Lenovo Global Technology

ThinkSystem SR650
(3.60 GHz, Intel Xeon Gold 6244)

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

SPECspeed2017_int_base = 10.3
SPECspeed2017_int_peak = Not Run

Test Date: Mar-2019
Hardware Availability: Apr-2019
Software Availability: Oct-2018

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>32</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>32</td>
</tr>
<tr>
<td>605.mcf_s</td>
<td>32</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>32</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>32</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>32</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>32</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>32</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>32</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>32</td>
</tr>
</tbody>
</table>

### Software

- OS: SUSE Linux Enterprise Server 12 SP4 (x86_64)
- Compiler: C/C++: Version 19.0.0.117 of Intel C/C++
- Fortran: Version 19.0.0.117 of Intel Fortran

### Hardware

- CPU Name: Intel Xeon Gold 6244
- Max MHz.: 4400
- Nominal: 3600
- Enabled: 16 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: 24.75 MB I+D on chip per chip
- Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)
- Storage: 1 x 800 GB SATA SSD

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Standard Performance Evaluation Corporation (info@spec.org) https://www.spec.org/
SPEC CPU2017 Integer Speed Result

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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>
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<tr>
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<td>24.0</td>
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</tr>
</tbody>
</table>

SPECspeed2017_int_base = 10.3
SPECspeed2017_int_peak = Not Run

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

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

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</tr>
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<tr>
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<td>Not Run</td>
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</table>

**CPU2017 License:** 9017  
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**Software Availability:** Oct-2018

**General Notes (Continued)**

- built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5  

**Platform Notes**

- BIOS configuration:
  - Choose Operating Mode set to Maximum Performance  
  - Choose Operating Mode set to Custom Mode  
  - C-states set to Legacy  
  - Sysinfo program /home/cpu2017-1.0.5-ic19/bin/sysinfo  
  - Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
  - running on linux-txzs Wed Mar 13 00:53:52 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) Gold 6244 CPU @ 3.60GHz  
  - 2 "physical id"s (chips)  
  - 32 "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 : 8  
    - siblings : 16  
    - physical 0: cores 4 8 17 18 19 24 25 27  
    - physical 1: cores 2 3 4 8 17 20 24 26

- From lscpu:
  
  - Architecture: x86_64  
  - CPU op-mode(s): 32-bit, 64-bit  
  - Byte Order: Little Endian  
  - CPU(s): 32  
  - On-line CPU(s) list: 0-31  
  - Thread(s) per core: 2  
  - Core(s) per socket: 8  
  - Socket(s): 2  
  - NUMA node(s): 2  
  - Vendor ID: GenuineIntel  
  - CPU family: 6  
  - Model: 85  
  - Model name: Intel(R) Xeon(R) Gold 6244 CPU @ 3.60GHz  
  - Stepping: 6  
  - CPU MHz: 3600.000  
  - CPU max MHz: 4400.0000  
  - CPU min MHz: 1200.0000

(Continued on next page)
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### Platform Notes (Continued)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BogoMIPS</td>
<td>7200.00</td>
</tr>
<tr>
<td>Virtualization</td>
<td>VT-x</td>
</tr>
<tr>
<td>L1d cache</td>
<td>32K</td>
</tr>
<tr>
<td>L1i cache</td>
<td>32K</td>
</tr>
<tr>
<td>L2 cache</td>
<td>1024K</td>
</tr>
<tr>
<td>L3 cache</td>
<td>25344K</td>
</tr>
<tr>
<td>NUMA node0 CPU(s)</td>
<td>0-7,16-23</td>
</tr>
<tr>
<td>NUMA node1 CPU(s)</td>
<td>8-15,24-31</td>
</tr>
<tr>
<td>Flags</td>
<td>fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtsscp lm constant_tsc art 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 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single ssbd mba ibp stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2  erts invpcid rtm cqm mpx rdtx a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pin pts pku ospke avx512_vnni flush_lld arch_capabilities</td>
</tr>
</tbody>
</table>

```
/platform/cpuinfo cache data
  cache size : 25344 KB
```

From numactl --hardware  
WARNING: a numactl 'node' might or might not correspond to a physical chip.

<table>
<thead>
<tr>
<th>Available nodes</th>
<th>CPUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>node 0</td>
<td>0-1</td>
</tr>
<tr>
<td>node 0 size</td>
<td>386630 MB</td>
</tr>
<tr>
<td>node 0 free</td>
<td>385464 MB</td>
</tr>
<tr>
<td>node 1</td>
<td>8-18</td>
</tr>
<tr>
<td>node 1 size</td>
<td>387045 MB</td>
</tr>
<tr>
<td>node 1 free</td>
<td>386056 MB</td>
</tr>
</tbody>
</table>

From /proc/meminfo

<table>
<thead>
<tr>
<th>Memory Total</th>
<th>792244668 KB</th>
</tr>
</thead>
<tbody>
<tr>
<td>HugePages Total</td>
<td>0</td>
</tr>
<tr>
<td>Hugepagesize</td>
<td>4096 KB</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Distro</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUSE Linux Enterprise Server 12 (x86_64)</td>
<td>12</td>
</tr>
<tr>
<td>PATCHLEVEL</td>
<td>4</td>
</tr>
</tbody>
</table>

(Continued on next page)
# Platform Notes

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.

```bash
os-release:
  NAME="SLES"
  VERSION="12-SP4"
  VERSION_ID="12.4"
  PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
  ID="sles"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:12:sp4"
```

```
uname -a:
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 11 16:28
```

```
SPEC is set to: /home/cpu2017-1.0.5-ic19
  Filesystem     Type       Size  Used  Avail  Use% Mounted on
  /dev/sda2      btrfs       446G  37G  409G   9%  /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 -[IVE135R-2.10]- 02/27/2019
- Memory:
  24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)

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# Compiler Version Notes

```
CC  600.peribench_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
```

(Continued on next page)
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-----------------------------------
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.

-----------------------------------
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.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
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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

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