**SPEC CPU®2017 Integer Speed Result**

**Lenovo Global Technology**

ThinkSystem SR860  
(3.30 GHz, Intel Xeon Gold 6246)

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

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### Hardware

- **CPU Name:** Intel Xeon Gold 6246  
- **Max MHz:** 4200  
- **Nominal:** 3300  
- **Enabled:** 48 cores, 4 chips  
- **Orderable:** 2,4 chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **Cache L2:** 1 MB I+D on chip per core  
- **Cache L3:** 24.75 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R)  
- **Storage:** 800 GB tmpfs  
- **Other:** None

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### Software

- **OS:** SUSE Linux Enterprise Server 12 SP4 (x86_64)  
- **Kernel:** 4.12.14-94.41-default  
- **Compiler:** C/C++: Version 19.0.4.227 of Intel  
- **Parallel:** Yes  
- **Firmware:** Lenovo BIOS Version TEE142E 2.30 released Aug-2019 tested as TEE141E 2.30 Jul-2019  
- **File System:** tmpfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** jemalloc memory allocator V5.0.1  
- **Power Management:** --

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**CPU2017 License:** 9017  
**Test Date:** Aug-2019  
**Hardware Availability:** Jul-2019  
**Software Availability:** May-2019  

---

**SPECspeed®2017_int_base =** 10.7  
**SPECspeed®2017_int_peak =** Not Run
Lenovo Global Technology
ThinkSystem SR860 (3.30 GHz, Intel Xeon Gold 6246)

CPU2017 License: 9017
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Results Table

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</tbody>
</table>

SPECspeed®2017_int_base = 10.7
SPECspeed®2017_int_peak = Not Run

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

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
Tmpfs filesystem can be set with:
mount -t tmpfs -o size=800g tmpfs /home
Process tuning setting:
echo 50000 > /proc/sys/kernel/sched_cfs_bandwidth_slice_us
echo 240000000 > /proc/sys/kernel/sched_latency_ns
echo 5000000 > /proc/sys/kernel/sched_migration_cost_ns
echo 100000000 > /proc/sys/kernel/sched_min_granularity_ns
echo 150000000 > /proc/sys/kernel/sched_wakeup_granularity_ns

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19.0u4/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017-1.0.5-ic19.0u4/je5.0.1-64"
OMP_STACKSIZE = "192M"
Binaries compiled on a system with 1x Intel Core i9-799X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
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
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.

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

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SPECspeed®2017_int_base = 10.7
SPECspeed®2017_int_peak = Not Run

General Notes (Continued)

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
Choose Operating Mode set to Custom Mode
Hyper-Threading set to Disable
Adjacent Cache Prefetch set to Disable
MONITOR/MWAIT set to Enable
Sysinfo program /home/cpu2017-1.0.5-ic19.0u4/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-6lsv Fri Aug 16 17:36:37 2019

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 6246 CPU @ 3.30GHz
4 "physical id"'s (chips)
48 "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 : 12
siblings : 12
physical 0: cores 0 1 2 3 4 8 10 11 17 18 25 27
physical 1: cores 0 2 4 8 9 10 11 17 18 19 25 27
physical 2: cores 1 2 3 4 10 11 16 17 18 24 25 27
physical 3: cores 1 2 4 8 9 10 11 16 17 19 26 27

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 48
On-line CPU(s) list: 0-47
Thread(s) per core: 1

(Continued on next page)
Algorithm visualizations (not shown) are included in the full text.

**Platform Notes (Continued)**

- Core(s) per socket: 12
- Socket(s): 4
- NUMA node(s): 4
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 6246 CPU @ 3.30GHz
- Stepping: 7
- CPU MHz: 3300.000
- CPU max MHz: 4200.0000
- CPU min MHz: 1200.0000
- BogoMIPS: 6600.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 25344K
- NUMA node0 CPU(s): 0-11
- NUMA node1 CPU(s): 12-23
- NUMA node2 CPU(s): 24-35
- NUMA node3 CPU(s): 36-47
- Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acp1 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 aperffmapref 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 xsave avx f16c rdrand lahf_lm abtm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_pentium ssbd mba ibrs ibpb stibp tpr_shadow vmmx flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdts_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsxopt xsaveopt xsaveprec xgetbv1 xsaves cqmsrq cqmsr_1lc cqmsr_2lc qmmv qmmx Local qmmx_1lc qmmx_2lc qmmx_3lc qmmx_4lc qmmx_5lc qmmx_6lc qmmx_7lc qmmx_8lc qmmx_9lc qmmx_10lc qmmx_11lc qmmx_12lc qmmx_13lc qmmx_14lc qmmx_15lc qmmx_16lc qmmx_17lc qmmx_18lc qmmx_19lc qmmx_20lc qmmx_21lc qmmx_22lc qmmx_23lc qmmx_24lc qmmx_25lc qmmx_26lc qmmx_27lc qmmx_28lc qmmx_29lc qmmx_30lc qmmx_31lc qmmx_32lc qmmx_33lc qmmx_34lc qmmx_35lc qmmx_36lc qmmx_37lc qmmx_38lc qmmx_39lc qmmx_40lc qmmx_41lc qmmx_42lc qmmx_43lc qmmx_44lc qmmx_45lc qmmx_46lc qmmx_47lc qmmx_48lc qmmx_49lc qmmx_50lc qmmx_51lc qmmx_52lc qmmx_53lc qmmx_54lc qmmx_55lc qmmx_56lc qmmx_57lc qmmx_58lc qmmx_59lc qmmx_60lc qmmx_61lc qmmx_62lc qmmx_63lc qmmx_64lc qmmx_65lc qmmx_66lc qmmx_67lc qmmx_68lc qmmx_69lc qmmx_70lc qmmx_71lc qmmx_72lc qmmx_73lc qmmx_74lc qmmx_75lc qmmx_76lc qmmx_77lc qmmx_78lc qmmx_79lc qmmx_80lc qmmx_81lc qmmx_82lc qmmx_83lc qmmx_84lc qmmx_85lc qmmx_86lc qmmx_87lc qmmx_88lc qmmx_89lc qmmx_90lc qmmx_91lc qmmx_92lc qmmx_93lc qmmx_94lc qmmx_95lc qmmx_96lc qmmx_97lc qmmx_98lc qmmx_99lc qmmx_100lc qmmx_101lc qmmx_102lc qmmx_103lc qmmx_104lc qmmx_105lc qmmx_106lc qmmx_107lc qmmx_108lc qmmx_109lc qmmx_110lc qmmx_111lc qmmx_112lc qmmx_113lc qmmx_114lc qmmx_115lc qmmx_116lc qmmx_117lc qmmx_118lc qmmx_119lc qmmx_120lc qmmx_121lc qmmx_122lc qmmx_123lc qmmx_124lc qmmx_125lc qmmx_126lc qmmx_127lc qmmx_128lc

From numbactl --hardware WARNING: a numbactl '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
- node 0 size: 386666 MB
- node 0 free: 386279 MB
- node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23
- node 1 size: 387059 MB
- node 1 free: 386369 MB
- node 2 cpus: 24 25 26 27 28 29 30 31 32 33 34 35
- node 2 size: 387059 MB

(Continued on next page)
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SPECspeed®2017_int_base = 10.7
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Platform Notes (Continued)

node 2 free: 384513 MB
node 3 cpus: 36 37 38 39 40 41 42 43 44 45 46 47
node 3 size: 387027 MB
node 3 free: 376819 MB
node distances:
  node   0   1   2   3
  0:  10  21  21  31
  1:  21  10  31  21
  2:  21  31  10  21
  3:  31  21  21  10

From /proc/meminfo
  MemTotal: 1584960364 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
  SuSE-release:
    SUSE Linux Enterprise Server 12 (x86_64)
    VERSION = 12
    PATCHLEVEL = 4
    # This file is deprecated and will be removed in a future service pack or release.
    # Please check /etc/os-release for details about this release.
  os-release:
    NAME="SLES"
    VERSION="12-SP4"
    VERSION_ID="12.4"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12:sp4"

uname -a:
  x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Not affected
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

run-level 3 Aug 16 17:31

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u4
  Filesystem Type Size Used Avail Use% Mounted on
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Platform Notes (Continued)

tmpfs          tmpfs  800G  8.3G  792G   2% /home

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.

BIOS Lenovo -[TEE141E-2.30]- 07/02/2019
Memory: 48x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C       | 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base)
| 625.x264_s(base) 657.xz_s(base)
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
==============================================================================

C++     | 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
| 641.leela_s(base)
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
==============================================================================

Fortran | 648.exchange2_s(base)
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
==============================================================================

Base Compiler Invocation

C benchmarks:
  icc -m64 -std=c11

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### Base Compiler Invocation (Continued)

- **C++ benchmarks:**  
  icpc -m64

- **Fortran benchmarks:**  
  ifort -m64

### 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:**  
  `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
  -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP  
  -L/usr/local/je5.0.1-64/lib -ljemalloc`

- **C++ benchmarks:**  
  `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
  -qopt-mem-layout-trans=4  
  -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64  
  -lqkmalloc`

- **Fortran benchmarks:**  
  `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4  
  -nostandard-realloc-1hs`

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-D.html
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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-D.xml

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