SPEC CPU®2017 Floating Point Rate Result

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IEIT Systems Co., Ltd.
NF5180A7 (AMD EPYC 9684X)

$SPECrate®2017\_fp\_base = 1600$

$SPECrate®2017\_fp\_peak = 1680$

CPU2017 License: 3358
Test Sponsor: IEIT Systems Co., Ltd.
Tested by: IEIT Systems Co., Ltd.

Test Date: Aug-2024
Hardware Availability: Jun-2023
Software Availability: Jun-2023

Benchmark	Copies	Result
503.bwaves_r	384	1790
	48	1860
507.cactuBSSN_r	384	1690
	384	1690
508.namd_r	384	1380
	384	1390
510.parest_r	384	2170
511.povray_r	384	2040
519.lbm_r	384	594
	192	596
521.wrf_r	384	1380
	192	2030
526.blender_r	384	1900
	384	1910
527.cam4_r	384	1970
538.imagick_r	384	7620
544.nab_r	384	3120
549.fotonik3d_r	384	572
	192	576
554.roms_r	384	567
	192	687

SPECrate®2017_fp_base (1600)
SPECrate®2017_fp_peak (1680)

Hardware

CPU Name: AMD EPYC 9684X
 Max MHz: 3700
 Nominal: 2550
Enabled: 192 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: 1152 MB I+D on chip per chip,
 96 MB shared / 8 cores
 Other: None
Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 480 GB SSD
Other: CPU Cooling: Air

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: No
Firmware: Version 04.02.32 released May-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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SPECrate®2017_fp_base = 1600

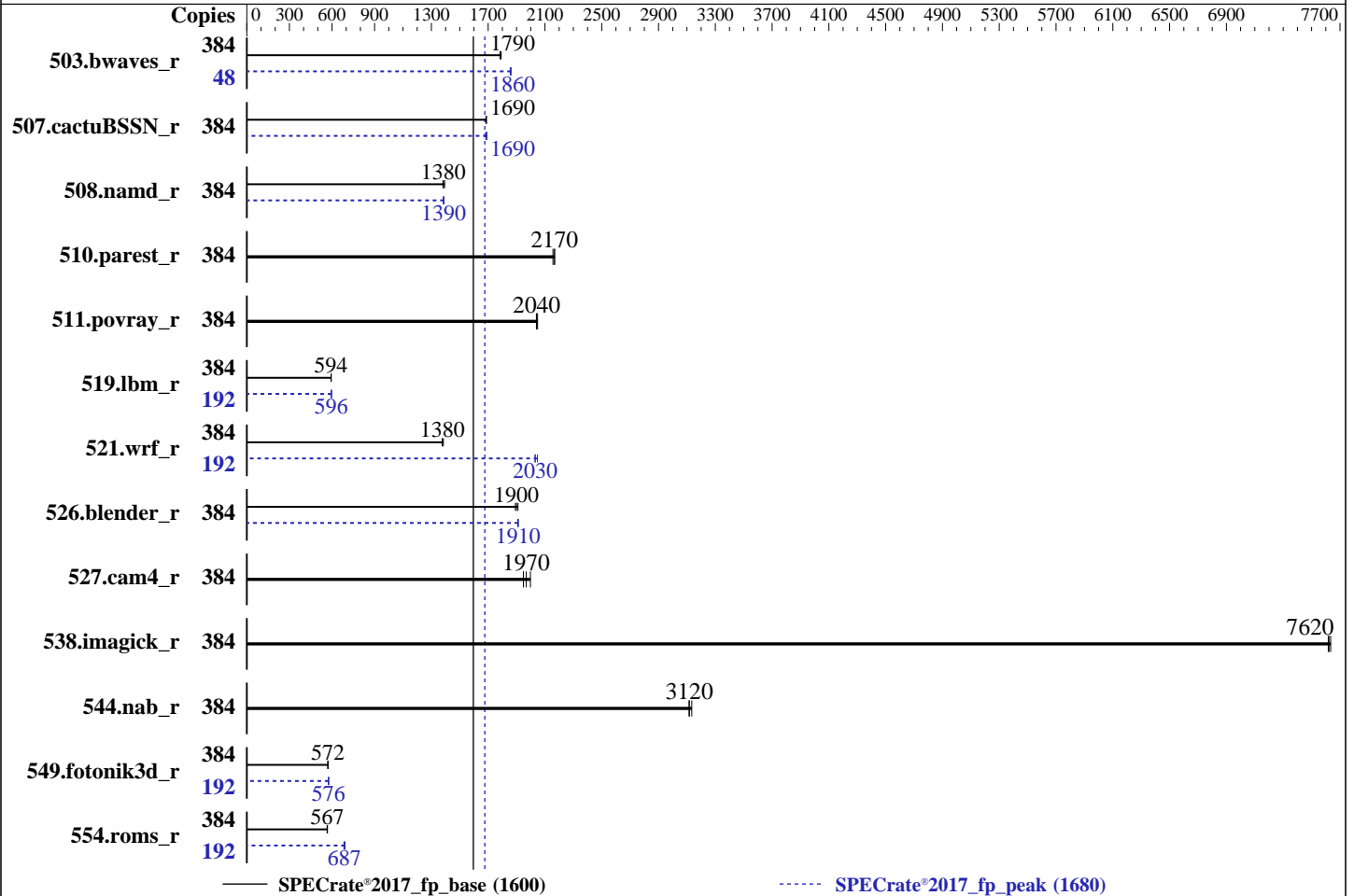## NF5180A7 (AMD EPYC 9684X)

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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	384	2159	1780	**2155**	**1790**	2149	1790	48	**259**	**1860**	259	1860	259	1860
507.cactuBSSN_r	384	**288**	**1690**	289	1680	288	1690	384	**288**	**1690**	287	1690	289	1680
508.namd_r	384	262	1390	**263**	**1380**	264	1380	384	**263**	**1390**	263	1390	264	1380
510.parest_r	384	466	2160	463	2170	**463**	**2170**	384	466	2160	463	2170	**463**	**2170**
511.povray_r	384	438	2050	**439**	**2040**	440	2040	384	438	2050	**439**	**2040**	440	2040
519.lbm_r	384	**682**	**594**	682	594	682	594	192	339	597	**340**	**596**	340	595
521.wrf_r	384	625	1380	**625**	**1380**	621	1380	192	212	2030	210	2050	**212**	**2030**
526.blender_r	384	309	1890	306	1910	**308**	**1900**	384	306	1910	**306**	**1910**	306	1910
527.cam4_r	384	336	2000	**341**	**1970**	345	1950	384	336	2000	**341**	**1970**	345	1950
538.imagick_r	384	125	7620	125	7630	**125**	**7620**	384	125	7620	125	7630	**125**	**7620**
544.nab_r	384	**207**	**3120**	206	3130	207	3110	384	**207**	**3120**	206	3130	207	3110
549.fotonik3d_r	384	**2618**	**572**	2618	572	2621	571	192	1300	576	**1299**	**576**	1299	576
554.roms_r	384	1075	568	1079	566	**1076**	**567**	192	**444**	**687**	446	684	441	691

SPECrate®2017_fp_base =	1600
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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,
```

(Continued on next page)

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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_znver4_A_lib/lib:/home/CPU2017/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:
 SVM Mode = disable
 DRAM Scrub time = disable
 NUMA nodes per socket = NPS4
 Determinism Slider = Power
 cTDP = 400
 Package Power Limit = 400

 Sysinfo program /home/CPU2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on localhost Sun Aug 25 21:33:29 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
```

(Continued on next page)

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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 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)
   x86_64 x86_64 x86_64 GNU/Linux


    ----------------------------------------------------------
 2. w
    21:33:29 up  5:38,  1 user,  load average: 178.98, 326.46, 358.78
    USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
    root     tty1     -                15:56    5:36m  1.76s  0.54s /bin/bash ./amd_rate_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) 6190762
   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) 6190762
   virtual memory          (kbytes, -v) unlimited
   file locks                      (-x) unlimited


    ----------------------------------------------------------
 5. sysinfo process ancestry
  /usr/lib/systemd/systemd --switched-root --system --deserialize 30
  login -- root
  -bash
  python3 ./run_amd_rate_aocc400_znver4_A1.py
  /bin/bash ./amd_rate_aocc400_znver4_A1.sh
  runcpu --config amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 fprate
  runcpu --configfile amd_rate_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 --nopower
    --runmode rate --tune base:peak --size test:train:refrate fprate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.002/templogs/preenv.fprate.002.0.log --lognum 002.0 --from_runcpu 2
  specperl $SPEC/bin/sysinfo
  $SPEC = /home/CPU2017
```

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Platform Notes (Continued)

```
  ----------------------------------------------------------
  6. /proc/cpuinfo
     model name        : AMD EPYC 9684X 96-Core Processor
     vendor_id         : AuthenticAMD
     cpu family        : 25
     model             : 17
     stepping          : 2
     microcode         : 0xa101244
     bugs              : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
     TLB size          : 3584 4K pages
     cpu cores         : 96
     siblings          : 192
     2 physical ids (chips)
     384 processors (hardware threads)
     physical id 0: core ids 0-95
     physical id 1: core ids 0-95
     physical id 0: apicids 0-191
     physical id 1: apicids 256-447
  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):                 384
    On-line CPU(s) list:    0-383
    Vendor ID:              AuthenticAMD
    Model name:             AMD EPYC 9684X 96-Core Processor
    CPU family:             25
    Model:                  17
    Thread(s) per core:     2
    Core(s) per socket:     96
    Socket(s):              2
    Stepping:               2
    Frequency boost:        enabled
    CPU max MHz:            3715.4290
    CPU min MHz:            1500.0000
    BogoMIPS:               5092.39
    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
    Virtualization:         AMD-V
```

(Continued on next page)

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Platform Notes (Continued)

```
  L1d cache:                    6 MiB (192 instances)
  L1i cache:                    6 MiB (192 instances)
  L2 cache:                     192 MiB (192 instances)
  L3 cache:                     2.3 GiB (24 instances)
  NUMA node(s):                 8
  NUMA node0 CPU(s):            0-23,192-215
  NUMA node1 CPU(s):            24-47,216-239
  NUMA node2 CPU(s):            48-71,240-263
  NUMA node3 CPU(s):            72-95,264-287
  NUMA node4 CPU(s):            96-119,288-311
  NUMA node5 CPU(s):            120-143,312-335
  NUMA node6 CPU(s):            144-167,336-359
  NUMA node7 CPU(s):            168-191,360-383
  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 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       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        96M     2.3G   16 Unified       3 98304       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: 0-23,192-215
  node 0 size: 193212 MB
  node 0 free: 189716 MB
  node 1 cpus: 24-47,216-239
  node 1 size: 193523 MB
  node 1 free: 191980 MB
  node 2 cpus: 48-71,240-263
  node 2 size: 193523 MB
  node 2 free: 191634 MB
  node 3 cpus: 72-95,264-287
  node 3 size: 193523 MB
  node 3 free: 192004 MB
  node 4 cpus: 96-119,288-311
  node 4 size: 193523 MB
  node 4 free: 191992 MB
  node 5 cpus: 120-143,312-335
  node 5 size: 193523 MB
  node 5 free: 192048 MB
  node 6 cpus: 144-167,336-359
  node 6 size: 193523 MB
  node 6 free: 192031 MB
  node 7 cpus: 168-191,360-383
  node 7 size: 193359 MB
  node 7 free: 191749 MB
  node distances:
```

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Platform Notes (Continued)

```
  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:       1584859836 kB


  ------------------------------------------------------------
10. who -r
   run-level 3 Aug 25 15:54


  ------------------------------------------------------------
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          getty@
   enabled-runtime  systemd-remount-fs
   disabled         YaST2-Firstboot YaST2-Second-Stage apparmor auditd autofs autoyast-initscripts
                    blk-availability boot-sysctl ca-certificates chrony-wait chronyd console-getty cron cups
                    cups-browsed debug-shell display-manager ebtables exchange-bmc-os-info firewalld gpm
                    grub2-once haveged haveged-switch-root hwloc-dump-hwdata ipmi ipmievd irqbalance
                    issue-add-ssh-keys issue-generator kbdsettings kexec-load klog lunmask lvm2-monitor
                    man-db-create multipathd nfs nfs-blkmap nscd nvmefc-boot-connections nvmf-autoconnect
                    postfix purge-kernels rdisc rollback rpcbind rpmconfigcheck rsyncd rsyslog serial-getty@
                    smartd smartd_generate_opts snmpd snmptrapd sshd systemd-boot-check-no-failures
                    systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd tuned
                    wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
   generated        jexec
   indirect         wickedd


  ------------------------------------------------------------
13. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
   root=UUID=23fac4c3-67a0-43a3-b5eb-2787b6b441ca
   splash=silent
   resume=/dev/disk/by-uuid/5e1ca509-5afc-4c24-bca2-34d66622ea63
   mitigations=auto
   quiet
   security=apparmor


  ------------------------------------------------------------
14. cpupower frequency-info
   analyzing CPU 0:
     current policy: frequency should be within 1.50 GHz and 2.55 GHz.
                     The governor "performance" may decide which speed to use
                     within this range.
     boost state support:
       Supported: yes
       Active: yes
```

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Platform Notes (Continued)

```
   --------------------------------------------------------------
   15. tuned-adm active
     It seems that tuned daemon is not running, preset profile is not activated.
     Preset profile: latency-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 SUSE Linux Enterprise Server 15 SP4

   --------------------------------------------------------------
   20. Disk information
   SPEC is set to: /home/CPU2017
     Filesystem     Type  Size  Used Avail Use% Mounted on
     /dev/nvme0n1p3 xfs   381G   65G  316G  17% /home

   --------------------------------------------------------------
   21. /sys/devices/virtual/dmi/id
       Vendor:        IEIT SYSTEMS
       Product:       NF5180-A7-A0-R0-00
```

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Platform Notes (Continued)

```
      Product Family: Not specified
      Serial:         000000000


    ----------------------------------------------------------
 22. 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:
     3x Hynix HMCG94MEBRA109N 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:     04.02.32
   BIOS Date:        05/14/2024
```

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#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, peak) 510.parest_r(base, peak)
----------------------------------------------------------------------------------------------
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, peak) 526.blender_r(base, peak)
----------------------------------------------------------------------------------------------
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, peak)
----------------------------------------------------------------------------------------------
```

(Continued on next page)

IEIT Systems Co., Ltd.

NF5180A7 (AMD EPYC 9684X)

SPECrate®2017_fp_base = 1600

SPECrate®2017_fp_peak = 1680

CPU2017 License: 3358   **Test Date:** Aug-2024
Test Sponsor: IEIT Systems Co., Ltd.   **Hardware Availability:** Jun-2023
Tested by: IEIT Systems Co., Ltd.   **Software Availability:** Jun-2023

Compiler Version Notes (Continued)

```
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
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      | 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#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, peak) 527.cam4_r(base, peak)
--------------------------------------------------------------------------------------------------
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
```

(Continued on next page)

IEIT Systems Co., Ltd.

SPECrate®2017_fp_base = 1600

NF5180A7 (AMD EPYC 9684X)

SPECrate®2017_fp_peak = 1680

CPU2017 License: 3358		**Test Date:**	Aug-2024
Test Sponsor:	IEIT Systems Co., Ltd.	**Hardware Availability:**	Jun-2023
Tested by:	IEIT Systems Co., Ltd.	**Software Availability:**	Jun-2023

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
```

Fortran benchmarks:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
```

(Continued on next page)

IEIT Systems Co., Ltd.

NF5180A7 (AMD EPYC 9684X)

SPECrate®2017_fp_base = 1600

SPECrate®2017_fp_peak = 1680

CPU2017 License: 3358   **Test Date:** Aug-2024
Test Sponsor: IEIT Systems Co., Ltd.   **Hardware Availability:** Jun-2023
Tested by: IEIT Systems Co., Ltd.   **Software Availability:** Jun-2023

Base Optimization Flags (Continued)

Fortran benchmarks (continued):
```
-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -Kieee -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -mllvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm -lamdalloc
-lflang
```

Benchmarks using both Fortran and C:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -Kieee -Mrecursive -funroll-loops -mllvm -lsr-in-nested-loop
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc -lflang
```

Benchmarks using both C and C++:
```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -mllvm -unroll-threshold=100 -finline-aggressive
-mllvm -loop-unswitch-threshold=200000 -lamdlibm -lamdalloc -lflang
```

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

Base Other Flags

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

(Continued on next page)

IEIT Systems Co., Ltd.
NF5180A7 (AMD EPYC 9684X)

SPECrate®2017_fp_base = 1600

SPECrate®2017_fp_peak = 1680

CPU2017 License: 3358
Test Sponsor: IEIT Systems Co., Ltd.
Tested by: IEIT Systems Co., Ltd.

Test Date: Aug-2024
Hardware Availability: Jun-2023
Software Availability: Jun-2023

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
```

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
```

SPEC CPU®2017 Floating Point Rate Result

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IEIT Systems Co., Ltd.

SPECrate®2017_fp_base = 1600

NF5180A7 (AMD EPYC 9684X)

SPECrate®2017_fp_peak = 1680

CPU2017 License: 3358		**Test Date:**	Aug-2024
Test Sponsor:	IEIT Systems Co., Ltd.	**Hardware Availability:**	Jun-2023
Tested by:	IEIT Systems Co., Ltd.	**Software Availability:**	Jun-2023

Peak Optimization Flags

C benchmarks:

```
519.lbm_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
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc
```

```
538.imagick_r: basepeak = yes
```

```
544.nab_r: basepeak = yes
```

C++ benchmarks:

```
508.namd_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
-finline-aggressive -mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lamdalloc
```

```
510.parest_r: basepeak = yes
```

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
```

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IEIT Systems Co., Ltd.

SPECrate®2017_fp_base = 1600

NF5180A7 (AMD EPYC 9684X)

SPECrate®2017_fp_peak = 1680

CPU2017 License: 3358		**Test Date:**	Aug-2024
Test Sponsor:	IEIT Systems Co., Ltd.	**Hardware Availability:**	Jun-2023
Tested by:	IEIT Systems Co., Ltd.	**Software Availability:**	Jun-2023

Peak Optimization Flags (Continued)

554.roms_r: Same as 503.bwaves_r

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
-fremap-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: basepeak = yes

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
-fremap-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++:
-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 -fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3 -zopt
-mllvm -unroll-threshold=100 -mllvm -loop-unswitch-threshold=200000
-finline-aggressive -faggressive-loop-transform -fvector-transform
-fscalar-transform -Mrecursive -fepilog-vectorization-of-inductions
-lamdlibm -lamdalloc -lflang

SPEC CPU®2017 Floating Point Rate Result

IEIT Systems Co., Ltd.

SPECrate®2017_fp_base = 1600

NF5180A7 (AMD EPYC 9684X)

SPECrate®2017_fp_peak = 1680

CPU2017 License: 3358　　　　　　　　　　　　　　　　**Test Date:** Aug-2024
Test Sponsor: IEIT Systems Co., Ltd.　　　　　　　　**Hardware Availability:** Jun-2023
Tested by: IEIT Systems Co., Ltd.　　　　　　　　　**Software Availability:** Jun-2023

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
```

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

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