



SPEC CPU®2017 Floating Point Speed Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL365 Gen11

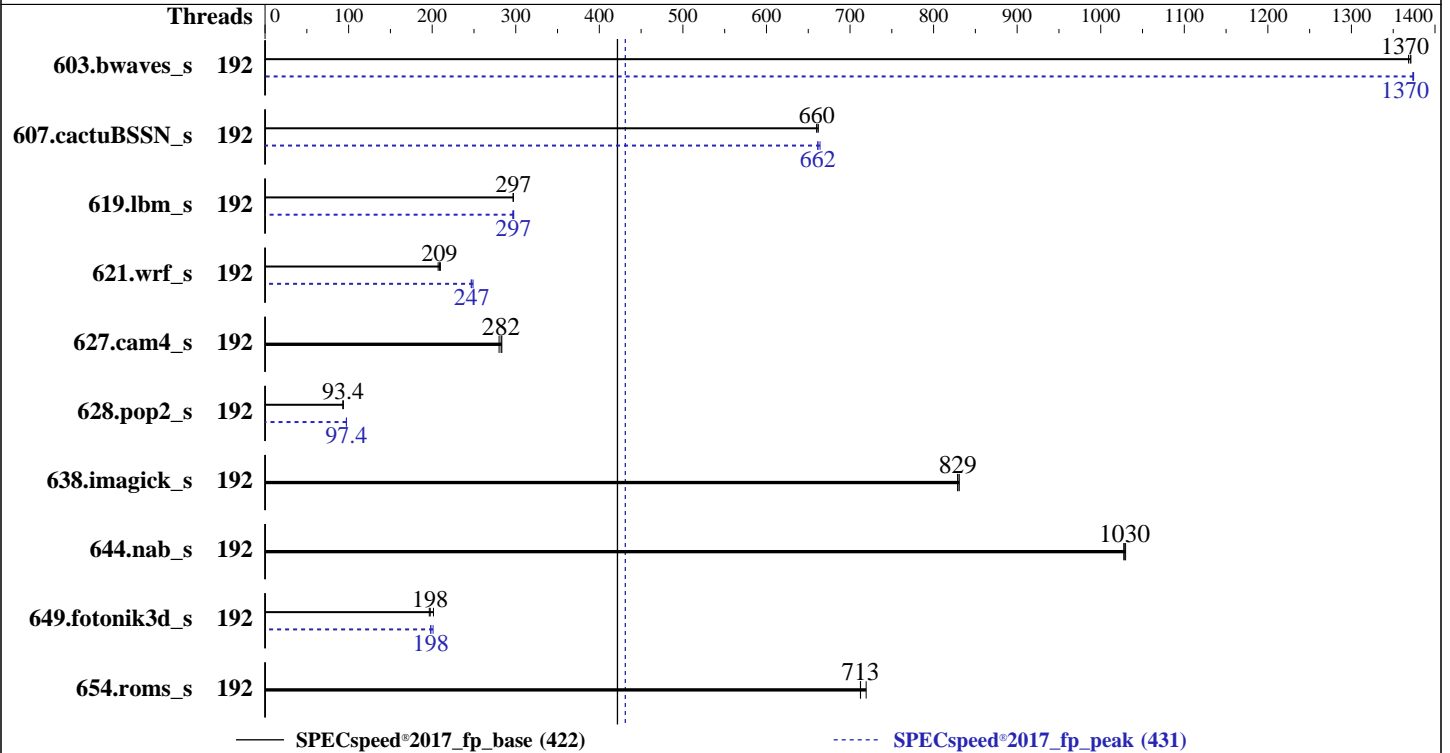
(2.40 GHz, AMD EPYC 9654)

SPECspeed®2017_fp_base = 422

SPECspeed®2017_fp_peak = 431

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

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



Hardware

CPU Name: AMD EPYC 9654
 Max MHz: 3700
 Nominal: 2400
 Enabled: 192 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 / 8 cores
 Other: None
 Memory: 768 GB (24 x 32 GB 2Rx8 PC5-4800B-R)
 Storage: 2 x 480 GB SATA SSD
 Other: None

Software

OS: Ubuntu 22.04.1 LTS
 Kernel 5.15.0-50-generic
 Compiler: C/C++/Fortran: Version 4.0.0 of AOCC
 Parallel: Yes
 Firmware: HPE BIOS Version v1.10 10/06/2022 released Oct-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						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	192	<u>43.1</u>	<u>1370</u>	43.1	1370	43.0	1370	192	42.9	1370	43.0	1370	<u>42.9</u>	<u>1370</u>
607.cactuBSSN_s	192	<u>25.2</u>	<u>660</u>	25.3	660	25.2	662	192	<u>25.2</u>	<u>662</u>	25.1	664	25.2	661
619.lbm_s	192	17.7	297	17.6	297	<u>17.6</u>	<u>297</u>	192	<u>17.6</u>	<u>297</u>	17.7	296	17.6	297
621.wrf_s	192	63.9	207	63.0	210	<u>63.4</u>	<u>209</u>	192	53.1	249	53.6	247	<u>53.5</u>	<u>247</u>
627.cam4_s	192	<u>31.4</u>	<u>282</u>	31.3	283	31.6	280	192	<u>31.4</u>	<u>282</u>	31.3	283	31.6	280
628.pop2_s	192	127	93.3	<u>127</u>	<u>93.4</u>	127	93.6	192	122	97.5	122	97.3	<u>122</u>	<u>97.4</u>
638.imagick_s	192	<u>17.4</u>	<u>829</u>	17.4	829	17.4	831	192	<u>17.4</u>	<u>829</u>	17.4	829	17.4	831
644.nab_s	192	17.0	1030	17.0	1030	<u>17.0</u>	<u>1030</u>	192	17.0	1030	17.0	1030	<u>17.0</u>	<u>1030</u>
649.fotonik3d_s	192	45.2	202	46.4	197	<u>46.1</u>	<u>198</u>	192	45.3	201	<u>45.9</u>	<u>198</u>	46.0	198
654.roms_s	192	21.9	719	22.1	712	<u>22.1</u>	<u>713</u>	192	21.9	719	22.1	712	<u>22.1</u>	<u>713</u>

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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.
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,

(Continued on next page)



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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 = "0-191"
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 = "192"
```

Environment variables set by runcpu during the 603.bwaves_s peak run:

```
GOMP_CPU_AFFINITY = "0-191"
```

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:

```
GOMP_CPU_AFFINITY = "0-191"
```

Environment variables set by runcpu during the 619.lbm_s peak run:

```
GOMP_CPU_AFFINITY = "0-191"
```

Environment variables set by runcpu during the 621.wrf_s peak run:

```
GOMP_CPU_AFFINITY = "0-191"
```

Environment variables set by runcpu during the 628.pop2_s peak run:

```
GOMP_CPU_AFFINITY = "0-191"
```

Environment variables set by runcpu during the 649.fotonik3d_s peak run:

```
GOMP_CPU_AFFINITY = "0-191"
PGHPPF_ZMEM = "yes"
```



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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

The system ROM used for this result contains microcode version 0xa10110d for the AMD EPYC 9nn4X family of processors. The reference code/AGESA version used in this ROM is version GenoaPI 1.0.0.1-L2

Sysinfo program /home/CPU2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on admin1 Fri Oct 21 03:03:15 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 9654 96-Core Processor
 2 "physical id"s (chips)
192 "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 : 96
siblings  : 96
physical 0: cores 0 1 2 3 4 5 6 7 16 17 18 19 20 21 22 23 32 33 34 35 36 37 38 39
48 49 50 51 52 53 54 55 64 65 66 67 68 69 70 71 80 81 82 83 84 85 86 87 96 97 98 99
100 101 102 103 112 113 114 115 116 117 118 119 128 129 130 131 132 133 134 135 144
145 146 147 148 149 150 151 160 161 162 163 164 165 166 167 176 177 178 179 180 181
```

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Platform Notes (Continued)

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physical 1: cores 0 1 2 3 4 5 6 7 16 17 18 19 20 21 22 23 32 33 34 35 36 37 38 39
48 49 50 51 52 53 54 55 64 65 66 67 68 69 70 71 80 81 82 83 84 85 86 87 96 97 98 99
100 101 102 103 112 113 114 115 116 117 118 119 128 129 130 131 132 133 134 135 144
145 146 147 148 149 150 151 160 161 162 163 164 165 166 167 176 177 178 179 180 181
182 183

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): 192
On-line CPU(s) list: 0-191
Vendor ID: AuthenticAMD
Model name: AMD EPYC 9654 96-Core Processor
CPU family: 25
Model: 17
Thread(s) per core: 1
Core(s) per socket: 96
Socket(s): 2
Stepping: 1
Frequency boost: enabled
CPU max MHz: 3709.0000
CPU min MHz: 400.0000
BogoMIPS: 4792.93
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
aperfmpperf 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_lld
Virtualization: AMD-V
L1d cache: 6 MiB (192 instances)
L1i cache: 6 MiB (192 instances)
L2 cache: 192 MiB (192 instances)
L3 cache: 768 MiB (24 instances)
NUMA node(s): 24

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Platform Notes (Continued)

```

NUMA node0 CPU(s):          0-7
NUMA node1 CPU(s):          8-15
NUMA node2 CPU(s):          16-23
NUMA node3 CPU(s):          24-31
NUMA node4 CPU(s):          32-39
NUMA node5 CPU(s):          40-47
NUMA node6 CPU(s):          48-55
NUMA node7 CPU(s):          56-63
NUMA node8 CPU(s):          64-71
NUMA node9 CPU(s):          72-79
NUMA node10 CPU(s):         80-87
NUMA node11 CPU(s):         88-95
NUMA node12 CPU(s):         96-103
NUMA node13 CPU(s):         104-111
NUMA node14 CPU(s):         112-119
NUMA node15 CPU(s):         120-127
NUMA node16 CPU(s):         128-135
NUMA node17 CPU(s):         136-143
NUMA node18 CPU(s):         144-151
NUMA node19 CPU(s):         152-159
NUMA node20 CPU(s):         160-167
NUMA node21 CPU(s):         168-175
NUMA node22 CPU(s):         176-183
NUMA node23 CPU(s):         184-191
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, 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	6M	8	Data	1	64	1	64
L1i	32K	6M	8	Instruction	1	64	1	64
L2	1M	192M	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 7

node 0 size: 31943 MB

node 0 free: 31754 MB

node 1 cpus: 8 9 10 11 12 13 14 15

node 1 size: 32253 MB

node 1 free: 32112 MB

node 2 cpus: 16 17 18 19 20 21 22 23

node 2 size: 32253 MB

node 2 free: 32096 MB

node 3 cpus: 24 25 26 27 28 29 30 31

node 3 size: 32253 MB

node 3 free: 32025 MB

node 4 cpus: 32 33 34 35 36 37 38 39

node 4 size: 32253 MB

node 4 free: 32059 MB

node 5 cpus: 40 41 42 43 44 45 46 47

node 5 size: 32253 MB

node 5 free: 32073 MB

node 6 cpus: 48 49 50 51 52 53 54 55

node 6 size: 32253 MB

node 6 free: 32059 MB

node 7 cpus: 56 57 58 59 60 61 62 63

node 7 size: 32253 MB

node 7 free: 32070 MB

node 8 cpus: 64 65 66 67 68 69 70 71

node 8 size: 32253 MB

node 8 free: 32116 MB

node 9 cpus: 72 73 74 75 76 77 78 79

node 9 size: 32253 MB

node 9 free: 32099 MB

node 10 cpus: 80 81 82 83 84 85 86 87

node 10 size: 32253 MB

node 10 free: 32107 MB

node 11 cpus: 88 89 90 91 92 93 94 95

node 11 size: 32253 MB

node 11 free: 32080 MB

node 12 cpus: 96 97 98 99 100 101 102 103

node 12 size: 32253 MB

node 12 free: 32131 MB

node 13 cpus: 104 105 106 107 108 109 110 111

node 13 size: 32253 MB

node 13 free: 32134 MB

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Platform Notes (Continued)

```

node 14 cpus: 112 113 114 115 116 117 118 119
node 14 size: 32253 MB
node 14 free: 32123 MB
node 15 cpus: 120 121 122 123 124 125 126 127
node 15 size: 32218 MB
node 15 free: 32094 MB
node 16 cpus: 128 129 130 131 132 133 134 135
node 16 size: 32253 MB
node 16 free: 32122 MB
node 17 cpus: 136 137 138 139 140 141 142 143
node 17 size: 32253 MB
node 17 free: 32096 MB
node 18 cpus: 144 145 146 147 148 149 150 151
node 18 size: 32253 MB
node 18 free: 32122 MB
node 19 cpus: 152 153 154 155 156 157 158 159
node 19 size: 32253 MB
node 19 free: 32134 MB
node 20 cpus: 160 161 162 163 164 165 166 167
node 20 size: 32253 MB
node 20 free: 32129 MB
node 21 cpus: 168 169 170 171 172 173 174 175
node 21 size: 32253 MB
node 21 free: 32127 MB
node 22 cpus: 176 177 178 179 180 181 182 183
node 22 size: 32253 MB
node 22 free: 32123 MB
node 23 cpus: 184 185 186 187 188 189 190 191
node 23 size: 32200 MB
node 23 free: 32063 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  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  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  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  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  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  11  11  11  11  11
11  11  11  11
13: 32  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  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  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  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  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  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  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  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  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  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  32  11  11  11  11  11  11  11  11
11  11  11  10

```

```

From /proc/meminfo
MemTotal:      792263924 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

```

/sbin/tuned-adm active
Current active profile: balanced

```

```

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

```

```

/usr/bin/lsb_release -d

```

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(2.40 GHz, AMD EPYC 9654)

SPECspeed®2017_fp_base = 422

SPECspeed®2017_fp_peak = 431

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

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

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 5.15.0-50-generic #56-Ubuntu SMP Tue Sep 20 13:23:26 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, 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 Oct 21 02:56

```
SPEC is set to: /home/CPU2017
Filesystem                Type      Size  Used Avail Use% Mounted on
/dev/mapper/ubuntu--vg-ubuntu--lv ext4      437G   75G  343G  18% /
```

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

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Platform Notes (Continued)

Product: ProLiant DL365 Gen11
Product Family: ProLiant
Serial: DL365G11-001

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 HMC88MEBRA113N 32 GB 2 rank 4800

BIOS:
BIOS Vendor: HPE
BIOS Version: 1.10
BIOS Date: 10/06/2022
BIOS Revision: 1.10
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
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin

(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

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)



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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

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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: -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
-freemap-arrays -fstrip-mining
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang
```

638.imagick_s: basepeak = yes

644.nab_s: basepeak = yes

Fortran benchmarks:

```
603.bwaves_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP
-Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math
-fopenmp -Mrecursive -mllvm -reduce-array-computations=3
-fvector-transform -fscalar-transform -fopenmp=libomp
-lomp -lamdlibm -lamdalloc -lflang
```

```
649.fotonik3d_s: -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP
-Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math
-fopenmp -flto -Mrecursive
-mllvm -reduce-array-computations=3 -zopt -fopenmp=libomp
```

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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



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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-rev2.0.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-rev2.0.xml>

<http://www.spec.org/cpu2017/flags/aocc400-flags.xml>

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