## Lenovo Global Technology

**ThinkSystem SR665**  
3.70 GHz, AMD EPYC 72F3

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

| 603.bwaves_s | 16 | 730 | 30.0 | 70.0 | 100 | 130 | 160 | 190 | 220 | 250 | 280 | 310 | 340 | 370 | 400 | 430 | 460 | 490 | 520 | 550 | 580 | 610 | 640 | 670 | 700 | 730 |
|--------------|----|-----|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 607.cactuBSSN_s | 16 | 730 | 30.0 | 70.0 | 100 | 130 | 160 | 190 | 220 | 250 | 280 | 310 | 340 | 370 | 400 | 430 | 460 | 490 | 520 | 550 | 580 | 610 | 640 | 670 | 700 | 730 |
| 619.lbm_s | 32 | 104 | 130 |
| 621.wrf_s | 16 | 104 | 130 |
| 627.cam4_s | 16 | 72.2 |
| 628.pop2_s | 16 | 67.3 |
| 638.imagick_s | 16 | 105 |
| 644.nab_s | 32 | 157 | 200 |
| 649.fotonik3d_s | 16 | 109 |
| 654.roms_s | 16 | 170 | 196 |

**SPECspeed®2017_fp_base = 132**  
**SPECspeed®2017_fp_peak = 144**

### Hardware

- **CPU Name:** AMD EPYC 72F3  
- **Max MHz:** 4100  
- **Nominal:** 3700  
- **Enabled:** 16 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:** 256 MB I+D on chip per chip, 32 MB per core  
- **Other:** None  
- **Memory:** 512 GB (16 x 32 GB 2Rx4 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 3.0.0 of AOCC  
- **Parallel:** Yes  
- **Firmware:** Lenovo BIOS Version D8E115E 2.01 released Mar-2021  
- **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 SR665

3.70 GHz, AMD EPYC 72F3

---

**SPECspeed®2017_fp_base = 132**

**SPECspeed®2017_fp_peak = 144**

---

### 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>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>16</td>
<td>82.5</td>
<td>715</td>
<td>82.0</td>
<td>720</td>
<td>81.6</td>
<td>723</td>
<td>16</td>
<td>82.5</td>
<td>715</td>
<td>82.0</td>
<td>720</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>16</td>
<td>98.1</td>
<td>170</td>
<td>95.3</td>
<td>175</td>
<td>95.0</td>
<td>175</td>
<td>16</td>
<td>98.1</td>
<td>170</td>
<td>95.3</td>
<td>175</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>16</td>
<td>82.3</td>
<td>63.6</td>
<td>82.1</td>
<td>63.8</td>
<td>82.1</td>
<td>63.8</td>
<td>32</td>
<td>50.0</td>
<td>105</td>
<td>50.2</td>
<td>104</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>16</td>
<td>102</td>
<td>130</td>
<td>103</td>
<td>129</td>
<td>101</td>
<td>130</td>
<td>16</td>
<td>102</td>
<td>130</td>
<td>103</td>
<td>130</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>16</td>
<td>123</td>
<td>72.2</td>
<td>124</td>
<td>71.7</td>
<td>123</td>
<td>72.2</td>
<td>16</td>
<td>123</td>
<td>72.2</td>
<td>124</td>
<td>71.7</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>16</td>
<td>178</td>
<td>66.6</td>
<td>176</td>
<td>67.3</td>
<td>176</td>
<td>67.4</td>
<td>16</td>
<td>178</td>
<td>66.6</td>
<td>176</td>
<td>67.3</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>16</td>
<td>137</td>
<td>105</td>
<td>137</td>
<td>105</td>
<td>137</td>
<td>105</td>
<td>16</td>
<td>137</td>
<td>105</td>
<td>137</td>
<td>105</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>16</td>
<td>111</td>
<td>157</td>
<td>111</td>
<td>157</td>
<td>111</td>
<td>157</td>
<td>32</td>
<td>87.3</td>
<td>200</td>
<td>87.3</td>
<td>200</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>16</td>
<td>84.3</td>
<td>108</td>
<td>83.1</td>
<td>110</td>
<td>83.3</td>
<td>109</td>
<td>16</td>
<td>84.3</td>
<td>108</td>
<td>83.1</td>
<td>110</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>16</td>
<td>92.9</td>
<td>169</td>
<td>92.8</td>
<td>170</td>
<td>92.8</td>
<td>170</td>
<td>16</td>
<td>80.4</td>
<td>196</td>
<td>80.5</td>
<td>196</td>
</tr>
</tbody>
</table>

---

### 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 numaclt i.e.:

```
numactl --interleave=all runcpu <etc>
```

'echo 8 > /proc/sys/vm/dirty_ratio' run as root to limit dirty cache to 8% of memory.

'echo 1 > /proc/sys/vm/swappiness' run as root to limit swap usage to minimum necessary.

'echo 1 > /proc/sys/vm/zone_reclaim_mode' run as root to free node-local memory and avoid remote memory usage.

'sync; echo 3 > /proc/sys/vm/drop_caches' run as root to reset filesystem memory.

'sysctl -w kernel.randomize_va_space=0' run as root to disable address space layout randomization (ASLR) to reduce run-to-run variability.

To enable Transparent Hugepages (THP) for all allocations,

'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
Lenovo Global Technology
ThinkSystem SR665
3.70 GHz, AMD EPYC 72F3

**SPECspeed®2017_fp_base = 132**
**SPECspeed®2017_fp_peak = 144**

<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>
<tr>
<td>Test Date:</td>
<td>Apr-2021</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Apr-2021</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Mar-2021</td>
</tr>
</tbody>
</table>

**Operating System Notes (Continued)**

'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.
To enable THP only on request for peak runs of 628.pop2_s, and 638.imagick_s,
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root.
To disable THP for peak runs of 627.cam4_s, 644.nab_s, 649.fotonik3d_s, and 654.roms_s,
'echo never > /sys/kernel/mm/transparent_hugepage/enabled' run as root.

**Environment Variables Notes**

Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-31"
LD_LIBRARY_PATH =

"/home/cpu2017-1.1.5-amd-aocc300-milan-A1/amd_speed_aocc300_milan_A_lib/
64;/home/cpu2017-1.1.5-amd-aocc300-milan-A1/amd_speed_aocc300_milan_A_lib/
32;"
MALLOCONF_CONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "32"

Environment variables set by runcpu during the 619.lbm_s peak run:
GOMP_CPU_AFFINITY = "0 16 1 17 2 18 3 19 4 20 5 21 6 22 7 23 8 24 9 25 10 26
11 27 12 28 13 29 14 30 15 31"

Environment variables set by runcpu during the 644.nab_s peak run:
GOMP_CPU_AFFINITY = "0 16 1 17 2 18 3 19 4 20 5 21 6 22 7 23 8 24 9 25 10 26
11 27 12 28 13 29 14 30 15 31"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0-15"

**General Notes**

Binaries were compiled on a system with 2x AMD EPYC 7713 CPU + 512GiB Memory using RHEL 8.2

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 v4.8.2 in RHEL 7.4 (No options specified)
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 configuration:
Operating Mode set to Maximum Performance and then set it to Custom Mode
4-Link xGMI Max Speed set to 16Gbps
SOC P-States set to P0
DLWM Support set to Disabled

Sysinfo program /home/cpu2017-1.1.5-amd-aocc300-milan-A1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on linux-ulti Thu Jul 25 19:27:32 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 72F3 8-Core Processor
  2 "physical id"s (chips)
  32 "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 : 8
siblings : 16
physical 0: cores 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 48 bits physical, 48 bits virtual
CPU(s): 32
On–line CPU(s) list: 0–31
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 2
Vendor ID: AuthenticAMD
CPU family: 25
Model: 1
Model name: AMD EPYC 72F3 8-Core Processor
Stepping: 1
CPU MHz: 3700.000
CPU max MHz: 3700.0000
CPU min MHz: 1500.0000
BogoMIPS: 7386.16
Virtualization: AMD-V
L1d cache: 32K

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR665
3.70 GHz, AMD EPYC 72F3

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

SPECspeed®2017_fp_base = 132
SPECspeed®2017_fp_peak = 144

Platform Notes (Continued)

L1i cache: 32K
L2 cache: 512K
L3 cache: 32768K
NUMA node0 CPU(s): 0-7,16-23
NUMA node1 CPU(s): 8-15,24-31

Flags: fpu vme de pse tsc msr pae mca cmov
pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp lm
constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid aperfmperf pni pclmulqdq
monitor ssse3 fma cx16 pcid sse4_1 sse4_2 movbe popcnt aes xsave avx f16c rdrand
lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3nowprefetch osvw
ibs skinit wdt tce topoext perfctr_core perfctr_nb bpxext perfctr_l2 mwaitx cpb
cat_l3 cdp_l3 invpcid_single hw_pstate sme ssbd sev ibrs ibpb vmmcall fsgsbase
bm1 avx2 smep bmi2 erms invpcid cqm rdt_a rdseed adx smap clflushopt clwb sha
xsaveopt xsave xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local
clzero irperf xsaveerptr wbnoinvd arat npt lbrv svm_lock nrip_save tsc_scale
vmcb_clean flushbyasid decodeassist pausefilter pfthreshold v_vmsave_vmload vgif
umip pku ospke vaes vpcmnlqhdg rdpid overflow_recover 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: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 16 17 18 19 20 21 22 23
node 0 size: 257841 MB
node 0 free: 257333 MB
node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
node 1 size: 258010 MB
node 1 free: 257842 MB
node distances:
node 0 1
t: 10 32
1: 32 10

From /proc/meminfo
MemTotal: 528233300 KB
HugePages_Total: 0
Hugepagesize: 2048 KB

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has
performance

From /etc/*release*/etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
Lenovo Global Technology
ThinkSystem SR665
3.70 GHz, AMD EPYC 72F3

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

SPECspeed®2017_fp_base = 132
SPECspeed®2017_fp_peak = 144

Test Date: Apr-2021
Hardware Availability: Apr-2021
Software Availability: Mar-2021

Platform Notes (Continued)

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:
  x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1): Mitigation: Full AMD retpoline, IBFB: conditional, IBRS_FW, STIBP: conditional, RSB filling
CVE-2018-3639 (Spectre variant 2):
CVE-2020-0543 (Special Register Buffer Data Sampling): No status reported
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Jul 25 19:26
SPEC is set to: /home/cpu2017-1.1.5-amd-aocc300-milan-A1
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sdb2 xfs 893G 56G 837G 7% /
From /sys/devices/virtual/dmi/id
  Vendor: Lenovo
  Product: ThinkSystem SR665 MB
  Product Family: ThinkSystem
  Serial: 1234567890

Additional information from dmidecode follows. WARNING: Use caution when you interpret

(Continued on next page)
Platform Notes (Continued)

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:
  16x Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200
  16x Unknown Unknown

BIOS:
  BIOS Vendor: Lenovo
  BIOS Version: D8E115E-2.01
  BIOS Date: 03/04/2021
  BIOS Revision: 2.1
  Firmware Revision: 3.1

(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)
------------------------------------------------------------------------------
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
==============================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
------------------------------------------------------------------------------
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on
LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
(Continued on next page)
Lenovo Global Technology
ThinkSystem SR665
3.70 GHz, AMD EPYC 72F3

SPECspeed®2017_fp_base = 132
SPECspeed®2017_fp_peak = 144

Compiler Version Notes (Continued)

InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

Fortran  
├── 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
  └── 654.roms_s(base, peak)

AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

Fortran, C  
├── 621.wrf_s(base, peak) 627.cam4_s(base, peak)
  └── 628.pop2_s(base, peak)

AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/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
Lenovo Global Technology
ThinkSystem SR665
3.70 GHz, AMD EPYC 72F3

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>Test Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>9017</td>
<td>Apr-2021</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Sponsor:</th>
<th>Hardware Availability:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lenovo Global Technology</td>
<td>Apr-2021</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tested by:</th>
<th>Software Availability:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lenovo Global Technology</td>
<td>Mar-2021</td>
</tr>
</tbody>
</table>

**SPECspeed®2017_fp_base = 132**
**SPECspeed®2017 fp_peak = 144**

**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:**

- `-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-region-vectorize`
- `-Wl,-mllvm -Wl,-function-specialize`
- `-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
- `-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3`
- `-fvecclib=AMDLIBM -ffast-math -flto -fstruct-layout=5`
- `-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000`
- `-fremap-arrays -mllvm -function-specialize -flv-function-specialization`
- `-mllvm -enable-gvn-hoist -mllvm -global-vectorize-slp=true`
- `-mllvm -enable-licm-vrpt -mllvm -reduce-array-computations=3 -z muldefs`
- `-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang -lflangrti`

**Fortran benchmarks:**

- `-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-enable-X86-prefetching`
- `-Wl,-mllvm -Wl,-enable-licm-vrpt -Wl,-mllvm -Wl,-region-vectorize`
- `-Wl,-mllvm -Wl,-function-specialize`
- `-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`
- `-Wl,-mllvm -Wl,-reduce-array-computations=3 -Hz,1,0x1 -O3`
- `-march=znver3 -fvecclib=AMDLIBM -ffast-math -frecusive`
- `-mllvm -fuse-tile-inner-loop -funroll-loops`
- `-mllvm -extra-vectorizer-passes -mllvm -lsr-in-nested-loop`
- `-mllvm -enable-licm-vrpt -mllvm -reduce-array-computations=3`
- `-mllvm -global-vectorize-slp=true -z muldefs -DSPEC_OPENMP -fopenmp`
- `-fopenmp -lomp -ljemalloc -ljemalloc -lflang -lflangrti`

**Benchmarks using both Fortran and C:**

- `-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-enable-X86-prefetching`
- `-Wl,-mllvm -Wl,-enable-licm-vrpt -Wl,-mllvm -Wl,-region-vectorize`
- `-Wl,-mllvm -Wl,-function-specialize`
- `-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6`

(Continued on next page)
**Lenovo Global Technology**

**ThinkSystem SR665**

3.70 GHz, AMD EPYC 72F3

<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 = 132**

**Specspeed®2017_fp_peak = 144**

### Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):

```
-W1,-mllv -Wl,-reduce-array-computations=3 -O3 -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mllv -unroll-threshold=50 -mllv -inline-threshold=1000
-fremap-arrays -mllv -function-specialize -flv-function-specialization
-mllv -enable-gvn-hoist -mllv -global-vectorize-slp=true
-mllv -enable-licm-vrp -mllv -reduce-array-computations=3 -Hz,1,0x1
-Mrecursive -mllv -fuse-tile-inner-loop -funroll-loops
-mllv -extra-vectorizer-passes -mllv -lsr-in-nested-loop -z muldefs
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
-llflang -llflangrti
```

Benchmarks using Fortran, C, and C++:

```
-m64 -mno-adx -mno-sse4a -std=c++98
-Wl,-mllv -Wl,-x86-use-vzeroupper=false
-Wl,-mllv -Wl,-region-vectorize -Wl,-mllv -Wl,-function-specialize
-Wl,-mllv -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllv -Wl,-reduce-array-computations=3 -O3 -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mllv -unroll-threshold=50 -mllv -inline-threshold=1000
-fremap-arrays -mllv -function-specialize -flv-function-specialization
-mllv -enable-gvn-hoist -mllv -global-vectorize-slp=true
-mllv -enable-licm-vrp -mllv -reduce-array-computations=3
-mllv -enable-partial-unswitch -mllv -unroll-threshold=100
-finline-aggressive -mllv -loop-unswitch-threshold=200000
-mllv -reroll-loops -mllv -aggressive-loop-unswitch
-mllv -extra-vectorizer-passes -mllv -convert-pow-exp-to-int=false
-Hz,1,0x1 -Mrecursive -mllv -fuse-tile-inner-loop -funroll-loops
-mllv -lsr-in-nested-loop -z muldefs -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -llflang -llflangrti
```

### Base Other Flags

**C benchmarks:**

```
-<Wno-unused-command-line-argument> -<Wno-return-type>
```

**Fortran benchmarks:**

```
-<Wno-unused-command-line-argument> -<Wno-return-type>
```

**Benchmarks using both Fortran and C:**

```
-<Wno-unused-command-line-argument> -<Wno-return-type>
```

**Benchmarks using Fortran, C, and C++:**

```
-<Wno-unused-command-line-argument> -<Wno-return-type>
```
Lenovo Global Technology
ThinkSystem SR665
3.70 GHz, AMD EPYC 72F3

SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Lenovo Global Technology

SPECspeed®2017_fp_base = 132
SPECspeed®2017_fp_peak = 144

CPU2017 License: 9017
Test Date: Apr-2021
Test Sponsor: Lenovo Global Technology
Hardware Availability: Apr-2021
Tested by: Lenovo Global Technology
Software Availability: Mar-2021

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:
619.lbm_s: -m64 -mno-adx -mno-sse4a
-W1,-mllvm -W1,-function-specialize
-W1,-mllvm -W1,-align-all-nofallthru-blocks=6
-W1,-mllvm -W1,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -flito
-fstruct-layout=5 -mllv -unroll-threshold=50
-fremap-arrays -flv-function-specialization
-mlvm -inline-threshold=1000 -mllv -enable-gvn-hoist
-mlv -global-vectorize-slp=true
-mlvm -function-specialize -mllv -enable-llicm-vrp
-mlv -reduce-array-computations=3 -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -ldl -ljemalloc -lflang

638.imagick_s: basepeak = yes

644.nab_s: -m64 -mno-adx -mno-sse4a -Wl,-mllv -Wl,-region-vectorize
-W1,-mllv -W1,-function-specialize -Ofast -march=znver3
-fveclib=AMDLIBM -ffast-math -flito -fstruct-layout=5
-mllv -unroll-threshold=50 -fremap-arrays
-flv-function-specialization -mllv -inline-threshold=1000
-mlv -enable-gvn-hoist -mlv -global-vectorize-slp=true
-mlv -function-specialize -mlv -enable-llicm-vrp

(Continued on next page)
## Lenovo Global Technology

**ThinkSystem SR665**  
3.70 GHz, AMD EPYC 72F3

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>Lenovo Global Technology</th>
<th>Lenovo Global Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>132</td>
<td>Test Sponsor:</td>
<td>Test Date:</td>
</tr>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>Tested by:</td>
<td>Hardware Availability:</td>
</tr>
<tr>
<td>144</td>
<td>Lenovo Global Technology</td>
<td>Apr-2021</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Software Availability:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mar-2021</td>
</tr>
</tbody>
</table>

### Peak Optimization Flags (Continued)

644.nab_s (continued):
-mlllvm -reduce-array-computations=3 -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamlibm -ljemalloc -lflang

Fortran benchmarks:

603.bwaves_s: basepeak = yes
649.fotonik3d_s: basepeak = yes
654.roms_s: -m64 -mno-adx -mno-sse4a
-Wl,-mlllvm -Wl,-enable-X86-prefetching
-Wl,-mlllvm -Wl,-enable-licm-vrp
-Wl,-mlllvm -Wl,-function-specialize
-Wl,-mlllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mlllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -Mrecursive
-mlllvm -reduce-array-computations=3
-mlllvm -global-vectorize-slp=true -mlllvm -enable-licm-vrp
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamlplibm
-ljemalloc -lflang

Benchmarks using both Fortran and C:

621.wrf_s: basepeak = yes
627.cam4_s: basepeak = yes
628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes

### Peak Other Flags

C benchmarks:
-Wno-unused-command-line-argument -Wno-return-type

Fortran benchmarks:
-Wno-unused-command-line-argument -Wno-return-type

Benchmarks using both Fortran and C:
-Wno-unused-command-line-argument -Wno-return-type

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR665
3.70 GHz, AMD EPYC 72F3

**SPECspeed®2017 fp_base = 132**
**SPECspeed®2017 fp_peak = 144**

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9017</th>
<th>Test Date:</th>
<th>Apr-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
<td>Hardware Availability:</td>
<td>Apr-2021</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
<td>Software Availability:</td>
<td>Mar-2021</td>
</tr>
</tbody>
</table>

**Peak Other Flags (Continued)**

Benchmarks using Fortran, C, and C++:
- `Wno-unused-command-line-argument`
- `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-Milan-D.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-Milan-D.xml

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 v1.1.5 on 2019-07-25 07:27:31-0400.
Originally published on 2021-04-27.