### SPEC CPU®2017 Floating Point Speed Result

**Hewlett Packard Enterprise**

*(Test Sponsor: HPE)*

ProLiant DL325 Gen10 Plus v2  
*(3.20 GHz, AMD EPYC 7343)*

**SPECspeed®2017_fp_base = 115**

**SPECspeed®2017_fp_peak = 123**

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS: Ubuntu 20.04.1 LTS (x86_64)</td>
<td>CPU Name: AMD EPYC 7343</td>
</tr>
<tr>
<td>Kernel 5.4.0-54-generic</td>
<td>Max MHz: 3900</td>
</tr>
<tr>
<td>Compiler: C/C++/Fortran: Version 3.0.0 of AOCC</td>
<td>Nominal: 3200</td>
</tr>
<tr>
<td>Parallel: Yes</td>
<td>Enabled: 16 cores, 1 chip, 2 threads/core</td>
</tr>
<tr>
<td>Firmware: HPE BIOS Version A43 v2.42 04/15/2021 released Apr-2021</td>
<td>Orderable: 1 chip</td>
</tr>
<tr>
<td>File System: ext4</td>
<td>Cache L1: 32 KB I+32 KB D on chip per core</td>
</tr>
<tr>
<td>System State: Run level 5 (multi-user, GUI disabled)</td>
<td>L2: 512 KB I+D on chip per core</td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
<td>L3: 128 MB I+D on chip per chip, 32 MB shared / 4 cores</td>
</tr>
<tr>
<td>Peak Pointers: 64-bit</td>
<td>Other: None</td>
</tr>
<tr>
<td>Power Management: BIOS set to prefer performance at the cost of additional power usage</td>
<td>Memory: 1 TB (8 x 128 GB 4Rx4 PC4-3200AA-L)</td>
</tr>
<tr>
<td>Other: jemalloc: jemalloc memory allocator library v5.1.0</td>
<td>Storage: 1 x 800 GB SAS SSD, RAID 0</td>
</tr>
</tbody>
</table>

---

### 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>16</td>
<td>159</td>
<td>165</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>16</td>
<td>57.5</td>
<td>68.9</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>32</td>
<td>68.9</td>
<td>85.1</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>16</td>
<td>153</td>
<td>188</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>16</td>
<td>69.8</td>
<td>86.1</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>16</td>
<td>105</td>
<td>188</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>16</td>
<td>151</td>
<td>188</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>32</td>
<td>151</td>
<td>188</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>16</td>
<td>188</td>
<td>225</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>16</td>
<td>124</td>
<td>225</td>
</tr>
</tbody>
</table>

**Test Sponsor:** HPE  
**Test Date:** Jun-2021  
**Hardware Availability:** Jun-2021  
**Software Availability:** Mar-2021
### 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>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>16</td>
<td>168</td>
<td>352</td>
<td>168</td>
<td>352</td>
<td>168</td>
<td>351</td>
<td>168</td>
<td>352</td>
<td>168</td>
<td>351</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>16</td>
<td>105</td>
<td>159</td>
<td>105</td>
<td>159</td>
<td>108</td>
<td>155</td>
<td>16</td>
<td>105</td>
<td>159</td>
<td>105</td>
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<td>16</td>
<td>91.1</td>
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<td>105</td>
<td>159</td>
<td>106.5</td>
<td>153</td>
<td>16</td>
<td>105</td>
<td>159</td>
<td>105</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>16</td>
<td>86.8</td>
<td>152</td>
<td>86.4</td>
<td>153</td>
<td>86.5</td>
<td>153</td>
<td>16</td>
<td>86.8</td>
<td>152</td>
<td>86.4</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>16</td>
<td>128</td>
<td>69.5</td>
<td>127</td>
<td>69.9</td>
<td>127</td>
<td>69.8</td>
<td>32</td>
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<td>85.3</td>
<td>104</td>
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<tr>
<td>628.pop2_s</td>
<td>16</td>
<td>138</td>
<td>86.1</td>
<td>138</td>
<td>86.1</td>
<td>138</td>
<td>86.2</td>
<td>32</td>
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<td>104</td>
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<tr>
<td>638.imagick_s</td>
<td>16</td>
<td>138</td>
<td>105</td>
<td>138</td>
<td>105</td>
<td>138</td>
<td>105</td>
<td>32</td>
<td>92.9</td>
<td>188</td>
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<td>644.nab_s</td>
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<td>116</td>
<td>151</td>
<td>116</td>
<td>151</td>
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<td>68.0</td>
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<td>124</td>
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<td>124</td>
<td>126</td>
<td>125</td>
<td>32</td>
<td>119</td>
<td>132</td>
<td>120</td>
</tr>
</tbody>
</table>

**SPECspeed®2017_fp_base = 115**

**SPECspeed®2017_fp_peak = 123**

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 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/defrag' run as root to enable

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL325 Gen10 Plus v2
(3.20 GHz, AMD EPYC 7343)

SPECspeed®2017_fp_base = 115
SPECspeed®2017_fp_peak = 123

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 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 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) 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.

(Continued on next page)
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ProLiant DL325 Gen10 Plus v2
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| SPECspeed®2017_fp_base = 115 |
| SPECspeed®2017_fp_peak = 123 |

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

General Notes (Continued)

jemalloc: configured and built with GCC v4.8.2 in RHEL 7.4 (No options specified)
jemalloc 5.1.0 is available here:
https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2

Submitted by: "Bucek, James" <james.bucek@hpe.com>
Submitted: Mon Jun 21 13:51:16 EDT 2021
Submission: cpu2017-20210621-27609.sub

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: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on dl325gen10plus Wed Apr 1 12:26:11 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 7343 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 from util-linux 2.34:
  Architecture: x86_64
  CPU op-mode(s): 32-bit, 64-bit
  Byte Order: Little Endian
  Address sizes: 48 bits physical, 48 bits virtual

(Continued on next page)
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Tested by: HPE

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

Platform Notes (Continued)

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): 4
Vendor ID: AuthenticAMD
CPU family: 25
Model: 1
Model name: AMD EPYC 7343 16-Core Processor
Stepping: 1
Frequency boost: enabled
CPU MHz: 2339.098
CPU max MHz: 3200.0000
CPU min MHz: 1500.0000
BogoMIPS: 6387.80
Virtualization: AMD-V
L1d cache: 512 KiB
L1i cache: 512 KiB
L2 cache: 8 MiB
L3 cache: 128 MiB
NUMA node0 CPU(s): 0-3,16-19
NUMA node1 CPU(s): 4-7,20-23
NUMA node2 CPU(s): 8-11,24-27
NUMA node3 CPU(s): 12-15,28-31
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spectre store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1: Mitigation; useregcopy/swapgs barriers and __user pointer sanitation
Vulnerability Spectre v2: Mitigation; Full AMD retpoline, IBPB conditional, IBRS_FW, STIBP always-on, RSB filling
Vulnerability Srbds: Not affected
Vulnerability Tx5 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 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 misalignsse 3dnowprefetch osvw ibs k8it wdt tce topoext perfctr_core perfctr_nb perfctr_l1d mwainx cpb cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbase bmi1 avx2 smep bmi2 invpcid cqm rdt_a rdsed adx smap clflushopt clwb sha ni xsaveopt xsavec xgetbv1 xsave vppc qm_llc qm_occup_llc qm_mb3_total qm_mb3_local clzero irperf xsaveerptr wbinvd arat npt lbrv svm_lock

(Continued on next page)
Platform Notes (Continued)

nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter pfthreshold
v_vmsave_vmload vgif umip pku ospke vaes vpclmulqdq rdpid overflow_recov succor smca

From lscpu --cache:

NAME ONE-SIZE ALL-SIZE WAYS TYPE LEVEL
L1d 32K 512K 8 Data 1
L1i 32K 512K 8 Instruction 1
L2 512K 8M 8 Unified 2
L3 32M 128M 16 Unified 3

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 16 17 18 19
node 0 size: 257775 MB
node 0 free: 257511 MB
node 1 cpus: 4 5 6 7 20 21 22 23
node 1 size: 258046 MB
node 1 free: 257865 MB
node 2 cpus: 8 9 10 11 24 25 26 27
node 2 size: 258046 MB
node 2 free: 257824 MB
node 3 cpus: 12 13 14 15 28 29 30 31
node 3 size: 245934 MB
node 3 free: 245335 MB
node distances:
node 0 1 2 3
 0: 10 11 11 11
 1: 11 10 11 11
 2: 11 11 10 11
 3: 11 11 11 10

From /proc/meminfo
MemTotal: 1044277468 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

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

From /usr/bin/lsb_release -d
Ubuntu 20.04.1 LTS

From /etc/*release* /etc/*version*
SPEC CPU®2017 Floating Point Speed Result

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Platform Notes (Continued)

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

run-level 5 Apr 1 12:23

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>27G</td>
<td>669G</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

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
Platform Notes (Continued)

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)

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
(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
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SPECspeed®2017_fp_peak = 123
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Jun-2021
Hardware Availability: Jun-2021
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Compiler Version Notes (Continued)

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
### 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
- -flang -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 -flang -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):

- `-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 -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 -larm.libm -ljemalloc`
- `-lflang -lfangrti`

Benchmarks using Fortran, C, and C++:

- `-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`
- `-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 -larm.libm -ljemalloc -lflang -lfangrti`

**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`
Hewlett Packard Enterprise

ProLiant DL325 Gen10 Plus v2
(3.20 GHz, AMD EPYC 7343)

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

SPECspeed®2017_fp_base = 115
SPECspeed®2017_fp_peak = 123

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 -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 -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -landlibm -ljemalloc -lflang

638.imagick_s: basepeak = yes

644.nab_s: -m64 -mno-adx -mno-sse4a -Wl, -mllvm -Wl,-region-vectorize
-Wl, -mllvm -Wl,-function-specialize -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

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

644.nab_s (continued):
-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: basepeak = yes
627.cam4_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 -flto
  -fstruct-layout=5 -mlirvm -unroll-threshold=50
  -fremap-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 -Mrecursive
  -DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
  -ljemalloc -lflang

628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

(Continued on next page)
SPEC CPU®2017 Floating Point Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL325 Gen10 Plus v2
(3.20 GHz, AMD EPYC 7343)

SPECspeed®2017_fp_base = 115
SPECspeed®2017_fp_peak = 123

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

Peak Optimization Flags (Continued)

607.cactuBSSN_s: basepeak = yes

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.

Tested with SPEC CPU®2017 v1.1.8 on 2020-04-01 13:26:11-0400.
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