



SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

IEIT Systems Co., Ltd.

SPECrate®2017_fp_base = 599

NF5280A7 (AMD EPYC 9174F)

SPECrate®2017_fp_peak = 608

CPU2017 License: 3358

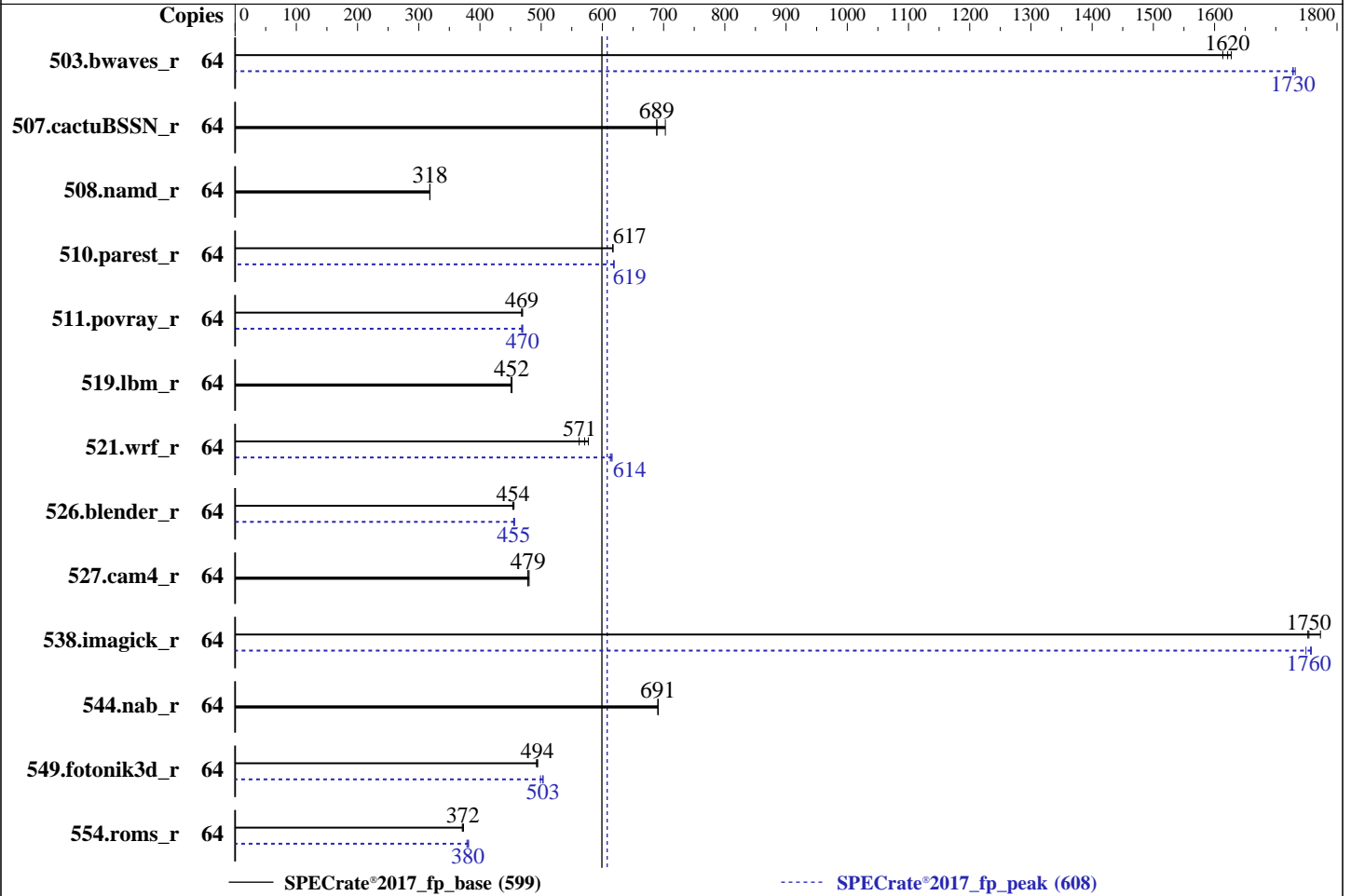
Test Date: Apr-2024

Test Sponsor: IEIT Systems Co., Ltd.

Hardware Availability: Feb-2023

Tested by: IEIT Systems Co., Ltd.

Software Availability: Nov-2022



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: CPU Cooling: Air

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 4.02.28 released Jan-2024
 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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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	64	394	1630	<u>396</u>	<u>1620</u>	398	1610	64	371	1730	371	1730	<u>371</u>	<u>1730</u>
507.cactuBSSN_r	64	115	703	<u>118</u>	<u>689</u>	118	689	64	115	703	<u>118</u>	<u>689</u>	118	689
508.namd_r	64	191	318	191	318	<u>191</u>	<u>318</u>	64	191	318	191	318	<u>191</u>	<u>318</u>
510.parest_r	64	271	617	<u>271</u>	<u>617</u>	271	617	64	<u>271</u>	<u>619</u>	271	619	271	619
511.povray_r	64	318	470	<u>319</u>	<u>469</u>	319	468	64	319	468	318	470	<u>318</u>	<u>470</u>
519.lbm_r	64	149	452	<u>149</u>	<u>452</u>	150	451	64	149	452	<u>149</u>	<u>452</u>	150	451
521.wrf_r	64	<u>251</u>	<u>571</u>	255	562	248	577	64	233	616	<u>233</u>	<u>614</u>	234	613
526.blender_r	64	214	456	<u>215</u>	<u>454</u>	215	454	64	<u>214</u>	<u>455</u>	214	455	213	457
527.cam4_r	64	<u>234</u>	<u>479</u>	233	480	234	478	64	<u>234</u>	<u>479</u>	233	480	234	478
538.imagick_r	64	90.8	1750	<u>90.7</u>	<u>1750</u>	89.8	1770	64	91.0	1750	<u>90.6</u>	<u>1760</u>	90.5	1760
544.nab_r	64	156	691	<u>156</u>	<u>691</u>	156	691	64	156	691	<u>156</u>	<u>691</u>	156	691
549.fotonik3d_r	64	505	494	507	492	<u>505</u>	<u>494</u>	64	<u>496</u>	<u>503</u>	500	499	496	503
554.roms_r	64	273	373	274	371	<u>273</u>	<u>372</u>	64	269	379	267	381	<u>267</u>	<u>380</u>

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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 set to Disable
DRAM Scrub time set to Disable
NUMA nodes per socket set to NPS4
Determinism Slider set to Power
cTDP set to 400
Package Power Limit set to 400

Sysinfo program /home/CPU2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost Wed Apr 24 14:16:05 2024

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. 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 5.14.0-70.22.1.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
 14:16:05 up 3:55, 1 user, load average: 41.93, 58.42, 61.59
USER  TTY      LOGIN@  IDLE   JCPU   PCPU   WHAT
root  tty1    10:21   3:54m  1.10s  0.22s  /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) 6191328
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) 6191328
virtual memory (kbytes, -v) unlimited
file locks (-x) unlimited

```

```

5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 28
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/CPU2017.004/templogs/preenv.fprate.004.0.log --lognum 004.0 --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      : 0xa10113e
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:               8187.75
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 bpeext 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_vpoptndq la57 rdpid overflow_recov succor smca fsrm flush_l1d
```

AMD-V

```

Virtualization:
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):   8
NUMA node0 CPU(s): 0-3,32-35
NUMA node1 CPU(s): 4-7,36-39
NUMA node2 CPU(s): 8-11,40-43
NUMA node3 CPU(s): 12-15,44-47
NUMA node4 CPU(s): 16-19,48-51
NUMA node5 CPU(s): 20-23,52-55
NUMA node6 CPU(s): 24-27,56-59
NUMA node7 CPU(s): 28-31,60-63
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/swaps 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: 8 nodes (0-7)
node 0 cpus: 0-3,32-35
node 0 size: 193288 MB
node 0 free: 192720 MB
node 1 cpus: 4-7,36-39
node 1 size: 193534 MB
node 1 free: 192981 MB
node 2 cpus: 8-11,40-43
node 2 size: 193534 MB
node 2 free: 192971 MB
node 3 cpus: 12-15,44-47
node 3 size: 193497 MB
node 3 free: 192900 MB
node 4 cpus: 16-19,48-51
node 4 size: 193534 MB
node 4 free: 192934 MB
node 5 cpus: 20-23,52-55
node 5 size: 193534 MB
node 5 free: 192980 MB
node 6 cpus: 24-27,56-59
node 6 size: 193534 MB
node 6 free: 192968 MB
node 7 cpus: 28-31,60-63

```

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Platform Notes (Continued)

```

node 7 size: 193480 MB
node 7 free: 192859 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:      1585087336 kB

```

```

-----
10. who -r
    run-level 3 Apr 24 10:20

```

```

-----
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    dbus-broker getty@ tuned udisks2 upower
enabled-runtime  systemd-remount-fs
disabled   NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd
           blk-availability canberra-system-bootup canberra-system-shutdown
           canberra-system-shutdown-reboot chrony-wait chronyd console-getty cpupower crond
           debug-shell firewallld irqbalance kdump kvm_stat lvm2-monitor man-db-restart-cache-update
           mdmonitor microcode nftables nis-domainname rdisc rhsm rhsm-facts rhsmcrttd rpmdb-rebuild
           rsyslog selinux-autorelabel-mark sep5 serial-getty@ sshd sshd-keygen@ sssd
           systemd-boot-check-no-failures systemd-network-generator 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=(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

```

```

-----
14. 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

```

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Platform Notes (Continued)

Pstate-P0: 4100MHz

15. tuned-adm active
Current active 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 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 29G 790G 4% /home

21. /sys/devices/virtual/dmi/id

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Platform Notes (Continued)

Vendor: IEIT SYSTEMS
Product: NF5280-A7-A0-R0-00
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:

3x Hynix HMC94MEBRA109N 64 GB 2 rank 4800
6x Samsung M329R8GA0BB0-CQKDG 64 GB 2 rank 4800
10x Samsung M329R8GA0BB0-CQKEG 64 GB 2 rank 4800
5x Samsung M329R8GA0BB0-CQKVG 64 GB 2 rank 4800

23. BIOS

(This section combines info from /sys/devices and dmidecode.)

BIOS Vendor: American Megatrends International, LLC.
BIOS Version: 04.02.28
BIOS Date: 01/04/2024

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

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Test Date: Apr-2024

Hardware Availability: Feb-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#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)
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

(Continued on next page)



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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

```

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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
-freemap-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
-freemap-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
-freemap-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
```



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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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Peak Optimization Flags

C benchmarks:

519.lbm_r: basepeak = yes

```
538.imagick_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
-freemap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc
```

544.nab_r: basepeak = yes

C++ benchmarks:

508.namd_r: basepeak = yes

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

Fortran benchmarks:

```
503.bwaves_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -Mrecursive
-mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm
-lamdalloc -lflang
```

```
549.fotonik3d_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -Kieee
-Mrecursive -mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -fvector-transform
-fscalar-transform -lamdlibm -lamdalloc -lflang
```

554.roms_r: Same as 503.bwaves_r

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Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

```
521.wrf_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math
-fstruct-layout=7 -mllvm -unroll-threshold=50
-freemap-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: -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
-freemap-arrays -mllvm -reduce-array-computations=3 -zopt
-mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -lamdlibm
-lamdalloc
```

```
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
-freemap-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



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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/IEIT-Platform-Settings-amd-V1.0.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/IEIT-Platform-Settings-amd-V1.0.xml>

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