**Lenovo Global Technology**

ThinkSystem SD650  
(2.40 GHz, Intel Xeon Platinum 8260)

<table>
<thead>
<tr>
<th>SPECspeed\textsuperscript{2017}_fp_base</th>
<th>144</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed\textsuperscript{2017}_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9017  
**Test Date:** Oct-2019  
**Test Sponsor:** Lenovo Global Technology  
**Hardware Availability:** Apr-2019  
**Tested by:** Lenovo Global Technology  
**Software Availability:** May-2019

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>48</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>48</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>48</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>48</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>48</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>48</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>48</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>48</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>48</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>48</td>
</tr>
</tbody>
</table>

### Hardware

**CPU Name:** Intel Xeon Platinum 8260  
**Max MHz:** 3900  
**Nominal:** 2400  
**Enabled:** 48 cores, 2 chips  
**Orderable:** 1.2 chips  
**Cache L1:** 32 KB I+ 32 KB D on chip per core  
**Cache L2:** 1 MB I+D on chip per core  
**Cache L3:** 35.75 MB I+D on chip per chip  
**Other:** None  
**Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)  
**Storage:** 1 x 480 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 19.0.4.227 of Intel C/C++  
**Compiler for Linux:** Compiler for Linux  
**Parallel:** Yes  
**Firmware:** Lenovo BIOS Version OTE142F 2.30 released Aug-2019 tested as OTE141F 2.30 Jul-2019  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** Not Applicable  
**Other:** None  
**Power Management:** --
Lenovo Global Technology  
ThinkSystem SD650  
(2.40 GHz, Intel Xeon Platinum 8260)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>48</td>
<td>115</td>
<td>513</td>
<td>116</td>
<td>508</td>
<td>117</td>
<td>505</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>48</td>
<td>101</td>
<td>165</td>
<td>101</td>
<td>165</td>
<td>102</td>
<td>163</td>
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<tr>
<td>619.lbm_s</td>
<td>48</td>
<td>52.9</td>
<td>99.0</td>
<td>52.7</td>
<td>99.4</td>
<td>53.0</td>
<td>98.9</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>48</td>
<td>104</td>
<td>127</td>
<td>105</td>
<td>126</td>
<td>105</td>
<td>126</td>
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<tr>
<td>627.cam4_s</td>
<td>48</td>
<td>84.3</td>
<td>105</td>
<td>84.2</td>
<td>105</td>
<td>84.3</td>
<td>105</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>48</td>
<td>187</td>
<td>63.6</td>
<td>186</td>
<td>63.7</td>
<td>188</td>
<td>63.2</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>48</td>
<td>109</td>
<td>133</td>
<td>101</td>
<td>142</td>
<td>101</td>
<td>143</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>48</td>
<td>65.6</td>
<td>266</td>
<td>65.5</td>
<td>267</td>
<td>65.5</td>
<td>267</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>48</td>
<td>105</td>
<td>87.2</td>
<td>106</td>
<td>86.2</td>
<td>106</td>
<td>86.1</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>48</td>
<td>97.4</td>
<td>162</td>
<td>97.3</td>
<td>162</td>
<td>97.6</td>
<td>161</td>
</tr>
</tbody>
</table>

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-ic19.0u4/lib/intel64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i9-799X 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

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.
## SPEC CPU®2017 Floating Point Speed Result

**Lenovo Global Technology**

ThinkSystem SD650  
(2.40 GHz, Intel Xeon Platinum 8260)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tr>
<td>SPECspeed®2017_fp_base</td>
<td>144</td>
</tr>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Oct-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** May-2019

### Platform Notes

**BIOS configuration:**  
Choose Operating Mode set to Maximum Performance and then set it to Custom Mode  
C1 Enhanced Mode set to Enable  
MONITOR/MWAIT set to Enable  
Hyper-Threading set to Disable  
Adjacent Cache Prefetch set to Disable  
Sysinfo program /home/cpu2017-1.0.5-ic19.0u4/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcd8f2999c33d61f64985e45859ea9  
running on localhost.localdomain Tue Oct 15 10:33:34 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

From /proc/cpuinfo

- model name: Intel(R) Xeon(R) Platinum 8260 CPU @ 2.40GHz  
- 2 "physical id"s (chips)  
- 48 "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: 24  
  - siblings: 24  
  - physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29  
  - physical 1: cores 0 1 2 3 4 5 6 8 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29

From lscpu:

- Architecture: x86_64  
- CPU op-mode(s): 32-bit, 64-bit  
- Byte Order: Little Endian  
- CPU(s): 48  
- On-line CPU(s) list: 0-47  
- Thread(s) per core: 1  
- Core(s) per socket: 24  
- Socket(s): 2  
- NUMA node(s): 2  
- Vendor ID: GenuineIntel  
- CPU family: 6  
- Model: 85  
- Model name: Intel(R) Xeon(R) Platinum 8260 CPU @ 2.40GHz  
- Stepping: 6  
- CPU MHz: 2400.000  
- BogoMIPS: 4800.00  
- Virtualization: VT-x  
- L1d cache: 32K  
- L1i cache: 32K  
- L2 cache: 1024K  
- L3 cache: 36608K

(Continued on next page)
**SPEC CPU®2017 Floating Point Speed Result**

**Lenovo Global Technology**
ThinkSystem SD650
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</table>

**Platform Notes (Continued)**

- NUMA node0 CPU(s): 0-23
- NUMA node1 CPU(s): 24-47
- 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 rdtsdp
- lm constant_tsc art arch_perfmon pebs bts rep_good ntopology nonstop_tsc
- aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
- fma cx16 x86pr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
- xsave avx f16c rdrand lahf_lm abm 3nowprefetch eb xcat_rae perf xloong ts
- intel_pt ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmpni flexpriority esm
- vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cmpx86 cmpx86 cmpx86
- intel_p6 aarch64 adx smap clflushopt clwb avx512bw avx512vnni xsaved xsaveopt
- xsave avx512_vnni spec_ctrl intel_stibp flush_l1d arch_capabilities

```
From /proc/cpuinfo cache data
  cache size: 36068 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 10 11 12 13 14 15 16 17 18 19 20 21 22 23
  node 0 size: 196280 MB
  node 0 free: 191413 MB
  node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
  node 1 size: 196608 MB
  node 1 free: 191866 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 395878416 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)
```

(Continued on next page)
Lenovo Global Technology

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SPECspeed®2017_fp_base = 144
SPECspeed®2017_fp_peak = Not Run

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

Test Date: Oct-2019
Hardware Availability: Apr-2019
Software Availability: May-2019

Platform Notes (Continued)

system-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)
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 Oct 15 10:32
SPEC is set to: /home/cpu2017-1.0.5-ic19.0u4
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/mapper/rhel-root xfs 445G 53G 393G 12% /

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 -{OTE141F-2.30}- 07/02/2019
Memory:
    4x NO DIMM NO DIMM
    12x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
|                           | 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 19.0.4.227 Build 20190416 |
| Copyright (C) 1985-2019 Intel Corporation. All rights reserved. |
==============================================================================

==============================================================================
|                           | 607.cactuBSSN_s(base) |
==============================================================================
| Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, |
| Version 19.0.4.227 Build 20190416 |
| Copyright (C) 1985-2019 Intel Corporation. All rights reserved. |
==============================================================================

(Continued on next page)
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SPECSpeed®2017_fp_base = 144
SPECSpeed®2017_fp_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: Oct-2019
Tested by: Lenovo Global Technology
Hardware Availability: Apr-2019
Software Availability: May-2019

Compiler Version Notes (Continued)

Fortran         | 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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
---------------

Fortran, C      | 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)
---------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 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
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Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.ibm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
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 -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-nostandard-realloc-lhs

Benchmarks using both Fortran and C:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

Benchmarks using Fortran, C, and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-F.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-F.xml
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