## Lenovo Global Technology

**ThinkSystem SR570**  
(1.70 GHz, Intel Xeon Bronze 3104)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>33.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>34.7</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9017  
**Test Date:** Jan-2018  
**Test Sponsor:** Lenovo Global Technology  
**Hardware Availability:** Nov-2017

**Tested by:** Lenovo Global Technology  
**Software Availability:** Sep-2017

### Hardware

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Bronze 3104</td>
</tr>
<tr>
<td>Max MHz.</td>
<td>1700</td>
</tr>
<tr>
<td>Nominal</td>
<td>1700</td>
</tr>
<tr>
<td>Enabled</td>
<td>12 cores, 2 chips</td>
</tr>
<tr>
<td>Orderable</td>
<td>1,2 chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3</td>
<td>8.25 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2133)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x 800 GB SAS SSD</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 12 SP3 (x86_64)</td>
</tr>
<tr>
<td>Compiler</td>
<td>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</td>
</tr>
<tr>
<td>Parallel</td>
<td>No</td>
</tr>
<tr>
<td>Firmware</td>
<td>Lenovo BIOS Version TEE119J 1.20 released Sep-2017</td>
</tr>
<tr>
<td>File System</td>
<td>btrfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Other</td>
<td>jemalloc: jemalloc memory allocator library V5.0.1</td>
</tr>
</tbody>
</table>
## Lenovo Global Technology

**ThinkSystem SR570**  
(1.70 GHz, Intel Xeon Bronze 3104)

### SPEC CPU2017 Integer Rate Result

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<th>Seconds</th>
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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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</tr>
</thead>
<tbody>
<tr>
<td>500.perlibbench_r</td>
<td>12</td>
<td>686</td>
<td>27.8</td>
<td>684</td>
<td>27.9</td>
<td>683</td>
<td>28.0</td>
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<tr>
<td>502.gcc_r</td>
<td>12</td>
<td>517</td>
<td>32.8</td>
<td>517</td>
<td>32.9</td>
<td>517</td>
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<tr>
<td>505.mcf_r</td>
<td>12</td>
<td>503</td>
<td>38.6</td>
<td>502</td>
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<tr>
<td>520.omnetpp_r</td>
<td>12</td>
<td>654</td>
<td>24.1</td>
<td>650</td>
<td>24.2</td>
<td>653</td>
<td>24.1</td>
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<tr>
<td>523.xalanbmk_r</td>
<td>12</td>
<td>356</td>
<td>35.6</td>
<td>356</td>
<td>35.6</td>
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<td>525.x264_r</td>
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<td>531.deepsjeng_r</td>
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<td>28.3</td>
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</tr>
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<td>541.leela_r</td>
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<td>859</td>
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</tr>
<tr>
<td>548.exchange2_r</td>
<td>12</td>
<td>483</td>
<td>65.1</td>
<td>483</td>
<td>65.1</td>
<td>481</td>
<td>65.4</td>
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<tr>
<td>557.xz_r</td>
<td>12</td>
<td>580</td>
<td>22.3</td>
<td>580</td>
<td>22.3</td>
<td>580</td>
<td>22.3</td>
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**SPECrate2017_int_base = 33.9**  
**SPECrate2017_int_peak = 34.7**

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"
```

Binary 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
```
runmcu 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;  
jemalloc: sources available from jemalloc.net or
```

(Continued on next page)
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
DCU Streamer Prefetcher set to Enable
MONITOR/MWAIT set to Enable
SNC set to Enable
XPT Prefetcher set to Enable
Stale 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 96c45e4568ad54c135fd618bcc091c0f
running on linux-3fwh Sun Jan 14 03:24:23 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
Lenovo Global Technology
ThinkSystem SR570
(1.70 GHz, Intel Xeon Bronze 3104)

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**SPEC CPU2017 Integer Rate Result**

**Lenovo Global Technology**

**ThinkSystem SR570**

(1.70 GHz, Intel Xeon Bronze 3104)

SPECrerate2017_int_base = 33.9
SPECrerate2017_int_peak = 34.7

**Platform Notes (Continued)**

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
- **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:** 1696.021
- **BogoMIPS:** 3392.04
- **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 pdmelt gb rdtscp lm constant-tsc art 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 xtrm pdcmt dca its se4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowpredetch arat epb pfn pts dtherm intel_pt tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bm1 hle avx2 smep bmi2 erms invpcid rtm cmx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512v lsaveopt xsave vgetbv cqm llc cqm_occup llc pku ospk

/procoll/cpulinfo 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:** 96060 MB
- **node 0 free:** 95616 MB
- **node 1 cpus:** 6 7 8 9 10 11
- **node 1 size:** 96750 MB

(Continued on next page)
Platform Notes (Continued)

node 1 free: 96402 MB
node distances:
  node  0  1
  0:  10  21
  1:  21  10

From /proc/meminfo
  MemTotal:       197438180 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
  SuSE-release:
    SUSE Linux Enterprise Server 12 (x86_64)
    VERSION = 12
    PATCHLEVEL = 3
    # 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-SP3"
    VERSION_ID="12.3"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
  Linux linux-3fwh 4.4.73-5-default #1 SMP Tue Jul 4 15:33:39 UTC 2017 (b7ce4e4) x86_64
  x86_64 x86_64 GNU/Linux

run-level 3 Jan 14 03:22

SPEC is set to: /home/cpu2017.1.0.2.ic18.0
  Filesystem     Type  Size  Used Avail Use% Mounted on
  /dev/sda2      btrfs  744G  20G  724G  3% /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 -[TEE119J-1.20]- 09/06/2017
  Memory:
    4x NO DIMM NO DIMM
    12x Samsung M393A2K43BB1-CTD 16 GB 2 rank 2666, configured at 2133

(End of data from sysinfo program)
Lenovo Global Technology
ThinkSystem SR570
(1.70 GHz, Intel Xeon Bronze 3104)

**SPEC CPU2017 Integer Rate Result**

**CPU2017 License:** 9017  
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**Software Availability:** Sep-2017

**SPECrate2017_int_base = 33.9**  
**SPECrate2017_int_peak = 34.7**

---

**Compiler Version Notes**

```plaintext
==============================================================================
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.
```

```plaintext
==============================================================================
CC  500.perlbench_r(peak) 502.gcc_r(peak)
==============================================================================
ICC (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

```plaintext
==============================================================================
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.
```

```plaintext
==============================================================================
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.
```

```plaintext
==============================================================================
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`

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR570
(1.70 GHz, Intel Xeon Bronze 3104)

SPEC CPU2017 Integer Rate Result
Copyright 2017-2018 Standard Performance Evaluation Corporation

Lenovo Global Technology
ThinkSystem SR570
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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.leelajr: -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)
Lenovo Global Technology
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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/je5.0.1-64/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/je5.0.1-32/lib -ljemalloc

(Continued on next page)
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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`


531.deepsjeng_r: Same as 520.omnetpp_r

541.leela_r: Same as 520.omnetpp_r

Fortran benchmarks:


### 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)
## Lenovo Global Technology

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### 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](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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