## SPEC CPU®2017 Floating Point Speed Result

**ASUSTeK Computer Inc.**

ASUS RS300-E10(P11C-C/4L) Server System  
(3.40 GHz, Intel Xeon E-2226G)

<table>
<thead>
<tr>
<th>Software</th>
<th>SPECspeed®2017_fp_base = 33.2</th>
<th>SPECspeed®2017_fp_peak = 33.5</th>
</tr>
</thead>
</table>

**CPU2017 License:** 9016  
**Test Sponsor:** ASUSTeK Computer Inc.  
**Tested by:** ASUSTeK Computer Inc.  
**Test Date:** Jan-2020  
**Hardware Availability:** Oct-2019  
**Software Availability:** May-2019

### Hardware

<table>
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<tr>
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</tr>
<tr>
<td>621.wrf_s</td>
<td>6</td>
<td>26.3</td>
</tr>
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<td>627.cam4_s</td>
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<td>638.imagick_s</td>
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<td>40.0</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>6</td>
<td>57.6</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
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### SPEC Speed

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</tr>
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<td>6</td>
<td>17.0</td>
</tr>
</tbody>
</table>

### Software

**CPU Name:** Intel Xeon E-2226G  
**Max MHz:** 4700  
**Nominal:** 3400  
**Enabled:** 6 cores, 1 chip  
**Orderable:** 1 chip  
**Cache L1:** 32 KB I + 32 KB D on chip per core  
**L2:** 256 KB I+D on chip per core  
**L3:** 12 MB I+D on chip per chip  
**Other:** None  
**Memory:** 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)  
**Storage:** 1 x 1 TB SATA SSD  
**Other:** None

**OS:** SUSE Linux Enterprise Server 15  
**Kernel:** 4.12.14-150.17-default  
**Compiler:** C/C++: Version 19.0.4.227 of Intel C/C++; Compiler Build 20190416 for Linux; Fortran: Version 19.0.4.227 of Intel Fortran; Compiler Build 20190416 for Linux  
**Parallel:** Yes  
**Firmware:** Version 3102 released Oct-2019  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 64-bit  
**Other:** None  
**Power Management:** Prefer performance at the cost of additional power usage.
ASUSTeK Computer Inc.
ASUS RS300-E10(P11C-C/4L) Server System
(3.40 GHz, Intel Xeon E-2226G)

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
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Results Table

<table>
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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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</tr>
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<tr>
<td>603.bwaves_s</td>
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<td>727</td>
<td>81.2</td>
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<td>300</td>
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<td>55.5</td>
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<tr>
<td>619.lbm_s</td>
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<td>16.3</td>
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<td>37.9</td>
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<td>644.nab_s</td>
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<td>57.6</td>
<td>303</td>
<td>57.6</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
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<td>524</td>
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</tr>
<tr>
<td>654.roms_s</td>
<td>6</td>
<td>923</td>
<td>17.1</td>
<td>916</td>
<td>17.2</td>
</tr>
</tbody>
</table>

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"
OS set to performance mode via cpupower frequency-set -g performance

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/spec2017_110/lib/intel64"
OMP_STACKSIZE = "192M"

General Notes

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.
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Hardware Availability: Oct-2019
Software Availability: May-2019

BIOS Configuration:
VT-d = Disabled
AES = Disabled

Sysinfo program /spec2017_110/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7eddb1e6e46a485a0011
running on linux-zeo2 Fri Jan 3 21:16:36 2020

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) E-2226G CPU @ 3.40GHz
1 "physical id"s (chips)
6 "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 : 6
physical 0: cores 0 1 2 3 4 5

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 6
On-line CPU(s) list: 0-5
Thread(s) per core: 1
Core(s) per socket: 6
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 158
Model name: Intel(R) Xeon(R) E-2226G CPU @ 3.40GHz
Stepping: 10
CPU MHz: 3400.000
CPU max MHz: 4700.0000
CPU min MHz: 800.0000
BogoMIPS: 6816.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 12288K
NUMA node0 CPU(s): 0-5

(Continued on next page)
### Platform Notes (Continued)

Flags:                  fpu vme de pse tsc msr pae mca cmov
                        pat pse36 clflush dts acpi 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 cpuid
                        aperf perf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
                        sdbg fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer
                        xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invpcid_single pti
                        ssbd ibrs ibpb stibp tpr_shadow vnumi flexpriority ept vpid fsgsbase tsc_adjust bmi1
                        hlxe smep bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt intel_pt xsaveopt
                        xsavex xgetbv1 xsaves dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp
                        md_clear flush_l1d

/proc/cpuinfo cache data cache size: 12288 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
g physical chip.
   available: 1 nodes (0)
   node 0 cpus: 0 1 2 3 4 5
   node 0 size: 64045 MB
   node 0 free: 56485 MB
   node distances:
   node 0
   0: 10

From /proc/meminfo
   MemTotal: 65582224 kB
   HugePages_Total: 0
   Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
    os-release:
       NAME="SLES"
       VERSION="15"
       VERSION_ID="15"
       PRETTY_NAME="SUSE Linux Enterprise Server 15"
       ID="sles"
       ID_LIKE="suse"
       ANSI_COLOR="0;32"
       CPE_NAME="cpe:/o:suse:sles:15"

uname -a:
   Linux linux-zeo2 4.12.14-150.17-default #1 SMP Thu May 2 15:15:46 UTC 2019 (bf13fb8)
   x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
   CVE-2018-3620 (L1 Terminal Fault): Mitigation: PTE Inversion; VMX: conditional

(Continued on next page)
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Platform Notes (Continued)

Microarchitectural Data Sampling: cache flushes, SMT disabled
CVE-2017-5754 (Meltdown): Mitigation: Clear CPU buffers; SMT disabled
CVE-2018-3639 (Speculative Store Bypass): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5715 (Spectre variant 2): Mitigation: __user pointer sanitization

run-level 3 Jan 3 17:09

SPEC is set to: /spec2017_110
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda4      xfs   929G   32G  897G   4% /

From /sys/devices/virtual/dmi/id
BIOS: American Megatrends Inc. 3102 10/04/2019
Vendor: ASUSTeK COMPUTER INC.
Product: P11C-C Series
Product Family: Server
Serial: System Serial Number

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.

Memory:
4x Samsung M391A2K43BB1-CTD 16 GB 2 rank 2667, configured at 2666

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C               | 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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

C++, C, Fortran | 607.cactuBSSN_s(base, peak)

(Continued on next page)
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Hardware Availability: Oct-2019  
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**Compiler Version Notes (Continued)**

Intel(R) C++  
Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Intel(R) C  
Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Intel(R) Fortran  
Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------

Fortran  
| 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)  
| 654.roms_s(base, peak)

------------------------------------------------------------------------------

Intel(R) Fortran  
Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------

Fortran, C  
| 621.wrf_s(base, peak) 627.cam4_s(base, peak)  
| 628.pop2_s(base, peak)

------------------------------------------------------------------------------

Intel(R) Fortran  
Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Intel(R) C  
Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 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`
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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-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

(Continued on next page)
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Peak Compiler Invocation (Continued)

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:
-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

(Continued on next page)
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Peak Optimization Flags (Continued)

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

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:

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