SPEC has determined that this result does not comply with the SPEC CPU 2017 run and reporting rules. Specifically, the test sponsor notified SPEC that the results were measured on an unsupported configuration.

<table>
<thead>
<tr>
<th>Copies</th>
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<tr>
<td>503.bwaves_r</td>
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<tr>
<td>507.cactuBSSN_r</td>
</tr>
<tr>
<td>508.namd_r</td>
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<tr>
<td>510.parest_r</td>
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<tr>
<td>511.povray_r</td>
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<td>538.imagick_r</td>
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<td>544.nab_r</td>
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<tr>
<td>549.fotonik3d_r</td>
</tr>
<tr>
<td>554.roms_r</td>
</tr>
</tbody>
</table>

**Hardware**
- **CPU Name:** AMD EPYC 9754
- **Max MHz:** 3100
- **Nominal:** 2250
- **Enabled:** 128 cores, 1 chip
- **Orderable:** 1 chip
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 1 MB I+D on chip per core
- **L3:** 256 MB I+D on chip per chip, 16 MB shared / 8 cores

**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:** No
- **Firmware:** HPE BIOS Version v1.30 03/06/2023 released
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit

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

**Hardware (Continued)**

- **Power Management**: BIOS and OS set to prefer performance at the cost of additional power usage.
- **Storage**: 1 x 960 GB SAS SSD
- **Memory**: 768 GB (12 x 64 GB 2Rx4 PC5-4800B-R)
- **Other**: None

**Software (Continued)**

- **Peak Pointers**: 64-bit
- **Other**: None

**Results Table**

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</tbody>
</table>

**Compiler Notes**

- The config file option 'submit' was used to bind copies to the cores.
- Submit Notes: The config file option 'submit' was used to bind copies to the cores. See the configuration file for details.

**Non-Compliant**

SPEC has determined that this result does not comply with the SPEC CPU 2017 run and reporting rules. Specifically, the test sponsor notified SPEC that the results were measured on an unsupported configuration.
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### 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 global memory usage, 'sysctl -w vm.zone_reclaim_mode=1' run as root.
To clear filesystem caches, 'sync; sysctl -w vm.cached filesystems=0' run as root.

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 global memory usage, 'sysctl -w vm.zone_reclaim_mode=1' run as root.
To clear filesystem caches, 'sync; sysctl -w vm.cached filesystems=0' run as root.

### Environment Variables Notes

**Environment variables set by runcpu before the start of the run:**

```
LD_LIBRARY_PATH =
"/home/cpu2017_19/amd_rate_aocc400_genoa_B_lib/lib:/home/cpu2017_19/amd_rate_aocc400_genoa_B_lib/lib32 :"
MALLOCS_CONF = "retain:true"
```

### General Notes

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 Throughput Compute
- AMD SMT Option set to Disabled
- Determinism Control set to Manual
- Performance Determinism set to Power Deterministic
SPEC has determined that this result does not comply with the SPEC CPU 2017 run and reporting rules. Specifically, the test sponsor notified SPEC that the results were measured on an unsupported configuration.
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Platform Notes (Continued)

3. Username
   From environment variable $USER: root

4. ulimit -a
   real-time non-blocking time (microseconds, -R) unlimited
   core file size (blocks, -c) 0
   data seg size (bytes, -d) unlimited
   scheduling priority (-e) 0
   file size (blocks, -f) unlimited
   pending signals (-i) 3094696
   max locked memory (bytes, -l) 2097152
   max memory size (kbytes, -m) unlimited
   open files (2624)
   pipe size (512 bytes, -p) 8
   POSIX message queues (bytes, -q) 819200
   real-time priority (-r) 0
   stack size (kbytes, -s) unlimited
   cpu time (seconds, -t) unlimited
   max user processes (-u) 3094696
   virtual memory (kbytes, -v) unlimited
   file locks (-x) unlimited

5. specinfo process ancestry
   /usr/lib/systemd/systemd --switched-root --system --deserialize 30
   sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups
   sshd: root [priv]
   sshd: root@notty
   bash -c cd $SPEC/ && $SPEC/fprate.sh
   python3 ./run_fprate.py
   /bin/bash ./amd_rate_aocc400_genoa_B1.sh
   runcpu --config amd_rate_aocc400_genoa_B1.cfg --tune all --reportable --iterations 3 fprate
   runcpu --configfile amd_rate_aocc400_genoa_B1.cfg --tune all --reportable --iterations 3 --nopower --runmode rate --tune base:peak --size test:train:refrate fprate --nopreenv --logfile $SPEC/tmp/CPU2017.001/templogs/preenv.fprate.001.0.log --lognum 001.0 --from_runcpu 2
   specperl $SPEC/bin/sysinfo
   $SPEC = /home/cpu2017_19

6. /proc/cpuinfo
   model name : AMD EPYC 9754 128-Core Processor
   vendor_id : AuthenticAMD
   cpu family : 25
   model : 160
   stepping : 2
   buqs : sysret_sa_attrs spectre_v1 spectre_v2 spec_store_bypass
   TLB size : 3584 4K pages

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

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)
ProLiant DL325 Gen11
(2.25 GHz, AMD EPYC 9754)

---

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<thead>
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<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Jun-2023</td>
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<tr>
<td>Software Availability:</td>
<td>Nov-2022</td>
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</table>

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

---

**Platform Notes (Continued)**

- umip pku ospke avx512_vni avx512_vnni avx512_bitalg avx512_vpopcntdq la57 rdwr overlap_recoev succor smca fsrm flush_l1d

**Virtualization:**
- AMD-V

**L1d cache:**
- 4 MiB (128 instances)

**L1i cache:**
- 4 MiB (128 instances)

**L2 cache:**
- 128 MiB (128 instances)

**L3 cache:**
- 256 MiB (512 instances)

**NUMA node(s):**
- 16

**NUMA node0 CPU(s):**
- 0-7

**NUMA node1 CPU(s):**
- 8-15

**NUMA node2 CPU(s):**
- 16-23

**NUMA node3 CPU(s):**
- 24-31

**NUMA node4 CPU(s):**
- 32-39

**NUMA node5 CPU(s):**
- 40-47

**NUMA node6 CPU(s):**
- 48-55

**NUMA node7 CPU(s):**
- 56-63

**NUMA node8 CPU(s):**
- 64-71

**NUMA node9 CPU(s):**
- 72-79

**NUMA node10 CPU(s):**
- 80-87

**NUMA node11 CPU(s):**
- 88-95

**Vulnerability Itlb multihit:** 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/swapsgs barriers and __user pointer sanitation

**Vulnerability Spectre v2:** Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP disabled, RSB filling

**Vulnerability Srbds:** Not affected

**Vulnerability Xsm async abort:** Not affected

---

8. numactl --hardware

**NOTE:** a numactl 'node' might or might not correspond to a physical chip.

---

(Continued on next page)
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Platform Notes (Continued)

Current active profile: throughput-performance

16. sysctl
   kernel.numa_balancing 0
   kernel.randomize_va_space 0
   vm.compaction_proactiveness 20
   vm.dirty_background_bytes 0
   vm.dirty_background_ratio 10
   vm.dirty_bytes 0
   vm.dirty_expire_centisecs 3000
   vm.dirty_ratio 8
   vm.dirty_writeback_centisecs 500
   vm.dirtytime_expire_seconds 43200
   vm.extfrag_threshold 5
   vm.mnr_unmapped_rmap
   vm.nr_hugepaged
   vm.nr_hugepages 0
   vm.nr_hugepages_mempolicy 0
   vm.nr_overcommit_hugepages 0
   vm.swappiness 1
   vm.zone_reclaim_mode

17. /sys/kernel/mm/transparent_hugepage
   defrag [always] defer defer+madvise madvise never
   enabled [always] madvise never
   hpage_pmd_size 2097152
   shmem_enabled always within_size advise [never] deny force

18. /sys/kernel/mm/transparent_hugepage/klhugepaged
   alloc_sleep_millisecs 60000
   defrag 1
   max_ptes_none 511
   max_ptes_shared 256
   max_ptes_swap 64
   pages_to_scan 4096

(Continued on next page)
SPEC has determined that this result does not comply with the SPEC CPU 2017 run and reporting rules. Specifically, the test sponsor notified SPEC that the results were measured on an unsupported configuration.

Platform Notes (Continued)

```
scan_sleep_milliseconds  10000
```

19. OS release
From /etc/*-release /etc/*-version
os-release     Red Hat Enterprise Linux 9.0
redhat-release Red Hat Enterprise Linux release 9.0 (Plow)
system-release Red Hat Enterprise Linux release 9.0 (Plow)

20. Disk information
SPEC is set to: /home/cpu2017_19
Filesystem            Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs   819G   44G  775G   6% /home

21. /sys/devices/virtual/dmi/id
Vendor:         HPE
Product:        ProLiant DL325 Gen11
Product Family: ProLiant
Serial:         DL325G11-010

22. dmidecode
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:
10x Hynix H4H94A8BRA103N 64 GB 2 rank 4800
2x Hynix H4H94A8BRA121N 64 GB 2 rank 4800

23. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor:       HPE
BIOS Version:      1.30
BIOS Date:         03/06/2023
BIOS Revision:     1.30
Firmware Revision: 1.10

Non-Compliant
SPEC has determined that this result does not comply with the SPEC CPU 2017 run and reporting rules. Specifically, the test sponsor notified SPEC that the results were measured on an unsupported configuration.

### Compiler Version Notes (Continued)

```
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin

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<tr>
<th>C++</th>
<th>508.namd_r(base, peak) 510.parest_r(base, peak)</th>
</tr>
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<tbody>
<tr>
<td>Target:</td>
<td>x86_64-unknown-linux-gnu</td>
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<tr>
<td>Thread model:</td>
<td>posix</td>
</tr>
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AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)

<table>
<thead>
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<th>C++, C</th>
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AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)

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<tr>
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<td>Thread model:</td>
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AMD clang version 14.0.6 (CLANG: AOCC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)

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**Base Portability Flags (Continued)**

510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.ibm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
526.blender_r: -funsigned-char -DSPEC_LP64
527.cam4_r: -DSPEC_CASE_FLAG -DSPEC_LP64
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

**Base Optimization Flags**

C benchmarks:
- -m64 -flto -Wl,-mlllvm -Wl,-align-all-nofallthru-blocks=6
- -Wl,-mlllvm -Wl,-reduce-array-computations=3
- -Wl,-mlllvm -Wl,-ldlmc=scalar-expand -fenable-aggressive-gather -O3
- -march=znever -mllvm=AMDLIBM -ffast-math -mstruct-layout=7
- -mlllvm=-unroll-threshold=50 -mlllvm -inline-threshold=1000
- -fremap-arrays -fstrip-mining -mlllvm -reduce-array-computations=3
- -zopt -lamdllibm -lamdalloc -lflang

C++ benchmarks:
- -m64 -flto -Wl,-mlllvm -Wl,-align-all-nofallthru-blocks=6
- -Wl,-mlllvm -Wl,-reduce-array-computations=3
- -Wl,-mlllvm -Wl,-x86-use-vzeroupper=false -O3 -march=znever4
- -fveclib=AMDLIBM -ffast-math -mlllvm -unroll-threshold=100
- -finlining-aggressive -mlllvm -loop-unschedule-threshold=200000
- -mlllvm -reduce-array-computations=3 -zopt -lamdllibm -lamdalloc -lflang

Fortran benchmarks:
- -m64 -flto -Wl,-mlllvm -Wl,-align-all-nofallthru-blocks=6
- -Wl,-mlllvm -Wl,-reduce-array-computations=3
- -Wl,-mlllvm -Wl,-enable-x86-prefetching -O3 -march=znever4
- -fveclib=AMDLIBM -ffast-math -Kieee -Mrecursive -funroll-loops
- -mlllvm -lsr-in-nested-loop -mlllvm -reduce-array-computations=3

(Continued on next page)
SPEC has determined that this result does not comply with the SPEC CPU 2017 run and reporting rules. Specifically, the test sponsor notified SPEC that the results were measured on an unsupported configuration.

### Base Optimization Flags (Continued)

**Fortran benchmarks (continued):**
- `-fepilog-vectorization-of-inductions -zopt -lamdlibm -lamdalloc -lflang`

**Benchmarks using both Fortran and C:**
- `-m64 -flto -Wl,-mltvsm -Wl,-align-all-nofallthru-blocks=6`
- `-Wl,-mltvsm -Wl,-reduce-array-computations=3`
- `-Wl,-mltvsm -Wl,-enable-X86 prefetching -march=znver4`
- `-fveclib=AMDLIBM -ffast-math -fstruct-layout=7`
- `-mltvsm -unroll-threshold=50 -mltvsm -inline-threshold=1000`
- `-fremap-arrays -fstrip-mining -mltvsm -reduce-array-computations=3`
- `-zopt -Kieee -Mrecursive -funroll-loops -mltvsm -lsr-in-nested-loop`
- `-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc -lflang`

**Benchmarks using both C and C++:**
- `-m64 -flto -Wl,-mltvsm -Wl,-align-all-nofallthru-blocks=6`
- `-Wl,-mltvsm -Wl,-reduce-array-computations=3`
- `-Wl,-mltvsm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4`
- `-fveclib=AMDLIBM -ffast-math -fstruct-layout=7`
- `-mltvsm -unroll-threshold=50 -mltvsm -inline-threshold=1000`
- `-fremap-arrays -fstrip-mining -mltvsm -reduce-array-computations=3`
- `-zopt -mltvsm -unroll-threshold=100 -finline-aggressive`
- `-mltvsm -loop-unschedule=200000 -lamdlibm -lamdalloc -lflang`

**Benchmarks using Fortran, C, and C++:**
- `-m64 -flto -Wl,-mltvsm -Wl,-align-all-nofallthru-blocks=6`
- `-Wl,-mltvsm -Wl,-reduce-array-computations=3`
- `-Wl,-mltvsm -Wl,-x86-use-vzeroupper=false -O3 -march=znver4`
- `-fveclib=AMDLIBM -ffast-math -fstruct-layout=7`
- `-mltvsm -unroll-threshold=50 -mltvsm -inline-threshold=1000`
- `-fremap-arrays -fstrip-mining -mltvsm -reduce-array-computations=3`
- `-zopt -mltvsm -unroll-threshold=100 -finline-aggressive`
- `-mltvsm -loop-unschedule=200000 -Kieee -Mrecursive`
- `-funroll-loops -mltvsm -lsr-in-nested-loop`
- `-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc -lflang`
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL325 Gen11
(2.25 GHz, AMD EPYC 9754)

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

Non-Compliant
SPEC has determined that this result does not comply with the SPEC CPU 2017 run and reporting rules. Specifically, the test sponsor notified SPEC that the results were measured on an unsupported configuration.

<table>
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<tr>
<th>Base Other Flags</th>
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<tr>
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<tr>
<td>-Wno-unused-command-line-argument</td>
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<tr>
<td>C++ benchmarks:</td>
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<td>-Wno-unused-command-line-argument</td>
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<tr>
<td>Fortran benchmarks:</td>
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<tr>
<td>-Wno-unused-command-line-argument</td>
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<tr>
<td>Benchmarks using both Fortran and C:</td>
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<table>
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<th>Peak Compiler Invocation</th>
</tr>
</thead>
<tbody>
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<td>C benchmarks: clang</td>
</tr>
<tr>
<td>clang++</td>
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<td>Fortran benchmarks: flang</td>
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</tr>
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</table>
SPEC has determined that this result does not comply with the SPEC CPU 2017 run and reporting rules. Specifically, the test sponsor notified SPEC that the results were measured on an unsupported configuration.

### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

**C benchmarks:**

519.lbm_r: basepeak = yes


544.nab_r: basepeak = yes

**C++ benchmarks:**


(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL325 Gen11
(2.25 GHz, AMD EPYC 9754)

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

SPEC has determined that this result does not comply with the SPEC CPU 2017 run and reporting rules. Specifically, the test sponsor notified SPEC that the results were measured on an unsupported configuration.

Peak Optimization Flags (Continued)

Fortran benchmarks:

503.bwaves_r: basepeak = yes

549.fotonik3d_r: -m64 -flto -Wl,-mlvvm -Wl,-all -fall -nofallthru-blocks=6
-Wl,-mlvvm -Wl,-reduce-array-computations=3
-Wl,-mlvvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -Mrecursive
-mlvvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -fvector-transform
-fscalar-transform -lamdlib -lamdalloc -flflag

554.roms_r: -m64 -flto -Wl,-mlvvm -Wl,-all -fall -nofallthru-blocks=6
-Wl,-mlvvm -Wl,-reduce-array-computations=3
-Wl,-mlvvm -Wl,-enable-X86-prefetching -Ofast
-march=znver4 -fveclib=AMDLIBM -ffast-math -Mrecursive
-mlvvm -reduce-array-computations=3
-fepilog-vectorization-of-inductions -zopt -lamdlibm
-lamdalloc -flflag

Benchmarks using both Fortran and C:

521.wrf_r: -m64 -flto -Wl,-mlvvm -Wl,-all -fall -nofallthru-blocks=6
-Wl,-mlvvm -Wl,-reduce-array-computations=3
-Wl,-mlvvm -Wl,-enable-X86-prefetching -Ofast
-fveclib=AMDLIBM -ffast-math
-fstruct-layout=7 -mlvvm -unroll-threshold=50
-fremp-arrays -fstrip-mining
-mlvvm -inline-threshold=1000
-mlvvm -reduce-array-computations=3 -zopt -Mrecursive
-fepilog-vectorization-of-inductions -lamdlibm -lamdalloc
-flflag

527.cam4_r: -m64 -flto -Wl,-mlvvm -Wl,-all -fall -nofallthru-blocks=6
-Wl,-mlvvm -Wl,-reduce-array-computations=3
-Wl,-mlvvm -Wl,-enable-X86-prefetching -O3 -March=znver4
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mlvvm -unroll-threshold=50 -mlvvm -inline-threshold=1000
-fremp-arrays -mlvvm -reduce-array-computations=3 -zopt
SPEC has determined that this result does not comply with the SPEC CPU 2017 run and reporting rules. Specifically, the test sponsor notified SPEC that the results were measured on an unsupported configuration.

### Peak Optimization Flags (Continued)

527.cam4_r (continued):
- -Kieee -Mrecursive -funroll-loops
- -mlvm -lsl-in-nested-loop
- -fepilog-vectorization-of-inductions -mlibm -lamdlib -lamdalloc
- -flang

Benchmarks using both C and C++:

511.povray_r: basepeak = yes

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactusBSSN_r: basepeak = yes

### Peak Other Flags

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

C++ benchmarks:
- -Wno-unused-command-line-argument

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

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

Benchmarks using both C and C++:
- -Wno-unused-command-line-argument

Benchmarks using Fortran, C, and C++:
- -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-Bergamo-rev1.0.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-Bergamo-rev1.0.xml
http://www.spec.org/cpu2017/flags/aocc400-flags.xml

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

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