## SPEC CPU®2017 Floating Point Speed Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL365 Gen10 Plus  
(2.75 GHz, AMD EPYC 7453)  

**SPECspeed®2017_fp_base = 185**  
**SPECspeed®2017_fp_peak = 189**

### Hardware

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Jun-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>HPE</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Jun-2021</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Mar-2021</td>
</tr>
</tbody>
</table>

| Threads | 0 | 30.0 | 60.0 | 90.0 | 120 | 150 | 180 | 210 | 240 | 270 | 300 | 330 | 360 | 390 | 420 | 450 | 480 | 510 | 540 | 570 | 600 | 630 | 660 | 690 | 720 |
|----------|---|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 603.bwaves_s | 56 | 119  | 112  | 145  | 140 | 145 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 607.cactuBSSN_s | 56 | 262  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 619.lbm_s | 56 | 318  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 621.wrf_s | 56 | 369  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 627.cam4_s | 56 | 417  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 628.pop2_s | 56 | 106  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 638.imagick_s | 56 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 644.nab_s | 56 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 649.fotonik3d_s | 56 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 654.roms_s | 56 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |

### Software

<table>
<thead>
<tr>
<th>OS:</th>
<th>Ubuntu 20.04.1 LTS (x86_64)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kernel:</td>
<td>5.4.0-56-generic</td>
</tr>
<tr>
<td>Compiler:</td>
<td>C/C++/Fortran: Version 3.0.0 of AOCC</td>
</tr>
<tr>
<td>Parallel:</td>
<td>Yes</td>
</tr>
<tr>
<td>Firmware:</td>
<td>HPE BIOS Version A42 v2.42 04/29/2021 released Apr-2021</td>
</tr>
<tr>
<td>File System:</td>
<td>ext4</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 5 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Power Management:</td>
<td>BIOS set to prefer performance at the cost of additional power usage</td>
</tr>
<tr>
<td>Other:</td>
<td>jemalloc; jemalloc memory allocator library v5.1.0</td>
</tr>
</tbody>
</table>

### CPU2017 License:

| 3 |

### Test Date:

| Jun-2021 |

### Tested by:

| HPE |

### Hardware Availability:

| Jun-2021 |

### Software Availability:

| Mar-2021 |
# SPEC CPU®2017 Floating Point Speed Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL365 Gen10 Plus  
(2.75 GHz, AMD EPYC 7453)

**SPECspeed®2017_fp_base = 185**  
**SPECspeed®2017_fp_peak = 189**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>56</td>
<td>96.3</td>
<td>613</td>
<td>96.6</td>
<td>611</td>
<td>96.7</td>
<td>610</td>
<td>56</td>
<td>96.3</td>
<td>613</td>
<td>96.6</td>
<td>611</td>
<td>96.7</td>
<td>610</td>
<td></td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>56</td>
<td>53.0</td>
<td>315</td>
<td>52.4</td>
<td>318</td>
<td>52.3</td>
<td>319</td>
<td>56</td>
<td>53.0</td>
<td>315</td>
<td>52.4</td>
<td>318</td>
<td>52.3</td>
<td>319</td>
<td></td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>56</td>
<td>43.4</td>
<td>121</td>
<td>44.0</td>
<td>119</td>
<td>45.1</td>
<td>116</td>
<td>112</td>
<td>44.0</td>
<td>119</td>
<td>44.0</td>
<td>119</td>
<td>46.7</td>
<td>112</td>
<td></td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>56</td>
<td>91.2</td>
<td>145</td>
<td>91.5</td>
<td>144</td>
<td>90.9</td>
<td>146</td>
<td>56</td>
<td>91.2</td>
<td>145</td>
<td>91.5</td>
<td>144</td>
<td>90.9</td>
<td>146</td>
<td></td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>56</td>
<td>63.1</td>
<td>140</td>
<td>63.4</td>
<td>140</td>
<td>63.2</td>
<td>140</td>
<td>112</td>
<td>61.2</td>
<td>145</td>
<td>61.1</td>
<td>145</td>
<td>61.4</td>
<td>144</td>
<td></td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>56</td>
<td>227</td>
<td>52.3</td>
<td>228</td>
<td>52.1</td>
<td>228</td>
<td>52.0</td>
<td>56</td>
<td>227</td>
<td>52.3</td>
<td>228</td>
<td>52.1</td>
<td>228</td>
<td>52.0</td>
<td></td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>56</td>
<td>55.1</td>
<td>262</td>
<td>55.2</td>
<td>261</td>
<td>55.2</td>
<td>262</td>
<td>56</td>
<td>55.1</td>
<td>262</td>
<td>55.2</td>
<td>261</td>
<td>55.2</td>
<td>262</td>
<td></td>
</tr>
<tr>
<td>644.nab_s</td>
<td>56</td>
<td>47.2</td>
<td>370</td>
<td>47.3</td>
<td>369</td>
<td>47.5</td>
<td>368</td>
<td>112</td>
<td>42.0</td>
<td>416</td>
<td>41.9</td>
<td>417</td>
<td>41.9</td>
<td>417</td>
<td></td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>56</td>
<td>85.6</td>
<td>106</td>
<td>86.0</td>
<td>106</td>
<td>86.0</td>
<td>106</td>
<td>56</td>
<td>85.6</td>
<td>106</td>
<td>86.0</td>
<td>106</td>
<td>86.0</td>
<td>106</td>
<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>56</td>
<td>85.5</td>
<td>184</td>
<td>85.5</td>
<td>184</td>
<td>86.7</td>
<td>182</td>
<td>56</td>
<td>80.7</td>
<td>195</td>
<td>80.8</td>
<td>195</td>
<td>81.8</td>
<td>193</td>
<td></td>
</tr>
</tbody>
</table>

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  
'ulimit -1 2097152' was used to set environment locked pages in memory limit

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

'echo 8 > /proc/sys/vm/dirty_ratio' run as root to limit dirty cache to 8% of memory.  
'echo 1 > /proc/sys/vm/swappiness' run as root to limit swap usage to minimum necessary.  
'echo 1 > /proc/sys/vm/zone_reclaim_mode' run as root to free node-local memory and avoid remote memory usage.  
'sync; echo 3 > /proc/sys/vm/drop_caches' run as root to reset filesystem caches.  
'sysctl -w kernel.randomize_va_space=0' run as root to disable address space layout randomization (ASLR) to reduce run-to-run variability.

(Continued on next page)
Operating System Notes (Continued)

To enable Transparent Hugepages (THP) for all allocations, 'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and 'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.
To enable THP only on request for peak runs of 628.pop2_s, and 638.imagick_s, 'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root.
To disable THP for peak runs of 627.cam4_s, 644.nab_s, 649.fotonik3d_s, and 654.roms_s, 'echo never > /sys/kernel/mm/transparent_hugepage/enabled' run as root.

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-111"
LD_LIBRARY_PATH = 
"/home/SPEC_CPU2017/amd_speed_aocc300_milan_B_lib/64;/home/SPEC_CPU2017/ amd_speed_aocc300_milan_B_lib/32:"
MALLOC_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "112"

Environment variables set by runcpu during the 619.lbm_s peak run:
GOMP_CPU_AFFINITY = "0 56 1 57 2 58 3 59 4 60 5 61 6 62 7 63 8 64 9 65 10 66
11 67 12 68 13 69 14 70 15 71 16 72 17 73 18 74 19 75 20 76 21 77 22 78
23 79 24 80 25 81 26 82 27 83 28 84 29 85 30 86 31 87 32 88 33 89 34 90
35 91 36 92 37 93 38 94 39 95 40 96 41 97 42 98 43 99 44 100 45 101 46
102 47 103 48 104 49 105 50 106 51 107 52 108 53 109 54 110 55 111"

Environment variables set by runcpu during the 627.cam4_s peak run:
GOMP_CPU_AFFINITY = "0 56 1 57 2 58 3 59 4 60 5 61 6 62 7 63 8 64 9 65 10 66
11 67 12 68 13 69 14 70 15 71 16 72 17 73 18 74 19 75 20 76 21 77 22 78
23 79 24 80 25 81 26 82 27 83 28 84 29 85 30 86 31 87 32 88 33 89 34 90
35 91 36 92 37 93 38 94 39 95 40 96 41 97 42 98 43 99 44 100 45 101 46
102 47 103 48 104 49 105 50 106 51 107 52 108 53 109 54 110 55 111"

Environment variables set by runcpu during the 644.nab_s peak run:
GOMP_CPU_AFFINITY = "0 56 1 57 2 58 3 59 4 60 5 61 6 62 7 63 8 64 9 65 10 66
11 67 12 68 13 69 14 70 15 71 16 72 17 73 18 74 19 75 20 76 21 77 22 78
23 79 24 80 25 81 26 82 27 83 28 84 29 85 30 86 31 87 32 88 33 89 34 90
35 91 36 92 37 93 38 94 39 95 40 96 41 97 42 98 43 99 44 100 45 101 46
102 47 103 48 104 49 105 50 106 51 107 52 108 53 109 54 110 55 111"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0-55"
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL365 Gen10 Plus
(2.75 GHz, AMD EPYC 7453)

General Notes

Binaries were compiled on a system with 2x AMD EPYC 7742 CPU + 1TiB Memory using openSUSE 15.2

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.

jemalloc: configured and built with GCC v4.8.2 in RHEL 7.4 (No options specified)
jemalloc 5.1.0 is available here:
hittp://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2

Submitted by: "Bhatnagar, Prateek" <prateek.bhatnagar@hpe.com>
Submitted: Mon Jun 21 10:16:41 EDT 2021
Submission: cpu2017-20210621-27517.sub

Platform Notes

BIOS Configuration
Workload Profile set to General Peak Frequency Compute
Determinism Control set to Manual
Performance Determinism set to Power Deterministic
Last-Level Cache (LLC) as NUMA Node set to Enabled
NUMA memory domains per socket set to One memory domain per socket
Thermal Configuration set to Maximum Cooling
Infinity Fabric Power Management set to Disabled
Infinity Fabric Performance State set to P0
Workload Profile set to Custom
Power Regulator set to OS Control Mode

Sysinfo program /home/SPEC_CPU2017/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on admin Wed Apr  1 17:29:36 2020

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 7453 28-Core Processor
  2 "physical id"s (chips)
  112 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)

(Continued on next page)
SPEC CPU®2017 Floating Point Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL365 Gen10 Plus
(2.75 GHz, AMD EPYC 7453)

SPECspeed®2017_fp_base = 185
SPECspeed®2017_fp_peak = 189

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

Hardware Availability: Jun-2021
Software Availability: Mar-2021

Platform Notes (Continued)

cpu cores : 28
siblings : 56
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 48 bits physical, 48 bits virtual
CPU(s): 112
On-line CPU(s) list: 0-111
Thread(s) per core: 2
Core(s) per socket: 28
Socket(s): 2
NUMA node(s): 8
Vendor ID: AuthenticAMD
CPU family: 25
Model: 1
Model name: AMD EPYC 7453 28-Core Processor
Stepping: 1
CPU MHz: 2350.735
BogoMIPS: 5489.56
Virtualization: AMD-V
L1d cache: 1.8 MiB
L1i cache: 1.8 MiB
L2 cache: 28 MiB
L3 cache: 128 MiB
NUMA node0 CPU(s): 0-6,56-62
NUMA node1 CPU(s): 7-13,63-69
NUMA node2 CPU(s): 14-20,70-76
NUMA node3 CPU(s): 21-27,77-83
NUMA node4 CPU(s): 28-34,84-90
NUMA node5 CPU(s): 35-41,91-97
NUMA node6 CPU(s): 42-48,98-104
NUMA node7 CPU(s): 49-55,105-111
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: 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; Full AMD retpoline, IBPB conditional,

(Continued on next page)
SPEC CPU®2017 Floating Point Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL365 Gen10 Plus
(2.75 GHz, AMD EPYC 7453)

SPECspeed®2017_fp_base = 185
SPECspeed®2017_fp_peak = 189

Platform Notes (Continued)

IBRS_FW, STIBP always-on, RSB filling
Vulnerability Srbds: Not affected
Vulnerability Tsx async abort: Not affected
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
aperfmpref perfclmulqdq monitor ssse3 fma cx16 pclid sse4_1 sse4_2 movbe popcnt aes
xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a
misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb
bpext perfctr_llc mwai tx cpb cat_l3 cd p_l3 invp ci d_s l e e hw_pstate ssbd mba
ibrs ibpb stibp vmmcall fsq gbase bmi1 avx2 smep bni2 invpcid cqm rdt_a rds ead adx
clflushopt clwb sha_ni xsav eopt xsave xget bvl xsave vgs c mm llc cqm oc cup_llc
cqm mbm total cqm mbm local clzero iperf xsav epr wbnoinvd arat npt lb rv svm_lock
nrip_save tsc_scale vmb c clean flushbyasid decodeassist s pausefilter pfthreshold
v_vm saves vmload vgif umip pk u ospke vae s vpclmulqdq rdpid ov erfl ow_re co v succor
smca

/proc/cpuinfo cache data
    cache size: 512 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
    physical chip.
    available: 8 nodes (0-7)
    node 0 cpus: 0 1 2 3 4 5 6 56 57 58 59 60 61 62
    node 0 size: 257797 MB
    node 0 free: 257516 MB
    node 1 cpus: 7 8 9 10 11 12 13 63 64 65 66 67 68 69
    node 1 size: 258044 MB
    node 1 free: 257820 MB
    node 2 cpus: 14 15 16 17 18 19 20 70 71 72 73 74 75 76
    node 2 size: 258044 MB
    node 2 free: 257825 MB
    node 3 cpus: 21 22 23 24 25 26 27 77 78 79 80 81 82 83
    node 3 size: 245933 MB
    node 3 free: 245710 MB
    node 4 cpus: 28 29 30 31 32 33 34 84 85 86 87 88 89 90
    node 4 size: 258044 MB
    node 4 free: 257823 MB
    node 5 cpus: 35 36 37 38 39 40 41 91 92 93 94 95 96 97
    node 5 size: 258044 MB
    node 5 free: 257637 MB
    node 6 cpus: 42 43 44 45 46 47 48 98 99 100 101 102 103 104
    node 6 size: 258020 MB
    node 6 free: 257731 MB
    node 7 cpus: 49 50 51 52 53 54 55 105 106 107 108 110 111
    node 7 size: 258041 MB
    node 7 free: 257852 MB
    node distances:
### Platform Notes (Continued)

<table>
<thead>
<tr>
<th>node</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>0:</td>
<td>10</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>1:</td>
<td>11</td>
<td>10</td>
<td>11</td>
<td>11</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>2:</td>
<td>11</td>
<td>11</td>
<td>10</td>
<td>11</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>3:</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>10</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>4:</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>10</td>
<td>11</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>5:</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>11</td>
<td>10</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>6:</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>11</td>
<td>11</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>7:</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>10</td>
</tr>
</tbody>
</table>

From /proc/meminfo:

- MemTotal: 2101220084 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

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

/usr/bin/lsb_release -d
- Ubuntu 20.04.1 LTS

From /etc/*release* /etc/*version*:
- debian_version: bullseye/sid
- os-release:
  - NAME="Ubuntu"
  - VERSION="20.04.1 LTS (Focal Fossa)"
  - ID=ubuntu
  - ID_LIKE=debian
  - PRETTY_NAME="Ubuntu 20.04.1 LTS"
  - VERSION_ID="20.04"
  - HOME_URL="https://www.ubuntu.com/"
  - SUPPORT_URL="https://help.ubuntu.com/"

uname -a:
- Linux admin 5.4.0-56-generic #62-Ubuntu SMP Mon Nov 23 19:20:19 UTC 2020 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
- CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
- CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swapgs

(Continued on next page)
Platform Notes (Continued)

barriers and __user pointer sanitization
Mitigation: Full AMD retpoline,
IBPB: conditional, IBRS_FW, STIBP: always-on, RSB filling
CVE-2017-5715 (Spectre variant 2):
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 5 Apr 1 17:24

SPEC is set to: /home/SPEC_CPU2017

Filesystem                        Type  Size  Used Avail Use% Mounted on
/dev/mapper/ubuntu--vg-ubuntu--lv ext4  196G   42G  145G  23% /

From /sys/devices/virtual/dmi/id
Vendor:         HPE
Product:        ProLiant DL365 Gen10 Plus
Product Family: ProLiant
Serial:         CN70430NKR

Additional information from dmidecode 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:
16x Samsung M386AAG40AM3-CWE 128 GB 4 rank 3200
16x UNKNOWN NOT AVAILABLE

BIOS:
BIOS Vendor:       HPE
BIOS Version:      A42
BIOS Date:         04/29/2021
BIOS Revision:     2.42
Firmware Revision: 2.42

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
| 619.lbm_s(base, peak) 638.imagick_s(base, peak) |
| 644.nab_s(base, peak) |
==============================================================================
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu

(Continued on next page)
Compiler Version Notes (Continued)

Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

------------------------------------------
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
------------------------------------------
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

------------------------------------------
Fortran         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
| 654.roms_s(base, peak)
------------------------------------------
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

------------------------------------------
Fortran, C      | 621.wrf_s(base, peak) 627.cam4_s(base, peak)
| 628.pop2_s(base, peak)
------------------------------------------
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

(Continued on next page)
**SPEC CPU®2017 Floating Point Speed Result**

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL365 Gen10 Plus  
(2.75 GHz, AMD EPYC 7453)

| SPECspeed®2017_fp_base = 185 |
| SPECspeed®2017_fp_peak = 189 |

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

**Test Date:** Jun-2021  
**Hardware Availability:** Jun-2021  
**Software Availability:** Mar-2021

**Compiler Version Notes (Continued)**

Thread model: posix  
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

**Base Compiler Invocation**

C benchmarks:  
clang

Fortran benchmarks:  
flang

Benchmarks using both Fortran and C:  
flang clang

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

**Base Portability Flags**

603.bwaves_s: -DSPEC_LP64  
607.cactuBSSN_s: -DSPEC_LP64  
619.lbm_s: -DSPEC_LP64  
621.wrf_s: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64  
627.cam4_s: -DSPEC_CASE_FLAG -DSPEC_LP64  
628.pop2_s: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64  
638.imagick_s: -DSPEC_LP64  
644.nab_s: -DSPEC_LP64  
649.fotonik3d_s: -DSPEC_LP64  
654.roms_s: -DSPEC_LP64

**Base Optimization Flags**

C benchmarks:  
-m64 -mno-adx -mno-sse4a -W1,-mllvm -W1,-region-vectorize  
-W1,-mllvm -W1,-function-specialize  
-W1,-mllvm -W1,-align-all-nofallthru-blocks=6  
-W1,-mllvm -W1,-reduce-array-computations=3 -03 -march=znver3  
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5  
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000  
-fremap-arrays -mllvm -function-specialize -flv-function-specialization

(Continued on next page)
Hewlett Packard Enterprise
ProLiant DL365 Gen10 Plus
(2.75 GHz, AMD EPYC 7453)

SPECspeed®2017_fp_base = 185
SPECspeed®2017_fp_peak = 189

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

Test Date: Jun-2021
Hardware Availability: Jun-2021
Software Availability: Mar-2021

Base Optimization Flags (Continued)

C benchmarks (continued):
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
-mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3 -z muldefs
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
-llvm -llang -llangrti

Fortran benchmarks:
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-licm-vrp -Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallback-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -H,1,0x1 -O3
-march=znver3 -fveclib=AMDLIBM -ffast-math -Mrecursive
-mllvm -fuse-tile-inner-loop -funroll-loops
-mllvm -extra-vectorizer-passes -mllvm -lsr-in-nested-loop
-mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true -z muldefs -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -llang -llangrti

Benchmarks using both Fortran and C:
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-licm-vrp -Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallback-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-freemap-arrays -mllvm -function-specialize -fiv-function-specialization
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
-mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3 -H,1,0x1
-Mrecursive -mllvm -fuse-tile-inner-loop -funroll-loops
-mllvm -extra-vectorizer-passes -mllvm -lsr-in-nested-loop -z muldefs
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
-llvm -llang -llangrti

Benchmarks using Fortran, C, and C++:
-m64 -mno-adx -mno-sse4a -std=c++98
-llvm -x86-use-vzeroupper=false
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallback-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-freemap-arrays -mllvm -function-specialize -fiv-function-specialization
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
-mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3

(Continued on next page)
## Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
- `-mllvm -enable-partial-unswitch -mllvm -unroll-threshold=100`
- `-finline-aggressive -mllvm -loop-unswitch-threshold=200000`
- `-mllvm -reroll-loops -mllvm -aggressive-loop-unswitch`
- `-mllvm -extra-vectorizer-passes -mllvm -convert-pow-exp-to-int=false`
- `-Hz,1,0x1 -Mrecursive -mllvm -fuse-tile-inner-loop -funroll-loops`
- `-mllvm -lsr-in-nested-loop -z muldefs -DSPEC_OPENMP -fopenmp`
- `-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang -lflangrti`

## Base Other Flags

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

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

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

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

## Peak Compiler Invocation

C benchmarks:
- `clang`

Fortran benchmarks:
- `flang`

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

Benchmarks using Fortran, C, and C++:
- `clang++ clang flang`
**SPEC CPU®2017 Floating Point Speed Result**

**Hewlett Packard Enterprise**

*(Test Sponsor: HPE)*

ProLiant DL365 Gen10 Plus

*(2.75 GHz, AMD EPYC 7453)*

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base = 185</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak = 189</td>
</tr>
</tbody>
</table>

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

---

**Peak Portability Flags**

Same as Base Portability Flags

---

**Peak Optimization Flags**

**C benchmarks:**

619.lbm_s: -m64 -mno-adx -mno-sse4a  
-W1,-mllvm -W1,-function-specialize  
-W1,-mllvm -W1,-align-all-nofallthru-blocks=6  
-W1,-mllvm -W1,-reduce-array-computations=3 -Ofast  
-march=znver3 -fveclib=AMDLIBM -ffast-math -flto  
-fstruct-layout=5 -mllvm -unroll-threshold=50  
-fremap-arrays -flv-function-specialization  
-mllvm -inline-threshold=1000 -mllvm -enable-gvn-hoist  
-mllvm -global-vectorize-slp=true  
-mllvm -function-specialize -mllvm -enable-licm-vrp  
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -fopenmp  
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang

638.imagick_s: basepeak = yes

644.nab_s: -m64 -mno-adx -mno-sse4a -W1,-mllvm -W1,-region-vectorize  
-W1,-mllvm -W1,-function-specialize -Ofast -march=znver3  
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5  
-mllvm -unroll-threshold=50 -fremap-arrays  
-flv-function-specialization -mllvm -inline-threshold=1000  
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true  
-mllvm -function-specialize -mllvm -enable-licm-vrp  
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -fopenmp  
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang

**Fortran benchmarks:**

603.bwaves_s: basepeak = yes

649.fotonik3d_s: basepeak = yes

654.roms_s: -m64 -mno-adx -mno-sse4a  
-W1,-mllvm -W1,-enable-X86-prefetching  
-W1,-mllvm -W1,-enable-licm-vrp  
-W1,-mllvm -W1,-function-specialize  
-W1,-mllvm -W1,-align-all-nofallthru-blocks=6  
-W1,-mllvm -W1,-reduce-array-computations=3 -Ofast  
-march=znver3 -fveclib=AMDLIBM -ffast-math -Mrecursive

(Continued on next page)
Peak Optimization Flags (Continued)

654.roms_s (continued):
-mlir -reduce-array-computations=3
-mlir -global-vectorize-slp=true -mlir -enable-licm-vrp
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -lflang

Benchmarks using both Fortran and C:

621.wrf_s: basepeak = yes

627.cam4_s: -m64 -mno-adx -mno-sse4a
-W1,-mlir -W1,-enable-x86-prefetching
-W1,-mlir -W1,-enable-licm-vrp
-W1,-mlir -W1,-function-specialize
-W1,-mlir -W1,-align-all-nofallthru-blocks=6
-W1,-mlir -W1,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -ftol
-fstruct-layout=5 -mlir -unroll-threshold=50
-fremap-arrays -flv-function-specialization
-mlir -inline-threshold=1000 -mlir -enable-gvn-hoist
-mlir -global-vectorize-slp=true
-mlir -function-specialize -mlir -enable-licm-vrp
-mlir -reduce-array-computations=3 -Mrecursive
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -lflang

628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes

Peak Other Flags

C benchmarks:
-Wno-unused-command-line-argument -Wno-return-type

Fortran benchmarks:
-Wno-unused-command-line-argument -Wno-return-type

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

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL365 Gen10 Plus
(2.75 GHz, AMD EPYC 7453)

SPECspeed®2017_fp_base = 185
SPECspeed®2017_fp_peak = 189

CPU2017 License: 3
Test Date: Jun-2021
Test Sponsor: HPE
Hardware Availability: Jun-2021
Tested by: HPE
Software Availability: Mar-2021

Peak Other Flags (Continued)

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

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-V1.2-EPYC-revP.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-V1.2-EPYC-revP.xml

SPEC CPU and SPECspeed 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 v1.1.5 on 2020-04-01 13:29:36-0400.
Report generated on 2021-07-06 18:41:18 by CPU2017 PDF formatter v6442.
Originally published on 2021-07-06.