Lenovo Global Technology
ThinkSystem SR650
(2.00 GHz, Intel Xeon Gold 5117)

SPEC® CPU2017 Integer Speed Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

SPECspeed2017_int_base = 6.68
SPECspeed2017_int_peak = 6.89

CPU2017 License: 9017  Test Date:  May-2018
Test Sponsor:  Lenovo Global Technology  Hardware Availability:  Aug-2017
Tested by:  Lenovo Global Technology  Software Availability:  Feb-2018

Hardware
CPU Name:  Intel Xeon Gold 5117
Max MHz.:  2800
Nominal:  2000
Enabled:  28 cores, 2 chips
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:  19.25 MB I+D on chip per chip
Other:  None
Memory:  768 GB (24 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)
Storage:  1 x 800 GB SAS SSD
Other:  None

Software
OS:  SUSE Linux Enterprise Server 12 SP2 (x86_64)
Kernel 4.4.114-92.64-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:  Yes
Firmware:  Lenovo BIOS Version IVE113W 1.12 released Feb-2018
File System:  xfs
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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<td>3.92</td>
<td>367</td>
<td>3.91</td>
<td>365</td>
<td>3.92</td>
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<td>641.leela_s</td>
<td>28</td>
<td>520</td>
<td>3.28</td>
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<td>3.28</td>
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<td>648.exchange2_s</td>
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<td>657.xz_s</td>
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<td>16.7</td>
<td>372</td>
<td>16.6</td>
<td>372</td>
<td>16.6</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:
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"
OMP_STACKSIZE = "192M"

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
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;
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.
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Platform Notes

BIOS configuration:
Choose Operating Mode set to Custom Mode
CPU Pstate Control set to None
C1 Enhance Mode set to Disable
C-states set to Legacy
Hyper-Threading set to Disable
MONITOR/MWAIT set to Enable
Adjacent Cache Prefetch set to Disable
Stale AtoS set to Enable
DCA set to Enable
Patrol Scrub set to Enable
Sysinfo program /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bccc91c0f
running on linux-mudv Mon May 21 10:17:29 2018

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 5117 CPU @ 2.00GHz
  2 "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 : 14
siblings : 14
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14

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: 14
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5117 CPU @ 2.00GHz
Stepping: 4
CPU MHz: 1995.318
BogoMIPS: 3990.63

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## Lenovo Global Technology

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### Platform Notes (Continued)

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<td>32K</td>
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<tr>
<td>L1i cache:</td>
<td>32K</td>
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<tr>
<td>L2 cache:</td>
<td>1024K</td>
</tr>
<tr>
<td>L3 cache:</td>
<td>19712K</td>
</tr>
<tr>
<td>NUMA node0 CPU(s):</td>
<td>0-13</td>
</tr>
<tr>
<td>NUMA node1 CPU(s):</td>
<td>14-27</td>
</tr>
<tr>
<td>Flags:</td>
<td>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 xtopology nonstop_tsc aperfmperf eagerfpup ni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpm pdcmt dca sse4_1_32 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts dtherm intel_pt rsb_ctxtsw spec_ctrl retpoline kaiser tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaveprec xgetbv1 cqm_1lc cqm_occup_llc</td>
</tr>
</tbody>
</table>

/proc/cpuinfo cache data

| cache size : | 19712 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 |
| node 0 size: | 386646 MB |
| node 0 free: | 385407 MB |
| node 1 cpus: | 14 15 16 17 18 19 20 21 22 23 24 25 26 27 |
| node 1 size: | 387040 MB |
| node 1 free: | 385630 MB |
| node distances: |
| node 0 1 |
| 0: | 10 21 |
| 1: | 21 10 |

From /proc/meminfo

| MemTotal: | 792255392 KB |
| HugePages_Total: | 0 |
| Hugepagesize: | 4096 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.

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Platform Notes (Continued)

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 linux-mudv 4.4.114-92.64-default #1 SMP Thu Feb 1 19:18:19 UTC 2018 (c6ce5db)
x86_64 x86_64 x86_64 GNU/Linux
run-level 3 May 18 11:14
SPEC is set to: /home/cpu2017.1.0.2.ic18.0

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 445G 20G 426G 5% /

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 -[IVE113W-1.12]- 02/06/2018
Memory:
 24x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400

(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, peak) 657.xz_s(base)
==============================================================================

icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

==============================================================================
CC  600.perlbench_s(peak) 602.gcc_s(peak) 605.mcf_s(peak) 657.xz_s(peak)
==============================================================================

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#### Compiler Version Notes (Continued)

```
CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
    641.leela_s(base)

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

```
CXXC 620.omnetpp_s(peak) 623.xalancbmk_s(peak) 631.deepsjeng_s(peak)
    641.leela_s(peak)

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

```
FC 648.exchange2_s(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
- **Fortran benchmarks:** ifort

#### 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

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Base Portability Flags (Continued)

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 -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=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

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

Base Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

Peak Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

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### Peak Compiler Invocation (Continued)

**Fortran benchmarks:**

`ifort`

---

### Peak Portability Flags

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<td>D_FILE_OFFSET_BITS=64  DSPEC_LINUX</td>
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### Peak Optimization Flags

**C benchmarks:**

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<tr>
<td>600.perlbench_s</td>
<td>-Wl,-z,muldefs  -prof-gen(pass 1)  -prof-use(pass 2)  -O2  -xCORE-AVX512  -qopt-mem-layout-trans=3  -ipo  -O3  -ipo  -O3  -ipo</td>
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<td>-Wl,-z,muldefs  -prof-gen(pass 1)  -prof-use(pass 2)  -O2  -xCORE-AVX512  -qopt-mem-layout-trans=3  -ipo  -O3  -ipo  -O3  -ipo</td>
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<td>-Wl,-z,muldefs  -prof-gen(pass 1)  -prof-use(pass 2)  -ipo  -xCORE-AVX512  -O3  -no-prec-div  -qopt-mem-layout-trans=3  -ipo  -O3</td>
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C++ benchmarks:

620.omnetpp_s:-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -03 -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

623.xalancbmk_s:-L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32
-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -03 -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-32/lib -ljemalloc

631.deepsjeng_s:Same as 620.omnetpp_s

641.leela_s:Same as 620.omnetpp_s

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:

-m64 -std=c11

C++ benchmarks (except as noted below):

-m64

623.xalancbmk_s:-m32

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
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-SKL-C.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-C.xml
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