SPEC CPU®2017 Floating Point Speed Result

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Supermicro
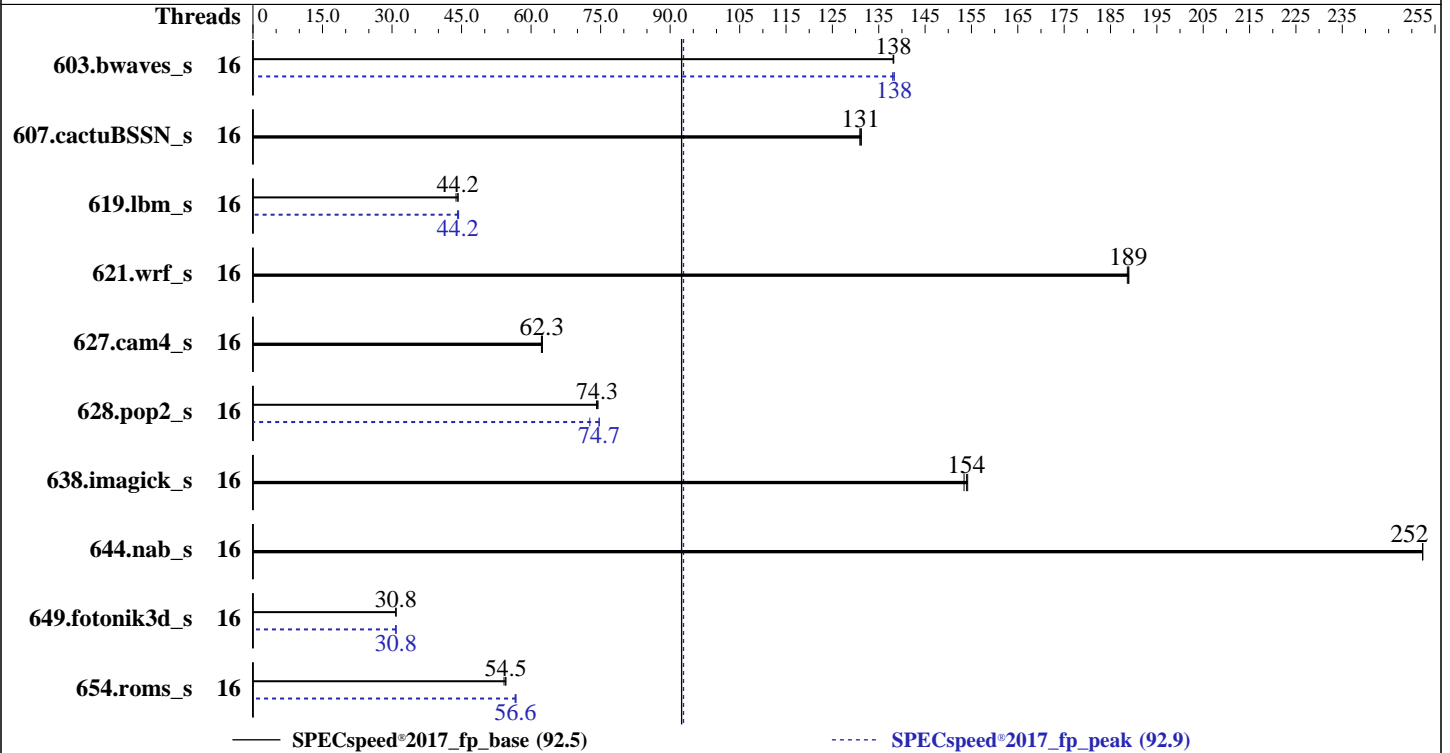
Mainstream A+ Server AS -1015A-MT
(H13SAE-MF , AMD EPYC 4564P)

$SPECspeed®2017\_fp\_base = 92.5$

$SPECspeed®2017\_fp\_peak = 92.9$

Threads — benchmark results (scale 0 to 255):

- **603.bwaves_s** 16 — base 138, peak 138
- **607.cactuBSSN_s** 16 — 131
- **619.lbm_s** 16 — base 44.2, peak 44.2
- **621.wrf_s** 16 — 189
- **627.cam4_s** 16 — 62.3
- **628.pop2_s** 16 — base 74.3, peak 74.7
- **638.imagick_s** 16 — 154
- **644.nab_s** 16 — 252
- **649.fotonik3d_s** 16 — base 30.8, peak 30.8
- **654.roms_s** 16 — base 54.5, peak 56.6

——— SPECspeed®2017_fp_base (92.5)   ------- SPECspeed®2017_fp_peak (92.9)

Hardware

CPU Name: AMD EPYC 4564P
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 2Rx8 PC5-5600B-U, running at 5200)
Storage: 1 x 960 GB NVMe SSD
Other: CPU Cooling: Air

Software

OS: Ubuntu 22.04.4 LTS
 Kernel 6.5.0-27-generic
Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
Parallel: Yes
Firmware: Version 1.2a released Feb-2024
File System: ext4
System State: Run level 5 (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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SPECspeed®2017_fp_base = 92.5

SPECspeed®2017_fp_peak = 92.9

CPU2017 License: 001176

Test Sponsor: Supermicro

Tested by: Supermicro

Test Date: Apr-2024

Hardware Availability: May-2024

Software Availability: Mar-2024

Results Table

Benchmark	Base						Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	16	427	138	**427**	**138**	427	138	16	426	138	428	138	**427**	**138**
607.cactuBSSN_s	16	127	131	127	131	**127**	**131**	16	127	131	127	131	**127**	**131**
619.lbm_s	16	120	43.8	**119**	**44.2**	118	44.3	16	119	44.2	118	44.4	**119**	**44.2**
621.wrf_s	16	**70.0**	**189**	70.0	189	70.1	189	16	**70.0**	**189**	70.0	189	70.1	189
627.cam4_s	16	142	62.4	**142**	**62.3**	142	62.2	16	142	62.4	**142**	**62.3**	142	62.2
628.pop2_s	16	160	74.1	159	74.4	**160**	**74.3**	16	159	74.7	**159**	**74.7**	163	72.7
638.imagick_s	16	**93.7**	**154**	94.0	153	93.6	154	16	**93.7**	**154**	94.0	153	93.6	154
644.nab_s	16	69.2	252	69.2	252	**69.2**	**252**	16	69.2	252	69.2	252	**69.2**	**252**
649.fotonik3d_s	16	296	30.8	**296**	**30.8**	295	30.9	16	296	30.8	**296**	**30.8**	296	30.8
654.roms_s	16	**289**	**54.5**	289	54.6	291	54.2	16	277	56.8	278	56.6	**278**	**56.6**
SPECspeed®2017_fp_base =		**92.5**											
SPECspeed®2017_fp_peak =		**92.9**											

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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CPU2017 License: 001176　　　　　　　　　　　　　　　　　**Test Date:** Apr-2024
Test Sponsor: Supermicro　　　　　　　　　　　　　　**Hardware Availability:** May-2024
Tested by: Supermicro　　　　　　　　　　　　　　　**Software Availability:** Mar-2024

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_znver4_A_lib/lib:"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOC_CONF = "oversize_threshold:0,retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "16"

Environment variables set by runcpu during the 603.bwaves_s peak run:
GOMP_CPU_AFFINITY = "0-15"

Environment variables set by runcpu during the 619.lbm_s peak run:
GOMP_CPU_AFFINITY = "0-15"

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

Environment variables set by runcpu during the 649.fotonik3d_s peak run:
GOMP_CPU_AFFINITY = "0-15"
PGHPF_ZMEM = "yes"

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 as-1015a-mt Mon Apr 15 04:19:19 2024
```

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Platform Notes (Continued)

```
  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 (249.11-0ubuntu3.12)
  12. Failed units, from systemctl list-units --state=failed
  13. Services, from systemctl list-unit-files
  14. Linux kernel boot-time arguments, from /proc/cmdline
  15. cpupower frequency-info
  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 as-1015a-mt 6.5.0-27-generic #28~22.04.1-Ubuntu SMP PREEMPT_DYNAMIC Fri Mar 15 10:51:06 UTC 2 x86_64
    x86_64 x86_64 GNU/Linux

  ------------------------------------------------------------
  2. w
     04:19:19 up  2:36,  4 users,  load average: 7.63, 5.33, 3.22
    USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
    lab      tty1     -                01:44    2:29m  0.76s  0.00s -bash
    lab      pts/0    -                01:45    2:29m  0.82s  0.75s sudo su -
    lab      tty2     -                01:49    1:58m  0.08s  0.00s -bash
    lab      pts/1    -                01:49    1:58m  0.07s  0.07s sudo su -

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

  ------------------------------------------------------------
  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              253495
```

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Platform Notes (Continued)

```
  nofiles            1024
  vmemory(kbytes)    unlimited
  locks              unlimited
  rtprio             0

  ------------------------------------------------------------
5. sysinfo process ancestry
 /sbin/init
 /bin/login -p --
 -bash
 sudo su -
 sudo su -
 su -
 -bash
 python3 ./run_amd_speed_aocc400_znver4_A1.py
 /bin/bash ./amd_speed_aocc400_znver4_A1.sh
 runcpu --config amd_speed_aocc400_znver4_A1.cfg --tune all --reportable --iterations 3 fpspeed
 runcpu --configfile amd_speed_aocc400_znver4_A1.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 EPYC 4564P 16-Core Processor
   vendor_id       : AuthenticAMD
   cpu family      : 25
   model           : 97
   stepping        : 2
   microcode       : 0xa601206
   bugs            : sysret_ss_attrs spectre_v1 spectre_v2 spec_store_bypass srso
   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 EPYC 4564P 16-Core Processor
  CPU family:               25
  Model:                    97
  Thread(s) per core:       1
  Core(s) per socket:       16
  Socket(s):                1
  Stepping:                 2
```

(Continued on next page)

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Platform Notes (Continued)

```
  CPU max MHz:                      5881.0000
  CPU min MHz:                      400.0000
  BogoMIPS:                         8983.04
  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 amd_lbr_v2 nopl nonstop_tsc cpuid extd_apicid
                                    aperfmperf rapl pni pclmulqdq monitor ssse3 fma cx16 sse4_1 sse4_2
                                    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 hw_pstate ssbd mba perfmon_v2 ibrs ibpb stibp ibrs_enhanced
                                    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 x2avic v_spec_ctrl vnmi avx512vbmi umip pku ospke avx512_vbmi2
                                    gfni vaes vpclmulqdq avx512_vnni avx512_bitalg avx512_vpopcntdq rdpid
                                    overflow_recov succor smca 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 Gather data sampling: Not affected
  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 rstack overflow: Mitigation; Safe RET
  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; Enhanced / Automatic IBRS, IBPB conditional, 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: 63428 MB
  node 0 free: 62871 MB
  node distances:
  node   0
    0:  10
```

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Platform Notes (Continued)

```
   ----------------------------------------------------------------
   9. /proc/meminfo
      MemTotal:        64950444 kB


   ----------------------------------------------------------------
   10. who -r
      run-level 5 Apr 15 01:44


   ----------------------------------------------------------------
   11. Systemd service manager version: systemd 249 (249.11-0ubuntu3.12)
      Default Target  Status
      graphical       degraded


   ----------------------------------------------------------------
   12. Failed units, from systemctl list-units --state=failed
        UNIT                              LOAD   ACTIVE SUB   DESCRIPTION
      * systemd-networkd-wait-online.service loaded failed failed Wait for Network to be Configured


   ----------------------------------------------------------------
   13. Services, from systemctl list-unit-files
      STATE            UNIT FILES
      enabled          ModemManager apparmor blk-availability cloud-config cloud-final cloud-init
                       cloud-init-local console-setup cron dmesg e2scrub_reap finalrd getty@ gpu-manager
                       grub-common grub-initrd-fallback irqbalance keyboard-setup lm-sensors lvm2-monitor
                       lxd-agent multipathd networkd-dispatcher open-iscsi open-vm-tools pollinate rsyslog
                       secureboot-db setvtrgb ssh systemd-networkd systemd-networkd-wait-online systemd-pstore
                       systemd-resolved systemd-timesyncd thermald ua-reboot-cmds ubuntu-advantage udisks2 ufw
                       vgauth
      enabled-runtime  netplan-ovs-cleanup systemd-fsck-root systemd-remount-fs
      disabled         console-getty debug-shell iscsid nftables rsync serial-getty@
                       systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                       systemd-time-wait-sync upower
      generated        apport
      indirect         uuidd
      masked           cryptdisks cryptdisks-early hwclock lvm2 multipath-tools-boot rc rcS screen-cleanup sudo
                       x11-common


   ----------------------------------------------------------------
   14. Linux kernel boot-time arguments, from /proc/cmdline
      BOOT_IMAGE=/boot/vmlinuz-6.5.0-27-generic
      root=UUID=493aa310-a89f-44f0-97e2-e438e6abbb08
      ro


   ----------------------------------------------------------------
   15. cpupower frequency-info
      analyzing CPU 7:
        current policy: frequency should be within 400 MHz and 5.88 GHz.
                        The governor "performance" may decide which speed to use
                        within this range.
        boost state support:
          Supported: yes
          Active: yes
          Boost States: 0
          Total States: 2
          Pstate-P0:  4500MHz


   ----------------------------------------------------------------
   16. sysctl
      kernel.numa_balancing               0
      kernel.randomize_va_space            0
```

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Platform Notes (Continued)

```
     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 Ubuntu 22.04.4 LTS


    ----------------------------------------------------------
    20. Disk information
    SPEC is set to: /home/cpu2017
      Filesystem     Type  Size  Used Avail Use% Mounted on
      /dev/nvme0n1p2 ext4  879G   17G  817G   3% /


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


    ----------------------------------------------------------
    22. 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:
```

(Continued on next page)

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Platform Notes (Continued)

```
     2x Micron Technology MTC16C2085S1UC56BGZ 32 GB 2 rank 5600, configured at 5200
     2x NO DIMM NO DIMM


     ------------------------------------------------------------
     23. BIOS
     (This section combines info from /sys/devices and dmidecode.)
        BIOS Vendor:       American Megatrends International, LLC.
        BIOS Version:      1.2a
        BIOS Date:         02/15/2024
        BIOS Revision:     5.32
```

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#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 | 607.cactuBSSN_s(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
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
----------------------------------------------------------------------------------------------


==============================================================================================
Fortran        | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(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     | 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#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#434 2022_10_28) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
```

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SPEC CPU®2017 Floating Point Speed Result

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Supermicro

Mainstream A+ Server AS -1015A-MT
(H13SAE-MF , AMD EPYC 4564P)

SPECspeed®2017_fp_base = 92.5

SPECspeed®2017_fp_peak = 92.9

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

Test Date: Apr-2024
Hardware Availability: May-2024
Software Availability: Mar-2024

Compiler Version Notes (Continued)

```
InstalledDir: /opt/AMD/aocc/aocc-compiler-4.0.0/bin
--------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
```
clang
```

Fortran benchmarks:
```
flang
```

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

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

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
```

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Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

Supermicro

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Base Optimization Flags (Continued)

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

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

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

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Supermicro

Mainstream A+ Server AS -1015A-MT
(H13SAE-MF , AMD EPYC 4564P)

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Test Date: Apr-2024
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Software Availability: Mar-2024

Base Other Flags (Continued)

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

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: -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
```

```
638.imagick_s: basepeak = yes
```

```
644.nab_s: basepeak = yes
```

Fortran benchmarks:

(Continued on next page)

Supermicro

Mainstream A+ Server AS -1015A-MT
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Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Apr-2024
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Software Availability: Mar-2024

Peak Optimization Flags (Continued)

603.bwaves_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`
`-Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math`
`-fopenmp -Mrecursive -mllvm -reduce-array-computations=3`
`-fvector-transform -fscalar-transform -fopenmp=libomp`
`-lomp -lamdlibm -lamdalloc -lflang`

649.fotonik3d_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`
`-Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math`
`-fopenmp -flto -Mrecursive`
`-mllvm -reduce-array-computations=3 -zopt -fopenmp=libomp`
`-lomp -lamdlibm -lamdalloc -lflang`

654.roms_s: `Same as 603.bwaves_s`

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`

(Continued on next page)

Supermicro

Mainstream A+ Server AS -1015A-MT
(H13SAE-MF , AMD EPYC 4564P)

SPECspeed®2017_fp_base = 92.5

SPECspeed®2017_fp_peak = 92.9

CPU2017 License: 001176

Test Sponsor: Supermicro

Tested by: Supermicro

Test Date: Apr-2024

Hardware Availability: May-2024

Software Availability: Mar-2024

Peak Other Flags (Continued)

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

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

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

The flags files that were used to format this result can be browsed at
```
http://www.spec.org/cpu2017/flags/aocc400-flags-A1.2.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-A1.2.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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