



# SPEC® CPU2017 Integer Rate Result

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## Lenovo Global Technology

SPECrate2017\_int\_base = 255

ThinkSystem SR950  
(3.80 GHz, Intel Xeon Platinum 8256)

SPECrate2017\_int\_peak = Not Run

CPU2017 License: 9017

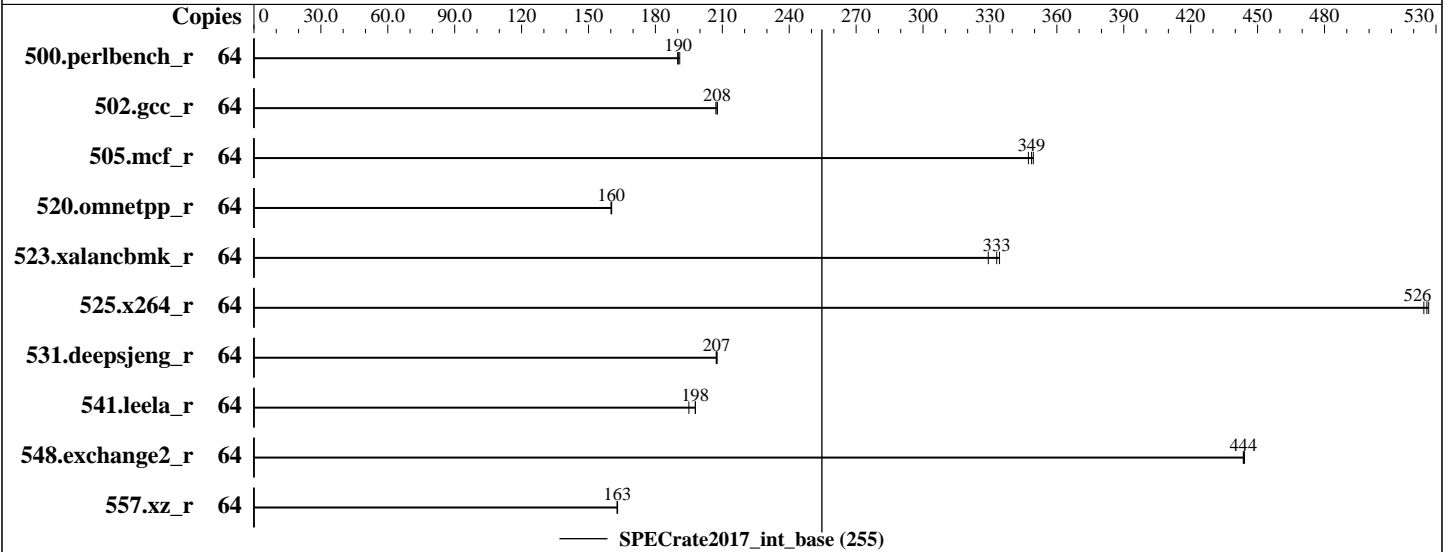
Test Date: Apr-2019

Test Sponsor: Lenovo Global Technology

Hardware Availability: Apr-2019

Tested by: Lenovo Global Technology

Software Availability: Dec-2018



### Hardware

CPU Name: Intel Xeon Platinum 8256  
 Max MHz.: 3900  
 Nominal: 3800  
 Enabled: 32 cores, 8 chips, 2 threads/core  
 Orderable: 2,3,4,6,8 chips  
 Cache L1: 32 KB I + 32 KB D on chip per core  
 L2: 1 MB I+D on chip per core  
 L3: 16.5 MB I+D on chip per chip  
 Other: None  
 Memory: 3 TB (96 x 32 GB 2Rx4 PC4-2933Y-R)  
 Storage: 960 GB tmpfs  
 Other: None

### Software

OS: SUSE Linux Enterprise Server 12 SP4 (x86\_64)  
 Kernel 4.12.14-94.41-default  
 Compiler: C/C++: Version 19.0.1.144 of Intel C/C++  
 Compiler Build 20181018 for Linux;  
 Fortran: Version 19.0.1.144 of Intel Fortran  
 Compiler Build 20181018 for Linux  
 Parallel: No  
 Firmware: Lenovo BIOS Version PSE121C 1.50 released Jan-2019  
 File System: tmpfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 Other: None



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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	64	<b>535</b>	<b>190</b>	534	191	536	190							
502.gcc_r	64	<b>436</b>	<b>208</b>	438	207	436	208							
505.mcf_r	64	<b>297</b>	<b>349</b>	298	347	296	349							
520.omnetpp_r	64	524	160	<b>524</b>	<b>160</b>	523	160							
523.xalancbmk_r	64	205	329	202	334	<b>203</b>	<b>333</b>							
525.x264_r	64	214	525	<b>213</b>	<b>526</b>	213	527							
531.deepsjeng_r	64	<b>354</b>	<b>207</b>	354	207	353	208							
541.leela_r	64	543	195	<b>536</b>	<b>198</b>	535	198							
548.exchange2_r	64	378	444	<b>378</b>	<b>444</b>	378	444							
557.xz_r	64	425	163	424	163	<b>424</b>	<b>163</b>							

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

## 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"  
Tmpfs filesystem can be set with:  
mount -t tmpfs -o size=960g tmpfs /home

## General Notes

Environment variables set by runcpu before the start of the run:  
LD\_LIBRARY\_PATH = "/home/cpu2017-1.0.5-ic19.0u1/lib/intel64"  
Binaries compiled on a system with 1x Intel Core i9-7900X 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  
runcpu command invoked through numactl i.e.:  
numactl --interleave=all runcpu <etc>  
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.

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## General Notes (Continued)

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.

## Platform Notes

BIOS configuration:

Choose Operating Mode set to Maximum Performance

Trusted Execution Technology set to Enable

DCU Streamer Prefetcher set to Disable

SNC set to Enable

Patrol Scrub set to Disable

Stale AtoS set to Enable

Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo

Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9

running on sles12sp4 Sun Apr 14 17:17:18 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 8256 CPU @ 3.80GHz

8 "physical id"s (chips)

64 "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 : 4

siblings : 8

physical 0: cores 1 5 9 13

physical 1: cores 1 2 5 13

physical 2: cores 2 5 9 13

physical 3: cores 4 8 9 13

physical 4: cores 1 2 4 13

physical 5: cores 5 8 9 13

physical 6: cores 2 5 9 13

physical 7: cores 5 8 9 12

From lscpu:

Architecture: x86\_64

CPU op-mode(s): 32-bit, 64-bit

Byte Order: Little Endian

CPU(s): 64

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### Platform Notes (Continued)

```

On-line CPU(s) list:    0-63
Thread(s) per core:    2
Core(s) per socket:    4
Socket(s):              8
NUMA node(s):          16
Vendor ID:              GenuineIntel
CPU family:             6
Model:                  85
Model name:             Intel(R) Xeon(R) Platinum 8256 CPU @ 3.80GHz
Stepping:               6
CPU MHz:                3800.000
CPU max MHz:            3900.0000
CPU min MHz:            1200.0000
BogoMIPS:               7600.00
Virtualization:         VT-x
L1d cache:              32K
L1i cache:              32K
L2 cache:                1024K
L3 cache:                16896K
NUMA node0 CPU(s):     0,2,32,34
NUMA node1 CPU(s):     1,3,33,35
NUMA node2 CPU(s):     4,5,36,37
NUMA node3 CPU(s):     6,7,38,39
NUMA node4 CPU(s):     8,10,40,42
NUMA node5 CPU(s):     9,11,41,43
NUMA node6 CPU(s):     12,15,44,47
NUMA node7 CPU(s):     13,14,45,46
NUMA node8 CPU(s):     16,17,48,49
NUMA node9 CPU(s):     18,19,50,51
NUMA node10 CPU(s):    20,23,52,55
NUMA node11 CPU(s):    21,22,53,54
NUMA node12 CPU(s):    24,26,56,58
NUMA node13 CPU(s):    25,27,57,59
NUMA node14 CPU(s):    28,31,60,63
NUMA node15 CPU(s):    29,30,61,62
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 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_l1d arch_capabilities

```

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## Platform Notes (Continued)

```
/proc/cpuinfo cache data
cache size : 16896 KB
```

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

```

available: 16 nodes (0-15)
node 0 cpus: 0 2 32 34
node 0 size: 193121 MB
node 0 free: 190877 MB
node 1 cpus: 1 3 33 35
node 1 size: 193530 MB
node 1 free: 193235 MB
node 2 cpus: 4 5 36 37
node 2 size: 193501 MB
node 2 free: 193316 MB
node 3 cpus: 6 7 38 39
node 3 size: 193530 MB
node 3 free: 193374 MB
node 4 cpus: 8 10 40 42
node 4 size: 193530 MB
node 4 free: 193374 MB
node 5 cpus: 9 11 41 43
node 5 size: 193530 MB
node 5 free: 193373 MB
node 6 cpus: 12 15 44 47
node 6 size: 193530 MB
node 6 free: 193367 MB
node 7 cpus: 13 14 45 46
node 7 size: 193530 MB
node 7 free: 183067 MB
node 8 cpus: 16 17 48 49
node 8 size: 193530 MB
node 8 free: 193374 MB
node 9 cpus: 18 19 50 51
node 9 size: 193530 MB
node 9 free: 193354 MB
node 10 cpus: 20 23 52 55
node 10 size: 193530 MB
node 10 free: 193380 MB
node 11 cpus: 21 22 53 54
node 11 size: 193530 MB
node 11 free: 193374 MB
node 12 cpus: 24 26 56 58
node 12 size: 193530 MB
node 12 free: 193338 MB
node 13 cpus: 25 27 57 59
node 13 size: 193530 MB

```

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### Platform Notes (Continued)

```

node 13 free: 192986 MB
node 14 cpus: 28 31 60 63
node 14 size: 193527 MB
node 14 free: 193221 MB
node 15 cpus: 29 30 61 62
node 15 size: 193530 MB
node 15 free: 193371 MB
node distances:
node  0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15
 0:  10 11 21 21 31 31 21 21 21 21 31 31 31 31 31 31
 1:  11 10 21 21 31 31 21 21 21 21 31 31 31 31 31 31
 2:  21 21 10 11 21 21 31 31 31 31 21 21 31 31 31 31
 3:  21 21 11 10 21 21 31 31 31 31 21 21 31 31 31 31
 4:  31 31 21 21 10 11 21 21 31 31 31 31 21 21 31 31
 5:  31 31 21 21 11 10 21 21 31 31 31 31 21 21 31 31
 6:  21 21 31 31 21 21 10 11 31 31 31 31 31 31 21 21
 7:  21 21 31 31 21 21 11 10 31 31 31 31 31 31 21 21
 8:  21 21 31 31 31 31 31 31 10 11 21 21 21 21 31 31
 9:  21 21 31 31 31 31 31 31 11 10 21 21 21 21 31 31
10:  31 31 21 21 31 31 31 31 21 21 10 11 31 31 21 21
11:  31 31 21 21 31 31 31 31 21 21 11 10 31 31 21 21
12:  31 31 31 31 21 21 31 31 21 21 31 31 10 11 21 21
13:  31 31 31 31 21 21 31 31 21 21 31 31 11 10 21 21
14:  31 31 31 31 31 31 21 21 31 31 21 21 21 21 10 11
15:  31 31 31 31 31 31 21 21 31 31 21 21 21 21 11 10

```

From /proc/meminfo

```

MemTotal:      3170354256 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"

```

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### Platform Notes (Continued)

```
uname -a:
Linux sles12sp4 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 Apr 14 03:46
```

```
SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1
Filesystem      Type      Size  Used Avail Use% Mounted on
tmpfs           tmpfs    960G   8.3G  952G   1% /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 -[PSE121C-1.50]- 01/16/2019
Memory:
96x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933
```

(End of data from sysinfo program)

### Compiler Version Notes

```
=====  
CC 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base)  
557.xz_r(base)  
-----
```

```
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
-----
```

```
=====  
CXXC 520.omnettp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)  
541.leela_r(base)  
-----
```

```
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
-----
```

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## Compiler Version Notes (Continued)

=====  
FC 548.exchange2\_r(base)  
=====

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.0.1.144 Build 20181018  
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

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:

-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4  
-L/usr/local/IntelCompiler19/compilers\_and\_libraries\_2019.1.144/linux/compiler/lib/intel64  
-lqkmalloc

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## Base Optimization Flags (Continued)

C++ benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64  
-lqkmalloc
```

Fortran benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64  
-lqkmalloc
```

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

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2019-04-02.html>

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

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

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2019-04-02.xml>

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