Hewlett Packard Enterprise
ProLiant DL345 Gen11
(3.60 GHz, AMD EPYC 9474F)

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

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

Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>48</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>48</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>48</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>48</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>48</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>48</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>48</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>48</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>48</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>48</td>
</tr>
</tbody>
</table>

SPECspeed\textsuperscript{2017\_fp\_base} = 255
SPECspeed\textsuperscript{2017\_fp\_peak} = 255

### Hardware

- **CPU Name:** AMD EPYC 9474F
- **Max MHz:** 4100
- **Nominal:** 3600
- **Enabled:** 48 cores, 1 chip
- **Orderable:** 1 chip
- **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
- **Memory:** 384 GB (12 x 32 GB 2Rx8 PC5-4800B-R)
- **Storage:** 1 x 1.6 TB NVMe SSD, RAID 0
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux 9.0 (Plow)
- **Kernel:** 5.14.0-70.13.1.el9_0.x86_64
- **Compiler:** C/C++/Fortran: Version 4.0.0 of AOCC
- **Parallel:** Yes
- **Firmware:** HPE BIOS Version v1.12 11/24/2022 released
- **File System:** xfs
- **System State:** Run level 3 (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
## 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>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>48</td>
<td>70.1</td>
<td>841</td>
<td>70.1</td>
<td>842</td>
<td>70.1</td>
<td>842</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>48</td>
<td>40.5</td>
<td>412</td>
<td>48</td>
<td>40.5</td>
<td>412</td>
<td>48</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>48</td>
<td>35.1</td>
<td>149</td>
<td>35.1</td>
<td>149</td>
<td>35.1</td>
<td>149</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>48</td>
<td>70.5</td>
<td>188</td>
<td>71.1</td>
<td>186</td>
<td>71.2</td>
<td>186</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>48</td>
<td>50.8</td>
<td>174</td>
<td>50.7</td>
<td>175</td>
<td>50.7</td>
<td>175</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>48</td>
<td>124</td>
<td>95.5</td>
<td>124</td>
<td>95.4</td>
<td>125</td>
<td>94.8</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>48</td>
<td>40.7</td>
<td>354</td>
<td>40.6</td>
<td>356</td>
<td>40.5</td>
<td>356</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>48</td>
<td>33.3</td>
<td>525</td>
<td>33.3</td>
<td>524</td>
<td>33.3</td>
<td>524</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>48</td>
<td>61.3</td>
<td>149</td>
<td>65.1</td>
<td>140</td>
<td>65.9</td>
<td>138</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>48</td>
<td>56.3</td>
<td>280</td>
<td>55.7</td>
<td>283</td>
<td>58.4</td>
<td>270</td>
</tr>
</tbody>
</table>

**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 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.

(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: 'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root.
To disable THP for peak runs of 627.cam4_s, 649.fotonik3d_s, and 654.roms_s, 'echo never > /sys/kernel/mm/transparent_hugepage/enabled' run as root.

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-47"
LD_LIBRARY_PATH = "/home/cpu2017/amd_speed_aocca00_genoa_B_lib:/lib:"
LIBOMP_NUM_HIDDEN_HELPER_THREADS = "0"
MALLOCP_CONF = "oversize_threshold:0,retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "48"

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 CST C2 Latency set to 18 microseconds
Memory PStates set to Disabled
Thermal Configuration set to Maximum Cooling

(Continued on next page)
Platform Notes (Continued)

Workload Profile set to Custom
Power Regulator set to OS Control Mode
The system ROM used for this result contains microcode version 0x0A10110e 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 982a61ec0915b55891ef0e16aca6c64d
running on localhost.localdomain Sun Jun  4 16:54:14 2023

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 9474F 48-Core Processor
1  "physical id"s (chips)
48 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following
excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 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

From lscpu from util-linux 2.37.4:
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):                48
On-line CPU(s) list:   0-47
Vendor ID:             AuthenticAMD
BIOS Vendor ID:        Advanced Micro Devices, Inc.
Model name:            AMD EPYC 9474F 48-Core Processor
BIOS Model name:       AMD EPYC 9474F 48-Core Processor
CPU family:            25
Model:                 17
Thread(s) per core:    1
Core(s) per socket:    48
Socket(s):             1
Stepping:              1
BogoMIPS:              7189.04
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
pdp16 pbe rdscp lm constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid
aarch64 aperfmperf rapl pni pclmulqdq monitor ssse3 fma cx16 pcid rdtscp svm
smep ssse4_1 ssse4_2 x2apic movbe

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL345 Gen11
(3.60 GHz, AMD EPYC 9474F)

SPEC CPU®2017 Floating Point Speed Result

Test Sponsor: HPE
Hardware Availability: Dec-2022
Software Availability: Nov-2022

CPU2017 License: 3
Test Date: Dec-2022
Tested by: HPE

SPECspeed®2017_fp_base = 255
SPECspeed®2017_fp_peak = 255

Platform Notes (Continued)

popcnt aes 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 bptext perfctr_llc mwaitx cpub cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmcall fsqsbase bml1 avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb avx512cd sha ni avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm llc cqm_occups llc cqm_mbm_total cqm_mbm_local avx512 bf16 clzero irperfs xsavesrtr rdprr wboinovmd ampppfin arat npt lbrv svm lockdown nhip_save tsc scale vmcb_clean flushbyasid decodeassists pausefilter ptthreshold avic v_vmsave_vmload vgif v_spec_ctrl avx512v bmi umip puck ospeke avx512_v bmi2 gfin vaes vpc1muldq avx512_vnli avx512_bitalg avx512_vpopcntdq la57 rdpid overflow_recov succor smca fsrm flush_lld

Virtualization: AMD-V
L1d cache: 1.5 MiB (48 instances)
L1i cache: 1.5 MiB (48 instances)
L2 cache: 48 MiB (48 instances)
L3 cache: 256 MiB (8 instances)
NUMA node(s): 8
NUMA node0 CPU(s): 0-5
NUMA node1 CPU(s): 24-29
NUMA node2 CPU(s): 12-17
NUMA node3 CPU(s): 36-41
NUMA node4 CPU(s): 18-23
NUMA node5 CPU(s): 42-47
NUMA node6 CPU(s): 6-11
NUMA node7 CPU(s): 30-35

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
Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitation
Vulnerability Spectre v2: Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP disabled, RSB filling
Vulnerability Srdbds: 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 1.5M 8 Data 1 64 1 64
L1i 32K 1.5M 8 Instruction 1 64 1 64
L2 1M 48M 8 Unified 2 2048 1 64
L3 32M 256M 16 Unified 3 32768 1 64

/proc/cpuinfo cache data
cache size : 1024 KB

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

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL345 Gen11
(3.60 GHz, AMD EPYC 9474F)

SPECspeed®2017_fp_base = 255
SPECspeed®2017_fp_peak = 255

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 4 5
 node 0 size: 48136 MB
 node 0 free: 47927 MB
 node 1 cpus: 24 25 26 27 28 29
 node 1 size: 48382 MB
 node 1 free: 47849 MB
 node 2 cpus: 12 13 14 15 16 17
 node 2 size: 48382 MB
 node 2 free: 48184 MB
 node 3 cpus: 36 37 38 39 40 41
 node 3 size: 48346 MB
 node 3 free: 48176 MB
 node 4 cpus: 18 19 20 21 22 23
 node 4 size: 48382 MB
 node 4 free: 48265 MB
 node 5 cpus: 42 43 44 45 46 47
 node 5 size: 48382 MB
 node 5 free: 48259 MB
 node 6 cpus: 6 7 8 9 10 11
 node 6 size: 48382 MB
 node 6 free: 48264 MB
 node 7 cpus: 30 31 32 33 34 35
 node 7 size: 48334 MB
 node 7 free: 48225 MB
node distances:
node 0 1 2 3 4 5 6 7
 0: 10 11 12 12 12 12 12
 1: 11 10 12 12 12 12 12
 2: 12 12 10 11 12 12 12
 3: 12 12 11 10 12 12 12
 4: 12 12 12 12 10 11 12
 5: 12 12 12 12 11 10 12
 6: 12 12 12 12 12 12 12
 7: 12 12 12 12 12 12 11

From /proc/meminfo
MemTotal:       396010920 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux"

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

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL345 Gen11
(3.60 GHz, AMD EPYC 9474F)

SPECspeed®2017_fp_base = 255
SPECspeed®2017_fp_peak = 255

<table>
<thead>
<tr>
<th>CPU2017 License: 3</th>
<th>Test Date: Dec-2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: HPE</td>
<td>Hardware Availability: Dec-2022</td>
</tr>
<tr>
<td>Tested by: HPE</td>
<td>Software Availability: Nov-2022</td>
</tr>
</tbody>
</table>

Platform Notes (Continued)

```plaintext
VERSION="9.0 (Plow)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="9.0"
PLATFORM_ID="platform:el9"
PRETTY_NAME="Red Hat Enterprise Linux 9.0 (Plow)"
ANSI_COLOR="0;31"

redhat-release: Red Hat Enterprise Linux release 9.0 (Plow)
system-release: Red Hat Enterprise Linux release 9.0 (Plow)
system-release-cpe: cpe:/o:redhat:enterprise_linux:9::baseos

uname -a:
Linux localhost.localdomain 5.14.0-70.13.1.el9_0.x86_64 #1 SMP PREEMPT Thu Apr 14 12:42:38 EDT 2022 x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

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

run-level 3 Jun 4 16:48

SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 819G 12G 807G 2% /home

From /sys/devices/virtual/dmi/id
Vendor: HPE
Product: ProLiant DL345 Gen11
Product Family: ProLiant
Serial: DL345G11-004
```

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

(Continued on next page)
Platform Notes (Continued)

frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

Memory:
12x Hynix HMCG88MEBRA113N 32 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)

Compiler Version Notes

<table>
<thead>
<tr>
<th></th>
<th>619.lbm_s(base, peak)</th>
<th>638.imagick_s(base, peak)</th>
<th>644.nab_s(base, peak)</th>
</tr>
</thead>
</table>

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

(Continued on next page)
Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL345 Gen11  
(3.60 GHz, AMD EPYC 9474F)  

SPECspeed®2017_fp_base = 255  
SPECspeed®2017_fp_peak = 255

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

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

Compiler Version Notes (Continued)

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

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

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
SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL345 Gen11
(3.60 GHz, AMD EPYC 9474F)

SPECspeed®2017_fp_base = 255
SPECspeed®2017_fp_peak = 255

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

SPECSpeed

2017_fp_peak = 255

Hewlett Packard Enterprise

(Test Sponsor: HPE)
ProLiant DL345 Gen11
(3.60 GHz, AMD EPYC 9474F)

SPECspeed®2017_fp_base = 255
SPECspeed®2017_fp_peak = 255

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

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
627.cam4_s: -DSPEC_CASE_FLAG -DSPEC_LP64
628.pop2_s: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -Wl,-mllvm -Wl,-align-all-nofallback-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -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
-DSPEC_OPENMP -zopt -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang

Fortran benchmarks:
-m64 -Wl,-mllvm -Wl,-align-all-nofallback-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -DSPEC_OPENMP -O3 -march=znver4
-fveclib=AMDLIBM -ffast-math -fopenmp -flto -Mrecursive
-funroll-loops -mllvm -lsr-in-nested-loop
-mllvm -reduce-array-computations=3 -zopt -fopenmp=libomp -lomp
-lamdlibm -lamdalloc -lflang

Benchmarks using both Fortran and C:
-m64 -Wl,-mllvm -Wl,-align-all-nofallback-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver4
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-fremap-arrays -fstrip-mining -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -zopt -Mrecursive -funroll-loops
-mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdalloc
-lflang

Benchmarks using Fortran, C, and C++:
-m64 -Wl,-mllvm -Wl,-align-all-nofallback-blocks=6

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

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant DL345 Gen11  
(3.60 GHz, AMD EPYC 9474F)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>255</td>
<td>255</td>
</tr>
</tbody>
</table>

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

### Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
- `-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`
- `-DSPEC_OPENMP -zopt -mllvm -unroll-threshold=100 -finline-aggressive`
- `-mllvm -loop-unswitch-threshold=200000 -Mrecursive -funroll-loops`
- `-mllvm -lsr-in-nested-loop -fopenmp=libomp -lomp -lamdlibm -lamdalloc -lflang`

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

Fortran benchmarks:
603.bwaves_s: basepeak = yes
649.fotonik3d_s: basepeak = yes
654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:
621.wrf_s: basepeak = yes
627.cam4_s: basepeak = yes
628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:
607.cactuBSSN_s: basepeak = yes

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

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

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL345 Gen11
(3.60 GHz, AMD EPYC 9474F)

SPECspeed®2017_fp_base = 255
SPECspeed®2017_fp_peak = 255

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

Peak Other Flags (Continued)

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

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-rev2.0.html
http://www.spec.org/cpu2017/flags/aocc400-flags.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-rev2.0.xml
http://www.spec.org/cpu2017/flags/aocc400-flags.xml

SPEC CPU and SPECspeed are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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 2023-06-04 07:24:14-0400.
Report generated on 2023-02-15 10:33:26 by CPU2017 PDF formatter v6442.
Originally published on 2023-02-14.