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

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL385 Gen11  
(2.75 GHz, AMD EPYC 9454)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>370</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>376</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 3  
**Test Date:** Jan-2023  
**Test Sponsor:** HPE  
**Hardware Availability:** Dec-2022  
**Tested by:** HPE  
**Software Availability:** Nov-2022

### Hardware

- **CPU Name:** AMD EPYC 9454  
- **Max MHz:** 3800  
- **Nominal:** 2750  
- **Enabled:** 96 cores, 2 chips  
- **Orderable:** 1.2 chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **Cache L2:** 1 MB I+D on chip per core  
- **Cache L3:** 256 MB I+D on chip per chip, 32 MB shared / 6 cores  
- **Other:** None  
- **Memory:** 1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)  
- **Storage:** 1 x 480 GB SATA SSD  
- **Other:** None

### Software

- **OS:** Ubuntu 22.04.1 LTS  
- **Compiler:** C/C++/Fortran: Version 4.0.0 of AOCC  
- **Parallel:** Yes  
- **Firmware:** HPE BIOS Version v1.12 11/24/2022 released  
- **File System:** ext4  
- **System State:** Run level 5 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** None  
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage

<table>
<thead>
<tr>
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<th>200</th>
<th>300</th>
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</tr>
</tbody>
</table>

**SPECspeed®2017_fp_base** (370)  
**SPECspeed®2017_fp_peak** (376)
SPEC CPU®2017 Floating Point Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL385 Gen11
(2.75 GHz, AMD EPYC 9454)

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Hewlett Packard Enterprise
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ProLiant DL385 Gen11
(2.75 GHz, AMD EPYC 9454)

SPECspeed®2017_fp_base = 370
SPECspeed®2017_fp_peak = 376

Results Table

<table>
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<tr>
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<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>25.7</td>
<td>613</td>
<td>25.7</td>
<td>613</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.

Operating System Notes

'ulimit -s unlimited' was used to set environment stack size limit
'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>

To limit dirty cache to 8% of memory, 'sysctl -w vm.dirty_ratio=8' run as root.
To limit swap usage to minimum necessary, 'sysctl -w vm.swappiness=1' run as root.
To free node-local memory and avoid remote memory usage,
'sysctl -w vm.zone_reclaim_mode=1' run as root.
To clear filesystem caches, 'sync; sysctl -w vm.drop_caches=3' run as root.
To disable address space layout randomization (ASLR) to reduce run-to-run variability,
'sysctl -w kernel.randomize_va_space=0' run as root.

To enable Transparent Hugepages (THP) for all allocations,

(Continued on next page)
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 always enable THP for peak runs of:
603.bwaves_s, 607.cactuBSSN_s, 619.lbm_s, 627.cam4_s, 628.pop2_s, 638.imagick_s, 644.nab_s, 649.fotonik3d_s:
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled; echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.
To disable THP for peak runs of 621.wrf_s:
'echo never > /sys/kernel/mm/transparent_hugepage/enabled; echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.
To enable THP only on request for peak runs of 654.roms_s:
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled; echo madvise > /sys/kernel/mm/transparent_hugepage/defrag' run as root.

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-95"
LD_LIBRARY_PATH = "/home/cpu2017/amd_speed_aocc400_genoa_B_lib/lib;"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOC_CONF = "oversize_threshold:0,retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "96"

Environment variables set by runcpu during the 603.bwaves_s peak run:
GOMP_CPU_AFFINITY = "0-95"

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:
GOMP_CPU_AFFINITY = "0-95"

Environment variables set by runcpu during the 619.lbm_s peak run:
GOMP_CPU_AFFINITY = "0-95"

Environment variables set by runcpu during the 621.wrf_s peak run:
GOMP_CPU_AFFINITY = "0-95"

Environment variables set by runcpu during the 627.cam4_s peak run:
GOMP_CPU_AFFINITY = "0-95"

Environment variables set by runcpu during the 628.pop2_s peak run:
GOMP_CPU_AFFINITY = "0-95"
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ProLiant DL385 Gen11
(2.75 GHz, AMD EPYC 9454)

SPECspeed®2017_fp_base = 370
SPECspeed®2017_fp_peak = 376

General Notes

Binaries were compiled on a system with 2x AMD EPYC 9174F CPU + 1.5TiB Memory using RHEL 8.6

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.

Platform Notes

BIOS Configuration
Workload Profile set to General Peak Frequency Compute
Determinism Control set to Manual
Performance Determinism set to Power Deterministic
AMD SMT Option set to Disabled
Last-Level Cache (LLC) as NUMA Node set to Enabled
ACPI C2 Latency set to 18 microseconds
Memory PStates set to Disabled
Thermal Configuration set to Maximum Cooling
Workload Profile set to Custom
Power Regulator set to OS Control Mode

The system ROM used for this result contains microcode version 0xa10110e for the AMD EPYC 9nn4X family of processors. The reference code/AGESA version used in this ROM is version GenoaPI 1.0.0.1-L6

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaf64d
running on admin1 Mon Jun 27 18:37:13 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
   model name : AMD EPYC 9454 48-Core Processor
   2 "physical id"s (chips)
   96 "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 : 48
   siblings : 48
   physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29 32 33 34 35 36 37 40 41 42 43 44 45 48 49 50 51 52 53 56 57 58 59 60 61
(Continued on next page)
Hewlett Packard Enterprise
ProLiant DL385 Gen11
(2.75 GHz, AMD EPYC 9454)

SPECspeed®2017_fp_base = 370
SPECspeed®2017_fp_peak = 376

CPU2017 License: 3
Test Sponsor: HPE
Test Date: Jan-2023
Hardware Availability: Dec-2022
Tested by: HPE
Software Availability: Nov-2022

Platform Notes (Continued)

physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
32 33 34 35 36 37 40 41 42 43 44 45 48 49 50 51 52 53 56 57 58 59 60 61

From lscpu from util-linux 2.37.2:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Address sizes: 52 bits physical, 57 bits virtual
Byte Order: Little Endian
CPU(s): 96
On-line CPU(s) list: 0-95
Vendor ID: AuthenticAMD
Model name: AMD EPYC 9454 48-Core Processor
CPU family: 25
Model: 17
Thread(s) per core: 1
Core(s) per socket: 48
Socket(s): 2
Stepping: 1
Frequency boost: enabled
CPU max MHz: 3812.0000
CPU min MHz: 400.0000
BogoMIPS: 5491.85
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr

Virtualization:
L1d cache: 3 MiB (96 instances)
L1i cache: 3 MiB (96 instances)
L2 cache: 96 MiB (96 instances)
L3 cache: 512 MiB (16 instances)
NUMA node(s): 16
NUMA node0 CPU(s): 0-5
NUMA node1 CPU(s): 24-29
NUMA node2 CPU(s): 12-17
NUMA node3 CPU(s): 36-41

(Continued on next page)
Hewlett Packard Enterprise
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SPECSpeed®2017_fp_peak = 376
SPECSpeed®2017_fp_base = 370

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**Platform Notes (Continued)**

NUMA node4 CPU(s):  18–23
NUMA node5 CPU(s):  42–47
NUMA node6 CPU(s):  6–11
NUMA node7 CPU(s):  30–35
NUMA node8 CPU(s):  48–53
NUMA node9 CPU(s):  72–77
NUMA node10 CPU(s): 60–65
NUMA node11 CPU(s): 84–89
NUMA node12 CPU(s): 66–71
NUMA node13 CPU(s): 90–95
NUMA node14 CPU(s): 54–59
NUMA node15 CPU(s): 78–83

Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Mmio stale data: Not affected
Vulnerability Retbleed: 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 sanitation
Vulnerability Spectre v2: Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP disabled, RSB filling, PBRSB-eIBRS Not affected
Vulnerability Srbds: Not affected
Vulnerability Tsx async abort: Not affected

From lscpu --cache:

```
NAME ONE-SIZE ALL-SIZE WAYS TYPE LEVEL SETS PHY-LINE COHERENCY-SIZE
L1d  32K   3M    8  Data 1  64  1  64
L1i  32K   3M    8  Instruction 1  64  1  64
L2    1M 96M    8  Unified 2 2048 1  64
L3   32M 512M 16  Unified 3 32768 1  64
```

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 3 4 5
node 0 size: 96456 MB
node 0 free: 96289 MB
node 1 cpus: 24 25 26 27 28 29
node 1 size: 96766 MB
node 1 free: 96629 MB
node 2 cpus: 12 13 14 15 16 17
```

(Continued on next page)
Platform Notes (Continued)

node 2 size: 96766 MB
node 2 free: 96656 MB
node 3 cpus: 36 37 38 39 40 41
node 3 size: 96766 MB
node 3 free: 96657 MB
node 4 cpus: 18 19 20 21 22 23
node 4 size: 96766 MB
node 4 free: 96643 MB
node 5 cpus: 42 43 44 45 46 47
node 5 size: 96766 MB
node 5 free: 96642 MB
node 6 cpus: 6 7 8 9 10 11
node 6 size: 96766 MB
node 6 free: 96648 MB
node 7 cpus: 30 31 32 33 34 35
node 7 size: 96766 MB
node 7 free: 96654 MB
node 8 cpus: 48 49 50 51 52 53
node 8 size: 96766 MB
node 8 free: 96531 MB
node 9 cpus: 72 73 74 75 76 77
node 9 size: 96766 MB
node 9 free: 96651 MB
node 10 cpus: 60 61 62 63 64 65
node 10 size: 96766 MB
node 10 free: 96559 MB
node 11 cpus: 84 85 86 87 88 89
node 11 size: 96766 MB
node 11 free: 96601 MB
node 12 cpus: 66 67 68 69 70 71
node 12 size: 96766 MB
node 12 free: 96636 MB
node 13 cpus: 90 91 92 93 94 95
node 13 size: 96716 MB
node 13 free: 96601 MB
node 14 cpus: 54 55 56 57 58 59
node 14 size: 96730 MB
node 14 free: 96618 MB
node 15 cpus: 78 79 80 81 82 83
node 15 size: 96766 MB
node 15 free: 96626 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

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

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

From /proc/meminfo
- MemTotal: 1585015524 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 22.04.1 LTS

From /etc/*release*/etc/*version*
- debian_version: bookworm/sid
- os-release:
  - PRETTY_NAME="Ubuntu 22.04.1 LTS"
  - NAME="Ubuntu"
  - VERSION_ID="22.04"
  - VERSION="22.04.1 LTS (Jammy Jellyfish)"
  - VERSION_CODENAME=jammy
  - ID=ubuntu
  - ID_LIKE=debian
  - HOME_URL="https://www.ubuntu.com/"

uname -a:
- Linux admin1 5.15.0-56-generic #62-Ubuntu SMP Tue Nov 22 19:54:14 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

(Continued on next page)
Platform Notes (Continued)

Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Not affected
mmio_stale_data: Not affected
retbleed: 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: Retpolines, IBPB: conditional, IBRS_FW, STIBP: disabled, RSB filling, PBRSB-eIBRS: Not affected
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 5 Jun 27 18:30
SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/ubuntu--vg-ubuntu--lv ext4 437G 21G 398G 5% /

From /sys/devices/virtual/dmi/id
Vendor: HPE
Product: ProLiant DL385 Gen11
Product Family: ProLiant
Serial: DL385GEN11-003

Additional information from dmidecode 3.3 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:
13x Hynix HMCG94MEBRA121N 64 GB 2 rank 4800
11x Hynix HMCG94MEBRA123N 64 GB 2 rank 4800

BIOS:
BIOS Vendor: HPE
BIOS Version: 1.12
BIOS Date: 11/24/2022
BIOS Revision: 1.12
Firmware Revision: 1.10

(End of data from sysinfo program)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
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(2.75 GHz, AMD EPYC 9454)

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SPECspeed®2017_fp_base = 370
SPECspeed®2017_fp_peak = 376

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

Test Date: Jan-2023
Hardware Availability: Dec-2022
Software Availability: Nov-2022

Compiler Version Notes

==============================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------

==============================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------

==============================================================================
Fortran         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------

==============================================================================
Fortran, C      | 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak)
------------------------------------------------------------------------------
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
------------------------------------------------------------------------------

(Continued on next page)
Hewlett Packard Enterprise (Test Sponsor: HPE)
ProLiant DL385 Gen11 (2.75 GHz, AMD EPYC 9454)

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

Compiler Version Notes (Continued)

LLVM Mirror.Version.14.0.6)
Target: x86_64 unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin
AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on
LLVM Mirror.Version.14.0.6)
Target: x86_64 unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/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

-DSPEC_LP64
-DSPEC_CASE_FLAG -Mbyteswapio
-DSPEC_LP64
-DSPEC_LP64
-DSPEC_LP64
-DSPEC_LP64
-DSPEC_LP64
-DSPEC_LP64
-DSPEC_LP64
-DSPEC_LP64
# SPEC CPU®2017 Floating Point Speed Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL385 Gen11  
(2.75 GHz, AMD EPYC 9454)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_base</td>
<td>370</td>
</tr>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>376</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 3  
**Test Date:** Jan-2023  
**Test Sponsor:** HPE  
**Hardware Availability:** Dec-2022  
**Tested by:** HPE  
**Software Availability:** Nov-2022

## Base Optimization Flags

**C benchmarks:**
- `-m64`  
- `-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`  
- `-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7`  
- `-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000`  
- `-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3`  
- `-DSPEC_OPENMP -zopt -fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang`

**Fortran benchmarks:**
- `-m64`  
- `-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`  
- `-Wl,-mllvm -Wl,-reduce-array-computations=3`  
- `-Wl,-mllvm -Wl,-enable-x86-prefetching -DSPEC_OPENMP -O3 -march=znver4`  
- `-mllvm -reduce-array-computations=3 -zopt -fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang`

**Benchmarks using both Fortran and C:**
- `-m64`  
- `-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`  
- `-Wl,-mllvm -Wl,-reduce-array-computations=3`  
- `-Wl,-mllvm -Wl,-enable-x86-prefetching -O3 -march=znver4`  
- `-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7`  
- `-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000`  
- `-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3`  

**Benchmarks using Fortran, C, and C++:**
- `-m64`  
- `-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`  
- `-Wl,-mllvm -Wl,-reduce-array-computations=3`  
- `-Wl,-mllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4`  
- `-fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=7`  
- `-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000`  
- `-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3`  
SPEC CPU®2017 Floating Point Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL385 Gen11
(2.75 GHz, AMD EPYC 9454)

SPECspeed®2017_fp_base = 370
SPECspeed®2017_fp_peak = 376

CPU2017 License: 3
Test Sponsor: HPE
Test Date: Jan-2023
Tested by: HPE
Hardware Availability: Dec-2022
Software Availability: Nov-2022

Base Other Flags

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

Fortran benchmarks:
-Wno-unused-command-line-argument

Benchmarks using both Fortran and C:
-Wno-return-type -Wno-unused-command-line-argument

Benchmarks using Fortran, C, and C++:
-Wno-return-type -Wno-unused-command-line-argument

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 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -fstruct-layout=9 -mllvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mllvm -inline-threshold=1000

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

619.lbm_s (continued):
-mlvvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

638.imagick_s: basepeak = yes

644.nab_s: basepeak = yes

Fortran benchmarks:

603.bwaves_s: -m64 -Wl,-mlvvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mlvvm -Wl,-reduce-array-computations=3
-Wl,-mlvvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP
-Ofast -march=znver4 -fveclib=AMDLIBM -ffast-math
-fopenmp -Mrecursive -mlvvm -reduce-array-computations=3
-fvector-transform -fscalar-transform -fopenmp=libomp
-lomp -lamdlibm -lamdalloc -lflang

649.fotonik3d_s: basepeak = yes

654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf_s: -m64 -Wl,-mlvvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mlvvm -Wl,-reduce-array-computations=3
-Wl,-mlvvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -fstruct-layout=9 -mlvvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mlvvm -inline-threshold=1000
-mlvvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-O3 -Mrecursive -funroll-loops -mlvvm -lsl-in-nested-loop
-fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

627.cam4_s: -m64 -Wl,-mlvvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mlvvm -Wl,-reduce-array-computations=3
-Wl,-mlvvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp
-flto -fstruct-layout=9 -mlvvm -unroll-threshold=50
-fremap-arrays -fstrip-mining
-mlvvm -inline-threshold=1000
-mlvvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt
-Mrecursive -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-1flang

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

**Hewlett Packard Enterprise**  
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**SPECspeed®2017_fp_base** = 370  
**SPECspeed®2017_fp_peak** = 376

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**Peak Optimization Flags (Continued)**

628.pop2_s:  
- -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
- -Wl,-mllvm -Wl,-reduce-array-computations=3  
- -Wl,-mllvm -Wl,-enable-X86-prefetching -Ofast  
- -march=znver4 -fveclib=AMDLIBM -ffast-math -fopenmp  
- -flto -fstruct-layout=9 -mllvm -unroll-threshold=50  
- -fremap-arrays -fstrip-mining  
- -mllvm -inline-threshold=1000  
- -mllvm -reduce-array-computations=3 -DSPEC_OPENMP -zopt  
- -Mrecursive -fvector-transform -fscalar-transform  
- -fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

Benchmarks using Fortran, C, and C++:

- -m64 -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
- -Wl,-mllvm -Wl,-reduce-array-computations=3  
- -Wl,-mllvm -Wl,-x86-use-vzeroupper=false -Ofast -march=znver4  
- -fveclib=AMDLIBM -ffast-math -fopenmp -flto -fstruct-layout=9  
- -mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining  
- -mllvm -inline-threshold=1000 -mllvm -reduce-array-computations=3  
- -DSPEC_OPENMP -zopt -flto -finline-aggressive -mllvm -unroll-threshold=100  
- -Mrecursive -fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang

---

**Peak Other Flags**

C benchmarks:

- -Wno-return-type -Wno-unused-command-line-argument

Fortran benchmarks:

- -Wno-unused-command-line-argument

Benchmarks using both Fortran and C:

- -Wno-return-type -Wno-unused-command-line-argument

Benchmarks using Fortran, C, and C++:

- -Wno-return-type -Wno-unused-command-line-argument

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The flags files that were used to format this result can be browsed at

http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-Genoa-rev2.1.html  

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-Genoa-rev2.1.xml  

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CPU2017 License: 3  
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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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