



# SPEC® CPU2017 Integer Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

## Lenovo Global Technology

ThinkSystem SR950  
(2.50 GHz, Intel Xeon Platinum 8180)

SPECrate2017\_int\_base = 430

SPECrate2017\_int\_peak = Not Run

CPU2017 License: 9017

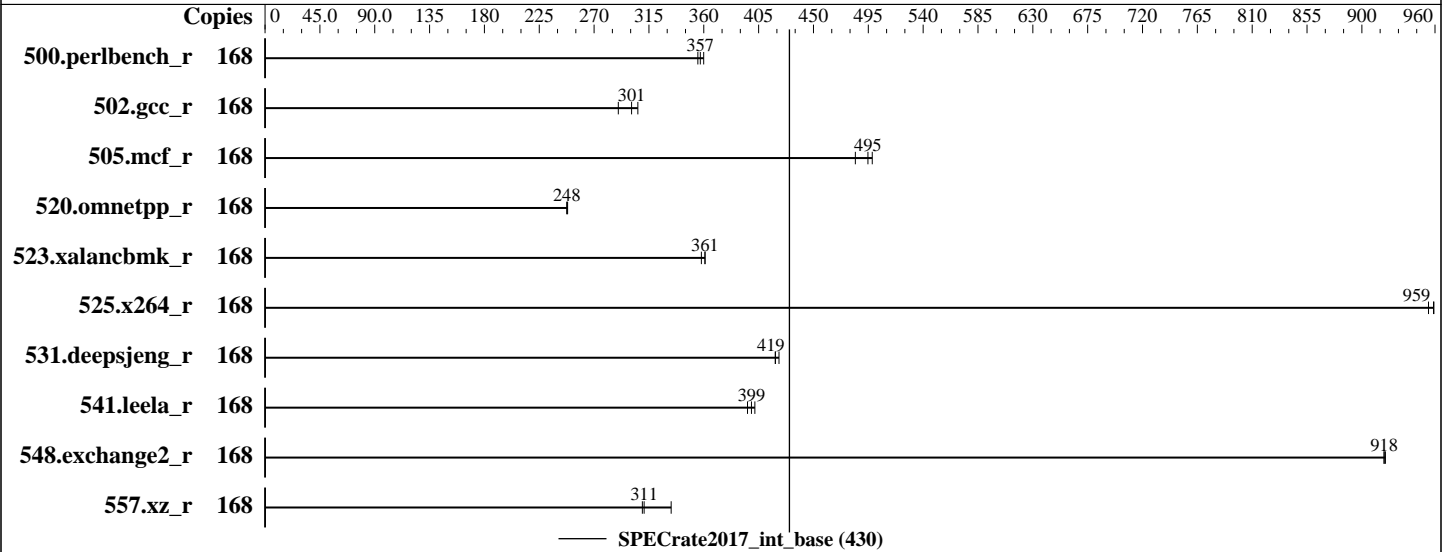
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Jul-2018

Hardware Availability: Sep-2017

Software Availability: May-2018



### Hardware

CPU Name: Intel Xeon Platinum 8180  
 Max MHz.: 3800  
 Nominal: 2500  
 Enabled: 84 cores, 3 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: 38.5 MB I+D on chip per chip  
 Other: None  
 Memory: 1152 GB (36 x 32 GB 2Rx4 PC4-2666V-R)  
 Storage: 1 x 800 GB SAS SSD  
 Other: None

### Software

OS: SUSE Linux Enterprise Server 12 SP2 (x86\_64)  
 Kernel 4.4.121-92.80-default  
 Compiler: C/C++: Version 18.0.2.199 of Intel C/C++  
 Compiler for Linux;  
 Fortran: Version 18.0.2.199 of Intel Fortran  
 Compiler for Linux  
 Parallel: No  
 Firmware: Lenovo BIOS Version PSE113P 1.30 released Jun-2018  
 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



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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	168	753	355	<b><u>749</u></b>	<b><u>357</u></b>	743	360							
502.gcc_r	168	778	306	<b><u>791</u></b>	<b><u>301</u></b>	821	290							
505.mcf_r	168	545	498	<b><u>549</u></b>	<b><u>495</u></b>	561	484							
520.omnetpp_r	168	888	248	<b><u>890</u></b>	<b><u>248</u></b>	890	248							
523.xalancbmk_r	168	<b><u>491</u></b>	<b><u>361</u></b>	496	358	491	361							
525.x264_r	168	307	959	<b><u>307</u></b>	<b><u>959</u></b>	308	955							
531.deepsjeng_r	168	457	422	460	419	<b><u>460</u></b>	<b><u>419</u></b>							
541.leela_r	168	692	402	703	396	<b><u>697</u></b>	<b><u>399</u></b>							
548.exchange2_r	168	<b><u>479</u></b>	<b><u>918</u></b>	479	918	479	919							
557.xz_r	168	544	333	<b><u>583</u></b>	<b><u>311</u></b>	586	310							

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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"

## General Notes

Environment variables set by runcpu before the start of the run:

LD\_LIBRARY\_PATH = "/home/cpu2017-1.0.5-ic18.0u2/lib/ia32:/home/cpu2017-1.0.5-ic18.0u2/lib/intel64"

LD\_LIBRARY\_PATH = "\$LD\_LIBRARY\_PATH:/home/cpu2017-1.0.5-ic18.0u2/je5.0.1-32:/home/cpu2017-1.0.5-ic18.0u2/je5.0.1-64"

Binaries compiled on a system with 1x Intel Core i7-6700K 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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**Hardware Availability:** Sep-2017  
**Software Availability:** May-2018

## 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.

jemalloc, a general purpose malloc implementation  
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 Max Performance  
Execute Disable Bit set to Disable  
DCA set to Enable  
SNC set to Enable  
Stale A to S set to Disable  
Sysinfo program /home/cpu2017-1.0.5-ic18.0u2/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
running on linux-x3kk Fri Jul 20 17:59:58 2018

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 8180 CPU @ 2.50GHz  
3 "physical id"s (chips)  
168 "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  
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): 168  
On-line CPU(s) list: 0-167  
Thread(s) per core: 2  
Core(s) per socket: 28  
Socket(s): 3

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### Platform Notes (Continued)

```

NUMA node(s):          6
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Platinum 8180 CPU @ 2.50GHz
Stepping:              4
CPU MHz:               2494.133
BogoMIPS:              4988.26
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              39424K
NUMA node0 CPU(s):    0-3,7-9,14-17,21-23,84-87,91-93,98-101,105-107
NUMA node1 CPU(s):    4-6,10-13,18-20,24-27,88-90,94-97,102-104,108-111
NUMA node2 CPU(s):    28-31,35-37,42-45,49-51,112-115,119-121,126-129,133-135
NUMA node3 CPU(s):    32-34,38-41,46-48,52-55,116-118,122-125,130-132,136-139
NUMA node4 CPU(s):    56-59,63-65,70-73,77-79,140-143,147-149,154-157,161-163
NUMA node5 CPU(s):    60-62,66-69,74-76,80-83,144-146,150-153,158-160,164-167
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
aperfmpperf eagerfpu pni pclmulqdq dtes64 ds_cpl vmx smx est tm2 sse3 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 ida arat epb invpcid_single pln pts dtherm
intel_pt rsb_ctxsw spec_ctrl stibp ssbd retpoline kaiser tpr_shadow vnmi
flexpriority ept vpid fsgsbase tsc_adjust bml hle avx2 smep bmi2 erms invpcid rtm
cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc

```

```

/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: 6 nodes (0-5)
node 0 cpus: 0 1 2 3 7 8 9 14 15 16 17 21 22 23 84 85 86 87 91 92 93 98 99 100 101 105
106 107
node 0 size: 192834 MB
node 0 free: 192544 MB
node 1 cpus: 4 5 6 10 11 12 13 18 19 20 24 25 26 27 88 89 90 94 95 96 97 102 103 104
108 109 110 111
node 1 size: 193513 MB
node 1 free: 193240 MB
node 2 cpus: 28 29 30 31 35 36 37 42 43 44 45 49 50 51 112 113 114 115 119 120 121 126
127 128 129 133 134 135
node 2 size: 193514 MB

```

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## Platform Notes (Continued)

```

node 2 free: 193093 MB
node 3 cpus: 32 33 34 38 39 40 41 46 47 48 52 53 54 55 116 117 118 122 123 124 125 130
131 132 136 137 138 139
node 3 size: 193514 MB
node 3 free: 193260 MB
node 4 cpus: 56 57 58 59 63 64 65 70 71 72 73 77 78 79 140 141 142 143 147 148 149 154
155 156 157 161 162 163
node 4 size: 193514 MB
node 4 free: 193209 MB
node 5 cpus: 60 61 62 66 67 68 69 74 75 76 80 81 82 83 144 145 146 150 151 152 153 158
159 160 164 165 166 167
node 5 size: 193509 MB
node 5 free: 193218 MB
node distances:
node  0  1  2  3  4  5
  0:  10  11  21  21  20  20
  1:  11  10  21  21  20  20
  2:  21  21  10  11  20  20
  3:  21  21  11  10  20  20
  4:  20  20  20  20  10  20
  5:  20  20  20  20  20  10

```

From /proc/meminfo

```

MemTotal:      1188250116 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

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

```

SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 2
  # 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-SP2"
  VERSION_ID="12.2"
  PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
  ID="sles"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:12:sp2"

```

uname -a:

```

Linux linux-x3kk 4.4.121-92.80-default #1 SMP Mon May 21 14:40:10 UTC 2018 (2afdd00)
x86_64 x86_64 x86_64 GNU/Linux

```

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## Platform Notes (Continued)

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Mitigation: PTI  
CVE-2017-5753 (Spectre variant 1): Mitigation: \_\_user pointer sanitization  
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

run-level 3 Jul 20 17:58

SPEC is set to: /home/cpu2017-1.0.5-ic18.0u2  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/sda3 xfs 743G 44G 700G 6% /

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 -[PSE113P-1.30]- 06/14/2018  
Memory:  
60x NO DIMM NO DIMM  
36x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666

(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)  
=====

icc (ICC) 18.0.2 20180210  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
=====

=====  
CXXC 520.omnetpp\_r(base) 523.xalancbmk\_r(base) 531.deepsjeng\_r(base)  
541.leela\_r(base)  
=====

icpc (ICC) 18.0.2 20180210  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
=====

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

ifort (IFORT) 18.0.2 20180210  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

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## Compiler Version Notes (Continued)

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## 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=3 -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
```

```
-L/usr/local/je5.0.1-64/lib -ljemalloc
```



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

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.html>

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

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

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.xml>

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