



# SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

## Lenovo Global Technology

ThinkSystem SR665  
3.20 GHz, AMD EPYC 7F72

SPECrate®2017\_fp\_base = 391

SPECrate®2017\_fp\_peak = 397

CPU2017 License: 9017

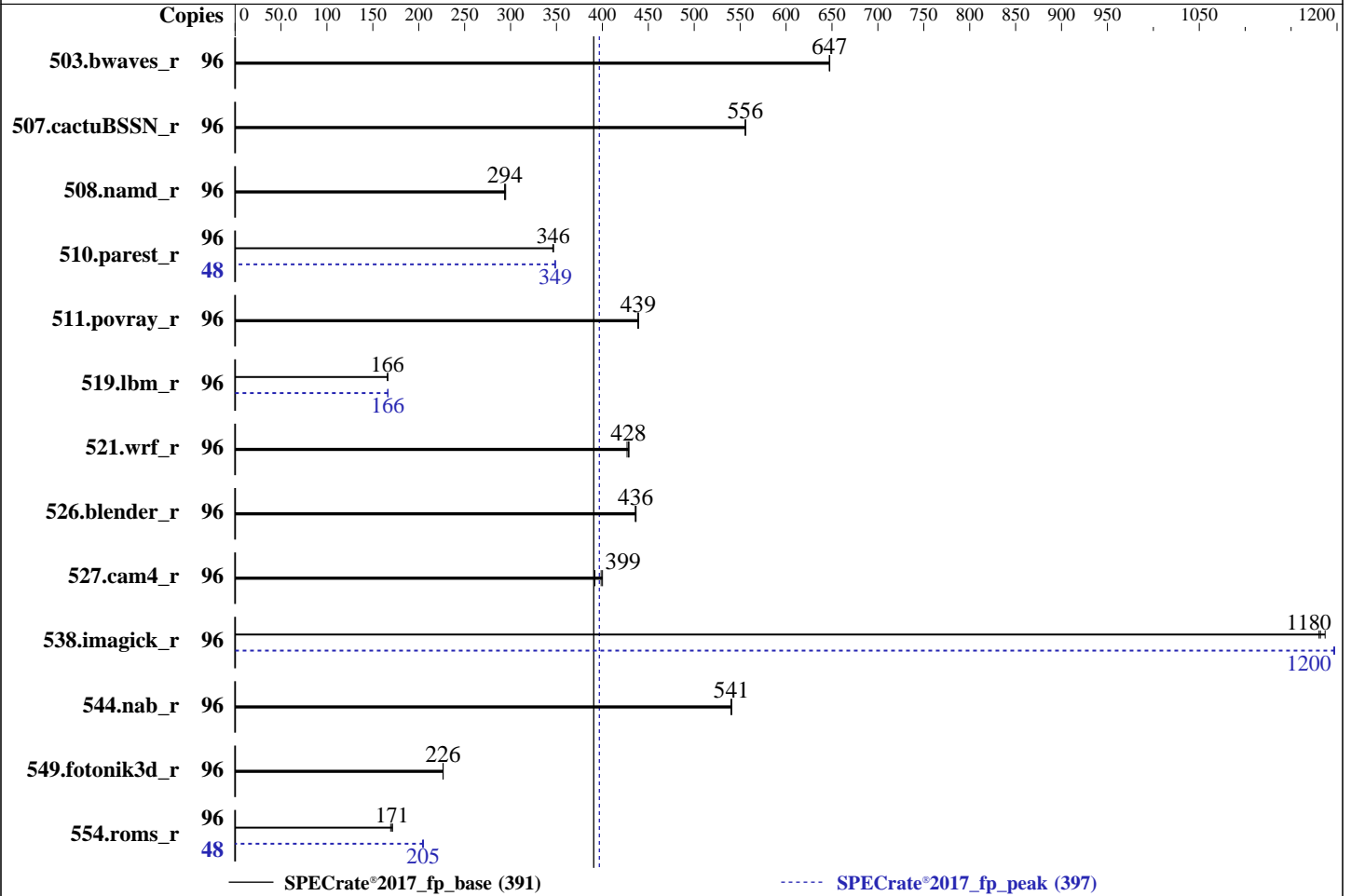
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Jul-2020

Hardware Availability: Jun-2020

Software Availability: Nov-2019



### Hardware

CPU Name: AMD EPYC 7F72  
 Max MHz: 3700  
 Nominal: 3200  
 Enabled: 48 cores, 2 chips, 2 threads/core  
 Orderable: 1,2 chips  
 Cache L1: 32 KB I + 32 KB D on chip per core  
 L2: 512 KB I+D on chip per core  
 L3: 192 MB I+D on chip per chip,  
 16 MB shared / 2 cores  
 Other: None  
 Memory: 1 TB (32 x 32 GB 2Rx8 PC4-3200AA-R)  
 Storage: 1 x 960 GB SATA SSD  
 Other: None

### Software

OS: Red Hat Enterprise Linux 8.1 (Ootpa)  
 Kernel 4.18.0-147.el8.x86\_64  
 Compiler: C/C++/Fortran: Version 2.0.0 of AOCC  
 Parallel: No  
 Firmware: Lenovo BIOS Version D8E105P 1.00 released May-2020  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 64-bit  
 Other: jemalloc: jemalloc memory allocator library v5.2.0  
 Power Management: BIOS 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
503.bwaves_r	96	<b><u>1487</u></b>	<b><u>647</u></b>	1487	648	1488	647	96	<b><u>1487</u></b>	<b><u>647</u></b>	1487	648	1488	647
507.cactuBSSN_r	96	219	556	219	556	<b><u>219</u></b>	<b><u>556</u></b>	96	219	556	219	556	<b><u>219</u></b>	<b><u>556</u></b>
508.namd_r	96	310	295	<b><u>310</u></b>	<b><u>294</u></b>	311	294	96	310	295	<b><u>310</u></b>	<b><u>294</u></b>	311	294
510.parest_r	96	724	347	726	346	<b><u>725</u></b>	<b><u>346</u></b>	48	360	349	360	348	<b><u>360</u></b>	<b><u>349</u></b>
511.povray_r	96	<b><u>511</u></b>	<b><u>439</u></b>	511	439	510	439	96	<b><u>511</u></b>	<b><u>439</u></b>	511	439	510	439
519.lbm_r	96	609	166	<b><u>610</u></b>	<b><u>166</u></b>	610	166	96	608	166	608	166	<b><u>608</u></b>	<b><u>166</u></b>
521.wrf_r	96	501	429	<b><u>502</u></b>	<b><u>428</u></b>	504	427	96	501	429	<b><u>502</u></b>	<b><u>428</u></b>	504	427
526.blender_r	96	<b><u>335</u></b>	<b><u>436</u></b>	335	437	335	436	96	<b><u>335</u></b>	<b><u>436</u></b>	335	437	335	436
527.cam4_r	96	420	400	429	392	<b><u>421</u></b>	<b><u>399</u></b>	96	420	400	429	392	<b><u>421</u></b>	<b><u>399</u></b>
538.imagick_r	96	202	1180	201	1190	<b><u>202</u></b>	<b><u>1180</u></b>	96	<b><u>199</u></b>	<b><u>1200</u></b>	199	1200	200	1200
544.nab_r	96	<b><u>299</u></b>	<b><u>541</u></b>	299	541	299	540	96	<b><u>299</u></b>	<b><u>541</u></b>	299	541	299	540
549.fotonik3d_r	96	<b><u>1652</u></b>	<b><u>226</u></b>	1653	226	1651	227	96	<b><u>1652</u></b>	<b><u>226</u></b>	1653	226	1651	227
554.roms_r	96	890	171	900	169	<b><u>892</u></b>	<b><u>171</u></b>	48	374	204	372	205	<b><u>372</u></b>	<b><u>205</u></b>

SPECrate®2017\_fp\_base = **391**

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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

(Continued on next page)



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### Operating System Notes (Continued)

dirty\_ratio, swappiness, zone\_reclaim\_mode and drop\_caches were all set using privileged echo (e.g. echo 1 > /proc/sys/vm/swappiness).

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

### Environment Variables Notes

Environment variables set by runcpu before the start of the run:  
LD\_LIBRARY\_PATH =  
"/home/cpu2017-1.1.0-amd-rome-aocc200-C1/amd\_rate\_aocc200\_rome\_C\_lib/64;  
/home/cpu2017-1.1.0-amd-rome-aocc200-C1/amd\_rate\_aocc200\_rome\_C\_lib/32:"  
MALLOC\_CONF = "retain:true"

### General Notes

Binaries were compiled on a system with 2x 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.  
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:  
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode  
NUMA nodes per socket set to NPS2

Sysinfo program /home/cpu2017-1.1.0-amd-rome-aocc200-C1/bin/sysinfo  
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011  
running on localhost.localdomain Thu Jul 2 01:31:33 2020

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 7F72 24-Core Processor

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### Platform Notes (Continued)

```
2 "physical id"s (chips)
96 "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 : 24
siblings  : 48
physical 0: cores 0 1 4 5 8 9 12 13 16 17 20 21 24 25 28 29 32 33 36 37 40 41 44 45
physical 1: cores 0 1 4 5 8 9 12 13 16 17 20 21 24 25 28 29 32 33 36 37 40 41 44 45
```

```
From lscpu:
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:             Little Endian
CPU(s):                 96
On-line CPU(s) list:   0-95
Thread(s) per core:    2
Core(s) per socket:    24
Socket(s):              2
NUMA node(s):          4
Vendor ID:              AuthenticAMD
CPU family:             23
Model:                  49
Model name:             AMD EPYC 7F72 24-Core Processor
Stepping:               0
CPU MHz:                2949.177
CPU max MHz:           3200.0000
CPU min MHz:           2500.0000
BogoMIPS:              6388.21
Virtualization:        AMD-V
L1d cache:             32K
L1i cache:             32K
L2 cache:              512K
L3 cache:              16384K
NUMA node0 CPU(s):     0-11,48-59
NUMA node1 CPU(s):     12-23,60-71
NUMA node2 CPU(s):     24-35,72-83
NUMA node3 CPU(s):     36-47,84-95
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 fl6c
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 hw_pstate sme ssbd mba sev ibrs ibpb stibp vmmcall fsgsbase bml 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
wbnoinvd arat npt lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid
```

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### Platform Notes (Continued)

decodeassists pausefilter pfthreshold avic v\_vmsave\_vmload vgif umip rdpid  
overflow\_recov succor smca

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

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 8 9 10 11 48 49 50 51 52 53 54 55 56 57 58 59
node 0 size: 257847 MB
node 0 free: 257428 MB
node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23 60 61 62 63 64 65 66 67 68 69 70 71
node 1 size: 258028 MB
node 1 free: 257644 MB
node 2 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 72 73 74 75 76 77 78 79 80 81 82 83
node 2 size: 258040 MB
node 2 free: 257783 MB
node 3 cpus: 36 37 38 39 40 41 42 43 44 45 46 47 84 85 86 87 88 89 90 91 92 93 94 95
node 3 size: 258015 MB
node 3 free: 257731 MB
node distances:
node  0  1  2  3
0:  10  12  32  32
1:  12  10  32  32
2:  32  32  10  12
3:  32  32  12  10
```

```
From /proc/meminfo
MemTotal: 1056697488 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

```
From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux"
VERSION="8.1 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.1"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.1 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.1:ga
```

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### Platform Notes (Continued)

uname -a:

```
Linux localhost.localdomain 4.18.0-147.el8.x86_64 #1 SMP Thu Sep 26 15:52:44 UTC 2019
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

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 and seccomp
CVE-2017-5753 (Spectre variant 1):	Mitigation: usercopy/swaps barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):	Mitigation: Full AMD retpoline, IBPB: conditional, IBRS_FW, STIBP: conditional, RSB filling

run-level 3 Jul 2 01:15

```
SPEC is set to: /home/cpu2017-1.1.0-amd-rome-aocc200-C1
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sdb2       xfs   838G  45G  793G   6% /home
```

```
From /sys/devices/virtual/dmi/id
BIOS:      Lenovo D8E105P-1.00 05/08/2020
Vendor:    Lenovo
Product:   ThinkSystem SR665 MB
Product Family: ThinkSystem
Serial:    1234567890
```

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.

```
Memory:
32x Samsung M393A4G43AB3-CWE 32 kB 2 rank 3200
```

(End of data from sysinfo program)  
This system support 16 DIMMs per processor, total 32 DIMMs.  
32 DIMM slots installed with 32 GB DIMM for this run.

### Compiler Version Notes

```
=====
C          | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
          | 544.nab_r(base, peak)
```

(Continued on next page)



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### Compiler Version Notes (Continued)

-----  
AOCC.LLVM.2.0.0.B191.2019\_07\_19 clang version 8.0.0 (CLANG: Jenkins  
AOCC\_2\_0\_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019\_07\_19)  
Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin  
-----

=====  
C++ | 508.namd\_r(base, peak) 510.parest\_r(base, peak)  
-----

AOCC.LLVM.2.0.0.B191.2019\_07\_19 clang version 8.0.0 (CLANG: Jenkins  
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Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin  
-----

=====  
C++, C | 511.povray\_r(base, peak) 526.blender\_r(base, peak)  
-----

AOCC.LLVM.2.0.0.B191.2019\_07\_19 clang version 8.0.0 (CLANG: Jenkins  
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-----

=====  
C++, C, Fortran | 507.cactuBSSN\_r(base, peak)  
-----

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Target: x86\_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

=====  
Fortran | 503.bwaves\_r(base, peak) 549.fotonik3d\_r(base, peak)  
| 554.roms\_r(base, peak)

AOCC.LLVM.2.0.0.B191.2019\_07\_19 clang version 8.0.0 (CLANG: Jenkins  
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=====  
Fortran, C | 521.wrf\_r(base, peak) 527.cam4\_r(base, peak)

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Target: x86\_64-unknown-linux-gnu  
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InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

### Base Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

flang

Benchmarks using both Fortran and C:

flang clang

(Continued on next page)





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## Base Compiler Invocation (Continued)

Benchmarks using both C and C++:

clang++ clang

Benchmarks using Fortran, C, and C++:

clang++ clang flang

## Base Portability Flags

503.bwaves\_r: -DSPEC\_LP64  
 507.cactuBSSN\_r: -DSPEC\_LP64  
 508.namd\_r: -DSPEC\_LP64  
 510.parest\_r: -DSPEC\_LP64  
 511.povray\_r: -DSPEC\_LP64  
 519.lbm\_r: -DSPEC\_LP64  
 521.wrf\_r: -DSPEC\_CASE\_FLAG -Mbyteswapio -DSPEC\_LP64  
 526.blender\_r: -funsigned-char -D\_\_BOOL\_DEFINED -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:

-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:

-std=c++98 -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

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Hardware Availability: Jun-2020

Software Availability: Nov-2019

## Base Optimization Flags (Continued)

C++ benchmarks (continued):

```
-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 -O3 -march=znver2
-funroll-loops -Mrecursive -mllvm -vector-library=LIBMVEC -z muldefs
-Kieee -fno-finite-math-only -lmvec -lamdlibm -ljemalloc -lflang
```

Benchmarks using both Fortran and C:

```
-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
-freemap-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 -funroll-loops -Mrecursive -z muldefs
-Kieee -fno-finite-math-only -lmvec -lamdlibm -ljemalloc -lflang
```

Benchmarks using both C and C++:

```
-std=c++98 -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
-fstruct-layout=3 -mllvm -unroll-threshold=50 -freemap-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 -mllvm -loop-unswitch-threshold=200000
-mllvm -unroll-threshold=100 -mllvm -enable-partial-unswitch -z muldefs
-lmvec -lamdlibm -ljemalloc -lflang
```

Benchmarks using Fortran, C, and C++:

```
-std=c++98 -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
-fstruct-layout=3 -mllvm -unroll-threshold=50 -freemap-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 -mllvm -loop-unswitch-threshold=200000
-mllvm -unroll-threshold=100 -mllvm -enable-partial-unswitch
```

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# SPEC CPU®2017 Floating Point Rate Result

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**Lenovo Global Technology**

ThinkSystem SR665  
3.20 GHz, AMD EPYC 7F72

SPECrate®2017\_fp\_base = 391

SPECrate®2017\_fp\_peak = 397

**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

**Test Date:** Jul-2020

**Hardware Availability:** Jun-2020

**Software Availability:** Nov-2019

## Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):

-funroll-loops -Mrecursive -z muldefs -Kieee -fno-finite-math-only  
-lmvec -lamdlibm -ljemalloc -lflang

## Peak Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

flang

Benchmarks using both Fortran and C:

flang clang

Benchmarks using both C and C++:

clang++ clang

Benchmarks using Fortran, C, and C++:

clang++ clang flang

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

519.lbm\_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

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## Peak Optimization Flags (Continued)

519.lbm\_r (continued):

```
-mllvm -vector-library=LIBMVEC
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
-flv-function-specialization -lmvec -lamdlibm -ljemalloc
-lflang
```

538.imagick\_r: Same as 519.lbm\_r

544.nab\_r: basepeak = yes

C++ benchmarks:

508.namd\_r: basepeak = yes

510.parest\_r: -std=c++98 -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 -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
```

Fortran benchmarks:

503.bwaves\_r: basepeak = yes

549.fotonik3d\_r: basepeak = yes

554.roms\_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
-Wl,-mllvm -Wl,-enable-X86-prefetching -O3 -march=znver2
-funroll-loops -Mrecursive -mllvm -vector-library=LIBMVEC
-Kieee -fno-finite-math-only -lmvec -lamdlibm -ljemalloc
-lflang
```

Benchmarks using both Fortran and C:

521.wrf\_r: basepeak = yes

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## Peak Optimization Flags (Continued)

527.cam4\_r: basepeak = yes

Benchmarks using both C and C++:

511.povray\_r: basepeak = yes

526.blender\_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactuBSSN\_r: basepeak = yes

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/aocc200-flags-B1-1.html>

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Rome2P-K.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2017/flags/aocc200-flags-B1-1.xml>

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Rome2P-K.xml>

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