Lenovo Global Technology
ThinkSystem SR650 V2
(2.30 GHz, Intel Xeon Gold 6314U)

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

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<th>SPECrate®2017_int_peak = Not Run</th>
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<tr>
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<td></td>
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<tr>
<td>557.xz_r 64</td>
<td></td>
</tr>
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</table>

Hardware
CPU Name: Intel Xeon Gold 6314U
Max MHz: 3400
Nominal: 2300
Enabled: 32 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 32 KB I + 48 KB D on chip per core
L2: 1.25 MB I+D on chip per core
L3: 48 MB I+D on chip per chip
Other: None
Memory: 512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R)
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 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
## Results Table

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

**SPECrate®2017_int_base = 222**

**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/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:

```bash
sync; echo 3> /proc/sys/vm/drop_caches
```

(Continued on next page)
### Lenovo Global Technology

ThinkSystem SR650 V2  
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**SPEC CPU®2017 Integer Rate Result**

<table>
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<th>CPU2017 License:</th>
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<th>Tested by:</th>
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**SPECrate®2017_int_base = 222**

**SPECrate®2017_int_peak = Not Run**

**Test Date:** Jun-2021  
**Hardware Availability:** Jul-2021  
**Software Availability:** Feb-2021

---

**General Notes (Continued)**

- runcpu command invoked through numactl i.e.:  
  ```bash
  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
  - Adjacent Cache Prefetch set to Disabled
  - 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 e8664e66d2d7080a76ea89d4b368e2f8c
  - Running on localhost.localdomain Wed Jun 2 18:45:28 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

- From /proc/cpuinfo:
  - **model name:** Intel(R) Xeon(R) Gold 6314U CPU @ 2.30GHz
  - **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: 32
    - siblings: 64
    - 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

- From lscpu:
  - **Architecture:** x86_64
  - **CPU op-mode(s):** 32-bit, 64-bit
  - **Byte Order:** Little Endian
  - **CPU(s):** 64
  - **On-line CPU(s) list:** 0-63
  - **Thread(s) per core:** 2
  - **Core(s) per socket:** 32
  - **Socket(s):** 1

(Continued on next page)
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Test Date: Jun-2021
Hardware Availability: Jul-2021
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NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 6314U CPU @ 2.30GHz
Stepping: 6
CPU MHz: 2990.063
BogoMIPS: 4600.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 49152K
NUMA node0 CPU(s): 0-15, 32-47
NUMA node1 CPU(s): 16-31, 48-63

Flags:
    fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
    pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
    lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid

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 32 33 34 35 36 37 38 39 40 41 42 43
    44 45 46 47
    node 0 size: 246447 MB
    node 0 free: 257036 MB
    node 1 cpus: 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
    node 1 size: 246447 MB
    node 1 free: 257036 MB
    node distances:
    node 0 1
    0: 10 11
    1: 11 10

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SPEC CPU®2017 Integer Rate Result

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Platform Notes (Continued)

From /proc/meminfo
   MemTotal: 528007204 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):
   Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass):
   Mitigation: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1):
   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

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Platform Notes (Continued)

run-level 3 Jun 2 18:40

SPEC is set to: /home/cpu2017-1.1.5-ic2021.1-revB
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 818G 148G 670G 19% /home

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:
16x NO DIMM NO DIMM
16x 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

==============================================================================
<table>
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<th>C</th>
<th>500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base)</th>
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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.

==============================================================================
<table>
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<th>C++</th>
<th>520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)</th>
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Hardware Availability: Jul-2021
Software Availability: Feb-2021

Compiler Version Notes (Continued)
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
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

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

(Continued on next page)
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**Base Optimization Flags (Continued)**

C benchmarks (continued):
-\texttt{-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin}
-\texttt{-lqkmalloc}

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

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

The flags files that were used to format this result can be browsed at:
-\texttt{http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-ICElake-D.html}
-\texttt{http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.html}

You can also download the XML flags sources by saving the following links:
-\texttt{http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-ICElake-D.xml}
-\texttt{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\textsuperscript{2017} v1.1.5 on 2021-06-02 06:45:28-0400.
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