Lenovo Global Technology

ThinkSystem SN550
(1.90 GHz, Intel Xeon Bronze 3204)

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

SPECrater2017_int_base = 39.7
SPECrater2017_int_peak = Not Run

Test Date: May-2019
Hardware Availability: Apr-2019
Software Availability: Nov-2018

<table>
<thead>
<tr>
<th>Copies</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>32.4</td>
<td>32.4</td>
<td>32.4</td>
<td>32.4</td>
<td>32.4</td>
<td>32.4</td>
<td>32.4</td>
<td>32.4</td>
<td>32.4</td>
<td>32.4</td>
<td>32.4</td>
<td>32.4</td>
<td></td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>37.9</td>
<td>37.9</td>
<td>37.9</td>
<td>37.9</td>
<td>37.9</td>
<td>37.9</td>
<td>37.9</td>
<td>37.9</td>
<td>37.9</td>
<td>37.9</td>
<td>37.9</td>
<td>37.9</td>
<td></td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>49.6</td>
<td>49.6</td>
<td>49.6</td>
<td>49.6</td>
<td>49.6</td>
<td>49.6</td>
<td>49.6</td>
<td>49.6</td>
<td>49.6</td>
<td>49.6</td>
<td>49.6</td>
<td>49.6</td>
<td></td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>30.5</td>
<td>30.5</td>
<td>30.5</td>
<td>30.5</td>
<td>30.5</td>
<td>30.5</td>
<td>30.5</td>
<td>30.5</td>
<td>30.5</td>
<td>30.5</td>
<td>30.5</td>
<td>30.5</td>
<td></td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>70.0</td>
<td>70.0</td>
<td>70.0</td>
<td>70.0</td>
<td>70.0</td>
<td>70.0</td>
<td>70.0</td>
<td>70.0</td>
<td>70.0</td>
<td>70.0</td>
<td>70.0</td>
<td>70.0</td>
<td></td>
</tr>
<tr>
<td>525.x264_r</td>
<td>32.1</td>
<td>32.1</td>
<td>32.1</td>
<td>32.1</td>
<td>32.1</td>
<td>32.1</td>
<td>32.1</td>
<td>32.1</td>
<td>32.1</td>
<td>32.1</td>
<td>32.1</td>
<td>32.1</td>
<td></td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>26.9</td>
<td>26.9</td>
<td>26.9</td>
<td>26.9</td>
<td>26.9</td>
<td>26.9</td>
<td>26.9</td>
<td>26.9</td>
<td>26.9</td>
<td>26.9</td>
<td>26.9</td>
<td>26.9</td>
<td></td>
</tr>
<tr>
<td>541.leela_r</td>
<td>73.6</td>
<td>73.6</td>
<td>73.6</td>
<td>73.6</td>
<td>73.6</td>
<td>73.6</td>
<td>73.6</td>
<td>73.6</td>
<td>73.6</td>
<td>73.6</td>
<td>73.6</td>
<td>73.6</td>
<td></td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>23.6</td>
<td>23.6</td>
<td>23.6</td>
<td>23.6</td>
<td>23.6</td>
<td>23.6</td>
<td>23.6</td>
<td>23.6</td>
<td>23.6</td>
<td>23.6</td>
<td>23.6</td>
<td>23.6</td>
<td></td>
</tr>
</tbody>
</table>

Hardware

CPU Name: Intel Xeon Bronze 3204
Max MHz.: 1900
Nominal: 1900
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: 768 GB (24 x 32 GB 2Rx4 PC4-2666V-R, running at 2133)
Storage: 1 x 960 GB SATA SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 (x86_64)
Compiler: C/C++: Version 19.0.1.144 of Intel C/C++
Compiler Build 20181018 for Linux;
Fortran: Version 19.0.1.144 of Intel Fortran
Compiler Build 20181018 for Linux
Parallel: No
Firmware: Lenovo BIOS Version IVE135M 2.10 released Jan-2019
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
Lenovo Global Technology
ThinkSystem SN550
(1.90 GHz, Intel Xeon Bronze 3204)

SPECrate2017_int_base = 39.7
SPECrate2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>12</td>
<td>589</td>
<td>32.4</td>
<td>590</td>
<td>32.4</td>
<td>591</td>
<td>32.3</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>12</td>
<td>449</td>
<td>37.9</td>
<td>449</td>
<td>37.9</td>
<td>448</td>
<td>37.9</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>12</td>
<td>391</td>
<td>49.6</td>
<td>391</td>
<td>49.6</td>
<td>391</td>
<td>49.6</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>12</td>
<td>516</td>
<td>30.5</td>
<td>517</td>
<td>30.5</td>
<td>517</td>
<td>30.5</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>12</td>
<td>255</td>
<td>49.7</td>
<td>253</td>
<td>50.0</td>
<td>254</td>
<td>49.9</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>12</td>
<td>300</td>
<td>70.0</td>
<td>300</td>
<td>70.0</td>
<td>300</td>
<td>70.0</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>12</td>
<td>428</td>
<td>32.1</td>
<td>428</td>
<td>32.1</td>
<td>428</td>
<td>32.1</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>12</td>
<td>739</td>
<td>26.9</td>
<td>738</td>
<td>26.9</td>
<td>738</td>
<td>26.9</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>12</td>
<td>427</td>
<td>73.7</td>
<td>427</td>
<td>73.6</td>
<td>427</td>
<td>73.6</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>12</td>
<td>549</td>
<td>23.6</td>
<td>549</td>
<td>23.6</td>
<td>550</td>
<td>23.6</td>
</tr>
</tbody>
</table>

SPECrate2017_int_base = 39.7
SPECrate2017_int_peak = Not Run

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/cpu2017-1.0.5-ic19.0u1/lib/intel64"

Binaries compiled on a system with 1x Intel Core i9-7900X 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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

NA: 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)
Lenovo Global Technology  
ThinkSystem SN550  
(1.90 GHz, Intel Xeon Bronze 3204)

**General Notes (Continued)**

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.

**Platform Notes**

BIOS configuration:  
Choose Operating Mode set to Maximum Performance  
Trusted Execution Technology set to Enable  
Stale AtoS set to Enable  
Sysinfo program /home/cpu2017-1.0.5-ic19.0ul/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
runtime on linux-30ed Wed May 15 16:56:40 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) Bronze 3204 CPU @ 1.90GHz
  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
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 3204 CPU @ 1.90GHz
Stepping: 6
```
Lenovo Global Technology  
ThinkSystem SN550  
(1.90 GHz, Intel Xeon Bronze 3204)  

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>SPECrate2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>39.7</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

Platform Notes (Continued)

CPU MHz: 1900.000  
CPU max MHz: 1900.0000  
CPU min MHz: 800.0000  
BogoMIPS: 3800.00  
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 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 cpuid aperfmperf pni pclmulqdq dtes64 ksm xsave avx f16c mmx movbe popcnt tsc_deadline_timer aes xsave avx1 f16c rdrand vcvtq vcvtd vcvto mmxset mdx veseta lartic mild  

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  
nodesize: 386663 MB  
node 1 cpus: 6 7 8 9 10 11  
nodesize: 387018 MB  
node distances:  
node 0 1  
0: 10 21  
1: 21 10  

From /proc/meminfo  
MemTotal: 792249940 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB  

From /etc/*release*/etc/*version*  
os-release: (Continued on next page)
## Lenovo Global Technology

**ThinkSystem SN550**  
(1.90 GHz, Intel Xeon Bronze 3204)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>39.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Tested by:** Lenovo Global Technology  
**Hardware Availability:** Apr-2019  
**Software Availability:** Nov-2018  
**Test Date:** May-2019

### Platform Notes (Continued)

```plaintext
NAME="SLES"  
VERSION="15"  
VERSION_ID="15"  
PRETTY_NAME="SUSE Linux Enterprise Server 15"  
ID="sles"  
ID_LIKE="suse"  
ANSI_COLOR="0;32"  
CPE_NAME="cpe:/o:suse:sles:15"
```

```plaintext
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

```plaintext
run-level 3 May 15 16:52
```

SPEC is set to: /home/cpu2017-1.0.5-ic19.0u1

```plaintext
Filesystem     Type  Size  Used Avail Use%       Mounted on
/dev/sda3      xfs   893G   42G  852G   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 -[IVE135M-2.10]- 01/16/2019
- Memory: 24x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2133

(End of data from sysinfo program)

### Compiler Version Notes

```
CC  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) 557.xz_r(base)
```

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.1.144 Build 20181018  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

(Continued on next page)
## Lenovo Global Technology

**ThinkSystem SN550**  
(1.90 GHz, Intel Xeon Bronze 3204)

<table>
<thead>
<tr>
<th>CPU2017 License: 9017</th>
<th>Test Date: May-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: Lenovo Global Technology</td>
<td>Hardware Availability: Apr-2019</td>
</tr>
<tr>
<td>Tested by: Lenovo Global Technology</td>
<td>Software Availability: Nov-2018</td>
</tr>
</tbody>
</table>

### SPEC CPU2017 Integer Rate Result

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>SPECrate2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>39.7</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

### Compiler Version Notes (Continued)

```
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
  541.leela_r(base)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
FC  548.exchange2_r(base)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.1.144 Build 20181018
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

```
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
```
Lenovo Global Technology
ThinkSystem SN550
(1.90 GHz, Intel Xeon Bronze 3204)

SPECrate2017_int_base = 39.7
SPECrate2017_int_peak = Not Run

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

Test Date: May-2019
Hardware Availability: Apr-2019
Software Availability: Nov-2018

C benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

The flags files that were used to format this result can be browsed at:
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-A.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-A.xml

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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

Tested with SPEC CPU2017 v1.0.5 on 2019-05-15 04:56:39-0400.
Originally published on 2019-06-11.