## Lenovo Global Technology

**ThinkSystem SR665**  
2.50 GHz, AMD EPYC 7502

### SPEC CPU®2017 Floating Point Speed Result

<table>
<thead>
<tr>
<th>Software Availability</th>
<th>Lenovo Global Technology</th>
</tr>
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<tr>
<td>Test Date:</td>
<td>Jul-2020</td>
</tr>
<tr>
<td>Hardware Availability</td>
<td>Jun-2020</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Dec-2019</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** AMD EPYC 7502  
- **Max MHz:** 3350  
- **Nominal:** 2500  
- **Enabled:** 64 cores, 2 chips, 2 threads/core  
- **Orderable:** 1.2 chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **Cache L2:** 512 KB I+D on chip per core  
- **Cache L3:** 128 MB I+D on chip per chip, 16 MB shared / 4 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:** SUSE Linux Enterprise Server 12 SP5 (x86_64)  
  Kernel 4.12.14-120-default  
- **Compiler:** C/C++/Fortran: Version 2.0.0 of AOCC  
- **Parallel:** Yes  
- **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 v5.1.0  
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage

### Benchmark Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
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<tr>
<td>603.bwaves_s</td>
<td>64</td>
<td>274</td>
<td>280</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>64</td>
<td>56.9</td>
<td>280</td>
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<tr>
<td>619.lbm_s</td>
<td>128</td>
<td>70.4</td>
<td>146</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>64</td>
<td>115</td>
<td>240</td>
</tr>
<tr>
<td>627.cam4_s</td>
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<td>241</td>
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<td>339</td>
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<td>128</td>
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<td>649.fotonik3d_s</td>
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</tr>
<tr>
<td>654.roms_s</td>
<td>64</td>
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### Summary

- **CPU2017 License:** 9017  
- **Test Sponsor:** Lenovo Global Technology  
- **Hardware Availability:** Jun-2020  
- **Software Availability:** Dec-2019  
- **Test Date:** Jul-2020  
- **Tested by:** Lenovo Global Technology  
- **CPU Name:** AMD EPYC 7502  
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---
## Results Table

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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>60.0</td>
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**SPECspeed®2017_fp_base = 168**

**SPECspeed®2017_fp_peak = 174**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Compiler Notes


## 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).

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:
GOMP_CPU_AFFINITY = "0-127"
LD_LIBRARY_PATH = 
    "/home/cpu2017-1.1.0-amd-rome-aocc200-C3/ amd_speed_aocc200_rome_C_lib/64
    ;/home/cpu2017-1.1.0-amd-rome-aocc200-C3/ amd_speed_aocc200_rome_C_lib/32
    ;
MALLOC_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "128"

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:
GOMP_CPU_AFFINITY = "0-63"

Environment variables set by runcpu during the 619.lbm_s peak run:
GOMP_CPU_AFFINITY = "0 64 1 65 2 66 3 67 4 68 5 69 6 70 7 71 8 72 9 73 10 74
    11 75 12 76 13 77 14 78 15 79 16 80 17 81 18 82 19 83 20 84 21 85 22 86
    23 87 24 88 25 89 26 90 27 91 28 92 29 93 30 94 31 95 32 96 33 97 34 98
    35 99 36 100 37 101 38 102 39 103 40 104 41 105 42 106 43 107 44 108 45
    109 46 110 47 111 48 112 49 113 50 114 51 115 52 116 53 117 54 118 55
    119 56 120 57 121 58 122 59 123 60 124 61 125 62 126 63 127"

Environment variables set by runcpu during the 627.cam4_s peak run:
GOMP_CPU_AFFINITY = "0-63"

Environment variables set by runcpu during the 628.pop2_s peak run:
GOMP_CPU_AFFINITY = "0-63"

Environment variables set by runcpu during the 638.imagick_s peak run:
GOMP_CPU_AFFINITY = "0-63"

Environment variables set by runcpu during the 644.nab_s peak run:
GOMP_CPU_AFFINITY = "0 64 1 65 2 66 3 67 4 68 5 69 6 70 7 71 8 72 9 73 10 74
    11 75 12 76 13 77 14 78 15 79 16 80 17 81 18 82 19 83 20 84 21 85 22 86
    23 87 24 88 25 89 26 90 27 91 28 92 29 93 30 94 31 95 32 96 33 97 34 98
    35 99 36 100 37 101 38 102 39 103 40 104 41 105 42 106 43 107 44 108 45
    109 46 110 47 111 48 112 49 113 50 114 51 115 52 116 53 117 54 118 55
    119 56 120 57 121 58 122 59 123 60 124 61 125 62 126 63 127"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0-63"
Lenovo Global Technology
ThinkSystem SR665
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SPECspeed®2017_fp_base = 168
SPECspeed®2017_fp_peak = 174

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 5.1.0 is available here: https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2

Platform Notes

BIOS settings:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
Global C-state Control set to Disable
NUMA nodes per socket set to NPS2
SOC P-States set to P0

Sysinfo program /home/cpu2017-1.1.0-amd-rome-aocc200-C3/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed1e1e6a485a0011
running on linux-410h Sun Jul 5 02:03:05 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 7502 32-Core Processor
  2 "physical id"s (chips)
  128 "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
  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
  physical 1: 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

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## Lenovo Global Technology

ThinkSystem SR665
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<table>
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### SPECspeed®2017_fp_base = 168

### SPECspeed®2017_fp_peak = 174

### Platform Notes (Continued)

Address sizes: 43 bits physical, 48 bits virtual
CPU(s): 128
On-line CPU(s) list: 0-127
Thread(s) per core: 2
Core(s) per socket: 32
Socket(s): 2
NUMA node(s): 4
Vendor ID: AuthenticAMD
CPU family: 23
Model: 49
Model name: AMD EPYC 7502 32-Core Processor
Stepping: 0
CPU MHz: 2500.000
CPU max MHz: 2500.0000
CPU min MHz: 1500.0000
BogoMIPS: 4990.54
Virtualization: AMD-V
L1d cache: 32K
L1i cache: 32K
L2 cache: 512K
L3 cache: 16384K
NUMA node0 CPU(s): 0-15,64-79
NUMA node1 CPU(s): 16-31,80-95
NUMA node2 CPU(s): 32-47,96-111
NUMA node3 CPU(s): 48-63,112-127

Flags: fpu vme de pse mce sse sse2 ht syscall nx mmx ext4 fxsr abm 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 aperfmperf pni pclmulqdq monitor ssse3 fma cx16 sse4_1 sse4_2 movbe popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm ext4 cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb bpxext perfctr_l2 mwAITx cpb cat_l3 cdp_l3 hw_pstate sme ssbd sev ibrs ibpb stibp vmmcall fsgsbase bmi1 avx2 smep bmi2 cmx rdta rdseed adx smap clflushopt clwb sha_8519 xsaveopt xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local clzero irperf xsaverptr wbinvd arat npt lbrv svm_lock nrip_save tsb_scale vmcb_clean flushbyasid decodeaissists pausefilter pfthreshold avic v_vmsave_vmload vfpg 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 12 13 14 15 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79
node 0 size: 257847 MB

(Continued on next page)
Lenovo Global Technology

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SPECspeed®2017_fp_base = 168
SPECspeed®2017_fp_peak = 174

Platform Notes (Continued)

node 0 free: 257402 MB
node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 80 81 82 83 84 85 86 87 88
89 90 91 92 93 94 95
node 1 size: 258028 MB
node 1 free: 257747 MB
node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 96 97 98 99 100 101 102
103 104 105 106 107 108 109 110 111
node 2 size: 258040 MB
node 2 free: 257870 MB
node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 112 113 114 115 116 117
118 119 120 121 122 123 124 125 126 127
node 3 size: 258009 MB
node 3 free: 257843 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: 1056693752 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
SuSE-release:

SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 5

# This file is deprecated and will be removed in a future service pack or release.
# Please check /etc/os-release for details about this release.

os-release:
NAME="SLES"
VERSION="12-SP5"
VERSION_ID="12.5"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP5"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp5"

uname -a:
Linux linux-410h 4.12.14-120-default #1 SMP Thu Nov 7 16:39:09 UTC 2019 (fd9dc36)
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR665
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**SPEC CPU®2017 Floating Point Speed Result**
Copyright 2017-2020 Standard Performance Evaluation Corporation

**SPECspeed®2017_fp_base = 168**
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**Platform Notes (Continued)**

- **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 and seccomp
- **CVE-2017-5753 (Spectre variant 1):** Mitigation: usercopy/swapgs barriers and __user pointer sanitization
- **CVE-2017-5715 (Spectre variant 2):** Mitigation: Full AMD retpoline, IBPP: conditional, IBRS_FW, STIBP: conditional, RSB filling
- **tsx_async_abort:** Not affected

- **run-level 3 Jul 5 00:01**
- **SPEC is set to:** /home/cpu2017-1.1.0-amd-rome-aocc200-C3
- **Filesystem** | **Type** | **Size** | **Used** | **Avail** | **Use%** | **Mounted on**
|----------------|----------|---------|---------|----------|---------|----------------|
| /dev/sda2 | xfs | 893G | 36G | 858G | 4% | /

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)

**Compiler Version Notes**

```
==============================================================================
| C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak) |
|                 | 644.nab_s(base, peak) |
```

AOCCLLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
Target: x86_64-unknown-linux-gnu

(Continued on next page)
Lenovo Global Technology

ThinkSystem SR665
2.50 GHz, AMD EPYC 7502

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

Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

---

C++, C, Fortran  | 607.cactuBSSN_s(base, peak)

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

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

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Fortran  | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
         | 654.roms_s(base, peak)

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

---

Fortran, C  | 621.wrf_s(base, peak) 627.cam4_s(base, peak)
            | 628.pop2_s(base, peak)

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

---

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Lenovo Global Technology
ThinkSystem SR665
2.50 GHz, AMD EPYC 7502

SPECspeed®2017_fp_base = 168
SPECspeed®2017_fp_peak = 174

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

Test Date: Jul-2020
Hardware Availability: Jun-2020
Software Availability: Dec-2019

Compiler Version Notes (Continued)

Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin

Base Compiler Invocation

C benchmarks:
clang

Fortran benchmarks:
flang

Benchmarks using both Fortran and C:
flang clang

Benchmarks using Fortran, C, and C++:
clang++ clang flang

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
627.cam4_s: -DSPEC_CASE_FLAG -DSPEC_LP64
628.pop2_s: -DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-fflt -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
-fremp-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

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SPEC CPU®2017 Floating Point Speed Result

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Base Optimization Flags (Continued)

C benchmarks (continued):
-ffunction-specialization -z muldefs -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm -ljemalloc
-llflang

Fortran benchmarks:
-iflto -Wl,-mlvm -Wl,-function-specialize
-Wl,-mlvm -Wl,-region-vectorize -Wl,-mlvm -Wl,-vector-library=LIBMVEC
-Wl,-mlvm -Wl,-reduce-array-computations=3 -O3 -march=znver2
-funroll-loops -Mrecursive -mlvm -vector-library=LIBMVEC -z muldefs
-Kieee -fno-finite-math-only -DSPEC_OPENMP -fopenmp -fopenmp=libomp
-lomp -lpthread -ldl -lmvec -lamdlibm -ljemalloc -llflang

Benmarks using both Fortran and C:
-iflto -Wl,-mlvm -Wl,-function-specialize
-Wl,-mlvm -Wl,-region-vectorize -Wl,-mlvm -Wl,-vector-library=LIBMVEC
-Wl,-mlvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver2 -fstruct-layout=3 -mlvm -unroll-threshold=50
-freemap-arrays -mlvm -function-specialize -mlvm -enable-gvn-hoist
-mlvm -reduce-array-computations=3 -mlvm -global-vectorize-slp
-mlvm -vector-library=LIBMVEC -mlvm -inline-threshold=1000
-flv-function-specialization -funroll-loops -Mrecursive -z muldefs
-Kieee -fno-finite-math-only -DSPEC_OPENMP -fopenmp -fopenmp=libomp
-lomp -lpthread -ldl -lmvec -lamdlibm -ljemalloc -llflang

Benmarks using Fortran, C, and C++:
-std=c++98 -iflto -Wl,-mlvm -Wl,-function-specialize
-Wl,-mlvm -Wl,-region-vectorize -Wl,-mlvm -Wl,-vector-library=LIBMVEC
-Wl,-mlvm -Wl,-reduce-array-computations=3
-Wl,-mlvm -Wl,-suppress-fmas -O3 -ffast-math -march=znver2
-fstruct-layout=3 -mlvm -unroll-threshold=50 -freemap-arrays
-mlvm -function-specialize -mlvm -enable-gvn-hoist
-mlvm -reduce-array-computations=3 -mlvm -global-vectorize-slp
-mlvm -vector-library=LIBMVEC -mlvm -inline-threshold=1000
-flv-function-specialization -mlvm -loop-unswitch-threshold=200000
-mlvm -unroll-threshold=100 -mlvm -enable-partial-unswitch
-funroll-loops -Mrecursive -z muldefs -Kieee -fno-finite-math-only
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lpthread -ldl -lmvec
-lamdlibm -ljemalloc -llflang

Base Other Flags

C benchmarks:
-Wno-return-type

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SPECspeed®2017_fp_base = 168
SPECspeed®2017_fp_peak = 174

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Test Date: Jul-2020
Hardware Availability: Jun-2020
Software Availability: Dec-2019

Base Other Flags (Continued)

Fortran benchmarks:
- Wno-return-type

Benchmarks using both Fortran and C:
- Wno-return-type

Benchmarks using Fortran, C, and C++:
- Wno-return-type

Peak Compiler Invocation

C benchmarks:
clang

Fortran benchmarks:
flang

Benchmarks using both Fortran and C:
flang clang

Benchmarks using Fortran, C, and C++:
clang++ clang flang

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
-f1to -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

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Peak Optimization Flags (Continued)

C benchmarks (continued):
- `flv-function-specialization` -`DSPEC_OPENMP` -`fopenmp` -`lmvec` -`lamlibm`
- `fopenmp=libomp` -`-lomp` -`-lpthread` -`-ldl` -`-ljemalloc` -`-lflang`

Fortran benchmarks:

603.bwaves_s: `basepeak = yes`

649.fotonik3d_s: `basepeak = yes`

654.roms_s: `-flto` `-Wl,-mlllvm` `-Wl,-function-simplify`
- `-Wl,-mlllvm -Wl,-region-vectorize`
- `-Wl,-mlllvm -Wl,-vector-library=LIBMVEC`
- `-Wl,-mlllvm -Wl,-reduce-array-computations=3`
- `-Wl,-mlllvm -Wl,-enable-X86-prefetching -O3 -march=znver2`
- `-funroll-loops` `-Mrecursive -mlllvm` `-vector-library=LIBMVEC`
- `-Kieee` `-fno-finite-math-only` `-DSPEC_OPENMP` `-fopenmp`
- `-fopenmp=libomp` `-lomp` `-lpthread` `-ldl` `-lmvec` `-lamlibm`
- `-ljemalloc` `-lflang`

Benchmarks using both Fortran and C:

621.wrf_s: `basepeak = yes`

627.cam4_s: `-flto` `-Wl,-mlllvm` `-Wl,-function-simplify`
- `-Wl,-mlllvm -Wl,-region-vectorize`
- `-Wl,-mlllvm -Wl,-vector-library=LIBMVEC`
- `-Wl,-mlllvm -Wl,-reduce-array-computations=3` `-Ofast`
- `-march=znver2` `-mno-sse4a` `-fstruct-layout=5`
- `-mllvm -vectorize-memory-aggressively`
- `-mlllvm -function-simplify` `-mlllvm -enable-gvn-hoist`
- `-mlllvm -unroll-threshold=50` `-fremap-arrays`
- `-mlllvm -vector-library=LIBMVEC`
- `-mlllvm -reduce-array-computations=3`
- `-mlllvm -global-vectorize-slp` `-mlllvm -inline-threshold=1000`
- `-flv-function-simplify` `-O3` `-funroll-loops`
- `-Mrecursive` `-Kieee` `-fno-finite-math-only` `-DSPEC_OPENMP`
- `-fopenmp` `-fopenmp=libomp` `-lomp` `-lpthread` `-ldl` `-lmvec`
- `-lamlibm` `-ljemalloc` `-lflang`

628.pop2_s: Same as 627.cam4_s

Benchmarks using Fortran, C, and C++:

- `-std=c++98` `-flto` `-Wl,-mlllvm` `-Wl,-function-simplify`
- `-Wl,-mlllvm -Wl,-region-vectorize` `-Wl,-mlllvm -Wl,-vector-library=LIBMVEC`
- `-Wl,-mlllvm -Wl,-reduce-array-computations=3` `-Ofast` `-march=znver2`
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 Tested by: Lenovo Global Technology

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Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
- mno-sse4a -fstruct-layout=5 -mlllvm -vectorize-memory-aggressively
- mlllvm -function-specialize -mlllvm -enable-gvn-hoist
- mlllvm -unroll-threshold=50 -fremap-arrays
- mlllvm -vector-library=LIBMVEC -mlllvm -reduce-array-computations=3
- mlllvm -global-vectorize-slp -mlllvm -inline-threshold=1000
- flv-function-specialization -mlllvm -unroll-threshold=100
- mlllvm -enable-partial-unswitch -mlllvm -loop-unswitch-threshold=200000
- O3 -funroll-loops -Mrecursive -Kieee -fno-finite-math-only
- DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lpthread -ldl -lmvec
- lamdlibm -ljemalloc -lflang

Peak Other Flags

C benchmarks:
- Wno-return-type

Fortran benchmarks:
- Wno-return-type

Benchmarks using both Fortran and C:
- Wno-return-type

Benchmarks using Fortran, C, and C++:
- Wno-return-type

The flags files that were used to format this result can be browsed at
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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-Rome2P-K.xml

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