Lenovo Global Technology
ThinkSystem SR590
(1.90 GHz, Intel Xeon Bronze 3204)

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

Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>12</td>
<td>40.0</td>
<td>Not Run</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>12</td>
<td>35.1</td>
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<tr>
<td>619.lbm_s</td>
<td>12</td>
<td>40.0</td>
<td>Not Run</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>12</td>
<td>42.8</td>
<td>Not Run</td>
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<tr>
<td>627.cam4_s</td>
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<td>20.0</td>
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<tr>
<td>628.pop2_s</td>
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<td>33.9</td>
<td>Not Run</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>12</td>
<td>25.9</td>
<td>Not Run</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>12</td>
<td>50.0</td>
<td>Not Run</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>12</td>
<td>45.1</td>
<td>Not Run</td>
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<tr>
<td>654.roms_s</td>
<td>12</td>
<td>42.2</td>
<td>Not Run</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: 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-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 19.0.0.117 of Intel C/C++
Compiler for Linux;
Fortran: Version 19.0.0.117 of Intel Fortran
Compiler for Linux
Parallel: Yes
Firmware: Lenovo BIOS Version TEE135L 2.10 released Jan-2019
File System: btrfs
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>
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<td>25.9</td>
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<tr>
<td>644.nab_s</td>
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<td>50.0</td>
<td>350</td>
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<tr>
<td>649.fotonik3d_s</td>
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<td>374</td>
<td>42.1</td>
</tr>
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</table>

SPECspeed2017_fp_base = 44.1
SPECspeed2017_fp_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,compact"
LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic19/lib/intel64"
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.
**Platform Notes**

BIOS configuration:
Choose Operating Mode set to Maximum Performance
Choose Operating Mode set to Custom Mode
CPU P-state Control set to Automatic
MONITOR/MWAIT set to Enable
Adjacent Cache Prefetch set to disable
Sysinfo program /home/cpu2017-1.0.5-ic19/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-o16r Thu Apr 18 09:36:34 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
    CPU MHz: 1900.000
    BogoMIPS: 3800.00
    Virtualization: VT-x
    L1d cache: 32K
    L1i cache: 32K
    L2 cache: 1024K
    L3 cache: 8448K

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**SPEC CPU2017 Floating Point Speed Result**

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>44.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_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:** Dec-2018

**Platform Notes (Continued)**

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 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 xprtdpcmcpid dca sse4_1 sse4_2 x2apic movcnt popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm ablp abmu smep intel_pt avx512vnni fsgsbase tsck t有不同的CPU7 arch_capabilities

/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: 96062 MB  
node 0 free: 95641 MB  
node 1 cpus: 6 7 8 9 10 11  
node 1 size: 96714 MB  
node 1 free: 96274 MB  
node distances:  
node 0 1  
0: 10 21  
1: 21 10
```

From /proc/meminfo

```
MemTotal:       197404004 kB  
MemFree:       92887497 kB  
MemAvailable:  197404004 kB  
```

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

```
SuSE-release:  
SUSE Linux Enterprise Server 12 (x86_64)  
VERSION = 12  
PATCHLEVEL = 4  
NAME="SLES"  
VERSION="12-SP4"  
VERSION_ID="12.4"
```
**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 18 09:35

SPEC is set to: /home/cpu2017-1.0.5-ic19
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/sda3 btrfs 740G 35G 705G 5% /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 -[TEE135L-2.10]- 01/10/2019
Memory:
    4x NO DIMM NO DIMM
    12x SK Hynix HMA82GR7CJR8N-WM 16 GB 2 rank 2933, configured at 2133

(End of data from sysinfo program)

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**Compiler Version Notes**

==============================================================================
<table>
<thead>
<tr>
<th>CC 619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)</th>
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<tbody>
<tr>
<td>Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,</td>
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<tr>
<td>Version 19.0.0.117 Build 20180804</td>
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<td>Copyright (C) 1985-2018 Intel Corporation. All rights reserved.</td>
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SPECSpeed2017_fp_base = 44.1
SPECSpeed2017_fp_peak = Not Run

Compiler Version Notes (Continued)

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.

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.

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

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=3 -qopenmp -DSPEC_OPENMP

**Fortran benchmarks:**
- -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
- -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
- -nostandard-realloc-lhs -align array32byte

**Benchmarks using both Fortran and C:**
- -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
- -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
- -nostandard-realloc-lhs -align array32byte

**Benchmarks using Fortran, C, and C++:**
- -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
- -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
- -nostandard-realloc-lhs -align array32byte

---

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.

Tested with SPEC CPU2017 v1.0.5 on 2019-04-17 21:36:32-0400.