## SPEC CPU®2017 Floating Point Speed Result

Supermicro  
SuperServer SSG-520P-ACTR12H  
(X12SPI-TF, Intel Xeon Platinum 8360Y)

### CPU2017 License: 001176  
Test Sponsor: Supermicro  
Tested by: Supermicro  
Hardware Availability: Apr-2021  
Software Availability: Apr-2021

<table>
<thead>
<tr>
<th>Software</th>
<th>Memory: 512 GB (8 x 64 GB 2Rx4 PC4-3200AA-R)</th>
<th>Other: None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Pointers: 64-bit</td>
<td>Peak Pointers: 64-bit</td>
<td>Power Management: BIOS set to prefer performance at the cost of additional power usage.</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
<td>File System: xfs</td>
<td></td>
</tr>
<tr>
<td>Firmware: Version 1.1 released Apr-2021</td>
<td>OS: Red Hat Enterprise Linux 8.3</td>
<td>Compiler: C/C++: Version 2021.1 of Intel oneAPI DPC++/C++</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 48 KB D on chip per core</td>
<td>Other: None</td>
<td>Classic Build 20201112 for Linux;</td>
</tr>
<tr>
<td>Cache L2: 1.25 MB I+D on chip per core</td>
<td>Storage: 1 x 4 TB SATA III, 7200 RPM</td>
<td>Classic Build 20201112 for Linux;</td>
</tr>
<tr>
<td>Cache L3: 54 MB I+D on chip per chip</td>
<td>Power Management: BIOS set to prefer performance at the cost of additional power usage.</td>
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</tr>
<tr>
<td>Other: None</td>
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### Hardware

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base = 135</th>
<th>SPECspeed®2017_fp_peak = 137</th>
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</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>36</td>
<td>189</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>36</td>
<td>80.0</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>36</td>
<td>151</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>36</td>
<td>101</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>36</td>
<td>92.0</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>36</td>
<td>119</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>36</td>
<td>68.0</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>36</td>
<td>260</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>36</td>
<td>67.8</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>36</td>
<td>113</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU Name: Intel Xeon Platinum 8360Y</th>
<th>Max MHz: 3500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal: 2400</td>
<td>Enabled: 36 cores, 1 chip, 2 threads/core</td>
</tr>
<tr>
<td>Orderable: 1 chip</td>
<td>Cache L1: 32 KB I + 48 KB D on chip per core</td>
</tr>
<tr>
<td>Cache L2: 1.25 MB I+D on chip per core</td>
<td>Cache L3: 54 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other: None</td>
<td>Memory: 512 GB (8 x 64 GB 2Rx4 PC4-3200AA-R)</td>
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**Supermicro**

SuperServer SSG-520P-ACTR12H  
(X12SPI-TF, Intel Xeon Platinum 8360Y)  

---

**Results Table**

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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>36</td>
<td>88.5</td>
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<td>88.4</td>
<td>189</td>
<td>88.2</td>
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<td>80.0</td>
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<td>621.wrf_s</td>
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<td>644.nab_s</td>
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<td>113</td>
<td>138</td>
<td>114</td>
<td>140</td>
<td>113</td>
</tr>
</tbody>
</table>

**SPECspeed®2017_fp_base = 135**  
**SPECspeed®2017_fp_peak = 137**

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
- KMP_AFFINITY = "granularity=fine,compact,1,0"
- LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
- MALLOC_CONF = "retain:true"
- OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0

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
```

NA: 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

(Continued on next page)
Supermicro
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Test Date: Apr-2021
Hardware Availability: Apr-2021
Software Availability: Apr-2021

General Notes (Continued)
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS Settings:
Power Technology = Custom
Power Performance Tuning = BIOS Controls EPB
ENERGY_PERF_BIAS_CFG mode = Maximum Performance
Stale AtoS = Disable
Patrol Scrub = Disable

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca64d
running on 135-180-251.engtw Thu Apr 29 16:49:38 2021

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) Platinum 8360Y CPU @ 2.40GHz
  1 "physical id"s (chips)
  72 "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 : 36
siblings : 72
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
25 26 27 28 29 30 31 32 33 34 35
```

From lscpu from util-linux 2.32.1:

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 72
On-line CPU(s) list: 0-71
Thread(s) per core: 2
Core(s) per socket: 36
Socket(s): 1
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Platinum 8360Y CPU @ 2.40GHz
Stepping: 6
```

(Continued on next page)
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**SPECspeed®2017_fp_base = 135**

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<td>Test Sponsor:</td>
<td>Supermicro</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Supermicro</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

- CPU MHz: 3100.000
- BogoMIPS: 4800.00
- Virtualization: VT-x
- L1d cache: 48K
- L1i cache: 32K
- L2 cache: 1280K
- L3 cache: 55296K
- NUMA node0 CPU(s): 0-17,36-53
- NUMA node1 CPU(s): 18-35,54-71
- Flags: fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpes gb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperf perfnum perf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtp r pdc dca cee4 l sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx fm64 rdm lahf_lm abn 3dnowprefetch cpu_fault epb cat l3 invpcid_single intel_pinn ssbd mba ibs ibpip stibp ibrs enhanced tpr_shadow vnmi fpxinit ept vpid ept_ad fsgebase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512sfma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsave xsetbv xsavec qmx svmx cx16 xsaveopt xsavec qmx svmx cx16 xsaveopt xsavec qmx svmx cx16 xsaveopt xsavec qmx svmx cx16 xsaveopt xsavec qmx svmx cx16 xsaveopt xsavec qmx svmx cx16 xsaveopt xsavec qmx svmx cx16 xsaveopt xsavec qmx svmx cx16

/proc/cpuinfo cache data

```
/proc/cpuinfo cache data
```

```
cache size : 55296 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 10 11 12 13 14 15 16 17 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
node 0 size: 245262 MB
node 0 free: 226245 MB
node 1 cpus: 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
node 1 size: 246721 MB
node 1 free: 234265 MB
node distances:
node 0 1
  0: 10 11
  1: 11 10

From /proc/meminfo

```
MemTotal: 527699776 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

(Continued on next page)
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Test Sponsor: Supermicro
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Platform Notes (Continued)

/sbin/tuned-adm active
Current active profile: throughput-performance

From /etc/*release*/etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux"
    VERSION="8.3 (Ootpa)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="8.3"
    PLATFORM_ID="platform:el8"
    PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
    ANSI_COLOR="0;31"

redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:
  Linux 135-180-251.engtw 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020
  x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass):
  Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1):
  Mitigation: usercopy/swaps barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):
  Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Apr 28 10:47

SPEC is set to: /home/cpu2017
  Filesystem Type Size Used Avail Use% Mounted on
/devmapper/rhel_135--179--109-home xfs 3.6T 149G 3.5T 5% /home

From /sys/devices/virtual/dmi/id
  Vendor: Testsupermicro
  Product: TestPXM000

(Continued on next page)
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Platform Notes (Continued)

Product Family: Family
Serial: TestPS000

Additional information from dmidecode 3.2 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.

Memory:
8x SK Hynix HMAA8GR7AJR4N-XN 64 GB 2 rank 3200

BIOS:
BIOS Vendor: American Megatrends International, LLC.
BIOS Version: 1.1
BIOS Date: 04/09/2021
BIOS Revision: 5.22

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
| C | 619.lbm_s(base, peak) 638.imagick_s(base, peak) |
|   | 644.nab_s(base) |
==============================================================================

Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==============================================================================

C | 644.nab_s(peak)
==============================================================================

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==============================================================================

C | 619.lbm_s(base, peak) 638.imagick_s(base, peak) |
|   | 644.nab_s(base) |
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Compiler Version Notes (Continued)

C               | 644.nab_s(peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

C++, C, Fortran | 607.cactuBSSN_s(base, peak)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
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Fortran         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
| 654.roms_s(base, peak)
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Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
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Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

Fortran, C      | 621.wrf_s(base, peak) 627.cam4_s(base, peak)
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### Base Compiler Invocation

- **C benchmarks:**
  - `icc`
- **Fortran benchmarks:**
  - `ifort`
- **Benchmarks using both Fortran and C:**
  - `ifort icc`
- **Benchmarks using Fortran, C, and C++:**
  - `icpc icc ifort`

### 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`
- `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:**
  - `-m64 -std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div -gopt-prefetch`
  - `-ffinite-math-only -gopt-mem-layout-trans=4 -gopenmp -DSPEC_OPENMP`
  - `-mbranches-within-32B-boundaries`
- **Fortran benchmarks:**
  - `-m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3`
  - `-no-prec-div -gopt-prefetch -ffinite-math-only`
  - `-gopt-mem-layout-trans=4 -gopenmp -nostandard-realloc-lhs`
  - `-mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib`
  - `-ljemalloc`
- **Benchmarks using both Fortran and C:**
  - `-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`

(Continued on next page)
Supermicro
SuperServer SSG-520P-ACTR12H (X12SPI-TF, Intel Xeon Platinum 8360Y)

Specspeed®2017_fp_base = 135
Specspeed®2017_fp_peak = 137

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

Test Date: Apr-2021
Hardware Availability: Apr-2021
Software Availability: Apr-2021

Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):
- qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
- DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs
- L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
- m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
- DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs
- L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Peak Compiler Invocation

C benchmarks (except as noted below):
icc
644.nab_s: icx

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
619.lbm_s: basepeak = yes
638.imagick_s: basepeak = yes

(Continued on next page)
## SPEC CPU®2017 Floating Point Speed Result

**Supermicro**

**SuperServer SSG-520P-ACTR12H**
(X12Spi-TF, Intel Xeon Platinum 8360Y)

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**CPU2017 License:** 001176  
**Test Sponsor:** Supermicro  
**Test Date:** Apr-2021  
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**Tested by:** Supermicro  
**Software Availability:** Apr-2021

## Peak Optimization Flags (Continued)

644.nab_s: -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math  
-flto -mfpmath=sse -funroll-loops -fopenmp  
-DSPEC_OPENMP -qopt-mem-layout-trans=4  
-fimf-accuracy-bits=14:sqrt  
-mbranches-within-32B-boundaries  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

### Fortran benchmarks:

603.bwaves_s: -m64 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)  
-DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -ipo -xCORE-AVX512  
-O3 -no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=4 -gopenmp -nostandard-realloc-lhs  
-mbranches-within-32B-boundaries  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

649.fotonik3d_s: Same as 603.bwaves_s

654.roms_s: basepeak = yes

### Benchmarks using both Fortran and C:

621.wrf_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1)  
-qprof-use(pass 2) -ipo -xCORE-AVX512 -O3 -no-prec-div  
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4  
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP  
-mbranches-within-32B-boundaries -nostandard-realloc-lhs  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

627.cam4_s: basepeak = yes

628.pop2_s: basepeak = yes

### 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:

- [http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-CLX-revI.xml](http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-CLX-revI.xml)
### SPEC CPU®2017 Floating Point Speed Result

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SuperServer SSG-520P-ACTR12H
(X12SPi-TF, Intel Xeon Platinum 8360Y)

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