



# SPEC CPU®2017 Integer Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

## Lenovo Global Technology

ThinkSystem SR860 V2  
(2.90 GHz, Intel Xeon Platinum 8380H)

**SPECSpeed®2017\_int\_base = 12.4**

**SPECSpeed®2017\_int\_peak = 12.6**

CPU2017 License: 9017

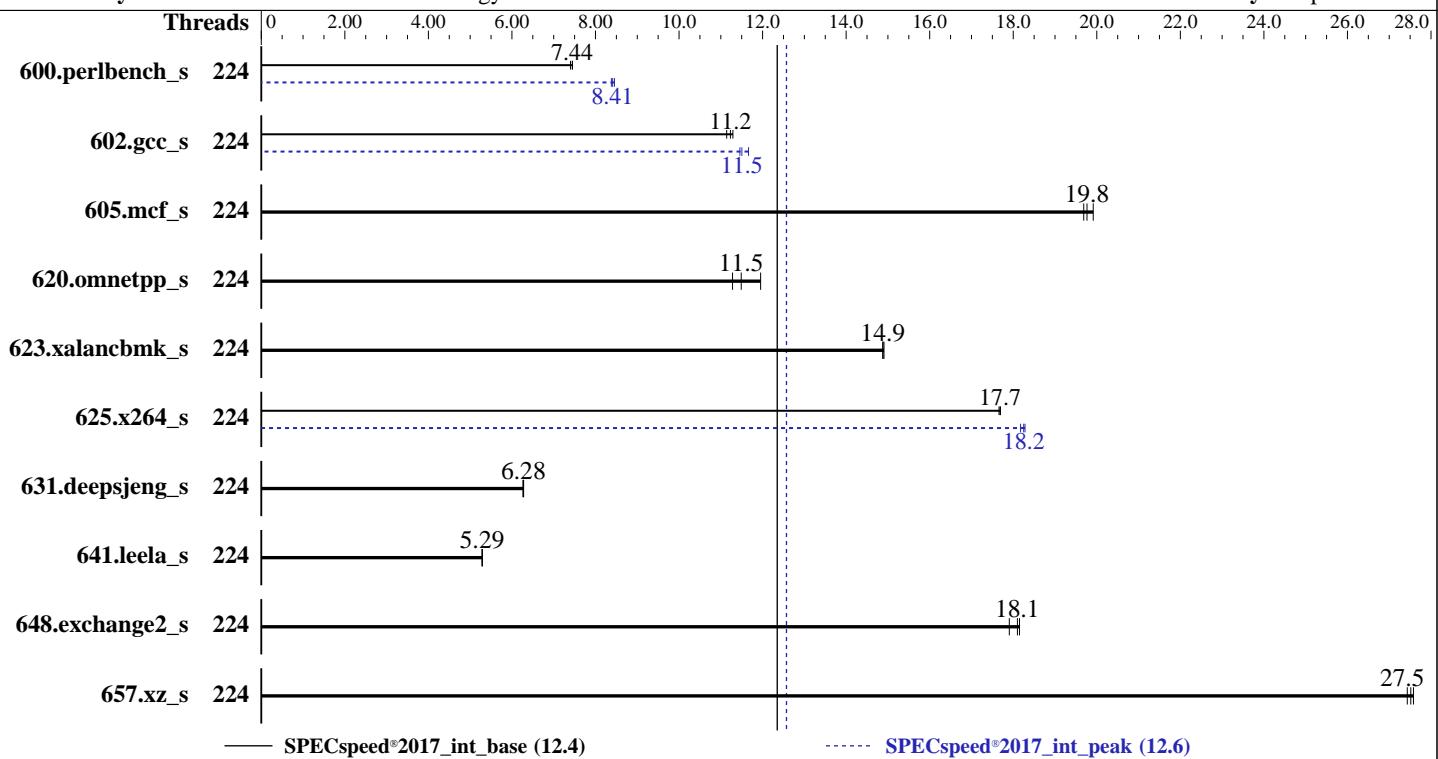
Test Date: Oct-2020

Test Sponsor: Lenovo Global Technology

Hardware Availability: Nov-2020

Tested by: Lenovo Global Technology

Software Availability: Apr-2020



Hardware		Software	
CPU Name:	Intel Xeon Platinum 8380H	OS:	Red Hat Enterprise Linux release 8.2 (Ootpa)
Max MHz:	4300	Compiler:	Kernel 4.18.0-193.el8.x86_64
Nominal:	2900	Parallel:	C/C++: Version 19.1.1.217 of Intel C/C++
Enabled:	112 cores, 4 chips, 2 threads/core	Firmware:	Compiler for Linux;
Orderable:	2,4 chips	File System:	Fortran: Version 19.1.1.217 of Intel Fortran
Cache L1:	32 KB I + 32 KB D on chip per core	System State:	Compiler for Linux
L2:	1 MB I+D on chip per core	Base Pointers:	Yes
L3:	38.5 MB I+D on chip per chip	Peak Pointers:	Lenovo BIOS Version M5E107D 1.00 released Sep-2020
Other:	None	Other:	xfs
Memory:	1536 GB (48 x 32 GB 2Rx4 PC4-3200AA-R)	Power Management:	Run level 3 (multi-user)
Storage:	1 x 960 GB SATA SSD		64-bit
Other:	None		64-bit
			jemalloc memory allocator V5.0.1
			BIOS set to prefer performance at the cost of additional power usage



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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	224	<b>238</b>	<b>7.44</b>	240	7.40	238	7.45	224	<b>211</b>	<b>8.41</b>	212	8.38	210	8.45
602.gcc_s	224	353	11.3	357	11.1	<b>355</b>	<b>11.2</b>	224	<b>346</b>	<b>11.5</b>	341	11.7	348	11.5
605.mcf_s	224	237	19.9	240	19.7	<b>239</b>	<b>19.8</b>	224	237	19.9	240	19.7	<b>239</b>	<b>19.8</b>
620.omnetpp_s	224	145	11.3	136	12.0	<b>142</b>	<b>11.5</b>	224	145	11.3	136	12.0	<b>142</b>	<b>11.5</b>
623.xalancbmk_s	224	95.1	14.9	95.2	14.9	<b>95.2</b>	<b>14.9</b>	224	95.1	14.9	95.2	14.9	<b>95.2</b>	<b>14.9</b>
625.x264_s	224	<b>99.7</b>	<b>17.7</b>	99.7	17.7	99.9	17.7	224	<b>96.7</b>	<b>18.2</b>	97.1	18.2	96.5	18.3
631.deepsjeng_s	224	229	6.26	<b>228</b>	<b>6.28</b>	228	6.28	224	229	6.26	<b>228</b>	<b>6.28</b>	228	6.28
641.leela_s	224	323	5.29	<b>323</b>	<b>5.29</b>	323	5.29	224	323	5.29	<b>323</b>	<b>5.29</b>	323	5.29
648.exchange2_s	224	<b>162</b>	<b>18.1</b>	164	17.9	162	18.1	224	<b>162</b>	<b>18.1</b>	164	17.9	162	18.1
657.xz_s	224	<b>225</b>	<b>27.5</b>	224	27.6	225	27.4	224	<b>225</b>	<b>27.5</b>	224	27.6	225	27.4
SPECspeed®2017_int_base = 12.4							SPECspeed®2017_int_peak = 12.6							

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:

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### 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.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases
```

### Platform Notes

BIOS configuration:

Choose Operating Mode set to Maximum Performance and then set it to Custom Mode  
MONITOR/MWAIT set to Enabled

```
Sysinfo program /home/cpu2017-1.1.0-ic19.1.1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
running on localhost.localdomain Sat Oct 24 12:00:23 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) Platinum 8380H CPU @ 2.90GHz
        4 "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 : 56
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
```

From lscpu:

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

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## Platform Notes (Continued)

CPU(s): 224  
On-line CPU(s) list: 0-223  
Thread(s) per core: 2  
Core(s) per socket: 28  
Socket(s): 4  
NUMA node(s): 4  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Platinum 8380H CPU @ 2.90GHz  
Stepping: 11  
CPU MHz: 3485.737  
CPU max MHz: 4300.0000  
CPU min MHz: 1000.0000  
BogoMIPS: 5800.00  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 39424K  
NUMA node0 CPU(s): 0-27,112-139  
NUMA node1 CPU(s): 28-55,140-167  
NUMA node2 CPU(s): 56-83,168-195  
NUMA node3 CPU(s): 84-111,196-223  
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 cpuid aperf mpf perf pni pclmulqdq dtes64 monitor ds\_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4\_1 sse4\_2 x2apic movebe popcnt tsc\_deadline\_timer aes xsave avx f16c rdrand lahf\_lm abm 3dnowprefetch cpuid\_fault epb cat\_l3 cdp\_l3 invpcid\_single intel\_ppin ssbd mba ibrs ibpb stibp ibrs\_enhanced tpr\_shadow vnmi flexpriority ept vpid fsgsbase tsc\_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpn rdt\_a avx512f avx512dq rdseed adx smap clflushopt clwb intel\_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm\_llc cqm\_occup\_llc cqm\_mbm\_total cqm\_mbm\_local avx512\_bf16 dtherm ida arat pln pts pku ospke avx512\_vnni md\_clear flush\_lll arch\_capabilities

/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: 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 18 19 20 21 22 23 24 25 26 27  
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 0 size: 386622 MB

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## Platform Notes (Continued)

```
node 0 free: 386224 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 55 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158
159 160 161 162 163 164 165 166 167
node 1 size: 387059 MB
node 1 free: 386666 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
81 82 83 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186
187 188 189 190 191 192 193 194 195
node 2 size: 387059 MB
node 2 free: 386558 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
106 107 108 109 110 111 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211
212 213 214 215 216 217 218 219 220 221 222 223
node 3 size: 387057 MB
node 3 free: 386557 MB
node distances:
node 0 1 2 3
 0: 10 20 20 20
 1: 20 10 20 20
 2: 20 20 10 20
 3: 20 20 20 10
```

```
From /proc/meminfo
MemTotal:      1584946212 kB
HugePages_Total:        0
Hugepagesize:     2048 kB
```

```
From /etc/*release* /etc/*version*
os-release:
  NAME="Red Hat Enterprise Linux"
  VERSION="8.2 (Ootpa)"
  ID="rhel"
  ID_LIKE="fedora"
  VERSION_ID="8.2"
  PLATFORM_ID="platform:el8"
  PRETTY_NAME="Red Hat Enterprise Linux 8.2 (Ootpa)"
  ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.2:ga
```

```
uname -a:
Linux localhost.localdomain 4.18.0-193.el8.x86_64 #1 SMP Fri Mar 27 14:35:58 UTC 2020
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

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## Platform Notes (Continued)

itlb_multihit:	Not affected
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: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):	Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
tsx_async_abort:	Not affected

run-level 3 Oct 24 11:56

SPEC is set to: /home/cpu2017-1.1.0-ic19.1.1  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/sda4 xfs 839G 41G 798G 5% /home

From /sys/devices/virtual/dmi/id  
BIOS: Lenovo M5E107D-1.00 09/16/2020  
Vendor: Lenovo  
Product: ThinkSystem SR860 V2  
Product Family: ThinkSystem  
Serial: none

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:  
48x Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200

(End of data from sysinfo program)

## Compiler Version Notes

=====

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

=====

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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## Compiler Version Notes (Continued)

=====

C | 600.perlbench\_s(peak)

=====

Intel(R) C 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.

=====

C | 600.perlbench\_s(base) 602.gcc\_s(base, peak) 605.mcf\_s(base, peak)  
| 625.x264\_s(base, peak) 657.xz\_s(base, peak)

=====

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.

=====

C | 600.perlbench\_s(peak)

=====

Intel(R) C 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.

=====

C++ | 620.omnetpp\_s(base, peak) 623.xalancbmk\_s(base, peak)  
| 631.deepsjeng\_s(base, peak) 641.leela\_s(base, peak)

=====

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.

=====

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

=====

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.

=====

## Base Compiler Invocation

C benchmarks:

icc

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## 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  
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs  
-xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops  
-fuse-lld=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  
-Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse  
-funroll-loops -fuse-lld=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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## 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(\*) -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

(\*) Indicates a portability flag that was found in a non-portability variable.

## Peak Optimization Flags

C benchmarks:

600.perlbench\_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)  
-xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4 -fno-strict-overflow  
-mbranches-within-32B-boundaries  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc  
  
602.gcc\_s: -m64 -qnextgen -std=c11 -fuse-ld=gold  
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries  
-Wl,-z,muldefs -fprofile-generate(pass 1)  
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto  
-Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

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## Peak Optimization Flags (Continued)

605.mcf\_s: basepeak = yes

```
625.x264_s: -m64 -qnnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -xCORE-AVX512 -flto -O3 -ffast-math
-fuse-ld=gold -qopt-mem-layout-trans=4 -fno-alias
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

657.xz\_s: basepeak = yes

C++ benchmarks:

620.omnetpp\_s: basepeak = yes

623.xalancbmk\_s: basepeak = yes

631.deepsjeng\_s: basepeak = yes

641.leela\_s: basepeak = yes

Fortran benchmarks:

648.exchange2\_s: basepeak = yes

The flags files that were used to format this result can be browsed at

[http://www.spec.org/cpu2017/flags/Intel-ic19.1ul-official-linux64\\_revA.html](http://www.spec.org/cpu2017/flags/Intel-ic19.1ul-official-linux64_revA.html)

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECCpu2017-Flags-V1.2-Cooperlake-A.html>

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

[http://www.spec.org/cpu2017/flags/Intel-ic19.1ul-official-linux64\\_revA.xml](http://www.spec.org/cpu2017/flags/Intel-ic19.1ul-official-linux64_revA.xml)

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECCpu2017-Flags-V1.2-Cooperlake-A.xml>

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Tested with SPEC CPU®2017 v1.1.0 on 2020-10-24 12:00:23-0400.

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