**Lenovo Global Technology**

ThinkSystem SR630 V3  
(2.00 GHz, Intel Xeon Gold 5420+)

**SPEC CPU®2017 Integer Rate Result**

**Lenovo Global Technology**

**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology

**Test Date:** Jan-2023  
**Hardware Availability:** Feb-2023  
**Software Availability:** Jun-2022

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<td>557.xz_r</td>
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</table>

**Hardware**

- **CPU Name:** Intel Xeon Gold 5420+
- **Max MHz:** 4100
- **Nominal:** 2000
- **Enabled:** 56 cores, 2 chips, 2 threads/core
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 48 KB D on chip per core
- **Cache L2:** 2 MB I+D on chip per core
- **Cache L3:** 52.5 MB I+D on chip per chip
- **Memory:** 512 GB (16 x 32 GB 2Rx8 PC5-4800B-R, running at 4400)
- **Storage:** 1 x 960 GB SATA SSD
- **Other:** None

**Software**

- **OS:** SUSE Linux Enterprise Server 15 SP4 (x86_64)  
  Kernel 5.14.21-150400.22-default
- **Compiler:** C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux;  
  Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;
- **Firmware:** Lenovo BIOS Version ESE109L 1.10 released Jan-2023
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage
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**SPECrating®2017_int_base =** 460

**SPECrating®2017_int_peak = Not Run**

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### Results Table

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**SPECrating®2017_int_base =** 460  
**SPECrating®2017_int_peak = Not Run**

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

---

### Compiler Notes

SPEC has ruled that the compiler used for this result was performing a compilation that specifically improves the performance of the 523.xalancbmk_r / 623.xalanchmk_s benchmarks using a priori knowledge of the SPEC code and dataset to perform a transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4 https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4), SPEC will no longer publish results using this optimization.

This result is left in the SPEC results database for historical reference.

---

### 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:

```bash
LD_LIBRARY_PATH = "*/home/cpu2017-1.1.8-ic2022.1/lib/intel64:/home/cpu2017-1.1.8-ic2022.1/lib/ia32:/home/cpu2017-1.1.8-ic2022.1/jre5.0.1-32"
MALLOC_CONF = "retain:true"
```

---

Page 2  
Standard Performance Evaluation Corporation (info@spec.org)  
https://www.spec.org/
General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using Red Hat Enterprise Linux 8.4
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
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
SNC set to SNC2
LLC Prefetch set to Disabled
UPI Link Disable set to Disabled 1 Link
C-state set to Legacy
Sysinfo program /home/cpu2017-1.1.8-ic2022.1/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16a6a64d
running on localhost Mon Jan 23 19:00:15 2023

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 5420+
    2 "physical id"s (chips)
    112 "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 : 28
    siblings : 56
    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
    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

From lscpu from util-linux 2.37.2:
    Architecture: x86_64
    CPU op-mode(s): 32-bit, 64-bit
    Address sizes: 46 bits physical, 57 bits virtual
    Byte Order: Little Endian
    CPU(s): 112
    On-line CPU(s) list: 0-111
    Vendor ID: GenuineIntel
    Model name: Intel(R) Xeon(R) Gold 5420+
    CPU family: 6
    Model: 143
    Thread(s) per core: 2
    Core(s) per socket: 28
    Socket(s): 2

(Continued on next page)
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From /proc/cpuinfo

NAME ONE-SIZE ALL-SIZE WAYS TYPE
L1d 48K 2.6M 12 Data
L1i 32K 1.8M 8 Instruction
L2 2M 112M 16 Unified
L3 52.5M 105M 15 Unified

/proc/cpuintinfo cache data
cache size : 53760 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 9 10 11 12 13 56 57 58 59 60 61 62 63 64 65 66 67 68 69
node 0 size: 128680 MB
node 0 free: 127877 MB
node 1 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27 70 71 72 73 74 75 76 77 78 79 80 81 82 83
node 1 size: 129016 MB

(Continued on next page)
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Platform Notes (Continued)

node 1 free: 128573 MB
node 2 cpus: 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
node 2 size: 128982 MB
node 2 free: 128356 MB
node 3 cpus: 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
node 3 size: 128988 MB
node 3 free: 128640 MB
node distances:
  node 0 1 2 3
  0: 10 12 21 21
  1: 12 10 21 21
  2: 21 21 10 12
  3: 21 21 12 10

From /proc/meminfo
MemTotal: 528044188 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
os-release:
NAME="SLES"
VERSION="15-SP4"
VERSION_ID="15.4"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP4"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp4"

uname -a:
Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18
UTC 2022 (49db222) 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/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 Jan 23 18:57

SPEC is set to: /home/cpu2017-1.1.8-ic2022.1
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 894G 25G 870G 3% /

From /sys/devices/virtual/dmi/id

(Continued on next page)
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Platform Notes (Continued)

Vendor: Lenovo
Product: ThinkSystem SR630 V3 MB, EGS, DDR5, NY, IU
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:
2x Samsung M321R4GA3BB0-CQKMG 32 GB 2 rank 4800, configured at 4400
14x Samsung M321R4GA3BB0-CQKVG 32 GB 2 rank 4800, configured at 4400

BIOS:
BIOS Vendor: Lenovo
BIOS Version: ESE109L-1.10
BIOS Date: 01/07/2023
BIOS Revision: 1.10
Firmware Revision: 1.0

(End of data from sysinfo program)

Compiler Version Notes

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<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316 Copyright (C) 1985-2022 Intel Corporation. All rights reserved.</td>
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Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

(Continued on next page)
### Base Compiler Invocation (Continued)

#### Fortran benchmarks:

ifx

### Base Portability Flags

- perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
- gcc_r: -DSPEC_LP64
- mcf_r: -DSPEC_LP64
- omnetpp_r: -DSPEC_LP64
- xalancbm_r: -DSPEC_LP64 -DSPEC_LINUX
- x264_r: -DSPEC_LP64
- deepsjeng_r: -DSPEC_LP64
- leela_r: -DSPEC_LP64
- exchange2_r: -DSPEC_LP64
- 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
- L/usr/local/intel/compiler/2022.1.0/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
- L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
- lqkmalloc

#### Fortran benchmarks:

- w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
- mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
- nostandard-realloc-lhs -align array32byte -auto
- L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
- lqkmalloc

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

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You can also download the XML flags sources by saving the following links:


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