



SPEC® CPU2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Lenovo Global Technology

SPECrate2017_int_base = 198

ThinkSystem SR570
(2.20 GHz, Intel Xeon Gold 5220)

SPECrate2017_int_peak = Not Run

CPU2017 License: 9017

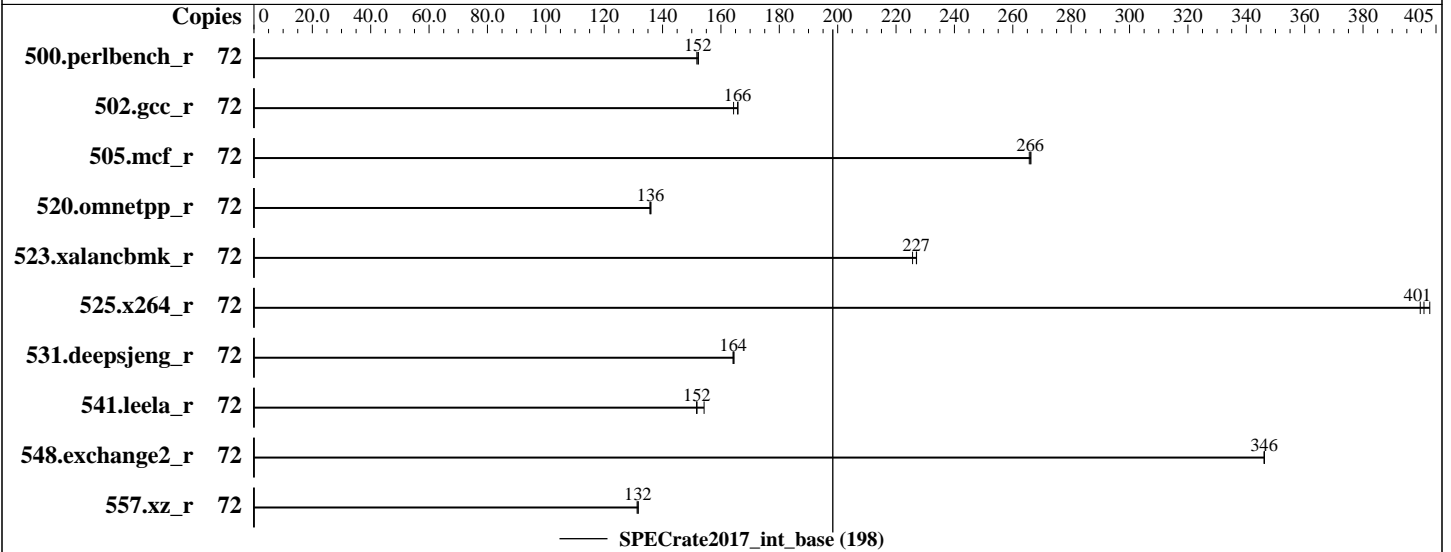
Test Date: May-2019

Test Sponsor: Lenovo Global Technology

Hardware Availability: Apr-2019

Tested by: Lenovo Global Technology

Software Availability: Dec-2018



Hardware

CPU Name: Intel Xeon Gold 5220
 Max MHz.: 3900
 Nominal: 2200
 Enabled: 36 cores, 2 chips, 2 threads/core
 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: 24.75 MB I+D on chip per chip
 Other: None
 Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R, running at 2666)
 Storage: 1 x 960 GB SATA SSD
 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 TEE135L 2.10 released Jan-2019
 File System: xfs
 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	72	755	152	<u>754</u>	<u>152</u>	753	152							
502.gcc_r	72	615	166	<u>615</u>	<u>166</u>	620	164							
505.mcf_r	72	<u>437</u>	<u>266</u>	438	266	437	266							
520.omnetpp_r	72	<u>695</u>	<u>136</u>	696	136	694	136							
523.xalancbmk_r	72	337	226	335	227	<u>335</u>	<u>227</u>							
525.x264_r	72	313	403	<u>314</u>	<u>401</u>	315	400							
531.deepsjeng_r	72	503	164	<u>502</u>	<u>164</u>	502	165							
541.leela_r	72	773	154	<u>785</u>	<u>152</u>	786	152							
548.exchange2_r	72	545	346	<u>545</u>	<u>346</u>	545	346							
557.xz_r	72	591	132	<u>591</u>	<u>132</u>	592	131							

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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"

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>

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)

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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-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
Choose Operating Mode set to Custom Mode
MONITOR/MWAIT set to Enable
SNC set to Enable
Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-et90 Mon May 6 16:54:50 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) Gold 5220 CPU @ 2.20GHz
2 "physical id"s (chips)
72 "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 : 18
siblings : 36
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 72
On-line CPU(s) list: 0-71
Thread(s) per core: 2
Core(s) per socket: 18
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5220 CPU @ 2.20GHz

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Platform Notes (Continued)

```
Stepping: 6
CPU MHz: 2200.000
CPU max MHz: 3900.0000
CPU min MHz: 1000.0000
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-2,5,6,9,10,14,15,36-38,41,42,45,46,50,51
NUMA node1 CPU(s): 3,4,7,8,11-13,16,17,39,40,43,44,47-49,52,53
NUMA node2 CPU(s): 18-20,23,24,27,28,32,33,54-56,59,60,63,64,68,69
NUMA node3 CPU(s): 21,22,25,26,29-31,34,35,57,58,61,62,65-67,70,71
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
aperfmpperf 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 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_lld arch_capabilities
```

```
/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: 4 nodes (0-3)
node 0 cpus: 0 1 2 5 6 9 10 14 15 36 37 38 41 42 45 46 50 51
node 0 size: 47685 MB
node 0 free: 47085 MB
node 1 cpus: 3 4 7 8 11 12 13 16 17 39 40 43 44 47 48 49 52 53
node 1 size: 48341 MB
node 1 free: 48029 MB
node 2 cpus: 18 19 20 23 24 27 28 32 33 54 55 56 59 60 63 64 68 69
node 2 size: 48370 MB
node 2 free: 48128 MB
node 3 cpus: 21 22 25 26 29 30 31 34 35 57 58 61 62 65 66 67 70 71
node 3 size: 48367 MB
node 3 free: 48138 MB
node distances:
node 0 1 2 3
0: 10 11 21 21
```

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Platform Notes (Continued)

```

1:  11  10  21  21
2:  21  21  10  11
3:  21  21  11  10

```

From /proc/meminfo

```

MemTotal:      197391392 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"

```

uname -a:

```

Linux linux-et90 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 May 6 16:53

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1

```

Filesystem      Type      Size      Used Avail Use% Mounted on
/dev/sda3        xfs       892G      35G  857G   4% /

```

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 -[TEE135L-2.10]- 01/10/2019

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Platform Notes (Continued)

Memory:

4x NO DIMM NO DIMM

12x SK Hynix HMA82GR7CJR8N-WM 16 GB 2 rank 2933, configured at 2666

(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.

=====
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



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

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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