**SPEC CPU®2017 Floating Point Speed Result**

**ASUSTeK Computer Inc.**

ASUS RS700-E10(Z12PP-D32) Server System
(3.00 GHz, Intel Xeon Gold 5317)

| SPECspeed®2017_fp_base = 144 | SPECspeed®2017_fp_peak = 145 |

| CPU2017 License: | 9016 |
| Test Sponsor: | ASUSTeK Computer Inc. |
| Tested by: | ASUSTeK Computer Inc. |
| Test Date: | Oct-2021 |
| Hardware Availability: | May-2021 |
| Software Availability: | Mar-2021 |

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017 fp_base (144)</th>
<th>SPECspeed®2017 fp_peak (145)</th>
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<tr>
<td>603.bwaves_s</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<td>112</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>24</td>
<td>130</td>
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<tr>
<td>621.wrf_s</td>
<td>24</td>
<td>85.7</td>
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<td>627.cam4_s</td>
<td>24</td>
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<tr>
<td>628.pop2_s</td>
<td>24</td>
<td>127</td>
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<tr>
<td>638.imagick_s</td>
<td>24</td>
<td>208</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>24</td>
<td>104</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>24</td>
<td>104</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>24</td>
<td>136</td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Gold 5317
- **Max MHz:** 3600
- **Nominal:** 3000
- **Enabled:** 24 cores, 2 chips
- **Orderable:** 1, 2 chip(s)
- **Cache L1:** 32 KB I + 48 KB D on chip per core
- **L2:** 1.25 MB I+D on chip per core
- **L3:** 18 MB I+D on chip per chip
- **Other:** None
- **Memory:** 1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R, running at 2933)
- **Storage:** 1 x 4 TB PCIE NVME SSD
- **Other:** None

**Software**

- **OS:** Red Hat Enterprise Linux release 8.3 (Ootpa)
  4.18.0-240.22.1.el8_3.x86_64
- **Compiler:**
  C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux;
  Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux;
- **Parallel:** Yes
- **Firmware:** Version 0504 released May-2021
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** jemalloc memory allocator V5.0.1
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage.
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## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<tbody>
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<tr>
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<td><strong>92.9</strong></td>
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<td>83.9</td>
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</tr>
</tbody>
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**SPECspeed®2017_fp_base = 144**  
**SPECspeed®2017_fp_peak = 145**

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 = "/home/cpu118/lib/intel64:/home/cpu118/je5.0.1-64"  
MALLOCONF = "retain:true"  
OMP_STACKSIZE = "192M"

## General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM  
memory using Redhat Enterprise Linux 8.0  
Transparent Huge Pages enabled by default  
Prior to runcpu invocation  
Filesystme page cache synced and cleared with:  
sync; echo 3>>/proc/sys/vm/drop_caches  
NA: 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.  
jemalloc, a general purpose malloc implementation

(Continued on next page)
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**Test Sponsor:** ASUSTeK Computer Inc.  
**Hardware Availability:** May-2021  
**Tested by:** ASUSTeK Computer Inc.  
**Software Availability:** Mar-2021  

**Test Date:** Oct-2021  
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**Software Availability:** Mar-2021

### General Notes (Continued)

built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5  

### Platform Notes

**BIOS Configuration:**
- VT-d = Disabled
- Patrol Scrub = Disabled
- Hyper-Threading = Disable
- Engine Boost = Aggressive
- SR-IOV Support = Disabled

**BMC Configuration:**
- Fan mode = Full speed mode

```
Sysinfo program /home/cpu118/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e6acac64d
```

**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 5317 CPU @ 3.00GHz
  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 : 12
  siblings : 12
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11
  physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11
```

```
From lscpu from util-linux 2.32.1:
  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: 1
  Core(s) per socket: 12
  Socket(s): 2
  NUMA node(s): 2
  Vendor ID: GenuineIntel
  CPU family: 6
  Model: 106
```

(Continued on next page)
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Hardware Availability: May-2021
Software Availability: Mar-2021

Platform Notes (Continued)

- Model name: Intel(R) Xeon(R) Gold 5317 CPU @ 3.00GHz
- Stepping: 6
- CPU MHz: 1086.933
- CPU max MHz: 3600.0000
- CPU min MHz: 800.0000
- BogoMIPS: 6000.00
- Virtualization: VT-x
- L1d cache: 48K
- L1i cache: 32K
- L2 cache: 1280K
- L3 cache: 18432K
- NUMA node0 CPU(s): 0-11
- NUMA node1 CPU(s): 12-23

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 cpuid
- aperfmpref 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 cpuid_fault epb cat_l3 invpcid_single
- intel_pinn ssbd mba ibrs ibpb stibp ibrs Enhanced tpr_shadow vmx flexpriority ept
- vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3ms invpcid cqm rdt_a
- avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni
- avx512bw avx512vl xsaveopt xsavec xsavecs xsavec llvm cqm_llc cqm_occup_llc cqm_mbm_total
- cqm_mbm_local split_lock_detect wbnoiwv dtherm ida arat pln pts hwp hwp_act_window
- hwp epp hwp_pkg_req avx512vbmi umip pku ospke avx512_vbmi2 gfn vaes vpmulqdq
- avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_lld
- arch_capabilities

/proc/cpuinfo cache data
- cache size : 18432 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 10 11
- node 0 size: 506967 MB
- node 0 free: 514034 MB
- node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23
- node 1 size: 507087 MB
- node 1 free: 509162 MB

From /proc/meminfo
- MemTotal: 1056485700 kB

(Continued on next page)
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Platform Notes (Continued)

HugePages_Total:       0
Hugepagesize:       2048 kB

/sbin/tuned-adm active
Current active profile: throughput-performance

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance

From /etc/*release*/etc/*version*
os-release:
NAME="Red Hat Enterprise Linux"
VERSION="8.3 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.3"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:
Linux localhost.localdomain 4.18.0-240.22.1.el8_3.x86_64 #1 SMP Thu Mar 25 14:36:04 EDT 2021 x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swaps barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected
un-level 3 Oct 6 11:42

SPEC is set to: /home/cpu118

(Continued on next page)
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Platform Notes (Continued)

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/mapper/rhel-home</td>
<td>xfs</td>
<td>3.6T</td>
<td>36G</td>
<td>3.6T</td>
<td>1%</td>
<td>/home</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id
Vendor: ASUSTeK COMPUTER INC.
Product: RS700-E10-RS12U
Product Family: Server

Additional information from dmidecode 3.2 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:
- 16x NO DIMM NO DIMM
- 16x Samsung M393A8G40AB2-CWE 64 GB 2 rank 3200, configured at 2933

BIOS:
- BIOS Vendor: American Megatrends Inc.
- BIOS Version: 0504
- BIOS Date: 05/26/2021
- BIOS Revision: 5.4

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base)
==============================================================================
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==============================================================================
C | 644.nab_s(peak)
==============================================================================
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==============================================================================
C | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base)
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Compiler Version Notes (Continued)

Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

C               | 644.nab_s(peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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

Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
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Fortran         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
| 654.roms_s(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
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Fortran, C      | 621.wrf_s(base, peak) 627.cam4_s(base, peak)
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Compiler Version Notes (Continued)

Base Compiler Invocation

C benchmarks:
icc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

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:
-m64 -std=c11 -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-mbranches-within-32B-boundaries

Fortran benchmarks:
-m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-nostandard-realloc-lhs -mbranches-within-32B-boundaries

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Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using both Fortran and C:
-m64 -std=c11 -Wl,-z,muldefs -xcORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
-m64 -std=c11 -Wl,-z,muldefs -xcORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Peak Compiler Invocation

C benchmarks (except as noted below):
icc
644.nab_s: icx

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

(Continued on next page)
SPEC CPU®2017 Floating Point Speed Result

ASUSTeK Computer Inc.

ASUS RS700-E10(Z12PP-D32) Server System (3.00 GHz, Intel Xeon Gold 5317)

SPECspeed®2017_fp_base = 144
SPECspeed®2017_fp_peak = 145

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.
Hardware Availability: May-2021
Test Date: Oct-2021
Software Availability: Mar-2021

Peak Optimization Flags (Continued)

619.lbm_s: basepeak = yes
638.imagick_s: basepeak = yes
644.nab_s: -m64 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -ffast-math
 -flto -mfpmath=sse -funroll-loops -fiopenmp
 -DSPEC_OPENMP -qopt-mem-layout-trans=4
 -fimf-accuracy-bits=14:sqrt
 -mbranches-within-32B-boundaries
 -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:
603.bwaves_s: -m64 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
 -DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -ipo -xCORE-AVX2
 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
 -qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs
 -mbranches-within-32B-boundaries
 -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
649.fotonik3d_s: Same as 603.bwaves_s
654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:
621.wrf_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1)
 -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div
 -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4
 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
 -mbranches-within-32B-boundaries -nostandard-realloc-lhs
 -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
627.cam4_s: basepeak = yes
628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:
607.cactuBSSN_s: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-z12-V1.0.html
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ASUS RS700-E10(Z12PP-D32) Server System  
(3.00 GHz, Intel Xeon Gold 5317)

**SPECspeed®2017_fp_base = 144**

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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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