



SPEC CPU®2017 Floating Point Rate Result

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Fujitsu

PRIMERGY RX1440 M2,
AMD EPYC 9454P, 2.75 GHz

SPECrate®2017_fp_base = 538

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 19

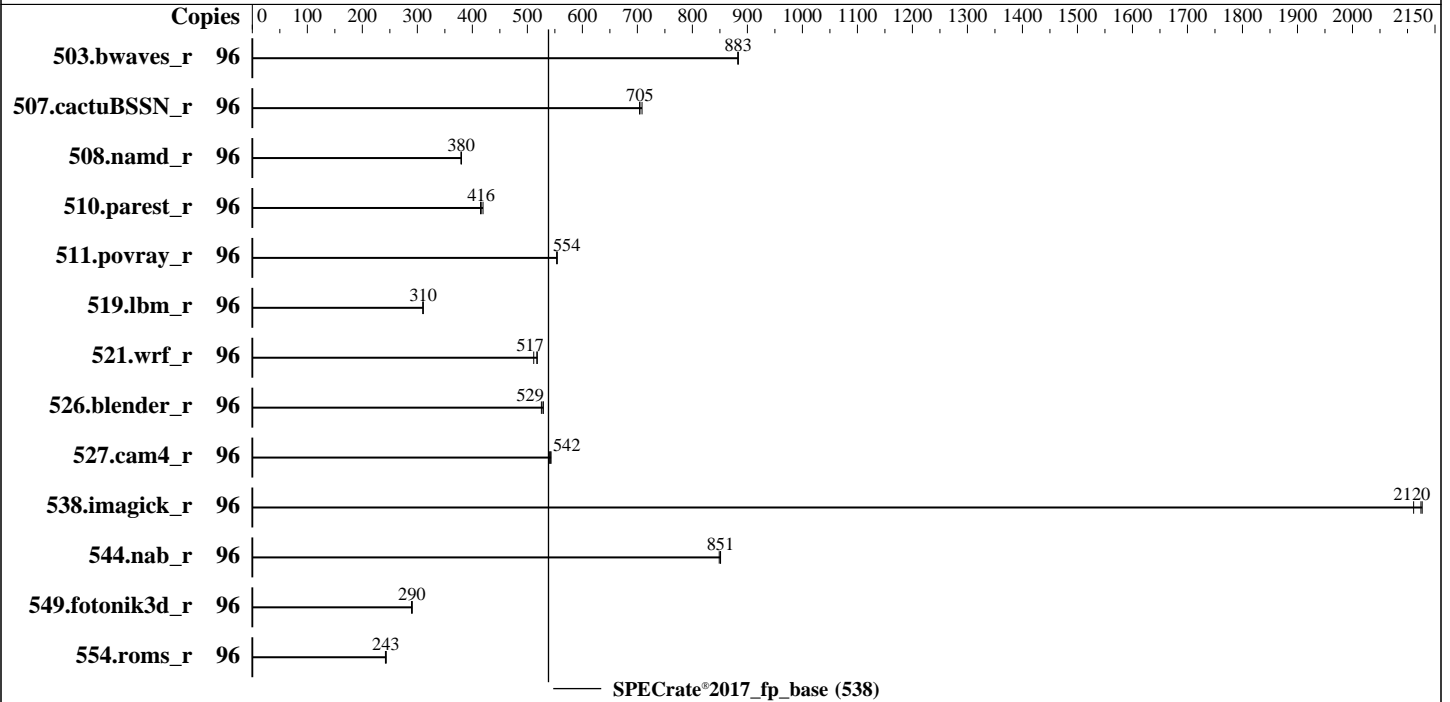
Test Sponsor: Fujitsu

Tested by: Fujitsu

Test Date: Feb-2024

Hardware Availability: Feb-2024

Software Availability: Nov-2022



Hardware

CPU Name: AMD EPYC 9454P
 Max MHz: 3800
 Nominal: 2750
 Enabled: 48 cores, 1 chip, 2 threads/core
 Orderable: 1 chip
 Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 256 MB I+D on chip per chip,
 32 MB shared / 6 cores
 Other: None
 Memory: 384 GB (12 x 32 GB 2Rx8 PC5-4800B-R)
 Storage: 1 x SATA SSD, 3.84 TB
 Other: Cooling: Air

Software

OS: Red Hat Enterprise Linux 9.0 (Plow)
 5.14.0-70.13.1.el9_0.x86_64
 Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
 Parallel: No
 Firmware: Fujitsu BIOS Version Version V5.0.0.27 R1.5.0 for
 D4130-A1x. Released May-2024
 tested as V5.0.0.27 R1.4.0 for D4130-A1x Jan-2024
 File System: xfs
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: Not Applicable
 Other: None
 Power Management: BIOS 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	96	1091	883	1090	883	1090	883							
507.cactuBSSN_r	96	172	708	173	704	172	705							
508.namd_r	96	240	380	240	380	240	380							
510.parest_r	96	599	419	605	415	604	416							
511.povray_r	96	405	553	405	554	405	554							
519.lbm_r	96	326	311	326	310	326	310							
521.wrf_r	96	415	518	420	512	416	517							
526.blender_r	96	278	526	277	529	277	529							
527.cam4_r	96	309	543	310	542	311	540							
538.imagick_r	96	113	2110	112	2130	112	2120							
544.nab_r	96	190	849	190	851	190	851							
549.fotonik3d_r	96	1288	290	1288	290	1292	289							
554.roms_r	96	627	243	630	242	628	243							

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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/Benchmark/speccpu2017r/amd_rate_aocc400_znver4_A_lib/lib:/home/Benchmark/speccpu2017r/amd_rate_aocc400_znver4_A_lib/lib32:"
MALLOC_CONF = "retain:true"

General Notes

Binaries were compiled on a system with 2x AMD EPYC 9174F CPU + 1.5TiB Memory using RHEL 8.6

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

Platform Notes

BIOS configuration:
Determinism Slider = Power
TDP Control = Manual
TDP Limit = 300
Package Power Limit Control = Manual
Package Power Limit = 300
Power Profile Selection = High Performance
NUMA nodes per socket = NPS4
Periodic Directory Rinse (PDR) Tuning = Cache-Bound
Fan Control = Full

Sysinfo program /home/Benchmark/speccpu2017r/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Tue Feb 27 18:59:28 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

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Platform Notes (Continued)

```

9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 250 (250-6.e19_0)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
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.e19_0.x86_64 #1 SMP PREEMPT Thu Apr 14 12:42:38 EDT 2022 x86_64
x86_64 x86_64 GNU/Linux

```

```

2. w
18:59:28 up 1 min, 1 user, load average: 0.56, 0.26, 0.10
USER TTY LOGIN@ IDLE JCPU PCPU WHAT
root tty1 18:58 13.00s 1.10s 0.09s /bin/bash ./amd_rate_aocc400_znver4_A1.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) 1543655
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) 1543655
virtual memory (kbytes, -v) unlimited
file locks (-x) unlimited

```

```

5. sysinfo process ancestry
/usr/lib/systemd/systemd rhgb --switched-root --system --deserialize 31
login -- root
-bash
python3 ./run_amd_fprate_aocc400_znver4_A1.py
/bin/bash ./amd_rate_aocc400_znver4_A1.sh
runcpu --config amd_rate_aocc400_znver4_A1.cfg --tune base --reportable --iterations 3 fprate

```

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Platform Notes (Continued)

```
runcpu --configfile amd_rate_aocc400_znver4_A1.cfg --tune base --reportable --iterations 3 --nopower
--runmode rate --tune base --size test:train:refrate fprate --nopreenv --note-preenv --logfile
$SPEC/tmp/CPU2017.001/templogs/preenv.fprate.001.0.log --lognum 001.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/Benchmark/speccpu2017r
```

6. /proc/cpuinfo

```
model name      : AMD EPYC 9454P 48-Core Processor
vendor_id      : AuthenticAMD
cpu family     : 25
model          : 17
stepping       : 1
microcode      : 0xa101144
bugs           : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
TLB size      : 3584 4K pages
cpu cores     : 48
siblings      : 96
1 physical ids (chips)
96 processors (hardware threads)
physical id 0: core ids 0-5,8-13,16-21,24-29,32-37,40-45,48-53,56-61
physical id 0: apicids 0-11,16-27,32-43,48-59,64-75,80-91,96-107,112-123
```

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):                 96
On-line CPU(s) list:   0-95
Vendor ID:              AuthenticAMD
BIOS Vendor ID:        Advanced Micro Devices, Inc.
Model name:             AMD EPYC 9454P 48-Core Processor
BIOS Model name:       AMD EPYC 9454P 48-Core Processor
CPU family:             25
Model:                  17
Thread(s) per core:    2
Core(s) per socket:    48
Socket(s):              1
Stepping:               1
Frequency boost:        enabled
CPU max MHz:           3810.7910
CPU min MHz:           1500.0000
BogoMIPS:               5491.63
Flags:                  fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
                        clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp lm
                        constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid aperfmperf rapl
                        pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe
                        popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy
                        abm sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext
                        perfctr_core perfctr_nb bpext perfctr_llc mwaitx cpb cat_l3 cdp_l3
                        invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbase bmi1
                        avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap
                        avx512ifma clflushopt clwb avx512cd sha_ni avx512bw avx512vl xsaveopt
                        xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
```

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Platform Notes (Continued)

avx512_bf16 clzero irperf xsaveerptr rdpru wbnoinvd amd_ppin arat npt lbrv
svm_lock nrrip_save tsc_scale vmcb_clean flushbyasid decodeassists
pausefilter pfthreshold avic v_omsave_vmload vgif v_spec_ctrl avx512vbmi
umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
avx512_vpopcntdq la57 rdpid overflow_recov succor smca fsrm flush_lld
AMD-V

Virtualization: AMD-V
L1d cache: 1.5 MiB (48 instances)
L1i cache: 1.5 MiB (48 instances)
L2 cache: 48 MiB (48 instances)
L3 cache: 256 MiB (8 instances)
NUMA node(s): 4
NUMA node0 CPU(s): 0-11,48-59
NUMA node1 CPU(s): 12-23,60-71
NUMA node2 CPU(s): 24-35,72-83
NUMA node3 CPU(s): 36-47,84-95
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 1.5M 8 Data 1 64 1 64
L1i 32K 1.5M 8 Instruction 1 64 1 64
L2 1M 48M 8 Unified 2 2048 1 64
L3 32M 256M 16 Unified 3 32768 1 64

8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0-11,48-59
node 0 size: 95815 MB
node 0 free: 95083 MB
node 1 cpus: 12-23,60-71
node 1 size: 96762 MB
node 1 free: 96086 MB
node 2 cpus: 24-35,72-83
node 2 size: 96762 MB
node 2 free: 96229 MB
node 3 cpus: 36-47,84-95
node 3 size: 96678 MB
node 3 free: 96204 MB
node distances:
node 0 1 2 3
0: 10 12 12 12
1: 12 10 12 12
2: 12 12 10 12
3: 12 12 12 10

9. /proc/meminfo
MemTotal: 395283252 kB

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Platform Notes (Continued)

10. who -r
run-level 3 Feb 27 18:57

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 atd auditd bluetooth crond dbus-broker firewalld getty@ insights-client-boot irqbalance iscsi iscsi-onboot kdump libstoragemgmt lm_sensors lvm2-monitor mcelog mdmonitor microcode multipathd nis-domainname nvme-fc-boot-connections pcmd pmie pmlogger rhsmcertd rsyslog selinux-autorelabel-mark smartd sshd sssd sysstat systemd-network-generator udisks2 upower
enabled-runtime	rc-local systemd-remount-fs
disabled	arp-ethers blk-availability canberra-system-bootup canberra-system-shutdown canberra-system-shutdown-reboot chrony-wait chronyd cni-dhcp console-getty cpupower debug-shell fancontrol grafana-server hwloc-dump-hwdata iprdump iprinit iprupdate ipsec iscsid iscsiui kpatch kvm_stat ledmon man-db-restart-cache-update nftables nvme-autoconnect pmfind pmie_farm pmlogger_farm pmproxy podman podman-auto-update podman-restart postfix powertop psacct ras-mc-ctl rasdaemon rdisc rhcd rhsm rhsm-facts rpmdb-rebuild rrdcached saslauthd serial-getty@ sshd-keygen@ systemd-boot-check-no-failures systemd-pstore systemd-sysextr trace-cmd
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/rhel-root
ro
crashkernel=1G-4G:192M,4G-64G:256M,64G-:512M
resume=/dev/mapper/rhel-swap
rd.lvm.lv=rhel/root
rd.lvm.lv=rhel/swap
rhgb
quiet

14. cpupower frequency-info
analyzing CPU 0:
current policy: frequency should be within 1.50 GHz and 2.75 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: 2750MHz

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

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Platform Notes (Continued)

```

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

```

```

-----
16. /sys/kernel/mm/transparent_hugepage
defrag      [always] 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/Benchmark/speccpu2017r
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs   3.5T   43G  3.4T   2% /home

```

```

-----
20. /sys/devices/virtual/dmi/id
Vendor:          FUJITSU
Product:         PRIMERGY RX1440 M2
Product Family: SERVER
Serial:          xxxxxxxxxx

```

```

-----
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:
12x Samsung M321R4GA3BB6-CQKEG 32 GB 2 rank 4800

```

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Platform Notes (Continued)

22. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: FUJITSU // American Megatrends Inc.
BIOS Version: V5.0.0.27 R1.4.0 for D4130-Alx
BIOS Date: 01/30/2024
BIOS Revision: 1.4
Firmware Revision: 2.42

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#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

=====
C++ | 508.namd_r(base) 510.parest_r(base)

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

=====
C++, C | 511.povray_r(base) 526.blender_r(base)

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

=====
C++, C, Fortran | 507.cactuBSSN_r(base)

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
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Software Availability: Nov-2022

Compiler Version Notes (Continued)

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#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

Fortran, C | 521.wrf_r(base) 527.cam4_r(base)

AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin

Base Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++

Fortran benchmarks:
flang

Benchmarks using both Fortran and C:
flang clang

Benchmarks using both C and C++:
clang++ clang

Benchmarks using Fortran, C, and C++:
clang++ clang flang

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64

(Continued on next page)



SPEC CPU®2017 Floating Point Rate Result

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Fujitsu

PRIMERGY RX1440 M2,
AMD EPYC 9454P, 2.75 GHz

SPECrate®2017_fp_base = 538

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 19
Test Sponsor: Fujitsu
Tested by: Fujitsu

Test Date: Feb-2024
Hardware Availability: Feb-2024
Software Availability: Nov-2022

Base Portability Flags (Continued)

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

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Test Sponsor: Fujitsu
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Test Date: Feb-2024
Hardware Availability: Feb-2024
Software Availability: Nov-2022

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):

```
-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
```

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

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Base Other Flags (Continued)

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/Fujitsu-Platform-Settings-V1.0-Genoa-RevD.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/Fujitsu-Platform-Settings-V1.0-Genoa-RevD.xml>

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

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