



# SPEC® CPU2017 Integer Speed Result

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## Lenovo Global Technology

SPECspeed2017\_int\_base = 9.87

ThinkSystem SR650  
(2.70 GHz, Intel Xeon Platinum 8280)

SPECspeed2017\_int\_peak = Not Run

CPU2017 License: 9017

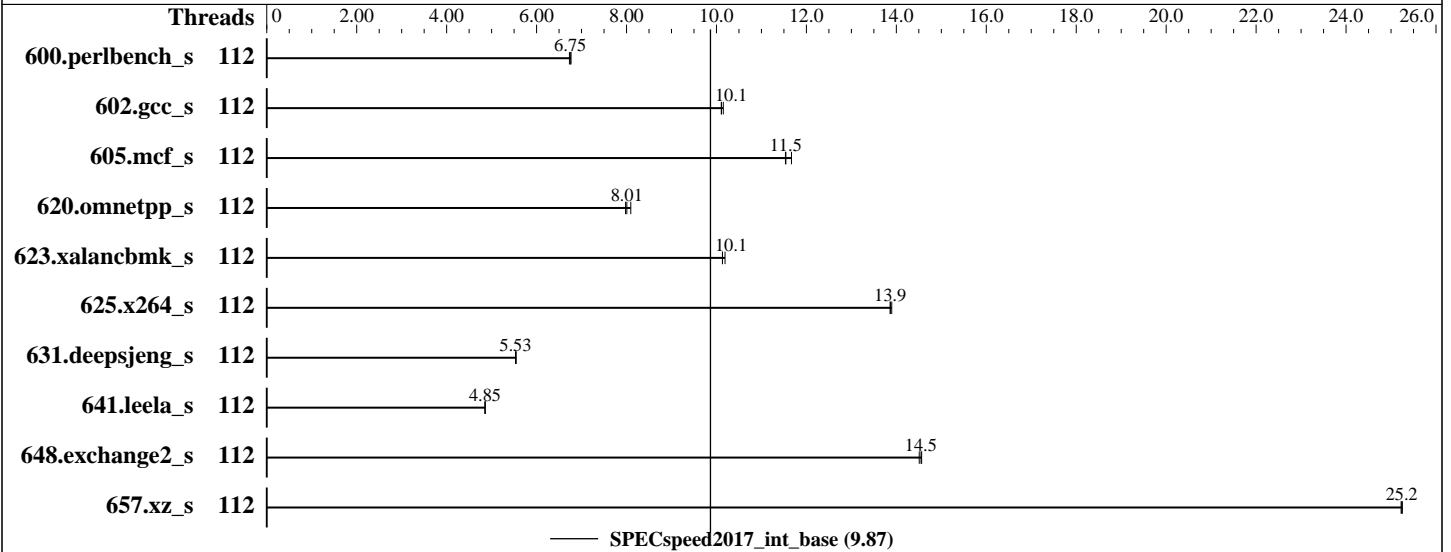
Test Date: Mar-2019

Test Sponsor: Lenovo Global Technology

Hardware Availability: Apr-2019

Tested by: Lenovo Global Technology

Software Availability: Oct-2018



### Hardware

CPU Name: Intel Xeon Platinum 8280  
 Max MHz.: 4000  
 Nominal: 2700  
 Enabled: 56 cores, 2 chips, 2 threads/core  
 Orderable: 1,2 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: 768 GB (24 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 19.0.0.117 of Intel C/C++  
 Compiler for Linux;  
 Fortran: Version 19.0.0.117 of Intel Fortran  
 Compiler for Linux  
 Parallel: Yes  
 Firmware: Lenovo BIOS Version IVE135K 2.10 released Jan-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



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## Results Table

| Benchmark       | Base    |                   |                    |                   |                    |                   |                    |         | Peak    |       |         |       |         |       |  |  |
|-----------------|---------|-------------------|--------------------|-------------------|--------------------|-------------------|--------------------|---------|---------|-------|---------|-------|---------|-------|--|--|
|                 | Threads | Seconds           | Ratio              | Seconds           | Ratio              | Seconds           | Ratio              | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |  |  |
| 600.perlbench_s | 112     | 262               | 6.77               | <b><u>263</u></b> | <b><u>6.75</u></b> | 264               | 6.73               |         |         |       |         |       |         |       |  |  |
| 602.gcc_s       | 112     | 394               | 10.1               | <b><u>394</u></b> | <b><u>10.1</u></b> | 392               | 10.2               |         |         |       |         |       |         |       |  |  |
| 605.mcf_s       | 112     | <b><u>409</u></b> | <b><u>11.5</u></b> | 405               | 11.7               | 409               | 11.5               |         |         |       |         |       |         |       |  |  |
| 620.omnetpp_s   | 112     | 204               | 7.98               | 201               | 8.09               | <b><u>204</u></b> | <b><u>8.01</u></b> |         |         |       |         |       |         |       |  |  |
| 623.xalancbmk_s | 112     | 139               | 10.2               | <b><u>140</u></b> | <b><u>10.1</u></b> | 140               | 10.1               |         |         |       |         |       |         |       |  |  |
| 625.x264_s      | 112     | 127               | 13.9               | 127               | 13.9               | <b><u>127</u></b> | <b><u>13.9</u></b> |         |         |       |         |       |         |       |  |  |
| 631.deepsjeng_s | 112     | <b><u>259</u></b> | <b><u>5.53</u></b> | 258               | 5.55               | 259               | 5.53               |         |         |       |         |       |         |       |  |  |
| 641.leela_s     | 112     | <b><u>351</u></b> | <b><u>4.85</u></b> | 351               | 4.86               | 351               | 4.85               |         |         |       |         |       |         |       |  |  |
| 648.exchange2_s | 112     | <b><u>202</u></b> | <b><u>14.5</u></b> | 202               | 14.6               | 203               | 14.5               |         |         |       |         |       |         |       |  |  |
| 657.xz_s        | 112     | 245               | 25.2               | <b><u>245</u></b> | <b><u>25.2</u></b> | 245               | 25.3               |         |         |       |         |       |         |       |  |  |

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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"

## 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/lib/ia32:/home/cpu2017-1.0.5-ic19/lib/intel64"  
LD\_LIBRARY\_PATH = "\$LD\_LIBRARY\_PATH:/home/cpu2017-1.0.5-ic19/je5.0.1-32:/home/cpu2017-1.0.5-ic19/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

Yes: 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

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### General Notes (Continued)

built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5  
sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

### Platform Notes

BIOS configuration:

Choose Operating Mode set to Maximum Performance

Choose Operating Mode set to Custom Mode

C-states set to Legacy

    Sysinfo program /home/cpu2017-1.0.5-ic19/bin/sysinfo

    Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9

    running on linux-nr46 Sun Mar 17 14:39:35 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

    2 "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 : 56

    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

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: 2

Core(s) per socket: 28

Socket(s): 2

NUMA node(s): 2

Vendor ID: GenuineIntel

CPU family: 6

Model: 85

Model name: Intel(R) Xeon(R) Platinum 8280 CPU @ 2.70GHz

Stepping: 6

CPU MHz: 2700.000

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### Platform Notes (Continued)

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): 0-27,56-83

NUMA node1 CPU(s): 28-55,84-111

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 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 xtpr pdcm pcid 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 cdp\_l3 invpcid\_single ssbd mba ibrs ibpb stibp tpr\_shadow vnmi flexpriority ept vpid fsgsbase tsc\_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt\_a avx512f avx512dq rdseed adx smap clflushopt clwb intel\_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm\_llc cqm\_occup\_llc cqm\_mbm\_total cqm\_mbm\_local dtherm ida arat pln pts pku ospke avx512\_vnni flush\_lld arch\_capabilities

```
/proc/cpuinfo cache data
cache size : 39424 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 24 25 26 27
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 81 82 83
node 0 size: 386563 MB
node 0 free: 385227 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
53 54 55 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106
107 108 109 110 111
node 1 size: 387038 MB
node 1 free: 386577 MB
node distances:
node 0 1
0: 10 21
1: 21 10
```

```
From /proc/meminfo
MemTotal: 792168472 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

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### Platform Notes (Continued)

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:

Linux linux-nr46 4.12.14-94.41-default #1 SMP Wed Oct 31 12:25:04 UTC 2018 (3090901)  
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 Mar 17 14:36

SPEC is set to: /home/cpu2017-1.0.5-ic19

| Filesystem | Type  | Size | Used | Avail | Use% | Mounted on |
|------------|-------|------|------|-------|------|------------|
| /dev/sdb2  | btrfs | 744G | 23G  | 721G  | 4%   | /home      |

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 -[IVE135K-2.10]- 01/04/2019

Memory:

24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)



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## Compiler Version Notes

=====  
CC 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 19.0.0.117 Build 20180804  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
-----

=====  
CXXC 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 19.0.0.117 Build 20180804  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
-----

=====  
FC 648.exchange2\_s(base)  
=====

-----  
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.0.0.117 Build 20180804  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
-----

## Base Compiler Invocation

C benchmarks:

icc -m64 -std=c11

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

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## Base Portability Flags (Continued)

```
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-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

C++ benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc
```

Fortran benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/Intel-ic19.0-official-linux64.2019-01-15.html>

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-A.2019-04-02.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2017/flags/Intel-ic19.0-official-linux64.2019-01-15.xml>

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-A.2019-04-02.xml>

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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