## SPEC CPU®2017 Floating Point Speed Result

### ASUSTeK Computer Inc.
ASUS RS300-E10(P11C-C/4L) Server System
(3.60 GHz, Intel Xeon E-2234)

<table>
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<tr>
<th>SPECspeed®2017_fp_base</th>
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**CPU2017 License:** 9016  
**Test Sponsor:** ASUSTeK Computer Inc.  
**Tested by:** ASUSTeK Computer Inc.  
**Test Date:** Dec-2019  
**Hardware Availability:** Oct-2019  
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<td>35.9</td>
</tr>
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<td>619.lbm_s</td>
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<td>22.4</td>
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<tr>
<td>621.wrf_s</td>
<td>8</td>
<td>22.4</td>
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<tr>
<td>627.cam4_s</td>
<td>8</td>
<td>22.4</td>
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<td>628.pop2_s</td>
<td>8</td>
<td>50.9</td>
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<tr>
<td>638.imagick_s</td>
<td>8</td>
<td>14.3</td>
</tr>
<tr>
<td>644.nab_s</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>8</td>
<td>14.3</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>8</td>
<td>14.3</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon E-2234  
- **Max MHz:** 4800  
- **Nominal:** 3600  
- **Enabled:** 4 cores, 1 chip, 2 threads/core  
- **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:** 8 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  
- **Power Management:** Prefer performance at the cost of additional power usage.

### Software

- **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

---

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Standard Performance Evaluation Corporation (info@spec.org)  
https://www.spec.org/
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Results Table

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<tr>
<th>Benchmark</th>
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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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</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
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<tr>
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<td>24.6</td>
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<td>643</td>
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<td>644.nab_s</td>
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<td>17.3</td>
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<tr>
<td>654.roms_s</td>
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<td>14.3</td>
<td>1100</td>
<td>14.3</td>
<td>1103</td>
<td>14.3</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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Tested by: ASUSTeK Computer Inc.
Hardware Availability: Oct-2019
Software Availability: May-2019

Platform Notes

BIOS Configuration:
VT-d = Disabled
AES = Disabled

Sysinfo program /spec2017_110/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed6e646a485a0011
running on linux-zeo2 Sat Dec 28 23:04:36 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) E-2234 CPU @ 3.60GHz
 1 "physical id"s (chips)
 8 "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 : 4
siblings : 8
physical 0: cores 0 1 2 3

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 8
On-line CPU(s) list: 0-7
Thread(s) per core: 2
Core(s) per socket: 4
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 158
Model name: Intel(R) Xeon(R) E-2234 CPU @ 3.60GHz
Stepping: 10
CPU MHz: 3600.000
CPU max MHz: 4800.0000
CPU min MHz: 800.0000
BogoMIPS: 7200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 8192K
NUMA node0 CPU(s): 0-7

(Continued on next page)
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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
             perfmon
             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  abtm  3dnowprefetch  cpuid_fault  epb  invpcid_single  pti
             ssbd  ibrs  ibpb  stibp  tpr_shadow  vmvi  flexpriority  ept  fsgsbase  tsc_adjust
             bmi1  hle  smep  bmi2  erms  invpcid  rdmsk  rdtscp  adx  smap  clflushopt  intel_pt  xsaveopt
             xsavec  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: 8192 KB

From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
physical chip.
  available: 1 nodes (0)
  node 0 cpus: 0 1 2 3 4 5 6 7
  node 0 size: 64045 MB
  node 0 free: 61383 MB
  node distances:
    node 0
    0:  10

From /proc/meminfo
  MemTotal:       65582808 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

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Platform Notes (Continued)

Microarchitectural Data Sampling: cache flushes, SMT vulnerable
CVE-2017-5754 (Meltdown): Mitigation: Clear CPU buffers; SMT vulnerable
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 Dec 27 17:18

SPEC is set to: /spec2017_110

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

==============================================================================
<table>
<thead>
<tr>
<th>C</th>
<th>619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)</th>
</tr>
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<tr>
<td>Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416</td>
<td></td>
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<tr>
<td>Copyright (C) 1985-2019 Intel Corporation. All rights reserved.</td>
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<tr>
<td>C++, C, Fortran</td>
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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.

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

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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
```

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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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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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