# Lenovo Global Technology

## ThinkSystem SR650
(2.40 GHz, Intel Xeon Gold 5115)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>SPECrate2017_int_peak</th>
</tr>
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<tbody>
<tr>
<td>103</td>
<td>107</td>
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**CPU2017 License:** 9017  
**Test Date:** Dec-2017  
**Test Sponsor:** Lenovo Global Technology  
**Hardware Availability:** Aug-2017  
**Software Availability:** Sep-2017

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
</tr>
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</table>
| CPU Name: Intel Xeon Gold 5115  
Max MHz.: 3200  
Nominal: 2400  
Enabled: 20 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: 13.75 MB I+D on chip per chip  
Other: None  
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)  
Storage: 1 x 800 GB SAS SSD  
Other: None  
OS: SUSE Linux Enterprise Server 12 SP2 (x86_64)  
Kernel 4.4.21-69-default  
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 IVE111C 1.00 released Jul-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 |

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<tr>
<th>500.perlbench_r</th>
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<th>520.omnetpp_r</th>
<th>523.xalancbmk_r</th>
<th>525.x264_r</th>
<th>531.deepsjeng_r</th>
<th>541.leela_r</th>
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Results Table

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<tr>
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<tr>
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<td>557.xz_r</td>
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<td>40</td>
<td>628</td>
<td>68.8</td>
<td>630</td>
<td>68.6</td>
</tr>
</tbody>
</table>

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>
jemalloc: configured and built at default for 32bit (i686) and 64bit (x86_64) targets;
jemalloc: built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5;

(Continued on next page)
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**SPECrate2017_int_base = 103**  
**SPECrate2017_int_peak = 107**

**General Notes (Continued)**

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.

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
SNC set to Enable
Hardware Prefetcher set to Disable
MONITORWAIT set to Enable
Execute Disable Bit set to Disable
Trusted Execution Technology set to Enable
Stable 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 96c45e4568ad54c135fd618b1920f0f
running on Cyborg-SPEccpu2006-SUSE12SP2 Wed Dec 20 06:04:52 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) Gold 5115 CPU @ 2.40GHz
  2 "physical id"s (chips)
  40 "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 : 10
siblings : 20
physical 0: cores 0 1 2 3 4 8 9 10 11 12
(Continued on next page)
## Lenovo Global Technology

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<tr>
<td>Hardware Availability: Aug-2017</td>
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</tr>
<tr>
<td>Software Availability: Sep-2017</td>
<td>Lenovo Global Technology</td>
</tr>
</tbody>
</table>

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**Platform Notes (Continued)**

```
physical 1: cores 0 1 2 3 4 8 9 10 11 12
```

From `lscpu`:

- **Architecture**: x86_64
- **CPU op-mode(s)**: 32-bit, 64-bit
- **Byte Order**: Little Endian
- **CPU(s)**: 40
- **On-line CPU(s) list**: 0-39
- **Thread(s) per core**: 2
- **Core(s) per socket**: 10
- **Socket(s)**: 2
- **NUMA node(s)**: 2
- **Vendor ID**: GenuineIntel
- **Model**: 85
- **Model name**: Intel(R) Xeon(R) Gold 5115 CPU @ 2.40GHz
- **Stepping**: 4
- **CPU MHz**: 2394.363
- **BogoMIPS**: 4788.72
- **Virtualization**: VT-x
- **L1d cache**: 32K
- **L1i cache**: 32K
- **L2 cache**: 1024K
- **L3 cache**: 14080K
- **NUMA node0 CPU(s)**: 0-9,20-29
- **NUMA node1 CPU(s)**: 10-19,30-39
- **Flags**: fpu vme de pse tsc msr pae 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 sdbg fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb pknit dtherm intel_pt tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2  ```

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 20 21 22 23 24 25 26 27 28 29
node 0 size: 193110 MB
node 0 free: 192265 MB
node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
node 1 size: 193504 MB
```
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Platform Notes (Continued)

node 1 free: 192819 MB
node distances:
node 0 1
   0: 10 21
   1: 21 10

From /proc/meminfo
MemTotal: 395893940 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
SuSE-release:
   SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 2
# This file is deprecated and will be removed in a future service pack or release.
# Please check /etc/os-release for details about this release.
os-release:
   NAME="SLES"
   VERSION="12-SP2"
   VERSION_ID="12.2"
   PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
   ID="sles"
   ANSI_COLOR="0;32"
   CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
   Linux Cyborg-SPECcpu2006-SUSE12SP2 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016 (9464f67) x86_64 x86_64 x86_64 GNU/Linux
run-level 3 Dec 20 05:43
SPEC is set to: /home/cpu2017.1.0.2.ic18.0
  Filesystem   Type  Size  Used  Avail   Use% Mounted on
  /dev/sdb2    btrfs  744G  174G  570G  24% /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 -[IVE111C-1.00]- 07/17/2017
   Memory:
      24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)
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SPEC CPU2017 Integer Rate Result
Copyright 2017-2018 Standard Performance Evaluation Corporation

SPECrater2017_int_base = 103
SPECrater2017_int_peak = 107

CPU2017 License: 9017
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Test Date: Dec-2017
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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.
==============================================================================

Base Compiler Invocation

C benchmarks:
  icc

C++ benchmarks:
  icpc

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**SPEC CPU2017 Integer Rate Result**

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### Base Compiler Invocation (Continued)

**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**

-W1,-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**

-W1,-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**

-W1,-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

### Base Other Flags

**C benchmarks**

-m64 -std=c11

**C++ benchmarks**

-m64

(Continued on next page)
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Base Other Flags (Continued)

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:

500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-fno-strict-overflow -L/usr/local/jemalloc-5.0.1-64/lib
-ljemalloc

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/jemalloc-5.0.1-32/lib -ljemalloc

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Peak Optimization Flags (Continued)

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
-ljemalloc

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 -ljemalloc

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 -ljemalloc

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 -ljemalloc

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 -ljemalloc

Peak Other Flags

C benchmarks (except as noted below):
-m64 -std=c11

502.gcc_r: -m32 -std=c11

C++ benchmarks (except as noted below):
-m64

523.xalancbmk_r: -m32

(Continued on next page)
## Peak Other Flags (Continued)

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

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/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-A.xml