Supermicro
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Gold 5118)

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Threads
603.bwaves_s 24
607.cactuBSSN_s 24
619.lbm_s 24
621.wrf_s 24
627.cam4_s 24
628.pop2_s 24
638.imagick_s 24
644.nab_s 24
649.fotonik3d_s 24
654.roms_s 24

SPECspeed2017_fp_base = 80.8
SPECspeed2017_fp_peak = 81.6

Hardware
CPU Name: Intel Xeon Gold 5118
Max MHz.: 3200
Nominal: 2300
Enabled: 24 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: 16.5 MB I+D on chip per chip
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: Yes
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: jemalloc memory allocator library V5.0.1
Supermicro
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Gold 5118)

SPECspeed2017_fp_base = 80.8
SPECspeed2017_fp_peak = 81.6

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>24</td>
<td>155</td>
<td>381</td>
<td>155</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>24</td>
<td>150</td>
<td>111</td>
<td>158</td>
<td>105</td>
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<tr>
<td>619.lbm_s</td>
<td>24</td>
<td>144</td>
<td>36.3</td>
<td>144</td>
<td>36.4</td>
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<tr>
<td>621.wrf_s</td>
<td>24</td>
<td>214</td>
<td>61.9</td>
<td>213</td>
<td>62.1</td>
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<tr>
<td>627.cam4_s</td>
<td>24</td>
<td>190</td>
<td>46.6</td>
<td>189</td>
<td>46.8</td>
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<tr>
<td>628.pop2_s</td>
<td>24</td>
<td>221</td>
<td>53.8</td>
<td>216</td>
<td>55.0</td>
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<tr>
<td>638.imagick_s</td>
<td>24</td>
<td>222</td>
<td>65.1</td>
<td>220</td>
<td>65.6</td>
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<tr>
<td>644.nab_s</td>
<td>24</td>
<td>127</td>
<td>138</td>
<td>127</td>
<td>138</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>24</td>
<td>136</td>
<td>66.9</td>
<td>132</td>
<td>68.9</td>
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<tr>
<td>654.roms_s</td>
<td>24</td>
<td>184</td>
<td>85.8</td>
<td>185</td>
<td>85.3</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 80.8
SPECspeed2017_fp_peak = 81.6

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/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

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

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.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
### Platform Notes

BIOS Settings:
- Hyper-Threading [ALL] = Disable
- 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 9bcde8f2999c33d61f64985e45859ea9
running on linux-ima8 Sun Oct 28 04:17:34 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) Gold 5118 CPU @ 2.30GHz
  2 "physical id"s (chips)
  24 "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 : 12
siblings : 12
  physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
  physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13
```

From lscpu:
```
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                24
On-line CPU(s) list:   0-23
Thread(s) per core:    1
Core(s) per socket:    12
Socket(s):             2
NUMA node(s):          2
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Gold 5118 CPU @ 2.30GHz
Stepping:              4
CPU MHz:               2301.000
CPU max MHz:           2301.0000
CPU min MHz:           1000.0000
BogoMIPS:              4599.98
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
```
**Platform Notes (Continued)**

<table>
<thead>
<tr>
<th>Platform Notes</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>L2 cache:</td>
<td>1024K</td>
</tr>
<tr>
<td>L3 cache:</td>
<td>16896K</td>
</tr>
<tr>
<td>NUMA node0 CPU(s):</td>
<td>0-11</td>
</tr>
<tr>
<td>NUMA node1 CPU(s):</td>
<td>12-23</td>
</tr>
<tr>
<td>Flags:</td>
<td></td>
</tr>
<tr>
<td>fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov</td>
<td></td>
</tr>
<tr>
<td>pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpec1b rdtscp</td>
<td></td>
</tr>
<tr>
<td>lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc</td>
<td></td>
</tr>
<tr>
<td>aperfmpcr perf eagerfpul pni pclmulqdq dtsc64 monitor ds cpl vmp smx est tm2 sse3 sdbg</td>
<td></td>
</tr>
<tr>
<td>fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes</td>
<td></td>
</tr>
<tr>
<td>xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts</td>
<td></td>
</tr>
<tr>
<td>dtherm intel_pt rsb_ctxsw spec_ctrl retpoline kaiser tpr_shadow vnmi flexpriority</td>
<td></td>
</tr>
<tr>
<td>ept vpid fsgsbase tsc_adjust bni hle avx2 smep bmi2 erms invpcid rtm cqm mpx</td>
<td></td>
</tr>
<tr>
<td>avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt</td>
<td></td>
</tr>
<tr>
<td>xsaves xgetbv1 cqm_1lc cqm_occup_1lc pkp ospke</td>
<td></td>
</tr>
</tbody>
</table>

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 10 11
- node 0 size: 192093 MB
- node 0 free: 186868 MB
- node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23
- node 1 size: 193517 MB
- node 1 free: 191359 MB
- node distances:
  - node 0 1
  - 0: 10 21
  - 1: 21 10

From `/proc/meminfo`

<table>
<thead>
<tr>
<th>Memory Information</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MemTotal:</td>
<td>394865340 kB</td>
</tr>
<tr>
<td>HugePages_Total:</td>
<td>0</td>
</tr>
<tr>
<td>Hugepagesize:</td>
<td>2048 kB</td>
</tr>
</tbody>
</table>

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"

(Continued on next page)
Supermicro
SuperServer 6029U-TR4 (X11DPU , Intel Xeon Gold 5118)

SPEC CPU2017 Floating Point Speed Result

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SPECspeed2017_fp_base = 80.8
SPECspeed2017_fp_peak = 81.6

<table>
<thead>
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<tr>
<td>001176</td>
<td>Oct-2018</td>
</tr>
</tbody>
</table>

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<tr>
<th>Test Sponsor</th>
<th>Hardware Availability</th>
<th>Tested by</th>
<th>Software Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supermicro</td>
<td>Jul-2017</td>
<td>Supermicro</td>
<td>Mar-2018</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Platform Notes (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VERSION_ID=&quot;12.3&quot;</td>
</tr>
<tr>
<td>PRETTY_NAME=&quot;SUSE Linux Enterprise Server 12 SP3&quot;</td>
</tr>
<tr>
<td>ANSI_COLOR=&quot;0;32&quot;</td>
</tr>
<tr>
<td>CPE_NAME=&quot;cpe:/o:suse:sles:12:sp3&quot;</td>
</tr>
</tbody>
</table>

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 27 22:07

SPEC is set to: /home/cpu2017

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda4      xfs   145G   50G   95G  35% /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)

<table>
<thead>
<tr>
<th>Compiler Version Notes</th>
</tr>
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<tbody>
<tr>
<td>CC 619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak)</td>
</tr>
<tr>
<td>icc (ICC) 18.0.2 20180210</td>
</tr>
<tr>
<td>Copyright (C) 1985-2018 Intel Corporation. All rights reserved.</td>
</tr>
<tr>
<td>CC 619.lbm_s(peak)</td>
</tr>
<tr>
<td>icc (ICC) 18.0.2 20180210</td>
</tr>
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(Continued on next page)
### SPEC CPU2017 Floating Point Speed Result

**Supermicro**  
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**SPECspeed2017_fp_base = 80.8**  
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<tr>
<td>Tested by:</td>
<td>Supermicro</td>
<td>Software Availability:</td>
<td>Mar-2018</td>
</tr>
</tbody>
</table>

#### Compiler Version Notes (Continued)

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

```
---
FC  607.cactuBSSN_s(base, peak)
---
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
---
FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base, peak)
---
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
---
FC  603.bwaves_s(peak) 649.fotonik3d_s(peak)
---
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
---
CC  621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)
---
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
---
CC  621.wrf_s(peak) 628.pop2_s(peak)
---
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```
Supermicro
SuperServer 6029U-TR4 (X11DPU, Intel Xeon Gold 5118)  

| SPECspeed2017_fp_base = 80.8 |
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CPU2017 License: 001176
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Test Date: Oct-2018
Hardware Availability: Jul-2017
Software Availability: Mar-2018

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

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:
- Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -gopenmp -DSPEC_OPENMP
- L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
- Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -gopenmp
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc

Benchmarks using both Fortran and C:
- Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -gopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc

(Continued on next page)
SPEC CPU2017 Floating Point Speed Result

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

Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
ifort -m64 icc -m64 -std=gnu11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=gnu11 ifort -m64

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
619.lbm_s: basepeak = yes
638.imagick_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
644.nab_s: basepeak = yes

Fortran benchmarks:

(Continued on next page)
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<tr>
<td>Software Availability:</td>
<td>Mar-2018</td>
</tr>
</tbody>
</table>

### SPECspeed2017 fp_base = 80.8

### SPECspeed2017 fp_peak = 81.6

---

### Peak Optimization Flags (Continued)

- **603.bwaves_s:** `-prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -qopenmp -nostandard-realloc-lhs`

- **649.fotonik3d_s:** Same as 603.bwaves_s

- **654.roms_s:** `basepeak = yes`

---

### Benchmarks using both Fortran and C:

- **621.wrf_s:** `-prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs`

- **627.cam4_s:** `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs`

- **628.pop2_s:** Same as 621.wrf_s

### Benchmarks using Fortran, C, and C++:

- **607.cactuBSSN_s:** `basepeak = yes`

---

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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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 2018-10-27 16:17:33-0400.  