Hewlett Packard Enterprise
ProLiant DL345 Gen10 Plus
(2.80 GHz, AMD EPYC 7543P)

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

SPECspeed®2017_fp_base = 154
SPECspeed®2017_fp_peak = 159

Threads

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</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>32</td>
</tr>
<tr>
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<tr>
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<tr>
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<td>628.pop2_s</td>
<td>32</td>
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<td>638.imagick_s</td>
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<tr>
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<tr>
<td>649.fotonik3d_s</td>
<td>32</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>32</td>
</tr>
</tbody>
</table>

Hardware

CPU Name: AMD EPYC 7543P
Max MHz: 3700
Nominal: 2800
Enabled: 32 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 512 KB I+D on chip per core
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 480 GB SAS 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 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
## Results Table

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<tr>
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<th>Threads</th>
<th>Base</th>
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<td>392</td>
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<tr>
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<td>71.3</td>
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<td>619.lbm_s</td>
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<td>72.2</td>
<td>72.6</td>
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<tr>
<td>628.pop2_s</td>
<td>32</td>
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<td>89.5</td>
<td>132</td>
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<td>638.imagick_s</td>
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<td>177</td>
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<tr>
<td>644.nab_s</td>
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<td>67.6</td>
<td>259</td>
<td>67.6</td>
<td>258</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>32</td>
<td>119</td>
<td>76.6</td>
<td>119</td>
<td>76.3</td>
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<tr>
<td>654.roms_s</td>
<td>32</td>
<td>98.9</td>
<td>159</td>
<td>98.9</td>
<td>159</td>
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</table>

### Compiler Notes


### Submit Notes

The config file option 'submit' was used.

### 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.:
  
  ```bash
  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.

To enable Transparent Hugepages (THP) for all allocations,
SPEC CPU®2017 Floating Point Speed Result

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Environment Variables Notes

Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-63"
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 = "64"

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:
GOMP_CPU_AFFINITY = "0-31"

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 644.nab_s peak run:
GOMP_CPU_AFFINITY = "0 32 1 33 2 34 3 35 4 36 5 37 6 38 7 39 8 40 9 41 10 42
11 43 12 44 13 45 14 46 15 47 16 48 17 49 18 50 19 51 20 52 21 53 22 54
23 55 24 56 25 57 26 58 27 59 28 60 29 61 30 62 31 63"

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)
SPEC CPU®2017 Floating Point Speed Result

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General Notes (Continued)

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 12:30:41 EDT 2021
Submission: cpu2017-20210524-26397.sub

Platform Notes

BIOS Configuration
Workload Profile set to General Peak Frequency Compute
Thermal Configuration set to Maximum Cooling
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
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 ubuntu Wed Apr  1 10:28:12 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)
  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:

(Continued on next page)
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Hardware Availability: Jun-2021
Software Availability: Mar-2021

Platform Notes (Continued)

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 7543P 32-Core Processor
Stepping: 1
Frequency boost: enabled
CPU MHz: 1496.698
CPU max MHz: 2800.0000
CPU min MHz: 1500.0000
BogoMIPS: 5589.87
Virtualization: AMD-V
L1d cache: 1 MiB
L1i cache: 1 MiB
L2 cache: 16 MiB
L3 cache: 256 MiB
NUMA node0 CPU(s): 0-3,32-35
NUMA node1 CPU(s): 4-7,46-39
NUMA node2 CPU(s): 8-11,40-43
NUMA node3 CPU(s): 12-15,44-47
NUMA node4 CPU(s): 16-19,48-51
NUMA node5 CPU(s): 20-23,52-55
NUMA node6 CPU(s): 24-27,56-59
NUMA node7 CPU(s): 28-31,60-63
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, IBFB conditional, 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

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SPEC CPU®2017 Floating Point Speed Result
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Platform Notes (Continued)

pdpe1gb rdtscp lm constant_tsc rep_good nonstop_tsc cpuid extd_apicid
aperfmpref perfctr_l1c 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
misalignsse 3nowprefetch osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb
bpret perfctr_l1c mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs
ibpb stibp vmmcall fsqgbase bmi1 avx2 smep bmi2 invpcid cqm rdt_a rdseed adx smap
cflushtpr clwb sha ni xsaveopt xsavec xgetbv1 xsavees cqm_llc cqm_occup_llc
cqm_mbb_total cqm_mbb_local clzero irperf xsavertr xsaveopt xcmm_mm_lock
nrip_save tsc_scale vmc_serialize flushbyasid decodeassists pausefilter pfthreshold
v_vmsave_vmload vgif umip puo ospke vaes vpcmulqdq rdpid overflow_recov 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 32 33 34 35
  node 0 size: 128775 MB
  node 0 free: 128162 MB
  node 1 cpus: 4 5 6 7 36 37 38 39
  node 1 size: 129022 MB
  node 1 free: 128856 MB
  node 2 cpus: 8 9 10 11 40 41 42 43
  node 2 size: 129022 MB
  node 2 free: 128881 MB
  node 3 cpus: 12 13 14 15 44 45 46 47
  node 3 size: 129022 MB
  node 3 free: 128843 MB
  node 4 cpus: 16 17 18 19 48 49 50 51
  node 4 size: 129022 MB
  node 4 free: 128788 MB
  node 5 cpus: 20 21 22 23 52 53 54 55
  node 5 size: 129022 MB
  node 5 free: 128877 MB
  node 6 cpus: 24 25 26 27 56 57 58 59
  node 6 size: 128997 MB
  node 6 free: 128618 MB
  node 7 cpus: 28 29 30 31 60 61 62 63
  node 7 size: 116908 MB
  node 7 free: 116749 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

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SPEC CPU®2017 Floating Point Speed Result

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Platform Notes (Continued)

4: 11 11 11 11 11 11 11
5: 11 11 11 11 11 11 11
6: 11 11 11 11 11 11 11
7: 11 11 11 11 11 11 11

From /proc/meminfo
MemTotal: 1044267156 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

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

/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 ubuntu 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 Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1): Mitigation: Full AMD retropline, IBPB: conditional, IBRS_FW, STIBP: always-on, RSB filling
CVE-2017-5715 (Spectre variant 2):

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**SPECspeed®2017_fp_base** = 154  
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**Platform Notes (Continued)**

CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected  
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 5 Apr 1 10:23

SPEC is set to: /home/SPEC_CPU2017  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/mapper/vgubuntu-root ext4 365G 25G 322G 7% /

From /sys/devices/virtual/dmi/id  
Vendor: HPE  
Product: ProLiant DL345 Gen10 Plus  
Product Family: ProLiant  
Serial: J20APP0014

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

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)

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**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
```

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Compiler Version Notes (Continued)

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
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Target: x86_64-unknown-linux-gnu
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Fortran | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
654.roms_s(base, peak)

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
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### 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 -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-lcm-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

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**Base Optimization Flags (Continued)**

**Fortran benchmarks (continued):**

- `-W1,-mllvm -W1,-enable-licm-vrp -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 -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 -W1,-mllvm -W1,-enable-X86-prefetching`
- `-W1,-mllvm -W1,-enable-licm-vrp -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 -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`
- `-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 -lflang -lflangrti`

**Benchmarks using Fortran, C, and C++:**

- `-m64 -mno-adx -mno-sse4a -std=c++98`
- `-W1,-mllvm -W1,-x86-use-vzeroupper=false`
- `-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 -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`
- `-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`
Hewlett Packard Enterprise  
ProLiant DL345 Gen10 Plus  
(2.80 GHz, AMD EPYC 7543P)  

SPECspeed®2017_fp_base = 154  
SPECspeed®2017_fp_peak = 159

CPU2017 License: 3  
Test Sponsor: HPE  
Test Date: Apr-2021

Tested by: HPE  
Hardware Availability: Jun-2021  
Software Availability: Mar-2021

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

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

619.lbm_s: -m64 -mno-adx -mno-sse4a  
-Wl,-mllvm -Wl,-function-specialize  
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast  
-march=znver3 -fveclib=AMDLIBM -ffast-math -ftlo  
-fstruct-layout=5 -mllvm -unroll-threshold=50

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

619.lbm_s (continued):
-fremap-arrays -flv-function-specialization
-mllv -inline-threshold=1000 -mllv -enable-gvn-hoist
-mllv -global-vectorize-slp=true
-mllv -function-specialize -mllv -enable-licm-vrp
-mllv -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 -Wl,-mllv -Wl,-region-vectorize
-Wl,-mllv -Wl,-function-specialize -Ofast -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mllv -unroll-threshold=50 -fremap-arrays
-fly-function-specialization -mllv -inline-threshold=1000
-mllv -enable-gvn-hoist -mllv -global-vectorize-slp=true
-mllv -function-specialize -mllv -enable-licm-vrp
-mllv -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
-Wl,-mllv -Wl,-enable-X86-prefetching
-Wl,-mllv -Wl,-enable-licm-vrp
-Wl,-mllv -Wl,-function-specialize
-Wl,-mllv -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllv -Wl,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -Mrecursive
-mllv -reduce-array-computations=3
-mllv -global-vectorize-slp=true -mllv -enable-licm-vrp
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -lflang

Benchmarks using both Fortran and C:

621.wrf_s: -m64 -mno-adx -mno-sse4a
-Wl,-mllv -Wl,-enable-X86-prefetching
-Wl,-mllv -Wl,-enable-licm-vrp
-Wl,-mllv -Wl,-function-specialize
-Wl,-mllv -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllv -Wl,-reduce-array-computations=3 -Ofast

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

621.wrf_s (continued):
-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 -Hz,1,0x1 -O3
-Mrecursive -mllvm -fuse-tile-inner-loop -funroll-loops
-mllvm -extra-vectorizer-passes -mllvm -lsr-in-nested-loop
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -lflang

627.cam4_s: basepeak = yes

628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:
-m64 -mno-adx -mno-sse4a -std=c++98
-W1,-mllvm -W1,-x86-use-vzeroupper=false -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 -fstruct-layout=5
-mllvm -unroll-threshold=50 -fremap-arrays -flv-function-specialization
-mllvm -global-vectorize-slp=true -mllvm -function-specialize
-mllvm -enable-licm-vrp -mllvm -reduce-array-computations=3
-finline-aggressive -mllvm -unroll-threshold=100 -mllvm -reroll-loops
-mllvm -aggressive-loop-unswitch -Mrecursive -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm
-ljemalloc -lflang

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 DL345 Gen10 Plus
(2.80 GHz, AMD EPYC 7543P)

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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

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