## SPEC CPU®2017 Integer Speed Result

**Lenovo Global Technology**

**ThinkSystem SD650 V2**  
(2.10 GHz, Intel Xeon Gold 5318Y)

**Copyright 2017-2021 Standard Performance Evaluation Corporation**

### Lenovo Global Technology

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Jun-2021  
**Hardware Availability:** Jul-2021  
**Software Availability:** Dec-2020

#### 600-perlbench_s
- 96 Threads
- SPECspeed®2017_int_base = 11.5
- SPECspeed®2017_int_peak = Not Run

### Hardware

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Gold 5318Y</td>
</tr>
<tr>
<td>Max MHz</td>
<td>3400</td>
</tr>
<tr>
<td>Nominal</td>
<td>2100</td>
</tr>
<tr>
<td>Enabled</td>
<td>48 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable</td>
<td>2 chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KBI + 48 KB D on chip per core</td>
</tr>
<tr>
<td>Cache L2</td>
<td>1.25 MB I+D on chip per core</td>
</tr>
<tr>
<td>Cache L3</td>
<td>36 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R, running at 2933)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x 480 GB SATA SSD</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>Red Hat Enterprise Linux 8.3</td>
</tr>
<tr>
<td></td>
<td>(Ootpa)</td>
</tr>
<tr>
<td>Kernel</td>
<td>4.18.0-240.el8.x86_64</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/C++, Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux; Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux;</td>
</tr>
<tr>
<td>Parallel</td>
<td>Yes</td>
</tr>
<tr>
<td>Firmware</td>
<td>Lenovo BIOS Version U8E111A 1.02 released May-2021</td>
</tr>
<tr>
<td>File System</td>
<td>xfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Other</td>
<td>jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Power Management</td>
<td>BIOS and OS set to prefer performance at the cost of additional power usage</td>
</tr>
</tbody>
</table>

---
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---

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>96</td>
<td>255</td>
<td>6.96</td>
<td><strong>255</strong></td>
<td>6.96</td>
<td><strong>254</strong></td>
<td>6.98</td>
<td></td>
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<tr>
<td>602.gcc_s</td>
<td>96</td>
<td>384</td>
<td>10.4</td>
<td>390</td>
<td>10.2</td>
<td><strong>385</strong></td>
<td>10.3</td>
<td></td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>96</td>
<td>252</td>
<td>18.7</td>
<td>253</td>
<td>18.7</td>
<td><strong>252</strong></td>
<td>18.7</td>
<td></td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>96</td>
<td>146</td>
<td>11.1</td>
<td>148</td>
<td>11.1</td>
<td>146</td>
<td>11.2</td>
<td></td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>96</td>
<td><strong>107</strong></td>
<td>13.2</td>
<td>108</td>
<td>13.2</td>
<td>107</td>
<td>13.2</td>
<td></td>
</tr>
<tr>
<td>625.x264_s</td>
<td>96</td>
<td>106</td>
<td>16.7</td>
<td><strong>106</strong></td>
<td>16.7</td>
<td>106</td>
<td>16.7</td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>96</td>
<td><strong>253</strong></td>
<td>5.67</td>
<td>253</td>
<td>5.67</td>
<td>253</td>
<td>5.66</td>
<td></td>
</tr>
<tr>
<td>641.leela_s</td>
<td>96</td>
<td><strong>368</strong></td>
<td>4.63</td>
<td>369</td>
<td>4.63</td>
<td>368</td>
<td>4.63</td>
<td></td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>96</td>
<td><strong>150</strong></td>
<td>19.6</td>
<td>150</td>
<td>19.5</td>
<td>150</td>
<td>19.6</td>
<td></td>
</tr>
<tr>
<td>657.xz_s</td>
<td>96</td>
<td><strong>269</strong></td>
<td>23.0</td>
<td>269</td>
<td>23.0</td>
<td>269</td>
<td>23.0</td>
<td></td>
</tr>
</tbody>
</table>

**SPECspeed®2017_int_base = 11.5**  
**SPECspeed®2017_int_peak = Not Run**

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

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### Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

---

### Environment Variables Notes

Environment variables set by runcpu before the start of the run:
- KMP_AFFINITY = "granularity=fine,scatter"
- LD_LIBRARY_PATH = 
  
"/home/cpu2017-1.1.8-ic2021.1-revB/lib/intel64:/home/cpu2017-1.1.8-ic2021.1-revB/je5.0.1-64"
- MALLOC_CONF = "retain:true"
- OMP_STACKSIZE = "192M"

---

### General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0  
Transparent Huge Pages enabled by default  
Prior to runcpu invocation  
Filesystem page cache synced and cleared with:  
  sync; echo 3 > /proc/sys/vm/drop_caches

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.

(Continued on next page)
**SPEC CPU®2017 Integer Speed Result**  
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</tr>
</tbody>
</table>

**CPU2017 License:** 9017  
**Test Date:** Jun-2021

**CPU2017 License:** 9017  
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### General Notes (Continued)

jemalloc, a general purpose malloc implementation  
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5  

---

### Platform Notes

**BIOS configuration:**  
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode  
C-States set to Autonomous  
CPU P-state Control set to Autonomous

**Sysinfo program**  
/home/cpu2017-1.1.8-ic2021.1-revB/bin/sysinfo  
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafec64d  
running on localhost.localdomain Wed Jun 30 14:32:17 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 : Intel(R) Xeon(R) Gold 5318Y CPU @ 2.10GHz  
  2 "physical id"s (chips)  
  96 "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 : 24  
    siblings : 48  
    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  
    physical 1: 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
```

From lscpu from util-linux 2.32.1:  
**Architecture:** x86_64  
**CPU op-mode(s):** 32-bit, 64-bit  
**Byte Order:** Little Endian  
**CPU(s):** 96

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(Continued on next page)
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SPECspeed®2017_int_base = 11.5
SPECspeed®2017_int_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Jun-2021
Hardware Availability: Jul-2021
Tested by: Lenovo Global Technology
Software Availability: Dec-2020

Platform Notes (Continued)

BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 36864K
NUMA node0 CPU(s): 0-23,48-71
NUMA node1 CPU(s): 24-47,72-95
Flags: fpu vme de pse tsc msr pae mce cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmon perf pni pclmulqdq dtes64 monitor ds cpl cpuollo smx est tm2 ssse3 sdbg fma cx16
xtrp pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 invpcid_single
intel_pinn ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmni fxsactivity ept
vpid ept_ad fsgsgbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cqm rdt_a
avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni
avx512bw avx512vl xsaveopt xsave env xsavec xsaveopt xsaves cqm_llc cqm_occup_llc cqm_mbm_total
cqm_mbm_local split_lock_detect wbnoinvd dtherm ida arat pln pts hwp epp avx512v bmi
umip pku ospke avx512_vbmi2 gfi vaes vpcmldqavx512 vnni avx512 bitalg tme
avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities

/proc/cpuinfo cache data
  cache size: 36864 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 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 48 49 50 51
  52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71
  node 0 size: 243258 MB
  node 0 free: 256172 MB
  node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 72
  73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95
  node 1 size: 243662 MB
  node 1 free: 256758 MB

/node distances:
  node 0: 10 20
  node 1: 20 10

From /proc/meminfo
  MemTotal: 528000292 KB
  HugePages_Total: 0
  Hugepagesize: 2048 KB

/sbin/tuned-adm active

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Platform Notes (Continued)

No current active profile.

/usr/bin/lsb_release -d
Red Hat Enterprise Linux release 8.3 (Ootpa)

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.el8.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:

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: userscopy/swaps
   barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB:
   conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Jun 30 10:38

SPEC is set to: /home/cpu2017-1.1.8-ic2021.1-revB
   Filesystem Type Size Used Avail Use% Mounted on
   /dev/sda4 xfs 372G 125G 247G 34% /home

From /sys/devices/virtual/dmi/id

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

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<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>Test Date:</th>
<th>Test Sponsor:</th>
<th>Hardware Availability:</th>
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<tbody>
<tr>
<td>9017</td>
<td>Jun-2021</td>
<td>Lenovo Global Technology</td>
<td>Jul-2021</td>
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</tbody>
</table>

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<thead>
<tr>
<th>Tested by:</th>
<th>Software Availability:</th>
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<tbody>
<tr>
<td>Lenovo Global Technology</td>
<td>Dec-2020</td>
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</table>

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base =</th>
<th>SPECspeed®2017_int_peak =</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.5</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

#### Platform Notes (Continued)

Vendor: Lenovo  
Product: ThinkSystem SD650 V2  
Product Family: ThinkSystem  
Serial: 1234567890

Additional information from `dmidecode` 3.2 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, configured at 2933

BIOS:  
BIOS Vendor: Lenovo  
BIOS Version: U8E111A-1.02  
BIOS Date: 05/07/2021  
BIOS Revision: 1.2  
Firmware Revision: 1.40

(End of data from sysinfo program)

#### Compiler Version Notes

```plaintext
C       | 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base)  
| 625.x264_s(base) 657.xz_s(base)  

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  

C++     | 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)  
| 641.leela_s(base)  

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  

Fortran | 648.exchange2_s(base)  

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
```

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<th>Jun-2021</th>
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<tbody>
<tr>
<td>Test Sponsor: Lenovo Global Technology</td>
<td>Hardware Availability: Jul-2021</td>
<td></td>
</tr>
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<td>Tested by: Lenovo Global Technology</td>
<td>Software Availability: Dec-2020</td>
<td></td>
</tr>
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<td></td>
</tr>
</tbody>
</table>

Compiler Version Notes (Continued)

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---------------------------------------------

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
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

Base Optimization Flags

C benchmarks:
-DSPEC_OPENMP -std=c11 -m64 -fiopenmp -Wl,-z,muldefs -xCORE-AVX2
-O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:
-DSPEC_OPENMP -m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin/
-lqkmalloc

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Base Optimization Flags (Continued)

Fortran benchmarks:
-m64 -xCORE-AVX2 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries

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-ICElake-E.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-ICElake-E.xml
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml

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Tested with SPEC CPU®2017 v1.1.8 on 2021-06-30 02:32:16-0400.
Originally published on 2021-07-20.