# Lenovo Global Technology

## ThinkSystem SR650

(2.70 GHz, Intel Xeon Platinum 8280M)

<table>
<thead>
<tr>
<th>Specrate2017_int_base</th>
<th>305</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specrate2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Mar-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** Oct-2018

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate2017_int_base</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>112</td>
<td></td>
</tr>
<tr>
<td>502.gcc_r</td>
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<td>227</td>
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<tr>
<td>505.mcf_r</td>
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<td>342</td>
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<td>520.omnetpp_r</td>
<td>112</td>
<td>177</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>112</td>
<td>271</td>
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<tr>
<td>525.x264_r</td>
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</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>112</td>
<td>203</td>
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<td>541.leela_r</td>
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<td>280</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>112</td>
<td></td>
</tr>
<tr>
<td>557.xz_r</td>
<td>112</td>
<td>218</td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Platinum 8280M  
- **Max MHz.:** 4000  
- **Nominal:** 2700  
- **Enabled:** 56 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:** 38.5 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 19.0.0.117 of Intel C/C++  
- **Compiler for Linux:** Fortran: Version 19.0.0.117 of Intel Fortran  
- **Parallel:** No  
- **Firmware:** Lenovo BIOS Version IVE135K 2.10 released Jan-2019  
- **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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SPECrate2017_int_base = 305
SPECrate2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
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<th>Seconds</th>
<th>Ratio</th>
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<tr>
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<td>249</td>
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<td>249</td>
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<tr>
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<td>333</td>
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<tr>
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<td>293</td>
<td>443</td>
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</tr>
<tr>
<td>541.leela_r</td>
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<td>279</td>
<td>660</td>
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<td>469</td>
<td>626</td>
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<tr>
<td>557.xz_r</td>
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<td>532</td>
<td>227</td>
<td>555</td>
<td>218</td>
<td>574</td>
<td>211</td>
</tr>
</tbody>
</table>

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/lib/ia32:/home/cpu2017-1.0.5-ic19/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017-1.0.5-ic19/je5.0.1-32:/home/cpu2017-1.0.5-ic19/je5.0.1-64"

Binaries compiled on a system with 1x Intel Core i9-799X 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>

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.

(Continued on next page)
**SPEC CPU2017 Integer Rate Result**

**Lenovo Global Technology**

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(2.70 GHz, Intel Xeon Platinum 8280M)

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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology

---

**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  
Choose Operating Mode set to Custom Mode  
C-states set to Legacy  
SNC set to Enable  
Hardware Prefetcher set to Disable  
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/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcede8f2999c33d61f64985e45859ea9  
running on localhost.localdomain Wed Mar 13 11:18:00 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 8280M CPU @ 2.70GHz
  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
```

(Continued on next page)
# SPEC CPU2017 Integer Rate Result

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---

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---

**SPECraten2017_int_base =** 305  
**SPECraten2017_int_peak =** Not Run

---

## Platform Notes (Continued)

- **CPU(s):** 112  
- **On-line CPU(s) list:** 0-111  
- **Thread(s) per core:** 2  
- **Core(s) per socket:** 28  
- **Socket(s):** 2  
- **NUMA node(s):** 4  
- **Vendor ID:** GenuineIntel  
- **CPU family:** 6  
- **Model:** 85  
- **Model name:** Intel(R) Xeon(R) Platinum 8280M CPU @ 2.70GHz  
- **Stepping:** 6  
- **CPU MHz:** 2700.000  
- **BogoMIPS:** 5400.00  
- **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:  
---

From numactl --hardware 
---

WARNING: a numactl 'node' might or might not correspond to a physical chip.
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**Platform Notes (Continued)**

<table>
<thead>
<tr>
<th>node 1 free:</th>
<th>192089 MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>node 2 cpus:</td>
<td>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</td>
</tr>
<tr>
<td>node 2 size:</td>
<td>196608 MB</td>
</tr>
<tr>
<td>node 2 free:</td>
<td>192134 MB</td>
</tr>
<tr>
<td>node 3 cpus:</td>
<td>32 33 34 38 40 41 46 47 48 52 53 54 55 88 89 90 94 95 96 97 102 103 104 108 109 110 111</td>
</tr>
<tr>
<td>node 3 size:</td>
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<td>191719 MB</td>
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<td>10 11 21 21</td>
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<tr>
<td>1:</td>
<td>11 10 21 21</td>
</tr>
<tr>
<td>2:</td>
<td>21 21 10 11</td>
</tr>
<tr>
<td>3:</td>
<td>21 21 11 10</td>
</tr>
</tbody>
</table>

From `/proc/meminfo`

- MemTotal: 792178620 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:

```plaintext
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 Mar 13 11:00  

(Continued on next page)
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Test Date: Mar-2019
Hardware Availability: Apr-2019
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Platform Notes (Continued)
SPEC is set to: /home/cpu2017-1.0.5-ic19
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sdc2      xfs   689G  102G  587G  15% /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 -[IVE135K-2.10]- 01/04/2019
Memory:
  24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

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 19.0.0.117 Build 20180804
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 19.0.0.117 Build 20180804
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 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
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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.xalanchbmkr: -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 -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc

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:
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.

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