SPEC CPU®2017 Floating Point Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL385 Gen10 Plus
(2.60 GHz, AMD EPYC 7513)

**SPECspeed®2017_fp_base = 208**
**SPECspeed®2017_fp_peak = 214**

**Hardware**

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base (208)</th>
<th>SPECspeed®2017_fp_peak (214)</th>
</tr>
</thead>
<tbody>
<tr>
<td>64</td>
<td>670</td>
<td>674</td>
</tr>
<tr>
<td>128</td>
<td></td>
<td></td>
</tr>
<tr>
<td>603.bwaves_s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>128</td>
<td></td>
<td></td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td></td>
<td></td>
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<tr>
<td>128</td>
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<tr>
<td>619.lbm_s</td>
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</tr>
<tr>
<td>125</td>
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</tr>
<tr>
<td>621.wrf_s</td>
<td></td>
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<tr>
<td>180</td>
<td></td>
<td></td>
</tr>
<tr>
<td>627.cam4_s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>154</td>
<td></td>
<td></td>
</tr>
<tr>
<td>128</td>
<td></td>
<td></td>
</tr>
<tr>
<td>628.pop2_s</td>
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</tr>
<tr>
<td>66.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>638.imagick_s</td>
<td></td>
<td></td>
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<tr>
<td>294</td>
<td></td>
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</tr>
<tr>
<td>644.nab_s</td>
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</tr>
<tr>
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<tr>
<td>128</td>
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<tr>
<td>649.fotonik3d_s</td>
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<tr>
<td>107</td>
<td></td>
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<tr>
<td>128</td>
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<tr>
<td>654.roms_s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>225</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CPU Name:** AMD EPYC 7513
**Max MHz:** 3650
**Nominal:** 2600
**Enabled:** 64 cores, 2 chips, 2 threads/core
**Orderable:** 1.2 chip(s)
**Cache L1:** 32 KB I + 32 KB D on chip per core
**L2:** 512 KB I+D on chip per core
**L3:** 128 MB I+D on chip per chip, 32 MB shared / 8 cores
**Other:** None
**Memory:** 2 TB (16 x 128 GB 4Rx4 PC4-3200AA-L)
**Storage:** 1 x 182 GB SATA SSD, RAID 0
**Other:** None

**Software**

**OS:** Ubuntu 20.04.1 LTS (x86_64)
**Kernel:** 5.4.0-42-generic
**Compiler:** C/C++/Fortran: Version 3.0.0 of AOCC
**Parallel:** Yes
**Firmware:** HPE BIOS Version A42 v2.42 04/29/2021 released Apr-2021
**File System:** ext4
**System State:** Run level 5 (multi-user)
**Base Pointers:** 64-bit
**Peak Pointers:** 64-bit
**Other:** jemalloc: jemalloc memory allocator library v5.1.0
**Power Management:** BIOS set to prefer performance at the cost of additional power usage
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SPECspeed®2017_fp_base = 208
SPECspeed®2017_fp_peak = 214

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</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>64</td>
<td>87.8</td>
<td>672</td>
<td>88.3</td>
<td>668</td>
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<td>128</td>
<td>87.8</td>
<td>672</td>
<td>88.0</td>
<td>678</td>
<td>87.5</td>
<td>674</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>64</td>
<td>49.5</td>
<td>337</td>
<td>49.6</td>
<td>336</td>
<td>49.8</td>
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<tr>
<td>619.lbm_s</td>
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<td>43.0</td>
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<td>621.wrf_s</td>
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<td>73.4</td>
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<td>73.6</td>
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<td>72.3</td>
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<td>627.cam4_s</td>
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<tr>
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<td>66.7</td>
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<tr>
<td>644.nab_s</td>
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<td>42.8</td>
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<td>43.0</td>
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<td>649.fotonik3d_s</td>
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<td>105</td>
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<td>654.roms_s</td>
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<td>69.8</td>
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<td>64</td>
<td>56.2</td>
<td>280</td>
<td>56.9</td>
<td>277</td>
<td>56.9</td>
<td>276</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 -l 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 = "0-127"
LD_LIBRARY_PATH = "/home/cpu2017_B1/amd_speed_aocc300_milan_B_lib/64;/home/cpu2017_B1/amd_speed_aocc300_milan_B_lib/32:"
MALLOC_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "128"

Environment variables set by runcpu during the 603.bwaves_s peak run:
GOMP_CPU_AFFINITY = "0 64 1 65 2 66 3 67 4 68 5 69 6 70 7 71 8 72 9 73 10 74 11 75 12 76 13 77 14 78 15 79 16 80 17 81 18 82 19 83 20 84 21 85 22 86 23 87 24 88 25 89 26 90 27 91 28 92 29 93 30 94 31 95 32 96 33 97 34 98 35 99 36 100 37 101 38 102 39 103 40 104 41 105 42 106 43 107 44 108 45 109 46 110 47 111 48 112 49 113 50 114 51 115 52 116 53 117 54 118 55 119 56 120 57 121 58 122 59 123 60 124 61 125 62 126 63 127"

Environment variables set by runcpu during the 627.cam4_s peak run:
GOMP_CPU_AFFINITY = "0 64 1 65 2 66 3 67 4 68 5 69 6 70 7 71 8 72 9 73 10 74 11 75 12 76 13 77 14 78 15 79 16 80 17 81 18 82 19 83 20 84 21 85 22 86 23 87 24 88 25 89 26 90 27 91 28 92 29 93 30 94 31 95 32 96 33 97 34 98 35 99 36 100 37 101 38 102 39 103 40 104 41 105 42 106 43 107 44 108 45 109 46 110 47 111 48 112 49 113 50 114 51 115 52 116 53 117 54 118 55 119 56 120 57 121 58 122 59 123 60 124 61 125 62 126 63 127"

Environment variables set by runcpu during the 644.nab_s peak run:
GOMP_CPU_AFFINITY = "0 64 1 65 2 66 3 67 4 68 5 69 6 70 7 71 8 72 9 73 10 74 11 75 12 76 13 77 14 78 15 79 16 80 17 81 18 82 19 83 20 84 21 85 22 86 23 87 24 88 25 89 26 90 27 91 28 92 29 93 30 94 31 95 32 96 33 97 34 98 35 99 36 100 37 101 38 102 39 103 40 104 41 105 42 106 43 107 44 108 45 109 46 110 47 111 48 112 49 113 50 114 51 115 52 116 53 117 54 118 55 119 56 120 57 121 58 122 59 123 60 124 61 125 62 126 63 127"
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SPECspeed®2017_fp_base = 208
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### CPU2017 License:
3

### Test Date:
Apr-2021

### Test Sponsor:
HPE

### Hardware Availability:
Apr-2021

### Tested by:
HPE

### Software Availability:
Mar-2021

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**Environment Variables Notes (Continued)**

Environment variables set by runcpu during the 649.fotonik3d_s peak run:
- GOMP_CPU_AFFINITY = "0-63"
- PGHPF_ZMEM = "yes"

Environment variables set by runcpu during the 654.roms_s peak run:
- GOMP_CPU_AFFINITY = "0-63"

---

**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
jemalloc 5.1.0 is available here:
https://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 May 24 12:46:43 EDT 2021
Submission: cpu2017-20210524-26445.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
- Workload Profile set to Custom
- Infinity Fabric Power Management set to Disabled
- Infinity Fabric Performance State set to P0
- Power Regulator set to OS Control Mode

Sysinfo program /home/cpu2017_B1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on dl385g10v2 Wed Apr 1 17:55:20 2020

SUT (System Under Test) info as seen by some common utilities.

(Continued on next page)
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CPU2017 License: 3
Test Date: Apr-2021
Test Sponsor: HPE
Hardware Availability: Apr-2021
Tested by: HPE
Software Availability: Mar-2021

Platform Notes (Continued)

For more information on this section, see
https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
-model name: AMD EPYC 7513 32-Core Processor
  2 "physical id"s (chips)
  128 "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 : 32
siblings : 64
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

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): 128
On-line CPU(s) list: 0-127
Thread(s) per core: 2
Core(s) per socket: 32
Socket(s): 2
NUMA node(s): 8
Vendor ID: AuthenticAMD
CPU family: 25
Model: 1
Model name: AMD EPYC 7513 32-Core Processor
Stepping: 1
Frequency boost: enabled
CPU MHz: 2941.893
CPU max MHz: 2600.0000
CPU min MHz: 1500.0000
BogoMIPS: 5190.13
Virtualization: AMD-V
L1d cache: 2 MiB
L1i cache: 2 MiB
L2 cache: 32 MiB
L3 cache: 256 MiB
NUMA node0 CPU(s): 0-7,64-71
NUMA node1 CPU(s): 8-15,72-79
NUMA node2 CPU(s): 16-23,80-87
NUMA node3 CPU(s): 24-31,88-95
NUMA node4 CPU(s): 32-39,96-103

(Continued on next page)
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Test Sponsor: HPE
Tested by: HPE

Platform Notes (Continued)

NUMA node5 CPU(s): 40-47,104-111
NUMA node6 CPU(s): 48-55,112-119
NUMA node7 CPU(s): 56-63,120-127
Vulnerability Itlb multihit: Not affected
Vulnerability Ltif: 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 retropline, IBPB conditional, IBRS_FW, STIBP always-on, RSB filling
Vulnerability Srbd: 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 nop1 nonstop_tsc cpuid extd_apicid aperfmperpfn pni pclmulqdq monitor ssse3 fma cx16 pcid 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 mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbase bmi1 avx2 smep bmi2 invpcid cm Queen rdt_a rdseed adx smash clflushopt clwb sha ni xsaveopt xsavec xgetbv1 xsavec qcm_llc qcm_occup_llc qcm_mbb_total qcm_mbb_local clzero irperf xsaverpr wbnoinvd arat npt lbv svmclock nrip_save tsc_scale vmcb_clean flushbyaid decodeassist pfthreshold v_vmsave_vmload vgif umip pkpu oske vaes vpclmulqdq rdpid overflow_recov succor smca

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 7 64 66 68 69 70 71
node 0 size: 257797 MB
node 0 free: 257496 MB
node 1 cpus: 8 9 10 11 12 13 14 15 72 73 74 75 76 77 78 79
node 1 size: 258044 MB
node 1 free: 257799 MB
node 2 cpus: 16 17 18 19 20 21 22 23 80 81 82 83 84 85 86 87
node 2 size: 258044 MB
node 2 free: 257485 MB
node 3 cpus: 24 25 26 27 28 29 30 31 88 89 90 91 92 93 94 95
node 3 size: 245933 MB
node 3 free: 245718 MB
node 4 cpus: 32 33 34 35 36 37 38 39 96 97 98 99 100 101 102 103

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SPECspeed\textsuperscript{\textregistered}2017\_fp\_base = 208
SPECspeed\textsuperscript{\textregistered}2017\_fp\_peak = 214

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

Platform Notes (Continued)

node 4 size: 258044 MB
defree: 257817 MB
cpus: 40 41 42 43 44 45 46 47 104 105 106 107 108 109 110 111

node 5 size: 258044 MB
free: 257818 MB
cpus: 48 49 50 51 52 53 54 55 112 113 114 115 116 117 118 119

node 6 size: 258020 MB
free: 257756 MB
cpus: 48 49 50 51 52 53 54 55 112 113 114 115 116 117 118 119

node 7 size: 258041 MB
defree: 257835 MB
cpus: 56 57 58 59 60 61 62 63 120 121 122 123 124 125 126 127

node distances:

node 0 1 2 3 4 5 6 7
0: 10 11 11 11 32 32 32 32
1: 11 10 11 11 32 32 32 32
2: 11 11 10 11 32 32 32 32
3: 11 11 11 10 32 32 32 32
4: 32 32 32 32 10 11 11 11
5: 32 32 32 32 11 10 11 11
6: 32 32 32 32 11 10 11 11
7: 32 32 32 32 11 11 11 10

From /proc/meminfo
MemTotal: 2101217220 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 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/"

(Continued on next page)
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

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

Platform Notes (Continued)

uname -a:
 Linux dl385g10v2 5.4.0-42-generic #46-Ubuntu SMP Fri Jul 10 00:24:02 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): Mitigation: Speculative Store
CVE-2018-3639 (Speculative Store Bypass): Bypass disabled via prctl and
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swapgs
CVE-2017-5715 (Spectre variant 2): barriers and __user pointer
CVE-2017-5751 (Spectre variant 2): sanitization
CVE-2020-0543 (Special Register Buffer Data Sampling): Mitigation: Full AMD retpoline,
CVE-2019-11135 (TSX Asynchronous Abort): IBFB: conditional, IBRS_FW, STIBF:
Not affected
always-on, RSB filling
Not affected

run-level 5 Apr 1 12:23

SPEC is set to: /home/cpu2017_B1
 Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/ubuntu--vg-ubuntu--lv ext4 182G 54G 119G 32% /

From /sys/devices/virtual/dmi/id
 Vendor: HPE
 Product: ProLiant DL385 Gen10 Plus
 Product Family: ProLiant
 Serial: CN79340HC3

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

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL385 Gen10 Plus
(2.60 GHz, AMD EPYC 7513)

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

SPECspeed®2017_fp_base = 208
SPECspeed®2017_fp_peak = 214

CPU2017 License: 3
Test Date: Apr-2021
Hardware Availability: Apr-2021

Test Sponsor: HPE
Hardware Availability: Apr-2021

Tested by: HPE
Software Availability: Mar-2021

Platform Notes (Continued)

BIOS Revision: 2.42
Firmware Revision: 2.40

(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 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

==============================================================================
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

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

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL385 Gen10 Plus  
(2.60 GHz, AMD EPYC 7513)  

**SPECspeed®2017 fp_base = 208**  
**SPECspeed®2017 fp_peak = 214**

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

| Test Date: | Apr-2021 |
| Hardware Availability: | Apr-2021 |
| Software Availability: | Mar-2021 |

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**Compiler Version Notes (Continued)**

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

---

**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

(Continued on next page)
Hewlett Packard Enterprise
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ProLiant DL385 Gen10 Plus
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SPECspeed®2017_fp_base = 208
SPECspeed®2017_fp_peak = 214

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

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

Base Portability Flags (Continued)

649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-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
-fremap-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 -z muldefs
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
-llflang -llflangrti

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-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Hz,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 -llflang -llflangrti

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-nofallthru-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
-fremap-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 -Hz,1,0x1
-Mrecursive -mllvm -fuse-tile-inner-loop -funroll-loops
-mllvm -extra-vectorizer-passes -mllvm -lsr-in-nested-loop -z muldefs
Base Optimization Flags (Continued):

Benchmarks using both Fortran and C (continued):
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
-llang -llflangrti

Benchmarks using Fortran, C, and C++:
-m64 -mno-adx -mno-sse4a -std=c++98
-Wl,-mllvm -Wl,-x86-use-vzeroupper=false
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3
-ffast-math
-flto
-fstruct-layout=5
-mlibm -unroll-threshold=50 -mlibm -inline-threshold=1000
-performance -mlibm -function-specialize -flv-function-specialization
-mlibm -enable-gvn-hoist -mlibm -global-vectorize-slp=true
-mlibm -enable-licm-vrp -mlibm -reduce-array-computations=3
-mlibm -enable-partial-unswitch -mlibm -unroll-threshold=100
-finlne-aggressive -mlibm -loop-unswitch-threshold=200000
-mlibm -reroll-loops -mlibm -aggressive-loop-unswitch
-mlibm -extra-vectorizer-passes -mlibm -convert-pow-exp-to-int=false
-Hz,1,1x -mrecursive -mlibm -funroll-loops
-mlibm -lsr-in-nested-loop -z muldefs -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -llang -llflangrti

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
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL385 Gen10 Plus  
(2.60 GHz, AMD EPYC 7513)  

SPECspeed®2017_fp_base = 208  
SPECspeed®2017_fp_peak = 214

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

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

Peak Compiler Invocation (Continued)

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

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

619.lbm_s: basepeak = yes
638.imagick_s: basepeak = yes

Fortran benchmarks:


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

603.bwaves_s (continued):
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -lflang

649.fotonik3d_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 -flto
-Mrecursive -mllvm -Wl,-enable-X86-prefetching
-Mrecursive -mllvm -Wl,-enable-licm-vrp
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -lflang

654.roms_s: Same as 603.bwaves_s

Benchmarks using both Fortran and C:

621.wrf_s: basepeak = yes

627.cam4_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 -flto
-struct-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 -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
SPEC CPU®2017 Floating Point Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL385 Gen10 Plus
(2.60 GHz, AMD EPYC 7513)

SPECspeed®2017_fp_base = 208
SPECspeed®2017_fp_peak = 214

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

Peek 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

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

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Tested with SPEC CPU®2017 v1.1.5 on 2020-04-01 18:55:19-0400.
Originally published on 2021-06-08.