# SPEC CPU®2017 Integer Speed Result

## Lenovo Global Technology

**ThinkSystem SR850**  
(2.70 GHz, Intel Xeon Platinum 8280)

**SPECspeed®2017_int_base = 10.7**  
**SPECspeed®2017_int_peak = Not Run**

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_int_base (10.7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>6.99</td>
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<tr>
<td>2.00</td>
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<td>4.00</td>
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<tr>
<td>10.0</td>
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<tr>
<td>12.0</td>
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<td>14.0</td>
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<td>16.0</td>
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<td>26.0</td>
<td></td>
</tr>
<tr>
<td>26.0</td>
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</tr>
</tbody>
</table>

## Hardware

**CPU Name:** Intel Xeon Platinum 8280  
**Max MHz:** 4000  
**Nominal:** 2700  
**Enabled:** 112 cores, 4 chips  
**Orderable:** 2.4 chips  
**Cache L1:** 32 KB I + 32 KB D on chip per core  
**L2:** 1 MB I+D on chip per core  
**L3:** 38.5 MB I+D on chip per chip  
**Other:** None  
**Memory:** 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R)  
**Storage:** 1 x 800 GB SATA SSD  
**Other:** None

## Software

**OS:** SUSE Linux Enterprise Server 12 SP4 (x86_64)  
**Kernel:** 4.12.14-94.41-default  
**Compiler:**  
C/C++: Version 19.0.4.227 of Intel  
C/C++: Compiler for Linux;  
**Fortran:** Version 19.0.4.227 of Intel Fortran  
**Compiler for Linux:**  
**Parallel:** Yes  
**Firmware:** Lenovo BIOS Version TEE142E 2.30 released Aug-2019 tested as TEE141E 2.30 Jul-2019  
**File System:** btrfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** Not Applicable  
**Other:** jemalloc memory allocator V5.0.1  
**Power Management:** --
Lenovo Global Technology
ThinkSystem SR850
(2.70 GHz, Intel Xeon Platinum 8280)

**SPEC®2017_int_base = 10.7**
**SPEC®2017_int_peak = Not Run**

<table>
<thead>
<tr>
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<th>Ratio</th>
<th>Seconds</th>
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<td>12.7</td>
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<td>17.6</td>
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<td>657.xz_s</td>
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<td>242</td>
<td>25.6</td>
<td>242</td>
<td>25.5</td>
</tr>
</tbody>
</table>

**Operating System Notes**

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

**General Notes**

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19.0u4/lib/intel64"
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19.0u4/je5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i9-799X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
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.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3640 (Spectre variant 3a)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3639 (Spectre variant 4)
is mitigated in the system as tested and documented.

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

(Continued on next page)
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SPEC®2017_int_base = 10.7
SPEC®2017_int_peak = Not Run

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

Test Date: Aug-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

General Notes (Continued)

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set to Custom Mode
C-States set to Legacy
Trusted Execution Technology set to Enable
Hyper-Threading set to Disable

Sysinfo program /home/cpu2017-1.0.5-ic19.0u4/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-9o83 Thu Aug 29 20:52:07 2019

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) Platinum 8280 CPU @ 2.70GHz
  4 "physical id"s (chips)
  112 "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 : 28
siblings : 28
  physical 0: cores  0  1  2  3  4  5  6  8  9  10  11  12  13  14  16  17  18  19  20  21  22  24  25  26  27
            28  29  30
  physical 1: cores  0  1  2  3  4  5  6  8  9  10  11  12  13  14  16  17  18  19  20  21  22  24  25  26  27
            28  29  30
  physical 2: cores  0  1  2  3  4  5  6  8  9  10  11  12  13  14  16  17  18  19  20  21  22  24  25  26  27
            28  29  30
  physical 3: cores  0  1  2  3  4  5  6  8  9  10  11  12  13  14  16  17  18  19  20  21  22  24  25  26  27
            28  29  30

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 112
On-line CPU(s) list: 0-111
Thread(s) per core: 1
Core(s) per socket: 28
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel

(Continued on next page)
## Platform Notes (Continued)

```plaintext
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8280 CPU @ 2.70GHz
Stepping: 6
CPU MHz: 2700.000
CPU max MHz: 4000.0000
CPU min MHz: 1000.0000
BogoMIPS: 5400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 39424K
NUMA node0 CPU(s): 0-27
NUMA node1 CPU(s): 28-55
NUMA node2 CPU(s): 56-83
NUMA node3 CPU(s): 84-111
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc arch_perfmon pebs bts rep_good nopl x87nop mmxset nonstop_ts cpuid
aperfmpref pni pclmulqdq dtes64 monitor ds_cpl tsc刨intr mou nonstop_tsc cpuid
ap rngperf pni pclmulqdq dtes64 monitor ds_cpl tsc刨intr mou nonstop_tsc cpuid
ap rngperf pni pclmulqdq dtes64 monitor ds_cpl tsc刨intr mou nonstop_tsc cpuid
```

/proc/cpuinfo cache data

```plaintext
cache size : 39424 KB
```

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

```plaintext
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
node 0 size: 386660 MB
node 0 free: 386174 MB
node 1 cpus: 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
node 1 size: 387027 MB
node 1 free: 386816 MB
node 2 cpus: 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
node 2 size: 387056 MB
node 2 free: 385772 MB
node 3 cpus: 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105
```

(Continued on next page)
Platform Notes (Continued)

106 107 108 109 110 111 112
node 3 size: 387053 MB
node 3 free: 386854 MB
node distances:
node 0 1 2 3
 0: 10 21 21 31
 1: 21 10 31 21
 2: 21 31 10 21
 3: 31 21 21 10

From /proc/meminfo
MemTotal: 1584944892 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 4
  # This file is deprecated and will be removed in a future service pack or release.
  # Please check /etc/os-release for details about this release.
  os-release:
    NAME="SLES"
    VERSION="12-SP4"
    VERSION_ID="12.4"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12:sp4"

uname -a:
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2017-5754 (Meltdown): Not affected
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

run-level 3 Aug 29 18:11

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u4

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda2      btrfs  744G 134G 609G  19% /home
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Platform Notes (Continued)

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.

BIOS Lenovo -[TEE141E-2.30]- 07/02/2019
Memory:
48x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(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) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

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

C++

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

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

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

Fortran

| 648.exchange2_s(base) |
-------------------------------------------------------------------------------

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

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

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

(Continued on next page)
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### Base Compiler Invocation (Continued)

**C++ benchmarks:**  
icpc -m64

**Fortran benchmarks:**  
ifort -m64

### 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:**  
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP  
-1/usr/local/je5.0.1-64/lib -1jemalloc

**C++ benchmarks:**  
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4  
-1/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64  
-1qkmalloc

**Fortran benchmarks:**  
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4  
-nostandard-realloc-1hs

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-CLX-D.html](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-D.html)
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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-CLX-D.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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