Lenovo Global Technology  
ThinkSystem SR650 V2  
(3.00 GHz, Intel Xeon Gold 6354) 

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  

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<th>SPECrate®2017_int_base = 309</th>
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<td>169</td>
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**Hardware**

CPU Name: Intel Xeon Gold 6354  
Max MHz: 3600  
Nominal: 3000  
Enabled: 36 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: 39 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  
Other: None

**Software**

OS: Red Hat Enterprise Linux 8.3  
(Octopi)  
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 AFE109PT1 1.00  
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
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Results Table

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<tr>
<th>Benchmark</th>
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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/je5.0.1-32"
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)
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SPECRate®2017_int_base = 309
SPECRate®2017_int_peak = Not Run

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 Legacy
UPI Link Disable set to Disabled 1 Link
DCU Streamer Prefetcher set to Disabled
SNC set to Enabled

Sysinfo program /home/cpu2017-1.1.5-ic2021.1-revB/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d27080afeaa89d4b38e2f1c
running on localhost.localdomain Fri May 21 18:18:46 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 6354 CPU @ 3.00GHz
   2 "physical id"s (chips)
   72 "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 : 18
      siblings : 36
      physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
      physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

From lscpu:
   Architecture: x86_64
   CPU op-mode(s): 32-bit, 64-bit
   Byte Order: Little Endian
   CPU(s): 72
   On-line CPU(s) list: 0-71
   Thread(s) per core: 2
   Core(s) per socket: 18
   Socket(s): 2

(Continued on next page)
Platform Notes (Continued)

NUMA node(s):        4
Vendor ID:           GenuineIntel
CPU family:          6
Model:               106
Model name:          Intel(R) Xeon(R) Gold 6354 CPU @ 3.00GHz
Stepping:            6
CPU MHz:             3600.039
BogoMIPS:            6000.00
Virtualization:      VT-x
L1d cache:           48K
L1i cache:           32K
L2 cache:            1280K
L3 cache:            39936K
NUMA node0 CPU(s):   0-8,36-44
NUMA node1 CPU(s):   9-17,45-53
NUMA node2 CPU(s):   18-26,54-62
NUMA node3 CPU(s):   27-35,63-71

Flags:               fpu vme de pse tsc msr pae mca cmov pat pse36 clflush dts
                     ept vmbidi lmvptms rdtscp lm constant_tsc arch_perfmon pebs
                     bts rep_good nopl xtopology nonstop_tsc cpuid
                     aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx
                     smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid
                     dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer
                     aes pkuvm avx1 f16c rdrand lahf_lm abtm 3dnowprefetch
                     preed Fault epb cat_l3 invpcid_single intel_pni ssbd
                     mba ibrs ibp btb ibs Enhanced tpr_shadow vmx
                     fmmx rich Priorities cmps idtind hle axp2 smep bmi2 erms
                     invpcid cmp rdt_a avx512f avx512dq rdseed adx smap
                     avx512ifma clflushopt clwb intel_pt avx512cd sha ni
                     avx512bw avx512vl xsaveopt xsavec xenvtb v xaesesopt
                     xsaveopt xsaves cmq llc cmq_occap _llc cmq_mbb_total
                     cmq_mbb_local split_lock_detect wbnioivd dtherm ida arat
                     pln pts avx512vbmi umip ku ospe avx512_vbmi2
                     gfn vaes vpcilmulddqv avx512_vnni avx512_bitalg
                     tme avx512 vpoptdtdq la57 rdpid md_clear pconfig
                     flush_lld arch_capabilities

/proc/cpuinfo cache data
  cache size : 39936 KB

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 4 5 6 7 8 36 37 38 39 40 41 42 43 44
   node 0 size: 252156 MB
   node 0 free: 257239 MB
   node 1 cpus: 9 10 11 12 13 14 15 16 17 45 46 47 48 49 50 51 52 53
   node 1 size: 252936 MB
   node 1 free: 257560 MB
   node 2 cpus: 18 19 20 21 22 23 24 25 26 54 55 56 57 58 59 60 61 62
   node 2 size: 252869 MB
   node 2 free: 257753 MB
   node 3 cpus: 27 28 29 30 31 32 33 34 35 63 64 65 66 67 68 69 70 71

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SPECCPU®2017 Integer Rate Result
Copyright 2017-2021 Standard Performance Evaluation Corporation

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Platform Notes (Continued)

node 3 size: 252841 MB
node 3 free: 257716 MB
node distances:
  node 0 1 2 3
  0: 10 11 20 20
  1: 11 10 20 20
  2: 20 20 10 11
  3: 20 20 11 10

From /proc/meminfo
  MemTotal:       1056486488 kB
  HugePages_Total:   0
  Hugepagesize:       2048 kB

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

/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

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Platform Notes (Continued)

CVE-2017-5753 (Spectre variant 1):
Mitigation: usercopy/swapgs 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 May 21 18:10

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

From /sys/devices/virtual/dmi/id
Vendor: Lenovo
Product: ThinkSystem SR650 V2 MB
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:
32x Samsung M393A4G43AB3-CWE 32 GB 2 rank 3200

BIOS:
BIOS Vendor: Lenovo
BIOS Version: AFE109PT1-1.00
BIOS Date: 04/28/2021
BIOS Revision: 1.0
Firmware Revision: 1.0

(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
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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Compiler Version Notes (Continued)

==============================================================================
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)
-----------------------------------------------------------------------------
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.
-----------------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

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
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557.xz_r: -DSPEC_LP64
**SPEC CPU®2017 Integer Rate Result**

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### Base Optimization Flags

**C benchmarks:**
- `w -std=c11 -m64 -W1,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`  

**C++ benchmarks:**
- `w -m64 -W1,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`  

**Fortran benchmarks:**

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

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