## SPEC® CPU2017 Integer Rate Result

**Lenovo Global Technology**

ThinkSystem SR650 (2.20 GHz, Intel Xeon Platinum 8276M)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>Lenovo Global Technology</th>
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<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Lenovo Global Technology</td>
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<td>Tested by:</td>
<td>Lenovo Global Technology</td>
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<td>Test Date:</td>
<td>Apr-2019</td>
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<td>Apr-2019</td>
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<td>Software Availability:</td>
<td>Nov-2018</td>
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### SPECrate2017_int_base

SPECrater2017_int_base = 290

### Copies

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<td>502.gcc_r</td>
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<tr>
<td>505.mcf_r</td>
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<tr>
<td>520.omnetpp_r</td>
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<tr>
<td>523.xalancbmk_r</td>
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<tr>
<td>525.x264_r</td>
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<tr>
<td>531.deepsjeng_r</td>
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<td>541.leela_r</td>
</tr>
<tr>
<td>548.exchange2_r</td>
</tr>
<tr>
<td>557.xz_r</td>
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</table>

### Hardware

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon Platinum 8276M</th>
</tr>
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<tbody>
<tr>
<td>Max MHz.:</td>
<td>4000</td>
</tr>
<tr>
<td>Nominal:</td>
<td>2200</td>
</tr>
<tr>
<td>Enabled:</td>
<td>56 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable:</td>
<td>1,2 chips</td>
</tr>
<tr>
<td>Cache L1:</td>
<td>32 KB I + 32 KB D on chip per core</td>
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<tr>
<td>L2:</td>
<td>1 MB I+D on chip per core</td>
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<tr>
<td>L3:</td>
<td>38.5 MB I+D on chip per chip</td>
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<tr>
<td>Other:</td>
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</tr>
<tr>
<td>Memory:</td>
<td>768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)</td>
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<tr>
<td>Storage:</td>
<td>1 x 800 GB SATA SSD</td>
</tr>
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<td>Other:</td>
<td>None</td>
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### Software

<table>
<thead>
<tr>
<th>OS:</th>
<th>Red Hat Enterprise Linux Server release 7.6 (Maipo)</th>
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<tbody>
<tr>
<td>Kernel:</td>
<td>3.10.0-957.el7.x86_64</td>
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<tr>
<td>Compiler:</td>
<td>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</td>
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<tr>
<td>Parallel:</td>
<td>No</td>
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<tr>
<td>Firmware:</td>
<td>Lenovo BIOS Version IVE135R 2.10 released Feb-2019</td>
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<tr>
<td>File System:</td>
<td>xfs</td>
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<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
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<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
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<tr>
<td>Peak Pointers:</td>
<td>Not Applicable</td>
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<td>Other:</td>
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SPEC CPU2017 Integer Rate Result

Lenovo Global Technology
ThinkSystem SR650
(2.20 GHz, Intel Xeon Platinum 8276M)

SPECraten2017_int_base = 290
SPECraten2017_int_peak = Not Run

Results Table

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</tr>
</tbody>
</table>

SPECraten2017_int_base = 290
SPECraten2017_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-ic19.0u1/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.:
umactl --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)
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Apr-2019
Hardware Availability: Apr-2019
Software Availability: Nov-2018

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-ic19.0ul/bin/sysinfo
Rev: r5974 of 2018-05-19 9bce8f2999c33d61f64985e45859ea9
running on localhost.localdomain Fri Apr 26 10:18:19 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 8276M CPU @ 2.20GHz
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

(Continued on next page)
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Platform Notes (Continued)

NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8276M CPU @ 2.20GHz
Stepping: 6
CPU MHz: 2200.000
BogoMIPS: 4400.00
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, 56-59, 63-65, 70-73, 77-79
NUMA node1 CPU(s): 4-6, 10-13, 18-20, 24-27, 60-62, 66-69, 74-76, 80-83
NUMA node2 CPU(s): 28-31, 35-37, 42-45, 49-51, 84-87, 91-93, 98-101, 105-107
NUMA node3 CPU(s): 32-34, 38-41, 46-48, 52-55, 88-90, 94-97, 102-104, 108-111
Flags: fpu vme de pse tm ht nx mmx libp pe mce pae mce 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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperff perf eagerfpu pni pclmulqdq dtex64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpm pdcz dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3nowprefetch epb cat_l3 cdp_l3 intel_pt ssbd ibrs ibpb stibp ibrsenhanced tpr_shadow vmmx flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cmq mxp rt_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaveci xgetbv1 cmq_llc cmq_occup_llc cmq_mbm_total cmq_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni spec_ctrl intel_stibp flush_lld arch_capabilities

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 14 15 16 17 21 22 23 56 57 58 59 63 64 65 70 71 72 73 77 78 79
    node 0 size: 196220 MB
    node 0 free: 191247 MB
    node 1 cpus: 4 5 6 10 11 12 13 18 19 20 24 25 26 27 60 61 62 66 67 68 69 74 75 76 80 81 82 83
    node 1 size: 196608 MB
    node 1 free: 192057 MB
    node 2 cpus: 28 29 30 31 35 36 37 42 43 44 45 49 50 51 84 85 86 87 91 92 93 98 99 100 101 105 106 107
    node 2 size: 196608 MB
    node 2 free: 192094 MB

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Lenovo Global Technology
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SPECrate2017_int_base = 290
SPECrate2017_int_peak = Not Run

Platform Notes (Continued)

node 3 cpus: 32 33 34 38 39 40 41 46 47 48 52 53 54 55 88 89 90 94 95 96 97 102 103 104 108 109 110 111
node 3 size: 196608 MB
node 3 free: 192059 MB
node distances:
node 0 1 2 3
0:  10  11  21  21
1:  11  10  21  21
2:  21  21  10  11
3:  21  21  11  10

From /proc/meminfo
MemTotal:       792178240 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.6 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VARIANT="Server"
      VARIANT_ID="server"
      VERSION_ID="7.6"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.6 (Maipo)"
   redhat-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)

   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 Apr 26 10:16
   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
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<table>
<thead>
<tr>
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<tbody>
<tr>
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**Test Date:** Apr-2019  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Hardware Availability:** Apr-2019  
**Software Availability:** Nov-2018

### Platform Notes ( Continued )

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

*(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.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:**

```
cc  -m64  -std=c11
```

**C++ benchmarks:**

```
icpc  -m64
```
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**SPECrate2017_int_base = 290**

**SPECrate2017_int_peak = Not Run**

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**Base Compiler Invocation (Continued)**

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:

-W1, -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

C++ benchmarks:

-W1, -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:

-W1, -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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-A.html
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You can also download the XML flags sources by saving the following links:


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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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