SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

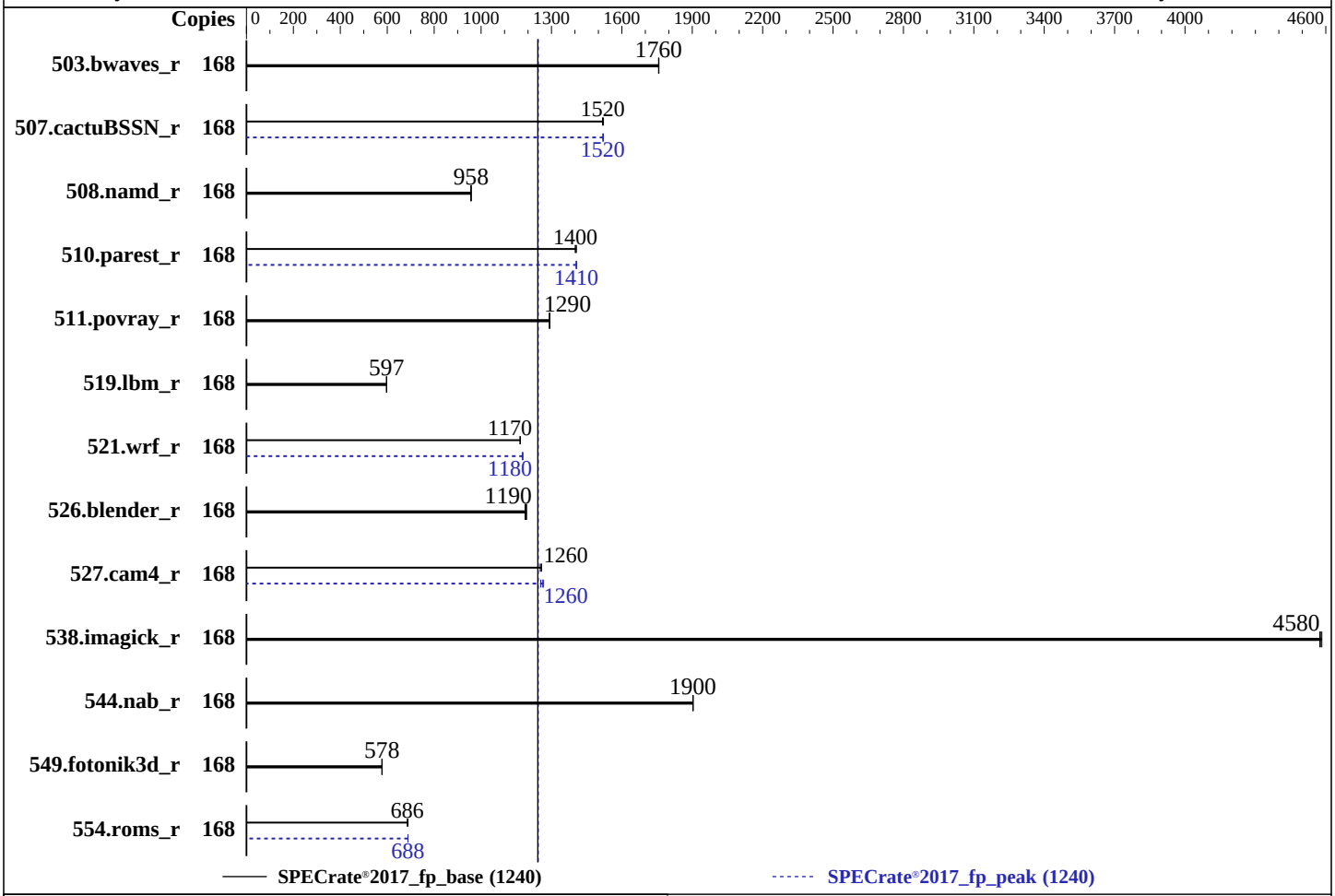
ProLiant DL365 Gen11
(2.25 GHz, AMD EPYC 9634)

SPECrate®2017_fp_base = 1240

SPECrate®2017_fp_peak = 1240

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

Test Date: Jan-2023
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:	No
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						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	168	958	1760	**959**	**1760**	959	1760	168	958	1760	**959**	**1760**	959	1760
507.cactuBSSN_r	168	**140**	**1520**	140	1520	140	1520	168	140	1520	**140**	**1520**	140	1520
508.namd_r	168	167	956	167	958	**167**	**958**	168	167	956	167	958	**167**	**958**
510.parest_r	168	312	1410	**313**	**1400**	314	1400	168	312	1410	**312**	**1410**	313	1400
511.povray_r	168	303	1290	304	1290	**304**	**1290**	168	303	1290	304	1290	**304**	**1290**
519.lbm_r	168	**296**	**597**	296	597	297	597	168	**296**	**597**	296	597	297	597
521.wrf_r	168	322	1170	323	1170	**323**	**1170**	168	**320**	**1180**	319	1180	320	1180
526.blender_r	168	215	1190	214	1190	**215**	**1190**	168	215	1190	214	1190	**215**	**1190**
527.cam4_r	168	**234**	**1260**	235	1250	234	1260	168	232	1270	**233**	**1260**	234	1250
538.imagick_r	168	**91.2**	**4580**	91.3	4570	91.2	4580	168	**91.2**	**4580**	91.3	4570	91.2	4580
544.nab_r	168	**149**	**1900**	149	1900	148	1900	168	**149**	**1900**	149	1900	148	1900
549.fotonik3d_r	168	1133	578	1133	578	**1133**	**578**	168	1133	578	1133	578	**1133**	**578**
554.roms_r	168	**389**	**686**	389	686	388	689	168	388	688	388	688	**388**	**688**

SPECrate®2017_fp_base = 1240

SPECrate®2017_fp_peak = 1240

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.
```

(Continued on next page)

Operating System Notes (Continued)

```
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.
```

Environment Variables Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
     "/home/cpu2017/amd_rate_aocc400_genoa_B_lib/lib:/home/cpu2017/amd_rate_a
     occ400_genoa_B_lib/lib32:"
MALLOC_CONF = "retain:true"
```

General Notes

```
Binaries were compiled on a system with 2x AMD EPYC 9174F CPU + 1.5TiB Memory using RHEL 8.6

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
is mitigated in the system as tested and documented.
```

Platform Notes

```
BIOS Configuration
 Workload Profile set to General Throughput 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
 NUMA memory domains per socket set to Four memory domains per socket
 ACPI CST C2 Latency set to 18 microseconds
 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
```

(Continued on next page)

Platform Notes (Continued)

```
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 Tue Jun 28 01:30:32 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
       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:                        4493.27
```

(Continued on next page)

Platform Notes (Continued)

```
Flags:                           fpu vme de pse tsc msr pae mce cx8 apic sep mtrr
pge mca cmov pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt
pdpe1gb rdtscp lm constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid
aperfmperf 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
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
```

(Continued on next page)

Platform Notes (Continued)

```
      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
     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: 63945 MB
    node 1 cpus: 28 29 30 31 32 33 34
    node 1 size: 64510 MB
    node 1 free: 64361 MB
    node 2 cpus: 56 57 58 59 60 61 62
    node 2 size: 64510 MB
    node 2 free: 64309 MB
    node 3 cpus: 14 15 16 17 18 19 20
    node 3 size: 64510 MB
    node 3 free: 64341 MB
    node 4 cpus: 42 43 44 45 46 47 48
    node 4 size: 64510 MB
    node 4 free: 64366 MB
    node 5 cpus: 70 71 72 73 74 75 76
    node 5 size: 64510 MB
    node 5 free: 64273 MB
    node 6 cpus: 21 22 23 24 25 26 27
    node 6 size: 64510 MB
    node 6 free: 64359 MB
```

(Continued on next page)

Platform Notes (Continued)

```
node 7 cpus: 49 50 51 52 53 54 55
node 7 size: 64510 MB
node 7 free: 64348 MB
node 8 cpus: 77 78 79 80 81 82 83
node 8 size: 64510 MB
node 8 free: 64374 MB
node 9 cpus: 7 8 9 10 11 12 13
node 9 size: 64510 MB
node 9 free: 64380 MB
node 10 cpus: 35 36 37 38 39 40 41
node 10 size: 64510 MB
node 10 free: 64389 MB
node 11 cpus: 63 64 65 66 67 68 69
node 11 size: 64510 MB
node 11 free: 64353 MB
node 12 cpus: 84 85 86 87 88 89 90
node 12 size: 64510 MB
node 12 free: 64393 MB
node 13 cpus: 112 113 114 115 116 117 118
node 13 size: 64510 MB
node 13 free: 64388 MB
node 14 cpus: 140 141 142 143 144 145 146
node 14 size: 64510 MB
node 14 free: 64398 MB
node 15 cpus: 98 99 100 101 102 103 104
node 15 size: 64510 MB
node 15 free: 64391 MB
node 16 cpus: 126 127 128 129 130 131 132
node 16 size: 64510 MB
node 16 free: 64394 MB
node 17 cpus: 154 155 156 157 158 159 160
node 17 size: 64510 MB
node 17 free: 64390 MB
node 18 cpus: 105 106 107 108 109 110 111
node 18 size: 64510 MB
node 18 free: 64399 MB
node 19 cpus: 133 134 135 136 137 138 139
node 19 size: 64510 MB
node 19 free: 64394 MB
node 20 cpus: 161 162 163 164 165 166 167
node 20 size: 64510 MB
node 20 free: 64391 MB
node 21 cpus: 91 92 93 94 95 96 97
node 21 size: 64510 MB
node 21 free: 64397 MB
node 22 cpus: 119 120 121 122 123 124 125
node 22 size: 64510 MB
```

(Continued on next page)

Platform Notes (Continued)

```
node 22 free: 64397 MB
node 23 cpus: 147 148 149 150 151 152 153
node 23 size: 64421 MB
node 23 free: 64283 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  12  12  12  12  12  12  12  12  12  32  32  32  32  32  32  32  32
  32  32  32  32
  1:  11  10  11  12  12  12  12  12  12  12  12  12  32  32  32  32  32  32  32  32
  32  32  32  32
  2:  11  11  10  12  12  12  12  12  12  12  12  12  32  32  32  32  32  32  32  32
  32  32  32  32
  3:  12  12  12  10  11  11  12  12  12  12  12  12  32  32  32  32  32  32  32  32
  32  32  32  32
  4:  12  12  12  11  10  11  12  12  12  12  12  12  32  32  32  32  32  32  32  32
  32  32  32  32
  5:  12  12  12  11  11  10  12  12  12  12  12  12  32  32  32  32  32  32  32  32
  32  32  32  32
  6:  12  12  12  12  12  12  10  11  11  12  12  12  32  32  32  32  32  32  32  32
  32  32  32  32
  7:  12  12  12  12  12  12  11  10  11  12  12  12  32  32  32  32  32  32  32  32
  32  32  32  32
  8:  12  12  12  12  12  12  11  11  10  12  12  12  32  32  32  32  32  32  32  32
  32  32  32  32
  9:  12  12  12  12  12  12  12  12  12  10  11  11  32  32  32  32  32  32  32  32
  32  32  32  32
 10:  12  12  12  12  12  12  12  12  12  12  11  10  11  32  32  32  32  32  32  32  32
 32  32  32  32
 11:  12  12  12  12  12  12  12  12  12  12  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  32  10  11  11  12  12  12  12  12
 12  12  12  12
 13:  32  32  32  32  32  32  32  32  32  32  32  32  32  11  10  11  12  12  12  12  12
 12  12  12  12
 14:  32  32  32  32  32  32  32  32  32  32  32  32  32  11  11  10  12  12  12  12  12
 12  12  12  12
 15:  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  10  11  11  12  12
 12  12  12  12
 16:  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  11  10  11  12  12
 12  12  12  12
 17:  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  11  11  10  12  12
 12  12  12  12
 18:  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  10  11
 11  12  12  12
 19:  32  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  11  10
 11  12  12  12
```

(Continued on next page)

Platform Notes (Continued)

```
    20:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  11  11
    10  12  12  12
    21:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12
    12  10  11  11
    22:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12
    12  11  10  11
    23:  32  32  32  32  32  32  32  32  32  32  32  32  12  12  12  12  12  12  12  12
    12  11  11  10

  From /proc/meminfo
     MemTotal:       1584992740 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
     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
```

(Continued on next page)

Platform Notes (Continued)

```
 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 28 00:00

 SPEC is set to: /home/cpu2017
    Filesystem                     Type  Size  Used Avail Use% Mounted on
    /dev/mapper/ubuntu--vg-ubuntu--lv ext4  437G   20G  399G   5% /

 From /sys/devices/virtual/dmi/id
     Vendor:         HPE
     Product:        ProLiant DL365 Gen11
     Product Family: ProLiant
     Serial:         DL365G11-003

 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:
     24x Hynix HMCG94AEBRA103N 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               | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
                | 544.nab_r(base, peak)
```

(Continued on next page)

Compiler Version Notes (Continued)

```
------------------------------------------------------------------------------
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++             | 508.namd_r(base, peak) 510.parest_r(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          | 511.povray_r(base, peak) 526.blender_r(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
------------------------------------------------------------------------------

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

(Continued on next page)

Compiler Version Notes (Continued)

```
  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          | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
                 | 554.roms_r(base, peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#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       | 521.wrf_r(base, peak) 527.cam4_r(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`

C++ benchmarks:
`clang++`

Fortran benchmarks:
`flang`

Benchmarks using both Fortran and C:
`flang clang`

(Continued on next page)

Base Compiler Invocation (Continued)

Benchmarks using both C and C++:
clang++ clang

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

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
526.blender_r: -funsigned-char -DSPEC_LP64
527.cam4_r: -DSPEC_CASE_FLAG -DSPEC_LP64
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather -O3
-march=znver4 -fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-zopt -lamdlibm -lamdalloc -lflang

C++ benchmarks:
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -mllvm -unroll-threshold=100
-finline-aggressive -mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lamdalloc
-lflang

(Continued on next page)

Base Optimization Flags (Continued)

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

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

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

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

Base Other Flags

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

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

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

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

Benchmarks using both C and C++:
`-Wno-unused-command-line-argument`

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

Peak Compiler Invocation

C benchmarks:
`clang`

C++ benchmarks:
`clang++`

Fortran benchmarks:
`flang`

Benchmarks using both Fortran and C:
`flang clang`

Benchmarks using both C and C++:
`clang++ clang`

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

Peak Portability Flags

`Same as Base Portability Flags`

Peak Optimization Flags

C benchmarks:

519.lbm_r: `basepeak = yes`

538.imagick_r: `basepeak = yes`

544.nab_r: `basepeak = yes`

C++ benchmarks:

508.namd_r: `basepeak = yes`

510.parest_r: `-m64 -flto -Wl,-mllvm -Wl,-suppress-fmas -Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math -finline-aggressive -mllvm -unroll-threshold=100 -mllvm -reduce-array-computations=3 -zopt -lamdlibm -lamdalloc`

Fortran benchmarks:

503.bwaves_r: `basepeak = yes`

549.fotonik3d_r: `basepeak = yes`

554.roms_r: `-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6 -Wl,-mllvm -Wl,-reduce-array-computations=3 -Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math -Mrecursive -mllvm -reduce-array-computations=3 -fepilog-vectorization-of-inductions -zopt -lamdlibm -lamdalloc -lflang`

Benchmarks using both Fortran and C:

521.wrf_r: `-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6 -Wl,-mllvm -Wl,-reduce-array-computations=3 -Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math -fstruct-layout=7 -mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining -mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3 -zopt -Mrecursive -fepilog-vectorization-of-inductions -lamdlibm -lamdalloc -lflang`

(Continued on next page)

Peak Optimization Flags (Continued)

527.cam4_r: `-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver4`
`-fveclib=AMDLIBM -ffast-math -fstruct-layout=7`
`-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000`
`-fremap-arrays -mllvm -reduce-array-computations=3 -zopt`
`-Kieee -Mrecursive -funroll-loops`
`-mllvm -lsr-in-nested-loop`
`-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc`
`-lflang`

Benchmarks using both C and C++:

511.povray_r: `basepeak = yes`

526.blender_r: `basepeak = yes`

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

Peak Other Flags

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

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

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

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

(Continued on next page)

Peak Other Flags (Continued)

Benchmarks using both C and C++:
`-Wno-unused-command-line-argument`

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

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

SPEC CPU and SPECrate are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU®2017 v1.1.8 on 2022-06-27 16:00:32-0400.
Report generated on 2023-03-02 11:21:40 by CPU2017 PS formatter v6442.
Originally published on 2023-02-28.