



# SPEC® CPU2017 Floating Point Speed Result

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## ASUSTeK Computer Inc.

ASUS RS720Q-E9(Z11PH-D12) Server System  
(2.20 GHz, Intel Xeon Silver 4114)

SPECspeed2017\_fp\_base = 75.7

SPECspeed2017\_fp\_peak = 76.5

CPU2017 License: 9016

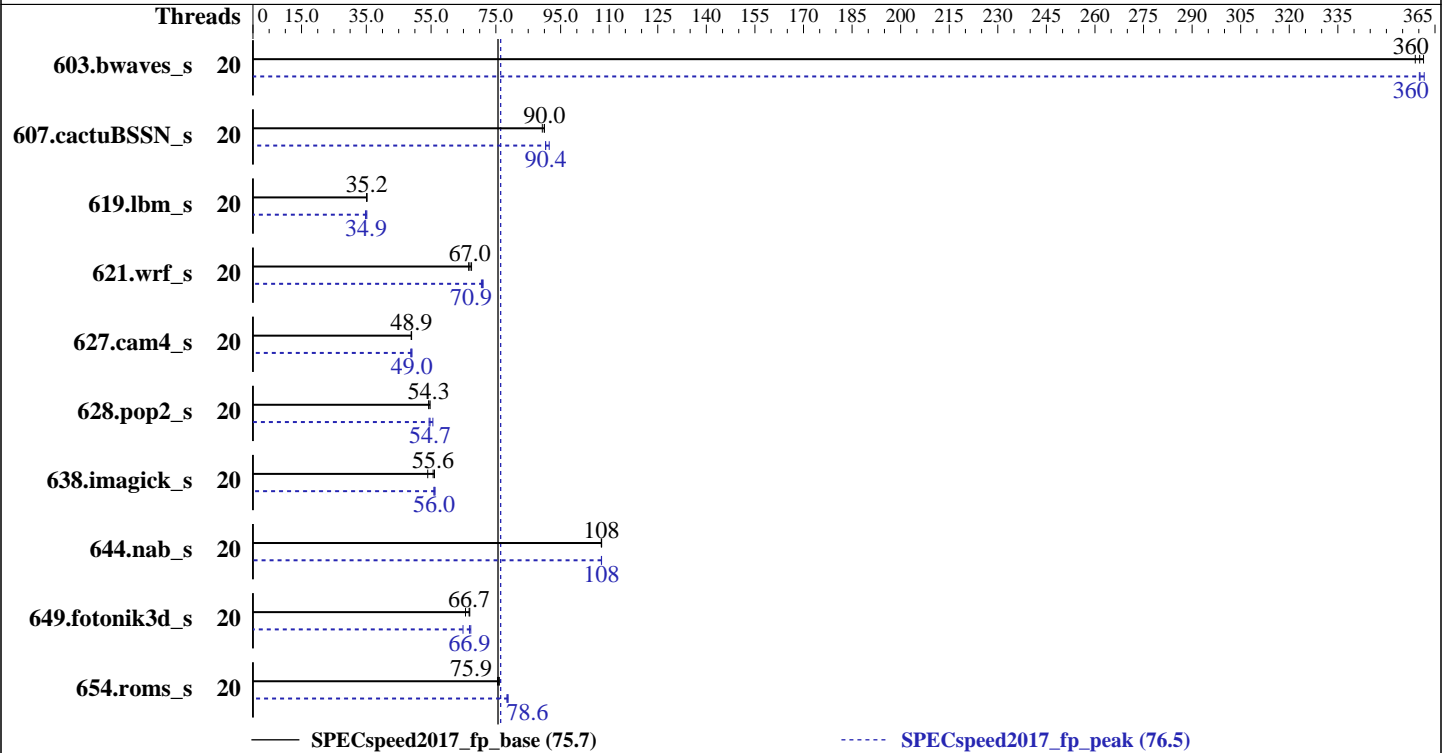
Test Sponsor: ASUSTeK Computer Inc.

Tested by: ASUSTeK Computer Inc.

Test Date: Aug-2018

Hardware Availability: Mar-2018

Software Availability: Mar-2018



### Hardware

CPU Name: Intel Xeon Silver 4114  
 Max MHz.: 3000  
 Nominal: 2200  
 Enabled: 20 cores, 2 chips  
 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: 13.75 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 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 18.0.3.222 of Intel C/C++ Compiler for Linux;  
 Fortran: Version 18.0.3.222 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

Benchmark	Base						Peak							
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	20	<b>164</b>	<b>360</b>	164	359	163	361	20	<b>164</b>	<b>360</b>	163	362	164	360
607.cactuBSSN_s	20	187	89.4	185	90.0	<b>185</b>	<b>90.0</b>	20	<b>184</b>	<b>90.4</b>	182	91.5	185	90.3
619.lbm_s	20	149	35.2	149	35.1	<b>149</b>	<b>35.2</b>	20	151	34.7	149	35.2	<b>150</b>	<b>34.9</b>
621.wrf_s	20	199	66.6	<b>197</b>	<b>67.0</b>	196	67.5	20	<b>187</b>	<b>70.9</b>	187	70.5	186	71.1
627.cam4_s	20	181	48.9	181	49.0	<b>181</b>	<b>48.9</b>	20	182	48.7	181	49.0	<b>181</b>	<b>49.0</b>
628.pop2_s	20	219	54.3	217	54.7	<b>219</b>	<b>54.3</b>	20	<b>217</b>	<b>54.7</b>	218	54.4	214	55.6
638.imagick_s	20	257	56.1	267	54.0	<b>259</b>	<b>55.6</b>	20	257	56.2	258	55.9	<b>258</b>	<b>56.0</b>
644.nab_s	20	162	108	162	108	<b>162</b>	<b>108</b>	20	<b>162</b>	<b>108</b>	162	108	162	108
649.fotonik3d_s	20	136	67.0	<b>137</b>	<b>66.7</b>	139	65.6	20	<b>136</b>	<b>66.9</b>	141	64.9	136	67.3
654.roms_s	20	<b>208</b>	<b>75.9</b>	207	76.1	209	75.5	20	201	78.4	<b>200</b>	<b>78.6</b>	200	78.8

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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 = "/spec2017/lib/ia32:/spec2017/lib/intel64:/spec2017/je5.0.1-32:/spec2017/je5.0.1-64"

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

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### Platform Notes (Continued)

Patrol Scrub = Disabled

VT-d = Disabled

HyperThreading = Disabled

Sysinfo program /spec2017/bin/sysinfo

Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9

running on linux-pmm5 Fri Aug 10 21:55:38 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)

20 "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 : 10

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): 20

On-line CPU(s) list: 0-19

Thread(s) per core: 1

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: 2201.000

CPU max MHz: 2201.0000

CPU min MHz: 800.0000

BogoMIPS: 4532.20

Virtualization: VT-x

L1d cache: 32K

L1i cache: 32K

L2 cache: 1024K

L3 cache: 14080K

NUMA node0 CPU(s): 0-9

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### Platform Notes (Continued)

```

NUMA node1 CPU(s):      10-19
Flags:                  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
aperfmpperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 sse3 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 vnmi
flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc 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
node 0 size: 192067 MB
node 0 free: 188389 MB
node 1 cpus: 10 11 12 13 14 15 16 17 18 19
node 1 size: 193517 MB
node 1 free: 189395 MB
node distances:
node  0  1
  0:  10  21
  1:  21  10

```

From /proc/meminfo

```

MemTotal:      394839504 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
```

Kernel self-reported vulnerability status:

```
CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB
```

run-level 3 Aug 10 15:44

SPEC is set to: /spec2017

```
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 btrfs 203G 121G 82G 60% /
```

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 Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400

(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) 18.0.3 20180410

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

```
=====  
CC 619.lbm_s(peak)  
=====
```

icc (ICC) 18.0.3 20180410

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### Compiler Version Notes (Continued)

FC 607.cactuBSSN\_s(base)

```
-----
icpc (ICC) 18.0.3 20180410
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.3 20180410
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.3 20180410
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
-----
```

=====  
FC 607.cactuBSSN\_s(peak)

```
-----
icpc (ICC) 18.0.3 20180410
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.3 20180410
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.3 20180410
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
-----
```

=====  
FC 603.bwaves\_s(base) 649.fotonik3d\_s(base) 654.roms\_s(base)

```
-----
ifort (IFORT) 18.0.3 20180410
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
-----
```

=====  
FC 603.bwaves\_s(peak) 649.fotonik3d\_s(peak) 654.roms\_s(peak)

```
-----
ifort (IFORT) 18.0.3 20180410
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) 18.0.3 20180410
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.3 20180410
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
-----
```

=====  
CC 621.wrf\_s(peak) 628.pop2\_s(peak)

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## Compiler Version Notes (Continued)

ifort (IFORT) 18.0.3 20180410  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
icc (ICC) 18.0.3 20180410  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
-----

## 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

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## Base Optimization Flags (Continued)

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
```

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.lbm_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
```

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## Peak Optimization Flags (Continued)

619.lbm\_s (continued):

-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

-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

<http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-z11-V2.0-revD.html>

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.html>

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

<http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-z11-V2.0-revD.xml>

<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](mailto:info@spec.org).

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