Lenovo Global Technology
ThinkSystem SR630
(1.70 GHz, Intel Xeon Bronze 3104)

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

Software
OS: SUSE Linux Enterprise Server 12 SP2 (x86_64)
Compiler: C/C++: Version 18.0.0.128 of Intel C/C++
Compiler for Linux:
Fortran: Version 18.0.0.128 of Intel Fortran

Hardware
CPU Name: Intel Xeon Bronze 3104
Max MHz.: 1700
Nominal: 1700
Enabled: 12 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: 8.25 MB I+D on chip per chip
Other: None
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R, running at 2133)
Storage: 1 x 800 GB SAS SSD
Other: None

SPECspeed2017_int_base = 4.11
SPECspeed2017_int_peak = 4.22
**SPEC CPU2017 Integer Speed Result**

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Test Date: Jan-2018
Hardware Availability: Aug-2017
Software Availability: Sep-2017

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**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>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>12</td>
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<td>2.82</td>
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<td>602.gcc_s</td>
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<td>605.mcf_s</td>
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<td>807</td>
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<tr>
<td>620.omnetpp_s</td>
<td>12</td>
<td>557</td>
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<td>570</td>
<td>2.86</td>
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<tr>
<td>623.xalancbmk_s</td>
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<td>4.44</td>
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<td>625.x264_s</td>
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<td>631.deepsjeng_s</td>
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<td>2.52</td>
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<td>2.52</td>
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<tr>
<td>641.leea_s</td>
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<td>648.exchange2_s</td>
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<tr>
<td>657.xz_s</td>
<td>12</td>
<td>742</td>
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<td>742</td>
<td>8.33</td>
<td>742</td>
<td>8.33</td>
</tr>
</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:
- `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;
jemalloc: sources available from jemalloc.net or
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.
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### General Notes (Continued)

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
- MONITORM/WAIT set to Enable
- Adjacent Cache Prefetch set to Disable
- XPT Prefetcher set to Enable
- Stale AtoS set to Enable
- DCA set to Enable

**Sysinfo program:** /home/cpu2017.1.0.2.ic18.0/bin/sysinfo
- Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
- running on Cable-SPECcpu2006-SUSE12SP2 Wed Jan 10 01:08:01 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) Bronze 3104 CPU @ 1.70GHz
- 2 "physical id"s (chips)
- 12 "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: 6
  - siblings: 6
  - physical 0: cores 0 1 2 3 4 5
  - physical 1: cores 0 1 2 3 4 5

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 12
- On-line CPU(s) list: 0-11

(Continued on next page)
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SPECspeed2017_int_base = 4.11
SPECspeed2017_int_peak = 4.22

Platform Notes (Continued)

Thread(s) per core: 1
Core(s) per socket: 6
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Bronze 3104 CPU @ 1.70GHz
Stepping: 4
CPU MHz: 1696.017
BogoMIPS: 3392.03
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 8448K
NUMA node0 CPU(s): 0-5
NUMA node1 CPU(s): 6-11
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 aperfmperf eagerfpu nopl pmlnest qdts pcd pvd pmr pdcm dca sse4_1 mda sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3nowprefetch arat epb pln pts dtherm intel_pt tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ets invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512bw avx512vl xsaveopt xsavec xgetbv1 cmp_l1c cmp_legacy cmp_legacy_active mmxplus

From /proc/cpuinfo cache data

cache size: 8448 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
node 0 size: 193110 MB
node 0 free: 192328 MB
node 1 cpus: 6 7 8 9 10 11
node 1 size: 193504 MB
node 1 free: 192819 MB
node distances:
node 0 1
 0: 10 21
 1: 21 10

From /proc/meminfo

MemTotal: 395893876 KB

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<table>
<thead>
<tr>
<th>Platform Notes (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HugePages_Total: 0</td>
</tr>
<tr>
<td>Hugepagesize: 2048 kB</td>
</tr>
</tbody>
</table>

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 Cable-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 Jan 10 01:05

**SPEC is set to:** /home/cpu2017.1.0.2.ic18.0  
**Filesystem**  
Type Size Used Avail Use% Mounted on  
/dev/sda2 btrfs 744G 191G 552G 26% /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 -[IVE113K-1.10]- 09/06/2017**  
**Memory:**  
24x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666, configured at 2133

(End of data from sysinfo program)

**Compiler Version Notes**

==============================================================================  
<table>
<thead>
<tr>
<th>CC  600.perlbench_s(base)</th>
<th>602.gcc_s(base)</th>
<th>605.mcf_s(base)</th>
<th>625.x264_s(base, peak)</th>
<th>657.xz_s(base)</th>
</tr>
</thead>
<tbody>
<tr>
<td>icc (ICC) 18.0.0 20170811</td>
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(Continued on next page)
**SPEC CPU2017 Integer Speed Result**

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**Hardware Availability:** Aug-2017

**Software Availability:** Sep-2017

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**Compiler Version Notes (Continued)**

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**Base Compiler Invocation**

C benchmarks:

- icc

C++ benchmarks:

- icpc

Fortran benchmarks:

- ifort
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## Base Portability Flags

<table>
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<tr>
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<th>Details</th>
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<tbody>
<tr>
<td>600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64</td>
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<tr>
<td>602.gcc_s: -DSPEC_LP64</td>
<td></td>
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<tr>
<td>605.mcf_s: -DSPEC_LP64</td>
<td></td>
</tr>
<tr>
<td>620.omnetpp_s: -DSPEC_LP64</td>
<td></td>
</tr>
<tr>
<td>623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX</td>
<td></td>
</tr>
<tr>
<td>625.x264_s: -DSPEC_LP64</td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s: -DSPEC_LP64</td>
<td></td>
</tr>
<tr>
<td>641.leela_s: -DSPEC_LP64</td>
<td></td>
</tr>
<tr>
<td>648.exchange2_s: -DSPEC_LP64</td>
<td></td>
</tr>
<tr>
<td>657.xz_s: -DSPEC_LP64</td>
<td></td>
</tr>
</tbody>
</table>

## 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
## Lenovo Global Technology

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</tbody>
</table>

### Peak Compiler Invocation

- **C benchmarks:**
  - icc

- **C++ benchmarks:**
  - icpc

- **Fortran benchmarks:**
  - ifort

### Peak 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: -D_FILE_OFFSET_BITS=64 -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

### Peak Optimization Flags

- **C benchmarks:**
  - 600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512 -qopt-mem-layout-trans=3 -ipo -O3 -no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -fno-strict-overflow -L/usr/local/je5.0.1-64/lib -ljemalloc

- 602.gcc_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512 -qopt-mem-layout-trans=3 -ipo -O3 -no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

- 605.mcf_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

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SPECspeed2017_int_base = 4.11
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Peak Optimization Flags (Continued)

625.x264_s: -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

657.xz_s: Same as 602.gcc_s

C++ benchmarks:

620.omnetpp_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -gopenmp -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 -O3 -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -gopenmp -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:

-m64 -std=c11

C++ benchmarks (except as noted below):

-m64

623.xalancbmk_s: -m32

Fortran benchmarks:

-m64

Peak Other Flags

C benchmarks:

C++ benchmarks (except as noted below):

-m64

623.xalancbmk_s: -m32

Fortran benchmarks:

-m64
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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/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/Intel-ic18.0-official-linux64.xml)

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

Tested with SPEC CPU2017 v1.0.2 on 2018-01-09 12:08:00-0500.


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