**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL365 Gen10 Plus v2  
(2.80 GHz, AMD EPYC 7473X)  

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

**CPU2017 License:** 3  
**Test Sponsor:** HPE  
**Tested by:** HPE  
**Test Date:** Feb-2022  
**Hardware Availability:** Mar-2022  
**Software Availability:** Jan-2022

### Threads

<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>48</td>
<td>322</td>
<td>322</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>48</td>
<td>127</td>
<td>127</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>48</td>
<td>151</td>
<td>151</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>48</td>
<td>138</td>
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</tr>
<tr>
<td>627.cam4_s</td>
<td>48</td>
<td>142</td>
<td>142</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>48</td>
<td>57.0</td>
<td>57.0</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>48</td>
<td>274</td>
<td>274</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>48</td>
<td>362</td>
<td>362</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>48</td>
<td>123</td>
<td>123</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>48</td>
<td>309</td>
<td>309</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>** SPECspeed®2017_fp_base (208)**</td>
<td>** SPECspeed®2017_fp_peak (214)**</td>
<td></td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** AMD EPYC 7473X  
- **Max MHz:** 3700  
- **Nominal:** 2800  
- **Enabled:** 48 cores, 2 chips  
- **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:** 768 MB I+D on chip per chip, 96 MB shared / 3 cores  
- **Other:** None  
- **Memory:** 2 TB (16 x 128 GB 4Rx4 PC4-3200AA-L)  
- **Storage:** 1 x 400 GB SAS SSD, RAID 0  
- **Other:** None

### Software

- **OS:** Ubuntu 20.04.2 LTS (x86_64)  
- **Kernel:** 5.13.0-28-generic  
- **Compiler:** C/C++/Fortran: Version 3.2.0 of AOCC  
- **Parallel:** Yes  
- **Firmware:** HPE BIOS Version A42 v2.56 02/10/2022 released Feb-2022  
- **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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Operating System Notes (Continued)

'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:
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root.
To disable THP for peak runs of 627.cam4_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 = "0-47"
LD_LIBRARY_PATH =
    "/home/cpu2017_speed/amd_speed_aocc320_milanx_A_lib/lib;/home/cpu2017_sp
    eed/amd_speed_aocc320_milanx_A_lib/lib32;"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOCC_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "48"

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:
GOMP_CPU_AFFINITY = "0-47"

Environment variables set by runcpu during the 619.lbm_s peak run:
GOMP_CPU_AFFINITY = "0-47"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0-47"

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
**Platform Notes**

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

The system date and time as discovered by sysinfo is incorrect as the time was not updated prior to the run. The test_date field shows an accurate date for the result.

The system ROM used for this result contains microcode version 0x 0A001227h for the AMD EPYC 7nn3X family of processors. The reference code/AGESA version used in this ROM is version MilanPI 1.0.0.8.

Sysinfo program /home/cpu2017_speed/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaf64d
running on cpu2017-ProLiant-DL365-Gen10-Plus Mon Jan 10 14:03:18 2022

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

```plaintext
model name : AMD EPYC 7473X 24-Core Processor
  2 "physical id"s (chips)
  48 "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 : 24
siblings : 24
  physical 0: cores 0 1 2 4 5 6 8 9 10 12 13 14 16 17 18 20 21 22 24 25 26 28 29 30
  physical 1: cores 0 1 2 4 5 6 8 9 10 12 13 14 16 17 18 20 21 22 24 25 26 28 29 30
```

From lscpu from util-linux 2.34:

```plaintext
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):            48
On-line CPU(s) list: 0-47
Thread(s) per core: 1
```

(Continued on next page)
Hewlett Packard Enterprise
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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: Feb-2022
Hardware Availability: Mar-2022
Software Availability: Jan-2022

Platform Notes (Continued)

Core(s) per socket: 24
Socket(s): 2
NUMA node(s): 16
Vendor ID: AuthenticAMD
CPU family: 25
Model: 1
Model name: AMD EPYC 747X 24-Core Processor
Stepping: 2
Frequency boost: enabled
CPU MHz: 2800.000
CPU max MHz: 2800.0000
CPU min MHz: 1500.0000
BogoMIPS: 5589.53
Virtualization: AMD-V
L1d cache: 1.5 MiB
L1i cache: 1.5 MiB
L2 cache: 24 MiB
L3 cache: 1.5 GiB
NUMA node0 CPU(s): 0–2
NUMA node1 CPU(s): 3–5
NUMA node2 CPU(s): 6–8
NUMA node3 CPU(s): 9–11
NUMA node4 CPU(s): 12–14
NUMA node5 CPU(s): 15–17
NUMA node6 CPU(s): 18–20
NUMA node7 CPU(s): 21–23
NUMA node8 CPU(s): 24–26
NUMA node9 CPU(s): 27–29
NUMA node10 CPU(s): 30–32
NUMA node11 CPU(s): 33–35
NUMA node12 CPU(s): 36–38
NUMA node13 CPU(s): 39–41
NUMA node14 CPU(s): 42–44
NUMA node15 CPU(s): 45–47
Vulnerability Itlb multihit: Not affected
Vulnerability L1t: 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, STIBF disabled, RSB filling
Vulnerability Srbd: Not affected
Vulnerability Txs async abort: Not affected
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr

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Platform Notes (Continued)

pge mca cmov pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt
pdpe1gb rdscpu lm constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid
aperfmpref pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe
popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy abm ssse3 misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb
bplist perfctr_l1d mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs
ibpb stibp vmmcall fsgsbase bmi1 avx2 smep bmi2 invpcid cqm rdt_a rdseed adx smap
clfuslopt clwb sha ni xsaveopt xsavec xgetbv1 xsaves cqm_l1d cqm_l1c cqm_l2c
mtrr_size qword physically_4g clflushopt clwb sha_ni xsaveopt xsavec xgetbv1
xsaves cqm_l1c cqm_l2c cqm_l3c cqm_l4c cqm_l5c cqm_l6c cqm_l7c cqm_mbb_total
cqm_lmb_mib_local clzero irperf xsaverptr rdpru wbnoinvd amd_ppin arat
npt libvm svm_lock nrip_save tsc_scale vmcb_clean flushbyasis decodeasistles
pausefilter pfthreshold v_vmsave_vmload vgif v_spec_ctrl umip pku ospke vaes
vpclmulqdq rdpid overflow_recov succor smca

From lscpu --cache:
NAME ONE-SIZE ALL-SIZE WAYS TYPE LEVEL
L1d  32K  1.5M 8 Data 1
L1i  32K  1.5M 8 Instruction 1
L2  512K  24M 8 Unified 2
L3  96M  1.5G 16 Unified 3

/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: 16 nodes (0-15)
   node 0 cpus: 0 1 2
   node 0 size: 128711 MB
   node 0 free: 127939 MB
   node 1 cpus: 3 4 5
   node 1 size: 129023 MB
   node 1 free: 128945 MB
   node 2 cpus: 6 7 8
   node 2 size: 128989 MB
   node 2 free: 128827 MB
   node 3 cpus: 9 10 11
   node 3 size: 129023 MB
   node 3 free: 128906 MB
   node 4 cpus: 12 13 14
   node 4 size: 129023 MB
   node 4 free: 128928 MB
   node 5 cpus: 15 16 17
   node 5 size: 129023 MB
   node 5 free: 128857 MB
   node 6 cpus: 18 19 20
   node 6 size: 129023 MB
   node 6 free: 128883 MB

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SPECspeed®2017_fp_peak = 214

Platform Notes (Continued)

node 7 cpus: 21 22 23
node 7 size: 116910 MB
node 7 free: 116754 MB
node 8 cpus: 24 25 26
node 8 size: 129023 MB
node 8 free: 128886 MB
node 9 cpus: 27 28 29
node 9 size: 129023 MB
node 9 free: 128972 MB
node 10 cpus: 30 31 32
node 10 size: 129023 MB
node 10 free: 128943 MB
node 11 cpus: 33 34 35
node 11 size: 129023 MB
node 11 free: 128960 MB
node 12 cpus: 36 37 38
node 12 size: 129023 MB
node 12 free: 128965 MB
node 13 cpus: 39 40 41
node 13 size: 129023 MB
node 13 free: 128982 MB
node 14 cpus: 42 43 44
node 14 size: 129023 MB
node 14 free: 128945 MB
node 15 cpus: 45 46 47
node 15 size: 129015 MB
node 15 free: 128959 MB

node distances:
node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
0:  10  11  11  11  11  11  11  11  32  32  32  32  32  32  32  32

From /proc/meminfo

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Platform Notes (Continued)

MemTotal: 2101148780 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 20.04.2 LTS
From /etc/*release* /etc/*version*
debian_version: bullseye/sid
os-release:
  NAME="Ubuntu"
  VERSION="20.04.2 LTS (Focal Fossa)"
  ID=ubuntu
  ID_LIKE=debian
  PRETTY_NAME="Ubuntu 20.04.2 LTS"
  VERSION_ID="20.04"
  HOME_URL="https://www.ubuntu.com/"
  SUPPORT_URL="https://help.ubuntu.com/"
uname -a:
  Linux cpu2017-ProLiant-DL365-Gen10-Plus 5.13.0-28-generic #31~20.04.1-Ubuntu SMP Wed Jan 19 14:08:10 UTC 2022 x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swaps barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Full AMD retpoline, IBPB: conditional, IBRS_FW, STIBP: disabled, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

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Specspeed®2017_fp_base = 208
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CPU2017 License: 3
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Platform Notes (Continued)

run-level 5 Jan 10 10:27

SPEC is set to: /home/cpu2017_speed
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda2      ext4  366G   69G  279G  20% /

From /sys/devices/virtual/dmi/id
Vendor:         HPE
Product:        ProLiant DL365 Gen10 Plus
Product Family: ProLiant
Serial:         CN70430NKN

Additional information from dmidecode 3.2 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:         02/10/2022
   BIOS Revision:     2.56
   Firmware Revision: 2.55

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
<table>
<thead>
<tr>
<th>C</th>
<th>619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)</th>
</tr>
</thead>
</table>
AMD clang version 13.0.0 (CLANG: AOCC_3.2.0-Build#128 2021_11_12) (based on LLVM Mirror.Version.13.0.0) Target: x86_64-unknown-linux-gnu Thread model: posix InstalledDir: /opt/AMD/aocc-compiler-3.2.0/bin

==============================================================================
<table>
<thead>
<tr>
<th>C++, C, Fortran</th>
<th>607.cactuBSSN_s(base, peak)</th>
</tr>
</thead>
</table>
AMD clang version 13.0.0 (CLANG: AOCC_3.2.0-Build#128 2021_11_12) (based on

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Compiler Version Notes (Continued)

LLVM Mirror.Version.13.0.0)  
Target: x86_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc-compiler-3.2.0/bin  
AMD clang version 13.0.0 (CLANG: AOCC_3.2.0-Build#128 2021_11_12) (based on LLVM Mirror.Version.13.0.0)  
Target: x86_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc-compiler-3.2.0/bin  
AMD clang version 13.0.0 (CLANG: AOCC_3.2.0-Build#128 2021_11_12) (based on LLVM Mirror.Version.13.0.0)  
Target: x86_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc-compiler-3.2.0/bin

Fortran         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak)
-------------|---------------------------|---------------------------
----------|---------------------------|---------------------------
AMD clang version 13.0.0 (CLANG: AOCC_3.2.0-Build#128 2021_11_12) (based on LLVM Mirror.Version.13.0.0)  
Target: x86_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc-compiler-3.2.0/bin

Fortran, C      | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)
-------------|---------------------------|---------------------------
----------|---------------------------|---------------------------
AMD clang version 13.0.0 (CLANG: AOCC_3.2.0-Build#128 2021_11_12) (based on LLVM Mirror.Version.13.0.0)  
Target: x86_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /opt/AMD/aocc-compiler-3.2.0/bin

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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 -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 -fopenmp -flto -fstruct-layout=5
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-freemap-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=libomp -lomp -lamdlibm -ljemalloc -lflang

Fortran benchmarks:
-m64 -Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-lcm-vrp -Wl,-mllvm -Wl,-region-vectorize

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

Fortran benchmarks (continued):
- -Wl,-mlivm -Wl,-function-specialize
- -Wl,-mlivm -Wl,-align-all-nofallthru-blocks=6
- -Wl,-mlivm -Wl,-reduce-array-computations=3 -Hz,1,0x1 -O3
- -march=znver3 -fveclib=AMDLIBM -ffast-math -fopenmp -Mrecursive
- -mlivm -fuse-tile-inner-loop -funroll-loops
- -mlivm -extra-vectorizer-passes -mlivm -lsr-in-nested-loop
- -mlivm -enable-licm-vrp -mlivm -reduce-array-computations=3
- -mlivm -global-vectorize-slp=true -mlivm -enable-loopinterchange
- -mlivm -compute-interchange-order -z muldefs -DSPEC_OPENMP
- -fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang

Benchmarks using both Fortran and C:
- -m64 -Wl,-mlivm -Wl,-enable-X86-prefetching
- -Wl,-mlivm -Wl,-enable-licm-vrp -Wl,-mlivm -Wl,-region-vectorize
- -Wl,-mlivm -Wl,-function-specialize
- -Wl,-mlivm -Wl,-align-all-nofallthru-blocks=6
- -Wl,-mlivm -Wl,-reduce-array-computations=3 -O3 -march=znver3
- -fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=5
- -mlivm -unroll-threshold=50 -mlivm -inline-threshold=1000
- -fremap-arrays -mlivm -function-specialize -flv-function-specialization
- -mlivm -enable-gvn-hoist -mlivm -global-vectorize-slp=true
- -mlivm -enable-licm-vrp -mlivm -reduce-array-computations=3 -Hz,1,0x1
- -Mrecursive -mlivm -fuse-tile-inner-loop -funroll-loops
- -mlivm -extra-vectorizer-passes -mlivm -lsr-in-nested-loop
- -mlivm -enable-loopinterchange -mlivm -compute-interchange-order
- -z muldefs -DSPEC_OPENMP -fopenmp=libomp -lomp -lamdlibm -ljemalloc
- -lflang

Benchmarks using Fortran, C, and C++:
- -m64 -Wl,-mlivm -Wl,-x86-use-vzeroupper=false
- -Wl,-mlivm -Wl,-region-vectorize -Wl,-mlivm -Wl,-function-specialize
- -Wl,-mlivm -Wl,-align-all-nofallthru-blocks=6
- -Wl,-mlivm -Wl,-reduce-array-computations=3 -O3 -march=znver3
- -fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=5
- -mlivm -unroll-threshold=50 -mlivm -inline-threshold=1000
- -fremap-arrays -mlivm -function-specialize -flv-function-specialization
- -mlivm -enable-gvn-hoist -mlivm -global-vectorize-slp=true
- -mlivm -enable-licm-vrp -mlivm -reduce-array-computations=3
- -mlivm -enable-partial-unswitch -mlivm -unroll-threshold=100
- -finline-aggressive -mlivm -loop-unswitch-threshold=200000
- -mlivm -reroll-loops -mlivm -aggressive-loop-unswitch
- -mlivm -extra-vectorizer-passes -mlivm -convert-pow-exp-to-int=false
- -Hz,1,0x1 -Mrecursive -mlivm -fuse-tile-inner-loop -funroll-loops
- -mlivm -lsr-in-nested-loop -mlivm -enable-loopinterchange
- -mlivm -compute-interchange-order -z muldefs -DSPEC_OPENMP

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Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL365 Gen10 Plus v2
(2.80 GHz, AMD EPYC 7473X)

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

Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
- -fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang

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
SPEC CPU®2017 Floating Point Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL365 Gen10 Plus v2
(2.80 GHz, AMD EPYC 7473X)

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

| CPU2017 License: 3 | Test Date: Feb-2022 |
| Test Sponsor: HPE | Hardware Availability: Mar-2022 |
| Tested by: HPE | Software Availability: Jan-2022 |

Peak Optimization Flags

C benchmarks:

619.lbm_s: -m64 -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 -fopenmp
-flto -fstruct-layout=5 -mllvm -unroll-threshold=50
-freemap-arrays -flv-function-specialization
-mllvm -inline-threshold=1000 -mllvm -enable-gvn-hoist
-mllvm -global-vectorize-slp=true
-mllvm -function-specialize -mllvm -enable-licm-vrp
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang

638.imagick_s: basepeak = yes
644.nab_s: basepeak = yes

Fortran benchmarks:

603.bwaves_s: basepeak = yes
649.fotonik3d_s: basepeak = yes

654.roms_s: -m64 -Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-licm-vrp
-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 -fopenmp
-Mrecursive -mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true -mllvm -enable-licm-vrp
-DSPEC_OPENMP -fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang

Benchmarks using both Fortran and C:

621.wrf_s: basepeak = yes
627.cam4_s: basepeak = yes
628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

-m64 -Wl,-mllvm -Wl,-x86-use-vzeroupper=false
-Wl,-mllvm -Wl,-enable-licm-vrp

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Hewlett Packard Enterprise
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ProLiant DL365 Gen10 Plus v2
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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: Feb-2022
Hardware Availability: Mar-2022
Software Availability: Jan-2022

Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
- -Wl,-mllvm -Wl,-do-block-reorder=aggressive
- -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 -fopenmp -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-lcvm-vrp -mllvm -reduce-array-computations=3
- -finline-aggressive -mllvm -unroll-threshold=100 -mllvm -reroll-loops
- -mllvm -aggressive-loop-unswitch -Mrecursive
- -mllvm -do-block-reorder=aggressive -DSPEC_OPENMP -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

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-revR.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-revR.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.1.8 on 2022-01-10 03:33:18-0500.
Originally published on 2022-03-21.