SPEC CPU®2017 Floating Point Rate Result

Inspur Corporation

Inspur NF5280A6 (AMD EPYC 7513)

SPECrate®2017_fp_base =   451

SPECrate®2017_fp_peak = Not Run
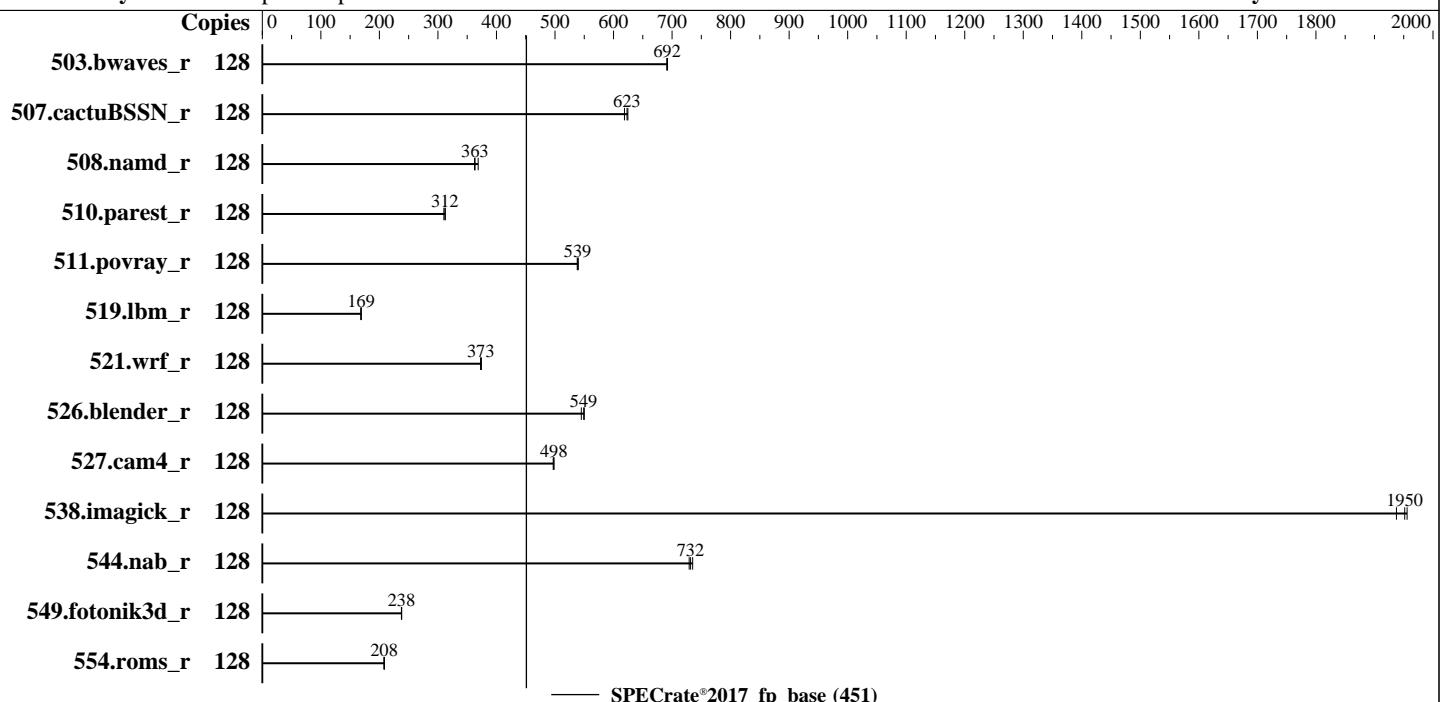
CPU2017 License: 3358

Test Sponsor: Inspur Corporation

Tested by: Inspur Corporation

Test Date: Jan-2023

Hardware Availability: Mar-2021

Software Availability: Mar-2021

Copies	
503.bwaves_r	128 — 692
507.cactuBSSN_r	128 — 623
508.namd_r	128 — 363
510.parest_r	128 — 312
511.povray_r	128 — 539
519.lbm_r	128 — 169
521.wrf_r	128 — 373
526.blender_r	128 — 549
527.cam4_r	128 — 498
538.imagick_r	128 — 1950
544.nab_r	128 — 732
549.fotonik3d_r	128 — 238
554.roms_r	128 — 208

SPECrate®2017_fp_base (451)

Hardware

CPU Name: AMD EPYC 7513
 Max MHz: 3650
 Nominal: 2600
Enabled: 64 cores, 2 chips, 2 threads/core
Orderable: 1,2 chips
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 512 KB I+D on chip per core
 L3: 128 MB I+D on chip per chip, 32 MB shared / 8 cores
 Other: None
Memory: 2 TB (16 x 128 GB 4Rx4 PC4-3200AA-L)
Storage: 1 x 480 GB SATA SSD
Other: None

Software

OS: Red Hat Enterprise Linux 8.3 (Ootpa)
 4.18.0-240.el8.x86_64
Compiler: C/C++/Fortran: Version 3.0.0 of AOCC
Parallel: No
Firmware: Version 4.00.26 released Sep-2022
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: jemalloc: jemalloc memory allocator library v5.1.0
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	128	**1856**	**692**	1857	691	1854	692							
507.cactuBSSN_r	128	262	619	259	624	**260**	**623**							
508.namd_r	128	**335**	**363**	330	369	335	363							
510.parest_r	128	1071	313	**1073**	**312**	1080	310							
511.povray_r	128	**555**	**539**	556	538	554	540							
519.lbm_r	128	802	168	**799**	**169**	799	169							
521.wrf_r	128	**768**	**373**	766	374	769	373							
526.blender_r	128	358	545	**355**	**549**	354	550							
527.cam4_r	128	451	497	**450**	**498**	449	498							
538.imagick_r	128	164	1940	**163**	**1950**	163	1960							
544.nab_r	128	295	729	293	735	**294**	**732**							
549.fotonik3d_r	128	**2098**	**238**	2095	238	2099	238							
554.roms_r	128	974	209	979	208	**977**	**208**							

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SPECrate®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

```
'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.
```

(Continued on next page)

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Operating System Notes (Continued)

```
To disable address space layout randomization (ASLR) to reduce run-to-run
variability, 'sysctl -w kernel.randomize_va_space=0' run as root.

Scaling_Governor set to Performance

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.
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
     "/home/CPU2017/amd_rate_aocc300_milan_B_lib/lib;/home/CPU2017/amd_rate_a
     occ300_milan_B_lib/lib32:"
LIBRARY_PATH =
     "/home/CPU2017/amd_rate_aocc300_milan_A_lib/lib;/home/CPU2017/amd_rate_a
     occ300_milan_A_lib/lib32:"
MALLOC_CONF = "retain:true"
```

General Notes

```
Binaries were compiled on a system with 2x AMD EPYC 7742 CPU + 1TiB Memory using OpenSUSE 15.2

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.

jemalloc: configured and built with GCC v4.8.2 in RHEL 7.4 (No options specified)
jemalloc 5.1.0 is available here:
https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2
```

Platform Notes

```
 BIOS configuration:
 SVM Mode set to disable
 DRAM Scrub time set to disable
 NUMA nodes per socket set to NPS4
 APBDIS set to 1
```

(Continued on next page)

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Platform Notes (Continued)

```
Sysinfo program /home/CPU2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on localhost.localdomain Fri Jan 10 18:55:25 2020

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 239 (239-40.el8)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
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. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
21. Disk information
22. /sys/devices/virtual/dmi/id
23. dmidecode
24. BIOS
------------------------------------------------------------


------------------------------------------------------------
1. uname -a
  Linux localhost.localdomain 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020 x86_64 x86_64 x86_64
  GNU/Linux


------------------------------------------------------------
2. w
   18:55:25 up 1 day, 59 min,  2 users,  load average: 0.00, 0.00, 0.00
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty2     -                Thu17   16.00s  1.09s  0.00s sh runfp.sh
   root     tty3     -                Thu18   24:37m  0.02s  0.02s -bash
```

(Continued on next page)

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Platform Notes (Continued)

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


   -------------------------------------------------------------
   4. ulimit -a
     core file size          (blocks, -c) 0
     data seg size           (kbytes, -d) unlimited
     scheduling priority             (-e) 0
     file size               (blocks, -f) unlimited
     pending signals                 (-i) 8255571
     max locked memory       (kbytes, -l) 64
     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) 8255571
     virtual memory          (kbytes, -v) unlimited
     file locks                      (-x) unlimited


   -------------------------------------------------------------
   5. sysinfo process ancestry
    /usr/lib/systemd/systemd --switched-root --system --deserialize 17
    login -- root
    -bash
    sh runfp.sh
    runcpu --config amd_rate_aocc300_milan_B2.cfg --reportable --copies=128 --iterations 3 --size=ref
       --tune=base fprate
    runcpu --configfile amd_rate_aocc300_milan_B2.cfg --reportable --copies 128 --iterations 3 --size ref --tune
      base --nopower --runmode rate --tune base --size refrate fprate --nopreenv --note-preenv --logfile
       $SPEC/tmp/CPU2017.019/templogs/preenv.fprate.019.0.log --lognum 019.0 --from_runcpu 2
    specperl $SPEC/bin/sysinfo
   $SPEC = /home/CPU2017


   -------------------------------------------------------------
   6. /proc/cpuinfo
      model name     : AMD EPYC 7513 32-Core Processor
      vendor_id      : AuthenticAMD
      cpu family     : 25
      model          : 1
      stepping       : 1
      microcode      : 0xa001173
      bugs           : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
```

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Platform Notes (Continued)

```
      TLB size           : 2560 4K pages
      cpu cores          : 32
      siblings           : 64
      2 physical ids (chips)
      128 processors (hardware threads)
      physical id 0: core ids 0-31
      physical id 1: core ids 0-31
      physical id 0: apicids 0-63
      physical id 1: apicids 64-127
   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 2.32.1:
    Architecture:        x86_64
    CPU op-mode(s):      32-bit, 64-bit
    Byte Order:          Little Endian
    CPU(s):              128
    On-line CPU(s) list: 0-127
    Thread(s) per core:  2
    Core(s) per socket:  32
    Socket(s):           2
    NUMA node(s):        8
    Vendor ID:           AuthenticAMD
    CPU family:          25
    Model:               1
    Model name:          AMD EPYC 7513 32-Core Processor
    Stepping:            1
    CPU MHz:             2616.201
    CPU max MHz:         2600.0000
    CPU min MHz:         1500.0000
    BogoMIPS:            5190.13
    Virtualization:      AMD-V
    L1d cache:           32K
    L1i cache:           32K
    L2 cache:            512K
    L3 cache:            32768K
    NUMA node0 CPU(s):   0-7,64-71
    NUMA node1 CPU(s):   8-15,72-79
    NUMA node2 CPU(s):   16-23,80-87
    NUMA node3 CPU(s):   24-31,88-95
    NUMA node4 CPU(s):   32-39,96-103
    NUMA node5 CPU(s):   40-47,104-111
    NUMA node6 CPU(s):   48-55,112-119
    NUMA node7 CPU(s):   56-63,120-127
```

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Platform Notes (Continued)

```
  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 pni pclmulqdq 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 cpb cat_l3 cdp_l3 invpcid_single hw_pstate
                            sme ssbd mba sev ibrs ibpb stibp vmmcall fsgsbase bmi1 avx2 smep bmi2 invpcid cqm
                            rdt_a rdseed adx smap clflushopt clwb sha_ni xsaveopt xsavec xgetbv1 xsaves cqm_llc
                            cqm_occup_llc cqm_mbm_total cqm_mbm_local clzero irperf xsaveerptr wbnoinvd amd_ppin
                            arat npt lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists
                            pausefilter pfthreshold v_vmsave_vmload vgif umip pku ospke vaes vpclmulqdq rdpid
                            overflow_recov succor smca


  ------------------------------------------------------------
  8. numactl --hardware
  NOTE: a numactl 'node' might or might not correspond to a physical chip.
    available: 8 nodes (0-7)
    node 0 cpus: 0-7,64-71
    node 0 size: 257691 MB
    node 0 free: 256211 MB
    node 1 cpus: 8-15,72-79
    node 1 size: 257887 MB
    node 1 free: 256162 MB
    node 2 cpus: 16-23,80-87
    node 2 size: 257919 MB
    node 2 free: 255703 MB
    node 3 cpus: 24-31,88-95
    node 3 size: 257915 MB
    node 3 free: 256353 MB
    node 4 cpus: 32-39,96-103
    node 4 size: 257921 MB
    node 4 free: 256777 MB
    node 5 cpus: 40-47,104-111
    node 5 size: 257911 MB
    node 5 free: 256730 MB
    node 6 cpus: 48-55,112-119
    node 6 size: 257957 MB
    node 6 free: 256772 MB
    node 7 cpus: 56-63,120-127
    node 7 size: 257909 MB
    node 7 free: 256714 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
```

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Platform Notes (Continued)

```
      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:       2113617132 kB


   -----------------------------------------------------------
10. who -r
     run-level 3 Jan 9 17:56


   -----------------------------------------------------------
11. Systemd service manager version: systemd 239 (239-40.el8)
     Default Target  Status
     multi-user      running


   -----------------------------------------------------------
12. Services, from systemctl list-unit-files
     STATE      UNIT FILES
     enabled    tuned
     disabled   NetworkManager NetworkManager-dispatcher NetworkManager-wait-online auditd autovt@
            blk-availability chrony-wait chronyd console-getty cpupower crond dbxtool debug-shell ebtables
            firewalld getty@ import-state iprdump iprinit iprupdate irqbalance kdump loadmodules lvm2-monitor
            microcode nftables nis-domainname rdisc rhsm rhsm-facts rhsmcertd rngd rngd-wake-threshold
            rsyslog selinux-autorelabel-mark serial-getty@ sshd sshd-keygen@ sssd systemd-resolved tcsd
              timedatex
     indirect   sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo
     masked     systemd-timedated


   -----------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
     BOOT_IMAGE=(hd0,gpt2)/vmlinuz-4.18.0-240.el8.x86_64
     root=/dev/mapper/rhel-root
     ro
     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 2.60 GHz.
                       The governor "performance" may decide which speed to use
```

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Platform Notes (Continued)

```
                           within this range.
      boost state support:
         Supported: yes
         Active: no
         Boost States: 0
         Total States: 3
         Pstate-P0:  2800MHz


    ----------------------------------------------------------------
    15. tuned-adm active
      Current active profile: throughput-performance


    ----------------------------------------------------------------
    16. sysctl
      kernel.numa_balancing              1
      kernel.randomize_va_space          0
      vm.dirty_background_bytes          0
      vm.dirty_background_ratio         10
      vm.dirty_bytes                     0
      vm.dirty_expire_centisecs       3000
      vm.dirty_ratio                    40
      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                     10
      vm.watermark_scale_factor         10
      vm.zone_reclaim_mode               0


    ----------------------------------------------------------------
    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_swap              64
      pages_to_scan            4096
      scan_sleep_millisecs    10000
```

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Platform Notes (Continued)

```
   ----------------------------------------------------------------
19. OS release
   From /etc/*-release /etc/*-version
   os-release      Red Hat Enterprise Linux 8.3 (Ootpa)
   redhat-release Red Hat Enterprise Linux release 8.3 (Ootpa)
   system-release Red Hat Enterprise Linux release 8.3 (Ootpa)


   ----------------------------------------------------------------
20. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
   itlb_multihit        Not affected
   l1tf                 Not affected
   mds                  Not affected
   meltdown             Not affected
   spec_store_bypass    Mitigation: Speculative Store Bypass disabled via prctl and seccomp
   spectre_v1           Mitigation: usercopy/swapgs barriers and __user pointer sanitization
   spectre_v2           Mitigation: Full AMD retpoline, IBPB: conditional, IBRS_FW, STIBP: always-on, RSB
                        filling
   srbds                Not affected
   tsx_async_abort      Not affected
For more information, see the Linux documentation on hardware vulnerabilities, for example
     https://www.kernel.org/doc/html/latest/admin-guide/hw-vuln/index.html


   ----------------------------------------------------------------
21. Disk information
SPEC is set to: /home/CPU2017
   Filesystem            Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel-home xfs   372G   20G  353G   6% /home


   ----------------------------------------------------------------
22. /sys/devices/virtual/dmi/id
     Vendor:          Inspur
     Product:         NF5280A6
     Product Family:  Not specified
     Serial:          200857231


   ----------------------------------------------------------------
23. 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:
    16x Samsung M393AAG40M32-CAE 128 GB 4 rank 3200
    16x Unknown Unknown
```

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Platform Notes (Continued)

```
   --------------------------------------------------------------
   24. BIOS
   (This section combines info from /sys/devices and dmidecode.)
      BIOS Vendor:        American Megatrends Inc.
      BIOS Version:       4.00.26
      BIOS Date:          09/07/2022
```

Compiler Version Notes

```
==============================================================================
C                 | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
------------------------------------------------------------------------------
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
  LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
------------------------------------------------------------------------------


==============================================================================
C++               | 508.namd_r(base) 510.parest_r(base)
------------------------------------------------------------------------------
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
  LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
------------------------------------------------------------------------------


==============================================================================
C++, C            | 511.povray_r(base) 526.blender_r(base)
------------------------------------------------------------------------------
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
  LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
  LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
------------------------------------------------------------------------------


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

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SPEC CPU®2017 Floating Point Rate Result

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Inspur Corporation

SPECrate®2017_fp_base =   451

Inspur NF5280A6 (AMD EPYC 7513)

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 3358
Test Sponsor: Inspur Corporation
Tested by: Inspur Corporation

Test Date: Jan-2023
Hardware Availability: Mar-2021
Software Availability: Mar-2021

Compiler Version Notes (Continued)

```
--------------------------------------------------------------------------
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
  LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
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  LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
--------------------------------------------------------------------------


==========================================================================
Fortran        | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
--------------------------------------------------------------------------
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
  LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
--------------------------------------------------------------------------


==========================================================================
Fortran, C     | 521.wrf_r(base) 527.cam4_r(base)
--------------------------------------------------------------------------
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
  LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
  LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
--------------------------------------------------------------------------
```

SPEC CPU®2017 Floating Point Rate Result

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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 -D__BOOL_DEFINED -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,-region-vectorize`
`-Wl,-mllvm -Wl,-function-specialize`
`-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math`
`-march=znver3 -fveclib=AMDLIBM -fstruct-layout=5`

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Inspur NF5280A6 (AMD EPYC 7513)

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Tested by: Inspur Corporation

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Software Availability: Mar-2021

Base Optimization Flags (Continued)

C benchmarks (continued):
```
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -mllvm -function-specialize -flv-function-specialization
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
-mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3 -z muldefs
-lamdlibm -ljemalloc -lflang -lflangrti
```

C++ benchmarks:
```
-m64 -std=c++98 -mno-adx -mno-sse4a
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -flto
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver3 -fveclib=AMDLIBM -mllvm -enable-partial-unswitch
-mllvm -unroll-threshold=100 -finline-aggressive
-flv-function-specialization -mllvm -loop-unswitch-threshold=200000
-mllvm -reroll-loops -mllvm -aggressive-loop-unswitch
-mllvm -extra-vectorizer-passes -mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true -mllvm -convert-pow-exp-to-int=false
-z muldefs -lamdlibm -ljemalloc -lflang -lflangrti
```

Fortran benchmarks:
```
-m64 -Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-licm-vrp -flto -Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Hz,1,0x1 -O3 -ffast-math
-march=znver3 -fveclib=AMDLIBM -Kieee -Mrecursive
-mllvm -fuse-tile-inner-loop -funroll-loops
-mllvm -extra-vectorizer-passes -mllvm -lsr-in-nested-loop
-mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true -z muldefs -lamdlibm -ljemalloc
-lflang -lflangrti
```

Benchmarks using both Fortran and C:
```
-m64 -Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-licm-vrp -flto -Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver3 -fveclib=AMDLIBM -fstruct-layout=5
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -mllvm -function-specialize -flv-function-specialization
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
-mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3 -Hz,1,0x1
-Kieee -Mrecursive -mllvm -fuse-tile-inner-loop -funroll-loops
```

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Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):

```
-mllvm -extra-vectorizer-passes -mllvm -lsr-in-nested-loop -z muldefs
-lamdlibm -ljemalloc -lflang -lflangrti
```

Benchmarks using both C and C++:

```
-m64 -std=c++98 -mno-adx -mno-sse4a
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -flto
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver3 -fveclib=AMDLIBM -fstruct-layout=5
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -mllvm -function-specialize -flv-function-specialization
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
-mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3
-mllvm -enable-partial-unswitch -mllvm -unroll-threshold=100
-finline-aggressive -mllvm -loop-unswitch-threshold=200000
-mllvm -reroll-loops -mllvm -aggressive-loop-unswitch
-mllvm -extra-vectorizer-passes -mllvm -convert-pow-exp-to-int=false
-z muldefs -lamdlibm -ljemalloc -lflang -lflangrti
```

Benchmarks using Fortran, C, and C++:

```
-m64 -std=c++98 -mno-adx -mno-sse4a
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -flto
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver3 -fveclib=AMDLIBM -fstruct-layout=5
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -mllvm -function-specialize -flv-function-specialization
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
-mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3
-mllvm -enable-partial-unswitch -mllvm -unroll-threshold=100
-finline-aggressive -mllvm -loop-unswitch-threshold=200000
-mllvm -reroll-loops -mllvm -aggressive-loop-unswitch
-mllvm -extra-vectorizer-passes -mllvm -convert-pow-exp-to-int=false
-Hz,1,0x1 -Kieee -Mrecursive -mllvm -fuse-tile-inner-loop
-funroll-loops -mllvm -lsr-in-nested-loop -z muldefs -lamdlibm
-ljemalloc -lflang -lflangrti
```

Base Other Flags

C benchmarks:

```
-Wno-unused-command-line-argument
```

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Inspur NF5280A6 (AMD EPYC 7513)

SPECrate®2017_fp_base =   451

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Test Date: Jan-2023

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Software Availability: Mar-2021

Base Other Flags (Continued)

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/aocc300-flags-B2.2023-02-15.html`
`http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-amd-V1.7.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/aocc300-flags-B2.2023-02-15.xml`
`http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-amd-V1.7.xml`

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

Tested with SPEC CPU®2017 v1.1.9 on 2020-01-10 18:55:24-0500.
Report generated on 2023-02-15 10:31:36 by CPU2017 PDF formatter v6442.
Originally published on 2023-02-14.