



# SPEC® CPU2017 Integer Speed Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

## Lenovo Global Technology

ThinkSystem SR630  
(2.20 GHz, Intel Xeon Gold 5120)

SPECspeed2017\_int\_base = 7.61

SPECspeed2017\_int\_peak = 7.82

CPU2017 License: 9017

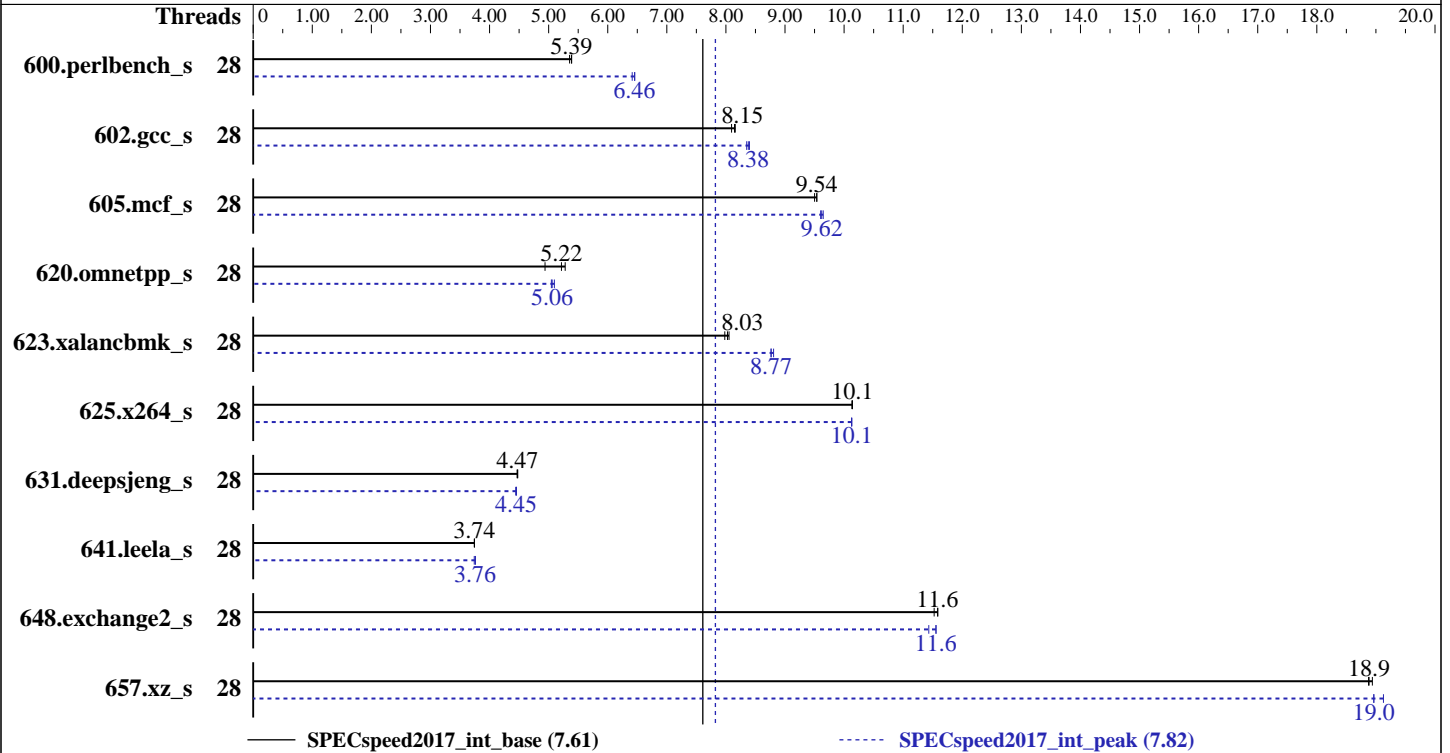
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Dec-2017

Hardware Availability: Aug-2017

Software Availability: Sep-2017



### Hardware

CPU Name: Intel Xeon Gold 5120  
 Max MHz.: 3200  
 Nominal: 2200  
 Enabled: 28 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: 19.25 MB I+D on chip per chip  
 Other: None  
 Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)  
 Storage: 1 x 800 GB SAS SSD  
 Other: None

### Software

OS: SUSE Linux Enterprise Server 12 SP2 (x86\_64)  
 Kernel 4.4.21-69-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 IVE109Q 1.00 released Jun-2017  
 File System: btrfs  
 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 available from jemalloc.net or releases



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## Results Table

Benchmark	Base						Peak							
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	28	332	5.35	<b>330</b>	<b>5.39</b>	329	5.39	28	<b>275</b>	<b>6.46</b>	277	6.41	275	6.46
602.gcc_s	28	<b>489</b>	<b>8.15</b>	488	8.16	492	8.10	28	477	8.35	<b>475</b>	<b>8.38</b>	474	8.40
605.mcf_s	28	497	9.50	495	9.54	<b>495</b>	<b>9.54</b>	28	<b>491</b>	<b>9.62</b>	492	9.60	489	9.65
620.omnetpp_s	28	<b>313</b>	<b>5.22</b>	309	5.28	330	4.94	28	<b>322</b>	<b>5.06</b>	320	5.10	323	5.05
623.xalancbmk_s	28	<b>177</b>	<b>8.03</b>	178	7.98	176	8.05	28	<b>162</b>	<b>8.77</b>	162	8.76	161	8.81
625.x264_s	28	174	10.1	<b>174</b>	<b>10.1</b>	174	10.1	28	174	10.1	174	10.1	<b>174</b>	<b>10.1</b>
631.deepsjeng_s	28	<b>320</b>	<b>4.47</b>	320	4.48	321	4.47	28	<b>322</b>	<b>4.45</b>	322	4.46	323	4.44
641.leela_s	28	456	3.75	<b>456</b>	<b>3.74</b>	456	3.74	28	<b>454</b>	<b>3.76</b>	454	3.76	456	3.74
648.exchange2_s	28	254	11.6	255	11.5	<b>254</b>	<b>11.6</b>	28	254	11.6	<b>254</b>	<b>11.6</b>	257	11.4
657.xz_s	28	<b>327</b>	<b>18.9</b>	326	18.9	328	18.9	28	323	19.1	326	19.0	<b>326</b>	<b>19.0</b>

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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"

## General Notes

Environment variables set by runcpu before the start of the run:

KMP\_AFFINITY = "granularity=fine,scatter"

LD\_LIBRARY\_PATH = "/home/cpu2017.1.0.2.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"

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
```

## Platform Notes

BIOS configuration:

Choose Operating Mode set to Maximum Performance

Hyper-Threading set to Disable

MONITORMWAIT set to Enable

Adjacent Cache Prefetch set to Disable

XPT Prefetcher set to Enable

Stale AtoS set to Enable

DCA set to Enable

Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo

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### Platform Notes (Continued)

Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f  
running on Cable-SPECcpu2017-SUSE12SP2 Sat Dec 2 20:36:07 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 5120 CPU @ 2.20GHz
 2 "physical id"s (chips)
 28 "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 : 14
siblings : 14
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
```

From lscpu:

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 28
On-line CPU(s) list: 0-27
Thread(s) per core: 1
Core(s) per socket: 14
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5120 CPU @ 2.20GHz
Stepping: 4
CPU MHz: 2194.857
BogoMIPS: 4389.71
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 19712K
NUMA node0 CPU(s): 0-13
NUMA node1 CPU(s): 14-27
Flags: fpu vme de pse tsc msr pae mce 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
aperfperf eagerfpu 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
```

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### Platform Notes (Continued)

```
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb pln pts dtherm intel_pt
tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmil hle avx2 smep bmi2
erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd
avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc
```

```
/proc/cpuinfo cache data
cache size : 19712 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
node 0 size: 193110 MB
node 0 free: 192352 MB
node 1 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27
node 1 size: 193504 MB
node 1 free: 192762 MB
node distances:
node 0 1
0: 10 21
1: 21 10
```

```
From /proc/meminfo
MemTotal: 395893364 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

```
From /etc/*release* /etc/*version*
SuSE-release:
SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 2
# 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-SP2"
VERSION_ID="12.2"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp2"
```

```
uname -a:
Linux Cable-SPECcpu2017-SUSE12SP2 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC
2016 (9464f67) x86_64 x86_64 x86_64 GNU/Linux
```

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### Platform Notes (Continued)

run-level 3 Dec 2 20:35

SPEC is set to: /home/cpu2017.1.0.2.icl8.0  
Filesystem      Type      Size   Used Avail Use% Mounted on  
/dev/sda2       btrfs    744G   171G  573G  23% /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 -[IVE109Q-1.00]- 06/28/2017

Memory:

24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

### Compiler Version Notes

=====  
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

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## Compiler Version Notes (Continued)

Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

FC 648.exchange2\_s(base, peak)

ifort (IFORT) 18.0.0 20170811

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## 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

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## Base Optimization Flags (Continued)

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
```

## 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
```

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## Peak Portability Flags (Continued)

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: -w1,-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  
-DSPEC\_OPENMP -fno-strict-overflow  
-L/usr/local/je5.0.1-64/lib -ljemalloc

602.gcc\_s: -w1,-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  
-DSPEC\_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

605.mcf\_s: -w1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-DSPEC\_SUPPRESS\_OPENMP -qopenmp -DSPEC\_OPENMP  
-L/usr/local/je5.0.1-64/lib -ljemalloc

625.x264\_s: -w1,-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

657.xz\_s: Same as 602.gcc\_s

C++ benchmarks:

620.omnetpp\_s: -w1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-DSPEC\_SUPPRESS\_OPENMP -qopenmp -DSPEC\_OPENMP  
-L/usr/local/je5.0.1-64/lib -ljemalloc

623.xalancbmk\_s: -L/opt/intel/compilers\_and\_libraries\_2018/linux/lib/ia32  
-w1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-DSPEC\_SUPPRESS\_OPENMP -qopenmp -DSPEC\_OPENMP  
-L/usr/local/je5.0.1-32/lib -ljemalloc

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## Peak Optimization Flags (Continued)

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
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

## 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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-A.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.xml>

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-A.xml>

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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