**CPU2017 Floating Point Speed Result**

**Lenovo Global Technology**

ThinkSystem SR550

(1.90 GHz, Intel Xeon Bronze 3204)

CPU2017 License: 9017

Test Sponsor: Lenovo Global Technology

Tested by: Lenovo Global Technology

**SPECspeed2017_fp_base** = 43.3

**SPECspeed2017_fp_peak** = Not Run

**Threads**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>12</td>
<td>47.8</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>12</td>
<td>35.4</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>12</td>
<td>40.0</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>12</td>
<td>19.7</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>12</td>
<td>33.6</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>12</td>
<td>25.7</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>12</td>
<td>46.6</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>12</td>
<td>44.8</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>12</td>
<td>43.1</td>
</tr>
</tbody>
</table>

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**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: 384 GB (12 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 12 SP4 (x86_64)

Kernel 4.12.14-94.41-default

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: Yes

Firmware: Lenovo BIOS Version TEE135L 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
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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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</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>12</td>
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<td>228</td>
<td>260</td>
<td>227</td>
<td>260</td>
<td>227</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<td>47.5</td>
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<td>619.lbm_s</td>
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<td>621.wrf_s</td>
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<tr>
<td>627.cam4_s</td>
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<td>449</td>
<td>19.7</td>
<td>450</td>
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</tr>
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<td>628.pop2_s</td>
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<td>356</td>
<td>33.4</td>
<td>352</td>
<td>33.7</td>
<td>354</td>
<td>33.6</td>
</tr>
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<td>638.imagick_s</td>
<td>12</td>
<td>562</td>
<td>25.7</td>
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<td>44.9</td>
<td>203</td>
<td>44.8</td>
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<tr>
<td>654.roms_s</td>
<td>12</td>
<td>366</td>
<td>43.1</td>
<td>365</td>
<td>43.2</td>
<td>366</td>
<td>43.1</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:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19.0u1/lib/intel64"
OMP_STACKSIZE = "192M"

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

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) 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.
Lenovo Global Technology
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SPECspeed2017_fp_base = 43.3
SPECspeed2017_fp_peak = Not Run

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

Platform Notes

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set to Custom Mode
MONITOR/MWAIT set to Enable
Sysinfo program /home/cpu2017-1.0.5-ic19.0ul/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-h2e9 Sun Apr 28 15:28:53 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
	num

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
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

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

NUMA node0 CPU(s): 0-5  
NUMA node1 CPU(s): 6-11  
Flags:               

```
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 cpuid
aperfmpref perf 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 3dnowprefetch cpuid_fault epb cat _cat _13 cdp _13
invpcid_single ssbd mba ibrs ibpb tpr_shadow vmmi flexpriority ept vpid
```

```
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: 193098 MB  
   node 0 free: 191504 MB  
   node 1 cpus: 6 7 8 9 10 11  
   node 1 size: 193511 MB  
   node 1 free: 193229 MB  
   node distances:  
      node 0 1  
         0: 10 21  
         1: 21 10
```

From `/proc/meminfo`  

```
  MemTotal:       395888708 kB  
  HugePages_Total:       0  
  Hugepagesize:       2048 kB
```

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

```
    SuSE-release:  
        SUSE Linux Enterprise Server 12 (x86_64)  
        VERSION = 12  
        PATCHLEVEL = 4  
        # 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-SP4"  
        VERSION_ID="12.4"
```

(Continued on next page)
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Platform Notes (Continued)

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 Apr 28 11:55

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

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 892G 31G 861G 4% /

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 -[TEE135L-2.10]- 01/10/2019
Memory:
12x SK Hynix HMA84GR7AFR4N-VK 32 GB 2 rank 2666, configured at 2133

Compiler Version Notes

==============================================================================
<table>
<thead>
<tr>
<th>CC  619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)</th>
</tr>
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<tbody>
<tr>
<td>Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,</td>
</tr>
<tr>
<td>Version 19.0.1.144 Build 20181018</td>
</tr>
<tr>
<td>Copyright (C) 1985-2018 Intel Corporation. All rights reserved.</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
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<tr>
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Compiler Version Notes (Continued)

Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
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.
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

Fortran benchmarks:
  ifort -m64

Benchmarks using both Fortran and C:
  ifort -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
  icpc -m64 icc -m64 -std=c11 ifort -m64
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### Base Portability Flags

- 603.bwaves_s: -DSPEC_LP64
- 607.cactuBSSN_s: -DSPEC_LP64
- 619.lbm_s: -DSPEC_LP64
- 621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
- 627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
- 628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
- assume byterecl
- 638.imagick_s: -DSPEC_LP64
- 644.nab_s: -DSPEC_LP64
- 649.fotonik3d_s: -DSPEC_LP64
- 654.roms_s: -DSPEC_LP64

### Base Optimization Flags

**C benchmarks:**
- -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
- ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

**Fortran benchmarks:**
- -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
- ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
- -nostandard-realloc-lhs

**Benchmarks using both Fortran and C:**
- -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
- ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
- -nostandard-realloc-lhs

**Benchmarks using Fortran, C, and C++:**
- -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
- ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
- -nostandard-realloc-lhs

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

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