### Lenovo Global Technology

**ThinkSystem SR645**  
3.70 GHz, AMD EPYC 72F3

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#### SPEC CPU®2017 Integer Speed Result

**SPECspeed®2017_int_base** = 13.1  
**SPECspeed®2017_int_energy_base** = 78.5  
**SPECspeed®2017_int_peak** = 13.2  
**SPECspeed®2017_int_energy_peak** = 78.6

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#### 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  
- **L2:** 512 KB I+D on chip per core  
- **L3:** 256 MB I+D on chip per chip, 32 MB per core  
- **Other:** None

- **Memory:** 512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R)  
- **Storage:** 1 x 960 GB SATA SSD  
- **Other:** None

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#### 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 D8E115B 2.00 released Feb-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 balance power and performance

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#### Test Details

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

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#### Benchmarks

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**Power Usage:**

- **SPECspeed®2017_int_energy_peak** = 78.6 W  
- **SPECspeed®2017_int_energy_base** = 78.5 W

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**Notes:**

- The results are based on the SPEC CPU®2017 benchmark suite.  
- The test was conducted on a Lenovo ThinkSystem SR645 server with an AMD EPYC 72F3 processor.  
- The test was run in single-threaded mode with the specified conditions.

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**Contact:**  
Standard Performance Evaluation Corporation  
info@spec.org  
https://www.spec.org/
### Lenovo Global Technology

**ThinkSystem SR645**

**3.70 GHz, AMD EPYC 72F3**

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

### Power

- **Max. Power (W):** 336.07  
- **Idle Power (W):** 157.69  
- **Min. Temperature (C):** 23.25  
- **Elevation (m):** 43  
- **Line Standard:** 220 V / 50 Hz / 1 phase / 3 wires  
- **Provisioning:** Line-powered  

### Power Analyzer

- **Power Analyzer:** WIN:9888  
- **Hardware Vendor:** YOKOGAWA, Inc.  
- **Model:** YokogawaWT310E  
- **Serial Number:** C3UD17023E  
- **Input Connection:** Default  
- **Metrology Institute:** CNAS  
- **Calibration By:** GUANG ZHOU GRG METROLOGY & TEST CO.,LTD.  
- **Calibration Label:** J202009040176A-0001  
- **Calibration Date:** 25-Sep-2020  
- **PTDaemon® Version:** 1.9.1 (a2d19f26: 2019-07-17)  
- **Power-Relevant Hardware**
  - **Power Supply:** 1 x 750 W (non-redundant)  
  - **Details:** ThinkSystem 750W Titanium Power Supply 4P57A26292  
  - **Backplane:** 10 x 2.5-inch HDD back plane  
  - **Other Storage:** None  
  - **Storage Model #s:** 4XB7A17089  
  - **NICs Installed:** 1 x ThinkSystem Ethernet 4-port Adaptor @ 1 Gb  
  - **NICs Enabled (FW/OS):** 4 / 1  
  - **NICs Connected/Speed:** 1 @ 1 Gb  
  - **Other HW Model #s:** 8 x High Performance fans  

### Temperature Meter

- **Temperature Meter:** WIN:9889  
- **Hardware Vendor:** Digi International, Inc.  
- **Model:** DigiWATCHPORT_H  
- **Serial Number:** W62330940  
- **Input Connection:** USB  
- **PTDaemon® Version:** 1.9.1 (a2d19f26: 2019-07-17)  
- **Setup Description:** 50 mm in front of SUT main intake  

### Base Results Table

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Lenovo Global Technology
ThinkSystem SR645
3.70 GHz, AMD EPYC 72F3

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SPECspeed®2017_int_energy_base = 78.5
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology
Test Date: Mar-2021
Hardware Availability: Apr-2021
Software Availability: Mar-2021

Peak Results Table

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

Compiler Notes

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

Submit Notes

The config file option 'submit' was used.
'numactl' was used to bind copies to the cores.
See the configuration file for details.

Operating System Notes

'ulimit -s unlimited' was used to set environment stack size
'ulimit -l 2097152' was used to set environment locked pages in memory limit
runcpu command invoked through numactl i.e.: numactl --interleave=all runcpu <etc>

'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.

(Continued on next page)
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Operating System Notes (Continued)

'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root to enable
Transparent Hugepages (THP) for this run.
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root for peak
runs of 628.pop2_s and 638.imagick_s to enable THP only on request.

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-B1/amd_speed_aocc300_milan_B_lib/
64;/home/cpu2017-1.1.5-amd-aocc300-milan-B1/amd_speed_aocc300_milan_B_li
b/32;"
MALLOCONF = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "32"

Environment variables set by runcpu during the 602.gcc_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 623.xalancbmk_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 625.x264_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 648.exchange2_s peak run:
GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 657.xz_s peak run:
GOMP_CPU_AFFINITY = "0-15"

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
ThinkSystem SR645
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SPECspeed®2017_int_energy_base = 78.5
SPECspeed®2017_int_peak = 13.2
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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 settings:
Operating Mode set to Custom Mode
Memory Speed set to 3200MHz
NUMA nodes per socket set to NPS2
DRAM Scrub Time set to Disable

Sysinfo program /home/cpu2017-1.1.5-amd-aocc300-milan-B1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost Mon Mar  1 19:13:30 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 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

(Continued on next page)
### Platform Notes (Continued)

- **Core(s) per socket:** 8
- **Socket(s):** 2
- **NUMA node(s):** 4
- **Vendor ID:** AuthenticAMD
- **CPU family:** 25
- **Model:** 1
- **Model name:** AMD EPYC 72F3 8-Core Processor
- **Stepping:** 1
- **CPU MHz:** 1495.173
- **CPU max MHz:** 3700.0000
- **CPU min MHz:** 1500.0000
- **BogoMIPS:** 7385.50
- **Virtualization:** AMD-V
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 512K
- **L3 cache:** 32768K
- **NUMA node0 CPU(s):** 0-3,16-19
- **NUMA node1 CPU(s):** 4-7,20-23
- **NUMA node2 CPU(s):** 8-11,24-27
- **NUMA node3 CPU(s):** 12-15,28-31
- **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 rdtsscp 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 avx f16c rdrand lahf_lm cmp_legacy svm extatic cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext perfctr_core perfctr_nb bpext perfctr_llc mwaitx cpb cat_d3 cdp_d3 invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbse bmin avx2 smep bmi2 erms invpcid cqm rdr_a rdseed adx smap clflushopt clwb sha ni xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local clzero irperf xsaveerptr wbnoinvd arat npt lbv svm_lock nrip_save tsc_scale vmcb_clean flushbyasid decodeassist psesubfilter pfthreshold v_vmsave_vmload vgif umip pku ospe vaes vpcmklqdq 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 16 17 18 19
    node 0 size: 128832 MB
    node 0 free: 128660 MB
    node 1 cpus: 4 5 6 7 20 21 22 23
    node 1 size: 128974 MB

(Continued on next page)
## Lenovo Global Technology

### ThinkSystem SR645

3.70 GHz, AMD EPYC 72F3

| SPECspeed\textsuperscript{®}2017_int_base = | 13.1 |
| SPECspeed\textsuperscript{®}2017_int_energy_base = | 78.5 |
| SPECspeed\textsuperscript{®}2017_int_peak = | 13.2 |
| SPECspeed\textsuperscript{®}2017_int_energy_peak = | 78.6 |

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

### Platform Notes (Continued)

| node 1 free: | 128832 MB |
| node 2 cpus: | 8 9 10 11 24 25 26 27 |
| node 2 size: | 129019 MB |
| node 2 free: | 128828 MB |
| node 3 cpus: | 12 13 14 15 28 29 30 31 |
| node 3 size: | 129019 MB |
| node 3 free: | 128716 MB |
| node distances: |
| 0: | 10 12 32 32 |
| 1: | 12 10 32 32 |
| 2: | 32 32 10 12 |
| 3: | 32 32 12 10 |

From /proc/meminfo  
MemTotal: 528225492 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

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

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 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

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR645
3.70 GHz, AMD EPYC 72F3

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Platform Notes (Continued)

CVE-2017-5753 (Spectre variant 1):
Mitigation: usercopy/swapgs barriers and __user pointer sanitation

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 Mar 1 17:52

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 185G 704G 21% /

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 M393A4G43AB3-CWE 32 GB 2 rank 3200
16x Unknown Unknown

BIOS:
BIOS Vendor: Lenovo
BIOS Version: D8E115B-2.00
BIOS Date: 02/02/2021
BIOS Revision: 2.0
Firmware Revision: 3.0

(End of data from sysinfo program)

Compiler Version Notes

| 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(base, peak) |

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

**ThinkSystem SR645**  
3.70 GHz, AMD EPYC 72F3

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

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### Compiler Version Notes (Continued)

```
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++ | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak)  
    | 631.deepsjeng_s(base, peak) 641.leela_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 | 648.exchange2_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
```

---

### Base Compiler Invocation

**C benchmarks:**  
clang

**C++ benchmarks:**  
clang++

**Fortran benchmarks:**  
flang
SPEC CPU®2017 Integer Speed Result
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Lenovo Global Technology
ThinkSystem SR645
3.70 GHz, AMD EPYC 72F3

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SPECspeed®2017_int_peak = 13.2
SPECspeed®2017_int_energy_peak = 78.6

Base Portability Flags

600.perlbench_s: -DSPEC_LINUX_X64 -DSPEC_LP64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LINUX -DSPEC_LP64
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.zz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-m64 -mno-adx -mno-sse4a -W1,-allow-multiple-definition
-W1,-mllvm -W1,-enable-licm-vrp -W1,-mllvm -W1,-region-vectorize
-W1,-mllvm -W1,-function-specialize
-W1,-mllvm -W1,-align-all-nofallthru-blocks=6
-W1,-mllvm -W1,-reduce-array-computations=3 -O3 -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5
-mllvm -unroll-threshold=50 -mllvm -inline-threshold=1000
-freemap-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
-1flang -1flangrti

C++ benchmarks:
-m64 -std=c++98 -mno-adx -mno-sse4a
-W1,-mllvm -W1,-do-block-reorder=aggressive
-W1,-mllvm -W1,-region-vectorize -W1,-mllvm -W1,-function-specialize
-W1,-mllvm -W1,-align-all-nofallthru-blocks=6
-W1,-mllvm -W1,-reduce-array-computations=3 -O3 -march=znver3
-fveclib=AMDLIBM -ffast-math -flto -mllvm -enable-partial-unswitch
-mllvm -unroll-threshold=100 -finline-aggressive
-flv-function-specialization -mllvm -loop-unswitch-threshold=200000
-mllvm -reroll-loops -mllvm -aggressive-loop-unswitch
-mllvm -extra-vectorizer-passes -mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true -mllvm -convert-pow-exp-to-int=false
-z muldefs -mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden -DSPEC_OPENMP
-fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc -1flang

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR645
3.70 GHz, AMD EPYC 72F3

SPECs speed®2017_int_base = 13.1
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Base Optimization Flags (Continued)

C++ benchmarks (continued):
-llflangrti

Fortran benchmarks:
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-lssl-in-nested-loop -Wl,-mllvm -Wl,-enable-iv-split
-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
-ffast-math
-ffast-math
-fveclib=AMDLIBM
-fflto
-z muldefs
-mllvm -unroll-aggressive -mllvm -unroll-threshold=150 -DSPEC_OPENMP
-fopenmp -fopenmp=libomp -lomp -lamlbilib -ljemalloc -llflang
-llflangrti

Base Other Flags

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

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

Fortran benchmarks:
-Wno-return-type

Peak Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++

Fortran benchmarks:
flang
Lenovo Global Technology
ThinkSystem SR645
3.70 GHz, AMD EPYC 72F3

SPECspeed\textsuperscript{\textregistered}2017\_int\_base = 13.1
SPECspeed\textsuperscript{\textregistered}2017\_int\_energy\_base = 78.5
SPECspeed\textsuperscript{\textregistered}2017\_int\_peak = 13.2
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Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

600.perlbench\_s: basepeak = yes

602.gcc\_s: -m64 -mno-adx -mno-sse4a -Wl,-allow-multiple-definition
-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 -flto
-fstructured-layout=5 -mllvm -unroll-threshold=50
-freemap-arrays -flv-function-specialization
-mllvm -inline-threshold=1000 -mllvm -enable-gvn-hoist
-mllvm -global-vectorize-slp=true
-mllvm -function-specialize -mllvm -enable-licm-vrp
-mllvm -reduce-array-computations=3 -DSPEC/OpenMP -fopenmp
-fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang

605.mcf\_s: basepeak = yes

625.x264\_s: Same as 602.gcc\_s

657.xz\_s: Same as 602.gcc\_s

C++ benchmarks:

620.omnetpp\_s: basepeak = yes

623.xalancbmk\_s: -m64 -std=c++98 -mno-adx -mno-sse4a
-Wl,-mllvm -Wl,-do-block-reorder=aggressive
-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
-finline-aggressive -mllvm -unroll-threshold=100
-flv-function-specialization -mllvm -enable-licm-vrp
-mllvm -reroll-loops -mllvm -aggressive-loop-unswitch
-mllvm -reduce-array-computations=3

(Continued on next page)
Lenovo Global Technology
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Peak Optimization Flags (Continued)

623.xalancbmk_s (continued):
-mllvm -global-vectorize-slp=true
-mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -lflang

631.deepsjeng_s: basepeak = yes

641.leela_s: basepeak = yes

Fortran benchmarks:
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-isr-in-nested-loop -Wl,-mllvm -Wl,-enable-iv-split
-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 -mllvm -unroll-aggressive
-mllvm -unroll-threshold=150 -DSPEC_OPENMP -fopenmp -fopenmp=libomp
-lomp -lamdlibm -ljemalloc -lflang

Peak Other Flags

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

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

Fortran benchmarks:
-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-C.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-C.xml
# SPEC CPU®2017 Integer Speed Result

## Lenovo Global Technology

**ThinkSystem SR645**  
3.70 GHz, AMD EPYC 72F3

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

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