**Lenovo Global Technology**

ThinkSystem ST550  
(1.90 GHz, Intel Xeon Bronze 3206R)

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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Mar-2020  
**Hardware Availability:** Mar-2020  
**Software Availability:** Sep-2019  

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### Software

**OS:**  
SUSE Linux Enterprise Server 15 SP1 (x86_64)  
Kernel 4.12.14-195-default

**Compiler:**  
C/C++: Version 19.0.5.281 of Intel C/C++  
Compiler for Linux;  
Fortran: Version 19.0.5.281 of Intel Fortran  
Compiler for Linux

**Parallel:** No

**Firmware:**  
Lenovo BIOS Version oOe152L 2.51 released Feb-2020 tested as OOE151L 2.51 Jan-2020

**File System:** xfs

**System State:** Run level 3 (multi-user)

**Base Pointers:** 64-bit

**Peak Pointers:** Not Applicable

**Other:** None

**Power Management:** BIOS set to prefer performance at the cost of additional power usage

---

### Hardware

**CPU Name:** Intel Xeon Bronze 3206R  
**Max MHz:** 1900  
**Nominal:** 1900  
**Enabled:** 16 cores, 2 chips  
**Orderable:** 1.2 chips  
**Cache L1:** 32 KB I + 32 KB D on chip per core  
**L2:** 1 MB I+D on chip per core  
**L3:** 11 MB I+D on chip per chip  
**Other:** None

**Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R, running at 2133)

**Storage:** 1 x 480 GB SATA SSD  
**Other:** None

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**SPEC CPU®2017 Integer Rate Result**

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**SPECrate®2017_int_base = 55.0**

**SPECrate®2017_int_peak = Not Run**

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**Tested by:** Lenovo Global Technology
**SPEC CPU®2017 Integer Rate Result**

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## Results Table

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</table>

**SPECrate®2017_int_base = 55.0**  
**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/cpu2017-1.1.0-ic19.0u5/lib/intel64:/home/cpu2017-1.1.0-ic19.0u5/1  
lib/ia32:/home/cpu2017-1.1.0-ic19.0u5/je5.0.1-32"
```

---

### 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  
runcpu command invoked through numactl i.e.:  
numactl --interleave=all runcpu <etc>

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

Lenovo Global Technology
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SPECrates®2017_int_base = 55.0
SPECrates®2017_int_peak = Not Run

General Notes (Continued)

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.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3640 (Spectre variant 3a) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3639 (Spectre variant 4) 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
Patrol Scrub set to Disable
Sysinfo program /home/cpu2017-1.1.0-ic19.0u5/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a001l
running on linux-9n08 Tue Mar 17 11:05:52 2020

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) Bronze 3206R CPU @ 1.90GHz
2 "physical id"s (chips)
16 "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 : 8
siblings : 8
physical 0: cores 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 46 bits physical, 48 bits virtual
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 1
Core(s) per socket: 8
Socket(s): 2

(Continued on next page)
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SPECrate®2017_int_base = 55.0
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Test Date: Mar-2020
Hardware Availability: Mar-2020
Software Availability: Sep-2019

Platform Notes (Continued)

NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Bronze 3206R CPU @ 1.90GHz
Stepping: 7
CPU MHz: 1900.000
CPU max MHz: 1900.000
CPU min MHz: 1000.000
BogoMIPS: 3800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0-7
NUMA nodel CPU(s): 8-15
Flags: fpu vme de pse tsc msr pae mca 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 art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmperf pni pclmulqdq dtes64 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 xsave avx f16c
rdx rdp x86relok dl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc
NUMA node0 cpu(s) sam cachepiche tsc_adjust bmi1 hle avx2 smep bmi2 3dnow FMA xsave
From /proc/cpuinfo cache data
  cache size: 11264 KB
From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
  available: 2 nodes (0-1)
  node 0 cpus: 0 1 2 3 4 5 6 7
  node 0 size: 96357 MB
  node 0 free: 95949 MB
  node 1 cpus: 8 9 10 11 12 13 14 15
  node 1 size: 96765 MB
  node 1 free: 96407 MB
  node distances:
    node   0   1
    0: 10 21
    1: 21 10
From /proc/meminfo

(Continued on next page)
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Platform Notes (Continued)

MemTotal: 197758608 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="SLES"
    VERSION="15-SP1"
    VERSION_ID="15.1"
    PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
    ID="sles"
    ID_LIKE="suse"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:15:sp1"

uname -a:
  Linux linux-9n08 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
  x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

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: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 3 Mar 17 11:04

SPEC is set to: /home/cpu2017-1.1.0-ic19.0u5
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda3 xfs 445G 34G 411G 8% /

From /sys/devices/virtual/dmi/id
  BIOS: Lenovo -[00E151L-2.51]- 01/14/2020
  Vendor: Lenovo
  Product: System X -[7X09TO2000]-
  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.

(Continued on next page)
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Platform Notes (Continued)

Memory:
12x SK Hynix HMA82GR7CJR8N-WM 16 GB 2 rank 2933

(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) C Compiler for applications running on Intel(R) 64, Version 19.0.5
NextGen Technology Build 20190729
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

==============================================================================
C++ | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(base)
==============================================================================
Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 19.0.5
NextGen Technology Build 20190729
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

==============================================================================
Fortran | 548.exchange2_r(base)
==============================================================================
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort
### Lenovo Global Technology

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#### 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:**  
-m64  
-std=c11  
-W1,-z,muldefs  
-xCORE-AVX512  
-Ofast  
-flto  
-mfpmath=sse  
-funroll-loops  
-qnextgen  
-merge-functions=4  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin  
-1qkmalloc

**C++ benchmarks:**  
-m64  
-W1,-z,muldefs  
-xCORE-AVX512  
-Ofast  
-flto  
-mfpmath=sse  
-funroll-loops  
-qnextgen  
-merge-functions=4  
-merge-functions=4  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin  
-1qkmalloc

**Fortran benchmarks:**  
-m64  
-W1,-z,muldefs  
-xCORE-AVX512  
-O3  
-no-prec-div  
-qopt-mem-layout-trans=4  
-nostandard-realloc-lhs  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin  
-1qkmalloc

---

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-CLX-F.html](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-F.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-CLX-F.xml](http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-F.xml)
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**SPEC CPU®2017** Integer Rate Result

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Tested with SPEC CPU®2017 v1.1.0 on 2020-03-16 23:05:51-0400.
Originally published on 2020-04-14.