**Hewlett Packard Enterprise**

**ProLiant DL365 Gen10 Plus**

(3.20 GHz, AMD EPYC 7343)

---

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>HPE</td>
</tr>
<tr>
<td>Tested by:</td>
<td>HPE</td>
</tr>
</tbody>
</table>

**Software**

- OS: Ubuntu 20.04.1 LTS (x86_64)
- Kernel: 5.4.0-56-generic
- Compiler: C/C++/Fortran: Version 3.0.0 of AOCC
- Parallel: Yes
- Firmware: HPE BIOS Version A42 v2.42 04/29/2021 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

---

**Hardware**

- CPU Name: AMD EPYC 7343
- Max MHz: 3900
- Nominal: 3200
- Enabled: 32 cores, 2 chips, 2 threads/core
- 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: 128 MB I+D on chip per chip, 32 MB shared / 4 cores
- Other: None
- Memory: 2 TB (16 x 128 GB 4Rx4 PC4-3200AA-L)
- Storage: 1 x 196 GB SATA SSD, RAID 0
- Other: None

---

** SPECspeed®2017_fp_base = 177**

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_peak = 187</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
</tr>
<tr>
<td>619.lbm_s</td>
</tr>
<tr>
<td>621.wrf_s</td>
</tr>
<tr>
<td>627.cam4_s</td>
</tr>
<tr>
<td>628.pop2_s</td>
</tr>
<tr>
<td>638.imagick_s</td>
</tr>
<tr>
<td>644.nab_s</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
</tr>
<tr>
<td>654.roms_s</td>
</tr>
</tbody>
</table>

---

**Threads**

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base (177)</th>
<th>SPECspeed®2017_fp_peak (187)</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>250</td>
<td>665</td>
</tr>
<tr>
<td>64</td>
<td></td>
<td>664</td>
</tr>
<tr>
<td>103</td>
<td></td>
<td>176</td>
</tr>
<tr>
<td>116</td>
<td></td>
<td></td>
</tr>
<tr>
<td>115</td>
<td></td>
<td>132</td>
</tr>
<tr>
<td>67.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>326</td>
<td></td>
<td></td>
</tr>
<tr>
<td>216</td>
<td></td>
<td></td>
</tr>
<tr>
<td>243</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Power Management:**

- BIOS set to prefer performance at the cost of additional power usage

---

**Test Date:** May-2021

**Hardware Availability:** Jun-2021

**Software Availability:** Mar-2021
## SPEC CPU®2017 Floating Point Speed Result

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL365 Gen10 Plus  
(3.20 GHz, AMD EPYC 7343)

**SPECspeed®2017_fp_base = 177**  
**SPECspeed®2017_fp_peak = 187**

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Base</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>32</td>
<td>88.7</td>
<td>665</td>
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<td>88.9</td>
<td>664</td>
<td>88.9</td>
<td>664</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>32</td>
<td>66.1</td>
<td>252</td>
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<td>66.9</td>
<td>249</td>
<td>66.6</td>
<td>250</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>32</td>
<td>51.0</td>
<td>103</td>
<td></td>
<td>51.1</td>
<td>103</td>
<td>51.0</td>
<td>103</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>32</td>
<td>75.2</td>
<td>176</td>
<td></td>
<td>75.2</td>
<td>176</td>
<td>76.0</td>
<td>174</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>32</td>
<td>77.8</td>
<td>114</td>
<td></td>
<td>77.2</td>
<td>115</td>
<td>77.1</td>
<td>115</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>32</td>
<td>176</td>
<td>67.6</td>
<td></td>
<td>177</td>
<td>67.0</td>
<td>176</td>
<td>67.3</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>32</td>
<td>76.2</td>
<td>199</td>
<td></td>
<td>76.4</td>
<td>189</td>
<td>75.9</td>
<td>190</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>32</td>
<td>63.7</td>
<td>247</td>
<td></td>
<td>63.8</td>
<td>247</td>
<td>63.9</td>
<td>274</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>32</td>
<td>80.7</td>
<td>113</td>
<td></td>
<td>80.7</td>
<td>113</td>
<td>80.4</td>
<td>113</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>32</td>
<td>72.8</td>
<td>216</td>
<td></td>
<td>72.5</td>
<td>217</td>
<td>73.6</td>
<td>214</td>
</tr>
</tbody>
</table>

**SPECspeed®2017_fp_base = 177**  
**SPECspeed®2017_fp_peak = 187**

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.

(Continued on next page)
Operating System Notes (Continued)

To enable Transparent Hugepages (THP) for all allocations, '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, and 638.imagick_s, 'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root.
To disable THP for peak runs of 627.cam4_s, 644.nab_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 = "0-63"
LD_LIBRARY_PATH = 
"/home/SPEC_CPU2017/amd_speed_aoccc300_milan_B_lib/64;/home/SPEC_CPU2017/ 
amd_speed_aoccc300_milan_B_lib/32:"
MALLOCONF = "retain: true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREADLIMIT = "64"

Environment variables set by runcpu during the 603.bwaves_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 619.lbm_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 627.cam4_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 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"
**SPEC CPU®2017 Floating Point Speed Result**

Hewlett Packard Enterprise (Test Sponsor: HPE)
ProLiant DL365 Gen10 Plus (3.20 GHz, AMD EPYC 7343)

---

### 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

Submitted by: "Bhatnagar, Prateek" <prateek.bhatnagar@hpe.com>
Submitted: Mon May 24 12:41:46 EDT 2021
Submission: cpu2017-20210524-26440.sub

Submitted by: "Bhatnagar, Prateek" <prateek.bhatnagar@hpe.com>
Submitted: Tue Jun 1 09:17:25 EDT 2021
Submission: cpu2017-20210524-26440.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
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 admin Wed Apr 1 17:26:29 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

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

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

Platform Notes (Continued)

2 "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 : 16  
siblings : 32  
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15  
physical 1: 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  
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: 16  
Socket(s): 2  
NUMA node(s): 8  
Vendor ID: AuthenticAMD  
CPU family: 25  
Model: 1  
Model name: AMD EPYC 7343 16-Core Processor  
Stepping: 1  
Frequency boost: enabled  
CPU MHz: 1880.135  
CPU max MHz: 3200.0000  
CPU min MHz: 1500.0000  
BogoMIPS: 6387.93  
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): 4-7,36-39  
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

(Continued on next page)
Platform Notes (Continued)

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 Txs async abort: Not affected
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pgse 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 pclmulqdq

/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: 257799 MB	node 0 free: 257479 MB
node 1 cpus: 4 5 6 7 36 37 38 39
node 1 size: 258021 MB
node 1 free: 257835 MB
node 2 cpus: 8 9 10 11 40 41 42 43
node 2 size: 258046 MB
node 2 free: 257853 MB
node 3 cpus: 12 13 14 15 44 45 46 47
node 3 size: 245935 MB
node 3 free: 245779 MB
node 4 cpus: 16 17 18 19 48 49 50 51
node 4 size: 258046 MB
node 4 free: 257852 MB
node 5 cpus: 20 21 22 23 52 53 54 55
node 5 size: 258046 MB
node 5 free: 257916 MB
node 6 cpus: 24 25 26 27 56 57 58 59
node 6 size: 258046 MB

(Continued on next page)
**Platform Notes (Continued)**

```
node 6 free: 257912 MB
node 7 cpus: 28 29 30 31 60 61 62 63
node 7 size: 258043 MB
node 7 free: 257759 MB
node distances:
node   0   1   2   3   4   5   6   7
0:  10  11  11  11  32  32  32  32
1:  11  10  11  11  32  32  32  32
2:  11  11  10  11  32  32  32  32
3:  11  11  11  10  32  32  32  32
4:  32  32  32  32  10  11  11  11
5:  32  32  32  32  11  10  11  11
6:  32  32  32  32  11  11  10  11
7:  32  32  32  32  11  11  11  10
```

From /proc/meminfo
- MemTotal: 2101230984 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

/sbin/tuned-adm active
- Current active profile: balanced

/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 admin 5.4.0-56-generic #62-Ubuntu SMP Mon Nov 23 19:20:19 UTC 2020 x86_64 x86_64
- x86_64 GNU/Linux

Kernel self-reported vulnerability status:

(Continued on next page)
### Platform Notes (Continued)

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:
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 17:24

SPEC is set to: /home/SPEC_CPU2017

From /sys/devices/virtual/dmi/id
Vendor: HPE
Product: ProLiant DL365 Gen10 Plus
Product Family: ProLiant
Serial: CN70430NKR

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:
16x Samsung M386AAG40AM3-CWE 128 GB 4 rank 3200
16x UNKNOWN NOT AVAILABLE

BIOS:
BIOS Vendor: HPE
BIOS Version: A42
BIOS Date: 04/29/2021
BIOS Revision: 2.42
Firmware Revision: 2.42

(End of data from sysinfo program)
Hewlett Packard Enterprise
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Tested by: HPE

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

Compiler Version Notes

==============================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
                 | 644.nab_s(base, peak)
------------------------------------------------------------------------------
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
------------------------------------------------------------------------------

C++, C, Fortran | 607.cactuBSSN_s(base, peak)
------------------------------------------------------------------------------
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
------------------------------------------------------------------------------

Fortran         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
                 | 654.roms_s(base, peak)
------------------------------------------------------------------------------
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
------------------------------------------------------------------------------

Fortran, C      | 621.wrf_s(base, peak) 627.cam4_s(base, peak)
                 | 628.pop2_s(base, peak)
------------------------------------------------------------------------------
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

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

Compiler Version Notes (Continued)

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

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.ibm_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
-\textit{-Wl,-mllvm -Wl,-function-specialize}
-\textit{-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6}
-\textit{-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3}
-\textit{-fvecclib=AMDLIBM -ffast-math -flto -fstruct-layout=5}
-\textit{-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000}
-\textit{-fremap-arrays -mllvm -function-specialize -flv-function-specialization}
-\textit{-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true}
-\textit{-mllvm -enable-lcm-vrp -mllvm -reduce-array-computations=3 -z muldefs}
-\textit{-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc}
-\textit{-lflang -lflangrti}

Fortran benchmarks:
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-enable-X86-prefetching
-\textit{-Wl,-mllvm -Wl,-function-specialize}
-\textit{-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6}
-\textit{-Wl,-mllvm -Wl,-reduce-array-computations=3 -Hz,1,0x1 -O3}
-\textit{-march=znver3 -fvecclib=AMDLIBM -ffast-math -Mrecursive}
-\textit{-mllvm -fuse-tile-inner-loop -funroll-loops}
-\textit{-mllvm -extra-vectorizer-passes -mllvm -lsr-in-nested-loop}
-\textit{-mllvm -enable-lcm-vrp -mllvm -reduce-array-computations=3}
-\textit{-mllvm -global-vectorize-slp=true -z muldefs -DSPEC_OPENMP -fopenmp}
-\textit{-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang -lflangrti}

Benchmarks using both Fortran and C:
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-enable-X86-prefetching
-\textit{-Wl,-mllvm -Wl,-function-specialize}
-\textit{-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6}
-\textit{-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3}
-\textit{-fvecclib=AMDLIBM -ffast-math -flto -fstruct-layout=5}
-\textit{-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000}
-\textit{-fremap-arrays -mllvm -function-specialize -flv-function-specialization}
-\textit{-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true}
-\textit{-mllvm -enable-lcm-vrp -mllvm -reduce-array-computations=3 -Hz,1,0x1}
-\textit{-Mrecursive -mllvm -fuse-tile-inner-loop -funroll-loops}
-\textit{-mllvm -extra-vectorizer-passes -mllvm -lsr-in-nested-loop -z muldefs}
-\textit{-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc}
-\textit{-lflang -lflangrti}

Benchmarks using Fortran, C, and C++:
-m64 -mno-adx -mno-sse4a -std=c++98
-\textit{-Wl,-mllvm -Wl,-x86-use-vzeroupper=false}
-\textit{-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-function-specialize}

(Continued on next page)
Hewlett Packard Enterprise
ProLiant DL365 Gen10 Plus
(3.20 GHz, AMD EPYC 7343)

SPECspeed®2017_fp_base = 177
SPECspeed®2017_fp_peak = 187

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

Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
-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
-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
-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

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

(Continued on next page)
Peak Compiler Invocation (Continued)

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 -lamdlibm -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
-mllvm -reduce-array-computations=3 -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang

Fortran benchmarks:

603.bwaves_s: -m64 -mno-adx -mno-sse4a
-Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-licm-vrp
-Wl,-mllvm -Wl,-function-specialize

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SPEC CPU®2017 Floating Point Speed Result
Copyright 2017-2021 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL365 Gen10 Plus
(3.20 GHz, AMD EPYC 7343)

SPECspeed®2017_fp_base = 177
SPECspeed®2017_fp_peak = 187

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

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

Peak Optimization Flags (Continued)

603.bwaves_s (continued):
-Wl,-mlivm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mlivm -Wl,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -Mrecursive
-mlivm -reduce-array-computations=3
-mlivm -global-vectorize-slp=true -mlivm -enable-licm-vrp
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -llflang

649.fotonik3d_s: basepeak = yes

654.roms_s: Same as 603.bwaves_s

Benchmarks using both Fortran and C:

621.wrf_s: basepeak = yes

627.cam4_s: -m64 -mno-adx -mno-sse4a
-Wl,-mlivm -Wl,-enable-X86-prefetching
-Wl,-mlivm -Wl,-enable-licm-vrp
-Wl,-mlivm -Wl,-function-specialize
-Wl,-mlivm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mlivm -Wl,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -flto
-fstruct-layout=5 -mlivm -unroll-threshold=50
-fremap-arrays -flv-function-specialization
-mlivm -inline-threshold=1000 -mlivm -enable-gvn-hoist
-mlivm -global-vectorize-slp=true
-mlivm -function-specialize -mlivm -enable-licm-vrp
-mlivm -reduce-array-computations=3 -Mrecursive
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -llflang

628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes

Peak Other Flags

C benchmarks:
- Wno-unused-command-line-argument -Wno-return-type

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

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