



SPEC CPU®2017 Integer Rate Results

Copyright 2017-2023 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL325 Gen11

(2.40 GHz, AMD EPYC 9654P)

SPECrate®2017_int_base =

SPECrate®2017_int_peak =

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Oct-2022

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.perlbench_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 9654P

Nominal: 2400

Enabled: 96 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: 384 MB I+D on chip per chip, 32 MB shared / 8 cores

Other: None

Memory: 384 GB (12 x 32 GB 2Rx8 PC5-4800B-R)

Storage: 1 x 960 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 v1.10 10/06/2022 released

Oct-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
502.gcc_r	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
520.omnetpp_r	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
525.x264_r	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
541.leela_r	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
557.xz_r	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 runcpu 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"

Environment variables set by runcpu during the 523.xalancbmk_r peak run:

MALLOC_CONF = "thp:never"

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 0x0A10110E for the AMD EPYC 9nn4X family of processors. The reference code/AGESA version used in this

(Continued on next page)



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Platform Notes (Continued)

ROM is version GenoaPI 1.0.0.1-L2

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaf...
running on localhost.localdomain Thu Apr 7 05:33:11 2022

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see
<https://www.spec.org/cpu2017/Documentation/fig.html#sysinfo>

From /proc/cpuinfo

```
model name : AMD EPYC 9654P 96-Core Processor
 1 "physical id"s (chips)
 192 "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 : 96
siblings : 192
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
81 82 83 84 85 86 87 88 89 90 91 92 93 94 95
```

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): 192
On-line CPU(s) list: 0-191
Vendor ID: AuthenticAMD
BIOS Vendor ID: Advanced Micro Devices, Inc.
Model name: AMD EPYC 9654P 96-Core Processor
CPU family: AMD EPYC 9654P 96-Core Processor
CPU family: 25
Model: 17
Thread(s) per core: 2
Core(s) per socket: 96
Socket(s): 1
Stepping: 1
BogoMIPS: 4792.83
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
pdpe1gb rdtscp lm constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid
aperfperf rapl pni pclmulqdq monitor ssse3 fma cxl6 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
```

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Platform Notes (Continued)

```
cqm_mbm_local avx512_bf16 clzero irperf xsaveerpt ...
lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyas ...
pfthreshold avic v_vmsave_vmload vgif v_spec_ctrl ...
avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bita ...
avx512_vpopcntdq la57
rdpid overflow_recov succor smca fsrm flush_lld
```

```
Virtualization: AMD-V
L1d cache: 3 MiB (96 instances)
L1i cache: 3 MiB (96 instances)
L2 cache: 5 MiB (96 instances)
L3 cache: 384 MiB (12 instances)
NUMA node(s): 12
NUMA node0 CPU(s): 0-7,96-103
NUMA node1 CPU(s): 8-15,104-111
NUMA node2 CPU(s): 16-23,112-119
NUMA node3 CPU(s): 24-31,120-127
NUMA node4 CPU(s): 32-39,128-135
NUMA node5 CPU(s): 40-47,136-143
NUMA node6 CPU(s): 48-55,144-151
NUMA node7 CPU(s): 56-63,152-159
NUMA node8 CPU(s): 64-71,160-167
NUMA node9 CPU(s): 72-79,168-175
NUMA node10 CPU(s): 80-87,176-183
NUMA node11 CPU(s): 88-95,184-191
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spectre store bypass: Mitigation; Speculative Store Bypass disabled via
retl
Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user
pointer sanitization
Vulnerability Spectre v2: Mitigation; Retpolines, IBPB conditional, IBRS_FW,
STIBP always-on, RSB filling
Vulnerability Srbds: Not affected
Vulnerability Tsx async abort: Not affected
```

```
From /sys/cpu --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 384M 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: 12 nodes (0-11)
node 0 cpus: 0 1 2 3 4 5 6 7 96 97 98 99 100 101 102 103
node 0 size: 32006 MB
```

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Platform Notes (Continued)

```

node 0 free: 31721 MB
node 1 cpus: 8 9 10 11 12 13 14 15 104 105 106 107 108 109 110 111
node 1 size: 32252 MB
node 1 free: 31874 MB
node 2 cpus: 16 17 18 19 20 21 22 23 112 113 114 115 116 117 118 119
node 2 size: 32252 MB
node 2 free: 32012 MB
node 3 cpus: 24 25 26 27 28 29 30 31 120 121 122 123 124 125 126 127
node 3 size: 32252 MB
node 3 free: 32037 MB
node 4 cpus: 32 33 34 35 36 37 38 39 128 129 130 131 132 133 134 135
node 4 size: 32252 MB
node 4 free: 32075 MB
node 5 cpus: 40 41 42 43 44 45 46 47 136 137 138 139 140 141 142 143
node 5 size: 32216 MB
node 5 free: 31999 MB
node 6 cpus: 48 49 50 51 52 53 54 55 144 145 146 147 148 149 150 151
node 6 size: 32252 MB
node 6 free: 32057 MB
node 7 cpus: 56 57 58 59 60 61 62 63 152 153 154 155 156 157 158 159
node 7 size: 32252 MB
node 7 free: 31997 MB
node 8 cpus: 64 65 66 67 68 69 70 71 160 161 162 163 164 165 166 167
node 8 size: 32252 MB
node 8 free: 32064 MB
node 9 cpus: 72 73 74 75 76 77 78 79 168 169 170 171 172 173 174 175
node 9 size: 32193 MB
node 9 free: 31973 MB
node 10 cpus: 80 81 82 83 84 85 86 87 176 177 178 179 180 181 182 183
node 10 size: 32252 MB
node 10 free: 31970 MB
node 11 cpus: 88 89 90 91 92 93 94 95 184 185 186 187 188 189 190 191
node 11 size: 32252 MB
node 11 free: 31545 MB

```

```

node distances:
node 0 1 2 3 4 5 6 7 8 9 10 11
0: 10 12 12 12 11 12 12 12 11 12 12 12
1: 12 10 12 12 12 11 12 12 12 11 12 12
2: 12 12 10 12 12 12 11 12 12 12 11 12
3: 12 12 12 10 12 12 12 11 12 12 12 11
4: 11 12 12 12 10 12 12 12 11 12 12 12
5: 12 11 12 12 12 10 12 12 12 11 12 12
6: 12 12 11 12 12 12 10 12 12 12 11 12
7: 12 12 12 11 12 12 12 10 12 12 12 11
8: 11 12 12 12 11 12 12 12 10 12 12 12
9: 12 11 12 12 12 11 12 12 12 10 12 12
10: 12 12 11 12 12 12 11 12 12 12 10 12
11: 12 12 12 11 12 12 12 11 12 12 12 10

```

From /proc/meminfo
MemTotal: 395968412 kB

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Platform Notes (Continued)

HugePages_Total: 0
Hugepagesize: 2048 kB

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

```
From /etc/*release* /etc/*version*
os-release:
  NAME="Red Hat Enterprise Linux"
  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; root: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-2018-639 (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 819G 19G 800G 3% /home
```

```
From /sys/devices/virtual/dmi/id
Vendor: HPE
Product: ProLiant DL325 Gen11
Product Family: ProLiant
```

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Platform Notes (Continued)

Serial: DL325G11-010

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 input may not be met, as there are frequent changes to hardware, firmware, and the SMBIOS standard.

Memory:

6x Hynix HMC88MEBRA113N 32 GB 2 rank 4800
6x Hynix HMC88MEBRA115N 32 GB 2 rank 4800

BIOS:

BIOS Vendor: HPE
BIOS Version: 1.10
BIOS Date: 10/06/2022
BIOS Revision: 1.10
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)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-3206-389/bin

=====
C | 505.mcf_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak)
C | 557.x264_r(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 | 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)
Target: i386-unknown-linux-gnu
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Compiler Version Notes (Continued)

C | 500.perlbench_r(base, peak) 502.gcc_r(base, peak) 503.gcc_r(base, peak) 525.x264_r(base, peak)
| 557.xz_r(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++ | 523.xalancbmk_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)
Target: i386-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) 531.deepsjeng_r(base, peak) 541.leela_r(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++ | 523.xalancbmk_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)
Target: i386-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) 531.deepsjeng_r(base, peak) 541.leela_r(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 | 548.exchange2_r(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)

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Compiler Version Notes (Continued)

Target: x86_64-unknown-linux-gnu

Thread model: posix

InstalledDir: /opt/AMD/aocc/aocc-compiler-rel-4.0-32/389/bin

Base Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

flang

Base Portability Flags

500.perlbench_r: -DSPEC_LINUX_X64 -DSPEC_LP64

502.gcc_r: -DSPEC_LP64

505.vpr_r: -DSPEC_LP64

520.omnibench_r: -DSPEC_LP64

523.xalancbench_r: -DSPEC_LINUX -DSPEC_LP64

525.061.gcc_r: -DSPEC_LP64

531.deepsjeng_l: -DSPEC_LP64

543.leela_r: -DSPEC_LP64

548.exchange2_r: -DSPEC_LP64

557.xz_l: -DSPEC_LP64

Base Optimization Flags

C benchmarks:

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

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

-Wl,-mllvm -Wl,-ldist-scalar-expand -fenable-aggressive-gather

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SPEC CPU®2017 Integer Rate Results

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(Test Sponsor: HPE)

ProLiant DL325 Gen11

(2.40 GHz, AMD EPYC 9654P)

SPECrate®2017_int_base =

SPECrate®2017_int_peak =

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Oct-2022

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.

Base Optimization Flags (Continued)

C benchmarks (continued):

```
-z muldefs -O3 -march=znver4 -fveclib=AMD64 -ffast-math
-fstruct-layout=7 -mllvm -unroll-threshold=5
-mllvm -inline-threshold=1000 -fremap-args -strip-mining
-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=AMD64 -ffast-math
-mllvm -unroll-threshold=1000 -finline-aggressive
-mllvm -loop-unswitch-threshold=10000
-mllvm -reduce-array-computations=3 -zopt
-fvirtual-function-elimination -fvisibility=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,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
-Wl,-mllvm -Wl,-enable-iv-split -z muldefs -O3 -march=znver4
-fveclib=AMD64 -ffast-math -fepilog-vectorization-of-inductions
-mllvm -optimize-tridged-mem-cost -floop-transform
-mllvm -unroll-aggressive -mllvm -unroll-threshold=500 -lamdlibm
-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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Peak Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

flang

Peak Portability Flags

```

500.perlbench_r: -DSPEC_LINUX_X64 -DSPEC_LP64
502.gcc_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: basepeak = yes

```

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

```

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Peak Optimization Flags (Continued)

505.mcf_r: basepeak = yes

525.x264_r: basepeak = yes

557.xz_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=100
-fremap-arrays -fstrip-mirroring
-mllvm -inline-threshold=100
-mllvm -reduce-array-computations=3 -zopt -lamdlibm
-lflang -lamdalloc

C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: -m32 -flto -Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-do-block-reorder=aggressive
-fno-loop-reroll -ffast-math -march=znver4 -fveclib=AMDLIBM
-ffast-math -finline-aggressive
-mllvm -unroll-threshold=100
-mllvm -reduce-array-computations=3 -zopt
-mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden
-lamdalloc-ext

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

541.leela_r: basepeak = yes

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Peak Optimization Flags (Continued)

Fortran benchmarks:

```
-m64 -flto -Wl,-mllvm -Wl,-align-all-nofast-thru-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-split -O3 -march=genoa -fveclib=AMDLIBM
-ffast-math -fepilog-vectorization-opts-inductions
-mllvm -optimize-strided-memory-access -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
```

```
502.gcc_r: -L/usr/lib32 -Wno-unused-command-line-argument
```

```
-L/home/work/cpu2017/v118/aocc4/b1/rate/amd_rate_aocc400_genoa_B_lib/lib32
```

C++ benchmarks (except as noted below):

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

```
523.xalancbmk_r: -L/usr/lib32 -Wno-unused-command-line-argument
```

```
-L/home/work/cpu2017/v118/aocc4/b1/rate/amd_rate_aocc400_genoa_B_lib/lib32
```

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-rev2.0.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>



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