SPEC CPU®2017 Floating Point Speed Result

Supermicro

Mainstream A+ Server AS -1015A-MT
(H13SAE-MF , AMD Ryzen 9 7950X)

$SPECspeed®2017\_fp\_base = 92.6$

$SPECspeed®2017\_fp\_peak = 93.1$

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Jul-2023
Hardware Availability: Jun-2023
Software Availability: Jun-2023

Threads (scale: 0, 15.0, 30.0, 45.0, 60.0, 75.0, 90.0, 105, 115, 125, 135, 145, 155, 165, 175, 185, 195, 205, 215, 225, 235, 245, 260)

Benchmark	Threads	base	peak
603.bwaves_s	16	138	
607.cactuBSSN_s	16	131	
619.lbm_s	16	44.5	
621.wrf_s	16	187	
627.cam4_s	16	62.1	
628.pop2_s	16	73.9	74.8
638.imagick_s	16	157	158
644.nab_s	16	256	
649.fotonik3d_s	16	30.8	
654.roms_s	16	54.1	56.4

——— **SPECspeed®2017_fp_base (92.6)**   - - - - - **SPECspeed®2017_fp_peak (93.1)**

Hardware

CPU Name: AMD Ryzen 9 7950X
Max MHz: 5700
Nominal: 4500
Enabled: 16 cores, 1 chip
Orderable: 1 chip
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 64 MB I+D on chip per chip, 32 MB shared / 8 cores
Other: None
Memory: 64 GB (2 x 32 GB 2Rx4 PC5-5600B-E, running at 5200)
Storage: 1 x 480 GB NVMe M.2 SSD
Other: None

Software

OS: Ubuntu 22.04.2 LTS
Kernel 5.19.0-46-generic
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: Yes
Firmware: Version 1.0 released May-2023
File System: ext4
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None
Power Management: Default

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

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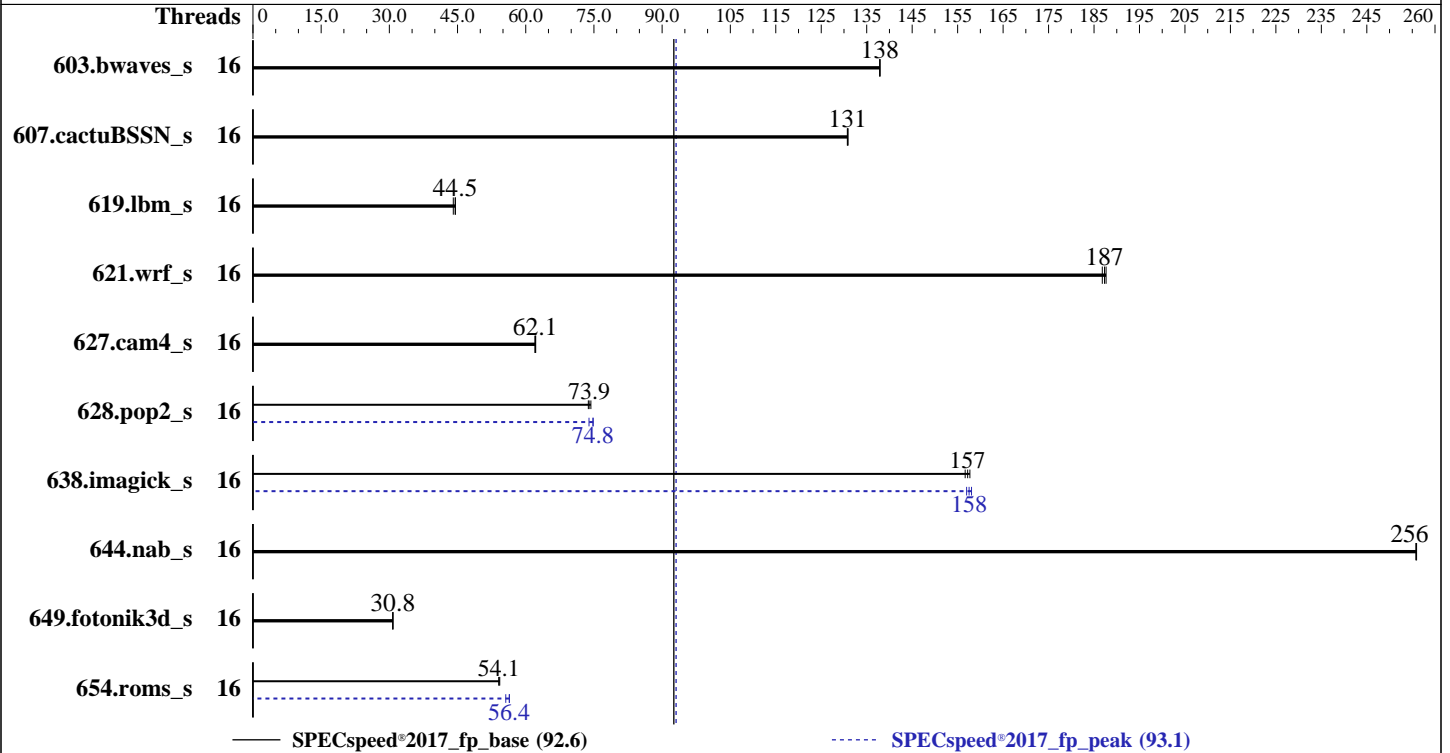Copyright 2017-2023 Standard Performance Evaluation Corporation

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Results Table

Benchmark	Base						Peak					
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	16	428	138	428	138	**428**	**138**	16	428	138	428	138	**428**	**138**
607.cactuBSSN_s	16	128	131	127	131	**127**	**131**	16	128	131	127	131	**127**	**131**
619.lbm_s	16	119	44.1	118	44.5	**118**	**44.5**	16	119	44.1	118	44.5	**118**	**44.5**
621.wrf_s	16	**70.6**	**187**	70.5	188	70.8	187	16	**70.6**	**187**	70.5	188	70.8	187
627.cam4_s	16	143	62.2	143	62.0	**143**	**62.1**	16	143	62.2	143	62.0	**143**	**62.1**
628.pop2_s	16	160	74.3	161	73.8	**161**	**73.9**	16	**159**	**74.8**	159	74.8	161	73.9
638.imagick_s	16	91.5	158	92.1	157	**91.8**	**157**	16	**91.6**	**158**	91.9	157	91.3	158
644.nab_s	16	**68.3**	**256**	68.3	256	68.3	256	16	**68.3**	**256**	68.3	256	68.3	256
649.fotonik3d_s	16	**296**	**30.8**	296	30.8	296	30.8	16	**296**	**30.8**	296	30.8	296	30.8
654.roms_s	16	**291**	**54.1**	290	54.3	291	54.1	16	283	55.6	**279**	**56.4**	279	56.4
SPECspeed®2017_fp_base =	**92.6**											
SPECspeed®2017_fp_peak =	**93.1**											

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.
To always enable THP for peak runs of:
603.bwaves_s, 607.cactuBSSN_s, 619.lbm_s, 627.cam4_s, 628.pop2_s, 638.imagick_s, 644.nab_s, 649.fotonik3d_s:
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled; echo always > /sys/kernel/mm/transparent_hugepage/defrag'
run as root.
```

(Continued on next page)

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Hardware Availability: Jun-2023
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Operating System Notes (Continued)

```
To disable THP for peak runs of 621.wrf_s:
'echo never > /sys/kernel/mm/transparent_hugepage/enabled; echo always > /sys/kernel/mm/transparent_hugepage/defrag'
run as root.
To enable THP only on request for peak runs of 654.roms_s:
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled; echo madvise > /sys/kernel/mm/transparent_hugepage/defrag'
run as root.
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-15"
LD_LIBRARY_PATH = "/home/cpu2017/amd_speed_aocc400_genoa_B_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 = "16"

Environment variables set by runcpu during the 628.pop2_s peak run:
GOMP_CPU_AFFINITY = "0-15"

Environment variables set by runcpu during the 638.imagick_s peak run:
GOMP_CPU_AFFINITY = "0-15"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0 8 1 9 2 10 3 11 4 12 5 13 6 14 7 15"
```

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 Settings:
SMT Control = Disable

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on super-Super-Server Tue Jul 18 21:58:43 2023

 SUT (System Under Test) info as seen by some common utilities.

 -----------------------------------------------------------
 Table of contents
 -----------------------------------------------------------
  1. uname -a
```

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Supermicro

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Platform Notes (Continued)

```
  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 (249.11-0ubuntu3.9)
 12. Services, from systemctl list-unit-files
 13. Linux kernel boot-time arguments, from /proc/cmdline
 14. cpupower frequency-info
 15. sysctl
 16. /sys/kernel/mm/transparent_hugepage
 17. /sys/kernel/mm/transparent_hugepage/khugepaged
 18. OS release
 19. Disk information
 20. /sys/devices/virtual/dmi/id
 21. dmidecode
 22. BIOS
    ------------------------------------------------------------


    ------------------------------------------------------------
  1. uname -a
    Linux super-Super-Server 5.19.0-46-generic #47~22.04.1-Ubuntu SMP PREEMPT_DYNAMIC Wed Jun 21 15:35:31 UTC 2
    x86_64 x86_64 x86_64 GNU/Linux


    ------------------------------------------------------------
  2. w
     21:58:43 up  2:35,  4 users,  load average: 6.93, 5.12, 3.18
    USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
    super    tty1     -                19:23    2:34m  3.04s  0.00s -bash
    super    pts/0    -                19:23    2:28m  0.78s  3.01s sudo su -
    super    tty2     -                19:31    2:27m  0.04s  0.00s -bash
    super    pts/1    -                19:31    2:27m  0.01s  0.01s sudo su -


    ------------------------------------------------------------
  3. Username
    From environment variable $USER:  root
    From the command 'logname':       super


    ------------------------------------------------------------
  4. ulimit -a
    time(seconds)        unlimited
    file(blocks)         unlimited
    data(kbytes)         unlimited
    stack(kbytes)        unlimited
    coredump(blocks)     0
    memory(kbytes)       unlimited
    locked memory(kbytes) 2097152
    process              253432
    nofiles              1024
    vmemory(kbytes)      unlimited
    locks                unlimited
    rtprio               0


    ------------------------------------------------------------
  5. sysinfo process ancestry
   /sbin/init splash
```

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Platform Notes (Continued)

```
 /bin/login -p --
 -bash
 sudo su -
 sudo su -
 su -
 -bash
 python3 ./run_amd_speed_aocc400_genoa_B1.py
 /bin/bash ./amd_speed_aocc400_genoa_B1.sh
 runcpu --config amd_speed_aocc400_genoa_B1.cfg --tune all --reportable --iterations 3 fpspeed
 runcpu --configfile amd_speed_aocc400_genoa_B1.cfg --tune all --reportable --iterations 3 --nopower
   --runmode speed --tune base:peak --size test:train:refspeed fpspeed --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.002/templogs/preenv.fpspeed.002.0.log --lognum 002.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017


-------------------------------------------------------------
6. /proc/cpuinfo
    model name        : AMD Ryzen 9 7950X 16-Core Processor
    vendor_id         : AuthenticAMD
    cpu family        : 25
    model             : 97
    stepping          : 2
    microcode         : 0xa601203
    bugs              : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass
    TLB size          : 3584 4K pages
    cpu cores         : 16
    siblings          : 16
    1 physical ids (chips)
    16 processors (hardware threads)
    physical id 0: core ids 0-15
    physical id 0: apicids 0-15
  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:           48 bits physical, 48 bits virtual
  Byte Order:              Little Endian
  CPU(s):                  16
  On-line CPU(s) list:     0-15
  Vendor ID:               AuthenticAMD
  Model name:              AMD Ryzen 9 7950X 16-Core Processor
  CPU family:              25
  Model:                   97
  Thread(s) per core:      1
  Core(s) per socket:      16
  Socket(s):               1
  Stepping:                2
  Frequency boost:         enabled
  CPU max MHz:             5879.8818
  CPU min MHz:             3000.0000
  BogoMIPS:                8982.99
  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 sse4_1 sse4_2 x2apic movbe popcnt aes
```

(Continued on next page)

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Platform Notes (Continued)

```
                      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 hw_pstate ssbd mba
                      perfmon_v2 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 cppc 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 rdpid overflow_recov succor smca fsrm flush_l1d
  Virtualization:                 AMD-V
  L1d cache:                      512 KiB (16 instances)
  L1i cache:                      512 KiB (16 instances)
  L2 cache:                       16 MiB (16 instances)
  L3 cache:                       64 MiB (2 instances)
  NUMA node(s):                   1
  NUMA node0 CPU(s):              0-15
  Vulnerability Itlb multihit:    Not affected
  Vulnerability L1tf:             Not affected
  Vulnerability Mds:              Not affected
  Vulnerability Meltdown:         Not affected
  Vulnerability Mmio stale data:  Not affected
  Vulnerability Retbleed:         Not affected
  Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl
  Vulnerability Spectre v1:       Mitigation; usercopy/swapgs barriers and __user pointer sanitization
  Vulnerability Spectre v2:       Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP disabled, RSB
                                  filling, PBRSB-eIBRS Not affected
  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     512K    8 Data            1     64        1             64
    L1i       32K     512K    8 Instruction     1     64        1             64
    L2         1M      16M    8 Unified         2   2048        1             64
    L3        32M      64M   16 Unified         3  32768        1             64

-------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 1 nodes (0)
  node 0 cpus: 0-15
  node 0 size: 63436 MB
  node 0 free: 62701 MB
  node distances:
  node   0
    0:  10

-------------------------------------------------------------
9. /proc/meminfo
  MemTotal:       64958576 kB

-------------------------------------------------------------
10. who -r
  run-level 3 Jul 18 19:23

-------------------------------------------------------------
11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.9)
```

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Platform Notes (Continued)

```
  Default Target  Status
  multi-user      running


      ----------------------------------------------------------
 12. Services, from systemctl list-unit-files
   STATE            UNIT FILES
   enabled          ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online
                    accounts-daemon anacron apparmor avahi-daemon bluetooth console-setup cron cups
                    cups-browsed dmesg e2scrub_reap getty@ gpu-manager grub-common grub-initrd-fallback
                    irqbalance kerneloops keyboard-setup lm-sensors networkd-dispatcher openvpn
                    power-profiles-daemon rsyslog secureboot-db setvtrgb ssh switcheroo-control systemd-oomd
                    systemd-pstore systemd-resolved systemd-timesyncd thermald ua-reboot-cmds ubuntu-advantage
                    udisks2 ufw wpa_supplicant
   enabled-runtime  netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
   disabled         acpid brltty console-getty debug-shell nftables openvpn-client@ openvpn-server@ openvpn@
                    rsync rtkit-daemon serial-getty@ speech-dispatcherd systemd-boot-check-no-failures
                    systemd-network-generator systemd-networkd systemd-networkd-wait-online systemd-sysext
                    systemd-time-wait-sync upower wpa_supplicant-nl80211@ wpa_supplicant-wired@
                    wpa_supplicant@
   generated        apport speech-dispatcher
   indirect         saned@ spice-vdagentd uuidd
   masked           alsa-utils cryptdisks cryptdisks-early hwclock pulseaudio-enable-autospawn rc rcS saned
                    sudo x11-common

      ----------------------------------------------------------
 13. Linux kernel boot-time arguments, from /proc/cmdline
   BOOT_IMAGE=/boot/vmlinuz-5.19.0-46-generic
   root=UUID=cd23bff8-09e7-4cd0-ab5f-4e9677be9fcc
   ro
   quiet
   splash
   vt.handoff=7


      ----------------------------------------------------------
 14. cpupower frequency-info
   analyzing CPU 0:
     current policy: frequency should be within 3.00 GHz and 4.50 GHz.
                     The governor "schedutil" may decide which speed to use
                     within this range.
     boost state support:
       Supported: yes
       Active: yes
       Boost States: 0
       Total States: 2
       Pstate-P0:  4500MHz


      ----------------------------------------------------------
 15. sysctl
   kernel.numa_balancing            0
   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
```

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Platform Notes (Continued)

```
    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
    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 Ubuntu 22.04.2 LTS


  ----------------------------------------------------------------
  19. Disk information
  SPEC is set to: /home/cpu2017
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/nvme0n1p2 ext4  439G   15G  402G   4% /


  ----------------------------------------------------------------
  20. /sys/devices/virtual/dmi/id
    Vendor:         Supermicro
    Product:        Super Server
    Product Family: Family
    Serial:         0123456789


  ----------------------------------------------------------------
  21. dmidecode
    Additional information from dmidecode 3.3 follows.  WARNING: Use caution when you interpret this section.
    The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately
    determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the
    "DMTF SMBIOS" standard.
    Memory:
      2x Micron Technology MTC20C2085S1EC56BGZ 32 GB 2 rank 5600, configured at 5200
      2x NO DIMM NO DIMM



  ----------------------------------------------------------------
  22. BIOS
  (This section combines info from /sys/devices and dmidecode.)
    BIOS Vendor:       American Megatrends International, LLC.
    BIOS Version:      1.0
    BIOS Date:         05/25/2023
```

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Platform Notes (Continued)

```
    BIOS Revision:     5.26
```

Compiler Version Notes

```
==============================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------


==============================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------


==============================================================================
Fortran         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------


==============================================================================
Fortran, C      | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:

```
clang
```

SPEC CPU®2017 Floating Point Speed Result

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Supermicro

Mainstream A+ Server AS -1015A-MT
(H13SAE-MF , AMD Ryzen 9 7950X)

SPECspeed®2017_fp_base = 92.6

SPECspeed®2017_fp_peak = 93.1

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Jul-2023
Hardware Availability: Jun-2023
Software Availability: Jun-2023

Base Compiler Invocation (Continued)

Fortran benchmarks:
`flang`

Benchmarks using both Fortran and C:
`flang clang`

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

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
```

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Base Optimization Flags (Continued)

Fortran benchmarks (continued):
```
-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
-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
```

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Test Date: Jul-2023
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Software Availability: Jun-2023

Peak 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
```

Peak Portability Flags

```
Same as Base Portability Flags
```

Peak Optimization Flags

C benchmarks:

619.lbm_s: basepeak = yes

638.imagick_s: `-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast`
`-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp`
`-flto -fstruct-layout=9 -mllvm -unroll-threshold=50`
`-fremap-arrays -fstrip-mining`
`-mllvm -inline-threshold=1000`
`-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt`
`-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang`

644.nab_s: basepeak = yes

Fortran benchmarks:

603.bwaves_s: basepeak = yes

649.fotonik3d_s: basepeak = yes

654.roms_s: `-m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP`

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Peak Optimization Flags (Continued)

654.roms_s (continued):
```
-Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math
-fopenmp -Mrecursive -mllvm -reduce-array-computations=3
-fvector-transform -fscalar-transform -fopenmp=libomp
-lomp -lamdlibm -lamdalloc -lflang
```

Benchmarks using both Fortran and C:

621.wrf_s: basepeak = yes

627.cam4_s: basepeak = yes

628.pop2_s: `-m64 -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 -fopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-Mrecursive -fvector-transform -fscalar-transform
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes

Peak 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
```

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CPU2017 License: 001176		**Test Date:**	Jul-2023
Test Sponsor:	Supermicro	**Hardware Availability:**	Jun-2023
Tested by:	Supermicro	**Software Availability:**	Jun-2023

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/Supermicro-Platform-Settings-V1.2-AM5-revA.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/Supermicro-Platform-Settings-V1.2-AM5-revA.xml

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

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