# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

## Lenovo Global Technology

ThinkSystem SR655
2.35 GHz,AMD EPYC 7452

$SPECrate®2017\_int\_base = 210$

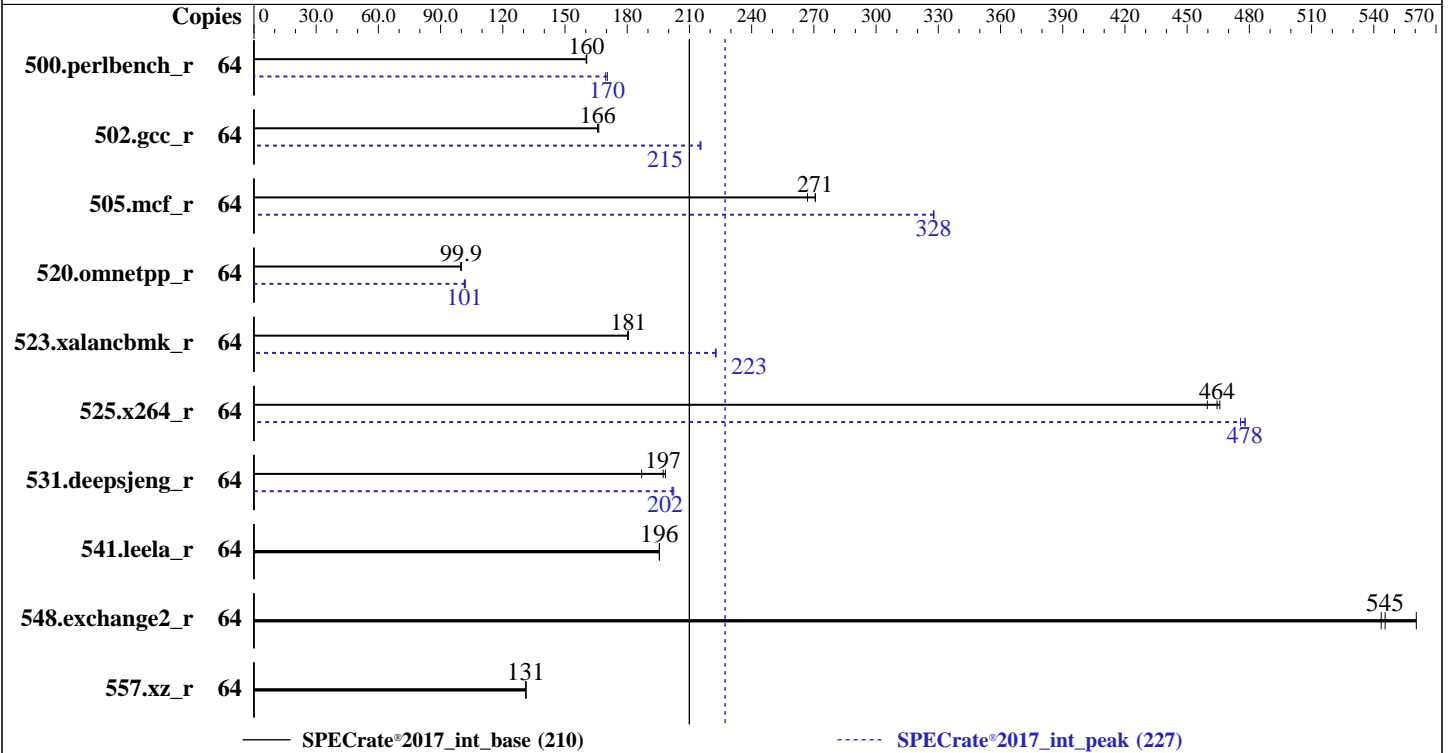$SPECrate®2017\_int\_peak = 227$

**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

**Test Date:** Sep-2019

**Hardware Availability:** Aug-2019

**Software Availability:** Aug-2019

| Copies | | |
|---|---|---|
| 500.perlbench_r | 64 | 160 / 170 |
| 502.gcc_r | 64 | 166 / 215 |
| 505.mcf_r | 64 | 271 / 328 |
| 520.omnetpp_r | 64 | 99.9 / 101 |
| 523.xalancbmk_r | 64 | 181 / 223 |
| 525.x264_r | 64 | 464 / 478 |
| 531.deepsjeng_r | 64 | 197 / 202 |
| 541.leela_r | 64 | 196 |
| 548.exchange2_r | 64 | 545 |
| 557.xz_r | 64 | 131 |

SPECrate®2017_int_base (210)    SPECrate®2017_int_peak (227)

## Hardware

CPU Name: AMD EPYC 7452
 Max MHz: 3350
 Nominal: 2350
Enabled: 32 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 512 KB I+D on chip per core
 L3: 128 MB I+D on chip per chip,
   16 MB shared / 4 cores
Other: None
Memory: 256 GB (8 x 32 GB 2Rx4 PC4-3200AA-R)
Storage: 1 x 960 GB SATA SSD
Other: None

## Software

OS: SUSE Linux Enterprise Server 15 SP1 (x86_64)
   Kernel 4.12.14-195-default
Compiler: C/C++/Fortran: Version 2.0.0 of AOCC
Parallel: No
Firmware: Lenovo BIOS Version CFE103L released Aug-2019
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: jemalloc: jemalloc memory allocator library v5.2.0
Power Management: --

# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

## Lenovo Global Technology

ThinkSystem SR655
2.35 GHz,AMD EPYC 7452

SPECrate®2017_int_base = 210

SPECrate®2017_int_peak = 227

| | |
|---|---|
| **CPU2017 License:** 9017 | **Test Date:** Sep-2019 |
| **Test Sponsor:** Lenovo Global Technology | **Hardware Availability:** Aug-2019 |
| **Tested by:** Lenovo Global Technology | **Software Availability:** Aug-2019 |

## Results Table

| Benchmark | Base Copies | Base Seconds | Base Ratio | Base Seconds | Base Ratio | Base Seconds | Base Ratio | Peak Copies | Peak Seconds | Peak Ratio | Peak Seconds | Peak Ratio | Peak Seconds | Peak Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 500.perlbench_r | 64 | **636** | **160** | 635 | 160 | 636 | 160 | 64 | 601 | 170 | 598 | 170 | **598** | **170** |
| 502.gcc_r | 64 | 545 | 166 | **546** | **166** | 547 | 166 | 64 | 420 | 216 | **421** | **215** | 421 | 215 |
| 505.mcf_r | 64 | **382** | **271** | 387 | 267 | 382 | 271 | 64 | 315 | 328 | 316 | 328 | **316** | **328** |
| 520.omnetpp_r | 64 | 842 | 99.8 | **841** | **99.9** | 840 | 100 | 64 | 828 | 101 | 823 | 102 | **827** | **101** |
| 523.xalancbmk_r | 64 | **374** | **181** | 374 | 181 | 375 | 180 | 64 | 303 | 223 | 304 | 223 | **303** | **223** |
| 525.x264_r | 64 | 244 | 460 | **241** | **464** | 241 | 466 | 64 | **235** | **478** | 236 | 476 | 234 | 478 |
| 531.deepsjeng_r | 64 | 370 | 198 | **372** | **197** | 392 | 187 | 64 | 362 | 202 | **364** | **202** | 364 | 202 |
| 541.leela_r | 64 | 542 | 195 | **542** | **196** | 542 | 196 | 64 | 542 | 195 | **542** | **196** | 542 | 196 |
| 548.exchange2_r | 64 | 299 | 561 | **307** | **545** | 308 | 544 | 64 | 299 | 561 | **307** | **545** | 308 | 544 |
| 557.xz_r | 64 | 527 | 131 | 527 | 131 | **527** | **131** | 64 | 527 | 131 | 527 | 131 | **527** | **131** |
| **SPECrate®2017_int_base =** | **210** | | | | | | | | | | | | | |
| **SPECrate®2017_int_peak =** | **227** | | | | | | | | | | | | | |

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.
'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
'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>

Set dirty_ratio=8 to limit dirty cache to 8% of memory
Set swappiness=1 to swap only if necessary
Set zone_reclaim_mode=1 to free local node memory and avoid remote memory
sync then drop_caches=3 to reset caches before invoking runcpu

dirty_ratio, swappiness, zone_reclaim_mode and drop_caches were
all set using privileged echo (e.g. echo 1 > /proc/sys/vm/swappiness).

**(Continued on next page)**

Standard Performance Evaluation Corporation (info@spec.org)                    https://www.spec.org/

## Lenovo Global Technology

SPECrate®2017_int_base = 210

ThinkSystem SR655
2.35 GHz,AMD EPYC 7452

SPECrate®2017_int_peak = 227

| | | | |
|---|---|---|---|
| **CPU2017 License:** 9017 | | **Test Date:** | Sep-2019 |
| **Test Sponsor:** Lenovo Global Technology | | **Hardware Availability:** | Aug-2019 |
| **Tested by:** Lenovo Global Technology | | **Software Availability:** | Aug-2019 |

## Operating System Notes (Continued)

```
Transparent huge pages set to 'always' for this run (OS default)
```

## General Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-amd-rome-aocc200/amd_rate_aocc200_rome_A_lib/64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017-1.0.5-amd-rome-aocc200/amd_rate_aocc200_rome_A_lib/32"
MALLOC_CONF = "retain:true"
Binaries were compiled on a system with 2p AMD EPYC 7601 CPU + 512GB Memory using Fedora 26

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.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3640 (Spectre variant 3a)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3639 (Spectre variant 4)
is mitigated in the system as tested and documented.
jemalloc: configured and built with GCC v9.1.0 in Ubuntu 19.04 with -O3 -znver2 -flto
jemalloc 5.2.0 is available here:
https://github.com/jemalloc/jemalloc/releases/download/5.2.0/jemalloc-5.2.0.tar.bz2
```

## Platform Notes

```
 BIOS settings:
 Operating Mode set to Maximum Performance
 NUMA nodes per socket set to NPS4
 Sysinfo program /home/cpu2017-1.0.5-amd-rome-aocc200/bin/sysinfo
 Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
 running on linux-01om Wed Sep  4 06:28:00 2019

 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 7452 32-Core Processor
       1  "physical id"s (chips)
       64 "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 : 32
       siblings  : 64
```

**(Continued on next page)**

## Lenovo Global Technology

SPECrate®2017_int_base = 210

ThinkSystem SR655
2.35 GHz,AMD EPYC 7452

SPECrate®2017_int_peak = 227

**CPU2017 License:** 9017                                   **Test Date:** Sep-2019
**Test Sponsor:** Lenovo Global Technology        **Hardware Availability:** Aug-2019
**Tested by:** Lenovo Global Technology          **Software Availability:** Aug-2019

### Platform Notes (Continued)

```
     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

  From lscpu:
     Architecture:        x86_64
     CPU op-mode(s):      32-bit, 64-bit
     Byte Order:          Little Endian
     Address sizes:       43 bits physical, 48 bits virtual
     CPU(s):              64
     On-line CPU(s) list: 0-63
     Thread(s) per core:  2
     Core(s) per socket:  32
     Socket(s):           1
     NUMA node(s):        4
     Vendor ID:           AuthenticAMD
     CPU family:          23
     Model:               49
     Model name:          AMD EPYC 7452 32-Core Processor
     Stepping:            0
     CPU MHz:             2350.000
     CPU max MHz:         2350.0000
     CPU min MHz:         1500.0000
     BogoMIPS:            4690.93
     Virtualization:      AMD-V
     L1d cache:           32K
     L1i cache:           32K
     L2 cache:            512K
     L3 cache:            16384K
     NUMA node0 CPU(s):   0-7,32-39
     NUMA node1 CPU(s):   8-15,40-47
     NUMA node2 CPU(s):   16-23,48-55
     NUMA node3 CPU(s):   24-31,56-63
     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 xtopology nonstop_tsc cpuid extd_apicid aperfmperf pni
     pclmulqdq monitor ssse3 fma cx16 sse4_1 sse4_2 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_l2 mwaitx cpb
     cat_l3 cdp_l3 hw_pstate sme ssbd sev ibrs ibpb stibp vmmcall fsgsbase bmi1 avx2 smep
     bmi2 cqm rdt_a rdseed adx smap clflushopt clwb sha_ni xsaveopt xsavec xgetbv1 xsaves
     cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local clzero irperf xsaveerptr arat npt
     lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter
     pfthreshold avic v_vmsave_vmload vgif umip rdpid overflow_recov succor smca

  /proc/cpuinfo cache data
     cache size : 512 KB
```

**(Continued on next page)**

## Lenovo Global Technology

SPECrate®2017_int_base = 210

ThinkSystem SR655
2.35 GHz,AMD EPYC 7452

SPECrate®2017_int_peak = 227

**CPU2017 License:** 9017
**Test Sponsor:** Lenovo Global Technology
**Tested by:** Lenovo Global Technology

**Test Date:** Sep-2019
**Hardware Availability:** Aug-2019
**Software Availability:** Aug-2019

## Platform Notes (Continued)

```
From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
physical chip.
  available: 4 nodes (0-3)
  node 0 cpus: 0 1 2 3 4 5 6 7 32 33 34 35 36 37 38 39
  node 0 size: 64304 MB
  node 0 free: 64069 MB
  node 1 cpus: 8 9 10 11 12 13 14 15 40 41 42 43 44 45 46 47
  node 1 size: 64499 MB
  node 1 free: 64241 MB
  node 2 cpus: 16 17 18 19 20 21 22 23 48 49 50 51 52 53 54 55
  node 2 size: 64470 MB
  node 2 free: 64256 MB
  node 3 cpus: 24 25 26 27 28 29 30 31 56 57 58 59 60 61 62 63
  node 3 size: 64485 MB
  node 3 free: 64284 MB
  node distances:
  node   0   1   2   3
    0:  10  12  12  12
    1:  12  10  12  12
    2:  12  12  10  12
    3:  12  12  12  10

From /proc/meminfo
   MemTotal:       263945864 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="SLES"
      VERSION="15-SP1"
      VERSION_ID="15.1"
      PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
      ID="sles"
      ID_LIKE="suse"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:15:sp1"

uname -a:
   Linux linux-01om 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
   x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown):          Not affected
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Full AMD retpoline, IBPB: conditional,
```

**(Continued on next page)**

## Lenovo Global Technology

ThinkSystem SR655
2.35 GHz,AMD EPYC 7452

SPECrate®2017_int_base = 210

SPECrate®2017_int_peak = 227

| | | | |
|---|---|---|---|
| **CPU2017 License:** | 9017 | **Test Date:** | Sep-2019 |
| **Test Sponsor:** | Lenovo Global Technology | **Hardware Availability:** | Aug-2019 |
| **Tested by:** | Lenovo Global Technology | **Software Availability:** | Aug-2019 |

## Platform Notes (Continued)

```
  IBRS_FW, STIBP: conditional, RSB filling

  run-level 3 Sep 4 06:19

  SPEC is set to: /home/cpu2017-1.0.5-amd-rome-aocc200
     Filesystem      Type   Size  Used Avail Use% Mounted on
     /dev/sda2       xfs    893G   68G  825G   8% /

  Additional information from dmidecode 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.
    BIOS Lenovo                CFE103L 08/19/2019
    Memory:
     8x Samsung M393A4K40DB2-CWE 32 kB 2 rank 3200
     8x Unknown Unknown

  (End of data from sysinfo program)
```

## Compiler Version Notes

```
================================================================================
C        | 502.gcc_r(peak)
--------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B179.2019_06_12 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#179) (based on LLVM AOCC.LLVM.2.0.0.B179.2019_06_12)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-2.0.0/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)
--------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B179.2019_06_12 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#179) (based on LLVM AOCC.LLVM.2.0.0.B179.2019_06_12)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-2.0.0/bin
--------------------------------------------------------------------------------


================================================================================
C        | 502.gcc_r(peak)
--------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B179.2019_06_12 clang version 8.0.0 (CLANG: Jenkins
```

**(Continued on next page)**

## Lenovo Global Technology

ThinkSystem SR655
2.35 GHz,AMD EPYC 7452

SPECrate®2017_int_base = 210

SPECrate®2017_int_peak = 227

**CPU2017 License:** 9017　　　　　　　　　　　　　　　　　　**Test Date:** Sep-2019
**Test Sponsor:** Lenovo Global Technology　　　　　　　**Hardware Availability:** Aug-2019
**Tested by:** Lenovo Global Technology　　　　　　　　**Software Availability:** Aug-2019

## Compiler Version Notes (Continued)

```
  AOCC_2_0_0-Build#179) (based on LLVM AOCC.LLVM.2.0.0.B179.2019_06_12)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-2.0.0/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)
--------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B179.2019_06_12 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#179) (based on LLVM AOCC.LLVM.2.0.0.B179.2019_06_12)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-2.0.0/bin
--------------------------------------------------------------------------


==========================================================================
C++          | 523.xalancbmk_r(peak)
--------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B179.2019_06_12 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#179) (based on LLVM AOCC.LLVM.2.0.0.B179.2019_06_12)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-2.0.0/bin
--------------------------------------------------------------------------


==========================================================================
C++          | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
             | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
--------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B179.2019_06_12 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#179) (based on LLVM AOCC.LLVM.2.0.0.B179.2019_06_12)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-2.0.0/bin
--------------------------------------------------------------------------


==========================================================================
C++          | 523.xalancbmk_r(peak)
--------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B179.2019_06_12 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#179) (based on LLVM AOCC.LLVM.2.0.0.B179.2019_06_12)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-2.0.0/bin
--------------------------------------------------------------------------
```

**(Continued on next page)**

# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

## Lenovo Global Technology

ThinkSystem SR655
2.35 GHz,AMD EPYC 7452

SPECrate®2017_int_base = 210

SPECrate®2017_int_peak = 227

**CPU2017 License:** 9017
**Test Sponsor:** Lenovo Global Technology
**Tested by:** Lenovo Global Technology

**Test Date:** Sep-2019
**Hardware Availability:** Aug-2019
**Software Availability:** Aug-2019

## Compiler Version Notes (Continued)

```
==============================================================================
C++      | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
         | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B179.2019_06_12 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#179) (based on LLVM AOCC.LLVM.2.0.0.B179.2019_06_12)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-2.0.0/bin
------------------------------------------------------------------------------


==============================================================================
Fortran | 548.exchange2_r(base, peak)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B179.2019_06_12 clang version 8.0.0 (CLANG: Jenkins
  AOCC_2_0_0-Build#179) (based on LLVM AOCC.LLVM.2.0.0.B179.2019_06_12)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-2.0.0/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.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

**(Continued on next page)**

Standard Performance Evaluation Corporation (info@spec.org)                    https://www.spec.org/

# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

## Lenovo Global Technology

ThinkSystem SR655
2.35 GHz,AMD EPYC 7452

SPECrate®2017_int_base = 210

SPECrate®2017_int_peak = 227

**CPU2017 License:** 9017
**Test Sponsor:** Lenovo Global Technology
**Tested by:** Lenovo Global Technology

**Test Date:** Sep-2019
**Hardware Availability:** Aug-2019
**Software Availability:** Aug-2019

## Base Portability Flags (Continued)

548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

## Base Optimization Flags

C benchmarks:
```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver2 -fstruct-layout=3 -mllvm -unroll-threshold=50
-fremap-arrays -mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp
-mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000
-flv-function-specialization -z muldefs -lmvec -lamdlibm -ljemalloc
-lflang
```

C++ benchmarks:
```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3
-Wl,-mllvm -Wl,-suppress-fmas -O3 -ffast-math -march=znver2
-mllvm -loop-unswitch-threshold=200000 -mllvm -vector-library=LIBMVEC
-mllvm -unroll-threshold=100 -flv-function-specialization
-mllvm -enable-partial-unswitch -z muldefs -lmvec -lamdlibm
-ljemalloc -lflang
```

Fortran benchmarks:
```
-flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize -Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -ffast-math
-Wl,-mllvm -Wl,-inline-recursion=4 -Wl,-mllvm -Wl,-lsr-in-nested-loop
-Wl,-mllvm -Wl,-enable-iv-split -O3 -march=znver2 -funroll-loops
-Mrecursive -mllvm -vector-library=LIBMVEC -z muldefs
-mllvm -disable-indvar-simplify -mllvm -unroll-aggressive
-mllvm -unroll-threshold=150 -lmvec -lamdlibm -ljemalloc -lflang
```

## Peak Compiler Invocation

C benchmarks:
```
clang
```

**(Continued on next page)**

Standard Performance Evaluation Corporation (info@spec.org)            https://www.spec.org/

## Lenovo Global Technology

ThinkSystem SR655
2.35 GHz,AMD EPYC 7452

SPECrate®2017_int_base = 210

SPECrate®2017_int_peak = 227

| | | | |
|---|---|---|---|
| **CPU2017 License:** 9017 | | **Test Date:** | Sep-2019 |
| **Test Sponsor:** | Lenovo Global Technology | **Hardware Availability:** | Aug-2019 |
| **Tested by:** | Lenovo Global Technology | **Software Availability:** | Aug-2019 |

# Peak Compiler Invocation (Continued)

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 -D_FILE_OFFSET_BITS=64`
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: `-flto -Wl,-mllvm -Wl,-function-specialize`
`-Wl,-mllvm -Wl,-region-vectorize`
`-Wl,-mllvm -Wl,-vector-library=LIBMVEC`
`-Wl,-mllvm -Wl,-reduce-array-computations=3`
`-fprofile-instr-generate`(pass 1)
`-fprofile-instr-use`(pass 2) `-Ofast -march=znver2`
`-mno-sse4a -fstruct-layout=5`
`-mllvm -vectorize-memory-aggressively`
`-mllvm -function-specialize -mllvm -enable-gvn-hoist`
`-mllvm -unroll-threshold=50 -fremap-arrays`
`-mllvm -vector-library=LIBMVEC`
`-mllvm -reduce-array-computations=3`
`-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000`
`-flv-function-specialization -lmvec -lamdlibm -ljemalloc`
`-lflang`

502.gcc_r: `-m32 -flto -Wl,-mllvm -Wl,-function-specialize`
`-Wl,-mllvm -Wl,-region-vectorize`
`-Wl,-mllvm -Wl,-vector-library=LIBMVEC`

**(Continued on next page)**

## Lenovo Global Technology

ThinkSystem SR655
2.35 GHz,AMD EPYC 7452

SPECrate®2017_int_base = 210

SPECrate®2017_int_peak = 227

**CPU2017 License:** 9017
**Test Sponsor:** Lenovo Global Technology
**Tested by:** Lenovo Global Technology

**Test Date:** Sep-2019
**Hardware Availability:** Aug-2019
**Software Availability:** Aug-2019

# Peak Optimization Flags (Continued)

502.gcc_r (continued):
```
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -mno-sse4a -fstruct-layout=5
-mllvm -vectorize-memory-aggressively
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -vector-library=LIBMVEC
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
-flv-function-specialization -fgnu89-inline -ljemalloc
```

505.mcf_r: `-flto -Wl,-mllvm -Wl,-function-specialize`
```
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -mno-sse4a -fstruct-layout=5
-mllvm -vectorize-memory-aggressively
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -vector-library=LIBMVEC
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
-flv-function-specialization -lmvec -lamdlibm -ljemalloc
-lflang
```

525.x264_r: Same as 500.perlbench_r

557.xz_r: basepeak = yes

C++ benchmarks:

520.omnetpp_r: `-flto -Wl,-mllvm -Wl,-function-specialize`
```
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -flv-function-specialization
-mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch
-mllvm -loop-unswitch-threshold=200000
-mllvm -vector-library=LIBMVEC
-mllvm -inline-threshold=1000 -lmvec -lamdlibm -ljemalloc
-lflang
```

523.xalancbmk_r: `-m32 -flto -Wl,-mllvm -Wl,-function-specialize`
```
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
```

**(Continued on next page)**

## Lenovo Global Technology

ThinkSystem SR655
2.35 GHz,AMD EPYC 7452

SPECrate®2017_int_base = 210

SPECrate®2017_int_peak = 227

**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

**Test Date:** Sep-2019

**Hardware Availability:** Aug-2019

**Software Availability:** Aug-2019

# Peak Optimization Flags (Continued)

523.xalancbmk_r (continued):
```
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -flv-function-specialization
-mllvm -unroll-threshold=100
-mllvm -enable-partial-unswitch
-mllvm -loop-unswitch-threshold=200000
-mllvm -vector-library=LIBMVEC
-mllvm -inline-threshold=1000 -ljemalloc
```

531.deepsjeng_r: `Same as 520.omnetpp_r`

541.leela_r: `basepeak = yes`

Fortran benchmarks:

548.exchange2_r: `basepeak = yes`

# Peak Other Flags

C benchmarks:

502.gcc_r: `-L/sppo/dev/cpu2017/amd_rate_aocc200_rome/amd_rate_aocc200_rome_A_lib/32`

C++ benchmarks:

523.xalancbmk_r: `-L/sppo/dev/cpu2017/amd_rate_aocc200_rome/amd_rate_aocc200_rome_A_lib/32`

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/aocc200-flags-A1.2019-09-17.html
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Rome-A.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/aocc200-flags-A1.2019-09-17.xml
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Rome-A.xml

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

Tested with SPEC CPU®2017 v1.0.5 on 2019-09-03 18:27:59-0400.
Report generated on 2019-10-01 14:17:45 by CPU2017 PDF formatter v6255.
Originally published on 2019-10-01.