SPEC CPU®2017 Floating Point Speed Result

Fujitsu

PRIMERGY RX2450 M2,
AMD EPYC 9654, 2.4 GHz

$SPECspeed®2017\_fp\_base =$ 430

$SPECspeed®2017_fp_peak = $ Not Run

CPU2017 License: 19	**Test Date:** Jan-2024
Test Sponsor: Fujitsu	**Hardware Availability:** Feb-2024
Tested by: Fujitsu	**Software Availability:** Nov-2022

Threads

- 603.bwaves_s **192** — 1360
- 607.cactuBSSN_s **192** — 675
- 619.lbm_s **192** — 297
- 621.wrf_s **192** — 217
- 627.cam4_s **192** — 303
- 628.pop2_s **192** — 94.2
- 638.imagick_s **192** — 825
- 644.nab_s **192** — 1030
- 649.fotonik3d_s **192** — 199
- 654.roms_s **192** — 762

SPECspeed®2017_fp_base (430)

Hardware

CPU Name: AMD EPYC 9654
  Max MHz: 3700
  Nominal: 2400
Enabled: 192 cores, 2 chips
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: 384 MB I+D on chip per chip,
     32 MB shared / 8 cores
  Other: None
Memory: 768 GB (24 x 32 GB 2Rx8 PC5-4800B-R)
Storage: 1 x PCIE NVME SSD, 2 TB
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4
   5.14.21-150400.22-default
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: Yes
Firmware: Fujitsu BIOS Version Version V5.0.0.27 R1.5.0 for
   D4129-A1x. Released May-2024
   tested as V5.0.0.27 R0.90.0 for D4129-A1x
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

Standard Performance Evaluation Corporation (info@spec.org) https://www.spec.org/

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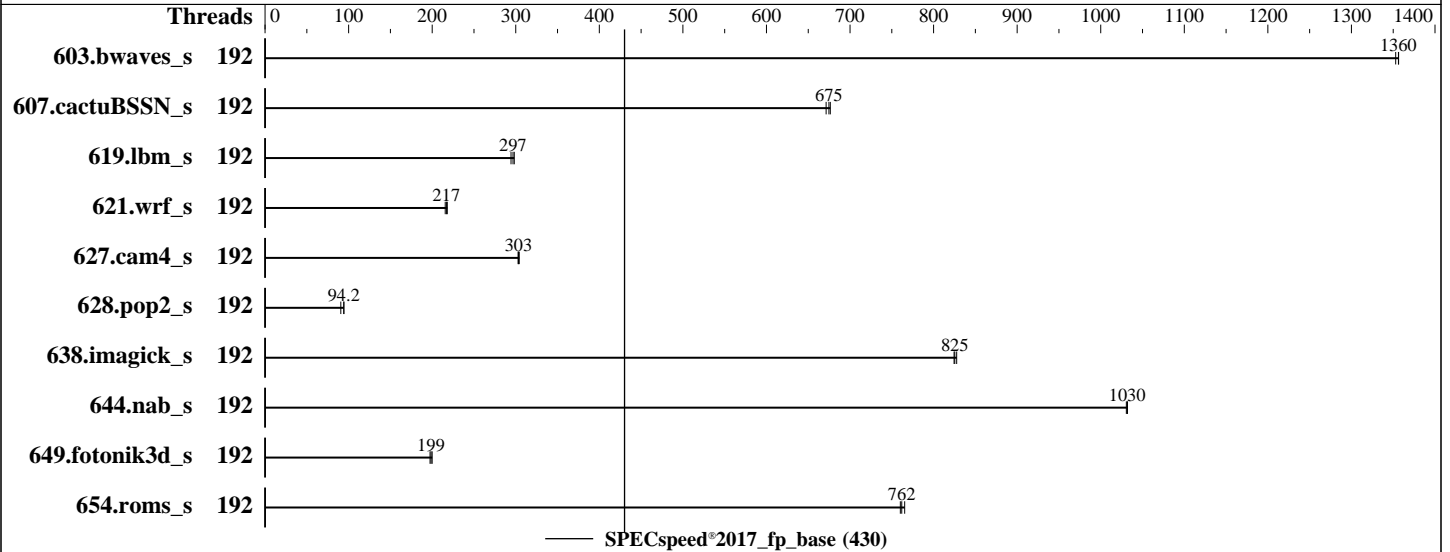SPECspeed®2017_fp_peak = Not Run

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

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

Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	192	**43.5**	**1360**	43.6	1350	43.5	1360							
607.cactuBSSN_s	192	24.6	676	**24.7**	**675**	24.8	671							
619.lbm_s	192	**17.7**	**297**	17.6	298	17.8	294							
621.wrf_s	192	61.3	216	60.7	218	**60.9**	**217**							
627.cam4_s	192	29.3	303	**29.2**	**303**	29.1	304							
628.pop2_s	192	131	90.6	126	94.3	**126**	**94.2**							
638.imagick_s	192	17.5	824	**17.5**	**825**	17.4	828							
644.nab_s	192	16.9	1030	17.0	1030	**16.9**	**1030**							
649.fotonik3d_s	192	46.2	197	45.6	200	**45.9**	**199**							
654.roms_s	192	**20.7**	**762**	20.7	760	20.6	765							
SPECspeed®2017_fp_base =			430											
SPECspeed®2017_fp_peak =			Not Run											

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,
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.
```

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Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-191"
LD_LIBRARY_PATH = "/home/Benchmark/speccpu2017s/amd_speed_aocc400_znver4_A_lib/lib:"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOC_CONF = "oversize_threshold:0,retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "192"
```

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:
SMT Control = Disabled
Determinism Slider = Power
TDP Control = Manual
TDP Limit = 400
Package Power Limit Control = Manual
Package Power Limit = 400
Power Profile Selection = High Performance
FAN Control = Full


 Sysinfo program /home/Benchmark/speccpu2017s/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Tue Jan 30 04:40:35 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 249 (249.11+suse.124.g2bc0b2c447)
 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 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)
       x86_64 x86_64 x86_64 GNU/Linux

     ------------------------------------------------------------
     2. w
        04:40:35 up 30 min,  1 user,  load average: 45.15, 130.86, 121.17
       USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
       root     tty1     -                04:16   24:03   1.26s  0.12s /bin/bash ./amd_speed_aocc400_znver4_A1.sh

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

     ------------------------------------------------------------
     4. ulimit -a
       core file size          (blocks, -c) unlimited
       data seg size           (kbytes, -d) unlimited
       scheduling priority             (-e) 0
       file size               (blocks, -f) unlimited
       pending signals                 (-i) 3092160
       max locked memory       (kbytes, -l) 2097152
       max memory size         (kbytes, -m) unlimited
       open files                      (-n) 65536
       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) 3092160
       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
      -bash
      python3 ./run_amd_fpspeed_aocc400_znver4_A1.py
      /bin/bash ./amd_speed_aocc400_znver4_A1.sh
      runcpu --config amd_speed_aocc400_znver4_A1.cfg --tune base --reportable --iterations 3 fpspeed
      runcpu --configfile amd_speed_aocc400_znver4_A1.cfg --tune base --reportable --iterations 3 --nopower
        --runmode speed --tune base --size test:train:refspeed fpspeed --nopreenv --note-preenv --logfile
        $SPEC/tmp/CPU2017.001/templogs/preenv.fpspeed.001.0.log --lognum 001.0 --from_runcpu 2
      specperl $SPEC/bin/sysinfo
      $SPEC = /home/Benchmark/speccpu2017s
```

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Platform Notes (Continued)

```
  -------------------------------------------------------------
  6. /proc/cpuinfo
     model name        : AMD EPYC 9654 96-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         : 96
     siblings          : 96
     2 physical ids (chips)
     192 processors (hardware threads)
     physical id 0: core ids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183
     physical id 1: core ids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183
     physical id 0: apicids 0-7,16-23,32-39,48-55,64-71,80-87,96-103,112-119,128-135,144-151,160-167,176-183
     physical id 1: apicids
     256-263,272-279,288-295,304-311,320-327,336-343,352-359,368-375,384-391,400-407,416-423,432-439
  Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
  virtualized systems.  Use the above data carefully.


  -------------------------------------------------------------
  7. lscpu

  From lscpu from util-linux 2.37.2:
    Architecture:           x86_64
    CPU op-mode(s):         32-bit, 64-bit
    Address sizes:          52 bits physical, 57 bits virtual
    Byte Order:             Little Endian
    CPU(s):                 192
    On-line CPU(s) list:    0-191
    Vendor ID:              AuthenticAMD
    Model name:             AMD EPYC 9654 96-Core Processor
    CPU family:             25
    Model:                  17
    Thread(s) per core:     1
    Core(s) per socket:     96
    Socket(s):              2
    Stepping:               1
    Frequency boost:        enabled
    CPU max MHz:            3707.8120
    CPU min MHz:            1500.0000
    BogoMIPS:               4792.49
    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
                            umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg
                            avx512_vpopcntdq la57 rdpid overflow_recov succor smca fsrm flush_l1d
```

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PRIMERGY RX2450 M2,
AMD EPYC 9654, 2.4 GHz

Platform Notes (Continued)

```
  Virtualization:              AMD-V
  L1d cache:                   6 MiB (192 instances)
  L1i cache:                   6 MiB (192 instances)
  L2 cache:                    192 MiB (192 instances)
  L3 cache:                    768 MiB (24 instances)
  NUMA node(s):                2
  NUMA node0 CPU(s):           0-95
  NUMA node1 CPU(s):           96-191
  Vulnerability Itlb multihit:    Not affected
  Vulnerability L1tf:             Not affected
  Vulnerability Mds:              Not affected
  Vulnerability Meltdown:         Not affected
  Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
  Vulnerability Spectre v1:       Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:       Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP disabled, RSB
                                  filling
  Vulnerability Srbds:            Not affected
  Vulnerability Tsx async abort:  Not affected

From lscpu --cache:
    NAME ONE-SIZE ALL-SIZE WAYS TYPE         LEVEL  SETS PHY-LINE COHERENCY-SIZE
    L1d       32K       6M    8 Data          1     64    1            64
    L1i       32K       6M    8 Instruction   1     64    1            64
    L2         1M     192M    8 Unified       2   2048    1            64
    L3        32M     768M   16 Unified       3  32768    1            64


  ------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 2 nodes (0-1)
  node 0 cpus: 0-95
  node 0 size: 386473 MB
  node 0 free: 384398 MB
  node 1 cpus: 96-191
  node 1 size: 386591 MB
  node 1 free: 385824 MB
  node distances:
  node   0   1
    0:  10  32
    1:  32  10


  ------------------------------------------------------------
9. /proc/meminfo
   MemTotal:       791617992 kB


  ------------------------------------------------------------
10. who -r
   run-level 3 Jan 30 04:13


  ------------------------------------------------------------
11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
   Default Target  Status
   multi-user      running


  ------------------------------------------------------------
12. Services, from systemctl list-unit-files
   STATE           UNIT FILES
   enabled         YaST2-Firstboot YaST2-Second-Stage apparmor auditd bluetooth cron display-manager getty@
                   haveged irqbalance iscsi issue-generator kbdsettings kdump kdump-early klog lvm2-monitor
                   nscd nvmefc-boot-connections postfix purge-kernels rollback rsyslog smartd sshd wicked
```

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Platform Notes (Continued)

```
                 wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
    enabled-runtime  systemd-remount-fs
    disabled         accounts-daemon appstream-sync-cache autofs autoyast-initscripts blk-availability
                     bluetooth-mesh boot-sysctl ca-certificates chrony-wait chronyd console-getty cups
                     cups-browsed debug-shell ebtables exchange-bmc-os-info firewalld gpm grub2-once
                     haveged-switch-root hwloc-dump-hwdata ipmi ipmievd iscsi-init iscsid iscsiuio
                     issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blkmap nmb
                     nvmf-autoconnect ostree-remount rdisc rpcbind rpmconfigcheck rsyncd rtkit-daemon
                     serial-getty@ smartd_generate_opts smb snmpd snmptrapd speech-dispatcherd
                     systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                     systemd-time-wait-sync systemd-timesyncd udisks2 upower
    indirect         wickedd


    -------------------------------------------------------------
 13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
    root=UUID=fc0a5636-eee2-42c1-a98a-4213e704cc89
    splash=silent
    mitigations=auto
    quiet
    security=apparmor
    crashkernel=328M,high
    crashkernel=72M,low


    -------------------------------------------------------------
 14. cpupower frequency-info
    analyzing CPU 0:
       current policy: frequency should be within 1.50 GHz and 2.40 GHz.
                       The governor "ondemand" may decide which speed to use
                       within this range.
       boost state support:
         Supported: yes
         Active: yes


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

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Platform Notes (Continued)

```
    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 SUSE Linux Enterprise Server 15 SP4


   ------------------------------------------------------------
19. Disk information
SPEC is set to: /home/Benchmark/speccpu2017s
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/nvme0n1p2 xfs   1.9T  189G  1.7T  11% /


   ------------------------------------------------------------
20. /sys/devices/virtual/dmi/id
     Vendor:         FUJITSU
     Product:        PRIMERGY RX2450 M2
     Product Family: SERVER
     Serial:         xxxxxxxxxx


   ------------------------------------------------------------
21. dmidecode
   Additional information from dmidecode 3.2 follows.  WARNING: Use caution when you interpret this section.
   The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately
   determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the
   "DMTF SMBIOS" standard.
     Memory:
       24x Samsung M321R4GA3BB6-CQKEG 32 GB 2 rank 4800



   ------------------------------------------------------------
22. BIOS
(This section combines info from /sys/devices and dmidecode.)
     BIOS Vendor:      FUJITSU // American Megatrends Inc.
     BIOS Version:     V5.0.0.27 R0.90.0 for D4129-A1x
     BIOS Date:        12/21/2023
     BIOS Revision:    0.90
     Firmware Revision: 2.40
```

Compiler Version Notes

```
==============================================================================================
C              | 619.lbm_s(base) 638.imagick_s(base) 644.nab_s(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
```

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Compiler Version Notes (Continued)

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

============================================================================================
C++, C, Fortran | 607.cactuBSSN_s(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
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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      | 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(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    | 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(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
```

Fortran benchmarks:
```
flang
```

Benchmarks using both Fortran and C:
```
flang clang
```

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

SPEC CPU®2017 Floating Point Speed Result

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Fujitsu

PRIMERGY RX2450 M2,
AMD EPYC 9654, 2.4 GHz

SPECspeed®2017_fp_base = 430

SPECspeed®2017_fp_peak = Not Run

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

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

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
627.cam4_s: -DSPEC_CASE_FLAG -DSPEC_LP64
628.pop2_s: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang

Fortran benchmarks:
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -Mrecursive
-funroll-loops -mllvm -lsr-in-nested-loop
-mllvm -reduce-array-computations=3 -zopt -fopenmp=libomp -lomp
-lamdlibm -lamdalloc -lflang

Benchmarks using both Fortran and C:
-m64 -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 -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang

Benchmarks using Fortran, C, and C++:
-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org)   https://www.spec.org/

SPEC CPU®2017 Floating Point Speed Result

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Fujitsu

PRIMERGY RX2450 M2,
AMD EPYC 9654, 2.4 GHz

SPECspeed®2017_fp_base =   430

SPECspeed®2017_fp_peak = Not Run

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

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

Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
```
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang
```

Base Other Flags

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

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

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

Benchmarks using Fortran, C, and C++:
```
-Wno-return-type -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-RevC.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-RevC.xml

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

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