## SPEC CPU®2017 Floating Point Speed Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL325 Gen10 Plus v2  
(2.80 GHz, AMD EPYC 7543P)  

**SPECspeed®2017_fp_base = 154**  
**SPECspeed®2017_fp_peak = 156**

### Hardware
- **CPU Name:** AMD EPYC 7543P  
- **Max MHz:** 3700  
- **Nominal:** 2800  
- **Enabled:** 32 cores, 1 chip  
- **Orderable:** 1 chip  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **Cache L2:** 512 KB I+D on chip per core  
- **Cache L3:** 256 MB I+D on chip per chip, 32 MB shared / 4 cores  
- **Other:** None  
- **Memory:** 1 TB (8 x 128 GB 4Rx4 PC4-3200AA-L)  
- **Storage:** 1 x 800 GB SAS SSD, RAID 0  
- **Other:** None

### Software
- **OS:** Ubuntu 20.04.1 LTS (x86_64)  
- **Kernel:** 5.4.0-54-generic  
- **Compiler:** C/C++/Fortran: Version 3.0.0 of AOCC  
- **Parallel:** Yes  
- **Firmware:** HPE BIOS Version A43 v2.40 02/15/2021 released Mar-2021  
- **File System:** ext4  
- **System State:** Run level 5 (multi-user, GUI disabled)  
- **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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### Test Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>32</td>
<td>232</td>
<td>393</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>32</td>
<td>232</td>
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<tr>
<td>619.lbm_s</td>
<td>32</td>
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<tr>
<td>621.wrf_s</td>
<td>32</td>
<td>89.5</td>
<td>177</td>
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<tr>
<td>627.cam4_s</td>
<td>32</td>
<td>112</td>
<td>258</td>
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<tr>
<td>628.pop2_s</td>
<td>32</td>
<td>177</td>
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</tr>
<tr>
<td>638.imagick_s</td>
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<tr>
<td>644.nab_s</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>32</td>
<td>76.3</td>
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<tr>
<td>654.roms_s</td>
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**CPU2017 License:** 3  
**Test Date:** Apr-2021  
**Hardware Availability:** Jun-2021  
**Test Sponsor:** HPE  
**Test Date:** Apr-2021  
**Software Availability:** Mar-2021  
**Test Sponsor:** HPE  
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### Results Table

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</tbody>
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**SPECspeed®2017_fp_base = 154**  
**SPECspeed®2017_fp_peak = 156**

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.  
'nupactl' 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 numacll i.e.:  
numacll --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.  
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root to enable...
## SPEC CPU®2017 Floating Point Speed Result

### Operating System Notes (Continued)

Transparent Hugepages (THP) for this run.
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root for peak runs of 628.pop2_s and 638.imagick_s to enable THP only on request.

The real test date is Apr-2021. The clock was mistakenly set to 2020 before the benchmark was run.

### Environment Variables Notes

Environment variables set by runcpu before the start of the run:
- `GOMP_CPU_AFFINITY = "0-31"
- `LD_LIBRARY_PATH = 
  
  
  "/cpu2017/amd_speed_aocc300_milan_B_lib/64;/cpu2017/amd_speed_aocc300_milan_B_lib/32:"`
- `MALLOCP_CONF = "retain:true"
- `OMP_DYNAMIC = "false"
- `OMP_SCHEDULE = "static"
- `OMP_STACKSIZE = "128M"
- `OMP_THREAD_LIMIT = "32"

Environment variables set by runcpu during the 619.lbm_s peak run:
- `GOMP_CPU_AFFINITY = "0-31"

Environment variables set by runcpu during the 621.wrf_s peak run:
- `GOMP_CPU_AFFINITY = "0-31"

Environment variables set by runcpu during the 654.roms_s peak run:
- `GOMP_CPU_AFFINITY = "0-31"

### 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: https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL325 Gen10 Plus v2
(2.80 GHz, AMD EPYC 7543P)

SPECSPEED®2017 fp_base = 154
SPECSPEED®2017 fp_peak = 156

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

Platform Notes

BIOS Configuration
- AMD SMT Option set to Disabled
- 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 /cpu2017/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on dl325gen10plus Wed Apr  1 21:09:32 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 7543P 32-Core Processor
  1 "physical id”s (chips)
  32 "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 : 32
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): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 1
Core(s) per socket: 32
Socket(s): 1
NUMA node(s): 8
Vendor ID: AuthenticAMD
CPU family: 25
Model: 1
Model name: AMD EPYC 7543P 32-Core Processor

(Continued on next page)
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SPECspeed®2017_fp_base = 154
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Test Date: Apr-2021
Hardware Availability: Jun-2021
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Platform Notes (Continued)

Stepping:                        1
Frequency boost:                 enabled
CPU MHz:                         3387.536
CPU max MHz:                     2800.0000
CPU min MHz:                     1500.0000
BogoMIPS:                        5589.18
Virtualization:                  AMD-V
L1d cache:                       1 MiB
L1i cache:                       1 MiB
L2 cache:                        16 MiB
L3 cache:                        256 MiB
NUMA node0 CPU(s):               0-3
NUMA node1 CPU(s):               4-7
NUMA node2 CPU(s):               8-11
NUMA node3 CPU(s):               12-15
NUMA node4 CPU(s):               16-19
NUMA node5 CPU(s):               20-23
NUMA node6 CPU(s):               24-27
NUMA node7 CPU(s):               28-31
Vulnerability Itlb multihit:     Not affected
Vulnerability Lltf:              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 sanitation
Vulnerability Spectre v2:        Mitigation; Full AMD retpoline, IBPB conditional,
IBRS_FW, STIBP disabled, RSB filling
Vulnerability Srbds:             Not affected
Vulnerability Tx sync 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
                                   aperfmperf 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
                                   misalgnssse 3nowprefetch osvw ibr skinct wd tce topoext perfctr_core perfctr_nb
                                   bext perfctr_l1c mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs
                                   ibpb stibp vmmcall fsqgbase bml1 avx2 smep bmi2 invpcid cmqm rdtd_a rdsed adx smap
dataclflushopt clwb sha_ni xsaveopt xsaves xgetbxv1 xsaves qcm_llc qcm_occu applause
                                   v_msave_vmload vgif umip pku ospe vae vpclmulqdq rdpid overflow_recov succor smca

/cache_info cache data

(Continued on next page)
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SPECspeed®2017_fp_peak = 156

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

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

Platform Notes (Continued)

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
  node 0 size: 128776 MB
  node 0 free: 128635 MB
  node 1 cpus: 4 5 6 7
  node 1 size: 129022 MB
  node 1 free: 128879 MB
  node 2 cpus: 8 9 10 11
  node 2 size: 129022 MB
  node 2 free: 128900 MB
  node 3 cpus: 12 13 14 15
  node 3 size: 129022 MB
  node 3 free: 128902 MB
  node 4 cpus: 16 17 18 19
  node 4 size: 129022 MB
  node 4 free: 128747 MB
  node 5 cpus: 20 21 22 23
  node 5 size: 128998 MB
  node 5 free: 128838 MB
  node 6 cpus: 24 25 26 27
  node 6 size: 129022 MB
  node 6 free: 128862 MB
  node 7 cpus: 28 29 30 31
  node 7 size: 116909 MB
  node 7 free: 116752 MB
  node distances:
  node 0  1  2  3  4  5  6  7
    0: 10 11 11 11 11 11 11 11
    1: 11 10 11 11 11 11 11 11
    2: 11 11 10 11 11 11 11 11
    3: 11 11 11  10 11 11 11 11
    4: 11 11 11  11 10 11 11 11
    5: 11 11 11  11 11 10 11 11
    6: 11 11 11  11 11 11 10 11
    7: 11 11 11  11 11 11 11 10

From /proc/meminfo
  MemTotal:       1044274732 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB

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

/usr/bin/lsb_release -d

(Continued on next page)
Hewlett Packard Enterprise
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ProLiant DL325 Gen10 Plus v2
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Ubuntu 20.04.1 LTS

From /etc/*release* /etc/*version*
debian_version: bullseye/sid

platform_notes:
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 dl325gen10plus 5.4.0-54-generic #60-Ubuntu SMP Fri Nov 6 10:37:59 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 Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swaps barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1): Mitigation: Full AMD retpoline, IBPB: conditional, IBRS_FW, STIBP: disabled, RSB filling
CVE-2017-5715 (Spectre variant 2): Mitigation: usercopy/swaps barriers and __user pointer sanitization
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: /cpu2017

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sdb2</td>
<td>ext4</td>
<td>733G</td>
<td>23G</td>
<td>673G</td>
<td>4%</td>
<td>/</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id

Vendor: HPE
Product: ProLiant DL325 Gen10 Plus
Product Family: ProLiant
Serial: CN79290FKQ

(Continued on next page)
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SPECspeed®2017_fp_base = 154
SPECspeed®2017_fp_peak = 156

Platform Notes (Continued)

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

BIOS:
  BIOS Vendor:       HPE
  BIOS Version:      A43
  BIOS Date:         02/15/2021
  BIOS Revision:     2.40
  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)
(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL325 Gen10 Plus v2
(2.80 GHz, AMD EPYC 7543P)

SPECspeed®2017_fp_base = 154
SPECspeed®2017_fp_peak = 156

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

Compiler Version Notes (Continued)

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

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
SPEC CPU®2017 Floating Point Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL325 Gen10 Plus v2
(2.80 GHz, AMD EPYC 7543P)

SPECspeed®2017_fp_base = 154
SPECspeed®2017_fp_peak = 156

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

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

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 -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 -flv-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
-lflang -lflangrti

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 -lflang -lflangrti

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

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

Benchmarks using both Fortran and C (continued):

```bash
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3
-fvecclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -mllvm -function-specialize -flv-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
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
-llflang -llflangrti
```

Benchmarks using Fortran, C, and C++:

```bash
-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
-fvecclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -mllvm -function-specialize -flv-function-specialization
-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true
-mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3
-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 -llflang -llflangrti
```

# Base Other Flags

C benchmarks:

```bash
-Wno-unused-command-line-argument -Wno-return-type
```

Fortran benchmarks:

```bash
-Wno-unused-command-line-argument -Wno-return-type
```

Benchmarks using both Fortran and C:

```bash
-Wno-unused-command-line-argument -Wno-return-type
```

Benchmarks using Fortran, C, and C++:

```bash
-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

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

619.lbm_s: -m64  -mno-adx  -mno-sse4a  
-Wl,-ml1vm -Wl,-function-specialize  
-Wl,-ml1vm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-ml1vm -Wl,-reduce-array-computations=3 -Ofast  
-march=znver3 -fveclib=AMDLIBM -ffast-math -fllto  
-fstruct-layout=5 -ml1vm -unroll-threshold=50  
-fremap-arrays -flv-function-specialization  
-ml1vm -inline-threshold=1000 -ml1vm -enable-gvn-hoist  
-ml1vm -global-vectorize-slp=true  
-ml1vm -function-specialize -ml1vm -enable-licm-vrp  
-ml1vm -reduce-array-computations=3 -DSPEC_OPENMP -fopenmp  
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang

638.imagick_s: basepeak = yes

644.nab_s: basepeak = yes

Fortran benchmarks:

603.bwaves_s: basepeak = yes

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

649.fotonik3d_s: basepeak = yes

654.roms_s: -m64 -mno-adx -mno-sse4a
-W1,-mlllvm -W1,-enable-X86-prefetching
-W1,-mlllvm -W1,-enable-licm-vrp
-W1,-mlllvm -W1,-function-specialize
-W1,-mlllvm -W1,-align-all-nofallthru-blocks=6
-W1,-mlllvm -W1,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -Mrecursive
-mlllvm -reduce-array-computations=3
-mlllvm -global-vectorize-slp=true -mlllvm -enable-licm-vrp
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -Iflang

Benchmarks using both Fortran and C:

621.wrf_s: -m64 -mno-adx -mno-sse4a
-W1,-mlllvm -W1,-enable-X86-prefetching
-W1,-mlllvm -W1,-enable-licm-vrp
-W1,-mlllvm -W1,-function-specialize
-W1,-mlllvm -W1,-align-all-nofallthru-blocks=6
-W1,-mlllvm -W1,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -ftlo
-fstruct-layout=5 -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 -Hz,1,0x1 -O3
-Mrecursive -mlllvm -fuse-tile-inner-loop -funroll-loops
-mlllvm -extra-vectorizer-passes -mlllvm -lsl-in-nested-loop
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -Iflang

627.cam4_s: basepeak = yes

628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
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**SPECspeed®2017_fp_base = 154**  
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<table>
<thead>
<tr>
<th>CPU2017 License: 3</th>
<th>Test Date: Apr-2021</th>
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</tr>
<tr>
<td>Tested by: HPE</td>
<td>Software Availability: Mar-2021</td>
</tr>
</tbody>
</table>

### 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`

- **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:


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](http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-V1.2-EPYC-revP.xml)

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