



SPEC CPU®2017 Integer Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

Lenovo Global Technology ThinkSystem SR635 2.00 GHz, AMD EPYC 7713P

SPECrate®2017_int_base =	291
SPECrate®2017_int_energy_base =	1520
SPECrate®2017_int_peak =	Not Run
SPECrate®2017_int_energy_peak =	Not Run

CPU2017 License: 9017

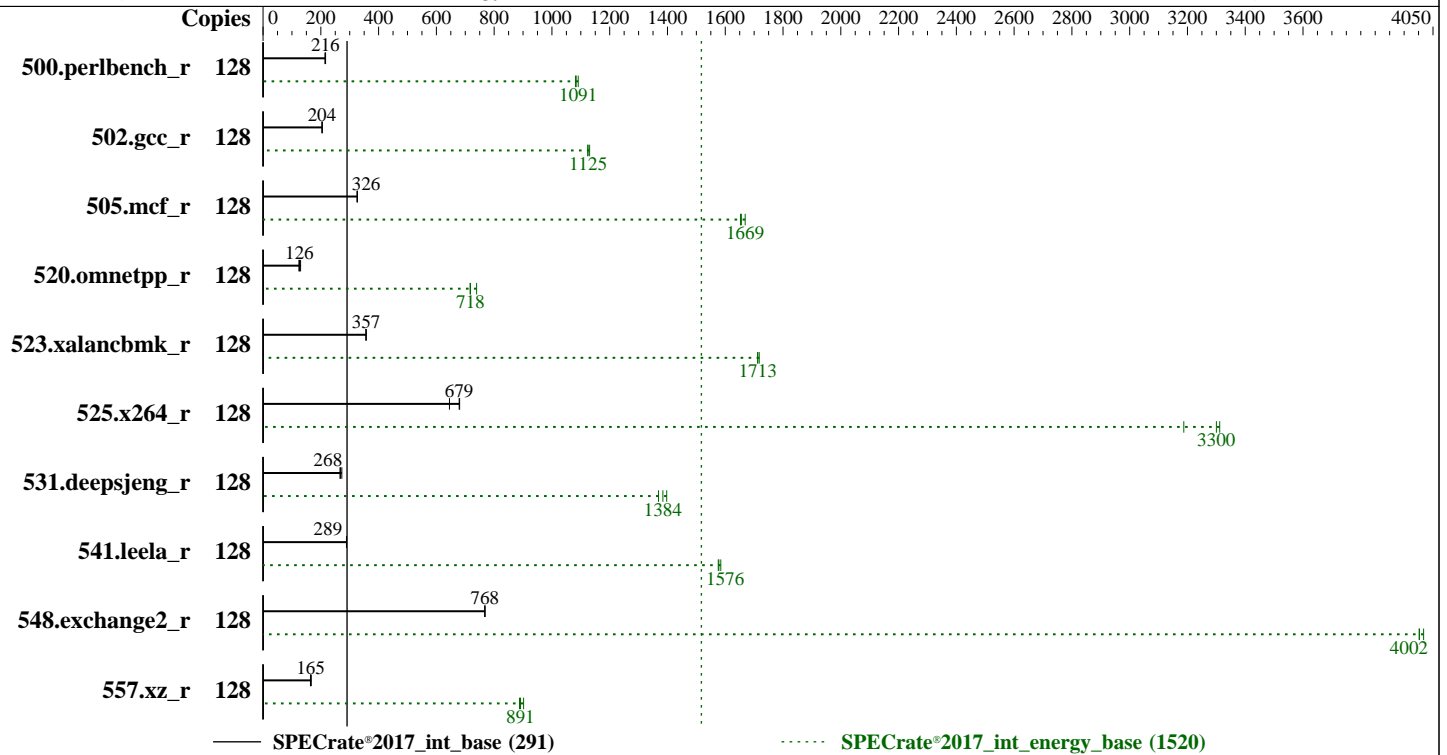
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: May-2021

Hardware Availability: Jun-2021

Software Availability: Mar-2021



Hardware

CPU Name: AMD EPYC 7713P
 Max MHz: 3675
 Nominal: 2000
 Enabled: 64 cores, 1 chip, 2 threads/core
 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: 256 MB I+D on chip per chip,
 32 MB shared / 8 cores
 Other: None
 Memory: 256 GB (8 x 32 GB 2Rx8 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: No
 Firmware: Lenovo BIOS Version CFE125S 6.0 released May-2021
 File System: xfs
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: Not Applicable
 Other: jemalloc: jemalloc memory allocator library v5.1.0
 Power Management: BIOS and OS set to balance power and performance

Power

Max. Power (W): 243.67
 Idle Power (W): 63.11
 Min. Temperature (C): 22.31
 Elevation (m): 43
 Line Standard: 220 V / 50 Hz / 1 phase / 3 wires
 Provisioning: Line-powered



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Power Settings

Management FW: Version 4.11 of AMBT23L
Memory Mode: Normal

Power-Relevant Hardware

Power Supply: 1 x 750 W (non-redundant)
Details: ThinkSystem 750W Platinum Power Supply 7N67A00883
Backplane: 10 x 2.5-inch HDD back plane
Other Storage: None
Storage Model #: 4XB7A10239
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 #: 7 x High Performance fans

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: 1.9.2 (3976349f; 2020-12-08)
Setup Description: Connected to PSU1
Current Ranges Used: 1A
Voltage Range Used: 300V

Temperature Meter

Temperature Meter: WIN:9889
Hardware Vendor: Digi International, Inc.
Model: DigiWATCHPORT_H
Serial Number: W62330940
Input Connection: USB
PTDaemon Version: 1.9.2 (3976349f; 2020-12-08)
Setup Description: 50 mm in front of SUT main intake

Base Results Table

Benchmark	Copies	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power	Seconds	Ratio	Energy (kJ)	Energy Ratio	Average Power	Maximum Power
500.perlbench_r	128	942	216	203	1090	215	232	942	216	204	1080	217	234	951	214	204	1080	215	229
502.gcc_r	128	884	205	174	1130	197	226	888	204	175	1120	197	224	887	204	175	1130	197	223
505.mcf_r	128	634	326	136	1670	214	241	636	325	137	1660	215	242	634	326	137	1650	216	244
520.omnetpp_r	128	1293	130	246	739	190	199	1353	124	254	717	188	197	1330	126	253	718	190	206
523.xalancbmk_r	128	379	357	85.5	1710	226	241	379	357	85.2	1720	225	239	380	356	85.5	1710	225	240
525.x264_r	128	330	679	73.6	3300	223	233	329	680	73.4	3310	223	234	347	645	76.2	3190	219	234
531.deepsjeng_r	128	538	273	114	1400	212	218	548	268	115	1380	210	215	550	266	116	1370	212	215
541.leela_r	128	734	289	146	1580	198	213	734	289	145	1580	198	213	733	289	145	1580	197	212
548.exchange2_r	128	437	768	90.8	4000	208	214	437	768	90.8	4000	208	215	437	768	90.5	4020	207	215
557.xz_r	128	829	167	167	902	201	217	842	164	169	888	201	217	838	165	169	891	201	216

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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/>



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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 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.
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root for peak
integer runs and all FP runs to enable Transparent Hugepages (THP).
'echo madvise > /sys/kernel/mm/transparent_hugepage/enabled' run as root for base
integer runs to enable THP only on request.
'echo 0 > /proc/sys/kernel/numa_balancing' run as root to eliminate NUMA
location probing; the workloads are all bound to specific NUMA nodes.
```

Environment Variables Notes

Environment variables set by runcpu before the start of the run:

```
LD_LIBRARY_PATH =
"/home/cpu2017-1.1.7-amd-aocc300-milan-A1/amd_rate_aocc300_milan_A_lib/6
4:/home/cpu2017-1.1.7-amd-aocc300-milan-A1/amd_rate_aocc300_milan_A_lib/
32:"
MALLOC_CONF = "retain:true"
```

General Notes

Binaries were compiled on a system with 2x AMD EPYC 7742 CPU + 512GiB Memory using OpenSUSE 15.2

(Continued on next page)



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General Notes (Continued)

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 settings:

Core Performance Boost set to Disabled
Memory Speed set to Auto
SOC P-states set to P3
LLC as NUMA Node set to Enabled
Memory interleaving set to Disabled

Sysinfo program /home/cpu2017-1.1.7-amd-aocc300-milan-A1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost Tue May 25 02:04:29 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 7713P 64-Core Processor
 1 "physical id"s (chips)
128 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following
excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 64
siblings  : 128
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
53 54 55 56 57 58 59 60 61 62 63
```

From lscpu:

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
```

(Continued on next page)



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Platform Notes (Continued)

```

Byte Order:                Little Endian
Address sizes:             48 bits physical, 48 bits virtual
CPU(s):                   128
On-line CPU(s) list:      0-127
Thread(s) per core:       2
Core(s) per socket:       64
Socket(s):                 1
NUMA node(s):             8
Vendor ID:                 AuthenticAMD
CPU family:                25
Model:                     1
Model name:                AMD EPYC 7713P 64-Core Processor
Stepping:                  1
CPU MHz:                   1741.928
CPU max MHz:               2000.0000
CPU min MHz:               1500.0000
BogoMIPS:                  3992.70
Virtualization:            AMD-V
L1d cache:                 32K
L1i cache:                 32K
L2 cache:                  512K
L3 cache:                  32768K
NUMA node0 CPU(s):         0-7,64-71
NUMA node1 CPU(s):         8-15,72-79
NUMA node2 CPU(s):         16-23,80-87
NUMA node3 CPU(s):         24-31,88-95
NUMA node4 CPU(s):         32-39,96-103
NUMA node5 CPU(s):         40-47,104-111
NUMA node6 CPU(s):         48-55,112-119
NUMA node7 CPU(s):         56-63,120-127
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 pcid sse4_1 sse4_2 movbe popcnt aes xsave avx fl6c 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_llc mwaitx cpb
cat_l3 cdp_l3 invpcid_single hw_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbase
bmi1 avx2 smep bmi2 erms invpcid cqm rdt_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 lbrv svm_lock nrip_save tsc_scale
vmcb_clean flushbyasid decodeassists pausefilter pfthreshold v_vmsave_vmload vgif
umip pku ospke vaes vpclmulqdq rdpid overflow_recov succor smca

```

/proc/cpuinfo cache data
cache size : 512 KB

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Platform Notes (Continued)

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

```
available: 8 nodes (0-7)
node 0 cpus: 0 1 2 3 4 5 6 7 64 65 66 67 68 69 70 71
node 0 size: 32058 MB
node 0 free: 31865 MB
node 1 cpus: 8 9 10 11 12 13 14 15 72 73 74 75 76 77 78 79
node 1 size: 32250 MB
node 1 free: 31997 MB
node 2 cpus: 16 17 18 19 20 21 22 23 80 81 82 83 84 85 86 87
node 2 size: 32252 MB
node 2 free: 31983 MB
node 3 cpus: 24 25 26 27 28 29 30 31 88 89 90 91 92 93 94 95
node 3 size: 32250 MB
node 3 free: 32058 MB
node 4 cpus: 32 33 34 35 36 37 38 39 96 97 98 99 100 101 102 103
node 4 size: 32218 MB
node 4 free: 31979 MB
node 5 cpus: 40 41 42 43 44 45 46 47 104 105 106 107 108 109 110 111
node 5 size: 32250 MB
node 5 free: 32064 MB
node 6 cpus: 48 49 50 51 52 53 54 55 112 113 114 115 116 117 118 119
node 6 size: 32252 MB
node 6 free: 32040 MB
node 7 cpus: 56 57 58 59 60 61 62 63 120 121 122 123 124 125 126 127
node 7 size: 32237 MB
node 7 free: 32058 MB
node distances:
node  0  1  2  3  4  5  6  7
  0:  10  11  11  11  11  11  11  11
  1:  11  10  11  11  11  11  11  11
  2:  11  11  10  11  11  11  11  11
  3:  11  11  11  10  11  11  11  11
  4:  11  11  11  11  10  11  11  11
  5:  11  11  11  11  11  10  11  11
  6:  11  11  11  11  11  11  10  11
  7:  11  11  11  11  11  11  11  10
```

From /proc/meminfo
MemTotal: 263955756 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

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

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Platform Notes (Continued)

performance

From /etc/*release* /etc/*version*

os-release:

```

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 seccomp
CVE-2017-5753 (Spectre variant 1):	Mitigation: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):	Mitigation: Full AMD retpoline, 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 May 25 02:00

```

SPEC is set to: /home/cpu2017-1.1.7-amd-aocc300-milan-A1
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda3       xfs   892G   34G  858G   4% /

```

From /sys/devices/virtual/dmi/id

```

Vendor:          Lenovo
Product:         ThinkSystem SR635 -[7Y98XXXXXX]-
Product Family: ThinkSystem

```

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Platform Notes (Continued)

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 M393A4G43AB3-CWE 32 GB 2 rank 3200
8x Unknown Unknown

BIOS:

BIOS Vendor: Lenovo
BIOS Version: CFE125S
BIOS Date: 05/11/2021
BIOS Revision: 6.0

(End of data from sysinfo program)

Compiler Version Notes

=====
C | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base)
525.x264_r(base) 557.xz_r(base)

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++ | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
541.leela_r(base)

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 | 548.exchange2_r(base)

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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

Base Compiler Invocation

C benchmarks:

clang

C++ benchmarks:

clang++

Fortran benchmarks:

flang

Base Portability Flags

500.perlbench_r: -DSPEC_LINUX_X64 -DSPEC_LP64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LINUX -DSPEC_LP64
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:

-m64 -Wl,-allow-multiple-definition -Wl,-mllvm -Wl,-enable-licm-vrp
-flto -Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-align-all-nofallthru-blocks=6

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Base Optimization Flags (Continued)

C benchmarks (continued):

```
-Wl,-mllvm -Wl,-reduce-array-computations=3 -O3 -ffast-math
-march=znver3 -fveclib=AMDLIBM -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
-lamdlibm -ljemalloc -lflang -lflangrti
```

C++ benchmarks:

```
-m64 -std=c++98 -Wl,-mllvm -Wl,-do-block-reorder=aggressive -flto
-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 -ffast-math
-march=znver3 -fveclib=AMDLIBM -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 -lamdlibm
-ljemalloc -lflang -lflangrti
```

Fortran benchmarks:

```
-m64 -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-lsr-in-nested-loop -Wl,-mllvm -Wl,-enable-iv-split
-flto -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 -ffast-math
-march=znver3 -fveclib=AMDLIBM -z muldefs -mllvm -unroll-aggressive
-mllvm -unroll-threshold=500 -lamdlibm -ljemalloc -lflang -lflangrti
```

Base Other Flags

C benchmarks:

-Wno-unused-command-line-argument

C++ benchmarks:

-Wno-unused-command-line-argument



SPEC CPU®2017 Integer Rate Result

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Lenovo Global Technology
ThinkSystem SR635
2.00 GHz, AMD EPYC 7713P

SPECrate®2017_int_base =	291
SPECrate®2017_int_energy_base =	1520
SPECrate®2017_int_peak =	Not Run
SPECrate®2017_int_energy_peak =	Not Run

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

Test Date: May-2021
Hardware Availability: Jun-2021
Software Availability: Mar-2021

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-Milan1P-G.html>
<http://www.spec.org/cpu2017/flags/aocc300-flags-A1.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-Milan1P-G.xml>
<http://www.spec.org/cpu2017/flags/aocc300-flags-A1.xml>

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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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