# SPEC® CPU2017 Floating Point Speed Result

**ASUSTeK Computer Inc.**

ASUS RS720Q-E9(Z11PH-D12) Server System
(3.40 GHz, Intel Xeon Gold 6128)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
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<tr>
<td>76.6</td>
<td>77.3</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9016

**Test Sponsor:** ASUSTeK Computer Inc.

**Tested by:** ASUSTeK Computer Inc.

**Test Date:** May-2018

**Hardware Availability:** Mar-2018

**Software Availability:** Mar-2018

## Threads

<table>
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<tr>
<th>Benchmark</th>
<th>Threads</th>
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<td>607.cactuBSSN_s</td>
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<td>36.9</td>
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<td>619.lbm_s</td>
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<td>73.7</td>
<td></td>
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<td>75.8</td>
<td></td>
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<td>51.9</td>
<td></td>
</tr>
<tr>
<td>644.nab_s</td>
<td>24</td>
<td>113</td>
<td></td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>24</td>
<td>70.8</td>
<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>24</td>
<td>78.3</td>
<td></td>
</tr>
</tbody>
</table>

## Hardware

**CPU Name:** Intel Xeon Gold 6128

**Max MHz.:** 3700

**Nominal:** 3400

**Enabled:** 12 cores, 2 chips, 2 threads/core

**Orderable:** 1, 2 chip(s)

**Cache L1:** 32 KB I + 32 KB D on chip per core

**L2:** 1 MB I+D on chip per core

**L3:** 19.25 MB I+D on chip per chip

**Other:** None

**Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R)

**Storage:** 1 x 240 GB SATA SSD

**Other:** None

## Software

**OS:** SUSE Linux Enterprise Server 12 (x86_64) SP3

**Kernel:** 4.4.120-94.17-default

**Compiler:** C/C++: Version 18.0.0.128 of Intel C/C++

**Compiler for Linux:** Fortran: Version 18.0.0.128 of Intel Fortran

**Compiler for Linux:**

**Parallel:** Yes

**Firmware:** Version 0905 released Mar-2018

**File System:** btrfs

**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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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>179</td>
<td>175</td>
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<td>627.cam4_s</td>
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<td>52.6</td>
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<td>71.7</td>
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<tr>
<td>654.roms_s</td>
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<td>201</td>
<td>78.4</td>
<td>201</td>
<td>201</td>
<td>78.3</td>
</tr>
</tbody>
</table>

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"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.4
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 Configuration:
SNC = Disabled
IMC interleaving = AUTO

(Continued on next page)
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Platform Notes (Continued)

Patrol Scrub = Disabled
VT-d = Disabled
HyperThreading = Enabled
Sysinfo program /spec2017/bin/sysinfo
Rev: r5979 of 2017-06-14 96c45e4568ad54c135fd618b5c091c0f
running on linux-pmm5 Thu May 31 12:07:04 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 6128 CPU @ 3.40GHz
  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 : 6
siblings : 12
physical 0: cores 0 6 9 10 11 13
physical 1: cores 0 6 9 10 11 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: 2
Core(s) per socket: 6
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6128 CPU @ 3.40GHz
Stepping: 4
CPU MHz: 3401.000
CPU max MHz: 3401.0000
CPU min MHz: 1200.0000
BogoMIPS: 7004.25
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 19712K
NUMA node0 CPU(s): 0-5,12-17

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**Platform Notes (Continued)**

NUMA node1 CPU(s): 6-11,18-23

Flags:

```plaintext
fpu vme de pse tsc msr pae mce 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 art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpref 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 rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts
dtherm intel_pt rsb_ctxsw spec_ctrl stibp retpoline kaiser tpr_shadow vmmi
flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
cqm mxp avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl
xsaves opt xsave xgetbv1 cqm_llc cqm_occup_llc pkp ospke
```

```
From /proc/cpuinfo
  cache size: 19712 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 12 13 14 15 16 17
  node 0 size: 95299 MB
  node 0 free: 94980 MB
  node 1 cpus: 6 7 8 9 10 11 18 19 20 21 22 23
  node 1 size: 96749 MB
  node 1 free: 96333 MB
  node distances:
  node 0 1
  0: 10 21
  1: 21 10
```

```
From /proc/meminfo
  MemTotal: 196658244 KB
  HugePages_Total: 0
  Hugepagesize: 2048 KB
```

```
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"
```

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Platform Notes (Continued)

ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
Linux linux-pmm5 4.4.120-94.17-default #1 SMP Wed Mar 14 17:23:00 UTC 2018 (cf3a7bb)
x86_64 x86_64 x86_64 GNU/Linux

run-level 3 May 31 12:06

SPEC is set to: /spec2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 btrfs 203G 27G 175G 13% /

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. 0905 03/19/2018
Memory:
12x Micron 18ASF2G72PDZ-2G6D1 16 GB 2 rank 2666

(End of data from sysinfo program)

Compiler Version Notes

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

icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

==============================================================================
FC 607.cactuBSSN_s(base)
==============================================================================

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

(Continued on next page)
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**Compiler Version Notes (Continued)**

ifort (IFORT) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

==============================================================================
FC  607.cactuBSSN_s(peak)
==============================================================================

icpc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811  
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ifort (IFORT) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

==============================================================================
FC  603.bwaves_s(base)  649.fotonik3d_s(base)  654.roms_s(base)
==============================================================================

ifort (IFORT) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

==============================================================================
FC  603.bwaves_s(peak)  649.fotonik3d_s(peak)  654.roms_s(peak)
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ifort (IFORT) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

==============================================================================
CC  621.wrf_s(base)  627.cam4_s(base, peak)  628.pop2_s(base)
==============================================================================

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icc (ICC) 18.0.0 20170811  
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==============================================================================
CC  621.wrf_s(peak)  628.pop2_s(peak)
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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:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs -align array32byte

Benchmarks using both Fortran and C:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -align array32byte

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### Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:
- `xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`  
  `-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP` 
  `-nostandard-realloc-lhs -align array32byte`

### 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

### Peak Optimization Flags

**C benchmarks:**

- `619.libm_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`

- `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`: Same as `638.imagick_s`

**Fortran benchmarks:**

- `-prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP`  
(Continued on next page)
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Peak Optimization Flags (Continued)

Fortran benchmarks (continued):
-DSPEC_OPENMP -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3
-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs -align array32byte

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 -align array32byte

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 -align array32byte

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:
-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
-align array32byte

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/Intel-ic18.0-official-linux64.2017-12-21.xml

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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 v1.0.2 on 2018-05-31 00:07:04-0400.
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