



SPEC® CPU2017 Integer Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Lenovo Global Technology

ThinkSystem SR950
(3.00 GHz, Intel Xeon Platinum 8158)

SPECrate2017_int_base = 607

SPECrate2017_int_peak = 650

CPU2017 License: 9017

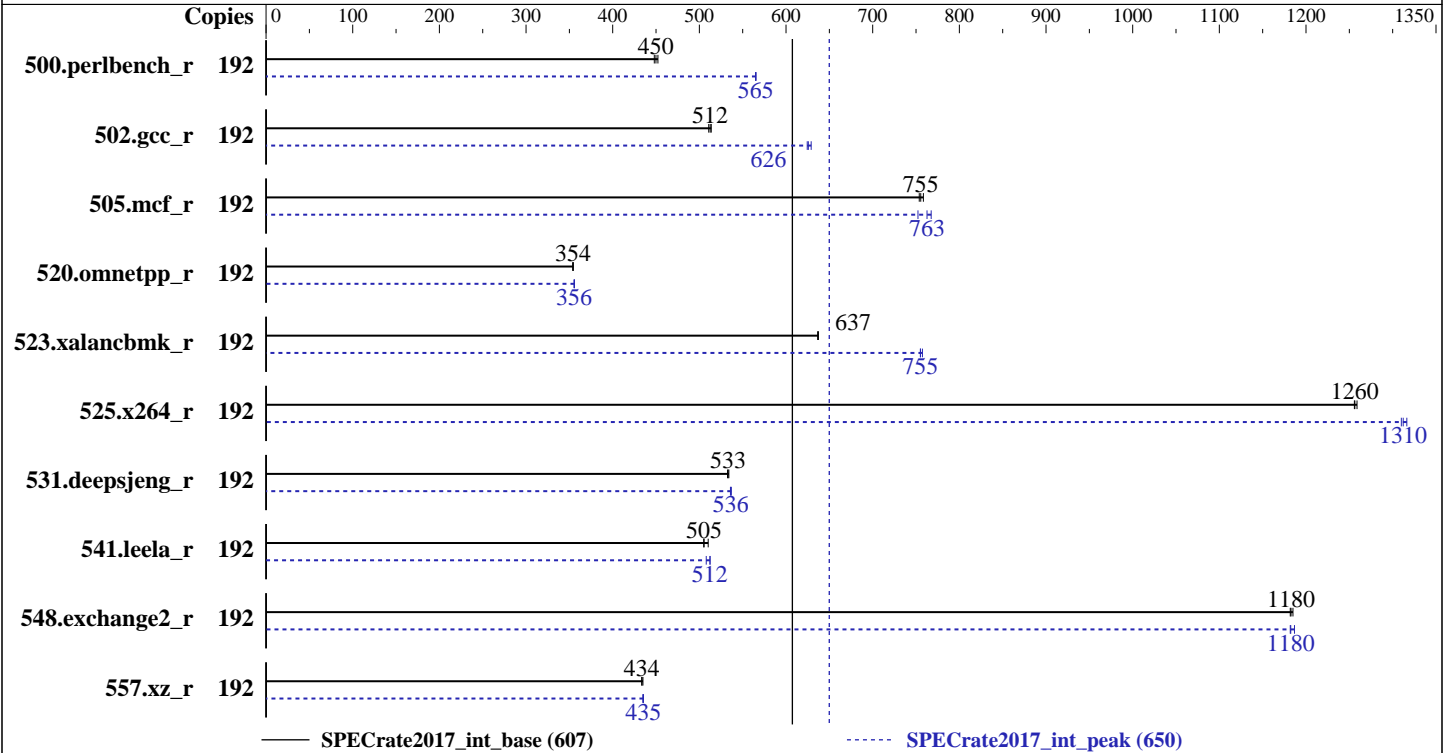
Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Jan-2018

Hardware Availability: Sep-2017

Software Availability: Sep-2017



Hardware

CPU Name: Intel Xeon Platinum 8158
 Max MHz.: 3700
 Nominal: 3000
 Enabled: 96 cores, 8 chips, 2 threads/core
 Orderable: 2,4,8 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: 3 TB (96 x 32 GB 2Rx4 PC4-2666V-R)
 Storage: 800 GB tmpfs
 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: No
 Firmware: Lenovo BIOS Version PSE105X 1.00 released Aug-2017
 File System: tmpfs
 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						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	192	679	450	682	448	676	452	192	541	565	541	565	541	565
502.gcc_r	192	531	512	532	511	529	514	192	432	629	434	626	435	624
505.mcf_r	192	409	759	412	754	411	755	192	404	767	407	763	412	752
520.omnetpp_r	192	711	354	712	354	711	354	192	709	355	708	356	708	356
523.xalancbmk_r	192	318	637	318	637	318	637	192	269	755	268	757	269	755
525.x264_r	192	268	1260	267	1260	268	1260	192	255	1320	256	1310	257	1310
531.deepsjeng_r	192	413	533	413	533	412	534	192	410	537	410	536	411	536
541.leela_r	192	623	510	629	505	630	505	192	621	512	626	508	621	512
548.exchange2_r	192	426	1180	425	1180	425	1180	192	425	1180	424	1190	426	1180
557.xz_r	192	478	434	477	435	478	433	192	477	435	476	435	476	435

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

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

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:
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:

(Continued on next page)



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General Notes (Continued)

```
sync; echo 3> /proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
```

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 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

SNC set to Enable

DCU Streamer Prefetcher set to Disable

MONITORMWAIT set to Enable

Execute Disable Bit set to Disable

Trusted Execution Technology set to Enable

Per Core Pstate set to Disable

XPT Prefetcher set to Enable

Stale AtoS set to Enable

LLC Deadline Alloc 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 Mon Jan 8 03:31:42 2018

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

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Platform Notes (Continued)

model name : Intel(R) Xeon(R) Platinum 8158 CPU @ 3.00GHz

8 "physical id"s (chips)

192 "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 : 24

physical 0: cores 0 1 2 3 4 8 9 11 17 18 19 20

physical 1: cores 0 1 2 3 4 9 10 16 18 19 25 26

physical 2: cores 0 1 2 3 4 9 10 16 18 19 25 26

physical 3: cores 0 1 2 3 4 8 9 11 17 18 19 20

physical 4: cores 0 1 2 3 10 17 18 19 24 25 26 27

physical 5: cores 0 1 2 3 4 9 10 16 18 19 25 26

physical 6: cores 0 1 2 3 4 9 10 16 18 19 25 26

physical 7: cores 0 3 4 5 6 7 16 18 19 20 21 22

From lscpu:

Architecture: x86_64

CPU op-mode(s): 32-bit, 64-bit

Byte Order: Little Endian

CPU(s): 192

On-line CPU(s) list: 0-191

Thread(s) per core: 2

Core(s) per socket: 12

Socket(s): 8

NUMA node(s): 16

Vendor ID: GenuineIntel

CPU family: 6

Model: 85

Model name: Intel(R) Xeon(R) Platinum 8158 CPU @ 3.00GHz

Stepping: 4

CPU MHz: 2993.000

BogoMIPS: 5986.00

Virtualization: VT-x

L1d cache: 32K

L1i cache: 32K

L2 cache: 1024K

L3 cache: 25344K

NUMA node0 CPU(s): 0-2,5,6,8,96-98,101,102,104

NUMA node1 CPU(s): 3,4,7,9-11,99,100,103,105-107

NUMA node2 CPU(s): 12-14,17,19,22,108-110,113,115,118

NUMA node3 CPU(s): 15,16,18,20,21,23,111,112,114,116,117,119

NUMA node4 CPU(s): 24-26,29,31,34,120-122,125,127,130

NUMA node5 CPU(s): 27,28,30,32,33,35,123,124,126,128,129,131

NUMA node6 CPU(s): 36-38,41,42,44,132-134,137,138,140

NUMA node7 CPU(s): 39,40,43,45-47,135,136,139,141-143

NUMA node8 CPU(s): 48-50,53,56,57,144-146,149,152,153

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Platform Notes (Continued)

```

NUMA node9 CPU(s):      51,52,54,55,58,59,147,148,150,151,154,155
NUMA node10 CPU(s):     60-62,65,67,70,156-158,161,163,166
NUMA node11 CPU(s):     63,64,66,68,69,71,159,160,162,164,165,167
NUMA node12 CPU(s):     72-74,77,79,82,168-170,173,175,178
NUMA node13 CPU(s):     75,76,78,80,81,83,171,172,174,176,177,179
NUMA node14 CPU(s):     84-86,90-92,180-182,186-188
NUMA node15 CPU(s):     87-89,93-95,183-185,189-191

```

```

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
aperfmpperf 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 : 25344 KB

```

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

```

available: 16 nodes (0-15)
node 0 cpus: 0 1 2 5 6 8 96 97 98 101 102 104
node 0 size: 192984 MB
node 0 free: 192268 MB
node 1 cpus: 3 4 7 9 10 11 99 100 103 105 106 107
node 1 size: 193528 MB
node 1 free: 192983 MB
node 2 cpus: 12 13 14 17 19 22 108 109 110 113 115 118
node 2 size: 193528 MB
node 2 free: 184525 MB
node 3 cpus: 15 16 18 20 21 23 111 112 114 116 117 119
node 3 size: 193528 MB
node 3 free: 193031 MB
node 4 cpus: 24 25 26 29 31 34 120 121 122 125 127 130
node 4 size: 193528 MB
node 4 free: 188057 MB
node 5 cpus: 27 28 30 32 33 35 123 124 126 128 129 131
node 5 size: 193528 MB
node 5 free: 193027 MB
node 6 cpus: 36 37 38 41 42 44 132 133 134 137 138 140
node 6 size: 193528 MB
node 6 free: 193051 MB
node 7 cpus: 39 40 43 45 46 47 135 136 139 141 142 143
node 7 size: 193528 MB
node 7 free: 193046 MB

```

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Platform Notes (Continued)

```

node 8 cpus: 48 49 50 53 56 57 144 145 146 149 152 153
node 8 size: 193528 MB
node 8 free: 193040 MB
node 9 cpus: 51 52 54 55 58 59 147 148 150 151 154 155
node 9 size: 193528 MB
node 9 free: 193053 MB
node 10 cpus: 60 61 62 65 67 70 156 157 158 161 163 166
node 10 size: 193528 MB
node 10 free: 193019 MB
node 11 cpus: 63 64 66 68 69 71 159 160 162 164 165 167
node 11 size: 193528 MB
node 11 free: 193045 MB
node 12 cpus: 72 73 74 77 79 82 168 169 170 173 175 178
node 12 size: 193528 MB
node 12 free: 193048 MB
node 13 cpus: 75 76 78 80 81 83 171 172 174 176 177 179
node 13 size: 193528 MB
node 13 free: 193054 MB
node 14 cpus: 84 85 86 90 91 92 180 181 182 186 187 188
node 14 size: 193528 MB
node 14 free: 193057 MB
node 15 cpus: 87 88 89 93 94 95 183 184 185 189 190 191
node 15 size: 193523 MB
node 15 free: 193050 MB
node distances:
node  0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15
  0:  10  20  20  20  20  20  20  20  20  20  20  20  20  20  20  20
  1:  20  10  20  20  20  20  20  20  20  20  20  20  20  20  20  20
  2:  20  20  10  20  20  20  20  20  20  20  20  20  20  20  20  20
  3:  20  20  20  10  20  20  20  20  20  20  20  20  20  20  20  20
  4:  20  20  20  20  10  20  20  20  20  20  20  20  20  20  20  20
  5:  20  20  20  20  20  10  20  20  20  20  20  20  20  20  20  20
  6:  20  20  20  20  20  20  10  20  20  20  20  20  20  20  20  20
  7:  20  20  20  20  20  20  20  10  20  20  20  20  20  20  20  20
  8:  20  20  20  20  20  20  20  20  10  20  20  20  20  20  20  20
  9:  20  20  20  20  20  20  20  20  20  10  20  20  20  20  20  20
10:  20  20  20  20  20  20  20  20  20  20  10  20  20  20  20  20
11:  20  20  20  20  20  20  20  20  20  20  20  10  20  20  20  20
12:  20  20  20  20  20  20  20  20  20  20  20  20  10  20  20  20
13:  20  20  20  20  20  20  20  20  20  20  20  20  20  10  20  20
14:  20  20  20  20  20  20  20  20  20  20  20  20  20  20  10  20
15:  20  20  20  20  20  20  20  20  20  20  20  20  20  20  20  10

```

```

From /proc/meminfo
MemTotal:      3170207908 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

(Continued on next page)



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Platform Notes (Continued)

```

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 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 Jan 8 03:28

SPEC is set to: /home/cpu2017.1.0.2.ic18.0
Filesystem      Type      Size  Used Avail Use% Mounted on
tmpfs           tmpfs    800G   11G  790G   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 -[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

```

=====
CC 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
   525.x264_r(base, peak) 557.xz_r(base, peak)
-----
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
-----

```

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Compiler Version Notes (Continued)

=====
CC 500.perlbench_r(peak) 502.gcc_r(peak)
=====

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

=====
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
541.leela_r(base)
=====

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

=====
CXXC 520.omnetpp_r(peak) 523.xalancbmk_r(peak) 531.deepsjeng_r(peak)
541.leela_r(peak)
=====

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

=====
FC 548.exchange2_r(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:
ifort



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Base Portability Flags

```
500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64
```

Base Optimization Flags

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
```

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
```



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Peak Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

Fortran benchmarks:

ifort

Peak Portability Flags

```
500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -D_FILE_OFFSET_BITS=64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -D_FILE_OFFSET_BITS=64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64
```

Peak Optimization Flags

C benchmarks:

```
500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-fno-strict-overflow -L/usr/local/je5.0.1-64/lib
-ljemalloc
```

```
502.gcc_r: -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
-L/usr/local/je5.0.1-32/lib -ljemalloc
```

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

```
525.x264_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -fno-alias
```

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Peak Optimization Flags (Continued)

525.x264_r (continued):

```
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

557.xz_r: Same as 505.mcf_r

C++ benchmarks:

```
520.omnetpp_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

```
523.xalancbmk_r: -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  
-L/usr/local/je5.0.1-32/lib -ljemalloc
```

531.deepsjeng_r: Same as 520.omnetpp_r

541.leela_r: Same as 520.omnetpp_r

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 (except as noted below):

```
-m64 -std=c11
```

502.gcc_r: -m32 -std=c11

C++ benchmarks (except as noted below):

```
-m64
```

523.xalancbmk_r: -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>



SPEC CPU2017 Integer Rate Result

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Lenovo Global Technology

ThinkSystem SR950
(3.00 GHz, Intel Xeon Platinum 8158)

SPECrate2017_int_base = 607

SPECrate2017_int_peak = 650

CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

Test Date: Jan-2018

Hardware Availability: Sep-2017

Software Availability: Sep-2017

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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