



# SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

## Lenovo Global Technology

ThinkSystem SR950  
(2.10 GHz, Intel Xeon Platinum 8176M)

**SPECSpeed®2017\_int\_base = 9.36**

**SPECSpeed®2017\_int\_peak = 9.63**

CPU2017 License: 9017

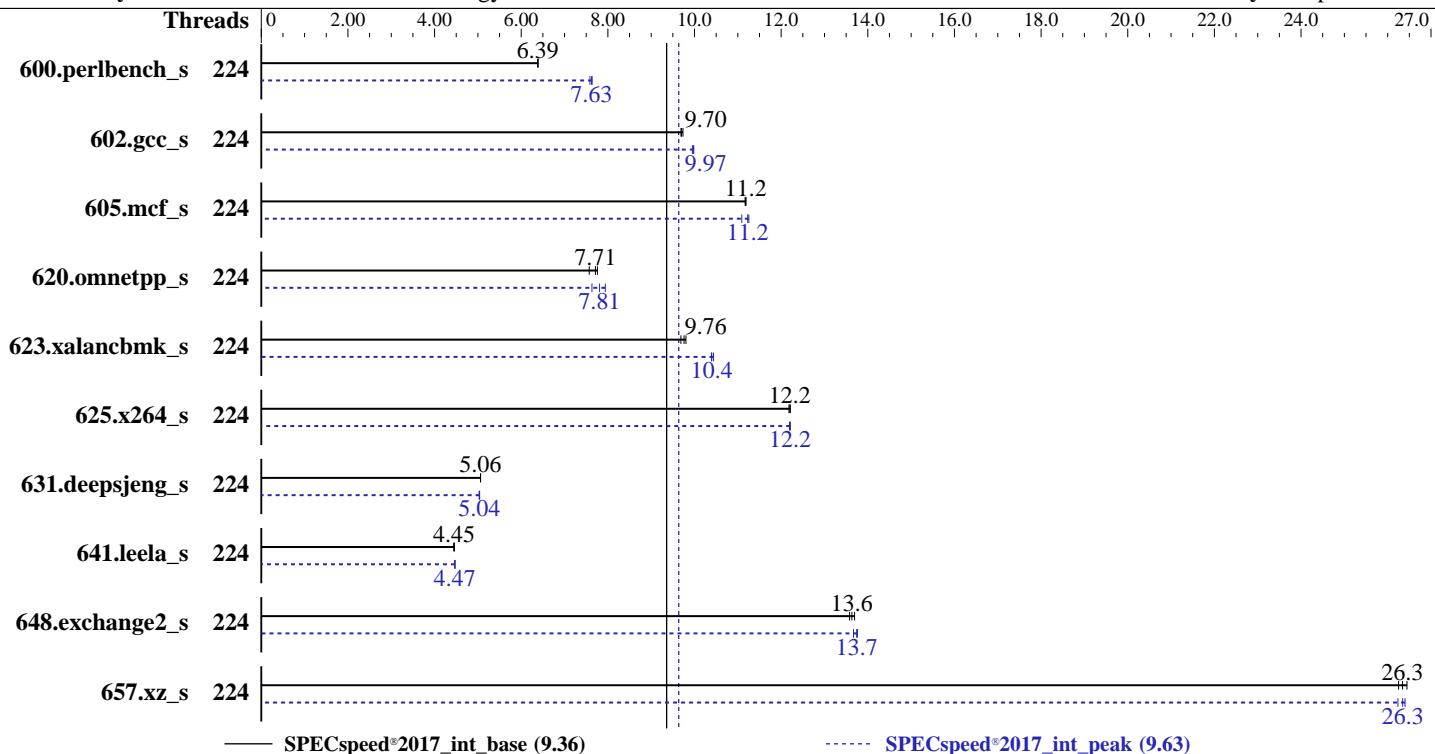
Test Date: Dec-2017

Test Sponsor: Lenovo Global Technology

Hardware Availability: Sep-2017

Tested by: Lenovo Global Technology

Software Availability: Sep-2017



Hardware		Software	
CPU Name:	Intel Xeon Platinum 8176M	OS:	SUSE Linux Enterprise Server 12 SP2 (x86_64)
Max MHz:	3800		Kernel 4.4.21-69-default
Nominal:	2100	Compiler:	C/C++: Version 18.0.0.128 of Intel C/C++ Compiler for Linux;
Enabled:	224 cores, 8 chips		Fortran: Version 18.0.0.128 of Intel Fortran Compiler for Linux
Orderable:	2,4,8 chips	Parallel:	Yes
Cache L1:	32 KB I + 32 KB D on chip per core	Firmware:	Lenovo BIOS Version PSE105X 1.00 released Aug-2017
L2:	1 MB I+D on chip per core	File System:	btrfs
L3:	38.5 MB I+D on chip per chip	System State:	Run level 3 (multi-user)
Other:	None	Base Pointers:	64-bit
Memory:	3 TB (96 x 32 GB 2Rx4 PC4-2666V-R)	Peak Pointers:	32/64-bit
Storage:	1 x 800 GB SAS SSD	Other:	jemalloc: jemalloc memory allocator library V5.0.1
Other:	None	Power Management:	--



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## Results Table

Benchmark	Base								Peak							
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	224	<b>278</b>	<b>6.39</b>	278	6.38	278	6.39	224	234	7.59	<b>233</b>	<b>7.63</b>	232	7.64		
602.gcc_s	224	<b>411</b>	<b>9.70</b>	411	9.69	409	9.73	224	399	9.98	<b>399</b>	<b>9.97</b>	400	9.95		
605.mcf_s	224	<b>422</b>	<b>11.2</b>	422	11.2	423	11.2	224	419	11.3	426	11.1	<b>420</b>	<b>11.2</b>		
620.omnetpp_s	224	215	7.57	<b>211</b>	<b>7.71</b>	210	7.76	224	<b>209</b>	<b>7.81</b>	205	7.94	214	7.63		
623.xalancbmk_s	224	145	9.80	146	9.69	<b>145</b>	<b>9.76</b>	224	<b>136</b>	<b>10.4</b>	136	10.4	136	10.4		
625.x264_s	224	145	12.2	144	12.2	<b>145</b>	<b>12.2</b>	224	145	12.2	<b>145</b>	<b>12.2</b>	144	12.2		
631.deepsjeng_s	224	<b>283</b>	<b>5.06</b>	283	5.06	283	5.06	224	<b>285</b>	<b>5.04</b>	284	5.04	285	5.03		
641.leela_s	224	383	4.45	<b>383</b>	<b>4.45</b>	384	4.45	224	382	4.47	382	4.47	<b>382</b>	<b>4.47</b>		
648.exchange2_s	224	215	13.7	<b>216</b>	<b>13.6</b>	217	13.6	224	215	13.7	214	13.8	<b>214</b>	<b>13.7</b>		
657.xz_s	224	<b>235</b>	<b>26.3</b>	234	26.4	235	26.3	224	234	26.4	236	26.2	<b>235</b>	<b>26.3</b>		
SPECspeed®2017_int_base =				9.36												
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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"

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

jemalloc, a general purpose malloc implementation

built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5

configured and built at default for

32bit (i686) and 64bit (x86\_64) targets;

sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

## Platform Notes

BIOS configuration:

Choose Operating Mode set to Maximum Performance

Hyper-Threading set to Disable

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## Platform Notes (Continued)

MONITORWAIT set to Enable

Execute Disable Bit set to Disable

Intel Virtualization Technology set to Disable

Uncore Frequency Scaling set to Disable

XPT Prefetcher set to Enable

UPI Prefetcher set to Disable

Stale AtoS set to Enable

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

Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f  
running on linux-boxi Tue Dec 12 19:23:12 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) Platinum 8176M CPU @ 2.10GHz
  8 "physical id"s (chips)
  224 "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 : 28
siblings : 28
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 4: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 5: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 6: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
physical 7: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
28 29 30
```

From lscpu:

Architecture:	x86_64
CPU op-mode(s):	32-bit, 64-bit
Byte Order:	Little Endian
CPU(s):	224
On-line CPU(s) list:	0-223
Thread(s) per core:	1

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## Platform Notes (Continued)

Core(s) per socket: 28  
Socket(s): 8  
NUMA node(s): 8  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Platinum 8176M CPU @ 2.10GHz  
Stepping: 4  
CPU MHz: 2095.097  
BogoMIPS: 4190.19  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 39424K  
NUMA node0 CPU(s): 0-27  
NUMA node1 CPU(s): 28-55  
NUMA node2 CPU(s): 56-83  
NUMA node3 CPU(s): 84-111  
NUMA node4 CPU(s): 112-139  
NUMA node5 CPU(s): 140-167  
NUMA node6 CPU(s): 168-195  
NUMA node7 CPU(s): 196-223  
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 aperfmpfperf 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 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 bmi1 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 : 39424 KB

From numactl --hardware   WARNING: a numactl 'node' might or might not correspond to a physical chip.

available: 8 nodes (0-7)  
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 26 27  
node 0 size: 386513 MB  
node 0 free: 385434 MB  
node 1 cpus: 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  
node 1 size: 387057 MB  
node 1 free: 386086 MB  
node 2 cpus: 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

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## Platform Notes (Continued)

```
81 82 83
node 2 size: 387057 MB
node 2 free: 386065 MB
node 3 cpus: 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105
106 107 108 109 110 111
node 3 size: 387057 MB
node 3 free: 386049 MB
node 4 cpus: 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129
130 131 132 133 134 135 136 137 138 139
node 4 size: 387057 MB
node 4 free: 385892 MB
node 5 cpus: 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157
158 159 160 161 162 163 164 165 166 167
node 5 size: 387057 MB
node 5 free: 386047 MB
node 6 cpus: 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185
186 187 188 189 190 191 192 193 194 195
node 6 size: 387057 MB
node 6 free: 386093 MB
node 7 cpus: 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213
214 215 216 217 218 219 220 221 222 223
node 7 size: 387052 MB
node 7 free: 386063 MB
node distances:
node   0   1   2   3   4   5   6   7
  0: 10  21  31  21  21  31  31  31
  1: 21  10  21  31  31  21  31  31
  2: 31  21  10  21  31  31  21  31
  3: 21  31  21  10  31  31  31  21
  4: 21  31  31  31  10  21  21  31
  5: 31  21  31  31  21  10  31  21
  6: 31  31  21  31  21  31  10  21
  7: 31  31  31  21  31  21  21  10
```

```
From /proc/meminfo
MemTotal:      3170210052 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:
```

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## Platform Notes (Continued)

```
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 linux-boxi 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016 (9464f67)
x86_64 x86_64 x86_64 GNU/Linux
```

run-level 3 Dec 12 19:21

```
SPEC is set to: /home/cpu2017.1.0.2.ic18.0
Filesystem      Type   Size  Used Avail Use% Mounted on
/dev/sdb2        btrfs  744G  25G  719G  4%  /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 -[PSE105X-1.00]- 08/17/2017

Memory:

```
96x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666
```

(End of data from sysinfo program)

## Compiler Version Notes

```
=====
C      | 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base,
      | peak) 625.x264_s(base, peak) 657.xz_s(base, peak)
-----
```

```
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
-----
```

```
=====
C++    | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak)
      | 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)
-----
```

```
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
-----
```

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## Compiler Version Notes (Continued)

=====  
Fortran | 648.exchange2\_s(base, peak)

-----  
ifort (IFORT) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
-----

## Base Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

Fortran benchmarks:

fort

## 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

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## Base Optimization Flags (Continued)

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
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
```

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## Peak Portability Flags (Continued)

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
-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 -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: -Wl,-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: -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
```

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 -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
-Wl,-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
```

631.deepsjeng\_s: Same as 620.omnetpp\_s

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## Peak Optimization Flags (Continued)

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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