SPEC® CPU2017 Floating Point Rate Result
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Supermicro
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Silver 4114)

SPECrate2017_fp_base = 104
SPECrate2017_fp_peak = 106

CPU2017 License: 001176
Test Sponsor: Supermicro
Test Date: Oct-2018
Tested by: Supermicro
Software Availability: Mar-2018

Hardware
CPU Name: Intel Xeon Silver 4114
Max MHz.: 3000
Nominal: 2200
Enabled: 20 cores, 2 chips, 2 threads/core
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: 13.75 MB I+D on chip per core
Other: None
Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)
Storage: 1 x 200 GB SATA III SSD
Other: None

Software
OS: SUSE Linux Enterprise Server 12 SP3 (x86_64)
Kernel 4.4.114-94.11-default
Compiler: C/C++: Version 18.0.2.199 of Intel C/C++ Compiler for Linux;
Fortran: Version 18.0.2.199 of Intel Fortran Compiler for Linux
Parallel: No
Firmware: Supermicro BIOS version 2.1a released Aug-2018
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None
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### Results Table

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## 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/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
```

Binaries compiled on a system with 1x Intel Core i7-6700K 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.:  
```
umactl --interleave=all runcpu <etc>
```

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
### General Notes (Continued)

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.

### Platform Notes

- BIOS Settings:
  - LLC prefetch = Enable
  - Power Technology = Custom
  - Power Performance Tuning = BIOS Controls EPB
  - ENERGY_PERF_BIAS_CFG mode = Extreme Performance
  - Hardware P-state = Out of Band Mode
  - XPT Prefetch = Enable
  - Stale AtoS = Enable
  - LLC dead line alloc = Disable
  - SDDC Plus One = Disable
  - ADDDC Sparing = Disable
  - Patrol Scrub = Disable
- Sysinfo program /home/cpu2017/bin/sysinfo
  Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f6d4985e45859ea9
  running on linux-ima8 Fri Oct 19 23:01:15 2018

- 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) Silver 4114 CPU @ 2.20GHz
  - 2 "physical id"s (chips)
  - 40 "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 : 10
    - siblings : 20
    - physical 0: cores 0 1 2 3 4 8 9 10 11 12
    - physical 1: cores 0 1 2 3 4 8 9 10 11 12

- From lscpu:
  - Architecture: x86_64
  - CPU op-mode(s): 32-bit, 64-bit
  - Byte Order: Little Endian
  - CPU(s): 40
  - On-line CPU(s) list: 0-39
  - Thread(s) per core: 2

(Continued on next page)
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Platform Notes (Continued)

Core(s) per socket: 10
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4114 CPU @ 2.20GHz
Stepping: 4
CPU MHz: 2200.006
BogoMIPS: 4400.01
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 14080K
NUMA node0 CPU(s): 0-9,20-29
NUMA node1 CPU(s): 10-19,30-39
Flags: fpu vme de pse tsc msr mdis msx 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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperf mmpref eagerfpu 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 rdrnd lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts dtherm intel_pt rsb_ctxsw spec_ctrl retpoline kaiser tpr_shadow vnmi fpxprec ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3msr invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaveprec xsavesveq xgetbv1 cqm_11c cqm_occup_11c pku ospke

/proc/cpuinfo cache data
  cache size: 14080 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 6 7 8 9 20 21 22 23 24 25 26 27 28 29
  node 0 size: 193035 MB
  node 0 free: 181096 MB
  node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
  node 1 size: 193516 MB
  node 1 free: 183405 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 395829448 KB

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

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

SuSE-release:

- SUSE Linux Enterprise Server 12 (x86_64)
- VERSION = 12
- PATCHLEVEL = 3
- # 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-SP3"
- VERSION_ID="12.3"
- PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
- ID="sles"
- ANSI_COLOR="0;32"
- CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:

- Linux linux-ima8 4.4.114-94.11-default #1 SMP Thu Feb 1 19:28:26 UTC 2018 (4309ff9)
- x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

- CVE-2017-5754 (Meltdown): Mitigation: PTI
- CVE-2017-5753 (Spectre variant 1): Mitigation: Barriers
- CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

run-level 3 Oct 19 11:40

**SPEC is set to:/home/cpu2017**

- Filesystem Type Size Used Avail Use% Mounted on
- /dev/sda4 xfs 145G 45G 100G 32% /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 American Megatrends Inc. 2.1a 08/23/2018
- Memory:
  - 12x NO DIMM NO DIMM
  - 12x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)
Compiler Version Notes

-----------------------------------------------
CC  519.lbm_r(base)  538.imagick_r(base, peak)  544.nab_r(base, peak)

icc (ICC)  18.0.2  20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

-----------------------------------------------
CC  519.lbm_r(peak)

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CXXC  508.namd_r(base)  510.parest_r(base, peak)

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ifort (IFORT) 18.0.2 20180210
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FC 554.roms_r(peak)

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CC 521.wrf_r(base) 527.cam4_r(base)

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icc (ICC) 18.0.2 20180210
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Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

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Base Compiler Invocation (Continued)

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
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 -03 -no-prec-div -qopt-prefetch -ffinite-math-only
  -qopt-mem-layout-trans=3

C++ benchmarks:
  -xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only
  -qopt-mem-layout-trans=3

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Base Optimization Flags (Continued)

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

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

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

Peak 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

Peak Portability Flags

Same as Base Portability Flags
SPEC CPU2017 Floating Point Rate Result

Supermicro
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Silver 4114)

SPECrate2017_fp_base = 104
SPECrate2017_fp_peak = 106

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro
Test Date: Oct-2018
Hardware Availability: Jul-2017
Software Availability: Mar-2018

Peak Optimization Flags

C benchmarks:
519.lbm_r: basepeak = yes
538.imagick_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3
544.nab_r: Same as 538.imagick_r

C++ benchmarks:
508.namd_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3
510.parest_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3

Fortran benchmarks:
503.bwaves_r: basepeak = yes
549.fotonik3d_r: basepeak = yes
554.roms_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

Benchmarks using both Fortran and C:
-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

Benchmarks using both C and C++:
511.povray_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3
526.blender_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:
507.cactuBSSN_r: basepeak = yes
## SPEC CPU2017 Floating Point Rate Result

### Supermicro
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Silver 4114)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tr>
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<tr>
<td>SPECrate2017_fp_peak</td>
<td>106</td>
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</tbody>
</table>

### Specifications
- **CPU2017 License**: 001176
- **Test Sponsor**: Supermicro
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The flags files that were used to format this result can be browsed at:

You can also download the XML flags sources by saving the following links:

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Tested with SPEC CPU2017 v1.0.5 on 2018-10-19 11:01:14-0400.