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

| Thread | 0 | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 240 | 255 | 270 | 285 | 300 | 315 | 330 | 345 | 360 |
|--------|---|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 603.bwaves_s |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 607.cactuBSSN_s |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 619.lbm_s |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 621.wrf_s |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 627.cam4_s |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 628.pop2_s |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 638.imagick_s |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 644.nab_s |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 649.fotonik3d_s |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 654.roms_s |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

--- SPECspeed2017_fp_base (75.7) ---
--- SPECspeed2017_fp_peak (76.5) ---

**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++
Fortran: Version 18.0.3.222 of Intel Fortran
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
SPEC CPU2017 Floating Point Speed Result

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Results Table

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<th>Ratio</th>
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<td>108</td>
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<td>649.fotonik3d_s</td>
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<td>137</td>
<td>66.7</td>
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<td>120</td>
<td>108</td>
<td>120</td>
<td>108</td>
<td>120</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)
## Platform Notes (Continued)

- Patrol Scrub = Disabled
- VT-d = Disabled
- HyperThreading = Disabled

Sysinfo program /spec2017/bin/sysinfo

Rev: r5974 of 2018-05-19 9bcd8f2999c33d61f64985e45859ea9
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

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

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Software Availability: Mar-2018

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 ccf flush dts acp1 mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtsscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xptr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer nonstop tsc
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 rdsese adx smap clflushopt clwb avx512cd avx512bw avx512vl
xsaveopt xsave vgetbv1 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"

(Continued on next page)
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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)
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icc (ICC) 18.0.3 20180410
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==============================================================================

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

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SPECspeed2017_fp_base = 75.7
SPECspeed2017_fp_peak = 76.5

---

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

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

### ASUSTeK Computer Inc.
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- **Test Date**: Aug-2018
- **Hardware Availability**: Mar-2018
- **Tested by**: ASUSTeK Computer Inc.
- **Software Availability**: Mar-2018

### 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.cactusBSSN_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`

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

(Continued on next page)
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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
-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++:
-pref-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 v1.0.5 on 2018-08-10 09:55:37-0400.
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