



SPEC CPU®2017 Integer Rate Results

Copyright 2017-2023 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL325 Gen11

(4.10 GHz, AMD EPYC 9174F)

SPECrate®2017_int_base =

SPECrate®2017_int_peak =

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Jan-2023

Hardware Availability: Dec-2022

Software Availability: Nov-2022

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.

Copies

500.perlbenc_r

502.gcc_r

505.mcf_r

520.omnetpp_r

523.xalancbmk_r

525.x264_r

531.deepsjeng_r

541.leela_r

548.exchange2_r

557.xz_r

Hardware

CPU Name: AMD EPYC 9174F

Nominal: 4100

Enabled: 16 cores, 1 chip, 2 threads/core

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,
32 MB shared / 2 cores

Other: None

Memory: 768 GB (12 x 64 GB 2Rx4 PC5-4800B-R)

Storage: 1 x 480 GB SATA SSD

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:

No

Firmware:

HPE BIOS Version v1.12 11/24/2022 released

Nov-2022

File System:

xfs

System State:

Run level 3 (multi-user)

Base Pointers:

64-bit

Peak Pointers:

32/64-bit

Other:

None

Power Management: BIOS and OS set to prefer performance at the cost of additional power usage



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Results Table

Benchmark	Base							Peak							
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	
500.perlbench_r	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
502.gcc_r	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
505.mcf_r	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
520.omnetpp_r	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
523.xalancbmk_r	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
525.x264_r	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
531.deepsjeng_r	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
541.leela_r	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
548.exchange2_r	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
557.xz_r	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

SPECrate®2017_int_base =

SPECrate®2017_int_peak =

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

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.

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Operating System Notes (Continued)

To clear filesystem caches, 'sync; sysctl -w vm.drop_caches=2' 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) only on request for base runs,
 'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root.
 To enable THP for all allocations for peak runs,
 'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
 'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.

Environment Variables Notes

Environment variables set by runner before the start of the run:
 LD_LIBRARY_PATH =
 "/home/cpu2017/amd_rate_aocc400_genoa_B_lib/lib:/home/cpu2017/amd_rate_aocc400_genoa_B_lib/lib32:"
 MALLOC_CONF = "retain:true"

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 Throughput 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 Four memory domains per socket
 ACPI CST C2 Latency set to 18 microseconds
 Thermal Configuration set to Maximum Cooling

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

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Platform Notes (Continued)

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaf0664d
running on localhost.localdomain Thu Apr 7 05:32:50 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 9174F 16-Core Processor
1 "physical id"s (chips)
32 "processors"
cores, siblings (Caution: counting these is slow and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 16
siblings : 32
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

From lscpu from util-linux 2.37.4
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): 32
On-line CPU(s) list: 0-31
Vendor ID: AuthenticAMD
BIOS Vendor ID: Advanced Micro Devices, Inc.
Model name: AMD EPYC 9174F 16-Core Processor
BIOS Model name: AMD EPYC 9174F 16-Core Processor
CPU family: 25
Model: 17
Thread(s) per core: 2
Core(s) per socket: 16
Socket(s): 1
Stepping: 1
BogoMIPS: 8187.58
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 pdptlgb rdtscp lm constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid aperfmperf rapl pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 x2apic movbe 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 bpext perfctr_llc mwaitx cpb cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbase bmi1 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_occup_llc cqm_mbm_total cqm_mbm_local avx512_bf16 clzero irperf xsaveerptr rdpru wbnoinvd amd_ppin arat npt lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter pfthreshold avic v_vmsave_vmload vgif v_spec_ctrl avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg avx512_vpopcntdq la57 rdpid overflow_recov succor smca fsrm flush_l1d

(Continued on next page)



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Platform Notes (Continued)

```

Virtualization: AMD-V
L1d cache: 512 KiB (16 instances)
L1i cache: 512 KiB (16 instances)
L2 cache: 16 MiB (16 instances)
L3 cache: 256 MiB (8 instances)
NUMA node(s): 8
NUMA node0 CPU(s): 0,1,16,17
NUMA node1 CPU(s): 8,9,24,25
NUMA node2 CPU(s): 5,20,21
NUMA node3 CPU(s): 12,13,28,29
NUMA node4 CPU(s): 6,7,22,23
NUMA node5 CPU(s): 14,15,30,31
NUMA node6 CPU(s): 2,3,18,19
NUMA node7 CPU(s): 10,11,26,27
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/swaps barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Retpolines, IBPB conditional, IBRS_FW, STIBP always-on, OS VR filling
Vulnerability Srbds: Not affected
Vulnerability Sx asy abort: Not affected

```

```

From lscpu --cache:
NAME ONE SIZE ALL-SIZE WAYS TYPE LEVEL SETS PHY-LINE COHERENCY-SIZE
L1d 512K 512K 8 Data 1 64 1 64
L1i 512K 512K 8 Instruction 1 64 1 64
L2 1M 16M 8 Unified 2 2048 1 64
L3 32M 256M 16 Unified 3 32768 1 64

```

```

/proc/cpuinfo cache data
cache size : 1024 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 16 17
node 0 size: 96484 MB
node 0 free: 96287 MB
node 1 cpus: 8 9 24 25
node 1 size: 96766 MB
node 1 free: 96614 MB
node 2 cpus: 4 5 20 21
node 2 size: 96766 MB
node 2 free: 96597 MB
node 3 cpus: 12 13 28 29
node 3 size: 96766 MB

```

(Continued on next page)



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Platform Notes (Continued)

```

node 3 free: 96626 MB
node 4 cpus: 6 7 22 23
node 4 size: 96766 MB
node 4 free: 96581 MB
node 5 cpus: 14 15 30 31
node 5 size: 96766 MB
node 5 free: 96545 MB
node 6 cpus: 2 3 18 19
node 6 size: 96766 MB
node 6 free: 96412 MB
node 7 cpus: 10 11 26 27
node 7 size: 96718 MB
node 7 free: 96488 MB
node distances:
node 0 1 2 3 4 5 6 7
0: 10 11 12 12 12 12 11 12
1: 11 10 12 12 12 12 12 12
2: 12 12 10 11 12 12 12 12
3: 12 12 11 10 12 12 12 12
4: 12 12 12 12 12 10 11 12
5: 12 12 12 12 12 10 12 12
6: 12 12 12 12 12 12 10 11
7: 12 12 12 12 12 12 11 10

```

```

From /proc/meminfo
MemTotal: 323758 kB
HugePages_Total: 0
Hugepagesize: 048 kB

/sbin/tuned-adm active
Current active profile: throughput-performance

```

```

From /etc/*release* /etc/*version*
NAME="Red Hat Enterprise Linux"
VERSION="9.0 (Plow)"
ID="rhel"
FAMILY="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:

(Continued on next page)



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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
CVE-2017-5753 (Spectre variant 1):   Mitigation: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):   Mitigation: Retpolines, 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 3 Apr 7 05:30

```

SPEC is set to: /home/cpu2017
Filesystem      Type      Size  Used Avail Use% Mounted on
/dev/mapper/rhel-home  xfs      372G  17G  355G   5% /home

```

```

From /sys/devices/virtual/dmidecode:
Vendor:          Hewlett-Packard
Product:         ProLiant DL325 Gen11
Product Family:  ProLiant
Serial:          225GE11-002

```

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: 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)

Compiler Version Notes

```

=====
C | 502.gcc_r(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)

```

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Compiler Version Notes (Continued)

Target: i386-unknown-linux-gnu

Thread model: posix

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

C | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak)
557.xz_r(base, peak)

AMD clang version 14.0.6 (CLANG: AOC_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 | 502.gcc_r(peak)

AMD clang version 14.0.6 (CLANG: AOC_4.0.0-Build#389 2022_10_07) (based on LLVM Mirror.Version.14.0.6)

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C | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak)
557.xz_r(base, peak)

AMD clang version 14.0.6 (CLANG: AOC_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++ | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak) 531.deepsjeng_r(base, peak)
541.leela_r(base, peak)

AMD clang version 14.0.6 (CLANG: AOC_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 | 548.exchange2_r(base, peak)

AMD clang version 14.0.6 (CLANG: AOC_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

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Compiler Version Notes (Continued)

Base Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

flang

Base Portability Flags

```

500.perlbench_r: -DSPEC_LINUX_x86_64 -DSPEC_LP64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xanobmk_r: -DSPEC_LINUX -DSPEC_LP64
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
547.xz_r: -DSPEC_LP64

```

Base Optimization Flags

C benchmarks:

```

-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather
-z muldefs -O3 -march=znver4 -fveclib=AMDLIBM -ffast-math
-fstruct-layout=7 -mllvm -unroll-threshold=50
-mllvm -inline-threshold=1000 -fremap-arrays -fstrip-mining

```

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Base Optimization Flags (Continued)

C benchmarks (continued):

```
-mllvm -reduce-array-computations=3 -zopt -lamdlibm -lflang  
-lamdalloc
```

C++ benchmarks:

```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3 -z muldefs -O3  
-march=znver4 -fveclib=AMDIBM -ffast-math  
-mllvm -unroll-threshold=100 -finline-aggressive  
-mllvm -loop-unswitch-threshold=200000  
-mllvm -reduce-array-computations=3 -zopt  
-fvirtual-function-elimination -fvirtualization=hidden -lamdlibm -lflang  
-lamdalloc-ext
```

Fortran benchmarks:

```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6  
-Wl,-mllvm -Wl,-reduce-array-computations=3  
-Wl,-mllvm -Wl,-finline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop  
-Wl,-mllvm -Wl,-enable-ivs-split -z muldefs -O3 -march=znver4  
-fveclib=AMDIBM -ffast-math -fepilog-vectorization-of-inductions  
-mllvm -optimize-bridged-mem-cost -floop-transform  
-mllvm -unroll-aggressive -mllvm -unroll-threshold=500 -lamdlibm  
-lflang -lamdalloc
```

Base Other Flags

C benchmarks:

```
-Wno-unused-command-line-argument
```

C++ benchmarks:

```
-Wno-unused-command-line-argument
```

Fortran benchmarks:

```
-Wno-unused-command-line-argument
```



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Test Date: Jan-2023

Hardware Availability: Dec-2022

Software Availability: Nov-2022

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

Peak Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

flang

Peak Portability Flags

```

500.perlbench_r: -DSPEC_LINUX_X64 -DSPEC_LP64
502.cc_r: -D_FILE_OFFSET_BITS=64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LINUX -DSPEC_LP64
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

```

Peak Optimization Flags

C benchmarks:

```

500.perlbench_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-fprofile-instr-generate(pass 1)
-fprofile-instr-use(pass 2) -Ofast -march=znver4
-fveclib=AMDLIBM -ffast-math -fstruct-layout=7
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -inline-threshold=1000
-mllvm -reduce-array-computations=3
-faggressive-loop-transform -fvector-transform

```

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SPEC CPU®2017 Integer Rate Results

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL325 Gen11

(4.10 GHz, AMD EPYC 9174F)

SPECrate®2017_int_base =

SPECrate®2017_int_peak =

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Jan-2023

Hardware Availability: Dec-2022

Software Availability: Nov-2022

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)

500.perlbench_r (continued):

-fscalar-transform -lamdlibm -lflang -lamdalloc

502.gcc_r: -m32 -flto -z muldefs -Ofast -march=znver4

-fveclib=AMDLIBM -ffast-math -fstruct-layout=7

-mllvm -unroll-threshold=50 -fremap-arrays -fstrip-mining

-mllvm -inline-threshold=1000

-mllvm -reduce-array-computations=3 -zopt -fgnu89-inline

-lamdalloc

505.mcf_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6

-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast

-march=znver4 -fveclib=AMDLIBM -ffast-math

-fstruct-layout=7 -mllvm -unroll-threshold=50

-fremap-arrays -fstrip-mining

-mllvm -inline-threshold=1000

-mllvm -reduce-array-computations=3 -zopt -lamdlibm

-lflang -lamdalloc

525.x264_r: basepeak = yes

557.xz_r: basepeak = yes

C++ benchmarks:

-m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6

-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast

-march=znver4 -fveclib=AMDLIBM -ffast-math

-finline-aggressive -mllvm -unroll-threshold=100

-mllvm -reduce-array-computations=3 -zopt

-fvirtual-function-elimination -fvisibility=hidden

-lamdlibm -lamdalloc-ext

523.xalancbmk_r: basepeak = yes

531.deepsjeng_r: -m64 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6

-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3

-march=znver4 -fveclib=AMDLIBM -ffast-math

-mllvm -unroll-threshold=100 -finline-aggressive

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Peak Optimization Flags (Continued)

531.deepsjeng_r (continued):

```
-mllvm -loop-unswitch-threshold=200000
-mllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=hidden
-lamdlibm -lamdalloc-ext
```

541.leela_r: basepeak = yes

Fortran benchmarks:

```
-m64 -flto -Wl,-mllvm -Wl,-align-all-rofallothru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
-Wl,-mllvm -Wl,-enable-iv-splitting=3 -march=znver4 -fveclib=AMDLIBM
-ffast-math -fepilog-vectorization-of-inductions
-mllvm -optimize-strided-pgm-cost -floop-transform
-mllvm -unroll-aggressive -mllvm -unroll-threshold=500 -lamdlibm
-lflang -lamdalloc
```

Peak Other Flags

C benchmarks (except as noted below):

```
-Wno-unused-command-line-argument
.../lib32 -Wno-unused-command-line-argument
~/home/work/cpu2017/v118/aocc4/b1/rate/amd_rate_aocc400_genoa_B_lib/lib32
```

C++ benchmarks:

```
-Wno-unused-command-line-argument
```

Fortran benchmarks:

```
-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-rev2.1.html>

<http://www.spec.org/cpu2017/flags/aocc400-flags.html>



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You can also download the XML flags source code using the following links:

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

<http://www.spec.org/cpu2017/flags/aocc400-flags.xml>

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