



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

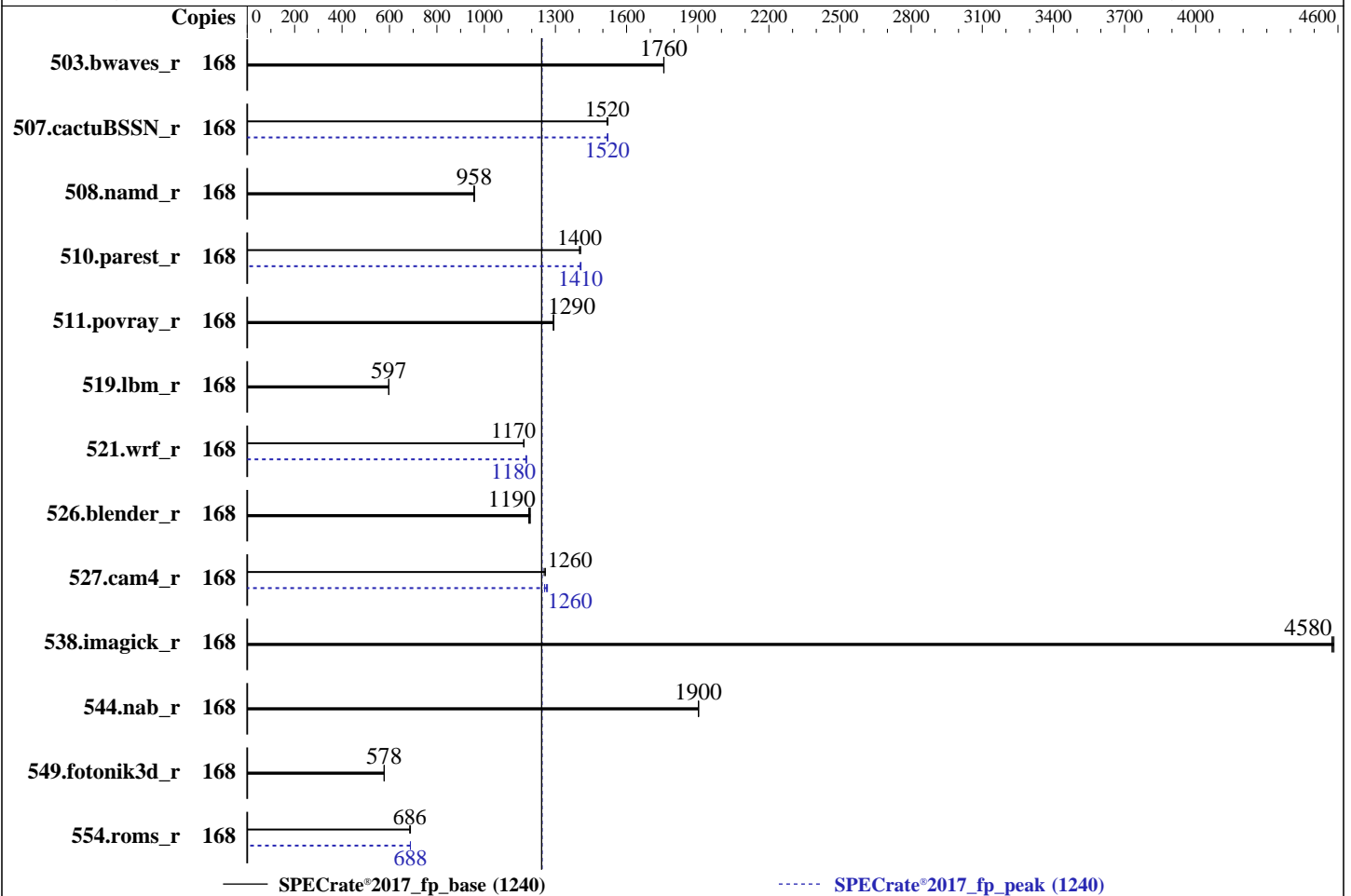
Test Sponsor: HPE

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



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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	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

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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

The AMD64 AOCC Compiler Suite is available at
<http://developer.amd.com/amd-aocc/>

Submit Notes

The config file option 'submit' was used.
'numactl' was used to bind copies to the cores.
See the configuration file for details.

Operating System Notes

'ulimit -s unlimited' was used to set environment stack size limit
'ulimit -l 2097152' was used to set environment locked pages in memory limit

runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

To limit dirty cache to 8% of memory, 'sysctl -w vm.dirty_ratio=8' run as root.
To limit swap usage to minimum necessary, 'sysctl -w vm.swappiness=1' run as root.
To free node-local memory and avoid remote memory usage,
'sysctl -w vm.zone_reclaim_mode=1' run as root.

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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_aocc400_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)



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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
```

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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 pdpelgb 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 fl6c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb bpxt 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 avx512v1 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_lld

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

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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, PBRSE-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

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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

```

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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 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 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 12 12 12 12 12
12 12 12 12
13: 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 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 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 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 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 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 12 12 12 12 12 12 11 10
11 12 12 12

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Platform Notes (Continued)

20:	32	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	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	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	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

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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, PBRSE-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 HMC94AEBRA103N 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)



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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)



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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

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)



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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

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

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
-freemap-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
-freemap-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
-freemap-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
```



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Software Availability: Nov-2022

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



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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

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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

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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>

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