



SPEC CPU®2017 Integer Rate Result

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Lenovo Global Technology

SPECrate®2017_int_base = 106

ThinkSystem SR650
(2.30 GHz, Intel Xeon Silver 4210T)

SPECrate®2017_int_peak = Not Run

CPU2017 License: 9017

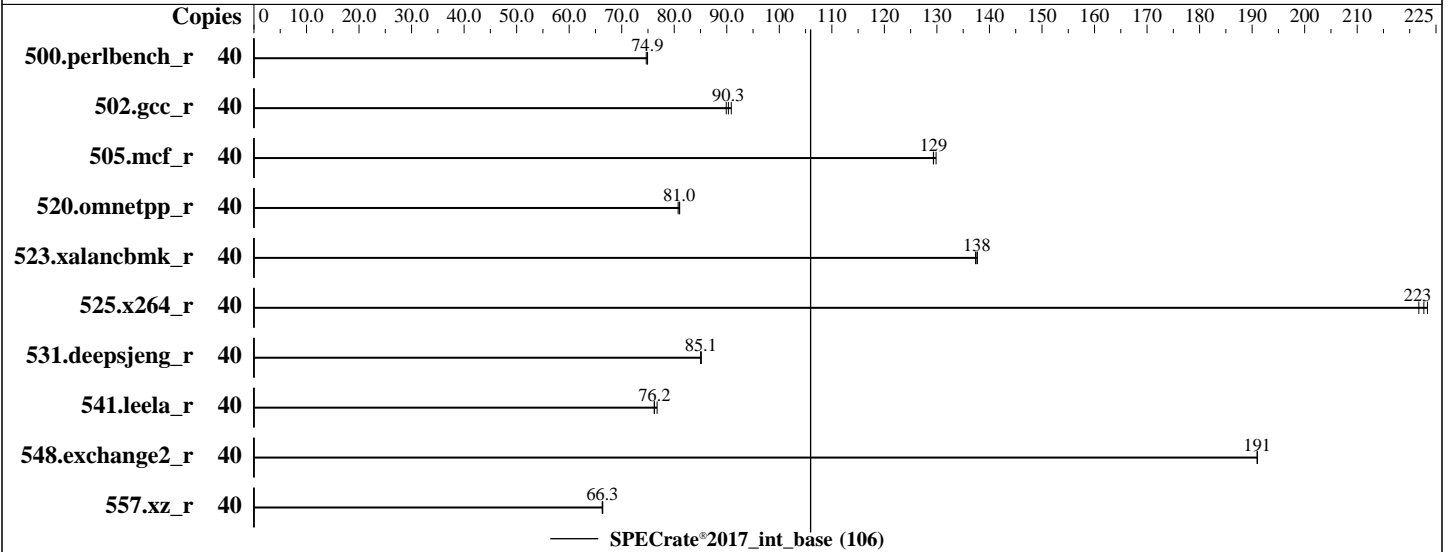
Test Date: Apr-2020

Test Sponsor: Lenovo Global Technology

Hardware Availability: Mar-2020

Tested by: Lenovo Global Technology

Software Availability: Sep-2019



Hardware

CPU Name: Intel Xeon Silver 4210T
 Max MHz: 3200
 Nominal: 2300
 Enabled: 20 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: 13.75 MB I+D on chip per chip
 Other: None
 Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R, running at 2400)
 Storage: 1 x 800 GB SATA SSD
 Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP1 (x86_64)
 Kernel 4.12.14-195-default
 Compiler: C/C++: Version 19.0.5.281 of Intel C/C++
 Compiler for Linux;
 Fortran: Version 19.0.5.281 of Intel Fortran
 Compiler for Linux
 Parallel: No
 Firmware: Lenovo BIOS Version IVE152L 2.51 released Feb-2020 tested as IVE151L 2.51 Jan-2020
 File System: xfs
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: Not Applicable
 Other: None
 Power Management: BIOS set to prefer performance at the cost of additional power usage



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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	40	850	74.9	850	74.9	853	74.7							
502.gcc_r	40	623	90.9	627	90.3	630	89.9							
505.mcf_r	40	500	129	500	129	498	130							
520.omnetpp_r	40	648	81.0	648	81.0	650	80.7							
523.xalancbmk_r	40	307	138	308	137	307	138							
525.x264_r	40	316	222	314	223	315	223							
531.deepsjeng_r	40	539	85.1	538	85.1	539	85.1							
541.leela_r	40	863	76.7	869	76.2	869	76.2							
548.exchange2_r	40	549	191	549	191	549	191							
557.xz_r	40	652	66.3	651	66.4	651	66.3							

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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"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
"/home/cpu2017-1.1.0-ic19.0u5/lib/intel64:/home/cpu2017-1.1.0-ic19.0u5/lib/ia32:/home/cpu2017-1.1.0-ic19.0u5/je5.0.1-32"

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

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General Notes (Continued)

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.
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 and then set it to Custom Mode
MONITOR/MWAIT set to Enable
DCU Streamer Prefetcher set to Disable
LLC dead line alloc set to Disable

```
Sysinfo program /home/cpu2017-1.1.0-ic19.0u5/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011
running on linux-xpyz Thu Apr 2 23:45:12 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) Silver 4210T CPU @ 2.30GHz
 2 "physical id"s (chips)
 40 "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 : 10
siblings : 20
physical 0: cores 0 1 2 3 4 8 9 10 11 12
physical 1: cores 0 1 2 3 4 8 9 10 11 12
```

```
From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 46 bits physical, 48 bits virtual
CPU(s): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 2
```

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Platform Notes (Continued)

```

Core(s) per socket: 10
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4210T CPU @ 2.30GHz
Stepping: 7
CPU MHz: 2300.000
CPU max MHz: 3200.0000
CPU min MHz: 1000.0000
BogoMIPS: 4600.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 14080K
NUMA node0 CPU(s): 0-9,20-29
NUMA node1 CPU(s): 10-19,30-39
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 fl6c 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 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 md_clear flush_l1d
arch_capabilities

```

```

/proc/cpuinfo cache data
cache size : 14080 KB

```

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

```

available: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 20 21 22 23 24 25 26 27 28 29
node 0 size: 386658 MB
node 0 free: 385901 MB
node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
node 1 size: 387067 MB
node 1 free: 386668 MB
node distances:
node  0  1
0:  10  21

```

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Platform Notes (Continued)

1: 21 10

From /proc/meminfo

MemTotal: 792295104 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*

```
os-release:
NAME="SLES"
VERSION="15-SP1"
VERSION_ID="15.1"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp1"
```

uname -a:

```
Linux linux-xpyz 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

```
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: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional,
RSB filling
```

run-level 3 Apr 2 23:39

SPEC is set to: /home/cpu2017-1.1.0-ic19.0u5

```
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 737G 41G 697G 6% /
```

From /sys/devices/virtual/dmi/id

```
BIOS: Lenovo -[IVE151L-2.51]- 01/14/2020
Vendor: Lenovo
Product: ThinkSystem SR650 -[7X05RCZ000]-
Product Family: ThinkSystem
Serial: 1234567890
```

Additional information from dmidecode follows. WARNING: Use caution when you interpret

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Platform Notes (Continued)

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:

24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

```
=====
C          | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base)
          | 525.x264_r(base) 557.xz_r(base)
-----
```

Intel(R) C Compiler for applications running on Intel(R) 64, Version 19.0.5
NextGen Technology Build 20190729
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

```
=====
C++       | 520.omnetpp_r(base) 523.xalanbmk_r(base) 531.deepsjeng_r(base)
          | 541.leela_r(base)
-----
```

Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 19.0.5
NextGen Technology Build 20190729
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

```
=====
Fortran   | 548.exchange2_r(base)
-----
```

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.5.281 Build 20190815
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

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Base Compiler Invocation (Continued)

Fortran benchmarks:

ifort

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:

```
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -flto
-mfpmath=sse -funroll-loops -qnextgen -fuse-ld=gold
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin
-lqkmalloc
```

C++ benchmarks:

```
-m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -flto -mfpmath=sse
-funroll-loops -qnextgen -fuse-ld=gold -qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin
-lqkmalloc
```

Fortran benchmarks:

```
-m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin
-lqkmalloc
```

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

http://www.spec.org/cpu2017/flags/Intel-ic19.0u5-official-linux64_revD.html

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-G.html>



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

http://www.spec.org/cpu2017/flags/Intel-ic19.0u5-official-linux64_revD.xml

<http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-G.xml>

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Tested with SPEC CPU®2017 v1.1.0 on 2020-04-02 11:45:11-0400.

Report generated on 2020-04-28 15:31:47 by CPU2017 PDF formatter v6255.

Originally published on 2020-04-28.