS Version:      01.09.00
   BIOS Date:         07/07/2023
```

Compiler Version Notes

```
==============================================================================================================
C               | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
--------------------------------------------------------------------------------------------------------------
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) 510.parest_r(base)
--------------------------------------------------------------------------------------------------------------
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) 526.blender_r(base)
--------------------------------------------------------------------------------------------------------------
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)
--------------------------------------------------------------------------------------------------------------
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) 549.fotonik3d_r(base) 554.roms_r(base)
--------------------------------------------------------------------------------------------------------------
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) 527.cam4_r(base)
--------------------------------------------------------------------------------------------------------------
```

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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
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`
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
-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
```

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Base Optimization Flags (Continued)

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

Base Other Flags

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

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

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

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

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

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

Peak Optimization Flags

C benchmarks:

519.lbm_r: basepeak = yes

538.imagick_r: basepeak = yes

(Continued on next page)

Peak Optimization Flags (Continued)

544.nab_r: basepeak = yes

C++ benchmarks:

508.namd_r: basepeak = yes

510.parest_r: basepeak = yes

Fortran benchmarks:

503.bwaves_r: basepeak = yes

549.fotonik3d_r: basepeak = yes

554.roms_r: basepeak = yes

Benchmarks using both Fortran and C:

521.wrf_r: basepeak = yes

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

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

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

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