Lenovo Global Technology
ThinkSystem SR650 V2
(2.10 GHz, Intel Xeon Gold 6338T)

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

Threads

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--- SPECspeed®2017_int_base (11.5) ---

### Hardware

CPU Name: Intel Xeon Gold 6338T
Max MHz: 3400
Nominal: 2100
Enabled: 48 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: 36 MB I+D on chip per chip
Other: None
Memory: 1 TB (32 x 32 GB 2Rx8 PC4-3200AA-R)
Storage: 1 x 960 GB SATA SSD

### 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;
Parallel: Yes
Firmware: Lenovo BIOS Version AFE111A 1.02 released May-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 and OS set to prefer performance at the cost of additional power usage
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SPECspeed®2017_int_base = 11.5
SPECspeed®2017_int_peak = Not Run

Results Table

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SPECSpeed®2017_int_base = 11.5
SPECSpeed®2017_int_peak = Not Run

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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/cpu2017-1.1.8-ic2021.1-revB/lib/intel64:/home/cpu2017-1.1.8-ic202
  1.1-revB/je5.0.1-64"
MALLOCC_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 synced and cleared 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
C-States set to Legacy

Sysinfo program /home/cpu2017-1.1.8-ic2021.1-revB/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca64d64
running on localhost.localdomain Wed Jun 23 20:17:14 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) Gold 6338T CPU @ 2.10GHz
  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 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
  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

From lscpu from util-linux 2.32.1:
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): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 6338T CPU @ 2.10GHz
Stepping: 6
CPU MHz: 2220.141
BogoMIPS: 4200.00

(Continued on next page)
Lenovo Global Technology
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SPECs2017_int_base = 11.5
SPECs2017_int_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
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Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 36864K
NUMA node0 CPU(s): 0-23,48-71
NUMA node1 CPU(s): 24-47,72-95
Flags: fpu vme de pse tsc msr pae 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 cpuid
aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 invpcid_single
intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmmflexpriority ept
vpid ept_ad fsgsbase tsc_adjust bmon hle avx2 smep bmi2 erms invpcid cqm rdt_a
avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha
avx512bw avx512vl xsaveopt xsavec xgetbv1 xsavees cqm_llc cqm_occup_llc cqm_mbb_total
cqm_mbb_local split_lock_detect wbnoinvd dtcetm ida arat pln pts avx512vbmi umip pku
ospke avx512_vbmi2 gfnl vaes vpclmulqdq avx512vnvi avx512_vbitalg tme
avx512_vpopcntdq la57 rdpid md_clear pconfig flush_lld arch_capabilities

/platform Notes (Continued)

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 48 49 50 51
52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71
node 0 size: 483433 MB
node 0 free: 514751 MB
node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 72
73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95
node 1 size: 481538 MB
node 1 free: 515491 MB
node distances:
node 0: 10 20
node 1: 20 10

From /proc/meminfo
MemTotal: 1056481976 kB
 HugePages_Total: 0
 Hugepagesize: 2048 kB

/sbin/tuned-adm active
Current active profile: balanced

(Continued on next page)
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SPECSpeed®2017_int_base = 11.5
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CPU2017 License: 9017
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Tested by: Lenovo Global Technology

Test Date: Jun-2021
Hardware Availability: Jul-2021
Software Availability: Dec-2020

Platform Notes (Continued)

/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): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swaps barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Jun 23 20:15

SPEC is set to: /home/cpu2017-1.1.8-ic2021.1-revB

Filesystem Type  Size  Used Avail Use% Mounted on
/dev/sda4 xfs  818G  160G  658G  20% /home

From /sys/devices/virtual/dmi/id
   Vendor: Lenovo

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

Product: ThinkSystem SR650 V2 MB  
Product Family: ThinkSystem  
Serial: 1234567890  

Additional information from dmidecode 3.2 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:  
32x Samsung M393A4G43AB3-CWE 32 GB 2 rank 3200  

BIOS:  
BIOS Vendor: Lenovo  
BIOS Version: AFE111A-1.02  
BIOS Date: 05/07/2021  
BIOS Revision: 1.2  
Firmware Revision: 1.10

(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)

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)

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on  
Intel(R) 64, Version 2021.1 Build 20201112_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
```

(Continued on next page)
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Test Date: Jun-2021
Hardware Availability: Jul-2021
Software Availability: Dec-2020

Compiler Version Notes (Continued)

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
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-DSPEC_OPENMP -std=c11 -m64 -fiopenmp -W1,-z,muldefs -xCORE-AVX2
-O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:
-DSPEC_OPENMP -m64 -W1,-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/
-lqkmalloc

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

**Lenovo Global Technology**
ThinkSystem SR650 V2  
(2.10 GHz, Intel Xeon Gold 6338T)

**SPECspeed®2017_int_base = 11.5**
**SPECspeed®2017_int_peak = Not Run**

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<td>Software Availability:</td>
<td>Dec-2020</td>
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**Base Optimization Flags (Continued)**

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

http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-ICElake-E.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-ICElake-E.xml

http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml

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

Tested with SPEC CPU®2017 v1.1.8 on 2021-06-23 08:17:14-0400.
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