## Lenovo Global Technology

**ThinkSystem SN850**  
(2.60 GHz, Intel Xeon Gold 6240)

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base</th>
<th>9.96</th>
</tr>
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<tbody>
<tr>
<td>SPECspeed2017_int_peak</td>
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**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Test Date:** May-2019  
**Hardware Availability:** Apr-2019  
**Software Availability:** Nov-2018

### Hardware

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</tr>
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</table>

**CPU Name:** Intel Xeon Gold 6240  
**Max MHz.:** 3900  
**Nominal:** 2600  
**Enabled:** 72 cores, 4 chips, 2 threads/core  
**Orderable:** 2,4 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:** 24.75 MB I+D on chip per chip  
**Other:** None  
**Memory:** 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)  
**Storage:** 1 x 960 GB SATA SSD  
**Other:** None

### Software

<table>
<thead>
<tr>
<th>OS: Red Hat Enterprise Linux Server release 7.6 (Maipo)</th>
<th>Compiler: C/C++: Version 19.0.1.144 of Intel C/C++ Compiler Build 20181018 for Linux; Fortran: Version 19.0.1.144 of Intel Fortran Compiler Build 20181018 for Linux</th>
</tr>
</thead>
</table>
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** Not Applicable  
**Other:** jemalloc memory allocator V5.0.1
## Lenovo Global Technology

**ThinkSystem SN850 (2.60 GHz, Intel Xeon Gold 6240)**

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

### SPECspeed2017_int_base = 9.96

### SPECspeed2017_int_peak = Not Run

### Results Table

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<tr>
<th>Benchmark</th>
<th>Base Threads</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Peak Threads</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
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</tbody>
</table>

### 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-ic19.0u1/lib/intel64"
  - LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19.0u1/je5.0.1-64"
  - OMP_STACKSIZE = "192M"

- Binaries compiled on a system with 1x Intel Core i9-7900X 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.
  - 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)
**General Notes (Continued)**


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**Platform Notes**

BIOS configuration:
Choose Operating Mode set to Custom Mode
Page Policy set to Adaptive
Trusted Execution Technology set to Enable
CPU Frequency Limits set to Restrict Maximum Frequency
Sysinfo program /home/cpu2017-1.0.5-ic19.0u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on localhost.localdomain Sun May 5 03:00:07 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) Gold 6240 CPU @ 2.60GHz
  4 "physical id"s (chips)
  144 "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 : 18
    siblings : 36
    physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
    physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
    physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
    physical 3: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
```

From lscpu:

```
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                144
On-line CPU(s) list:   0-143
Thread(s) per core:    2
Core(s) per socket:    18
Socket(s):             4
NUMA node(s):          4
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Gold 6240 CPU @ 2.60GHz
Stepping:              6
CPU MHz:               2600.000
```

(Continued on next page)
Lenovo Global Technology
ThinkSystem SN850
(2.60 GHz, Intel Xeon Gold 6240)

**SPECspeed2017_int_base** = 9.96
**SPECspeed2017_int_peak** = Not Run

**CPU2017 License:** 9017
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**Test Date:** May-2019  
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**Platform Notes (Continued)**

BogoMIPS: 5200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-17,72-89
NUMA node1 CPU(s): 18-35,90-107
NUMA node2 CPU(s): 36-53,108-125
NUMA node3 CPU(s): 54-71,126-143
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
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtopr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx vl sc rs seventh abm 3dnowprefetch epb cat l3 intel_pt ssbd mba
ibr ibpb stibp ibrs enhanced tpr shadow vmmi flexpriority ept vpid fsgsbase
tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rdt_a avx512f avx512dq
rdseed adx map cflushopt csw ax avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv
l ccm_llc ccm_occup llc ccm_mbb_total ccm_mbb_local dtherm ida arat p1 pt hwp_epk
pku ospke avx512_vnni spec_ctrl intel_stibp flush_l1d arch_capabilities

/proc/cpuinfo cache data
   cache size : 25344 KB

From numacl --hardware  WARNING: a numacl 'node' might or might not correspond to a
   physical chip.
   available: 4 nodes (0-3)
   node 0 cpus:  0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 72 73 74 75 76 77 78 79 80 81
      82 83 84 85 86 87 88 89
   node 0 size: 392885 MB
   node 0 free: 384049 MB
   node 1 cpus: 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 90 91 92 93 94 95 96
      97 98 99 100 101 102 103 104 105 106 107
   node 1 size: 393216 MB
   node 1 free: 384410 MB
   node 2 cpus: 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 108 109 110 111 112
      113 114 115 116 117 118 119 120 121 122 123 124 125
   node 2 size: 393216 MB
   node 2 free: 383610 MB
   node 3 cpus: 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 127 128 129 130
      131 132 133 134 135 136 137 138 139 140 141 142 143
   node 3 size: 393216 MB
   node 3 free: 383416 MB
   node distances:
   node 0  1  2  3
      0: 10 21 21 21

(Continued on next page)
SPEC CPU2017 Integer Speed Result
Copyright 2017-2019 Standard Performance Evaluation Corporation

Lenovo Global Technology
ThinkSystem SN850
(2.60 GHz, Intel Xeon Gold 6240)

SPECspeed2017_int_base = 9.96
SPECspeed2017_int_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
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Test Date: May-2019
Hardware Availability: Apr-2019
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Platform Notes (Continued)

1: 21 10 21 21
2: 21 21 10 21
3: 21 21 21 10

From /proc/meminfo
MemTotal: 1584959376 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
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:
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 May 5 02:57

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1
Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb2 xfs 839G 14G 826G 2% /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 -[IVE135L-2.10]- 01/10/2019
Memory:
48x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2666

(Continued on next page)
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Platform Notes (Continued)
(End of data from sysinfo program)

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 19.0.1.144 Build 20181018
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 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
-----------------------------------------------------------------------------

==============================================================================
FC  648.exchange2_s(base)
-----------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
   64, Version 19.0.1.144 Build 20181018
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
**SPEC CPU2017 Integer Speed Result**

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### 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.xalancbmk_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=4 -qopenmp -DSPEC_OPENMP  
-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=4  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64  
-lqkmalloc
```

**Fortran benchmarks:**  
```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4  
-nostandard-realloc-lhs
```

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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