## Lenovo Global Technology

### ThinkSystem SR645

**3.20 GHz, AMD EPYC 7343**

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base = 181</th>
<th>SPECspeed®2017_fp_peak = 193</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s 32</td>
<td>664</td>
<td>32</td>
</tr>
<tr>
<td>607.cactuBSSN_s 32</td>
<td>261</td>
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</tr>
<tr>
<td>619.lbm_s 64</td>
<td>115</td>
<td>191</td>
</tr>
<tr>
<td>621.wrf_s 32</td>
<td>122</td>
<td>141</td>
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<tr>
<td>627.cam4_s 64</td>
<td>73.8</td>
<td>189</td>
</tr>
<tr>
<td>628.pop2_s 32</td>
<td>278</td>
<td>328</td>
</tr>
<tr>
<td>638.imagick_s 32</td>
<td>110</td>
<td>216</td>
</tr>
<tr>
<td>644.nab_s 64</td>
<td>328</td>
<td></td>
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<tr>
<td>649.fotonik3d_s 32</td>
<td>263</td>
<td></td>
</tr>
<tr>
<td>654.roms_s 32</td>
<td>263</td>
<td></td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** AMD EPYC 7343
- **Max MHz:** 3900
- **Nominal:** 3200
- **Enabled:** 32 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, 32 MB shared / 4 cores
- **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 15 SP2 (x86_64) Kernel 5.3.18-22-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
# SPEC CPU®2017 Floating Point Speed Result

**Lenovo Global Technology**

ThinkSystem SR645
3.20 GHz, AMD EPYC 7343

**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

## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>32</td>
<td>88.9</td>
<td>664</td>
<td>88.9</td>
<td>663</td>
<td>88.9</td>
<td>664</td>
<td>88.9</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<td>63.6</td>
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<td>64.2</td>
<td>260</td>
<td>63.8</td>
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<td>64.2</td>
<td>260</td>
<td>63.8</td>
<td>261</td>
</tr>
<tr>
<td>619.lbm_s</td>
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<td>100</td>
<td>52.1</td>
<td>100</td>
<td>52.1</td>
<td>100</td>
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<tr>
<td>621.wrf_s</td>
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<td>191</td>
<td>69.3</td>
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<td>68.7</td>
<td>192</td>
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<td>627.cam4_s</td>
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<td>72.6</td>
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<td>72.3</td>
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<td>72.5</td>
<td>122</td>
<td>72.5</td>
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<td>649.fotonik3d_s</td>
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<td>83.1</td>
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<td>72.9</td>
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**SPECspeed®2017_fp_base = 181**

**SPECspeed®2017_fp_peak = 193**

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## Compiler Notes

The AMD64 AOCC Compiler Suite is available at http://developer.amd.com/amd-aocc/

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## 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.:

numaclt --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 caches.

'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

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CPUT2017 License: 9017
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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 = "0-63"
LD_LIBRARY_PATH =
   "/home/cpu2017-1.1.5-amd-aocc300-milan-B1/amd_speed_aocc300_milan_B_lib/
   64;/home/cpu2017-1.1.5-amd-aocc300-milan-B1/amd_speed_aocc300_milan_B_lib/
   32;"
MALLOCONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "64"

Environment variables set by runcpu during the 619.lbm_s peak run:
GOMP_CPU_AFFINITY = "0 32 1 33 2 34 3 35 4 36 5 37 6 38 7 39 8 40 9 41 10 42
   11 43 12 44 13 45 14 46 15 47 16 48 17 49 18 50 19 51 20 52 21 53 22 54
   23 55 24 56 25 57 26 58 27 59 28 60 29 61 30 62 31 63"

Environment variables set by runcpu during the 627.cam4_s peak run:
GOMP_CPU_AFFINITY = "0 32 1 33 2 34 3 35 4 36 5 37 6 38 7 39 8 40 9 41 10 42
   11 43 12 44 13 45 14 46 15 47 16 48 17 49 18 50 19 51 20 52 21 53 22 54
   23 55 24 56 25 57 26 58 27 59 28 60 29 61 30 62 31 63"

Environment variables set by runcpu during the 644.nab_s peak run:
GOMP_CPU_AFFINITY = "0 32 1 33 2 34 3 35 4 36 5 37 6 38 7 39 8 40 9 41 10 42
   11 43 12 44 13 45 14 46 15 47 16 48 17 49 18 50 19 51 20 52 21 53 22 54
   23 55 24 56 25 57 26 58 27 59 28 60 29 61 30 62 31 63"

Environment variables set by runcpu during the 654.roms_s peak run:
GOMP_CPU_AFFINITY = "0-31"

General Notes
Binaries were compiled on a system with 2x AMD EPYC 7742 CPU + 1TiB Memory using openSUSE 15.2

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)
**Lenovo Global Technology**

**Test Sponsor:** Lenovo Global Technology

**Hardware Availability:** Apr-2021

**Test Date:** Apr-2021

**Software Availability:** Mar-2021

---

**CPU2017 License:** 9017

**Tested by:** Lenovo Global Technology

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**General Notes (Continued)**

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-B1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost Tue Apr 20 14:28:52 2021

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 7343 16-Core Processor
2  "physical id"s (chips)
  64 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 16
siblings  : 32
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
```

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):                64
On-line CPU(s) list:   0-63
Thread(s) per core:    2
Core(s) per socket:    16
Socket(s):             2
NUMA node(s):          2
```

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Software Availability: Mar-2021

Platform Notes (Continued)

Vendor ID: AuthenticAMD  
CPU family: 25  
Model: 1  
Model name: AMD EPYC 7343 16-Core Processor  
Stepping: 1  
CPU MHz: 1795.632  
CPU max MHz: 3200.0000  
CPU min MHz: 1500.0000  
BogoMIPS: 6387.95  
Virtualization: AMD-V  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 512K  
L3 cache: 32768K  
NUMA node0 CPU(s): 0-15,32-47  
NUMA node1 CPU(s): 16-31,48-63  
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp lm constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid aperfmperf pni pclmulqdq monitor ssse3 fma cx16 pclid sse4_1 sse4_2 movbe popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb bpext perfctr_l1c mwaitx cpb cat_l13 cpd_l13 invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbase bmi1 avx2 smep bmi2 erts invpcid cmap cmtd ldt_a rdseed adx smap clflushopt clwb sha ni xsaveopt xsaveprec xgetbv1 xsaves cmq_l1c cmq_occup_l1c cmq_mbm_total cmq_mbm_local clzero irperf xsaveerptr wbinvd arat npt ibrv vmx_lock nirp_save tsc_scale vmc_mstable flushbyasid decodeassists pausefilter pthreshold v_vmsave_vmload vgif umip pkux vmspace vaes vpclmulqdq rdpid overflow_recover succor smca

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
node 0 size: 257805 MB
node 0 free: 257343 MB
node 0 distances:
node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
node 1 size: 258037 MB
node 1 free: 257394 MB
node distances:
node 0 1
0: 10 32
1: 32 10

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SPECspeed®2017_fp_base = 181
SPECspeed®2017_fp_peak = 193

Platform Notes (Continued)

From /proc/meminfo
MemTotal: 528223116 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

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

From /etc/*release* /etc/*version*
NAME="SLES"
VERSION="15-SP2"
VERSION_ID="15.2"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP2"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp2"

uname -a:
Linux localhost 5.3.18-22-default #1 SMP Wed Jun 3 12:16:43 UTC 2020 (720aeba) x86_64
x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multithit):  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/swaps barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):  Mitigation: Full AMD retpoline, IBPB: conditional, IBRS_FW, STIBP: always-on, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling):  Not affected
CVE-2019-11135 (TSX Asynchronous Abort):  Not affected

run-level 3 Apr 20 12:30

SPEC is set to: /home/cpu2017-1.1.5-amd-aocc300-milan-B1
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 889G 85G 804G 10% /
Lenovo Global Technology

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Platform Notes (Continued)

From /sys/devices/virtual/dmi/id
Vendor: Lenovo
Product: ThinkSystem SR645 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:
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

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Compiler Version Notes (Continued)

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

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

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Base Compiler Invocation (Continued)

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:
-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
-fveclib=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-vrp -mllvm -reduce-array-computations=3 -z muldefs
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc -lfplang -lfplangrtl

Fortran benchmarks:
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-licm-vrp -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 -fveclib=AMDLIBM -ffast-math -Mrecursive
-mllvm -fuse-tile-inner-loop -funroll-loops

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Lenovo Global Technology
ThinkSystem SR645
3.20 GHz, AMD EPYC 7343

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

SPECspeed®2017_fp_base = 181
SPECspeed®2017_fp_peak = 193

Base Optimization Flags (Continued):

Fortran benchmarks (continued):
-mltv -extra-vectorizer-passes -mltv -lslr-in-nested-loop
-mltv -enable-licm-vrp -mltv -reduce-array-computations=3
-mltv -global-vectorize-slp=true -z muldefs -DSPEC_OPENMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang -lflangrti

Benchmarks using both Fortran and C:
-m64 -mno-adx -mno-sse4a -Wl,-mltv -Wl,-enable-X86-prefetching
-Wl,-mltv -Wl,-enable-licm-vrp -Wl,-mltv -Wl,-region-vectorize
-Wl,-mltv -Wl,-function-specialize
-Wl,-mltv -Wl,-align-all-nofallthru-blocks=6
-Wl,-mltv -Wl,-reduce-array-computations=3 -O3 -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mltv -unroll-threshold=50 -mltv -inline-threshold=1000
-fremap-arrays -mltv -function-specialize -flv-function-specialization
-mltv -enable-gvn-hoist -mltv -global-vectorize-slp=true
-mltv -extra-vectorizer-passes -mltv -s -mltv -reduce-array-computations=3 -Hz,1,0x1
-Mrecursive -mltv -fuse-tile-inner-loop -funroll-loops
-mltv -extra-vectorizer-passes -mltv -lslr-in-nested-loop -z muldefs
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
-lflang -lflangrti

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

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
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -flto
-fstruct-layout=5 -mllvm -unroll-threshold=50

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Peak Optimization Flags (Continued)

619.lbm_s (continued):
-ffree=-arrays -flv-function-specialization
-mmllvm -inline-threshold=1000 mmllvm -enable-gvn-hoist
-mmllvm -global-vectorize-slp=true
-mmllvm -function-specialize -mmllvm -enable-licm-vrp
-mmllvm -reduce-array-computations=3 -DSPEC_OPENMP -fopenmp
-fopenmp=ligomp -lomp -lamdlibm -ljemalloc -lflang

638.imagick_s: basepeak = yes

644.nab_s: -m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize -Ofast -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mmllvm -unroll-threshold=50 -fremap-arrays
-flv-function-specialization -mmllvm -inline-threshold=1000
-mmllvm -enable-gvn-hoist -mmllvm -global-vectorize-slp=true
-mmllvm -function-specialize -mmllvm -enable-licm-vrp
-mmllvm -reduce-array-computations=3 -DSPEC_OPENMP -fopenmp
-fopenmp=ligomp -lomp -lamdlibm -ljemalloc -lflang

Fortran benchmarks:

603.bwaves_s: basepeak = yes

649.fotonik3d_s: basepeak = yes

654.roms_s: -m64 -mno-adx -mno-sse4a
-Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-licm-vrp
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -Mrecursive
-mmllvm -reduce-array-computations=3
-mmllvm -global-vectorize-slp=true -mmllvm -enable-licm-vrp
-DSPEC_OPENMP -fopenmp -fopenmp=ligomp -lomp -lamdlibm
-ljemalloc -lflang

Benchmarks using both Fortran and C:

621.wrf_s: basepeak = yes

627.cam4_s: -m64 -mno-adx -mno-sse4a
-Wl,-mllvm -Wl,-enable-X86-prefetching
-Wl,-mllvm -Wl,-enable-licm-vrp
-Wl,-mllvm -Wl,-function-specialize

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## Lenovo Global Technology

**ThinkSystem SR645**  
3.20 GHz, AMD EPYC 7343

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### Peak Optimization Flags (Continued)

627.cam4.s (continued):
- Wl, -mlllvm -Wl, -align-all-nofallthru-blocks=6
- Wl, -mlllvm -Wl, -reduce-array-computations=3 -Ofast
- march=znver3 -fveclib=AMDLIBM -ffast-math -flto
- fstruct-layout=5 -mlllvm -unroll-threshold=50
- freemap-arrays -flv-function-specialization
- mlllvm -inline-threshold=1000 -mlllvm -enable-gvn-hoist
- mlllvm -global-vectorize-slp=true
- mlllvm-function-specialize -mlllvm -enable-licm-vrp
- mlllvm -reduce-array-computations=3 -Mrecursive
- DSPEC_OPENMP =fopenmp =fopenmp=libomp -lomp -lamlidlibm
- ljmalloc -lflang

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

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


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-E.xml

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