**SPEC CPU®2017 Integer Rate Result**

**Lenovo Global Technology**

ThinkSystem SD650 V2
(2.40 GHz, Intel Xeon Platinum 8368)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 530</th>
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<tbody>
<tr>
<td><strong>SPECrate®2017_int_peak = Not Run</strong></td>
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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology

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</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Platinum 8368  
- **Max MHz:** 3400  
- **Nominal:** 2400  
- **Enabled:** 76 cores, 2 chips, 2 threads/core  
- **Orderable:** 2 chips  
- **Cache L1:** 32 KB I + 48 KB D on chip per core  
- **L2:** 1.25 MB I+D on chip per core  
- **L3:** 57 MB I+D on chip per chip  
- **Memory:** 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)  
- **Storage:** 1 x 480 GB SATA SSD  
- **Other:** None

**Software**

- **OS:** Red Hat Enterprise Linux 8.3  
  (Ootpa)  
  Kernel 4.18.0-240.el8.x86_64  
- **Compiler:** C/C++, Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux;  
  Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux;  
  C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux  
- **Parallel:** No  
- **Firmware:** Lenovo BIOS Version U8E109PT1 1.01 released Apr-2021  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** None  
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage
## Results Table

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<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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</tbody>
</table>

**SPECrate®2017_int_base = 530**  
**SPECrate®2017_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"

### Environment Variables Notes

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

```
LD_LIBRARY_PATH = 
"/home/cpu2017-1.1.5-ic2021.1-revB/lib/intel64:/home/cpu2017-1.1.5-ic2021.1-revB/lib/ia32:/home/cpu2017-1.1.5-ic2021.1-revB/jre5.0.1-32"
MALLOC_CONF = "retain:true"
```

### General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM  
memory using Red Hat Enterprise Linux 8.1  
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

(Continued on next page)
General Notes (Continued)

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) is mitigated in the system as tested and documented.

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
C-States set to Autonomous
DCU Streamer Prefetcher set to Disabled
Adjacent Cache Prefetch set to Disabled
UPI Link Disable set to Disabled 1 Link
CPU Frequency Limits set to Restrict maximum frequency
SNC set to Enabled

Sysinfo program /home/cpu2017-1.1.5-ic2021.1-revB/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost.localdomain Tue May 11 13:11:47 2021

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 8368 CPU @ 2.40GHz
  2 "physical id"s (chips)
  152 "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 : 38
siblings : 76
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
  25 26 27 28 29 30 31 32 33 34 35 36 37
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
  25 26 27 28 29 30 31 32 33 34 35 36 37

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 152
## Lenovo Global Technology

**ThinkSystem SD650 V2**  
(2.40 GHz, Intel Xeon Platinum 8368)

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>9017</th>
<th>Test Sponsor</th>
<th>Lenovo Global Technology</th>
<th>Test Date</th>
<th>May-2021</th>
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<tr>
<td>Tested by</td>
<td>Lenovo Global Technology</td>
<td>Hardware Availability</td>
<td>Jul-2021</td>
<td>Software Availability</td>
<td>Feb-2021</td>
</tr>
</tbody>
</table>

**SPECrate®2017_int_base = 530**  
**SPECrate®2017_int_peak = Not Run**

### Platform Notes (Continued)

- **On-line CPU(s) list:** 0-151
- **Thread(s) per core:** 2
- **Core(s) per socket:** 38
- **Socket(s):** 2
- **NUMA node(s):** 2
- **Vendor ID:** GenuineIntel
- **CPU family:** 6
- **Model:** 106
- **Model name:** Intel(R) Xeon(R) Platinum 8368 CPU @ 2.40GHz  
**Stepping:** 6  
**CPU MHz:** 3200.000  
**BogoMIPS:** 4800.00

**Virtualization:** VT-x

**L1d cache:** 48K  
**L1i cache:** 32K  
**L2 cache:** 1280K  
**L3 cache:** 58368K

**NUMA node0 CPU(s):** 0-37, 76-113  
**NUMA node1 CPU(s):** 38-75, 114-151

**Flags:**  
- fpu  
- vme  
- de  
- pae  
- mce  
- cmov  
- pat  
- pse36  
- clflush  
- dts  
- acpi  
- sep  
- mtrr  
- pae  
- mce  
- cx8  
- apic  
- sep  
- mtrr  
- pae  
- mce  
- cx8  
- apic  
- sep  
- mtrr  
- pae  
- mce  
- cx8  
- apic  
- sep

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

<table>
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<tr>
<th>available</th>
<th>2 nodes (0-1)</th>
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<tbody>
<tr>
<td>node 0 cpus:</td>
<td>0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113</td>
</tr>
<tr>
<td>node 0 size:</td>
<td>240274 MB</td>
</tr>
<tr>
<td>node 0 free:</td>
<td>256218 MB</td>
</tr>
<tr>
<td>node 1 cpus:</td>
<td>38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113</td>
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**Platform Notes (Continued)**

### Lenovo Global Technology

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**SPECrat©2017_int_base = 530**

**SPECrat©2017_int_peak = Not Run**

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<th>Test Date:</th>
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<td>Hardware Availability:</td>
<td>Jul-2021</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Feb-2021</td>
</tr>
</tbody>
</table>

```
148 149 150 151
node 1 size: 241300 MB
node 1 free: 257323 MB
node distances:
node   0   1
  0:  10  20
  1:  20  10
```

From `/proc/meminfo`

```
MemTotal:       527986128 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

```
/sbin/tuned-adm active
No current active profile.
```

```
/usr/bin/lsb_release -d
Red Hat Enterprise Linux release 8.3 (Ootpa)
```

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

```
os-release:
  NAME="Red Hat Enterprise Linux"
  VERSION="8.3 (Ootpa)"
  ID="rhel"
  ID_LIKE="fedora"
  VERSION_ID="8.3"
  PLATFORM_ID="platform:el8"
  PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
  ANSI_COLOR="0;31"
```

```
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga
```

```
uname -a:
Linux localhost.localdomain 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020
x86_64 x86_64 x86_64 GNU/Linux
```

**Kernel self-reported vulnerability status:**

- **CVE-2018-12207 (iTLB Multihit):** Not affected
- **CVE-2018-3620 (L1 Terminal Fault):** Not affected
- **Microarchitectural Data Sampling:** Not affected
- **CVE-2017-5754 (Meltdown):** Not affected
- **CVE-2018-3639 (Speculative Store Bypass):** Mitigation: Speculative Store Bypass disabled via prctl and seccomp
- **CVE-2017-5753 (Spectre variant 1):** Mitigation: usercopy/swapgs

(Continued on next page)
Lenovo Global Technology
ThinkSystem SD650 V2
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Platform Notes (Continued)

barriers and __user pointer sanitization
Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

CVE-2017-5715 (Spectre variant 2):

CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 May 11 13:09

SPEC is set to: /home/cpu2017-1.1.5-ic2021.1-revB

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<tr>
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<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
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<tbody>
<tr>
<td>/dev/sda4</td>
<td>xfs</td>
<td>372G</td>
<td>113G</td>
<td>259G</td>
<td>31%</td>
<td>/home</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id

Vendor: Lenovo
Product: ThinkSystem SD650 V2
Product Family: ThinkSystem
Serial: 1234567890

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.

Memory:
16x Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200

BIOS:

<table>
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<tr>
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<th>Lenovo</th>
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<tbody>
<tr>
<td>BIOS Version</td>
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<td>BIOS Revision</td>
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<tr>
<td>Firmware Revision</td>
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(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
| C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) 557.xz_r(base) |
==============================================================================

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
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(Continued on next page)
## Lenovo Global Technology

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| Tested by:      | Lenovo Global Technology  
| Test Date:      | May-2021  
| Hardware Availability: | Jul-2021  
| Software Availability: | Feb-2021  

**SPEC CPU®2017 Integer Rate Result**

| SPECrate®2017_int_base | 530  
|------------------------|-----|
| SPECrate®2017_int_peak | Not Run  

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### Compiler Version Notes (Continued)

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**C++**  
520.omnetpp_r(base)  
523.xalancbmk_r(base)  
531.deepsjeng_r(base)  
541.leela_r(base)

---

**Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113**  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

---

**Fortran**  
548.exchange2_r(base)

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**Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000**  
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### Base Compiler Invocation

**C benchmarks:**  
icx

**C++ benchmarks:**  
icpx

**Fortran benchmarks:**  
ifort

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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
**SPEC CPU®2017 Integer Rate Result**

**Lenovo Global Technology**
ThinkSystem SD650 V2
(2.40 GHz, Intel Xeon Platinum 8368)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>530</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**Base Optimization Flags**

C benchmarks:
- `-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math`
- `-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
- `-mbranches-within-32B-boundaries`
- `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin`
- `-lqkmalloc`

C++ benchmarks:
- `-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto`
- `-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
- `-mbranches-within-32B-boundaries`
- `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin`
- `-lqkmalloc`

Fortran benchmarks:
- `-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div`
- `-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte`
- `-auto -mbranches-within-32B-boundaries`
- `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin`
- `-lqkmalloc`

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


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-ICElake-D.xml](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-ICElake-D.xml)

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