# SPEC® CPU2017 Integer Rate Result



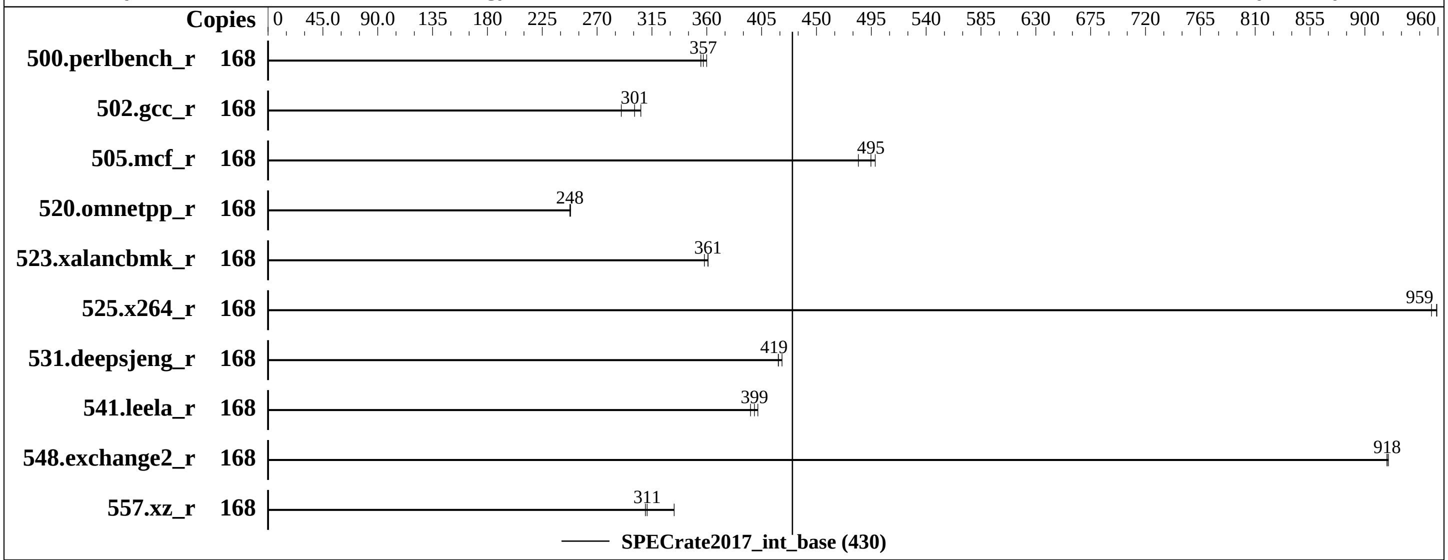
## Lenovo Global Technology

ThinkSystem SR950
(2.50 GHz, Intel Xeon Platinum 8180)

SPECrate2017_int_base = 430

SPECrate2017_int_peak = Not Run

| | | | |
|---|---|---|---|
| **CPU2017 License:** | 9017 | **Test Date:** | Jul-2018 |
| **Test Sponsor:** | Lenovo Global Technology | **Hardware Availability:** | Sep-2017 |
| **Tested by:** | Lenovo Global Technology | **Software Availability:** | May-2018 |




### Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon Platinum 8180 |
| Max MHz.: | 3800 |
| Nominal: | 2500 |
| Enabled: | 84 cores, 3 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: | 38.5 MB I+D on chip per chip |
| Other: | None |
| Memory: | 1152 GB (36 x 32 GB 2Rx4 PC4-2666V-R) |
| Storage: | 1 x 800 GB SAS SSD |
| Other: | None |

### Software

| | |
|---|---|
| OS: | SUSE Linux Enterprise Server 12 SP2 (x86_64) Kernel 4.4.121-92.80-default |
| Compiler: | C/C++: Version 18.0.2.199 of Intel C/C++ Compiler for Linux; Fortran: Version 18.0.2.199 of Intel Fortran Compiler for Linux |
| Parallel: | No |
| Firmware: | Lenovo BIOS Version PSE113P 1.30 released Jun-2018 |
| File System: | xfs |
| System State: | Run level 3 (multi-user) |
| Base Pointers: | 64-bit |
| Peak Pointers: | Not Applicable |
| Other: | jemalloc memory allocator V5.0.1 |

## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 500.perlbench_r | 168 | 753 | 355 | **749** | **357** | 743 | 360 | | | | | | | |
| 502.gcc_r | 168 | 778 | 306 | **791** | **301** | 821 | 290 | | | | | | | |
| 505.mcf_r | 168 | 545 | 498 | **549** | **495** | 561 | 484 | | | | | | | |
| 520.omnetpp_r | 168 | 888 | 248 | **890** | **248** | 890 | 248 | | | | | | | |
| 523.xalancbmk_r | 168 | **491** | **361** | 496 | 358 | 491 | 361 | | | | | | | |
| 525.x264_r | 168 | 307 | 959 | **307** | **959** | 308 | 955 | | | | | | | |
| 531.deepsjeng_r | 168 | 457 | 422 | 460 | 419 | **460** | **419** | | | | | | | |
| 541.leela_r | 168 | 692 | 402 | 703 | 396 | **697** | **399** | | | | | | | |
| 548.exchange2_r | 168 | **479** | **918** | 479 | 918 | 479 | 919 | | | | | | | |
| 557.xz_r | 168 | 544 | 333 | **583** | **311** | 586 | 310 | | | | | | | |

**SPECrate2017_int_base = 430**

**SPECrate2017_int_peak = Not Run**

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-ic18.0u2/lib/ia32:/home/cpu2017-1.0.5-ic18.0u2/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017-1.0.5-ic18.0u2/je5.0.1-32:/home/cpu2017-1.0.5-ic18.0u2/je5.0.1-64"

Binaries compiled on a system with 1x Intel Core i7-6700K 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) is mitigated in the system as tested and documented.

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## General Notes (Continued)

```
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.
 jemalloc, a general purpose malloc implementation
 built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
 sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases
```

## Platform Notes

```
BIOS configuration:
Choose Operating Mode set to Max Performance
Execute Disable Bit set to Disable
DCA set to Enable
SNC set to Enable
Stale A to S set to Disable
 Sysinfo program /home/cpu2017-1.0.5-ic18.0u2/bin/sysinfo
 Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
 running on linux-x3kk Fri Jul 20 17:59:58 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
    model name : Intel(R) Xeon(R) Platinum 8180 CPU @ 2.50GHz
       3  "physical id"s (chips)
       168 "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
       physical 3: 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):                168
      On-line CPU(s) list:   0-167
      Thread(s) per core:    2
      Core(s) per socket:    28
      Socket(s):             3
```

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## Platform Notes (Continued)

```
      NUMA node(s):          6
      Vendor ID:             GenuineIntel
      CPU family:            6
      Model:                 85
      Model name:            Intel(R) Xeon(R) Platinum 8180 CPU @ 2.50GHz
      Stepping:              4
      CPU MHz:               2494.133
      BogoMIPS:              4988.26
      Virtualization:        VT-x
      L1d cache:             32K
      L1i cache:             32K
      L2 cache:              1024K
      L3 cache:              39424K
      NUMA node0 CPU(s):     0-3,7-9,14-17,21-23,84-87,91-93,98-101,105-107
      NUMA node1 CPU(s):     4-6,10-13,18-20,24-27,88-90,94-97,102-104,108-111
      NUMA node2 CPU(s):     28-31,35-37,42-45,49-51,112-115,119-121,126-129,133-135
      NUMA node3 CPU(s):     32-34,38-41,46-48,52-55,116-118,122-125,130-132,136-139
      NUMA node4 CPU(s):     56-59,63-65,70-73,77-79,140-143,147-149,154-157,161-163
      NUMA node5 CPU(s):     60-62,66-69,74-76,80-83,144-146,150-153,158-160,164-167
      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
      aperfmperf eagerfpu 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 ida arat epb invpcid_single pln pts dtherm
      intel_pt rsb_ctxsw spec_ctrl stibp ssbd retpoline kaiser 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 : 39424 KB

 From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
 physical chip.
   available: 6 nodes (0-5)
   node 0 cpus: 0 1 2 3 7 8 9 14 15 16 17 21 22 23 84 85 86 87 91 92 93 98 99 100 101 105
   106 107
   node 0 size: 192834 MB
   node 0 free: 192544 MB
   node 1 cpus: 4 5 6 10 11 12 13 18 19 20 24 25 26 27 88 89 90 94 95 96 97 102 103 104
   108 109 110 111
   node 1 size: 193513 MB
   node 1 free: 193240 MB
   node 2 cpus: 28 29 30 31 35 36 37 42 43 44 45 49 50 51 112 113 114 115 119 120 121 126
   127 128 129 133 134 135
   node 2 size: 193514 MB
```

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## Platform Notes (Continued)

```
    node 2 free: 193093 MB
    node 3 cpus: 32 33 34 38 39 40 41 46 47 48 52 53 54 55 116 117 118 122 123 124 125 130
    131 132 136 137 138 139
    node 3 size: 193514 MB
    node 3 free: 193260 MB
    node 4 cpus: 56 57 58 59 63 64 65 70 71 72 73 77 78 79 140 141 142 143 147 148 149 154
    155 156 157 161 162 163
    node 4 size: 193514 MB
    node 4 free: 193209 MB
    node 5 cpus: 60 61 62 66 67 68 69 74 75 76 80 81 82 83 144 145 146 150 151 152 153 158
    159 160 164 165 166 167
    node 5 size: 193509 MB
    node 5 free: 193218 MB
    node distances:
    node   0   1   2   3   4   5
      0:  10  11  21  21  20  20
      1:  11  10  21  21  20  20
      2:  21  21  10  11  20  20
      3:  21  21  11  10  20  20
      4:  20  20  20  20  10  20
      5:  20  20  20  20  20  10

  From /proc/meminfo
     MemTotal:       1188250116 kB
     HugePages_Total:       0
     Hugepagesize:       2048 kB

  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-x3kk 4.4.121-92.80-default #1 SMP Mon May 21 14:40:10 UTC 2018 (2afdd00)
     x86_64 x86_64 x86_64 GNU/Linux
```

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## Platform Notes (Continued)

```
Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown):          Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

run-level 3 Jul 20 17:58

SPEC is set to: /home/cpu2017-1.0.5-ic18.0u2
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda3      xfs   743G   44G  700G   6% /

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 -[PSE113P-1.30]- 06/14/2018
  Memory:
   60x NO DIMM NO DIMM
   36x 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) 525.x264_r(base)
      557.xz_r(base)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
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)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 FC  548.exchange2_r(base)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
```

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## Compiler Version Notes (Continued)

------------------------------------------------------------------------------

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

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.html
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-H.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.xml
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-H.xml



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


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