



SPEC® CPU2017 Integer Rate Result

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Lenovo Global Technology

SPECrate2017_int_base = 312

ThinkSystem SR630
(2.20 GHz, Intel Xeon Platinum 8276L)

SPECrate2017_int_peak = Not Run

CPU2017 License: 9017

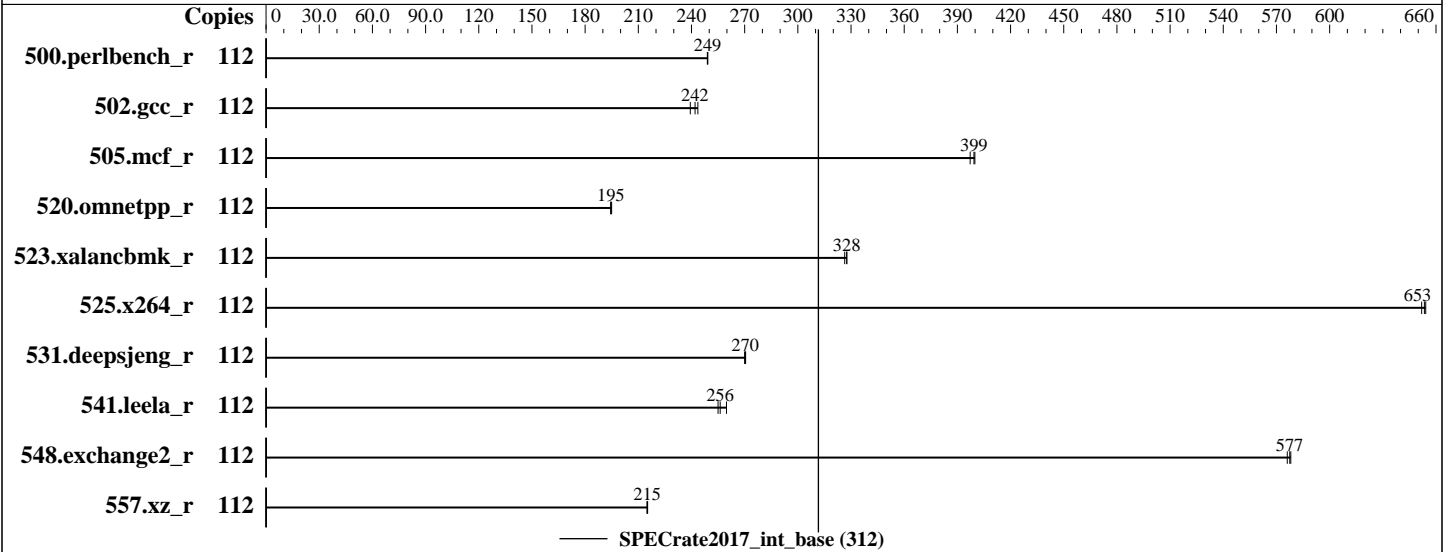
Test Date: May-2019

Test Sponsor: Lenovo Global Technology

Hardware Availability: Apr-2019

Tested by: Lenovo Global Technology

Software Availability: Nov-2018



Hardware

CPU Name: Intel Xeon Platinum 8276L
 Max MHz.: 4000
 Nominal: 2200
 Enabled: 56 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: 38.5 MB I+D on chip per chip
 Other: None
 Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R)
 Storage: 1 x 800 GB SATA SSD
 Other: None

Software

OS: Red Hat Enterprise Linux Server release 7.6 (Maipo)
 Kernel 3.10.0-957.el7.x86_64
 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 IVE135P 2.10 released Feb-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 | 112 | 716 | 249 | <u>716</u> | <u>249</u> | 716 | 249 | | | | | | | |
| 502.gcc_r | 112 | 663 | 239 | <u>655</u> | <u>242</u> | 651 | 244 | | | | | | | |
| 505.mcf_r | 112 | 453 | 400 | <u>453</u> | <u>399</u> | 456 | 397 | | | | | | | |
| 520.omnetpp_r | 112 | 756 | 194 | 754 | 195 | <u>755</u> | <u>195</u> | | | | | | | |
| 523.xalancbmk_r | 112 | <u>361</u> | <u>328</u> | 362 | 326 | 361 | 328 | | | | | | | |
| 525.x264_r | 112 | <u>300</u> | <u>653</u> | 301 | 652 | 300 | 654 | | | | | | | |
| 531.deepsjeng_r | 112 | 475 | 270 | 474 | 271 | <u>475</u> | <u>270</u> | | | | | | | |
| 541.leela_r | 112 | 714 | 260 | <u>724</u> | <u>256</u> | 727 | 255 | | | | | | | |
| 548.exchange2_r | 112 | 509 | 576 | 508 | 578 | <u>508</u> | <u>577</u> | | | | | | | |
| 557.xz_r | 112 | <u>562</u> | <u>215</u> | 562 | 215 | 563 | 215 | | | | | | | |

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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

C-states set to Legacy

SNC set to Enable

Trusted Execution Technology set to Enable

Stale AtoS set to Enable

LLC dead line alloc set to Disable

 Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo

 Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9

 running on localhost.localdomain Tue May 14 06:40:56 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 8276L CPU @ 2.20GHz

 2 "physical id"s (chips)

 112 "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

From lscpu:

Architecture: x86_64

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

Byte Order: Little Endian

CPU(s): 112

On-line CPU(s) list: 0-111

Thread(s) per core: 2

Core(s) per socket: 28

Socket(s): 2

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Platform Notes (Continued)

```

NUMA node(s):          4
Vendor ID:             GenuineIntel
CPU family:           6
Model:                85
Model name:           Intel(R) Xeon(R) Platinum 8276L CPU @ 2.20GHz
Stepping:             6
CPU MHz:              2200.000
BogoMIPS:             4400.00
Virtualization:       VT-x
L1d cache:            32K
L1i cache:            32K
L2 cache:             1024K
L3 cache:             39424K
NUMA node0 CPU(s):   0-3,7-9,14-17,21-23,56-59,63-65,70-73,77-79
NUMA node1 CPU(s):   4-6,10-13,18-20,24-27,60-62,66-69,74-76,80-83
NUMA node2 CPU(s):   28-31,35-37,42-45,49-51,84-87,91-93,98-101,105-107
NUMA node3 CPU(s):   32-34,38-41,46-48,52-55,88-90,94-97,102-104,108-111
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
aperfperf 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 epb cat_l3 cdp_l3 intel_pt 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 avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1
cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts pku ospke
avx512_vnni spec_ctrl intel_stibp flush_l1d 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 7 8 9 14 15 16 17 21 22 23 56 57 58 59 63 64 65 70 71 72 73 77 78
79
node 0 size: 97976 MB
node 0 free: 94488 MB
node 1 cpus: 4 5 6 10 11 12 13 18 19 20 24 25 26 27 60 61 62 66 67 68 69 74 75 76 80 81
82 83
node 1 size: 98304 MB
node 1 free: 95596 MB
node 2 cpus: 28 29 30 31 35 36 37 42 43 44 45 49 50 51 84 85 86 87 91 92 93 98 99 100
101 105 106 107
node 2 size: 98304 MB
node 2 free: 95686 MB

```

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Platform Notes (Continued)

```
node 3 cpus: 32 33 34 38 39 40 41 46 47 48 52 53 54 55 88 89 90 94 95 96 97 102 103 104
108 109 110 111
```

```
node 3 size: 98304 MB
```

```
node 3 free: 95699 MB
```

```
node distances:
```

```
node  0  1  2  3
  0: 10 11 21 21
  1: 11 10 21 21
  2: 21 21 10 11
  3: 21 21 11 10
```

```
From /proc/meminfo
```

```
MemTotal: 395877548 kB
```

```
HugePages_Total: 0
```

```
Hugepagesize: 2048 kB
```

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

```
os-release:
```

```
NAME="Red Hat Enterprise Linux Server"
```

```
VERSION="7.6 (Maipo)"
```

```
ID="rhel"
```

```
ID_LIKE="fedora"
```

```
VARIANT="Server"
```

```
VARIANT_ID="server"
```

```
VERSION_ID="7.6"
```

```
PRETTY_NAME="Red Hat Enterprise Linux Server 7.6 (Maipo)"
```

```
redhat-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)
```

```
system-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)
```

```
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.6:ga:server
```

```
uname -a:
```

```
Linux localhost.localdomain 3.10.0-957.el7.x86_64 #1 SMP Thu Oct 4 20:48:51 UTC 2018
```

```
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: Load fences, __user pointer sanitization
```

```
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS
```

```
run-level 3 May 14 01:57
```

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

```
Filesystem Type Size Used Avail Use% Mounted on
```

```
/dev/sdb2 xfs 689G 22G 668G 4% /home
```

```
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.

BIOS Lenovo -[IVE135P-2.10]- 02/13/2019

Memory:

24x Samsung M393A2K43CB2-CVF 16 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.

=====
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

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Base Compiler Invocation (Continued)

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
```

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>



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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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