**SPEC CPU®2017 Integer Speed Result**

**Lenovo Global Technology**  
ThinkSystem SR630  
(2.10 GHz, Intel Xeon Gold 6230R)

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

---

### Hardware

<table>
<thead>
<tr>
<th>Thread</th>
<th>SPEC2017_int_base</th>
<th>SPEC2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>104</td>
<td>6.86</td>
<td>Not Run</td>
</tr>
<tr>
<td>104</td>
<td>10.6</td>
<td></td>
</tr>
<tr>
<td>104</td>
<td>18.7</td>
<td></td>
</tr>
<tr>
<td>104</td>
<td>10.8</td>
<td></td>
</tr>
<tr>
<td>104</td>
<td>13.9</td>
<td></td>
</tr>
<tr>
<td>104</td>
<td>16.4</td>
<td></td>
</tr>
<tr>
<td>104</td>
<td>5.90</td>
<td></td>
</tr>
<tr>
<td>104</td>
<td>4.90</td>
<td></td>
</tr>
<tr>
<td>104</td>
<td>16.9</td>
<td></td>
</tr>
<tr>
<td>104</td>
<td>24.4</td>
<td></td>
</tr>
</tbody>
</table>

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### Software

- **OS:** SUSE Linux Enterprise Server 15 SP1 (x86_64)  
  Kernel 4.12.14-195-default
- **Compiler:**  
  C/C++: Version 19.1.1.217 of Intel C/C++  
  Compiler for Linux;  
  Fortran: Version 19.1.1.217 of Intel Fortran  
  Compiler for Linux
- **Parallel:** Yes
- **Firmware:** Lenovo BIOS Version IVE155L 2.61 released May-2020
- **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 set to prefer performance at the cost of additional power usage

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### Hardware

- **CPU Name:** Intel Xeon Gold 6230R  
  **Max MHz:** 4000
- **Nominal:** 2100
- **Enabled:** 52 cores, 2 chips, 2 threads/core
- **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:** 35.75 MB I+D on chip per chip
- **Other:** None
- **Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)
- **Storage:** 1 x 800 GB SATA SSD
- **Other:** None

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### Software

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

### Benchmark | Threads | Seconds | Ratio | Seconds | Ratio | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio
---|---|---|---|---|---|---|---|---|---|---|---|---|
600.perlbench_s | 104 | 258 | 6.89 | 259 | 6.85 | 259 | 6.86 | |
602.gcc_s | 104 | 374 | 10.6 | 376 | 10.6 | 375 | 10.6 | |
605.mcf_s | 104 | 250 | 18.9 | 253 | 18.6 | 252 | 18.7 | |
620.omnetpp_s | 104 | 152 | 10.8 | 152 | 10.7 | 150 | 10.8 | |
623.xalancbmk_s | 104 | 102 | 14.0 | 102 | 13.9 | 102 | 13.9 | |
625.x264_s | 104 | 107 | 16.5 | 108 | 16.4 | 108 | 16.4 | |
631.deepsjeng_s | 104 | 243 | 5.90 | 243 | 5.91 | 243 | 5.90 | |
641.leela_s | 104 | 348 | 4.90 | 348 | 4.90 | 348 | 4.90 | |
648.exchange2_s | 104 | 174 | 16.9 | 174 | 16.9 | 174 | 16.9 | |
657.xz_s | 104 | 253 | 24.4 | 253 | 24.5 | 253 | 24.4 | |

**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.

**Compiler Notes**
The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler. The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux
The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

**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/cpu2017-1.1.0-ic19.1.1/lib/intel64:/home/cpu2017-1.1.0-ic19.1.1/j e5.0.1-64"
MALLOC_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:

(Continued on next page)
Lenovo Global Technology

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

General Notes (Continued)

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.

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/cpu2017-1.1.0-ic19.1.1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edeb1e6e46a485a0011
running on linux-ttht Wed Jun 17 05:11:54 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) Gold 6230R CPU @ 2.10GHz
2  "physical id"'s (chips)
104 "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 : 26
siblings : 52
 physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29
 physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 25 26 27 28 29

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): 104
On-line CPU(s) list: 0-103
Thread(s) per core: 2

(Continued on next page)
Platform Notes (Continued)

Core(s) per socket: 26
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6230R CPU @ 2.10GHz
Stepping: 7
CPU MHz: 2100.000
CPU max MHz: 4000.0000
CPU min MHz: 1000.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-25,52-77
NUMA nodel CPU(s): 26-51,78-103
Flags: fpu vme de pse tsc msr pae mca cmov pat pse36 clflush dts dtst sse sse2 ss ht tm pbe syscall nx pdmelpb rdtsscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfperf fns pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpm pdcm dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_pni ssbd mba ibrs ibp bb stibp ibrs_enhanced tpr_shadow vnmi flexpriority etp vpid fsgsbase tsc_adjust bml1 hle avx2 smep bmi2 erms invpcid rtm cmq mxrt rdtd_avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cmq_llc cmq_occup_llc cmq_mbb_total cmq_mbb_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_lld arch_capabilities

/proc/cpuinfo cache data
  cache size: 36608 KB

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 24 25 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
  node 0 size: 386680 MB
  node 0 free: 385813 MB
  node 1 cpus: 26 27 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 65 66 67 68 69 70 71 72 73 74 75 76 77
  node 1 size: 387031 MB
  node 1 free: 386664 MB
  node distances:

(Continued on next page)
Platform Notes (Continued)

node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal:       792281264 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 15 SP1

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-thtl 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 Jun 17 05:10

SPEC is set to: /home/cpu2017-1.1.0-ic19.1.1
Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb2 xfs 744G 47G 698G 7% /

From /sys/devices/virtual/dmi/id
BIOS: Lenovo -[IVE155L-2.61]- 05/20/2020
Vendor: Lenovo

(Continued on next page)
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<tr>
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**Platform Notes (Continued)**

Product: ThinkSystem SR630 -[7X01RC2000]-  
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:
24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)

**Compiler Version Notes**

<table>
<thead>
<tr>
<th>C benchmarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base) 657.xz_s(base)</td>
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Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1  
NextGen Build 20200304  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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<table>
<thead>
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<th>C++ benchmarks</th>
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<tr>
<td>620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base) 641.leela_s(base)</td>
</tr>
</tbody>
</table>

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Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1  
NextGen Build 20200304  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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<table>
<thead>
<tr>
<th>Fortran benchmarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>648.exchange2_s(base)</td>
</tr>
</tbody>
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Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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**Base Compiler Invocation**

C benchmarks:  
icc

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Copyright 2017-2020 Standard Performance Evaluation Corporation

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

Base Compiler Invocation (Continued)

C++ benchmarks:
icpc
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:
-m64 -qnextgen -std=c11
-W1,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-fuse-ld=gold -qopt-mem-layout-trans=4 -fopenmp -DSPEC_OPENMP
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-W1,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse
-funroll-loops -fuse-ld=gold -qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

Fortran benchmarks:
-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -xCORE-AVX512
-O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte
-mbranches-within-32B-boundaries
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ThinkSystem SR630
(2.10 GHz, Intel Xeon Gold 6230R)