



# SPEC CPU®2017 Integer Rate Result

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## Lenovo Global Technology

SPECrate®2017\_int\_base = 673

ThinkSystem SR850P  
(2.70 GHz, Intel Xeon Platinum 8270)

SPECrate®2017\_int\_peak = Not Run

CPU2017 License: 9017

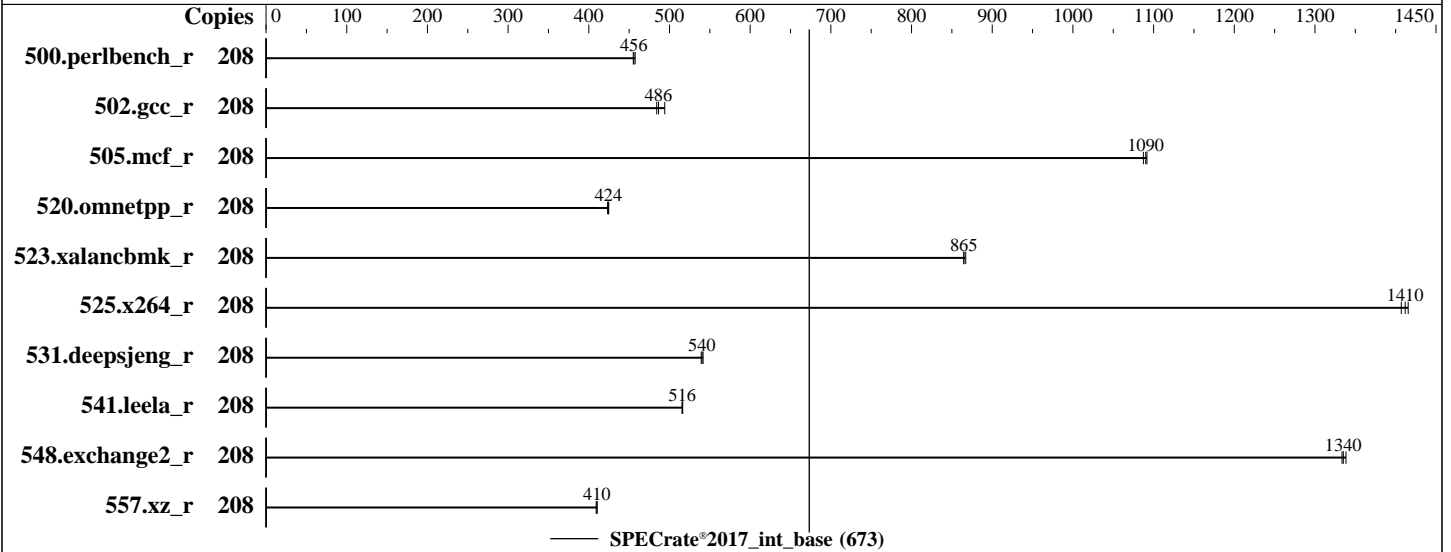
Test Date: Sep-2020

Test Sponsor: Lenovo Global Technology

Hardware Availability: Jun-2020

Tested by: Lenovo Global Technology

Software Availability: Apr-2020



### Hardware

CPU Name: Intel Xeon Platinum 8270  
 Max MHz: 4000  
 Nominal: 2700  
 Enabled: 104 cores, 4 chips, 2 threads/core  
 Orderable: 4 chips  
 Cache L1: 32 KB I + 32 KB D on chip per core  
 L2: 1 MB I+D on chip per core  
 L3: 35.75 MB I+D on chip per chip  
 Other: None  
 Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R)  
 Storage: 1 x 960 GB SATA SSD  
 Other: None

### Software

OS: SUSE Linux Enterprise Server 15 SP1 (x86\_64)  
 Kernel 4.12.14-195-default  
 Compiler: C/C++: Version 19.1.1.217 of Intel C/C++  
 Compiler for Linux;  
 Fortran: Version 19.1.1.217 of Intel Fortran  
 Compiler for Linux  
 Parallel: No  
 Firmware: Lenovo BIOS Version TEE156L 2.61 released May-2020  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 Other: None  
 Power Management: BIOS set to prefer performance at the cost of additional power usage



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## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	208	<b>726</b>	<b>456</b>	724	457	728	455							
502.gcc_r	208	596	494	608	484	<b>606</b>	<b>486</b>							
505.mcf_r	208	<b>308</b>	<b>1090</b>	308	1090	309	1090							
520.omnetpp_r	208	645	423	<b>643</b>	<b>424</b>	643	425							
523.xalancbmk_r	208	<b>254</b>	<b>865</b>	254	865	253	867							
525.x264_r	208	257	1420	259	1410	<b>258</b>	<b>1410</b>							
531.deepsjeng_r	208	<b>441</b>	<b>540</b>	442	539	440	542							
541.leela_r	208	<b>668</b>	<b>516</b>	667	516	668	516							
548.exchange2_r	208	407	1340	<b>408</b>	<b>1340</b>	409	1330							
557.xz_r	208	548	410	<b>548</b>	<b>410</b>	549	409							

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

## Compiler Notes

The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler. The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux  
The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

## Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

## 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:  
LD\_LIBRARY\_PATH =  
"/home/cpu2017-1.1.0-ic19.1.1/lib/intel64:/home/cpu2017-1.1.0-ic19.1.1/lib/ia32:/home/cpu2017-1.1.0-ic19.1.1/je5.0.1-32"  
MALLOCONF = "retain:true"



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### 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
```

runcpu command invoked through numactl i.e.:

```
numactl --interleave=all runcpu <etc>
```

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.

### Platform Notes

BIOS configuration:

Choose Operating Mode set to Maximum Performance and then set it to Custom Mode

MONITOR/MWAIT set to Enable

CPU P-state Control set to legacy

Adjacent Cache Prefetch set to Disable

DCU Streamer Prefetcher set to Disable

SNC set to Enable

```
Sysinfo program /home/cpu2017-1.1.0-ic19.1.1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011
running on linux-qjkl Thu Sep 3 05:38:06 2020
```

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 8270 CPU @ 2.70GHz
```

```
4 "physical id"s (chips)
```

```
208 "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 : 26
```

```
siblings : 52
```

```
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28
29
```

```
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28
29
```

```
physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28
```

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### Platform Notes (Continued)

29  
physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28  
29

From lscpu:

```

Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:             Little Endian
Address sizes:          46 bits physical, 48 bits virtual
CPU(s):                 208
On-line CPU(s) list:   0-207
Thread(s) per core:    2
Core(s) per socket:    26
Socket(s):              4
NUMA node(s):          8
Vendor ID:              GenuineIntel
CPU family:             6
Model:                  85
Model name:             Intel(R) Xeon(R) Platinum 8270 CPU @ 2.70GHz
Stepping:               7
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:               36608K
NUMA node0 CPU(s):     0-3,7-9,13-15,20-22,104-107,111-113,117-119,124-126
NUMA node1 CPU(s):     4-6,10-12,16-19,23-25,108-110,114-116,120-123,127-129
NUMA node2 CPU(s):     26-29,33-35,39-41,46-48,130-133,137-139,143-145,150-152
NUMA node3 CPU(s):     30-32,36-38,42-45,49-51,134-136,140-142,146-149,153-155
NUMA node4 CPU(s):     52-55,59-61,65-67,72-74,156-159,163-165,169-171,176-178
NUMA node5 CPU(s):     56-58,62-64,68-71,75-77,160-162,166-168,172-175,179-181
NUMA node6 CPU(s):     78-81,85-87,91-93,98-100,182-185,189-191,195-197,202-204
NUMA node7 CPU(s):     82-84,88-90,94-97,101-103,186-188,192-194,198-201,205-207
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
aperfmpperf 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 fl6c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced 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

```

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### Platform Notes (Continued)

cqm\_mbm\_local dtherm ida arat pln pts pku ospke avx512\_vnni md\_clear flush\_llid arch\_capabilities

/proc/cpuinfo cache data  
cache size : 36608 KB

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

```

available: 8 nodes (0-7)
node 0 cpus: 0 1 2 3 7 8 9 13 14 15 20 21 22 104 105 106 107 111 112 113 117 118 119
124 125 126
node 0 size: 193147 MB
node 0 free: 192546 MB
node 1 cpus: 4 5 6 10 11 12 16 17 18 19 23 24 25 108 109 110 114 115 116 120 121 122
123 127 128 129
node 1 size: 193530 MB
node 1 free: 193131 MB
node 2 cpus: 26 27 28 29 33 34 35 39 40 41 46 47 48 130 131 132 133 137 138 139 143 144
145 150 151 152
node 2 size: 193530 MB
node 2 free: 193182 MB
node 3 cpus: 30 31 32 36 37 38 42 43 44 45 49 50 51 134 135 136 140 141 142 146 147 148
149 153 154 155
node 3 size: 193530 MB
node 3 free: 193185 MB
node 4 cpus: 52 53 54 55 59 60 61 65 66 67 72 73 74 156 157 158 159 163 164 165 169 170
171 176 177 178
node 4 size: 193530 MB
node 4 free: 193173 MB
node 5 cpus: 56 57 58 62 63 64 68 69 70 71 75 76 77 160 161 162 166 167 168 172 173 174
175 179 180 181
node 5 size: 193530 MB
node 5 free: 193184 MB
node 6 cpus: 78 79 80 81 85 86 87 91 92 93 98 99 100 182 183 184 185 189 190 191 195
196 197 202 203 204
node 6 size: 193501 MB
node 6 free: 193147 MB
node 7 cpus: 82 83 84 88 89 90 94 95 96 97 101 102 103 186 187 188 192 193 194 198 199
200 201 205 206 207
node 7 size: 193528 MB
node 7 free: 192922 MB
node distances:
node 0 1 2 3 4 5 6 7
0: 10 11 21 21 21 21 21 21
1: 11 10 21 21 21 21 21 21
2: 21 21 10 11 21 21 21 21
3: 21 21 11 10 21 21 21 21

```

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### Platform Notes (Continued)

4:	21	21	21	21	10	11	21	21
5:	21	21	21	21	11	10	21	21
6:	21	21	21	21	21	21	10	11
7:	21	21	21	21	21	21	11	10

From /proc/meminfo

```
MemTotal:      1584979960 kB
HugePages_Total:      0
Hugepagesize:    2048 kB
```

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

```
os-release:
NAME="SLES"
VERSION="15-SP1"
VERSION_ID="15.1"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp1"
```

uname -a:

```
Linux linux-qjkl 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

```
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: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):      Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
```

run-level 3 Sep 3 00:53

SPEC is set to: /home/cpu2017-1.1.0-ic19.1.1

```
Filesystem      Type      Size      Used      Avail      Use%      Mounted on
/dev/sdb3        xfs       892G      32G      860G       4%      /
```

From /sys/devices/virtual/dmi/id

```
BIOS:      Lenovo -[TEE156L-2.61]- 05/20/2020
Vendor:    Lenovo
Product:   ThinkSystem SR850P -[7D2HCT01WW]-
Product Family: ThinkSystem
```

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### Platform Notes (Continued)

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:  
48x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)

### Compiler Version Notes

=====  
C | 500.perlbench\_r(base) 502.gcc\_r(base) 505.mcf\_r(base)  
| 525.x264\_r(base) 557.xz\_r(base)  
=====

Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1  
NextGen Build 20200304  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  
=====

=====  
C++ | 520.omnetpp\_r(base) 523.xalancbmk\_r(base) 531.deepsjeng\_r(base)  
| 541.leela\_r(base)  
=====

Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1  
NextGen Build 20200304  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  
=====

=====  
Fortran | 548.exchange2\_r(base)  
=====

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.1.1.217 Build 20200306  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  
=====

### Base Compiler Invocation

C benchmarks:  
icc

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## Base Compiler Invocation (Continued)

C++ benchmarks:

icpc

Fortran benchmarks:

ifort

## Base Portability Flags

```
500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64
```

## Base Optimization Flags

C benchmarks:

```
-m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX2 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-fuse-ld=gold -qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc
```

C++ benchmarks:

```
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto -mfpmath=sse
-funroll-loops -fuse-ld=gold -qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc
```

Fortran benchmarks:

```
-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX2 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
```

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## Base Optimization Flags (Continued)

Fortran benchmarks (continued):

-lqkmalloc

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

[http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64\\_revA.html](http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.html)

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

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

[http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64\\_revA.xml](http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.xml)

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-I.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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