## SPEC CPU®2017 Floating Point Rate Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL345 Gen10 Plus  
(2.95 GHz, AMD EPYC 75F3)  

**SPECrate®2017_fp_base = 268**  
**SPECrate®2017_fp_peak = 268**

### Software

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>AMD EPYC 75F3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz:</td>
<td>4000</td>
</tr>
<tr>
<td>Nominal:</td>
<td>2950</td>
</tr>
<tr>
<td>Enabled:</td>
<td>32 cores, 1 chip, 2 threads/core</td>
</tr>
<tr>
<td>Orderable:</td>
<td>1 chip</td>
</tr>
<tr>
<td>Cache L1:</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2:</td>
<td>512 KB I+D on chip per core</td>
</tr>
<tr>
<td>L3:</td>
<td>256 MB I+D on chip per chip, 32 MB shared / 4 cores</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>1 TB (8 x 128 GB 4Rx4 PC4-3200AA-L)</td>
</tr>
<tr>
<td>Storage:</td>
<td>1 x 480 GB SAS SSD, RAID 0</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
</tbody>
</table>

**OS:** Ubuntu 20.04.1 LTS (x86_64)  
Kernel 5.4.0-56-generic  
Compiler: C/C++/Fortran: Version 3.0.0 of AOCC  
Parallel: No  
Firmware: HPE BIOS Version A43 v2.42 04/15/2021 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

### Hardware

<table>
<thead>
<tr>
<th>Test Sponsor:</th>
<th>HPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested by:</td>
<td>HPE</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Apr-2021</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Mar-2021</td>
</tr>
<tr>
<td>CPU2017 License:</td>
<td>3</td>
</tr>
<tr>
<td>Test Date:</td>
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<td>Software</td>
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### Results

<table>
<thead>
<tr>
<th>Benchmark</th>
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<th>SPECrate®2017_fp_base</th>
<th>SPECrate®2017_fp_peak</th>
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<tr>
<td>503.bwaves_r</td>
<td>64</td>
<td>268</td>
<td>268</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>64</td>
<td>268</td>
<td>268</td>
</tr>
<tr>
<td>508.namd_r</td>
<td>64</td>
<td>268</td>
<td>268</td>
</tr>
<tr>
<td>510.parest_r</td>
<td>64</td>
<td>268</td>
<td>268</td>
</tr>
<tr>
<td>511.povray_r</td>
<td>64</td>
<td>268</td>
<td>268</td>
</tr>
<tr>
<td>519.lbm_r</td>
<td>64</td>
<td>268</td>
<td>268</td>
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<tr>
<td>521.wrf_r</td>
<td>64</td>
<td>268</td>
<td>268</td>
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<td>526.blender_r</td>
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<td>268</td>
<td>268</td>
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<td>527.cam4_r</td>
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<td>268</td>
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<td>544.nab_r</td>
<td>64</td>
<td>268</td>
<td>268</td>
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<tr>
<td>549.fotonik3d_r</td>
<td>64</td>
<td>268</td>
<td>268</td>
</tr>
<tr>
<td>554.roms_r</td>
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<td>268</td>
<td>268</td>
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**Note:** The results above were generated using the SPEC CPU®2017 benchmark suite. The specifications and results are based on the hardware and software configurations provided by the Test Sponsor: HPE.
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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 -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

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

randomization (ASLR) to reduce run-to-run variability.
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root for peak
integer runs and all FP runs to enable Transparent Hugepages (THP).
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root for base
integer runs to enable THP only on request.

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
"/home/SPEC_CPU2017/cpu2017/amd_rate_aocc300_milan_A_lib/64;/home/SPEC_CPU2017/cpu2017/amd_rate_aocc300_milan_A_lib/32:
MALLOCONF = "retain:true"

General Notes

Binaries were compiled on a system with 2x AMD EPYC 7742 CPU + 512GiB 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:
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 12:30:16 EDT 2021
Submission: cpu2017-20210524-26394.sub

Platform Notes

BIOS Configuration
Workload Profile set to General Throughput Compute
Determinism Control set to Manual
Thermal Configuration set to Maximum Cooling
Performance Determinism set to Power Deterministic
Last-Level Cache (LLC) as NUMA Node set to Enabled
NUMA memory domains per socket set to Four memory domains per socket

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

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

Platform Notes (Continued)

Data Fabric C-State Enable set to Force Enabled
Workload Profile set to Custom
L1 HW Prefetcher set to Disabled

Sysinfo program /home/SPEC_CPU2017/cpu2017/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeea89d4b38e2f1c
running on admin Wed Apr 1 17:27:00 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 75F3 32-Core Processor
  1 "physical id"s (chips)
  64 "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

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): 64
On-line CPU(s) list: 0-63
Thread(s) per core: 2
Core(s) per socket: 32
Socket(s): 1
NUMA node(s): 8
Vendor ID: AuthenticAMD
CPU family: 25
Model: 1
Model name: AMD EPYC 75F3 32-Core Processor
Stepping: 1
Frequency boost: enabled
CPU MHz: 3928.066
CPU max MHz: 2950.0000
CPU min MHz: 1500.0000
BogoMIPS: 5888.99
Virtualization: AMD-V
L1d cache: 1 MiB
L1i cache: 1 MiB

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

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</tr>
</thead>
<tbody>
<tr>
<td>L2 cache: 16 MiB</td>
</tr>
<tr>
<td>L3 cache: 256 MiB</td>
</tr>
<tr>
<td>NUMA node0 CPU(s): 0-3,32-35</td>
</tr>
<tr>
<td>NUMA node1 CPU(s): 4-7,36-39</td>
</tr>
<tr>
<td>NUMA node2 CPU(s): 8-11,40-43</td>
</tr>
<tr>
<td>NUMA node3 CPU(s): 12-15,44-47</td>
</tr>
<tr>
<td>NUMA node4 CPU(s): 16-19,48-51</td>
</tr>
<tr>
<td>NUMA node5 CPU(s): 20-23,52-55</td>
</tr>
<tr>
<td>NUMA node6 CPU(s): 24-27,56-59</td>
</tr>
<tr>
<td>NUMA node7 CPU(s): 28-31,60-63</td>
</tr>
<tr>
<td>Vulnerability Itlb multihit: Not affected</td>
</tr>
<tr>
<td>Vulnerability L1tf: Not affected</td>
</tr>
<tr>
<td>Vulnerability Mds: Not affected</td>
</tr>
<tr>
<td>Vulnerability Meltdown: Not affected</td>
</tr>
<tr>
<td>Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp</td>
</tr>
<tr>
<td>Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitation</td>
</tr>
<tr>
<td>Vulnerability Spectre v2: Mitigation; Full AMD retpoline, IBPB conditional, IBRS_FW, STIBP always-on, RSB filling</td>
</tr>
<tr>
<td>Vulnerability Srbsds: Not affected</td>
</tr>
<tr>
<td>Vulnerability Tsx async abort: Not affected</td>
</tr>
<tr>
<td>Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp lm constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid aperfmperf pni pclmulqdq monitor sse3 fma cx16 pcid sse4_1 sse4_2 movbe popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalgnsse 3nowprefetch osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb bext perfctr_llc mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmvcall fsqgbase bml1 avx2 smep bmi2 invpcid cqm rdt_a rdseed adx smap clflushopt clwb sha_ni xsaveopt xsaves xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local clzero irperf xsaveerptr wbnoinvd arat npt lbv svm_lock nrip_save tsc_scale vmcb_clean flushbyaid decodeassist pausefilter pfthreshold v_vmsave_vmload vgif umip pkpu ospke vaes vpclmulqdq rdpid overflow_recov succor smca</td>
</tr>
</tbody>
</table>

/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 32 33 34 35 |
| node 0 size: 128776 MB |
| node 0 free: 128371 MB |
| node 1 cpus: 4 5 6 7 36 37 38 39 |
| node 1 size: 129020 MB |
| node 1 free: 128692 MB |

(Continued on next page)
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Platform Notes (Continued)

node 2 cpus: 8 9 10 11 40 41 42 43
node 2 size: 128997 MB
node 2 free: 128833 MB
node 3 cpus: 12 13 14 15 44 45 46 47
node 3 size: 129021 MB
node 3 free: 128830 MB
node 4 cpus: 16 17 18 19 48 49 50 51
node 4 size: 129022 MB
node 4 free: 128845 MB
node 5 cpus: 20 21 22 23 52 53 54 55
node 5 size: 129021 MB
node 5 free: 128827 MB
node 6 cpus: 24 25 26 27 56 57 58 59
node 6 size: 129022 MB
node 6 free: 128842 MB
node 7 cpus: 28 29 30 31 60 61 62 63
node 7 size: 129008 MB
node 7 free: 128845 MB
node distances:

From /proc/meminfo
MemTotal: 1056654484 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance
/usr/bin/lsb_release -d
Ubuntu 20.04.1 LTS

(Continued on next page)
Platform Notes (Continued)

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

run-level 5 Apr 1 17:23

SPEC is set to: /home/SPEC_CPU2017/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/ubuntu--vg-ubuntu--lv ext4 196G 83G 104G 45% /

From /sys/devices/virtual/dmi/id
Vendor:        HPE
Product:       ProLiant DL345 Gen10 Plus
Product Family: ProLiant
Serial:        J20APP000K

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:
    8x Samsung M386AAG40AM3-CWE 128 GB 4 rank 3200
    8x UNKNOWN NOT AVAILABLE

(Continued on next page)
Platform Notes (Continued)

BIOS:

- BIOS Vendor: HPE
- BIOS Version: A43
- BIOS Date: 04/15/2021
- BIOS Revision: 2.42
- Firmware Revision: 2.40

(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) |
```

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

```
| 508.namd_r(base, peak) 510.parest_r(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

```
| 511.povray_r(base, peak) 526.blender_r(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
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(Continued on next page)
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<th>C++, C, Fortran</th>
<th>507.cactuBSSN_r(base, peak)</th>
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<tr>
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Base 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

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: -funsiged-char -D__BOOL_DEFINED -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,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver3 -fveclib=AMDLIBM -fstruct-layout=5

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

C benchmarks (continued):
-mlnv -unroll-threshold=50 -mllv -inline-threshold=1000
-fremap-arrays -mllv -function-specialize -flv-function-specialization
-mlnv -enable-gvn-hoist -mllv -global-vectorize-slp=true
-mlnv -enable-lcm-vrp -mllv -reduce-array-computations=3 -z muldefs
-lamdlibm -ljemalloc -lfangl -lfangrtl

C++ benchmarks:
-m64 -std=c++98 -mno-adx -mno-sse4a
-Wl,-mllv -Wl,-x86-use-vzeroupper=false -flto
-Wl,-mllv -Wl,-region-vectorize -Wl,-mllv -Wl,-function-specialize
-Wl,-mllv -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllv -Wl,-reduce-array-computations=3 -03 -ffast-math
-march=znver3 -fveclib=AMDLIBM -mllv -enable-partial-unswitch
-mlnv -unroll-threshold=100 -finline-aggressive
-flv-function-specialization -mllv -loop-unswitch-threshold=200000
-mllv -reroll-loops -mllv -aggressive-loop-unswitch
-mllv -extra-vectorizer-passes -mllv -reduce-array-computations=3
-mllv -global-vectorize-slp=true -mllv -convert-pow-exp-to-int=false
-z muldefs -lamdlibm -ljemalloc -lfangl -lfangrtl

Fortran benchmarks:
-m64 -Wl,-mllv -Wl,-enable-X86-prefetching
-Wl,-mllv -Wl,-enable-lcm-vrp -flto -Wl,-mllv -Wl,-region-vectorize
-Wl,-mllv -Wl,-function-specialize
-Wl,-mllv -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllv -Wl,-reduce-array-computations=3 -Hz,1,0x1 -03 -ffast-math
-march=znver3 -fveclib=AMDLIBM -Kieee -Mrecursive
-mllv -fuse-tile-inner-loop -funroll-loops
-mllv -extra-vectorizer-passes -mllv -lsr-in-nested-loop
-mllv -enable-lcm-vrp -mllv -reduce-array-computations=3
-mllv -global-vectorize-slp=true -z muldefs -lamdlibm -ljemalloc
-lfangl -lfangrtl

Benchmarks using both Fortran and C:
-m64 -Wl,-mllv -Wl,-enable-X86-prefetching
-Wl,-mllv -Wl,-enable-lcm-vrp -flto -Wl,-mllv -Wl,-region-vectorize
-Wl,-mllv -Wl,-function-specialize
-Wl,-mllv -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllv -Wl,-reduce-array-computations=3 -03 -ffast-math
-march=znver3 -fveclib=AMDLIBM -fstruct-layout=5
-mllv -unroll-threshold=50 -mllv -inline-threshold=1000
-fremap-arrays -mllv -function-specialize -flv-function-specialization
-mllv -enable-gvn-hoist -mllv -global-vectorize-slp=true
-mllv -enable-lcm-vrp -mllv -reduce-array-computations=3 -Hz,1,0x1
-Kieee -Mrecursive -mllv -fuse-tile-inner-loop -funroll-loops
SPEC CPU®2017 Floating Point Rate Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL345 Gen10 Plus
(2.95 GHz, AMD EPYC 75F3)

SPECrater®2017_fp_base = 268
SPECrater®2017_fp_peak = 268

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

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

Base Optimization Flags (Continued):

Benchmarks using both Fortran and C (continued):
-mltvm -extra-vectorizer-passes -mltvm -lsr-in-nested-loop -z muldefs
-landlibm -ljemalloc -lflang -lflangrti

Benchmarks using both C and C++:
-m64 -std=c++98 -mno-adx -mno-sse4a
-Wl,-mltvm -Wl,-x86-use-vzeroupper=false -flto
-Wl,-mltvm -Wl,-region-vectorize -Wl,-mltvm -Wl,-function-specialize
-Wl,-mltvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mltvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver3 -fvecclib=AMDLIBM -fstruct-layout=5
-mltvm -unroll-threshold=50 -mltvm -inline-threshold=1000
-freemap-arrays -mltvm -function-specialize -flv-function-specialization
-mltvm -enable-gvn-hoist -mltvm -global-vectorize-slp=true
-mltvm -enable-licm-vrp -mltvm -reduce-array-computations=3
-mltvm -enable-partial-unswitch -mltvm -unroll-threshold=100
-finline-aggressive -mltvm -loop-unswitch-threshold=200000
-mltvm -reroll-loops -mltvm -aggressive-loop-unswitch
-mltvm -extra-vectorizer-passes -mltvm -convert-pow-exp-to-int=false
-z muldefs -landlibm -ljemalloc -lflang -lflangrti

Base Other Flags

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

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL345 Gen10 Plus
(2.95 GHz, AMD EPYC 75F33)

SPECrater®2017_fp_base = 268
SPECrater®2017_fp_peak = 268

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

Base Other Flags (Continued)

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
SPEC CPU®2017 Floating Point Rate Result
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Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL345 Gen10 Plus
(2.95 GHz, AMD EPYC 75F3)

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

SPECrater®2017_fp_base = 268
SPECrater®2017_fp_peak = 268

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

Peak Optimization Flags

C benchmarks:

$519.lbm_r: -m64 -flto -Wl,-mllvm -Wl,-function-specialize
-\text{-Wl,-mllvm -Wl,-align-all-nofallback-blocks=6}
-\text{-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast}
-\text{-march=znver3 -fveclib=AMDLIBM -fstruct-layout=7}
-\text{-mllvm -unroll-threshold=50 -fremap-arrays}
-\text{-flv-function-specialization -mllvm -inline-threshold=1000}
-\text{-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true}
-\text{-mllvm -function-specialize -mllvm -enable-licm-vrp}
-\text{-mllvm -reduce-array-computations=3 -lamdlibm -ljemalloc}

$538.imagick_r: Same as $519.lbm_r

$544.nab_r: -m64 -flto -Wl,-mllvm -Wl,-region-vectorize
-\text{-Wl,-mllvm -Wl,-function-specialize -Ofast -march=znver3}
-\text{-fveclib=AMDLIBM -fstruct-layout=7}
-\text{-mllvm -unroll-threshold=50 -fremap-arrays}
-\text{-flv-function-specialization -mllvm -inline-threshold=1000}
-\text{-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true}
-\text{-mllvm -function-specialize -mllvm -enable-licm-vrp}
-\text{-mllvm -reduce-array-computations=3 -lamdlibm -ljemalloc}

C++ benchmarks:

$508.namd_r: basepeak = yes

$510.parest_r: -m64 -std=c++98 -mno-adx -mno-sse4a
-\text{-Wl,-mllvm -Wl,-x86-use-vzeroupper=false}
-\text{-Wl,-mllvm -Wl,-enable-licm-vrp -flto}
-\text{-Wl,-mllvm -Wl,-suppress-fmas}
-\text{-Wl,-mllvm -Wl,-function-specialize -Ofast -march=znver3}
-\text{-fveclib=AMDLIBM -finline-aggressive}
-\text{-mllvm -unroll-threshold=100 -flv-function-specialization}
-\text{-mllvm -enable-licm-vrp -mllvm -reroll-loops}
-\text{-mllvm -aggressive-loop-unswitch}
-\text{-mllvm -reduce-array-computations=3}
-\text{-mllvm -global-vectorize-slp=true -lamdlibm -ljemalloc}

Fortran benchmarks:

$503.bwaves_r: basepeak = yes

$549.fotonik3d_r: basepeak = yes

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

554.roms_r: basepeak = yes

Benchmarks using both Fortran and C:

521.wrf_r: basepeak = yes

527.cam4_r: -m64 -Wl,-mlllvm -Wl,-enable-X86-prefetching
-Wl,-mlllvm -Wl,-enable-licm-vrp -flto
-Wl,-mlllvm -Wl,-function-specialize
-Wl,-mlllvm -Wl,-force-vector-interleave=1 -Ofast
-march=znver3 -fveclib=AMDLIBM -fstruct-layout=7
-mlllvm -unroll-threshold=50 -fremap-arrays
-flv-function-specialization -mlllvm -inline-threshold=1000
-mlllvm -enable-gvn-hoist -mlllvm -global-vectorize-slp=true
-mlllvm -function-specialize -mlllvm -enable-licm-vrp
-mlllvm -reduce-array-computations=3 -03 -ffast-math
-funroll-loops -mlllvm -extra-vectorizer-passes
-mlllvm -lsr-in-nested-loop -Mrecursive -lamdlbm
-ljemalloc -lflang -lflangrti

Benchmarks using both C and C++:

511.povray_r: -m64 -std=c++98 -mno-adx -mno-sse4a
-Wl,-mlllvm -Wl,-x86-use-vzeroupper=false
-Wl,-mlllvm -Wl,-enable-licm-vrp -flto
-Wl,-mlllvm -Wl,-function-specialize
-Wl,-mlllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mlllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -fstruct-layout=7
-mlllvm -unroll-threshold=50 -fremap-arrays
-flv-function-specialization -mlllvm -inline-threshold=1000
-mlllvm -enable-gvn-hoist -mlllvm -global-vectorize-slp=true
-mlllvm -function-specialize -mlllvm -enable-licm-vrp
-mlllvm -reduce-array-computations=3 -ffast-math
-mlllvm -unroll-threshold=100 -mlllvm -reroll-loops
-mlllvm -aggressive-loop-unswitch -lamdlbm -ljemalloc

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_r: basepeak = yes
# SPEC CPU®2017 Floating Point Rate Result

## Hewlett Packard Enterprise
(Test Sponsor: HPE)  
ProLiant DL345 Gen10 Plus  
(2.95 GHz, AMD EPYC 75F3)

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

## 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  

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-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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