Lenovo Global Technology
ThinkSystem SN550 V2
(2.10 GHz, Intel Xeon Platinum 8352V)

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

Test Date: May-2021
Hardware Availability: Jul-2021
Software Availability: Feb-2021

Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>144</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>144</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>144</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>144</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>144</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>144</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>144</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>144</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>144</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>144</td>
</tr>
</tbody>
</table>

--- SPECspeed®2017_int_base (11.9) ---

**Hardware**

CPU Name: Intel Xeon Platinum 8352V
Max MHz: 3500
Nominal: 2100
Enabled: 72 cores, 2 chips, 2 threads/core
Orderable: 1.2 chips
Cache L1: 32 KB I + 48 KB D on chip per core
L2: 1.25 MB I+D on chip per core
L3: 54 MB I+D on chip per chip
Other: None
Memory: 512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R, running at 2933)
Storage: 1 x 960 GB SATA SSD
Other: None

**Software**

OS: Red Hat Enterprise Linux 8.3 (Ootpa)
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 202101112 for Linux;
C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux
Parallel: Yes
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: jemalloc memory allocator V5.0.1
Power Management: BIOS set to prefer performance at the cost of additional power usage
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**SPECspeed®2017_int_base** = 11.9
**SPECspeed®2017_int_peak** = Not Run

**Results Table**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tr>
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<td>605.mcf_s</td>
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<tr>
<td>620.omnetpp_s</td>
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<td>623.xalancbmk_s</td>
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<td>13.6</td>
<td>105</td>
<td>13.6</td>
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<tr>
<td>625.x264_s</td>
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<tr>
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<td>246</td>
<td>5.82</td>
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<tr>
<td>641.leela_s</td>
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<td>358</td>
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<td>358</td>
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<tr>
<td>648.exchange2_s</td>
<td>144</td>
<td>146</td>
<td>20.2</td>
<td>146</td>
<td>20.2</td>
<td>146</td>
<td>20.2</td>
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<tr>
<td>657.xz_s</td>
<td>144</td>
<td>254</td>
<td>24.4</td>
<td>254</td>
<td>24.3</td>
<td>252</td>
<td>24.5</td>
</tr>
</tbody>
</table>

**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:
- KMP_AFFINITY = "granularity=fine,scatter"
- LD_LIBRARY_PATH = 
  "/home/cpu2017-1.1.5-ic2021.1-revB/lib/intel64:/home/cpu2017-1.1.5-ic202
   1.1-revB/je5.0.1-64"
- MALLOC_CONF = "retain:true"
- OMP_STACKSIZE = "192M"

**General Notes**

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
memory using Redhat Enterprise Linux 8.0
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache syncd and cleard with:
sync; echo 3> /proc/sys/vm/drop_caches

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.

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

jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

**Platform Notes**

BIOS configuration:
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode
MONITOR/MWAIT set to Enabled
CPU P-state Control set to Cooperative with Legacy
C-States set to Legacy
UPI Link Disable set to Disabled 1 Link
UPI Prefetcher set to Disabled

Sysinfo program /home/cpu2017-1.1.5-ic2021.1-revB/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afea89d4b38e2f1c
running on localhost.localdomain Mon May 10 17:56:40 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 8352V CPU @ 2.10GHz
  2 "physical id"s (chips)
  144 "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: 36
siblings: 72
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
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

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 144
On-line CPU(s) list: 0-143
Thread(s) per core: 2
Core(s) per socket: 36
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel

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

**Lenovo Global Technology**

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<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>11.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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**Platform Notes (Continued)**

<table>
<thead>
<tr>
<th>CPU family:</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model:</td>
<td>106</td>
</tr>
<tr>
<td>Model name:</td>
<td>Intel(R) Xeon(R) Platinum 8352V CPU @ 2.10GHz</td>
</tr>
<tr>
<td>Stepping:</td>
<td>6</td>
</tr>
<tr>
<td>CPU MHz:</td>
<td>1363.225</td>
</tr>
<tr>
<td>CPU max MHz:</td>
<td>3500.0000</td>
</tr>
<tr>
<td>CPU min MHz:</td>
<td>800.0000</td>
</tr>
<tr>
<td>BogoMIPS:</td>
<td>4200.00</td>
</tr>
<tr>
<td>Virtualization:</td>
<td>VT-x</td>
</tr>
<tr>
<td>L1d cache:</td>
<td>48K</td>
</tr>
<tr>
<td>L1i cache:</td>
<td>32K</td>
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<tr>
<td>L2 cache:</td>
<td>1280K</td>
</tr>
<tr>
<td>L3 cache:</td>
<td>55296K</td>
</tr>
<tr>
<td>NUMA node0 CPU(s):</td>
<td>0-35,72-107</td>
</tr>
<tr>
<td>NUMA node1 CPU(s):</td>
<td>36-71,108-143</td>
</tr>
</tbody>
</table>

**Flags:**  
```
fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov  
pat pse36 clflush dts vsysr fmmx v penc ss ht tm pbe syscall nx pdpe1gb rdtscp  
lm constant_tsc arch_perfmon pebs bsel good nodpl xtopology nonstop_tsc cpubound  
aperfmprefetch pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbm fma cx16  
xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave  
sv f16c rdrand lahf_lm ablpmsaf pti cmov mpx stibp tpr_shadow vt msr_drm cpuid_l3  
invpcid_single intel_pni ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi fxl  
ex breakpoint xstate evtxserver vsuid xsaveopt xsavec xsavecf xsaveopt xsavecf xsaveopt  
xcvtsia cvtsid xlcinst xlcinst ndx xlcinst xlcinst xlcinst xlcinst xlcinst xlcinst  
```

```
/proc/cpuinfo cache data  
```

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

<table>
<thead>
<tr>
<th>available:</th>
<th>2 nodes (0-1)</th>
</tr>
</thead>
<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</td>
</tr>
<tr>
<td>node 1 cpus:</td>
<td>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</td>
</tr>
<tr>
<td>node 0 size:</td>
<td>240592 MB</td>
</tr>
<tr>
<td>node 0 free:</td>
<td>256871 MB</td>
</tr>
<tr>
<td>node 1 size:</td>
<td>242533 MB</td>
</tr>
<tr>
<td>node 1 free:</td>
<td>257062 MB</td>
</tr>
</tbody>
</table>

(Continued on next page)
SPEC CPU®2017 Integer Speed Result

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Platform Notes (Continued)

node distances:
node  0  1
0: 10  20
1: 20  10

From /proc/meminfo
MemTotal: 5278656200 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sbin/tuned-adm active
Current active profile: throughput-performance

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):
Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass):
Mitigation: usercopy/swapsgs barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1):
Mitigation: Enhanced IBRS, IBPB:

(Continued on next page)
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Platform Notes (Continued)
conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 May 10 17:54

SPEC is set to: /home/cpu2017-1.1.5-ic2021.1-revB
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 818G 96G 723G 12% /home

From /sys/devices/virtual/dmi/id
Vendor: Lenovo
Product: ThinkSystem SN550 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 M393A4G43AB3-CWE 32 GB 2 rank 3200, configured at 2933

BIOS:
  BIOS Vendor: Lenovo
  BIOS Version: U8E109PT1-1.01
  BIOS Date: 04/28/2021
  BIOS Revision: 1.1
  Firmware Revision: 1.40

(End of data from sysinfo program)

Compiler Version Notes
==============================================================================
C |  600.perlbench_s(base)  602.gcc_s(base)  605.mcf_s(base)
   |  625.x264_s(base)  657.xz_s(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.
==============================================================================
C++ |  620.omnetpp_s(base)  623.xalancbmk_s(base)  631.deepsjeng_s(base)
     |  641.leela_s(base)
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Compiler Version Notes (Continued)

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  |  648.exchange2_s(base)

Base Compiler Invocation

C benchmarks:
icx
C++ benchmarks:
icpx
Fortran benchmarks:
ifort

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
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### Base Optimization Flags

**C benchmarks:**
- `-DSPEC_OPENMP`  
- `-std=c11`  
- `-m64`  
- `-fiopenmp`  
- `-Wl,-z,muldefs`  
- `-xCORE-AVX2`  
- `-O3`  
- `-ffast-math`  
- `-flto`  
- `-mfpmath=sse`  
- `-funroll-loops`  
- `-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

**C++ benchmarks:**
- `-DSPEC_OPENMP`  
- `-m64`  
- `-Wl,-z,muldefs`  
- `-xCORE-AVX2`  
- `-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/`  
- `-lmqkmalloc`

**Fortran benchmarks:**
- `-m64`  
- `-xCORE-AVX2`  
- `-O3`  
- `-ipo`  
- `-no-prec-div`  
- `-qopt-mem-layout-trans=4`  
- `-nostandard-realloc-lhs `  
- `-align array32byte `  
- `-auto`  
- `-mbranches-within-32B-boundaries`

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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Tested with SPEC CPU®2017 v1.1.5 on 2021-05-10 05:56:39-0400.  