## Lenovo Global Technology

### SPEC CPU®2017 Integer Speed Result

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**Lenovo Global Technology**

ThinkSystem ST650 V2  
(2.10 GHz, Intel Xeon Gold 5318Y)

**SPECspeed®2017_int_base = 11.5**

**SPECspeed®2017_int_peak = Not Run**

**Lenovo Global Technology**

**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Hardware Availability:** Jul-2021  
**Software Availability:** Dec-2020

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Value</th>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>7.03</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>10.3</td>
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<tr>
<td>605.mcf_s</td>
<td>18.9</td>
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<td>620.omnetpp_s</td>
<td>11.2</td>
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<tr>
<td>623.xmlarchmk_s</td>
<td>13.2</td>
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<tr>
<td>625.x264_s</td>
<td>16.6</td>
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<tr>
<td>631.deepsjeng_s</td>
<td>5.75</td>
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<tr>
<td>641.leela_s</td>
<td>4.72</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>18.8</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>23.0</td>
</tr>
</tbody>
</table>

### Hardware

**CPU Name:** Intel Xeon Gold 5318Y  
**Max MHz:** 3400  
**Nominal:** 2100  
**Enabled:** 48 cores, 2 chips, 2 threads/core  
**Orderable:** 1.2 chips  
**Cache L1:** 32 KB I + 48 KB D on chip per core  
**L2:** 1.25 MB I+D on chip per core  
**L3:** 36 MB I+D on chip per chip  
**Other:** None  
**Memory:** 1 TB (32 x 32 GB 2Rx8 PC4-3200AA-R, running at 2933)  
**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++, 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  
**Parallel:** Yes  
**Firmware:** Lenovo BIOS Version U8E111A 1.02 released May-2021  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** Not Applicable  
**Other:** jemalloc memory allocator V5.0.1  
**Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage
### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Base Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base Seconds</th>
<th>Ratio</th>
<th>Peak Seconds</th>
<th>Ratio</th>
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<td>157</td>
<td>18.8</td>
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<tr>
<td>657.xz_s</td>
<td>96</td>
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<td>23.0</td>
<td>269</td>
<td>23.0</td>
</tr>
</tbody>
</table>

**SPECspeed**\(^{\text{2017}}\)\_int\_base = 11.5

**SPECspeed**\(^{\text{2017}}\)\_int\_peak = Not Run

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

### 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-ic202
  
  
  1.1-revB/je5.0.1-64"
- **MALLOCONF** = "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
```

```
/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)
Lenovo Global Technology
ThinkSystem ST650 V2
(2.10 GHz, Intel Xeon Gold 5318Y)

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

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

Test Date: Jul-2021
Hardware Availability: Jul-2021
Software Availability: Dec-2020

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 Legacy

Sysinfo program /home/cpu2017-1.1.8-ic2021.1-revB/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acfc64d
running on localhost.localdomain Fri Jul 23 21:26:31 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
On-line CPU(s) list: 0-95
Thread(s) per core: 2
Core(s) per socket: 24
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 5318Y CPU @ 2.10GHz
Stepping: 6
CPU MHz: 1834.740
BogoMIPS: 4200.00

(Continued on next page)
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**SPECSpeed®2017_int_base = 11.5**

**SPECSpeed®2017_int_peak = Not Run**

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### Platform Notes (Continued)

- **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 mca 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 aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtrpr pdcm pcd dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 invpcid_single intel_pinn ssbd mba ibrs ibpb stibp ibrs-enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad fs.gsbase 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 xsaves xsavec xgetbv1 xsavec cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbb_local split_lock Detect wbnoinvd dtherm ida arat pln pts avx512vmbmi umip pku ospke avx512_vmbmi2 gfi i vaes vpclmulqdq avx512_vnni avx512_vbitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities

```bash
# /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: 486529 MB
  node 0 free: 515063 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 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 1 size: 485718 MB
  node 1 free: 515159 MB
  node distances:
    node 0 1
      0: 10 20
      1: 20 10

From /proc/meminfo
  MemTotal: 1056481820 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB
```

/sbin/tuned-adm active
  Current active profile: balanced

(Continued on next page)
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</tr>
</tbody>
</table>

---

**Platform Notes (Continued)**

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

```bash
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: usercopy/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 Jul 23 21:26

SPEC is set to: /home/cpu2017-1.1.8-ic2021.1-revB

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda4</td>
<td>xfs</td>
<td>818G</td>
<td>108G</td>
<td>710G</td>
<td>14%</td>
<td>/home</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id

```bash
Vendor: Lenovo
Product: ThinkSystem ST650V2
Product Family: ThinkSystem
Serial: 1234567890
```

(Continued on next page)
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Platform Notes (Continued)

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:
32x Samsung M393A4G43AB3-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

==============================================================================
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
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
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---

#### Base Compiler Invocation

- **C benchmarks:** icx
- **C++ benchmarks:** icpx
- **Fortran benchmarks:** ifort

---

#### Base Portability Flags

- perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
- gcc_s: -DSPEC_LP64
- mcf_s: -DSPEC_LP64
- omnetpp_s: -DSPEC_LP64
- xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
- x264_s: -DSPEC_LP64
- deepsjeng_s: -DSPEC_LP64
- leela_s: -DSPEC_LP64
- exchange2_s: -DSPEC_LP64
- xz_s: -DSPEC_LP64

---

#### Base Optimization Flags

- **C benchmarks:**
  - -DSPEC_OPENMP -std=c11 -m64 -fipopenmp -Wl,-z,muldefs -xCORE-AVX512
  - -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-AVX512 -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

- **Fortran benchmarks:**
  - -m64 -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
  - -nostandard-realloc-lhs -align array32byte -auto
  - -mbranches-within-32B-boundaries
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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-F.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-F.xml  
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.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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