SPEC® CPU2017 Integer Rate Result

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Lenovo Global Technology

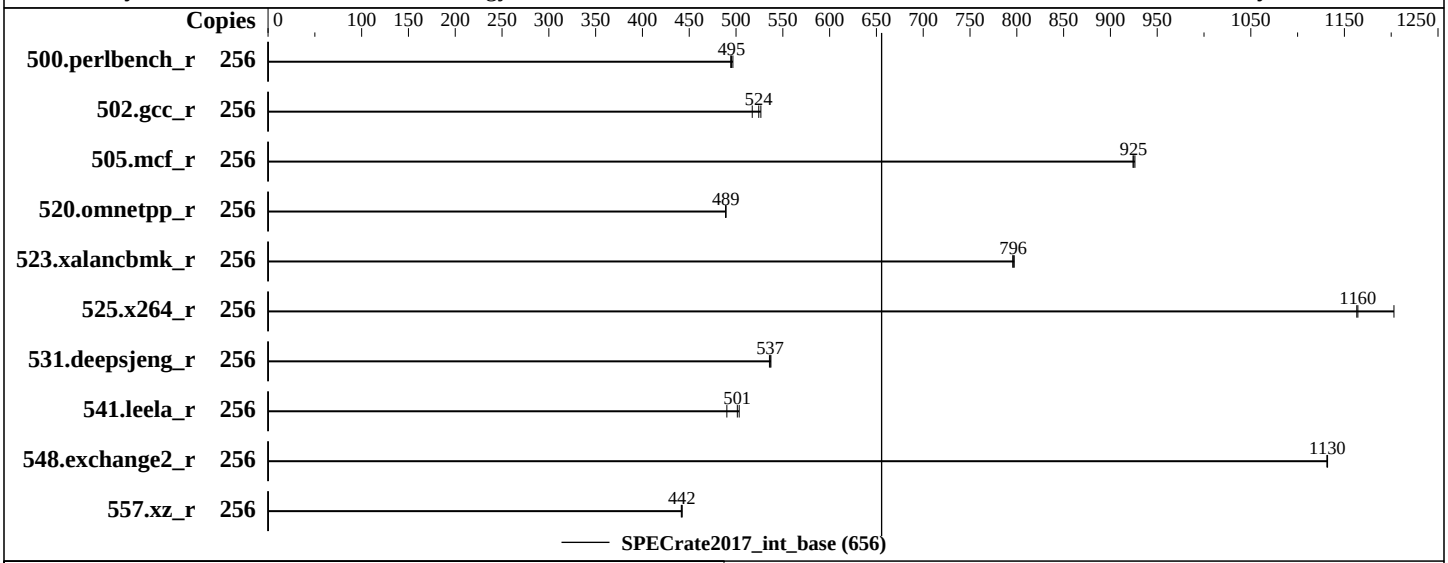
ThinkSystem SR950
(2.20 GHz, Intel Xeon Platinum 8253)

SPECrate2017_int_base = 656

SPECrate2017_int_peak = Not Run

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

Test Date: Apr-2019
Hardware Availability: Apr-2019
Software Availability: Dec-2018



Hardware

CPU Name:	Intel Xeon Platinum 8253
Max MHz.:	3000
Nominal:	2200
Enabled:	128 cores, 8 chips, 2 threads/core
Orderable:	2,3,4,6,8 chips
Cache L1:	32 KB I + 32 KB D on chip per core
L2:	1 MB I+D on chip per core
L3:	22 MB I+D on chip per chip
Other:	None
Memory:	3 TB (96 x 32 GB 2Rx4 PC4-2933Y-R)
Storage:	960 GB tmpfs
Other:	None

Software

OS:	SUSE Linux Enterprise Server 12 SP4 (x86_64) Kernel 4.12.14-94.41-default
Compiler:	C/C++: Version 19.0.1.144 of Intel C/C++ Compiler Build 20181018 for Linux; Fortran: Version 19.0.1.144 of Intel Fortran Compiler Build 20181018 for Linux
Parallel:	No
Firmware:	Lenovo BIOS Version PSE121C 1.50 released Jan-2019
File System:	tmpfs
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	Not Applicable
Other:	None

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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	256	821	497	824	494	**823**	**495**							
502.gcc_r	256	**691**	**524**	701	517	688	527							
505.mcf_r	256	**447**	**925**	447	926	448	924							
520.omnetpp_r	256	**687**	**489**	687	489	687	489							
523.xalancbmk_r	256	339	797	**340**	**796**	340	796							
525.x264_r	256	385	1160	373	1200	**385**	**1160**							
531.deepsjeng_r	256	**547**	**537**	546	537	548	536							
541.leela_r	256	842	503	**846**	**501**	865	490							
548.exchange2_r	256	593	1130	**593**	**1130**	592	1130							
557.xz_r	256	**625**	**442**	626	442	625	442							

SPECrate2017_int_base = 656

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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=960g tmpfs /home
```

General Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19.0u1/lib/intel64"

 Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM
 memory using Redhat Enterprise Linux 7.5
 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
 runcpu command invoked through numactl i.e.:
 numactl --interleave=all runcpu <etc>
Yes: 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)
```

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General Notes (Continued)

```
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.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3640 (Spectre variant 3a)
is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2018-3639 (Spectre variant 4)
is mitigated in the system as tested and documented.
```

Platform Notes

```
BIOS configuration:
Choose Operating Mode set to Maximum Performance
Trusted Execution Technology set to Enable
DCU Streamer Prefetcher set to Disable
SNC set to Enable
Patrol Scrub set to Disable
Stale AtoS set to Enable
 Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo
 Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
 running on sles12sp4 Tue Apr 16 02:08:07 2019

 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 8253 CPU @ 2.20GHz
       8  "physical id"s (chips)
       256 "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 : 16
       siblings  : 32
       physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 2: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 3: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 4: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 5: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 6: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
       physical 7: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

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

(Continued on next page)

Platform Notes (Continued)

```
CPU(s):                256
On-line CPU(s) list:   0-255
Thread(s) per core:    2
Core(s) per socket:    16
Socket(s):             8
NUMA node(s):          16
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Platinum 8253 CPU @ 2.20GHz
Stepping:              6
CPU MHz:               2200.000
CPU max MHz:           3000.0000
CPU min MHz:           1000.0000
BogoMIPS:              4400.00
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              22528K
NUMA node0 CPU(s):     0-3,8-11,128-131,136-139
NUMA node1 CPU(s):     4-7,12-15,132-135,140-143
NUMA node2 CPU(s):     16-19,24-27,144-147,152-155
NUMA node3 CPU(s):     20-23,28-31,148-151,156-159
NUMA node4 CPU(s):     32-35,40-43,160-163,168-171
NUMA node5 CPU(s):     36-39,44-47,164-167,172-175
NUMA node6 CPU(s):     48-51,56-59,176-179,184-187
NUMA node7 CPU(s):     52-55,60-63,180-183,188-191
NUMA node8 CPU(s):     64-67,72-75,192-195,200-203
NUMA node9 CPU(s):     68-71,76-79,196-199,204-207
NUMA node10 CPU(s):    80-83,88-91,208-211,216-219
NUMA node11 CPU(s):    84-87,92-95,212-215,220-223
NUMA node12 CPU(s):    96-99,104-107,224-227,232-235
NUMA node13 CPU(s):    100-103,108-111,228-231,236-239
NUMA node14 CPU(s):    112-115,120-123,240-243,248-251
NUMA node15 CPU(s):    116-119,124-127,244-247,252-255
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
aperfmperf pni pclmulqdq dtes64 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 cpuid_fault epb cat_l3 cdp_l3 invpcid_single ssbd
mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1
hle avx2 smep bmi2 erms invpcid rtm cqm mpx 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 dtherm ida arat pln pts pku ospke
avx512_vnni flush_l1d arch_capabilities
```

(Continued on next page)

Platform Notes (Continued)

```
 /proc/cpuinfo cache data
    cache size : 22528 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 3 8 9 10 11 128 129 130 131 136 137 138 139
   node 0 size: 193121 MB
   node 0 free: 180003 MB
   node 1 cpus: 4 5 6 7 12 13 14 15 132 133 134 135 140 141 142 143
   node 1 size: 193530 MB
   node 1 free: 193072 MB
   node 2 cpus: 16 17 18 19 24 25 26 27 144 145 146 147 152 153 154 155
   node 2 size: 193530 MB
   node 2 free: 193297 MB
   node 3 cpus: 20 21 22 23 28 29 30 31 148 149 150 151 156 157 158 159
   node 3 size: 193530 MB
   node 3 free: 193243 MB
   node 4 cpus: 32 33 34 35 40 41 42 43 160 161 162 163 168 169 170 171
   node 4 size: 193530 MB
   node 4 free: 193309 MB
   node 5 cpus: 36 37 38 39 44 45 46 47 164 165 166 167 172 173 174 175
   node 5 size: 193501 MB
   node 5 free: 193159 MB
   node 6 cpus: 48 49 50 51 56 57 58 59 176 177 178 179 184 185 186 187
   node 6 size: 193530 MB
   node 6 free: 193341 MB
   node 7 cpus: 52 53 54 55 60 61 62 63 180 181 182 183 188 189 190 191
   node 7 size: 193530 MB
   node 7 free: 193351 MB
   node 8 cpus: 64 65 66 67 72 73 74 75 192 193 194 195 200 201 202 203
   node 8 size: 193530 MB
   node 8 free: 193368 MB
   node 9 cpus: 68 69 70 71 76 77 78 79 196 197 198 199 204 205 206 207
   node 9 size: 193530 MB
   node 9 free: 193348 MB
   node 10 cpus: 80 81 82 83 88 89 90 91 208 209 210 211 216 217 218 219
   node 10 size: 193530 MB
   node 10 free: 193351 MB
   node 11 cpus: 84 85 86 87 92 93 94 95 212 213 214 215 220 221 222 223
   node 11 size: 193530 MB
   node 11 free: 193372 MB
   node 12 cpus: 96 97 98 99 104 105 106 107 224 225 226 227 232 233 234 235
   node 12 size: 193530 MB
   node 12 free: 193344 MB
   node 13 cpus: 100 101 102 103 108 109 110 111 228 229 230 231 236 237 238 239
```

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Platform Notes (Continued)

```
   node 13 size: 193530 MB
   node 13 free: 193344 MB
   node 14 cpus: 112 113 114 115 120 121 122 123 240 241 242 243 248 249 250 251
   node 14 size: 193530 MB
   node 14 free: 193380 MB
   node 15 cpus: 116 117 118 119 124 125 126 127 244 245 246 247 252 253 254 255
   node 15 size: 193527 MB
   node 15 free: 193385 MB
   node distances:
   node   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
     0:  10  11  21  21  31  31  21  21  21  21  31  31  31  31  31  31
     1:  11  10  21  21  31  31  21  21  21  21  31  31  31  31  31  31
     2:  21  21  10  11  21  21  31  31  31  31  21  21  31  31  31  31
     3:  21  21  11  10  21  21  31  31  31  31  21  21  31  31  31  31
     4:  31  31  21  21  10  11  21  21  31  31  31  31  21  21  31  31
     5:  31  31  21  21  11  10  21  21  31  31  31  31  21  21  31  31
     6:  21  21  31  31  21  21  10  11  31  31  31  31  31  31  21  21
     7:  21  21  31  31  21  21  11  10  31  31  31  31  31  31  21  21
     8:  21  21  31  31  31  31  31  31  10  11  21  21  21  21  31  31
     9:  21  21  31  31  31  31  31  31  11  10  21  21  21  21  31  31
    10:  31  31  21  21  31  31  31  31  21  21  10  11  31  31  21  21
    11:  31  31  21  21  31  31  31  31  21  21  11  10  31  31  21  21
    12:  31  31  31  31  21  21  31  31  21  21  31  31  10  11  21  21
    13:  31  31  31  31  21  21  31  31  21  21  31  31  11  10  21  21
    14:  31  31  31  31  31  31  21  21  31  31  21  21  21  21  10  11
    15:  31  31  31  31  31  31  21  21  31  31  21  21  21  21  11  10

 From /proc/meminfo
    MemTotal:       3170354256 kB
    HugePages_Total:       0
    Hugepagesize:       2048 kB

 From /etc/*release* /etc/*version*
    SuSE-release:
       SUSE Linux Enterprise Server 12 (x86_64)
       VERSION = 12
       PATCHLEVEL = 4
       # 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-SP4"
       VERSION_ID="12.4"
       PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
       ID="sles"
       ANSI_COLOR="0;32"
       CPE_NAME="cpe:/o:suse:sles:12:sp4"
```

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Platform Notes (Continued)

```
 uname -a:
    Linux sles12sp4 4.12.14-94.41-default #1 SMP Wed Oct 31 12:25:04 UTC 2018 (3090901)
    x86_64 x86_64 x86_64 GNU/Linux

 Kernel self-reported vulnerability status:

 CVE-2017-5754 (Meltdown):          Not affected
 CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
 CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation,
 IBPB, IBRS_FW

 run-level 3 Apr 16 02:04

 SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1
    Filesystem     Type   Size  Used Avail Use% Mounted on
    tmpfs          tmpfs  960G  8.3G  952G   1% /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 -[PSE121C-1.50]- 01/16/2019
   Memory:
    96x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

 (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
 CC  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base)
      557.xz_r(base)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
      541.leela_r(base)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
```

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Compiler Version Notes (Continued)

```
------------------------------------------------------------------------------

==============================================================================
 FC  548.exchange2_r(base)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

Base Compiler Invocation

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

C++ benchmarks:
`icpc -m64`

Fortran benchmarks:
`ifort -m64`

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=4`
`-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64`
`-lqkmalloc`

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Base Optimization Flags (Continued)

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2019-04-02.html
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-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-linux64.2019-04-02.xml
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-A.xml

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

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