



# SPEC CPU®2017 Integer Speed Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

## Lenovo Global Technology ThinkSystem SR655 3.70 GHz, AMD EPYC 72F3

SPECspeed®2017_int_base =	12.7
SPECspeed®2017_int_energy_base =	124
SPECspeed®2017_int_peak =	12.7
SPECspeed®2017_int_energy_peak =	124

CPU2017 License: 9017

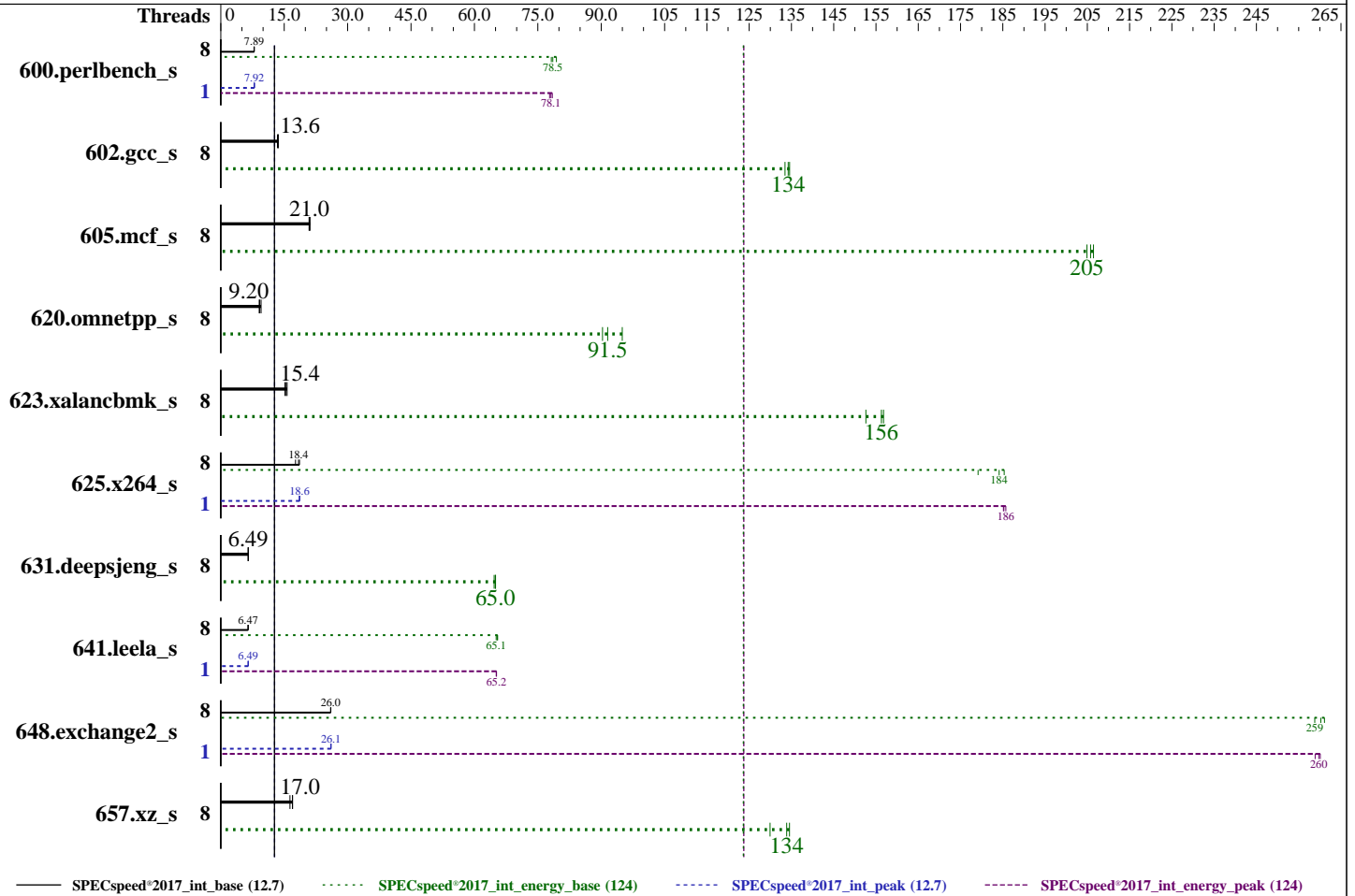
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: May-2021

Hardware Availability: Jun-2021

Software Availability: Mar-2021



### Hardware

CPU Name: AMD EPYC 72F3  
 Max MHz: 4100  
 Nominal: 3700  
 Enabled: 8 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 per core  
 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: Yes  
 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: 64-bit  
 Other: jemalloc: jemalloc memory allocator library v5.1.0  
 Power Management: BIOS and OS set to balance power and performance



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### Power

Max. Power (W): 172.61  
Idle Power (W): 61.33  
Min. Temperature (C): 20.69  
Elevation (m): 43  
Line Standard: 220 V / 50 Hz / 1 phase / 3 wires  
Provisioning: Line-powered

### 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 Titanium Power Supply 7N67A00884  
Backplane: 8 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 #: 6 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	Threads	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
600.perlbench_s	8	224	7.93	24.3	79.4	108	110	<b>225</b>	<b>7.89</b>	<b>24.5</b>	<b>78.5</b>	<b>109</b>	<b>110</b>	226	7.86	24.6	78.2	109	111
602.gcc_s	8	297	13.4	32.4	133	109	113	<b>293</b>	<b>13.6</b>	<b>32.2</b>	<b>134</b>	<b>110</b>	<b>113</b>	293	13.6	32.2	135	110	113
605.mcf_s	8	226	20.9	25.0	206	111	115	224	21.1	24.9	206	112	115	<b>225</b>	<b>21.0</b>	<b>25.1</b>	<b>205</b>	<b>112</b>	<b>115</b>
620.omnetpp_s	8	171	9.53	18.7	95.0	109	110	180	9.09	19.7	90.3	109	110	<b>177</b>	<b>9.20</b>	<b>19.4</b>	<b>91.5</b>	<b>109</b>	<b>110</b>
623.xalancbmk_s	8	<b>91.8</b>	<b>15.4</b>	<b>9.85</b>	<b>156</b>	<b>107</b>	<b>111</b>	93.5	15.2	10.1	153	108	111	90.3	15.7	9.82	157	109	111
625.x264_s	8	94.7	18.6	10.4	185	109	111	99.8	17.7	10.7	179	107	111	<b>95.9</b>	<b>18.4</b>	<b>10.4</b>	<b>184</b>	<b>109</b>	<b>111</b>
631.deepsjeng_s	8	<b>221</b>	<b>6.49</b>	<b>24.0</b>	<b>65.0</b>	<b>109</b>	<b>112</b>	221	6.48	24.1	64.7	109	113	220	6.50	24.0	65.0	109	112
641.leela_s	8	264	6.45	28.2	65.4	107	107	<b>264</b>	<b>6.47</b>	<b>28.4</b>	<b>65.1</b>	<b>108</b>	<b>108</b>	263	6.48	28.2	65.5	107	108
648.exchange2_s	8	113	26.0	12.3	261	108	110	113	26.0	12.3	260	109	110	<b>113</b>	<b>26.0</b>	<b>12.4</b>	<b>259</b>	<b>109</b>	<b>111</b>
657.xz_s	8	364	17.0	50.0	135	137	171	<b>365</b>	<b>17.0</b>	<b>50.3</b>	<b>134</b>	<b>138</b>	<b>171</b>	378	16.4	51.8	130	137	172

SPECSpeed®2017\_int\_base = 12.7

SPECSpeed®2017\_int\_energy\_base = 124

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



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**Test Date:** May-2021  
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## Peak Results Table

Benchmark	Threads	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
600.perlbench_s	1	224	7.92	24.8	77.8	110	111	<b>224</b>	<b>7.92</b>	<b>24.7</b>	<b>78.1</b>	<b>110</b>	<b>111</b>	223	7.95	24.6	78.4	110	111
602.gcc_s	8	297	13.4	32.4	133	109	113	<b>293</b>	<b>13.6</b>	<b>32.2</b>	<b>134</b>	<b>110</b>	<b>113</b>	293	13.6	32.2	135	110	113
605.mcf_s	8	226	20.9	25.0	206	111	115	224	21.1	24.9	206	112	115	<b>225</b>	<b>21.0</b>	<b>25.1</b>	<b>205</b>	<b>112</b>	<b>115</b>
620.omnetpp_s	8	171	9.53	18.7	95.0	109	110	180	9.09	19.7	90.3	109	110	<b>177</b>	<b>9.20</b>	<b>19.4</b>	<b>91.5</b>	<b>109</b>	<b>110</b>
623.xalanbmk_s	8	<b>91.8</b>	<b>15.4</b>	<b>9.85</b>	<b>156</b>	<b>107</b>	<b>111</b>	93.5	15.2	10.1	153	108	111	90.3	15.7	9.82	157	109	111
625.x264_s	1	94.8	18.6	10.4	185	109	111	<b>94.7</b>	<b>18.6</b>	<b>10.3</b>	<b>186</b>	<b>109</b>	<b>111</b>	94.6	18.6	10.4	185	110	111
631.deepsjeng_s	8	<b>221</b>	<b>6.49</b>	<b>24.0</b>	<b>65.0</b>	<b>109</b>	<b>112</b>	221	6.48	24.1	64.7	109	113	220	6.50	24.0	65.0	109	112
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648.exchange2_s	1	<b>113</b>	<b>26.1</b>	<b>12.3</b>	<b>260</b>	<b>109</b>	<b>111</b>	113	26.0	12.3	260	109	111	113	26.1	12.4	259	110	111
657.xz_s	8	364	17.0	50.0	135	137	171	<b>365</b>	<b>17.0</b>	<b>50.3</b>	<b>134</b>	<b>138</b>	<b>171</b>	378	16.4	51.8	130	137	172

SPECSpeed®2017\_int\_peak = 12.7

SPECSpeed®2017\_int\_energy\_peak = 124

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## 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 = "0-15"  
LD\_LIBRARY\_PATH =  
"/home/cpu2017-1.1.7-amd-aocc300-milan-B1/amd\_speed\_aocc300\_milan\_B\_lib/  
64;/home/cpu2017-1.1.7-amd-aocc300-milan-B1/amd\_speed\_aocc300\_milan\_B\_li  
b/32:"  
MALLOC\_CONF = "retain:true"  
OMP\_DYNAMIC = "false"  
OMP\_SCHEDULE = "static"  
OMP\_STACKSIZE = "128M"  
OMP\_THREAD\_LIMIT = "16"  
  
Environment variables set by runcpu during the 600.perlbench\_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 641.leela\_s peak run:  
GOMP\_CPU\_AFFINITY = "0"  
  
Environment variables set by runcpu during the 648.exchange2\_s peak run:  
GOMP\_CPU\_AFFINITY = "0"

## 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)  
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.

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## General Notes (Continued)

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:  
Memory Speed set to Auto  
SOC P-states set to P3  
NUMA nodes per socket set to NPS2

Sysinfo program /home/cpu2017-1.1.7-amd-aocc300-milan-B1/bin/sysinfo  
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c  
running on localhost Sat Apr 18 05:50:10 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 72F3 8-Core Processor  
1 "physical id"s (chips)  
16 "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

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): 16  
On-line CPU(s) list: 0-15  
Thread(s) per core: 2  
Core(s) per socket: 8  
Socket(s): 1  
NUMA node(s): 2  
Vendor ID: AuthenticAMD  
CPU family: 25

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## Platform Notes (Continued)

```

Model: 1
Model name: AMD EPYC 72F3 8-Core Processor
Stepping: 1
CPU MHz: 1796.634
CPU max MHz: 3700.0000
CPU min MHz: 1500.0000
BogoMIPS: 7386.37
Virtualization: AMD-V
L1d cache: 32K
L1i cache: 32K
L2 cache: 512K
L3 cache: 32768K
NUMA node0 CPU(s): 0-3,8-11
NUMA node1 CPU(s): 4-7,12-15
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 f16c rdrand
lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw
ibs skinit wdt tce topoext perfctr_core perfctr_nb bpeext 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

```

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 8 9 10 11
node 0 size: 128834 MB
node 0 free: 128479 MB
node 1 cpus: 4 5 6 7 12 13 14 15
node 1 size: 128973 MB
node 1 free: 128623 MB
node distances:
node  0  1
  0:  10  12
  1:  12  10

```

From /proc/meminfo

(Continued on next page)



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## Platform Notes (Continued)

MemTotal: 263995076 kB  
HugePages\_Total: 0  
Hugepagesize: 2048 kB

/sys/devices/system/cpu/cpu\*/cpufreq/scaling\_governor has  
schedutil

/usr/bin/lsb\_release -d  
SUSE Linux Enterprise Server 15 SP2

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 Apr 17 21:13

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## Platform Notes (Continued)

SPEC is set to: /home/cpu2017-1.1.7-amd-aocc300-milan-B1  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/md126p3 xfs 892G 34G 859G 4% /

From /sys/devices/virtual/dmi/id  
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 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 | 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)  
=====

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.xalanbmk\_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

(Continued on next page)





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**3.70 GHz, AMD EPYC 72F3**

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SPECspeed®2017\_int\_energy\_base = 124  
SPECspeed®2017\_int\_peak = 12.7  
SPECspeed®2017\_int\_energy\_peak = 124

**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

## 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

-----  
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

## 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.xz\_s: -DSPEC\_LP64



# SPEC CPU®2017 Integer Speed Result

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**Lenovo Global Technology**  
**ThinkSystem SR655**  
**3.70 GHz, AMD EPYC 72F3**

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SPECspeed®2017\_int\_energy\_base = 124  
SPECspeed®2017\_int\_peak = 12.7  
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## Base Optimization Flags

### C benchmarks:

```
-m64 -mno-adx -mno-sse4a -Wl,-allow-multiple-definition
-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 -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
-lflang -lflangrti
```

### C++ benchmarks:

```
-m64 -std=c++98 -mno-adx -mno-sse4a
-Wl,-mllvm -Wl,-do-block-reorder=aggressive
-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 -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 -lflang
-lflangrti
```

### Fortran benchmarks:

```
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-lsr-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
-fveclib=AMDLIBM -ffast-math -flto -z muldefs
-mllvm -unroll-aggressive -mllvm -unroll-threshold=150 -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  
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

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:  
600.perlbench\_s: -m64 -mno-adx -mno-sse4a -Wl,-allow-multiple-definition  
-Wl,-mllvm -Wl,-enable-licm-verify  
-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  
-fremap-arrays -flv-function-specialization  
-mllvm -inline-threshold=1000 -mllvm -enable-gvn-hoist

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SPECspeed®2017\_int\_energy\_peak = 124

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**Tested by:** Lenovo Global Technology

**Test Date:** May-2021

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## Peak Optimization Flags (Continued)

600.perlbench\_s (continued):

```
-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
```

602.gcc\_s: basepeak = yes

605.mcf\_s: basepeak = yes

625.x264\_s: Same as 600.perlbench\_s

657.xz\_s: basepeak = yes

C++ benchmarks:

620.omnetpp\_s: basepeak = yes

623.xalancbmk\_s: basepeak = yes

631.deepsjeng\_s: basepeak = yes

```
641.leela_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
-mllvm -global-vectorize-slp=true
-mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -lflang
```

Fortran benchmarks:

```
-m64 -mno-adx -mno-sse4a -Wl,-mllvm -Wl,-inline-recursion=4
-Wl,-mllvm -Wl,-lsr-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
```

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## Peak Optimization Flags (Continued)

Fortran benchmarks (continued):

```
-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-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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