Lenovo Global Technology
ThinkSystem SR630
(2.30 GHz, Intel Xeon Gold 5218N)

**SPECrate2017_fp_base** = 176
**SPECrate2017_fp_peak** = Not Run

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<th>Test Date: May-2019</th>
<th>Hardware Availability: Apr-2019</th>
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<td>Test Sponsor: Lenovo Global Technology</td>
<td>Software Availability: Oct-2018</td>
</tr>
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<td>Tested by: Lenovo Global Technology</td>
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<td>141</td>
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<tr>
<td>507.cactuBSSN_r 64</td>
<td>122</td>
</tr>
<tr>
<td>508.namd_r 64</td>
<td>105</td>
</tr>
<tr>
<td>510.parest_r 64</td>
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<tr>
<td>511.povray_r 64</td>
<td>104</td>
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<td>519.lbm_r 64</td>
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<tr>
<td>521.wrf_r 64</td>
<td>187</td>
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<td>526.blender_r 64</td>
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<td>527.cam4_r 64</td>
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<tr>
<td>538.imagick_r 64</td>
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<td>544.nab_r 64</td>
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<tr>
<td>549.fotonik3d_r 64</td>
<td>84.1</td>
</tr>
<tr>
<td>554.roms_r 64</td>
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**Hardware**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
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<tbody>
<tr>
<td>CPU Name: Intel Xeon Gold 5218N</td>
<td>OS: Red Hat Enterprise Linux Server release 7.6 (Maipo)</td>
</tr>
<tr>
<td>Max MHz.: 3700</td>
<td>Compiler: C/C++: Version 19.0.0.117 of Intel C/C++</td>
</tr>
<tr>
<td>Nominal: 2300</td>
<td>Compiler for Linux;</td>
</tr>
<tr>
<td>Enabled: 32 cores, 2 chips, 2 threads/core</td>
<td>Fortran: Version 19.0.0.117 of Intel Fortran</td>
</tr>
<tr>
<td>Orderable: 1.2 chips</td>
<td>Compiler for Linux</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
<td>Parallel: No</td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
<td>Firmware: Lenovo BIOS Version IVE135P 2.10 released Feb-2019</td>
</tr>
<tr>
<td>L3: 22 MB I+D on chip per chip</td>
<td>File System: xfs</td>
</tr>
<tr>
<td>Other: None</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R, running at 2666)</td>
<td>Base Pointers: 64-bit</td>
</tr>
<tr>
<td>Storage: 1 x 800 GB SATA SSD</td>
<td>Peak Pointers: Not Applicable</td>
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<tr>
<td>Other: None</td>
<td>Other: None</td>
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Lenovo Global Technology
ThinkSystem SR630
(2.30 GHz, Intel Xeon Gold 5218N)

Results Table

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<td>1209</td>
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</table>

SPECrate2017_fp_base = 176
SPECrate2017_fp_peak = Not Run

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>
NA: 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)
Lenovo Global Technology
ThinkSystem SR630
(2.30 GHz, Intel Xeon Gold 5218N)

SPECrate2017_fp_base = 176
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Test Date: May-2019
Tested by: Lenovo Global Technology
Hardware Availability: Apr-2019
Software Availability: Oct-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
SNC set to Enable
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 localhost.localdomain Sun May 12 02:30:28 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) Gold 5218N CPU @ 2.30GHz
 2 "physical id"s (chips)
 64 "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 : 16
siblings : 32
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 64
On-line CPU(s) list: 0-63

(Continued on next page)
Lenovo Global Technology
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SPECrate2017_fp_base = 176
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CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Platform Notes (Continued)

Thread(s) per core: 2
Core(s) per socket: 16
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5218N CPU @ 2.30GHz
Stepping: 6
CPU MHz: 2300.000
BogoMIPS: 4600.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0-3, 8-11, 16-19, 24-27, 32-35, 40-43
NUMA node1 CPU(s): 4-7, 12-15, 16-19, 20-23, 28-31, 36-39, 44-47
NUMA node2 CPU(s): 8-11, 16-19, 24-27, 32-35, 40-43
NUMA node3 CPU(s): 16-19, 20-23, 28-31, 36-39, 44-47

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 8 9 10 11 32 33 34 35 40 41 42 43
node 0 size: 97977 MB
node 0 free: 94973 MB
node 1 cpus: 4 5 6 7 12 13 14 15 36 37 38 39 44 45 46 47
node 1 size: 98304 MB
node 1 free: 95933 MB
node 2 cpus: 16 17 18 19 24 25 26 27 48 49 50 51 56 57 58 59
node 2 size: 98304 MB
node 2 free: 95930 MB
node 3 cpus: 20 21 22 23 28 29 30 31 60 61 62 63
node 3 size: 98304 MB
node 3 free: 95930 MB

(Continued on next page)
Lenovo Global Technology
ThinkSystem SR630
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SPECrate2017_fp_base = 176
SPECrate2017_fp_peak = Not Run

Platform Notes (Continued)

node 3 cpus:  20  21  22  23  28  29  30  31  52  53  54  55  60  61  62  63
node 3 size:  98304 MB
node 3 free:  95990 MB
node distances:
    node 0  1  2  3
    0: 10 11 21 21
    1: 11 10 21 21
    2: 21 21 10 11
    3: 21 21 11 10

From /proc/meminfo
    MemTotal: 395878596 kB
    HugePages_Total: 0
    Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
    os-release:
        NAME="Red Hat Enterprise Linux Server"
        VERSION="7.6 (Maipo)"
        ID="rhel"
        ID_LIKE="fedora"
        VARIANT="Server"
        VARIANT_ID="server"
        VERSION_ID="7.6"
        PRETTY_NAME="Red Hat Enterprise Linux Server 7.6 (Maipo)"
    redhat-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)
    system-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)

uname -a:
    Linux localhost.localdomain 3.10.0-957.el7.x86_64 #1 SMP Thu Oct 4 20:48:51 UTC 2018
    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: Load fences, __user pointer sanitization
    CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS

run-level 3 May 12 02:27

SPEC is set to: /home/cpu2017-1.0.5-ic19
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sdb2       xfs   689G  32G  657G   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

(Continued on next page)
## Lenovo Global Technology

**ThinkSystem SR630**  
(2.30 GHz, Intel Xeon Gold 5218N)

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</tr>
</tbody>
</table>

**CPU2017 License:** 9017  
**Test Sponsor:** Lenovo Global Technology  
**Test Date:** May-2019

### Platform Notes (Continued)

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 2666

(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.
```

(Continued on next page)
Lenovo Global Technology
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SPECraten2017_fp_base = 176
SPECraten2017_fp_peak = Not Run

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

Copyright 2017-2019 Standard Performance Evaluation Corporation

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

Compiler Version Notes (Continued)

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.

==============================================================================
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
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
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
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Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
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
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You can also download the XML flags sources by saving the following links:


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