# SPEC® CPU2017 Integer Rate Result

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## Lenovo Global Technology

### ThinkSystem SR650

(2.40 GHz, Intel Xeon Platinum 8260L)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
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<td>SPECrate2017_int_peak</td>
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<tr>
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<td>9017</td>
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<td>Lenovo Global Technology</td>
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<td>May-2019</td>
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<td><strong>Hardware Availability:</strong></td>
<td>Apr-2019</td>
</tr>
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### Hardware

<table>
<thead>
<tr>
<th>Copies</th>
<th>SPECrate2017_int_base (284)</th>
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<tbody>
<tr>
<td>500.perlbench_r</td>
<td>96</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>96</td>
</tr>
<tr>
<td>505.mcf_r</td>
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<tr>
<td>525.x264_r</td>
<td>96</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>96</td>
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<tr>
<td>541.lpea_r</td>
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</tr>
<tr>
<td>548.exchange2_r</td>
<td>96</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>96</td>
</tr>
</tbody>
</table>

**CPU Name:** Intel Xeon Platinum 8260L  
**Max MHz.:** 3900  
**Nominal:** 2400  
**Enabled:** 48 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:** 35.75 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:** Red Hat Enterprise Linux Server release 7.6 (Maipo)  
**Kernel:** 3.10.0-957.el7.x86_64  
**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 IVE135R 2.10 released Feb-2019  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** Not Applicable  
**Other:** None
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### Results Table

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<th>Ratio</th>
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<td>537</td>
<td>193</td>
</tr>
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**SPECrate2017_int_base** = 284  
**SPECrate2017_int_peak** = Not Run

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-ic19.0ul/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>

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)

(Continued on next page)
**General Notes (Continued)**

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
Choose Operating Mode set to Custom Mode
C-states set to Legacy
SNC set to Enable
Trusted Execution Technology set to Enable
Stale AtoS set to Enable
LLC dead line alloc set to Disable
Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on localhost.localdomain Wed May 1 18:24:18 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 8260L CPU @ 2.40GHz
  2 "physical id"s (chips)
  96 "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 : 24
  siblings : 48
  physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29
  physical 1: cores 0 1 2 3 4 5 6 8 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 96
On-line CPU(s) list: 0-95
Thread(s) per core: 2
Core(s) per socket: 24
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel

(Continued on next page)
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<table>
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**Tested by:** Lenovo Global Technology  
**Test Date:** May-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** Nov-2018

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**Platform Notes (Continued)**

```plaintext
CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Platinum 8260L CPU @ 2.40GHz  
Stepping: 6  
CPU MHz: 2400.000  
BogoMIPS: 4800.00  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 36608K  
NUMA node0 CPU(s): 0-3,7-9,13-15,19,20,48-51,55-57,61-63,67,68  
NUMA node1 CPU(s): 4-6,10-12,16-18,21-23,25-27,31,32,36-38,41-43,44-47,45-47,76-78,81-83,87-89,93-95  
NUMA node2 CPU(s): 24-27,31,32,36-38,41-43,44-47,76-78,81-83,87-89,93-95  
NUMA node3 CPU(s): 28-30,33-35,39-41,45-47,76-78,81-83,87-89,93-95  
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 aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtrar pdcm dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch epb cat_13 cdp_13 intel_pt ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnumi flexpriority ept vpid fsgsbase tsc_adjust bni hle avx2 smep bmi2 erms invpcid rtm cmp cqm mx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw xsaveopt xsaves xgetbv1 cmpcli cmpoccu cmpc qmem_total qmem_local dtherm ida arat pln pt pk ospke avx512_vnni spec_ctrl intel_stibp flush_l1d 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: 4 nodes (0-3)  
node 0 cpus: 0 1 2 3 7 8 9 10 11 12 13 14 15 16 17 18 21 22 23 52 53 54 55 56 57 61 62 63 64 65 66 67 68  
node 0 size: 196220 MB  
node 0 free: 191265 MB  
node 1 cpus: 4 5 6 10 11 12 16 17 18 21 22 23 52 53 54 55 56 57 60 64 65 66 69 70 71  
node 1 size: 196608 MB  
node 1 free: 192087 MB  
node 2 cpus: 24 25 26 27 31 32 36 37 38 42 43 44 72 73 74 75 79 80 84 85 86 90 91 92  
node 2 size: 196608 MB  
node 2 free: 192092 MB  
node 3 cpus: 28 29 30 33 34 35 39 40 41 45 46 47 76 77 78 81 82 83 87 88 89 93 94 95  
node 3 size: 196608 MB  
node 3 free: 192091 MB  
node distances:  
node 0 1 2 3

(Continued on next page)
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Platform Notes (Continued)

0:  10  11  21  21
1:  11  10  21  21
2:  21  21  10  11
3:  21  21  11  10

From /proc/meminfo
MemTotal:       792178244 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

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

uname -a:
Linux localhost.localdomain 3.10.0-957.el7.x86_64 #1 SMP Thu Oct 4 20:48:51 UTC 2018
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: Load fences, __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS

run-level 3 May 1 18:16

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1
Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb2 xfs 689G 116G 573G 17% /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 -[IVE135R-2.10]- 02/27/2019
Memory:
24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

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Platform Notes (Continued)

(End of data from sysinfo program)

### Compiler Version Notes

```plaintext
==============================================================================
CC  500.perlibench_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.omnetpp_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.
==============================================================================
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`
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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
-1/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-1qkmalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-1/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-1qkmalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout=trans=4 -nostandard-realloc-lhs -align array32byte
-1/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-1qkmalloc

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-A.html

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-A.xml
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