Lenovo Global Technology
ThinkSystem SR950
(2.70 GHz, Intel Xeon Platinum 8280)

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

Lenovo Global Technology

SPECspeed2017_int_base = 9.97
SPECspeed2017_int_peak = Not Run

CPU Name: Intel Xeon Platinum 8280
Max MHz.: 4000
Nominal: 2700
Enabled: 168 cores, 6 chips
Orderable: 2,4,6,8 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 (72 x 16 GB 2Rx8 PC4-2933Y-R)
Storage: 1 x 800 GB SATA SSD
Other: None

OS: SUSE Linux Enterprise Server 15 (x86_64)
Compiler: C/C++: Version 19.0.0.117 of Intel C/C++
Compiler for Linux:
Fortran: Version 19.0.0.117 of Intel Fortran
Compiler for Linux:
Parallel: Yes
Firmware: Lenovo BIOS Version PSE121C 1.50 released Jan-2019
File System: btrfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: jemalloc memory allocator V5.0.1
SPEC CPU2017 Integer Speed Result

Lenovo Global Technology
ThinkSystem SR950
(2.70 GHz, Intel Xeon Platinum 8280)

SPECspeed2017_int_base = 9.97
SPECspeed2017_int_peak = Not Run

Results Table

<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>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>168</td>
<td>264</td>
<td>6.73</td>
<td>265</td>
<td>6.70</td>
<td>264</td>
<td>6.72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>168</td>
<td>389</td>
<td>10.2</td>
<td>386</td>
<td>10.1</td>
<td>396</td>
<td>10.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>168</td>
<td>400</td>
<td>11.8</td>
<td>402</td>
<td>11.8</td>
<td>399</td>
<td>11.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>168</td>
<td>196</td>
<td>8.30</td>
<td>198</td>
<td>8.23</td>
<td>199</td>
<td>8.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>168</td>
<td>140</td>
<td>10.1</td>
<td>140</td>
<td>10.1</td>
<td>140</td>
<td>10.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>625.x264_s</td>
<td>168</td>
<td>126</td>
<td>14.0</td>
<td>126</td>
<td>14.0</td>
<td>126</td>
<td>14.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>168</td>
<td>263</td>
<td>5.45</td>
<td>263</td>
<td>5.45</td>
<td>263</td>
<td>5.45</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>641.leela_s</td>
<td>168</td>
<td>351</td>
<td>4.86</td>
<td>351</td>
<td>4.86</td>
<td>351</td>
<td>4.87</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>168</td>
<td>202</td>
<td>14.5</td>
<td>202</td>
<td>14.6</td>
<td>202</td>
<td>14.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>657.xz_s</td>
<td>168</td>
<td>234</td>
<td>26.4</td>
<td>234</td>
<td>26.4</td>
<td>241</td>
<td>25.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></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,scatter"
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 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

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.

jemalloc, a general purpose malloc implementation built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR950
(2.70 GHz, Intel Xeon Platinum 8280)

SPEC CPU2017 Integer Speed Result

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** Mar-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** Sep-2018

**SPECspeed2017_int_base =** 9.97  
**SPECspeed2017_int_peak =** Not Run

**General Notes (Continued)**  
Sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases

**Platform Notes**

**BIOS configuration:**  
Choose Operating Mode set to Maximum Performance  
Choose Operating Mode set to Custom Mode  
CPU P-state Control set to Cooperative  
C1 Enhanced Mode set to Enable  
C-States set to Legacy  
Hyper-Threading set to Disable  
Adjacent Cache Prefetch set to Disable  
Sysinfo program /home/cpu2017-1.0.5-ic19/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bced8f2999c33d61f6498e45859ea9  
running on linux-o8xw Tue Mar 19 06:57:53 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  
  - 6 "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: 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
  - 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 2: 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
  - physical 4: 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 6: 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

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

**ThinkSystem SR950**  
(2.70 GHz, Intel Xeon Platinum 8280)

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base</th>
<th>9.97</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Test Date:** Mar-2019  
**Hardware Availability:** Apr-2019  
**Tested by:** Lenovo Global Technology  
**Software Availability:** Sep-2018

### Platform Notes (Continued)

- **On-line CPU(s) list:** 0-167
- **Thread(s) per core:** 1
- **Core(s) per socket:** 28
- **Socket(s):** 6
- **NUMA node(s):** 6
- **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
- **CPU max MHz:** 4000.0000
- **CPU min MHz:** 1000.0000
- **BogoMIPS:** 5400.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 39424K
- **NUMA node0 CPU(s):** 0-27
- **NUMA node1 CPU(s):** 28-55
- **NUMA node2 CPU(s):** 56-83
- **NUMA node3 CPU(s):** 84-111
- **NUMA node4 CPU(s):** 112-139
- **NUMA node5 CPU(s):** 140-167
- **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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtr pdpr cmid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_13 invpcid_single ssbd mba ibrs ibpb stibp tpr_shadow vmx 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 intel_pt avx512cw avx512bw avx512vl xsaveopt xsaves xsaveprec xgetbv1 xsaves _cmq _occu _llc _cmq _mb _total _cmq _mb _local _dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke avx512_vnni 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: 6 nodes (0-5)  

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: 193082 MB  

node 0 free: 189434 MB

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR950
(2.70 GHz, Intel Xeon Platinum 8280)

SPEC CPU2017 Integer Speed Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Lenovo Global Technology

SPECspeed2017_int_base = 9.97
SPECspeed2017_int_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: Sep-2018

Platform Notes (Continued)

node 1 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
53 54 55
node 1 size: 193521 MB
node 1 free: 192486 MB
node 2 cpus: 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
81 82 83
node 2 size: 193521 MB
node 2 free: 193297 MB
node 3 cpus: 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105
106 107 108 109 111
node 3 size: 193521 MB
node 3 free: 193371 MB
node 4 cpus: 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129
130 131 132 133 134 135 136 137 138 139
node 4 size: 193522 MB
node 4 free: 192762 MB
node 5 cpus: 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157
158 159 160 161 162 163 164 165 166 167
node 5 size: 193519 MB
node 5 free: 193291 MB
node distances:
node 0 1 2 3 4 5
0: 10 21 31 21 21 20
1: 21 10 21 31 31 20
2: 31 21 10 21 31 20
3: 21 31 21 10 31 20
4: 21 31 31 31 10 20
5: 20 20 20 20 20 10

From /proc/meminfo
MemTotal: 1188546192 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

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

os-release:
NAME="SLES"
VERSION="15"
VERSION_ID="15"
PRETTY_NAME="SUSE Linux Enterprise Server 15"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15"
uname -a:

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR950
(2.70 GHz, Intel Xeon Platinum 8280)

SPEC CPU2017 Integer Speed Result

| SPECspeed2017_int_base          | 9.97 |
| SPECspeed2017_int_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: Sep-2018

Platform Notes (Continued)

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: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

run-level 3 Mar 18 21:40

SPEC is set to: /home/cpu2017-1.0.5-ic19
Filesystem     Type   Size  Used Avail Use% Mounted on
/dev/sdc3      btrfs  740G   29G  711G   4% /home

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 -[PSE121C-1.50]- 01/16/2019
Memory:
24x NO DIMM NO DIMM
72x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933

Compiler Version Notes

==============================================================================
CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base)
   657.xz_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.
==============================================================================

CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
   641.leela_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.
==============================================================================

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

**Lenovo Global Technology**

ThinkSystem SR950  
(2.70 GHz, Intel Xeon Platinum 8280)  

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base</th>
<th>9.97</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

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

---

**Compiler Version Notes (Continued)**

FC 648.exchange2_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.

---

**Base Compiler Invocation**

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

C++ benchmarks:  
```  
icpc -m64  
```

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

---

**Base Portability Flags**

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64  
602.gcc_s: -DSPEC_LP64  
605.mcf_s: -DSPEC_LP64  
620.omnetpp_s: -DSPEC_LP64  
623.xalancbmks_s: -DSPEC_LP64 -DSPEC_LINUX  
625.x264_s: -DSPEC_LP64  
631.deepsjeng_s: -DSPEC_LP64  
641.leela_s: -DSPEC_LP64  
648.exchange2_s: -DSPEC_LP64  
657.xz_s: -DSPEC_LP64

---

**Base Optimization Flags**

C benchmarks:  
```  
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -gopenmp -DSPEC_OPENMP  
-L/usr/local/je5.0.1-64/lib -ljemalloc  
```

C++ benchmarks:  
```  
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
```

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

Lenovo Global Technology  
ThinkSystem SR950  
(2.70 GHz, Intel Xeon Platinum 8280)

<table>
<thead>
<tr>
<th>CPU2017 License: 9017</th>
<th>Tested by: Lenovo Global Technology</th>
<th>SPECspeed2017_int_base = 9.97</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: Lenovo Global Technology</td>
<td>Test Date: Mar-2019</td>
<td>SPECspeed2017_int_peak = Not Run</td>
</tr>
<tr>
<td>Hardware Availability: Apr-2019</td>
<td>Software Availability: Sep-2018</td>
<td></td>
</tr>
</tbody>
</table>

**Base Optimization Flags (Continued)**

C++ benchmarks (continued):
- `-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc`

Fortran benchmarks:

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:

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU2017 v1.0.5 on 2019-03-18 18:57:52-0400.  
Originally published on 2019-04-02.