Lenovo Global Technology
ThinkSystem SR860
(2.30 GHz, Intel Xeon Gold 6140)

SPEC® CPU2017 Integer Speed Result

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

Hardware
CPU Name: Intel Xeon Gold 6140
Max MHz.: 3700
Nominal: 2300
Enabled: 72 cores, 4 chips
Orderable: 2,4 chips
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 1 MB I+D on chip per core
L3: 24.75 MB I+D on chip per chip
Other: None
Memory: 768 GB (48 x 16 GB 2Rx8 PC4-2666V-R)
Storage: 1 x 800 GB SAS SSD
Other: None

Software
OS: SUSE Linux Enterprise Server 12 SP3 (x86_64)
Kernel 4.4.73-5-default
Compiler: C/C++: Version 18.0.0.128 of Intel C/C++
Compiler for Linux:
Fortran: Version 18.0.0.128 of Intel Fortran
Compiler for Linux
Parallel: Yes
Firmware: Lenovo BIOS Version TEE117I 1.10 released Oct-2017
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: jemalloc: jemalloc memory allocator library
V5.0.1;
jemalloc: configured and built at default for
32bit (i686) and 64bit (x86_64) targets;
jemalloc: built with the RedHat Enterprise 7.4,
and the system compiler gcc 4.8.5;
jemalloc: sources avilable from jemalloc.net or
releases

SPECspeed2017_int_base = 8.85
SPECspeed2017_int_peak = 9.06
Lenovo Global Technology

ThinkSystem SR860
(2.30 GHz, Intel Xeon Gold 6140)

SPEC CPU2017 Integer Speed Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Lenovo Global Technology

Test Sponsor: Lenovo Global Technology

Test Date: Dec-2017

Hardware Availability: Nov-2017

Tested by: Lenovo Global Technology

Software Availability: Sep-2017

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>72</td>
<td>287</td>
<td>6.18</td>
<td>285</td>
<td>6.22</td>
<td>286</td>
<td>6.20</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>72</td>
<td>435</td>
<td>9.16</td>
<td>433</td>
<td>9.19</td>
<td>434</td>
<td>9.17</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>72</td>
<td>435</td>
<td>10.9</td>
<td>434</td>
<td>10.9</td>
<td>435</td>
<td>10.8</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>72</td>
<td>250</td>
<td>6.51</td>
<td>253</td>
<td>6.46</td>
<td>245</td>
<td>6.66</td>
</tr>
<tr>
<td>623.xalanchmk_s</td>
<td>72</td>
<td>151</td>
<td>9.40</td>
<td>149</td>
<td>9.50</td>
<td>150</td>
<td>9.43</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>72</td>
<td>151</td>
<td>11.7</td>
<td>150</td>
<td>11.7</td>
<td>151</td>
<td>11.7</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>72</td>
<td>290</td>
<td>4.93</td>
<td>289</td>
<td>4.95</td>
<td>290</td>
<td>4.95</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>72</td>
<td>394</td>
<td>4.33</td>
<td>394</td>
<td>4.33</td>
<td>394</td>
<td>4.33</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>72</td>
<td>221</td>
<td>13.3</td>
<td>220</td>
<td>13.4</td>
<td>220</td>
<td>13.4</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>72</td>
<td>266</td>
<td>23.2</td>
<td>266</td>
<td>23.2</td>
<td>266</td>
<td>23.3</td>
</tr>
</tbody>
</table>

SPECspeed2017_int_base = 8.85
SPECspeed2017_int_peak = 9.06

Operating System Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017.1.0.2.ic18.0/lib/ia32:/home/cpu2017.1.0.2.ic18.0/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017.1.0.2.ic18.0/je5.0.1-32:/home/cpu2017.1.0.2.ic18.0/je5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.4

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

No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
No: 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.
No: 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.

This benchmark result is intended to provide perspective on past performance using the historical hardware and/or software described on this result page.

The system as described on this result page was formerly
SPEC CPU2017 Integer Speed Result

Lenovo Global Technology
ThinkSystem SR860
(2.30 GHz, Intel Xeon Gold 6140)

SPECspeed2017_int_peak = 9.06
SPECspeed2017_int_base = 8.85

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Dec-2017
Tested by: Lenovo Global Technology
Hardware Availability: Nov-2017
Software Availability: Sep-2017

General Notes (Continued)

generally available. At the time of this publication, it may not be shipping, and/or may not be supported, and/or may fail to meet other tests of General Availability described in the SPEC OSG Policy document, http://www.spec.org/osg/policy.html

This measured result may not be representative of the result that would be measured were this benchmark run with hardware and software available as of the publication date.

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Hyper-Threading set to Disable
Adjacent Cache Prefetch set to Disable
MONITORMWAIT set to Enable
XPT Prefetcher set to Disable
Patrol Scrub set to Disable
StaleAtoS set to Enable
LLC deadline alloc set to Disable
Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618b6cc091c0f
running on SR860 Fri Dec 29 19:55:34 2017

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 6140 CPU @ 2.30GHz
4 "physical id" s (chips)
72 "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 : 18
siblings : 18
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 3: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 72

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR860
(2.30 GHz, Intel Xeon Gold 6140)

SPECspeed2017_int_base = 8.85
SPECspeed2017_int_peak = 9.06

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

Test Date: Dec-2017
Hardware Availability: Nov-2017
Software Availability: Sep-2017

Platform Notes (Continued)

On-line CPU(s) list: 0-71
Thread(s) per core: 1
Core(s) per socket: 18
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6140 CPU @ 2.30GHz
Stepping: 4
CPU MHz: 2294.600
BogoMIPS: 4589.20
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-17
NUMA node1 CPU(s): 18-35
NUMA node2 CPU(s): 36-53
NUMA node3 CPU(s): 54-71
Flags:

fpu vme de pse mce pop mtrr pae mca cmov
pat pse36 clflush dts acpl 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
aperfperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtrr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb pln pts dtherm intel_pt
tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd
avx512bw avx512vl xsaveopt xsaves xgetbv1 cqm_llc cqm_occu_pll pku ospke

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 14 15 16 17
node 0 size: 193128 MB
node 0 free: 192732 MB
node 1 cpus: 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
node 1 size: 193526 MB
node 1 free: 193253 MB
node 2 cpus: 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
node 2 size: 193526 MB
node 2 free: 193311 MB
node 3 cpus: 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71

(Continued on next page)
SPEC CPU2017 Integer Speed Result

Lenovo Global Technology
ThinkSystem SR860
(2.30 GHz, Intel Xeon Gold 6140)

SPECspeed2017_int_base = 8.85
SPECspeed2017_int_peak = 9.06

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Dec-2017
Hardware Availability: Nov-2017
Tested by: Lenovo Global Technology
Software Availability: Sep-2017

Platform Notes (Continued)

node 3 size: 193523 MB
node 3 free: 193290 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: 792273988 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 3
# 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-SP3"
VERSION_ID="12.3"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
Linux SR860 4.4.73-5-default #1 SMP Tue Jul 4 15:33:39 UTC 2017 (b7ce4e4) x86_64
x86_64 x86_64 GNU/Linux

run-level 3 Dec 29 19:54

SPEC is set to: /home/cpu2017.1.0.2.ic18.0

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 -[TEE117I-1.10]- 10/19/2017
Memory:
48x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666

(Continued on next page)
### SPEC CPU2017 Integer Speed Result

**Lenovo Global Technology**

ThinkSystem SR860
(2.30 GHz, Intel Xeon Gold 6140)

<table>
<thead>
<tr>
<th>CPU2017 License: 9017</th>
<th>Test Date: Dec-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: Lenovo Global Technology</td>
<td>Hardware Availability: Nov-2017</td>
</tr>
<tr>
<td>Tested by: Lenovo Global Technology</td>
<td>Software Availability: Sep-2017</td>
</tr>
</tbody>
</table>

**SPECspeed2017_int_base = 8.85**

**SPECspeed2017_int_peak = 9.06**

### Platform Notes (Continued)

(End of data from sysinfo program)

### Compiler Version Notes

```plaintext
==============================================================================
CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base, peak) 657.xz_s(base)
------------------------------------------------------------------------------
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CC  600.perlbench_s(peak) 602.gcc_s(peak) 605.mcf_s(peak) 657.xz_s(peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base) 641.leela_s(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CXXC 620.omnetpp_s(peak) 623.xalancbmk_s(peak) 631.deepsjeng_s(peak) 641.leela_s(peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
FC  648.exchange2_s(base, peak)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
```
**SPEC CPU2017 Integer Speed Result**

**Lenovo Global Technology**
ThinkSystem SR860  
(2.30 GHz, Intel Xeon Gold 6140)

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base = 8.85</th>
<th>SPECspeed2017_int_peak = 9.06</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2017 License: 9017</td>
<td>Test Date: Dec-2017</td>
</tr>
<tr>
<td>Test Sponsor: Lenovo Global Technology</td>
<td>Hardware Availability: Nov-2017</td>
</tr>
<tr>
<td>Tested by: Lenovo Global Technology</td>
<td>Software Availability: Sep-2017</td>
</tr>
</tbody>
</table>

### Base Compiler Invocation

- **C benchmarks:**  
  - icc

- **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:**  
  - -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
  - -qopt-mem-layout-trans=3 -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=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

- **Fortran benchmarks:**  
  - -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
  - -qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
  - -L/usr/local/je5.0.1-64/lib -ljemalloc
**SPEC CPU2017 Integer Speed Result**

**Lenovo Global Technology**

ThinkSystem SR860  
(2.30 GHz, Intel Xeon Gold 6140)

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base</th>
<th>8.85</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_int_peak</td>
<td>9.06</td>
</tr>
</tbody>
</table>

| CPU2017 License         | 9017  |
| Test Sponsor            | Lenovo Global Technology |
| Tested by               | Lenovo Global Technology  |
| Test Date               | Dec-2017 |
| Hardware Availability   | Nov-2017 |
| Software Availability   | Sep-2017 |

**Base Other Flags**

- C benchmarks:  
  - `-m64`  
  - `std=c11`

- C++ benchmarks:  
  - `-m64`

- Fortran benchmarks:  
  - `-m64`

**Peak Compiler Invocation**

- C benchmarks:  
  - `icc`

- C++ benchmarks:  
  - `icpc`

- Fortran benchmarks:  
  - `ifort`

**Peak 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: `-D_FILE_OFFSET_BITS=64 -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`

**Peak Optimization Flags**

- C benchmarks:  
  - `600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2`  
  - `-xCORE-AVX512 -qopt-mem-layout-trans=3 -ipo -O3`  
  - `-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp`

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR860
(2.30 GHz, Intel Xeon Gold 6140)

SPEC CPU2017 Integer Speed Result
Copyright 2017-2018 Standard Performance Evaluation Corporation

Lenovo Global Technology

SPECspeed2017_int_base = 8.85
SPECspeed2017_int_peak = 9.06

Peak Optimization Flags (Continued)

600.perlbench_s (continued):
-DSPEC_OPENMP -fno-strict-overflow
-L/usr/local/je5.0.1-64/lib -ljemalloc

602.gcc_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -gopt-mem-layout-trans=3 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_OPENMP -gopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

605.mcf_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -gopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -gopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

625.x264_s: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-gopt-mem-layout-trans=3 -gopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

657.xz_s: Same as 602.gcc_s

C++ benchmarks:

620.omnetpp_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -gopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -gopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

623.xalancbmk_s: -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32
-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -gopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -gopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-32/lib -ljemalloc

631.deepsjeng_s: Same as 620.omnetpp_s

641.leela_s: Same as 620.omnetpp_s

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-gopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc
Lenovo Global Technology
ThinkSystem SR860
(2.30 GHz, Intel Xeon Gold 6140)

SPEC CPU2017 Integer Speed Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

SPECspeed2017_int_base = 8.85
SPECspeed2017_int_peak = 9.06

Peak Other Flags

C benchmarks:
- m64  -std=c11

C++ benchmarks (except as noted below):
- m64

623.xalancbmk_s: -m32

Fortran benchmarks:
- m64

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.html
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.xml

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-SKL-A.xml

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU2017 v1.0.2 on 2017-12-29 06:55:33-0500.
Report generated on 2018-10-31 16:45:04 by CPU2017 PDF formatter v6067.
Originally published on 2018-03-06.