## SPEC® CPU2017 Floating Point Speed Result

SuperWorkstation 7049GP-TRT (X11DPG-QT, Intel Xeon Platinum 8280)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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</thead>
<tbody>
<tr>
<td>149</td>
<td>150</td>
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</table>

**CPU2017 License**: 001176  
**Test Sponsor**: Supermicro  
**Tested by**: Supermicro  
**Test Date**: Apr-2019  
**Hardware Availability**: Apr-2019  
**Software Availability**: Dec-2018

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
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<tr>
<td>603.bwaves_s</td>
<td>56</td>
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<tr>
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<td>56</td>
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<tr>
<td>619.lbm_s</td>
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<tr>
<td>621.wrf_s</td>
<td>56</td>
<td></td>
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<tr>
<td>638.imagick_s</td>
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<tr>
<td>644.nab_s</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>56</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name**: Intel Xeon Platinum 8280  
- **Max MHz.**: 4000  
- **Nominal**: 2700  
- **Enabled**: 56 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**: 38.5 MB I+D on chip per chip  
- **Other**: None  
- **Memory**: 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)  
- **Storage**: 1 x 2 TB SATA III HDD, 7200 RPM  
- **Other**: None

### Software

- **OS**: SUSE Linux Enterprise Server 12 SP4 (x86_64)  
- **Compiler**: C/C++: Version 19.0.1.144 of Intel C/C++ Compiler for Linux; Fortran: Version 19.0.1.144 of Intel Fortran Compiler for Linux  
- **Parallel**: Yes  
- **Firmware**: Version 3.0c released Mar-2019  
- **System State**: Run level 3 (multi-user)  
- **File System**: btrfs  
- **Base Pointers**: 64-bit  
- **Peak Pointers**: 64-bit  
- **Other**: None
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**Supermicro**
SuperWorkstation 7049GP-TRT (X11DPG-QT, Intel Xeon Platinum 8280)

<table>
<thead>
<tr>
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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>151</td>
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</tbody>
</table>

**SPECspeed2017_fp_base = 149**
**SPECspeed2017_fp_peak = 150**

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/intel64"
- OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i9-7900X 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.

### Platform Notes

BIOS Settings:
- Hyper-Threading = Disable

(Continued on next page)
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Supermicro
SuperWorkstation 7049GP-TRT (X11DPG-QT, Intel Xeon Platinum 8280)

**SPECspeed2017_fp_base = 149**

**SPECspeed2017_fp_peak = 150**

Platform Notes (Continued)

LLC prefetch = Disable
Power Technology = Custom
Power Performance Tuning = BIOS Controls EPB
ENERGY_PERF_BIAS_CFG mode = Performance
Hardware P-state = Out of Band Mode
XPT Prefetch = Disable
Stale AtoS = Disable
LLC dead line alloc = Enable
SDDC Plus One = Disable
ADDDC Sparing = Disable
Patrol Scrub = Disable
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcede8f2999c33d61f64985e45859ea9
running on linux-1g5v Mon Apr 15 22:36:52 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) Platinum 8280 CPU @ 2.70GHz
  2 "physical id"s (chips)
  56 "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 : 28
siblings : 28
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 56
On-line CPU(s) list: 0-55
Thread(s) per core: 1
Core(s) per socket: 28
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8280 CPU @ 2.70GHz
Stepping: 7

(Continued on next page)
Platform Notes (Continued)

CPU MHz: 2700.000
BogoMIPS: 5400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 39424K
NUMA node0 CPU(s): 0–27
NUMA node1 CPU(s): 28–55
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts aeni mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc arch_perfmon pebs bts rep_good noapic xtopology nonstop_tsc cpuid
aperfmperf pni pclmulqdq dtes64 ksm tm2 ssse3 sdbg fma cx16 xtpr pdcm
pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c
rdx cld lahflm abm 3dnowprefetch cpuid_fault epb cat_13 cdcp_13 invpcid_single
intel_pipn sbbd mba ibrs ibpb tpr_shadow vnmi flexpriority ept vpid fsgsbase
tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mxpx rdtsd avx512f avx512dq
rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsaves
xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln
pts hwp_epp pku ospke avx512_vnni flush_l1d arch_capabilities

From /proc/cpuinfo cache data
  cache size: 39424 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 18 19 20 21 22 23 24 25 26 27
  node 0 size: 191986 MB
  node 0 free: 190592 MB
  node 1 cpus: 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 54 55
  node 1 size: 193321 MB
  node 1 free: 186419 MB
  node distances:
  node 0: 10 21
  node 1: 21 10

From /proc/meminfo
  MemTotal: 394555716 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
  SUSE Linux Enterprise Server 12 SP4

(Continued on next page)
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Software Availability: Dec-2018

Platform Notes (Continued)

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:
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 15 17:26

SPEC is set to: /home/cpu2017
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/sda2 btrfs 1.6T 86G 1.5T 6% /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. 3.0c 03/27/2019
Memory:
    4x NO DIMM NO DIMM
    12x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2934

(End of data from sysinfo program)
Supermicro
SuperWorkstation 7049GP-TRT (X11DPG-QT , Intel Xeon Platinum 8280)

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Compiler Version Notes

==============================================================================
CC  619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
==============================================================================

FC  607.cactuBSSN_s(base, peak)
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.

==============================================================================
FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base, peak)
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.1.144 Build 20181018
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==============================================================================
FC  603.bwaves_s(peak) 649.fotonik3d_s(peak)
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.1.144 Build 20181018
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==============================================================================
CC  621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
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(Continued on next page)
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SuperWorkstation 7049GP-TRT (X11DPG-QT, Intel Xeon Platinum 8280)

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<tr>
<td>001176</td>
<td>Supermicro</td>
<td>Supermicro</td>
<td>149</td>
<td>150</td>
</tr>
</tbody>
</table>

### Compiler Version Notes (Continued)

---

CC 621.wrf_s(peak) 628.pop2_s(peak)

---

### 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

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Supermicro
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Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-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=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

Peak 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

Peak Portability Flags

Same as Base Portability Flags
**SPEC CPU2017 Floating Point Speed Result**

**Supermicro**

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**Tested by:** Supermicro  

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**Hardware Availability:** Apr-2019  
**Software Availability:** Dec-2018

---

**Peak Optimization Flags**

C benchmarks:
- `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only`  
- `-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP`

Fortran benchmarks:

603.bwaves_s: `-prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP`  
- `-DSPEC_OPENMP -O2 -xCORE-AVX2 -qopt-prefetch -ipo -O3`  
- `-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=4`  
- `-qopenmp -nostandard-realloc-lhs`

649.fotonik3d_s: Same as 603.bwaves_s

654.roms_s: `-DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div`  
- `-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4`  
- `-qopenmp -nostandard-realloc-lhs`

Benchmarks using both Fortran and C:

621.wrf_s: `-prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2`  
- `-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div`  
- `-qopt-mem-layout-trans=4 -DSPEC_SUPPRESS_OPENMP -qopenmp`  
- `-DSPEC_OPENMP -nostandard-realloc-lhs`

627.cam4_s: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch`  
- `-ffinite-math-only -qopt-mem-layout-trans=4 -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:

- [Supermicro-Platform-Settings-V1.2-CLX-revC.html](http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-CLX-revC.html)

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

- [Supermicro-Platform-Settings-V1.2-CLX-revC.xml](http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-CLX-revC.xml)
| Supermicro                                      | SPECspeed2017_fp_base = 149 |
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| CPU2017 License: 001176                        | Test Date:                  |
| Test Sponsor: Supermicro                       | Hardware Availability: Apr-2019 |
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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 2019-04-15 10:36:51-0400.