# SPEC® CPU2017 Floating Point Rate Result

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## Lenovo Global Technology

ThinkSystem SR630
(1.90 GHz, Intel Xeon Bronze 3204)

SPECrate2017_fp_base =   55.1

SPECrate2017_fp_peak =  Not Run

**CPU2017 License:** 9017

**Test Sponsor:** Lenovo Global Technology

**Tested by:** Lenovo Global Technology

**Test Date:** Apr-2019

**Hardware Availability:** Apr-2019

**Software Availability:** Dec-2018

| Benchmark | Copies | Result |
|-----------|--------|--------|
| 503.bwaves_r | 12 | 228 |
| 507.cactuBSSN_r | 12 | 36.5 |
| 508.namd_r | 12 | 29.1 |
| 510.parest_r | 12 | 36.3 |
| 511.povray_r | 12 | 47.7 |
| 519.lbm_r | 12 | 62.0 |
| 521.wrf_r | 12 | 57.2 |
| 526.blender_r | 12 | 41.9 |
| 527.cam4_r | 12 | 41.8 |
| 538.imagick_r | 12 | 94.8 |
| 544.nab_r | 12 | 58.3 |
| 549.fotonik3d_r | 12 | 77.9 |
| 554.roms_r | 12 | 38.2 |

SPECrate2017_fp_base (55.1)

## 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 (24 x 16 GB 2Rx8 PC4-2933Y-R, running at 2133)
Storage:   1 x 800 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:   No
Firmware:   Lenovo BIOS Version IVE135P 2.10 released Feb-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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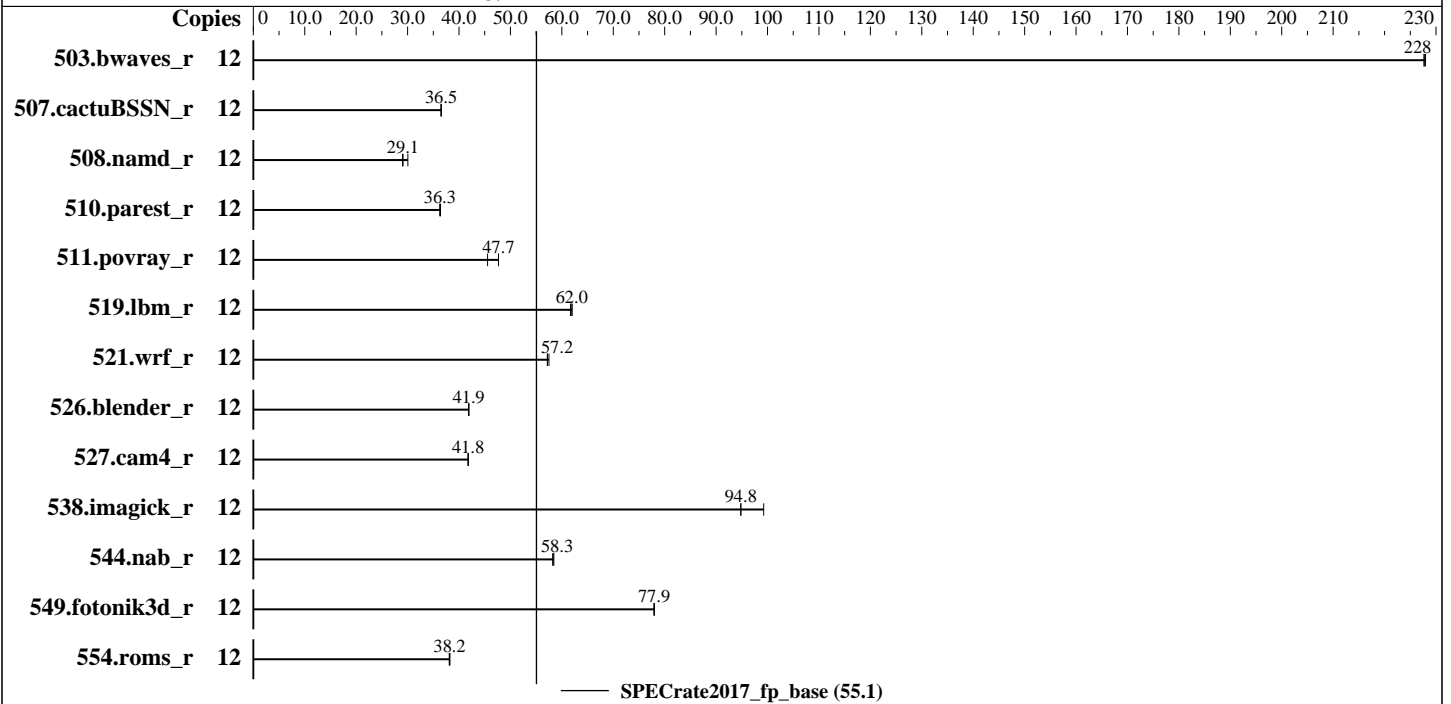
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## Results Table

| Benchmark | Base | | | | | | | Peak | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 503.bwaves_r | 12 | 528 | 228 | **528** | **228** | 529 | 228 | | | | | | | |
| 507.cactuBSSN_r | 12 | 416 | 36.5 | **416** | **36.5** | 416 | 36.5 | | | | | | | |
| 508.namd_r | 12 | **392** | **29.1** | 393 | 29.0 | 379 | 30.1 | | | | | | | |
| 510.parest_r | 12 | **865** | **36.3** | 865 | 36.3 | 862 | 36.4 | | | | | | | |
| 511.povray_r | 12 | 588 | 47.7 | **588** | **47.7** | 615 | 45.6 | | | | | | | |
| 519.lbm_r | 12 | 204 | 62.0 | **204** | **62.0** | 205 | 61.7 | | | | | | | |
| 521.wrf_r | 12 | **470** | **57.2** | 468 | 57.5 | 470 | 57.2 | | | | | | | |
| 526.blender_r | 12 | 437 | 41.8 | **436** | **41.9** | 436 | 41.9 | | | | | | | |
| 527.cam4_r | 12 | 502 | 41.8 | **502** | **41.8** | 502 | 41.8 | | | | | | | |
| 538.imagick_r | 12 | **315** | **94.8** | 315 | 94.8 | 301 | 99.3 | | | | | | | |
| 544.nab_r | 12 | 347 | 58.2 | **347** | **58.3** | 346 | 58.4 | | | | | | | |
| 549.fotonik3d_r | 12 | 600 | 78.0 | **600** | **77.9** | 600 | 77.9 | | | | | | | |
| 554.roms_r | 12 | 500 | 38.1 | 499 | 38.2 | **500** | **38.2** | | | | | | | |

|  |  |
|---|---|
| **SPECrate2017_fp_base =** | **55.1** |
| SPECrate2017_fp_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/lib/intel64"

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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.

**(Continued on next page)**

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**Software Availability:** Dec-2018

## General Notes (Continued)

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
C-states set to Legacy
DCU Streamer Prefetcher set to Disable
Trusted Execution Technology set to Enable
Stale AtoS set to Enable
LLC dead line alloc set to Disable
Patrol Scrub set to Disable
 Sysinfo program /home/cpu2017-1.0.5-ic19/bin/sysinfo
 Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
 running on linux-v7my Sat Apr 20 17:16:07 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
```

**(Continued on next page)**

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## Platform Notes (Continued)

```
        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
        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
      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_l3 cdp_l3
      invpcid_single ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
      fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_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 arat pln pts pku ospke avx512_vnni flush_l1d 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: 193126 MB
    node 0 free: 192692 MB
    node 1 cpus: 6 7 8 9 10 11
    node 1 size: 193482 MB
    node 1 free: 193065 MB
    node distances:
    node   0   1
      0:  10  21
      1:  21  10
```

**(Continued on next page)**

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## Platform Notes (Continued)

```
From /proc/meminfo
   MemTotal:       395888192 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"
      PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12:sp4"

uname -a:
   Linux linux-v7my 4.12.14-94.41-default #1 SMP Wed Oct 31 12:25:04 UTC 2018 (3090901)
   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 20 17:10

SPEC is set to: /home/cpu2017-1.0.5-ic19
   Filesystem      Type    Size   Used Avail Use% Mounted on
   /dev/sdb3       btrfs   740G   34G   706G   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 -[IVE135P-2.10]- 02/13/2019
   Memory:
   24x Samsung M393A2K43CB2-CVF 16 GB 2 rank 2933, configured at 2133
```

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## Platform Notes (Continued)

```
  (End of data from sysinfo program)
```

## Compiler Version Notes

```
==============================================================================
  CC  519.lbm_r(base) 538.imagick_r(base) 544.nab_r(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.
------------------------------------------------------------------------------


==============================================================================
  CXXC 508.namd_r(base) 510.parest_r(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.
------------------------------------------------------------------------------


==============================================================================
  CC  511.povray_r(base) 526.blender_r(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.
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  507.cactuBSSN_r(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.
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.
------------------------------------------------------------------------------


==============================================================================
```

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## Compiler Version Notes (Continued)

```
 FC  503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
--------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.0.117 Build 20180804
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--------------------------------------------------------------------


====================================================================
 CC  521.wrf_r(base) 527.cam4_r(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.
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.
--------------------------------------------------------------------
```

## Base Compiler Invocation

C benchmarks:
`icc -m64 -std=c11`

C++ benchmarks:
`icpc -m64`

Fortran benchmarks:
`ifort -m64`

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

Benchmarks using both C and C++:
`icpc -m64 icc -m64 -std=c11`

Benchmarks using Fortran, C, and C++:
`icpc -m64 icc -m64 -std=c11 ifort -m64`

## Base Portability Flags

503.bwaves_r: `-DSPEC_LP64`
507.cactuBSSN_r: `-DSPEC_LP64`
508.namd_r: `-DSPEC_LP64`

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# Base Portability Flags (Continued)

510.parest_r: `-DSPEC_LP64`
511.povray_r: `-DSPEC_LP64`
519.lbm_r: `-DSPEC_LP64`
521.wrf_r: `-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian`
526.blender_r: `-DSPEC_LP64 -DSPEC_LINUX -funsigned-char`
527.cam4_r: `-DSPEC_LP64 -DSPEC_CASE_FLAG`
538.imagick_r: `-DSPEC_LP64`
544.nab_r: `-DSPEC_LP64`
549.fotonik3d_r: `-DSPEC_LP64`
554.roms_r: `-DSPEC_LP64`

# Base Optimization Flags

C benchmarks:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only`
`-qopt-mem-layout-trans=3`

C++ benchmarks:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only`
`-qopt-mem-layout-trans=3`

Fortran benchmarks:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only`
`-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs`
`-align array32byte`

Benchmarks using both Fortran and C:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only`
`-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs`
`-align array32byte`

Benchmarks using both C and C++:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only`
`-qopt-mem-layout-trans=3`

Benchmarks using Fortran, C, and C++:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only`
`-qopt-mem-layout-trans=3 -auto -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/Intel-ic19.0-official-linux64.2019-01-15.html
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-A.html

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You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.0-official-linux64.2019-01-15.xml
http://www.spec.org/cpu2017/flags/Lenovo-Platform-SPECcpu2017-Flags-V1.2-CLX-A.xml

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

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