# Lenovo Global Technology

**ThinkSystem SR650**

(2.70 GHz, Intel Xeon Platinum 8280)

---

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

---

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>97.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
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---

**Test Date:** Mar-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** Oct-2018

---

## Hardware

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon Platinum 8280</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz.:</td>
<td>4000</td>
</tr>
<tr>
<td>Nominal:</td>
<td>2700</td>
</tr>
<tr>
<td>Enabled:</td>
<td>28 cores, 1 chip</td>
</tr>
<tr>
<td>Orderable:</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Cache L1:</td>
<td>32 KB I + 32 KB D on chip per core</td>
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<tr>
<td>Cache L2:</td>
<td>1 MB I+D on chip per core</td>
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<tr>
<td>Cache L3:</td>
<td>38.5 MB I+D on chip per chip</td>
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<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)</td>
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<tr>
<td>Storage:</td>
<td>1 x 800 GB SATA SSD</td>
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<tr>
<td>Other:</td>
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## Software

<table>
<thead>
<tr>
<th>OS:</th>
<th>Red Hat Enterprise Linux Server release 7.6 (Maipo)</th>
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<tbody>
<tr>
<td>Kernel:</td>
<td>3.10.0-957.el7.x86_64</td>
</tr>
</tbody>
</table>
| Compiler: | C/C++: Version 19.0.0.117 of Intel C/C++  
Fortran: Version 19.0.0.117 of Intel Fortran  
Compiler for Linux |
| Parallel: | Yes |
| Firmware: | Lenovo BIOS Version IVE135K 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 |

---

**Threads**

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</table>
Lenovo Global Technology
ThinkSystem SR650
(2.70 GHz, Intel Xeon Platinum 8280)

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

Results Table

<table>
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<tr>
<th>Benchmark</th>
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<th>Ratio</th>
<th>Seconds</th>
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</tbody>
</table>

SPECspeed2017_fp_base = 97.7
SPECspeed2017_fp_peak = Not Run

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19/lib/ia32:/home/cpu2017-1.0.5-ic19/lib/intel64"
LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017-1.0.5-ic19/je5.0.1-32:/home/cpu2017-1.0.5-ic19/je5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i9-799X CPU + 32GB RAM
memory compiled using Redhat Enterprise Linux 7.5
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Files system page cache synced and cleared with:
sync; echo 3> /proc/sys/vm/drop_caches
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.
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.
Lenovo Global Technology

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SPEC CPU2017 Floating Point Speed Result

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Lenovo Global Technology

SPECspeed2017_fp_base = 97.7
SPECspeed2017_fp_peak = Not Run

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

Test Date: Mar-2019
Hardware Availability: Apr-2019
Software Availability: Oct-2018

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set to Custom Mode
C-states set to Legacy
Hyper-Threading set to Disable
Adjacent Cache Prefetch set to Disable
Stale AtoS set to Enable
Sysinfo program /home/cpu2017-1.0.5-ic19/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on localhost.localdomain Mon Mar 18 22:16:52 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 8280 CPU @ 2.70GHz
    1 "physical id"s (chips)
    28 "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 : 28
    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

From lscpu:
    Architecture: x86_64
    CPU op-mode(s): 32-bit, 64-bit
    Byte Order: Little Endian
    CPU(s): 28
    On-line CPU(s) list: 0-27
    Thread(s) per core: 1
    Core(s) per socket: 28
    Socket(s): 1
    NUMA node(s): 1
    Vendor ID: GenuineIntel
    CPU family: 6
    Model: 85
    Model name: Intel(R) Xeon(R) Platinum 8280 CPU @ 2.70GHz
    Stepping: 6
    CPU MHz: 2700.000
    BogoMIPS: 5400.00
    Virtualization: VT-x
    L1d cache: 32K
    L1i cache: 32K
    L2 cache: 1024K

(Continued on next page)
Lenovo Global Technology
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Platform Notes (Continued)

L3 cache: 39424K
NUMA node0 CPU(s): 0-27
Flags:
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 pge mca cmov
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 pge mca cmov

/platform --hardware Warning: a numactl 'node' might or might not correspond to a
physical chip.
available: 1 nodes (0)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
node 0 size: 392828 MB
node 0 free: 382358 MB
node distances:
node 0
0: 10

From /proc/meminfo
MemTotal: 395817880 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)
uname -a:

(Continued on next page)
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<thead>
<tr>
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</table>

Platform Notes (Continued)

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 Mar 18 20:55

SPEC is set to: /home/cpu2017-1.0.5-ic19

Filesystem Type Size Used Avail Use% Mounted on
/dev/sdc2 xfs 689G 102G 587G 15% /home

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)
==============================================================================
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
==============================================================================
FC  607.cactuBSSN_s(base)
==============================================================================
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
Lenovo Global Technology
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SPECspeed2017_fp_base = 97.7
SPECspeed2017_fp_peak = Not Run

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### Compiler Version Notes (Continued)

64, Version 19.0.0.117 Build 20180804
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```
==============================================================================
FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
==============================================================================
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
==============================================================================
CC  621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)
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Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

### Base Compiler Invocation

C benchmarks:
```
icc -m64 -std=c11
```

Fortran benchmarks:
```
ifort -m64
```

Benchmarks using both Fortran and C:
```
ifort -m64 icc -m64 -std=c11
```

Benchmarks using Fortran, C, and C++:
```
icpc -m64 icc -m64 -std=c11 ifort -m64
```

### Base Portability Flags

```
603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
```

(Continued on next page)
SPEC CPU2017 Floating Point Speed Result

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SPECspeed2017_fp_base = 97.7
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Hardware Availability: Apr-2019

Base Portability Flags (Continued)

627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -gopt-prefetch
-ffinite-math-only -gopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -gopt-prefetch
-ffinite-math-only -gopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs -align array32byte

Benchmarks using both Fortran and C:
-xCORE-AVX512 -ipo -O3 -no-prec-div -gopt-prefetch
-ffinite-math-only -gopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -align array32byte

Benchmarks using Fortran, C, and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -gopt-prefetch
-ffinite-math-only -gopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -align array32byte

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

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

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Report generated on 2019-04-02 17:01:41 by CPU2017 PDF formatter v6067.
Originally published on 2019-04-02.