## SPEC CPU®2017 Floating Point Speed Result

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)
ProLiant DL325 Gen10 Plus v2
(3.50 GHz, AMD EPYC 73F3)

<table>
<thead>
<tr>
<th>Specspeed®2017_fp_base</th>
<th>118</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specspeed®2017_fp_peak</td>
<td>127</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_peak</th>
<th>SPECspeed®2017_fp_base</th>
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<tr>
<td>16</td>
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<td>16</td>
<td>163</td>
<td>118</td>
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<tr>
<td>32</td>
<td>148</td>
<td>148</td>
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<tr>
<td>32</td>
<td>148</td>
<td>89.9</td>
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<tr>
<td>16</td>
<td>105</td>
<td>149</td>
</tr>
<tr>
<td>32</td>
<td>73.7</td>
<td>191</td>
</tr>
<tr>
<td>16</td>
<td>136</td>
<td>147</td>
</tr>
</tbody>
</table>

### Hardware
- **CPU Name:** AMD EPYC 73F3  
- **Max MHz:** 4000  
- **Nominal:** 3500  
- **Enabled:** 16 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 / 2 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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SPECspeed®2017 fp_base = 118
SPECspeed®2017 fp_peak = 127

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<th>Seconds</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
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<td>147</td>
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<td>400</td>
<td>147</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>16</td>
<td>102</td>
<td>163</td>
<td>103</td>
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<td>103</td>
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<td>619.lbm_s</td>
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<td>57.0</td>
<td>91.9</td>
<td>57.0</td>
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<td>627.cam4_s</td>
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<td>638.imagick_s</td>
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<tr>
<td>644.nab_s</td>
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<td>649.fotonik3d_s</td>
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<td>654.roms_s</td>
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<td>107</td>
<td>147</td>
<td>107</td>
<td>148</td>
<td>107</td>
<td>147</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

The AMD64 AOCC Compiler Suite is available at http://developer.amd.com/amd-aocc/

Submit Notes

The config file option 'submit' was used. 'numactl' was used to bind copies to the cores. See the configuration file for details.

Operating System Notes

'ulimit -s unlimited' was used to set environment stack size
'ulimit -l 2097152' was used to set environment locked pages in memory limit
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
'echo 8 > /proc/sys/vm/dirty_ratio' run as root to limit dirty cache to 8% of memory.
'echo 1 > /proc/sys/vm/swappiness' run as root to limit swap usage to minimum necessary.
'echo 1 > /proc/sys/vm/zone_reclaim_mode' run as root to free node-local memory and avoid remote memory usage.
'sync; echo 3 > /proc/sys/vm/drop_caches' run as root to reset filesystem caches.
'sysctl -w kernel.randomize_va_space=0' run as root to disable address space layout randomization (ASLR) to reduce run-to-run variability.
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root to enable

(Continued on next page)
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;"
MALLOC_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "32"

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:
GOMP_CPU_AFFINITY = "0-15"

Environment variables set by runcpu during the 619.lbm_s peak run:
GOMP_CPU_AFFINITY = "0 16 1 17 2 18 3 19 4 20 5 21 6 22 7 23 8 24 9 25 10 26
11 27 12 28 13 29 14 30 15 31"

Environment variables set by runcpu during the 621.wrf_s peak run:
GOMP_CPU_AFFINITY = "0-15"

Environment variables set by runcpu during the 627.cam4_s peak run:
GOMP_CPU_AFFINITY = "0 16 1 17 2 18 3 19 4 20 5 21 6 22 7 23 8 24 9 25 10 26
11 27 12 28 13 29 14 30 15 31"

Environment variables set by runcpu during the 644.nab_s peak run:
GOMP_CPU_AFFINITY = "0 16 1 17 2 18 3 19 4 20 5 21 6 22 7 23 8 24 9 25 10 26
11 27 12 28 13 29 14 30 15 31"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0-15"

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)
SPEC CPU®2017 Floating Point Speed Result

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ProLiant DL325 Gen10 Plus v2
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SPECspeed®2017_fp_base = 118
SPECspeed®2017_fp_peak = 127

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

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

General Notes (Continued)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (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
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 17:24:56 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 73F3 16-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 : 16
    siblings : 32
    physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

From lscpu:
    Architecture:          x86_64
    CPU op-mode(s):        32-bit, 64-bit

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Hardware Availability: Jun-2021
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Platform Notes (Continued)

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: 2
Core(s) per socket: 16
Socket(s): 1
NUMA node(s): 8
Vendor ID: AuthenticAMD
CPU family: 25
Model: 1
Model name: AMD EPYC 73F3 16-Core Processor
Stepping: 1
Frequency boost: enabled
CPU MHz: 1794.166
CPU max MHz: 3500.0000
CPU min MHz: 1500.0000
BogoMIPS: 6987.09
Virtualization: AMD-V
L1d cache: 512 KiB
L1i cache: 512 KiB
L2 cache: 8 MiB
L3 cache: 256 MiB
NUMA node0 CPU(s): 0,1,16,17
NUMA node1 CPU(s): 2,3,18,19
NUMA node2 CPU(s): 4,5,20,21
NUMA node3 CPU(s): 6,7,22,23
NUMA node4 CPU(s): 8,9,24,25
NUMA node5 CPU(s): 10,11,26,27
NUMA node6 CPU(s): 12,13,28,29
NUMA node7 CPU(s): 14,15,30,31
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 Srbdss: Not affected
Vulnerability Txs sync abort: Not affected
Flags: fpv 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
aperfmpref pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 movbe popcnt aes

(Continued on next page)
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Platform Notes (Continued)

```
xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a
misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb
bpext perfctr_l1l mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs
ibpb stibp vmmcall fsqbase bm1 avx2 smep bmi2 invpcid cqm rdt_a rdseed adx smap
c1flushopt clwb sha_ni xsaveopt xsaves xgetbv1 xsavees cqm_llc cqm_occup_llc
cqm_mbm_total cqm_mbm_local clzero irperf xsaverprtr wbinvd arat lbrv svm_lock
nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pfthreshold
v_vmsave_vmload vgif umip pku ospke vaes vpclmulqdq rdpid overflow_recover 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 16 17
node 0 free: 128776 MB
node 0 size: 128776 MB
node 1 cpus: 2 3 18 19
node 1 free: 128920 MB
node 1 size: 128920 MB
node 2 cpus: 4 5 20 21
node 2 free: 128878 MB
node 2 size: 128878 MB
node 3 cpus: 6 7 22 23
node 3 free: 128844 MB
node 3 size: 128844 MB
node 4 cpus: 8 9 24 25
node 4 free: 128998 MB
node 4 size: 128998 MB
node 5 cpus: 10 11 26 27
node 5 free: 129022 MB
node 5 size: 129022 MB
node 6 cpus: 12 13 28 29
node 6 free: 129022 MB
node 6 size: 129022 MB
node 7 cpus: 14 15 30 31
node 7 free: 116909 MB
node 7 size: 116909 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

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

Platform Notes (Continued)

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
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 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/swapgs barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1): Mitigation: Full AMD retpoline, IBPB: conditional, IBRS_FW, STIBP: always-on, RSB filling
CVE-2017-5715 (Spectre variant 2):
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

(Continued on next page)
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<table>
<thead>
<tr>
<th>CPU2017 License: 3</th>
<th>Test Date: Apr-2021</th>
</tr>
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<tbody>
<tr>
<td>Test Sponsor: HPE</td>
<td>Hardware Availability: Jun-2021</td>
</tr>
<tr>
<td>Tested by: HPE</td>
<td>Software Availability: Mar-2021</td>
</tr>
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</table>

**Platform Notes (Continued)**

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

<table>
<thead>
<tr>
<th>Vendor:</th>
<th>HPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product:</td>
<td>ProLiant DL325 Gen10 Plus</td>
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<tr>
<td>Product Family:</td>
<td>ProLiant</td>
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<tr>
<td>Serial:</td>
<td>CN79290PKQ</td>
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</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>BIOS Vendor:</th>
<th>HPE</th>
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<tbody>
<tr>
<td>BIOS Version:</td>
<td>A43</td>
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<tr>
<td>BIOS Date:</td>
<td>02/15/2021</td>
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<tr>
<td>BIOS Revision:</td>
<td>2.40</td>
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<tr>
<td>Firmware Revision:</td>
<td>2.40</td>
</tr>
</tbody>
</table>

(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)
```

(Continued on next page)
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**Compiler Version Notes (Continued)**

AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

---

```
Fortran         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak)
```

---

```
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
```
SPEC CPU®2017 Floating Point Speed Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL325 Gen10 Plus v2
(3.50 GHz, AMD EPYC 73F3)

SPECspear®2017_fp_base = 118
SPECspeed®2017_fp_peak = 127

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<td>Software Availability: Mar-2021</td>
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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 -03 -march=znver3
-fvcclib=AMDLIBM -ffast-math -ffto -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-licm-vrp -mllvm -reduce-array-computations=3 -z muldefs
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
-llflang -llflangrti

Fortran benchmarks:
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-enable-X86-prefetching

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Tested by: HPE

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Base Optimization Flags (Continued):

Fortran benchmarks (continued):
-WL,-mlvvm,-Wl,-enable-licm-vrp,-Wl,-mlvvm,-Wl,-region-vectorize
-WL,-mlvvm,-Wl,-function-specialize
-WL,-mlvvm,-Wl,-align-all-nofallthru-blocks=6
-WL,-mlvvm,-Wl,-reduce-array-computations=3 -Hz,1,0x1 -O3
-march=znver3 -fvecclib=AMDLIBM -ffast-math -Mrecursive
-mlvvm -fuse-tile-inner-loop -funroll-loops
-mlvvm -extra-vectorizer-passes -mlvvm -lsr-in-nested-loop
-mlvvm -enable-licm-vrp -mlvvm -reduce-array-computations=3
-mlvvm -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,-mlvvm,-Wl,-enable-X86-prefetching
-WL,-mlvvm,-Wl,-enable-licm-vrp,-Wl,-mlvvm,-Wl,-region-vectorize
-WL,-mlvvm,-Wl,-function-specialize
-WL,-mlvvm,-Wl,-align-all-nofallthru-blocks=6
-WL,-mlvvm,-Wl,-reduce-array-computations=3 -O3 -march=znver3
-fvecclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mlvvm -unroll-threshold=50 -mlvvm -inline-threshold=1000
-fremap-arrays -mlvvm -function-specialize -flv-function-specialization
-mlvvm -enable-gvn-hoist -mlvvm -global-vectorize-slp=true
-mlvvm -enable-licm-vrp -mlvvm -reduce-array-computations=3 -Hz,1,0x1
-Mrecursive -mlvvm -fuse-tile-inner-loop -funroll-loops
-mlvvm -extra-vectorizer-passes -mlvvm -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
-WL,-mlvvm,-Wl,-x86-use-vzeroupper=false
-WL,-mlvvm,-Wl,-region-vectorize,-Wl,-mlvvm,-Wl,-function-specialize
-WL,-mlvvm,-Wl,-align-all-nofallthru-blocks=6
-WL,-mlvvm,-Wl,-reduce-array-computations=3 -O3 -march=znver3
-fvecclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mlvvm -unroll-threshold=50 -mlvvm -inline-threshold=1000
-fremap-arrays -mlvvm -function-specialize -flv-function-specialization
-mlvvm -enable-gvn-hoist -mlvvm -global-vectorize-slp=true
-mlvvm -enable-licm-vrp -mlvvm -reduce-array-computations=3
-mlvvm -enable-partial-unswitch -mlvvm -unroll-threshold=100
-finline-aggressive -mlvvm -loop-unswitch-threshold=200000
-mlvvm -reroll-loops -mlvvm -aggressive-loop-unswitch
-mlvvm -extra-vectorizer-passes -mlvvm -convert-pow-exp-to-int=false
-Hz,1,0x1 -Mrecursive -mlvvm -fuse-tile-inner-loop -funroll-loops
-mlvvm -lsr-in-nested-loop -z muldefs -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang -lflangrti
SPEC CPU®2017 Floating Point Speed Result

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Test Date: Apr-2021
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Hardware Availability: Jun-2021
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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.ibm_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 -flto
- fstruct-layout=5 -mllvm -unroll-threshold=50

(Continued on next page)
Hewlett Packard Enterprise
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Peak Optimization Flags (Continued)

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

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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: -m64 -mno-adx -mno-sse4a
- W1, -mllvm -W1, -enable-X86-prefetching
- W1, -mllvm -W1, -enable-licm-vrp
- W1, -mllvm -W1, -function-specialize
- W1, -mllvm -W1, -align-all-nofallthru-blocks=6
- W1, -mllvm -W1, -reduce-array-computations=3 -Ofast
- march=znver3 -fveclib=AMDLIBM -ffast-math -flto
- 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 -Mrecursive
- DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
- ljemalloc -lflang

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 -Wl,-mllvm -Wl, -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 -inline-threshold=1000 -mllvm -enable-gvn-hoist
- 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
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SPECspeed®2017_fp_peak = 127

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

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

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