Lenovo Global Technology
ThinkSystem SR655
3.20 GHz, AMD EPYC 7F72

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>104</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>104</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9017
**Test Date:** Mar-2020
**Test Sponsor:** Lenovo Global Technology
**Hardware Availability:** Jun-2020
**Tested by:** Lenovo Global Technology
**Software Availability:** Dec-2019

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OS:</strong> SUSE Linux Enterprise Server 15 SP1 (x86_64)</td>
<td><strong>CPU Name:</strong> AMD EPYC 7F72</td>
</tr>
<tr>
<td><strong>Kernel 4.12.14-195-default</strong></td>
<td><strong>Max MHz:</strong> 3700</td>
</tr>
<tr>
<td><strong>Compiler:</strong> C/C++/Fortran: Version 2.0.0 of AOCC</td>
<td><strong>Nominal:</strong> 3200</td>
</tr>
<tr>
<td><strong>Parallel:</strong> Yes</td>
<td><strong>Enabled:</strong> 24 cores, 1 chip</td>
</tr>
<tr>
<td><strong>Firmware:</strong> Lenovo BIOS Version CFE111B released Feb-2020</td>
<td><strong>Orderable:</strong> 1 chip</td>
</tr>
<tr>
<td><strong>File System:</strong> xfs</td>
<td><strong>Cache L1:</strong> 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td><strong>System State:</strong> Run level 3 (multi-user)</td>
<td><strong>L2:</strong> 512 KB I+D on chip per core</td>
</tr>
<tr>
<td><strong>Base Pointers:</strong> 64-bit</td>
<td><strong>L3:</strong> 192 MB I+D on chip per chip,</td>
</tr>
<tr>
<td><strong>Peak Pointers:</strong> 64-bit</td>
<td><strong>16 MB shared / 2 cores</strong></td>
</tr>
<tr>
<td>Other: jemalloc: jemalloc memory allocator library v5.1.0</td>
<td><strong>Other:</strong> None</td>
</tr>
<tr>
<td><strong>Power Management:</strong> BIOS set to prefer performance at the cost of additional power usage</td>
<td><strong>Memory:</strong> 256 GB (8 x 32 GB 2Rx4 PC4-3200AA-R)</td>
</tr>
<tr>
<td><strong>Storage:</strong> 1 x 960 GB SATA SSD</td>
<td><strong>Other:</strong> None</td>
</tr>
</tbody>
</table>

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Frames</th>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>24</td>
<td>603.bwaves_s</td>
<td>603.bwaves_s</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>24</td>
<td>607.cactuBSSN_s</td>
<td>607.cactuBSSN_s</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>24</td>
<td>619.lbm_s</td>
<td>619.lbm_s</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>24</td>
<td>621.wrf_s</td>
<td>621.wrf_s</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>24</td>
<td>627.cam4_s</td>
<td>627.cam4_s</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>24</td>
<td>628.pop2_s</td>
<td>628.pop2_s</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>24</td>
<td>638.imagick_s</td>
<td>638.imagick_s</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>24</td>
<td>644.nab_s</td>
<td>644.nab_s</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>24</td>
<td>649.fotonik3d_s</td>
<td>649.fotonik3d_s</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>24</td>
<td>654.roms_s</td>
<td>654.roms_s</td>
</tr>
</tbody>
</table>

#### SPECspeed®2017_fp_base (104)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Frames</th>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>24</td>
<td>603.bwaves_s</td>
<td>603.bwaves_s</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>24</td>
<td>607.cactuBSSN_s</td>
<td>607.cactuBSSN_s</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>24</td>
<td>619.lbm_s</td>
<td>619.lbm_s</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>24</td>
<td>621.wrf_s</td>
<td>621.wrf_s</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>24</td>
<td>627.cam4_s</td>
<td>627.cam4_s</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>24</td>
<td>628.pop2_s</td>
<td>628.pop2_s</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>24</td>
<td>638.imagick_s</td>
<td>638.imagick_s</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>24</td>
<td>644.nab_s</td>
<td>644.nab_s</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>24</td>
<td>649.fotonik3d_s</td>
<td>649.fotonik3d_s</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>24</td>
<td>654.roms_s</td>
<td>654.roms_s</td>
</tr>
</tbody>
</table>

#### SPECspeed®2017_fp_peak (104)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Frames</th>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>24</td>
<td>603.bwaves_s</td>
<td>603.bwaves_s</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>24</td>
<td>607.cactuBSSN_s</td>
<td>607.cactuBSSN_s</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>24</td>
<td>619.lbm_s</td>
<td>619.lbm_s</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>24</td>
<td>621.wrf_s</td>
<td>621.wrf_s</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>24</td>
<td>627.cam4_s</td>
<td>627.cam4_s</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>24</td>
<td>628.pop2_s</td>
<td>628.pop2_s</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>24</td>
<td>638.imagick_s</td>
<td>638.imagick_s</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>24</td>
<td>644.nab_s</td>
<td>644.nab_s</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>24</td>
<td>649.fotonik3d_s</td>
<td>649.fotonik3d_s</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>24</td>
<td>654.roms_s</td>
<td>654.roms_s</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** AMD EPYC 7F72
- **Max MHz:** 3700
- **Nominal:** 3200
- **Enabled:** 24 cores, 1 chip
- **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:** 192 MB I+D on chip per chip, 16 MB shared / 2 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:** Yes
- **Firmware:** Lenovo BIOS Version CFE111B released Feb-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
Lenovo Global Technology
ThinkSystem SR655
3.20 GHz, AMD EPYC 7F72

SPECspeed®2017_fp_base = 104
SPECspeed®2017_fp_peak = 104

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>24</td>
<td>183</td>
<td>322</td>
<td>183</td>
<td>322</td>
<td>183</td>
<td>322</td>
<td>183</td>
<td>322</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>24</td>
<td>95.7</td>
<td>174</td>
<td>96.0</td>
<td>174</td>
<td>96.3</td>
<td>173</td>
<td>95.6</td>
<td>174</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>24</td>
<td>169</td>
<td>30.9</td>
<td>169</td>
<td>30.9</td>
<td>169</td>
<td>30.9</td>
<td>169</td>
<td>30.9</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>24</td>
<td>115</td>
<td>115</td>
<td>115</td>
<td>115</td>
<td>115</td>
<td>115</td>
<td>115</td>
<td>115</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>24</td>
<td>134</td>
<td>66.2</td>
<td>134</td>
<td>66.2</td>
<td>134</td>
<td>66.2</td>
<td>134</td>
<td>66.2</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>24</td>
<td>174</td>
<td>68.2</td>
<td>174</td>
<td>68.2</td>
<td>174</td>
<td>68.2</td>
<td>174</td>
<td>68.2</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>24</td>
<td>113</td>
<td>127</td>
<td>113</td>
<td>127</td>
<td>113</td>
<td>128</td>
<td>113</td>
<td>127</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>24</td>
<td>101</td>
<td>172</td>
<td>101</td>
<td>172</td>
<td>101</td>
<td>172</td>
<td>101</td>
<td>172</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>24</td>
<td>145</td>
<td>62.7</td>
<td>145</td>
<td>63.1</td>
<td>146</td>
<td>62.4</td>
<td>144</td>
<td>63.3</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>24</td>
<td>136</td>
<td>115</td>
<td>136</td>
<td>116</td>
<td>136</td>
<td>116</td>
<td>133</td>
<td>118</td>
</tr>
</tbody>
</table>

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.

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)
Lenovo Global Technology
ThinkSystem SR655
3.20 GHz, AMD EPYC 7F72

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-23"
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
    ;"
MALLOCONF = "retain: true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "24"

Environment variables set by runcpu during the 607.cactuBSSN_s peak run:
GOMP_CPU_AFFINITY = "0-23"

Environment variables set by runcpu during the 619.lbm_s peak run:
GOMP_CPU_AFFINITY = "0 12 1 13 2 14 3 15 4 16 5 17 6 18 7 19 8 20 9 21 10 22
  11 23"

Environment variables set by runcpu during the 627.cam4_s peak run:
GOMP_CPU_AFFINITY = "0-23"

Environment variables set by runcpu during the 628.pop2_s peak run:
GOMP_CPU_AFFINITY = "0-23"

Environment variables set by runcpu during the 638.imagick_s peak run:
GOMP_CPU_AFFINITY = "0-23"

Environment variables set by runcpu during the 649.fotonik3d_s peak run:
GOMP_CPU_AFFINITY = "0-23"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0-23"

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.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3640 (Spectre variant 3a)
Lenovo Global Technology
ThinkSystem SR655
3.20 GHz, AMD EPYC 7F72

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

General Notes (Continued)

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

Platform Notes

BIOS settings:
Set Operating Mode set to Maximum Performance
SMT Mode set to Disabled

Sysinfo program /home/cpu2017-1.1.0-amd-rome-aoccc200-C3/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbl6e6a485a0011
running on linux-01om Thu Mar 26 01:24:20 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
  1 "physical id"s (chips)
  24 "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 : 24
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

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): 24
On-line CPU(s) list: 0-23
Thread(s) per core: 1
Core(s) per socket: 24
Socket(s): 1
NUMA node(s): 1
Vendor ID: AuthenticAMD
CPU family: 23
Model: 49

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR655
3.20 GHz, AMD EPYC 7F72

| SPECspeed®2017_fp_base = 104 |
| SPECspeed®2017_fp_peak = 104 |

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology
Test Date: Mar-2020
Hardware Availability: Jun-2020
Software Availability: Dec-2019

Platform Notes (Continued)

| Model name: | AMD EPYC 7F72 24-Core Processor |
| Stepping: | 0 |
| CPU MHz: | 3200.000 |
| CPU max MHz: | 3200.0000 |
| CPU min MHz: | 2500.0000 |
| BogoMIPS: | 6387.81 |
| Virtualization: | AMD-V |
| L1d cache: | 32K |
| L1i cache: | 32K |
| L2 cache: | 512K |
| L3 cache: | 16384K |
| NUMA node0 CPU(s): | 0-23 |
| 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 sse4_1 sse4_2 movbe popcnt aes avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw ibs skim wt tce topoext perfctr_core perfctr_nb bptext perfctr_l2 mwaitx cpb cat_l3 hwpstate sme ssbd sev ibrs ibpb stibp vmmcall fsgsbase bmi1 avx2 smep bmi2 cqmm rdt_a rdsese adx smap clflushopt clwb sha ni xsaves xsave cvtsi xsaveopt xsavec xgetbv1 xsaves cqmm_llc cqmm_occop_llc cqmm_mmb_total cqmm_mmb_local clzero irperf xsavecrtr arat npt lbv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pausefilter pfthreshold avic vmsave_vmload vgfl 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: 1 nodes (0)
  node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
  node 0 size: 257809 MB
  node 0 free: 257112 MB
  node distances:
    node 0
    0: 10

From /proc/meminfo
  MemTotal: 263996432 kB
  HugePages_Total: 0
  Hugepagesize: 2048 KB

From /etc/*release* /etc/*version*
  os-release:
    NAME="SLES"
    VERSION="15-SP1"
    VERSION_ID="15.1"

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR655
3.20 GHz, AMD EPYC 7F72

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

SPECspeed®2017_fp_base = 104
SPECspeed®2017_fp_peak = 104

Platform Notes (Continued)

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-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: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Full AMD retpoline, IBPB: conditional, IBRS_FW, STIBP: disabled, RSB filling

run-level 3 Mar 26 00:52

SPEC is set to: /home/cpu2017-1.1.0-amd-rome-aocc200-C3
From /sys/devices/virtual/dmi/id
BIOS: Lenovo CFE111B 02/11/2020
Vendor: Lenovo
Product: ThinkSystem SR655 -[7Y00000000]-
Product Family: ThinkSystem
Serial: 0123456789

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:
8x Samsung M393A4K40DB2-CWE 32 kB 2 rank 3200
8x Unknown Unknown

(End of data from sysinfo program)
SPEC CPU®2017 Floating Point Speed Result
Copyright 2017-2020 Standard Performance Evaluation Corporation

Lenovo Global Technology
ThinkSystem SR655
3.20 GHz, AMD EPYC 7F72

SPECspeed®2017_fp_base = 104
SPECspeed®2017_fp_peak = 104

Compiler Version Notes

==============================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOC2_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++, C, Fortran | 607.cactuBSSN_s(base, peak)
------------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
  AOC2_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
  AOC2_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
  AOC2_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         | 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
  AOC2_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
  AOC2_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
  AOC2_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
  AOC2_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

(Continued on next page)
# SPEC CPU®2017 Floating Point Speed Result

## Lenovo Global Technology

**ThinkSystem SR655**
3.20 GHz, AMD EPYC 7F72

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>104</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>104</td>
</tr>
</tbody>
</table>

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

### Compiler Version Notes (Continued)

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

### 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

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Portability Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>-DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>-DSPEC_CASE_FLAG -DSPEC_LP64</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>-DSPEC_CASE_FLAG -Mbyteswapio -DSPEC_LP64</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>-DSPEC_LP64</td>
</tr>
</tbody>
</table>
Lenovo Global Technology
ThinkSystem SR655
3.20 GHz, AMD EPYC 7F72

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Mar-2020
Tested by: Lenovo Global Technology
Hardware Availability: Jun-2020
Software Availability: Dec-2019

Base Optimization Flags

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

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

Benchmarks using both Fortran and C:
- `-flto -Wl,-mlllvm -Wl,-function-specialize`
- `-Wl,-mlllvm -Wl,-region-vectorize -Wl,-mlllvm -Wl,-vector-library=LIBMVEC`
- `-Wl,-mlllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math`
- `--march=znver2 -fstruct-layout=3 -mlllvm -unroll-threshold=50`
- `--fremap-arrays -mlllvm -function-specialize -mlllvm -enable-gvn-hoist`
- `--mlllvm -reduce-array-computations=3 -mlllvm -global-vectorize-slp`
- `--mlllvm -vector-library=LIBMVEC -mlllvm -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 -lflang`

Benchmarks using Fortran, C, and C++:
- `-std=c++98 -flto -Wl,-mlllvm -Wl,-function-specialize`
- `-Wl,-mlllvm -Wl,-region-vectorize -Wl,-mlllvm -Wl,-vector-library=LIBMVEC`
- `-Wl,-mlllvm -Wl,-reduce-array-computations=3`
- `-Wl,-mlllvm -Wl,-supress-fmas -O3 -ffast-math -March=znver2`
- `--fstruct-layout=3 -mlllvm -unroll-threshold=50 -fremap-arrays`
- `--mlllvm -function-specialize -mlllvm -enable-gvn-hoist`
- `--mlllvm -reduce-array-computations=3 -mlllvm -global-vectorize-slp`
- `--mlllvm -vector-library=LIBMVEC -mlllvm -inline-threshold=1000`
- `--flv-function-specialization -mlllvm -loop-unswitch-threshold=200000`
- `--mlllvm -unroll-threshold=100 -mlllvm -enable_partial_unswitch`
- `--funroll-loops -Mrecursive -z muldefs -Kieee -fno-finite-math-only`
- `--DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lpthread -ldl -lmvec`
- `--lamdlibm -ljemalloc -lflang`
Lenovo Global Technology
ThinkSystem SR655
3.20 GHz, AMD EPYC 7F72

SPECspeed\textsuperscript{®}2017.fp_base = 104
SPECspeed\textsuperscript{®}2017.fp_peak = 104

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Mar-2020
Tested by: Lenovo Global Technology
Hardware Availability: Jun-2020
Software Availability: Dec-2019

Base Other Flags

C benchmarks:
-\texttt{-Wno-return-type}

Fortran benchmarks:
-\texttt{-Wno-return-type}

Benchmarks using both Fortran and C:
-\texttt{-Wno-return-type}

Benchmarks using Fortran, C, and C++:
-\texttt{-Wno-return-type}

Peak Compiler Invocation

C benchmarks:
\texttt{clang}

Fortran benchmarks:
\texttt{flang}

Benchmarks using both Fortran and C:
\texttt{flang clang}

Benchmarks using Fortran, C, and C++:
\texttt{clang++ clang flang}

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR655
3.20 GHz, AMD EPYC 7F72

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Mar-2020
Hardware Availability: Jun-2020
Tested by: Lenovo Global Technology
Software Availability: Dec-2019

SPECspeed®2017_fp_base = 104
SPECspeed®2017_fp_peak = 104

Peak Optimization Flags (Continued)

619.lbm_s (continued):
-mlvm -function-specialize -mlvm-enable-gvn-hoist
-mlvm -unroll-threshold=50 -fremap-arrays
-mlvm -vector-library=LIBMVEC
-mlvm -reduce-array-computations=3
-mlvm -global-vectorize-slp -mlvm -inline-threshold=1000
-flv-function-specialization -DSPEC_OPENMP -fopenmp
-lmvec -lamdlibm -fopenmp=libomp -lomp -lpthread -ldl
-ljemalloc -lflang

638.imagick_s: Same as 619.lbm_s

644.nab_s: basepeak = yes

Fortran benchmarks:

649.fotonik3d_s: -flto -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 -Kieee
-fno-finite-math-only -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm
-ljemalloc -lflang

654.roms_s: -flto -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,-enable-X86-prefetching -O3 -march=znver2
-funroll-loops -Mrecursive -mlvm -vector-library=LIBMVEC
-Kieee -fno-finite-math-only -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm
-ljemalloc -lflang

Benchmarks using both Fortran and C:

621.wrf_s: basepeak = yes

627.cam4_s: -flto -Wl,-mlvm -Wl,-function-specialize
-Wl,-mlvm -Wl,-region-vectorize
-Wl,-mlvm -Wl,-vector-library=LIBMVEC
-Wl,-mlvm -Wl,-reduce-array-computations=3 -Ofast

(Continued on next page)
<table>
<thead>
<tr>
<th>Lenovo Global Technology</th>
<th>SPECspeed®2017_fp_base = 104</th>
<th>SPECspeed®2017_fp_peak = 104</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lenovo Global Technology</td>
<td>Test Sponsor: Lenovo Global Technology</td>
<td>Software Availability: Dec-2019</td>
</tr>
<tr>
<td>Lenovo Global Technology</td>
<td>Tested by: Lenovo Global Technology</td>
<td>Hardware Availability: Jun-2020</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9017
**Test Date:** Mar-2020

---

**Peak Optimization Flags (Continued)**

627.cam4_s (continued):

- `-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`
- `-fllvm-function-specialization`
- `-O3`
- `-funroll-loops`
- `-Mrecursive`
- `-Kieee`
- `-fno-finite-math-only`
- `-DSPEC_OPENMP`
- `-fopenmp`
- `-fopenmp=libomp`
- `-lomp`
- `-lpthread`
- `-ldl`
- `-lmvec`
- `-lamdlibm`
- `-ljemalloc`
- `-lflang`

628.pop2_s: Same as 627.cam4_s

**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`
- `-Ofast`
- `-mllvm -march=znver2`

**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`
## Lenovo Global Technology

**ThinkSystem SR655**

3.20 GHz, AMD EPYC 7F72

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
</tr>
</tbody>
</table>

### SPECspeed®2017 fp_base = 104

### SPECspeed®2017 fp_peak = 104

**Test Date:** Mar-2020  
**Hardware Availability:** Jun-2020  
**Software Availability:** Dec-2019

---

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


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


---

SPEC CPU and SPECspeed are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU®2017 v1.1.0 on 2020-03-25 13:24:20-0400.  
Report generated on 2020-04-14 14:12:59 by CPU2017 PDF formatter v6255.  
Originally published on 2020-04-14.