# SPEC CPU®2017 Integer Speed Result

## Lenovo Global Technology

**ThinkSystem SR665**  
2.30 GHz, AMD EPYC 7643

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>12.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_int_peak</td>
<td>12.4</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** AMD EPYC 7643  
- **Max MHz:** 3600  
- **Nominal:** 2300  
- **Enabled:** 96 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 shared / 6 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:** Red Hat Enterprise Linux 8.3 (Ootpa)  
- **Kernel:** 4.18.0-240.el8.x86_64  
- **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

### Test Information

- **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>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench</td>
<td>96</td>
<td>6.98</td>
<td>7.05</td>
</tr>
<tr>
<td>gcc</td>
<td>96</td>
<td>13.3</td>
<td>13.4</td>
</tr>
<tr>
<td>mcf</td>
<td>96</td>
<td>8.70</td>
<td></td>
</tr>
<tr>
<td>omnetpp</td>
<td>96</td>
<td>14.0</td>
<td></td>
</tr>
<tr>
<td>xalancbmk</td>
<td>96</td>
<td>16.9</td>
<td></td>
</tr>
<tr>
<td>x264</td>
<td>96</td>
<td>6.43</td>
<td>6.43</td>
</tr>
<tr>
<td>deepsjeng</td>
<td>96</td>
<td>5.71</td>
<td>5.73</td>
</tr>
<tr>
<td>leela</td>
<td>96</td>
<td>23.0</td>
<td></td>
</tr>
<tr>
<td>exchange2</td>
<td>96</td>
<td>25.2</td>
<td></td>
</tr>
<tr>
<td>xz</td>
<td>96</td>
<td>25.2</td>
<td></td>
</tr>
</tbody>
</table>

---

**Threads:** 12.4  
**SPECspeed®2017_int_base:** 12.4  
**SPECspeed®2017_int_peak:** 12.4
## 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>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Base</td>
<td></td>
<td>Peak</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>600.perlbench_s</td>
<td>96</td>
<td>256</td>
<td>6.93</td>
<td>253</td>
<td>7.00</td>
<td>254</td>
<td>6.98</td>
<td>1</td>
<td>252</td>
<td>7.08</td>
<td>249</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>96</td>
<td>298</td>
<td>13.4</td>
<td>298</td>
<td>13.3</td>
<td>299</td>
<td>13.3</td>
<td>1</td>
<td>298</td>
<td>13.4</td>
<td>298</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>96</td>
<td>229</td>
<td>20.6</td>
<td>229</td>
<td>20.6</td>
<td>229</td>
<td>20.6</td>
<td>1</td>
<td>229</td>
<td>20.6</td>
<td>229</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>96</td>
<td>187</td>
<td>8.72</td>
<td>187</td>
<td>8.70</td>
<td>188</td>
<td>8.67</td>
<td>96</td>
<td>187</td>
<td>8.72</td>
<td>187</td>
</tr>
<tr>
<td>623.xalanchmk_s</td>
<td>96</td>
<td>101</td>
<td>14.0</td>
<td>101</td>
<td>14.0</td>
<td>102</td>
<td>13.8</td>
<td>101</td>
<td>14.0</td>
<td>102</td>
<td>13.8</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>96</td>
<td>104</td>
<td>16.9</td>
<td>104</td>
<td>16.9</td>
<td>104</td>
<td>16.9</td>
<td>104</td>
<td>16.9</td>
<td>104</td>
<td>16.9</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>96</td>
<td>223</td>
<td>6.43</td>
<td>223</td>
<td>6.43</td>
<td>222</td>
<td>6.45</td>
<td>96</td>
<td>223</td>
<td>6.43</td>
<td>223</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>96</td>
<td>299</td>
<td>5.71</td>
<td>298</td>
<td>5.72</td>
<td>299</td>
<td>5.71</td>
<td>1</td>
<td>298</td>
<td>5.72</td>
<td>298</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>96</td>
<td>127</td>
<td>23.1</td>
<td>128</td>
<td>23.0</td>
<td>128</td>
<td>23.0</td>
<td>1</td>
<td>127</td>
<td>23.1</td>
<td>127</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>96</td>
<td>247</td>
<td>25.0</td>
<td>245</td>
<td>25.2</td>
<td>246</td>
<td>25.2</td>
<td>96</td>
<td>245</td>
<td>25.2</td>
<td>246</td>
</tr>
</tbody>
</table>

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

### 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 -1 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.
To enable Transparent Hugepages (THP) for all allocations,
'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR665
2.30 GHz, AMD EPYC 7643

SPECspeed®2017_int_base = 12.4
SPECspeed®2017_int_peak = 12.4

Operating System Notes (Continued)
'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.

Environment Variables Notes
Environment variables set by runcpu before the start of the run:
GOMP_CPU_AFFINITY = "0-191"
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;"
_malloc_conf = "retain:true"
OMP_DYNAMIC = "false"
OMP_SCHEDULE = "static"
OMP_STACKSIZE = "128M"
OMP_THREAD_LIMIT = "192"

Environment variables set by runcpu during the 600.perlbench_s peak run:
GOMP_CPU_AFFINITY = "0"

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

Environment variables set by runcpu during the 605.mcf_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"

Environment variables set by runcpu during the 657.xz_s peak run:
GOMP_CPU_AFFINITY = "0-95"

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.

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR665
2.30 GHz, AMD EPYC 7643

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>12.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_int_peak</td>
<td>12.4</td>
</tr>
</tbody>
</table>

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

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

General Notes (Continued)

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
NUMA nodes per socket set to NPS2

Sysinfo program /home/cpu2017-1.1.5-amd-aocc300-milan-B1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost.localdomain Fri Jun 22 19:15:22 2018

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 7643 48-Core Processor
  2 "physical id"s (chips)
  192 "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 : 48
siblings : 96
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
  32 33 34 35 36 37 40 41 42 43 44 45 48 49 50 51 52 53 56 57 58 59 60 61
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
  32 33 34 35 36 37 40 41 42 43 44 45 48 49 50 51 52 53 56 57 58 59 60 61

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 192
On-line CPU(s) list: 0-191
Thread(s) per core: 2
Core(s) per socket: 48
Socket(s): 2
NUMA node(s): 4

(Continued on next page)
Platform Notes (Continued)

Vendor ID: AuthenticAMD
CPU family: 25
Model: 1
Model name: AMD EPYC 7643 48-Core Processor
Stepping: 1
CPU MHz: 3025.861
CPU max MHz: 2300.0000
CPU min MHz: 1500.0000
BogoMIPS: 4591.70
Virtualization: AMD-V
L1d cache: 32K
L1i cache: 32K
L2 cache: 512K
L3 cache: 32768K
NUMA node0 CPU(s): 0-23,96-119
NUMA node1 CPU(s): 24-47,120-143
NUMA node2 CPU(s): 48-71,144-167
NUMA node3 CPU(s): 72-95,168-191
Flags: fpu vme de pse tsc msr pae mce 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 extapicr cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw
ibs skinit wdt tce topoext perfctr_core perfctr_nb bpref perfctr_l1d mwaitx cpb
cat_l3 cdp_l3 invpcid_single hw_pstate sme ssbd mba sev ibrs ibpb vmmcall
fsqdbase bmi1 avx2 smep bmi2 erva invpcid cqm rdt_a rdseed advclflushopt clwb
sha_ni xsaveopt xsave xgetbv1 xsaveas cgxv槚 cqm_llc cqmoccup_llc cqm_mbm_total
cqm_mbm_local clzero irqperf xsaveepr wbnoinvd amd_ppin arat npt lbv svm_lock
nrip_save tsc_scale vmcb_clean flushbyasid decodeassists pfnf treshold
v_vmsave_vmdload vgif umip pku ospe 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: 4 nodes (0-3)
node 0 cpus: 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
64 65 66 67 68 69 70 71
(Continued on next page)
Platform Notes (Continued)

144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165
166 167
node 2 size: 128813 MB
node 2 free: 128617 MB
node 3 cpus: 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95
168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189
190 191
node 3 size: 128785 MB
node 3 free: 128487 MB
node distances:
node 0 1 2 3
  0: 10 12 32 32
  1: 12 10 32 32
  2: 32 32 10 12
  3: 32 32 12 10

From /proc/meminfo
MemTotal: 528184936 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sbin/tuned-adm active
Current active profile: throughput-performance

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

From /etc/*release* /etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux"
    VERSION="8.3 (Ootpa)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="8.3"
    PLATFORM_ID="platform:el8"
    PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
    ANSI_COLOR="0;31"
  redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
  system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
  system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:
Linux localhost.localdomain 4.18.0-240.e18.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR665
2.30 GHz, AMD EPYC 7643

<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></td>
<td></td>
</tr>
<tr>
<td>Tested by:</td>
<td>Lenovo Global Technology</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SPEC CPU®2017 Integer Speed Result**

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base = 12.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_int_peak = 12.4</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

| 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/swaps 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 Jun 22 19:12

SPEC is set to: /home/cpu2017-1.1.5-amd-aocc300-milan-B1
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 819G 100G 719G 13% /home

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 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)
Lenovo Global Technology
ThinkSystem SR665
2.30 GHz, AMD EPYC 7643

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

SPECspeed®2017_int_base = 12.4
SPECspeed®2017_int_peak = 12.4

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

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.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

### Lenovo Global Technology

ThinkSystem SR665  
2.30 GHz, AMD EPYC 7643

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

**SPECspeed®2017_int_base = 12.4**  
**SPECspeed®2017_int_peak = 12.4**

<table>
<thead>
<tr>
<th>Base Portability Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s: -DSPEC_LINUX_X64 -DSPEC_LP64</td>
</tr>
<tr>
<td>602.gcc_s: -DSPEC_LP64</td>
</tr>
<tr>
<td>605.mcf_s: -DSPEC_LP64</td>
</tr>
<tr>
<td>620.omnetpp_s: -DSPEC_LP64</td>
</tr>
<tr>
<td>623.xalancbmk_s: -DSPEC_LINUX -DSPEC_LP64</td>
</tr>
<tr>
<td>625.x264_s: -DSPEC_LP64</td>
</tr>
<tr>
<td>631.deepsjeng_s: -DSPEC_LP64</td>
</tr>
<tr>
<td>641.leea_s: -DSPEC_LP64</td>
</tr>
<tr>
<td>648.exchange2_s: -DSPEC_LP64</td>
</tr>
<tr>
<td>657.xz_s: -DSPEC_LP64</td>
</tr>
</tbody>
</table>

**Base Optimization Flags**

**C benchmarks:**  
-m64 -mno-adx -mno-sse4a -W1,-allow-multiple-definition  
-W1,-mllvm -W1,-enable-lcmm-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 -finline -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-lcm-vrp -mllvm -reduce-array-computations=3 -z muldefs  
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamlb -ljemalloc  
-llflang -llflangrti

**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 -finline -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 -lamlb -ljemalloc -llflang  
-llflangrti

(Continued on next page)
**SPEC CPU®2017 Integer Speed Result**

**Lenovo Global Technology**

**ThinkSystem SR665**

2.30 GHz, AMD EPYC 7643

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

**SPECspeed®2017_int_base = 12.4**

**SPECspeed®2017_int_peak = 12.4**

### Base Optimization Flags (Continued)

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`

### 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
## Lenovo Global Technology

**ThinkSystem SR665**  
2.30 GHz, AMD EPYC 7643

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

<table>
<thead>
<tr>
<th>Test Sponsor</th>
<th>Tested by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lenovo Global Technology</td>
<td>Lenovo Global Technology</td>
</tr>
</tbody>
</table>

### SPEC CPU®2017 Integer Speed Result

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.4</td>
<td>12.4</td>
</tr>
</tbody>
</table>

### Peak Optimization Flags

**C benchmarks:**

- `-m64 -mno-adx -mno-sse4a -Wl,-allow-multiple-definition`
- `-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 -flto -fstruct-layout=5`
- `-mlllvm -unroll-threshold=50 -fremap-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`
- `-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang`

**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,-mlllvm -Wl,-do-block-reorder=aggressive`
- `-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 -flto`
- `-finline-aggressive -mlllvm -unroll-threshold=100`
- `-flv-function-specialization -mlllvm -enable-licm-vrp`
- `-mlllvm -reroll-loops -mlllvm -aggressive-loop-unswitch`
- `-mlllvm -reduce-array-computations=3`
- `-mlllvm -global-vectorize-slp=true`
- `-mlllvm -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,-mlllvm -Wl,-inline-recursion=4`
- `-Wl,-mlllvm -Wl,-lsr-in-nested-loop -Wl,-mlllvm -Wl,-enable-iv-split`
- `-Wl,-mlllvm -Wl,-function-specialize`
- `-Wl,-mlllvm -Wl,-align-all-nofallthru-blocks=6`
- `-Wl,-mlllvm -Wl,-reduce-array-computations=3 -O3 -march=znver3`
- `-fveclib=AMDLIBM -ffast-math -flto -mlllvm -unroll-aggressive`
- `-mlllvm -unroll-threshold=150 -DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc -lflang`
Lenovo Global Technology
ThinkSystem SR665
2.30 GHz, AMD EPYC 7643

SPECspeed\textsuperscript{\textregistered}2017\_int\_base = 12.4

SPECspeed\textsuperscript{\textregistered}2017\_int\_peak = 12.4

Peak Other Flags

C benchmarks:
-\texttt{-Wno-unused-command-line-argument -Wno-return-type}

C++ benchmarks:
-\texttt{-Wno-unused-command-line-argument -Wno-return-type}

Fortran benchmarks:
-\texttt{-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


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\textsuperscript{\textregistered}2017 v1.1.5 on 2018-06-22 07:15:22-0400.
Originally published on 2021-05-11.