Lenovo Global Technology  
ThinkSystem SR570  
(3.60 GHz, Intel Xeon Platinum 8156)  

**SPECrate2017_int_base = 55.5**  
**SPECrate2017_int_peak = 58.5**

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Test Date:** Dec-2017  
**Hardware Availability:** Nov-2017  
**Tested by:** Lenovo Global Technology  
**Software Availability:** Sep-2017

### Hardware

- **CPU Name:** Intel Xeon Platinum 8156  
- **Max MHz.:** 3700  
- **Nominal:** 3600  
- **Enabled:** 8 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:** 16.5 MB I+D on chip per chip  
- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R)  
- **Storage:** 1 x 800 GB SAS SSD  
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux Server release 7.4  
  (Maipo)  
- **Compiler:** C/C++: Version 18.0.0.128 of Intel C/C++  
  Compiler for Linux;  
  Fortran: Version 18.0.0.128 of Intel Fortran  
  Compiler for Linux  
- **Parallel:** No  
- **Firmware:** Lenovo BIOS Version TEE119J 1.20 released Sep-2017  
- **File System:** btrfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 32/64-bit  
- **Other:**  
  - jemalloc: jemalloc memory allocator library V5.0.1;  
  - jemalloc: configured and built at default for 32bit (i686) and 64-bit (x86_64) targets;  
  - jemalloc: built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5;  
  - jemalloc: sources avilable from jemalloc.net or releases
Lenovo Global Technology
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SPECrate2017_int_base = 55.5
SPECrate2017_int_peak = 58.5

Results Table

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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/cpu2017.1.0.2.ic18.0/lib/ia32:/home/cpu2017.1.0.2.ic18.0/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017.1.0.2.ic18.0/je5.0.1-32:/home/cpu2017.1.0.2.ic18.0/je5.0.1-64"
Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.4
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>
No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
No: 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.
No: 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.

(Continued on next page)
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Tested by: Lenovo Global Technology

General Notes (Continued)

This benchmark result is intended to provide perspective on past performance using the historical hardware and/or software described on this result page.

The system as described on this result page was formerly generally available. At the time of this publication, it may not be shipping, and/or may not be supported, and/or may fail to meet other tests of General Availability described in the SPEC OSG Policy document, http://www.spec.org/osg/policy.html

This measured result may not be representative of the result that would be measured were this benchmark run with hardware and software available as of the publication date.

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
DCU Streamer Prefetcher set to Enable
MONITORMWAIT set to Enable
SNC set to Enable
XPT Prefetcher set to Enable
Stale AtoS set to Enable
LLC Deadline Alloc set to Disable
Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618b0c091c0f
running on localhost.localdomain Fri Dec 1 16:29:23 2017

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 8156 CPU @ 3.60GHz
  2 "physical id"s (chips)
  16 "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 : 4
sibling : 8
physical 0: cores 0 3 10 13
physical 1: cores 1 5 9 13

From lscpu:
Architecture: x86_64
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CPU2017 License: 9017
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Platform Notes (Continued)

CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 2
Core(s) per socket: 4
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8156 CPU @ 3.60GHz
Stepping: 4
CPU MHz: 3600.000
BogoMIPS: 7200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 16896K
NUMA node0 CPU(s): 0,2,8,10
NUMA node1 CPU(s): 1,3,9,11
NUMA node2 CPU(s): 4,6,12,14
NUMA node3 CPU(s): 5,7,13,15
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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 fma cx16 xtrm pcid pclz dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave f16c rdrand lahf_lm abm 3dnowprefetch ebtx cat_13 cd pga intel_pt tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3dnow invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pin pts

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 2 8 10
node 0 size: 48530 MB
node 0 free: 47165 MB
node 1 cpus: 1 3 9 11
node 1 size: 49152 MB
node 1 free: 47945 MB

(Continued on next page)
### Lenovo Global Technology

**ThinkSystem SR570**

(3.60 GHz, Intel Xeon Platinum 8156)

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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Dec-2017  
**Hardware Availability:** Nov-2017  
**Software Availability:** Sep-2017

### Platform Notes (Continued)

- **node 2 cpus:** 4 6 12 14  
- **node 2 size:** 49152 MB  
- **node 2 free:** 47933 MB  
- **node 3 cpus:** 5 7 13 15  
- **node 3 size:** 49152 MB  
- **node 3 free:** 47741 MB

- **node distances:**
  - 0: 10 11 21 21  
  - 1: 11 10 21 21  
  - 2: 21 21 10 11  
  - 3: 21 21 11 10

- From `/proc/meminfo`
  - **MemTotal:** 197411280 kB  
  - **HugePages_Total:** 0  
  - **Hugepagesize:** 2048 kB

- From `/etc/*release* /etc/*version*`
  - **os-release:**
    - **NAME:** "Red Hat Enterprise Linux Server"  
    - **VERSION:** "7.4 (Maipo)"  
    - **ID:** "rhel"  
    - **ID_LIKE:** "fedora"  
    - **VARIANT:** "Server"  
    - **VARIANT_ID:** "server"  
    - **VERSION_ID:** "7.4"  
    - **PRETTY_NAME:** "Red Hat Enterprise Linux Server 7.4 (Maipo)"
  - **redhat-release:** Red Hat Enterprise Linux Server release 7.4 (Maipo)  
  - **system-release:** Red Hat Enterprise Linux Server release 7.4 (Maipo)  
  - **system-release-cpe:** cpe:/o:redhat:enterprise_linux:7.4:ga:server

- **uname -a:**
  
  Linux localhost.localdomain 3.10.0-693.el7.x86_64 #1 SMP Thu Jul 6 19:56:57 EDT 2017  
  x86_64 x86_64 x86_64 GNU/Linux

- **run-level 3 Dec 1 16:28**

- **SPEC is set to:** /home/cpu2017.1.0.2.ic18.0

- **Filesystem** | **Type** | **Size** | **Used** | **Avail** | **Use%** | **Mounted on**
  - /dev/sda2 | btrfs | 740G | 93G | 647G | 13% | /

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 -[TEE119J-1.20]- 09/06/2017**

(Continued on next page)
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ThinkSystem SR570
(3.60 GHz, Intel Xeon Platinum 8156)

**SPEC CPU2017 Integer Rate Result**

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**Hardware Availability:** Nov-2017

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**Test Date:** Dec-2017

**Tested by:** Lenovo Global Technology

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**Platform Notes (Continued)**

Memory:
- 4x NO DIMM NO DIMM
- 12x Samsung M393A2K43BB1-CTD 16 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, peak)
  525.x264_r(base, peak) 557.xz_r(base, peak)
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
---
CC  500.perlbench_r(peak) 502.gcc_r(peak)
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
---
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
  541.leela_r(base)
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
---
CXXC 520.omnetpp_r(peak) 523.xalancbmk_r(peak) 531.deepsjeng_r(peak)
  541.leela_r(peak)
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
---
FC  548.exchange2_r(base, peak)
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
---
```
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**Base Compiler Invocation**

- C benchmarks: `icc`
- C++ benchmarks: `icpc`
- 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:
  - `-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 -align array32byte`
  - `-L/usr/local/je5.0.1-64/lib -ljemalloc`
## SPEC CPU2017 Integer Rate Result

**Lenovo Global Technology**  
ThinkSystem SR570  
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<table>
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</table>

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

### Base Other Flags

- **C benchmarks:**  
  -m64 -std=c11

- **C++ benchmarks:**  
  -m64

- **Fortran benchmarks:**  
  -m64

### Peak Compiler Invocation

- **C benchmarks:**  
  icc

- **C++ benchmarks:**  
  icpc

- **Fortran benchmarks:**  
  ifort

### Peak Portability Flags

- 500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
- 502.gcc_r: -D_FILE_OFFSET_BITS=64
- 505.mcf_r: -DSPEC_LP64
- 520.omnetpp_r: -DSPEC_LP64
- 523.xalancbmk_r: -D_FILE_OFFSET_BITS=64 -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

### Peak Optimization Flags

- **C benchmarks:**  
  -l, -z, muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
  -xCORE-AVX512 -03 -no-prec-div -qopt-mem-layout-trans=3  
  -fno-strict-overflow -L/usr/local/je5.0.1-64/lib

(Continued on next page)
Peak Optimization Flags (Continued)

500.perlbench_r (continued):
-1jemalloc

502.gcc_r -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32
-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-L/usr/local/je5.0.1-32/lib -1jemalloc

505.mcf_r -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib
-1jemalloc

525.x264_r -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -fno-alias
-L/usr/local/je5.0.1-64/lib -1jemalloc

557.xz_r: Same as 505.mcf_r

C++ benchmarks:

520.omnetpp_r -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-L/usr/local/je5.0.1-64/lib -1jemalloc

523.xalancbmk_r -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32
-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-L/usr/local/je5.0.1-32/lib -1jemalloc

531.deepsjeng_r: Same as 520.omnetpp_r

541.leela_r: Same as 520.omnetpp_r

Fortran benchmarks:

-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -1jemalloc

Peak Other Flags

C benchmarks (except as noted below):

-m64 -std=c11

(Continued on next page)
**SPEC CPU2017 Integer Rate Result**

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### Peak Other Flags (Continued)

- `502.gcc_r: -m32 -std=c11`
- **C++ benchmarks (except as noted below):**
  - `-m64`
- `523.xalancbmk_r: -m32`
- **Fortran benchmarks:**
  - `-m64`

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.html](http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.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.xml](http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.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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