SPEC CPU®2017 Floating Point Speed Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

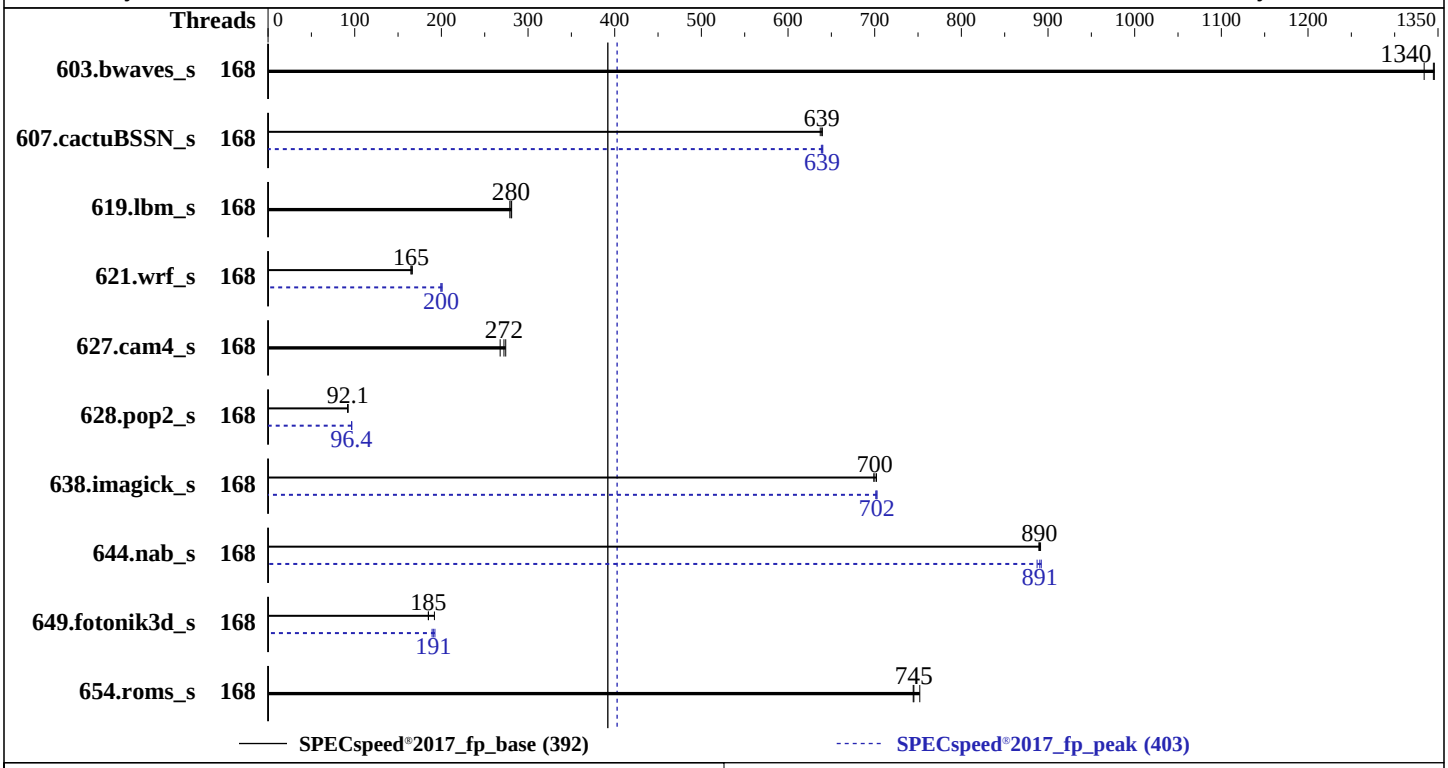
ProLiant DL385 Gen11
(2.25 GHz, AMD EPYC 9634)

SPECspeed®2017_fp_base = 392

SPECspeed®2017_fp_peak = 403

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Dec-2022
Hardware Availability: Dec-2022
Software Availability: Nov-2022



Hardware

CPU Name:	AMD EPYC 9634
Max MHz:	3700
Nominal:	2250
Enabled:	168 cores, 2 chips
Orderable:	1,2 chips
Cache L1:	32 KB I + 32 KB D on chip per core
L2:	1 MB I+D on chip per core
L3:	384 MB I+D on chip per chip, 32 MB shared / 7 cores
Other:	None
Memory:	1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)
Storage:	1 x 480 GB SATA SSD
Other:	None

Software

OS:	Ubuntu 22.04.1 LTS Kernel 5.15.0-56-generic
Compiler:	C/C++/Fortran: Version 4.0.0 of AOCC
Parallel:	Yes
Firmware:	HPE BIOS Version v1.12 11/24/2022 released Nov-2022
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

Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	168	43.8	1350	**43.9**	**1340**	44.2	1330	168	43.8	1350	**43.9**	**1340**	44.2	1330
607.cactuBSSN_s	168	**26.1**	**639**	26.2	637	26.1	640	168	**26.1**	**639**	26.0	640	26.1	638
619.lbm_s	168	**18.7**	**280**	18.8	279	18.6	281	168	**18.7**	**280**	18.8	279	18.6	281
621.wrf_s	168	80.2	165	79.4	167	**80.0**	**165**	168	**66.2**	**200**	66.3	199	65.8	201
627.cam4_s	168	32.3	274	**32.6**	**272**	33.1	268	168	32.3	274	**32.6**	**272**	33.1	268
628.pop2_s	168	129	92.2	**129**	**92.1**	129	91.9	168	123	96.5	123	96.4	**123**	**96.4**
638.imagick_s	168	20.5	702	20.6	699	**20.6**	**700**	168	**20.5**	**702**	20.6	701	20.5	703
644.nab_s	168	19.6	889	19.6	891	**19.6**	**890**	168	19.7	887	19.6	892	**19.6**	**891**
649.fotonik3d_s	168	47.5	192	**49.3**	**185**	49.3	185	168	48.2	189	**47.8**	**191**	47.3	193
654.roms_s	168	20.9	752	21.1	744	**21.1**	**745**	168	20.9	752	21.1	744	**21.1**	**745**

SPECspeed®2017_fp_base = 392

SPECspeed®2017_fp_peak = 403

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,
```

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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.
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.
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 = "0-167"
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 = "168"

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:
GOMP_CPU_AFFINITY = "0-167"

Environment variables set by runcpu during the 621.wrf_s peak run:
GOMP_CPU_AFFINITY = "0-167"

Environment variables set by runcpu during the 628.pop2_s peak run:
GOMP_CPU_AFFINITY = "0-167"

Environment variables set by runcpu during the 638.imagick_s peak run:
GOMP_CPU_AFFINITY = "0-167"

Environment variables set by runcpu during the 644.nab_s peak run:
GOMP_CPU_AFFINITY = "0-167"

Environment variables set by runcpu during the 649.fotonik3d_s peak run:
GOMP_CPU_AFFINITY = "0-167"
PGHPF_ZMEM = "yes"
```

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
 Workload Profile set to General Peak Frequency Compute
 Determinism Control set to Manual
   Performance Determinism set to Power Deterministic
 AMD SMT Option set to Disabled
 Last-Level Cache (LLC) as NUMA Node set to Enabled
 ACPI CST C2 Latency set to 18 microseconds
 Memory PStates set to Disabled
 Thermal Configuration set to Maximum Cooling
 Workload Profile set to Custom
   Power Regulator set to OS Control Mode

The system ROM used for this result contains microcode version 0xa10110e for the
AMD EPYC 9nn4X family of processors. The reference code/AGESA version used in this
ROM is version GenoaPI 1.0.0.1-L6

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
 running on admin1 Mon Jun 27 18:40:35 2022

 SUT (System Under Test) info as seen by some common utilities.
 For more information on this section, see
    https://www.spec.org/cpu2017/Docs/config.html#sysinfo

 From /proc/cpuinfo
    model name : AMD EPYC 9634 84-Core Processor
       2  "physical id"s (chips)
       168 "processors"
    cores, siblings (Caution: counting these is hw and system dependent. The following
    excerpts from /proc/cpuinfo might not be reliable.  Use with caution.)
       cpu cores : 84
       siblings  : 84
       physical 0: cores 0 1 2 3 4 5 6 16 17 18 19 20 21 22 32 33 34 35 36 37 38 48 49 50
       51 52 53 54 64 65 66 67 68 69 70 80 81 82 83 84 85 86 96 97 98 99 100 101 102 112
```

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Platform Notes (Continued)

```
      113 114 115 116 117 118 128 129 130 131 132 133 134 144 145 146 147 148 149 150 160
      161 162 163 164 165 166 176 177 178 179 180 181 182
      physical 1: cores 0 1 2 3 4 5 6 16 17 18 19 20 21 22 32 33 34 35 36 37 38 48 49 50
      51 52 53 54 64 65 66 67 68 69 70 80 81 82 83 84 85 86 96 97 98 99 100 101 102 112
      113 114 115 116 117 118 128 129 130 131 132 133 134 144 145 146 147 148 149 150 160
      161 162 163 164 165 166 176 177 178 179 180 181 182

 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):                          168
      On-line CPU(s) list:             0-167
      Vendor ID:                       AuthenticAMD
      Model name:                      AMD EPYC 9634 84-Core Processor
      CPU family:                      25
      Model:                           17
      Thread(s) per core:              1
      Core(s) per socket:              84
      Socket(s):                       2
      Stepping:                        1
      Frequency boost:                 enabled
      CPU max MHz:                     3701.0000
      CPU min MHz:                     400.0000
      BogoMIPS:                        4493.33
      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 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
     la57 rdpid overflow_recov succor smca fsrm flush_l1d
      Virtualization:                  AMD-V
      L1d cache:                       5.3 MiB (168 instances)
      L1i cache:                       5.3 MiB (168 instances)
      L2 cache:                        168 MiB (168 instances)
      L3 cache:                        768 MiB (24 instances)
      NUMA node(s):                    24
```

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Platform Notes (Continued)

```
      NUMA node0 CPU(s):                0-6
      NUMA node1 CPU(s):                28-34
      NUMA node2 CPU(s):                56-62
      NUMA node3 CPU(s):                14-20
      NUMA node4 CPU(s):                42-48
      NUMA node5 CPU(s):                70-76
      NUMA node6 CPU(s):                21-27
      NUMA node7 CPU(s):                49-55
      NUMA node8 CPU(s):                77-83
      NUMA node9 CPU(s):                7-13
      NUMA node10 CPU(s):               35-41
      NUMA node11 CPU(s):               63-69
      NUMA node12 CPU(s):               84-90
      NUMA node13 CPU(s):               112-118
      NUMA node14 CPU(s):               140-146
      NUMA node15 CPU(s):               98-104
      NUMA node16 CPU(s):               126-132
      NUMA node17 CPU(s):               154-160
      NUMA node18 CPU(s):               105-111
      NUMA node19 CPU(s):               133-139
      NUMA node20 CPU(s):               161-167
      NUMA node21 CPU(s):               91-97
      NUMA node22 CPU(s):               119-125
      NUMA node23 CPU(s):               147-153
      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 and seccomp
      Vulnerability Spectre v1:         Mitigation; usercopy/swapgs barriers and __user
      pointer sanitization
      Vulnerability Spectre v2:        Mitigation; Retpolines, IBPB conditional, IBRS_FW,
      STIBP disabled, RSB filling, 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     5.3M    8 Data            1    64        1             64
      L1i       32K     5.3M    8 Instruction     1    64        1             64
      L2         1M     168M    8 Unified         2  2048        1             64
      L3        32M     768M   16 Unified         3 32768        1             64

  /proc/cpuinfo cache data
```

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Platform Notes (Continued)

```
    cache size : 1024 KB

 From numactl --hardware
 WARNING: a numactl 'node' might or might not correspond to a physical chip.
   available: 24 nodes (0-23)
   node 0 cpus: 0 1 2 3 4 5 6
   node 0 size: 64199 MB
   node 0 free: 64015 MB
   node 1 cpus: 28 29 30 31 32 33 34
   node 1 size: 64510 MB
   node 1 free: 64294 MB
   node 2 cpus: 56 57 58 59 60 61 62
   node 2 size: 64474 MB
   node 2 free: 64216 MB
   node 3 cpus: 14 15 16 17 18 19 20
   node 3 size: 64510 MB
   node 3 free: 64363 MB
   node 4 cpus: 42 43 44 45 46 47 48
   node 4 size: 64510 MB
   node 4 free: 64326 MB
   node 5 cpus: 70 71 72 73 74 75 76
   node 5 size: 64510 MB
   node 5 free: 64352 MB
   node 6 cpus: 21 22 23 24 25 26 27
   node 6 size: 64510 MB
   node 6 free: 64306 MB
   node 7 cpus: 49 50 51 52 53 54 55
   node 7 size: 64510 MB
   node 7 free: 64340 MB
   node 8 cpus: 77 78 79 80 81 82 83
   node 8 size: 64510 MB
   node 8 free: 64309 MB
   node 9 cpus: 7 8 9 10 11 12 13
   node 9 size: 64510 MB
   node 9 free: 64336 MB
   node 10 cpus: 35 36 37 38 39 40 41
   node 10 size: 64510 MB
   node 10 free: 64366 MB
   node 11 cpus: 63 64 65 66 67 68 69
   node 11 size: 64510 MB
   node 11 free: 64320 MB
   node 12 cpus: 84 85 86 87 88 89 90
   node 12 size: 64510 MB
   node 12 free: 64396 MB
   node 13 cpus: 112 113 114 115 116 117 118
   node 13 size: 64510 MB
   node 13 free: 64392 MB
```

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Platform Notes (Continued)

```
node 14 cpus: 140 141 142 143 144 145 146
node 14 size: 64510 MB
node 14 free: 64387 MB
node 15 cpus: 98 99 100 101 102 103 104
node 15 size: 64510 MB
node 15 free: 64393 MB
node 16 cpus: 126 127 128 129 130 131 132
node 16 size: 64510 MB
node 16 free: 64406 MB
node 17 cpus: 154 155 156 157 158 159 160
node 17 size: 64510 MB
node 17 free: 64414 MB
node 18 cpus: 105 106 107 108 109 110 111
node 18 size: 64510 MB
node 18 free: 64409 MB
node 19 cpus: 133 134 135 136 137 138 139
node 19 size: 64510 MB
node 19 free: 64416 MB
node 20 cpus: 161 162 163 164 165 166 167
node 20 size: 64456 MB
node 20 free: 64348 MB
node 21 cpus: 91 92 93 94 95 96 97
node 21 size: 64510 MB
node 21 free: 64411 MB
node 22 cpus: 119 120 121 122 123 124 125
node 22 size: 64510 MB
node 22 free: 64396 MB
node 23 cpus: 147 148 149 150 151 152 153
node 23 size: 64510 MB
node 23 free: 64405 MB
node distances:
node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16  17  18  19
20  21  22  23
  0:  10  11  11  11  11  11  11  11  11  11  11  11  32  32  32  32  32  32  32  32
  32  32  32  32
  1:  11  10  11  11  11  11  11  11  11  11  11  11  32  32  32  32  32  32  32  32
  32  32  32  32
  2:  11  11  10  11  11  11  11  11  11  11  11  11  32  32  32  32  32  32  32  32
  32  32  32  32
  3:  11  11  11  10  11  11  11  11  11  11  11  11  32  32  32  32  32  32  32  32
  32  32  32  32
  4:  11  11  11  11  10  11  11  11  11  11  11  11  32  32  32  32  32  32  32  32
  32  32  32  32
  5:  11  11  11  11  11  10  11  11  11  11  11  11  32  32  32  32  32  32  32  32
  32  32  32  32
  6:  11  11  11  11  11  11  10  11  11  11  11  11  32  32  32  32  32  32  32  32
  32  32  32  32
```

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Platform Notes (Continued)

```
     7:  11  11  11  11  11  11  11  10  11  11  11  11  32  32  32  32  32  32  32  32
     32  32  32  32
     8:  11  11  11  11  11  11  11  11  10  11  11  11  32  32  32  32  32  32  32  32
     32  32  32  32
     9:  11  11  11  11  11  11  11  11  11  10  11  11  32  32  32  32  32  32  32  32
     32  32  32  32
    10:  11  11  11  11  11  11  11  11  11  11  10  11  32  32  32  32  32  32  32  32
    32  32  32  32
    11:  11  11  11  11  11  11  11  11  11  11  11  10  32  32  32  32  32  32  32  32
    32  32  32  32
    12:  32  32  32  32  32  32  32  32  32  32  32  32  10  11  11  11  11  11  11  11
    11  11  11  11
    13:  32  32  32  32  32  32  32  32  32  32  32  32  11  10  11  11  11  11  11  11
    11  11  11  11
    14:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  10  11  11  11  11  11
    11  11  11  11
    15:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  10  11  11  11  11
    11  11  11  11
    16:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11  10  11  11  11
    11  11  11  11
    17:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11  11  10  11  11
    11  11  11  11
    18:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11  11  11  10  11
    11  11  11  11
    19:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11  11  11  11  10
    11  11  11  11
    20:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11  11  11  11  11
    10  11  11  11
    21:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11  11  11  11  11
    11  10  11  11
    22:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11  11  11  11  11
    11  11  10  11
    23:  32  32  32  32  32  32  32  32  32  32  32  32  11  11  11  11  11  11  11  11
    11  11  11  10

  From /proc/meminfo
     MemTotal:       1584992788 kB
     HugePages_Total:       0
     Hugepagesize:       2048 kB

  /sbin/tuned-adm active
      Current active profile: throughput-performance

  /sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has
     performance

  /usr/bin/lsb_release -d
```


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Platform Notes (Continued)

```
   Ubuntu 22.04.1 LTS

From /etc/*release* /etc/*version*
   debian_version: bookworm/sid
   os-release:
      PRETTY_NAME="Ubuntu 22.04.1 LTS"
      NAME="Ubuntu"
      VERSION_ID="22.04"
      VERSION="22.04.1 LTS (Jammy Jellyfish)"
      VERSION_CODENAME=jammy
      ID=ubuntu
      ID_LIKE=debian
      HOME_URL="https://www.ubuntu.com/"

uname -a:
   Linux admin1 5.15.0-56-generic #62-Ubuntu SMP Tue Nov 22 19:54:14 UTC 2022 x86_64
   x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit):                          Not affected
CVE-2018-3620 (L1 Terminal Fault):                       Not affected
Microarchitectural Data Sampling:                        Not affected
CVE-2017-5754 (Meltdown):                                Not affected
mmio_stale_data:                                         Not affected
retbleed:                                                Not affected
CVE-2018-3639 (Speculative Store Bypass):                Mitigation: Speculative Store
                                                         Bypass disabled via prctl and
                                                         seccomp
CVE-2017-5753 (Spectre variant 1):                       Mitigation: usercopy/swapgs
                                                         barriers and __user pointer
                                                         sanitization
CVE-2017-5715 (Spectre variant 2):                       Mitigation: Retpolines, IBPB:
                                                         conditional, IBRS_FW, STIBP:
                                                         disabled, RSB filling,
                                                         PBRSB-eIBRS: Not affected
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort):                 Not affected

run-level 5 Jun 27 18:30

SPEC is set to: /home/cpu2017
   Filesystem                     Type  Size  Used Avail Use% Mounted on
   /dev/mapper/ubuntu--vg-ubuntu--lv ext4  437G   34G  385G   8% /

From /sys/devices/virtual/dmi/id
    Vendor:         HPE
```

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Platform Notes (Continued)

```
     Product:        ProLiant DL385 Gen11
     Product Family: ProLiant
     Serial:         DL385GEN11-003

  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:
      13x Hynix HMCG94MEBRA121N 64 GB 2 rank 4800
      11x Hynix HMCG94MEBRA123N 64 GB 2 rank 4800

  BIOS:
     BIOS Vendor:       HPE
     BIOS Version:      1.12
     BIOS Date:         11/24/2022
     BIOS Revision:     1.12
     Firmware Revision: 1.10

  (End of data from sysinfo program)
```

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
```

(Continued on next page)

Compiler Version Notes (Continued)

```
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`

Fortran benchmarks:
`flang`

Benchmarks using both Fortran and C:
`flang clang`

(Continued on next page)

Base Compiler Invocation (Continued)

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
-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

(Continued on next page)

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):
-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

Peak Compiler Invocation

C benchmarks:
clang

Fortran benchmarks:
flang

Benchmarks using both Fortran and C:
flang clang

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Peak Compiler Invocation (Continued)

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: -m64 -Wl,-mllvm -Wl,-region-vectorize -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

Fortran benchmarks:

603.bwaves_s: basepeak = yes

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

(Continued on next page)

Peak Optimization Flags (Continued)

649.fotonik3d_s (continued):
-lomp -lamdlibm -lamdalloc -lflang

654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf_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
-O3 -Mrecursive -funroll-loops -mllvm -lsr-in-nested-loop
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

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++:
-m64 -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 -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 -finline-aggressive -mllvm -unroll-threshold=100
-Mrecursive -fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

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`

The flags files that were used to format this result can be browsed at
`http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-Genoa-rev2.1.html`
`http://www.spec.org/cpu2017/flags/aocc400-flags.2023-02-15.html`

You can also download the XML flags sources by saving the following links:
`http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-Genoa-rev2.1.xml`
`http://www.spec.org/cpu2017/flags/aocc400-flags.2023-02-15.xml`

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