## SPEC CPU®2017 Integer Rate Result

**ASUSTeK Computer Inc.**

ASUS RS700-E10(Z12PP-D32) Server System (2.10 GHz, Intel Xeon Gold 6338T)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>336</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_peak</td>
<td>348</td>
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</tbody>
</table>

### CPU2017 License:
9016

**Test Sponsor:** ASUSTeK Computer Inc.

**Tested by:** ASUSTeK Computer Inc.

<table>
<thead>
<tr>
<th>Test Date</th>
<th>Sep-2021</th>
</tr>
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<tbody>
<tr>
<td>Hardware Availability</td>
<td>May-2021</td>
</tr>
<tr>
<td>Software Availability</td>
<td>Mar-2021</td>
</tr>
</tbody>
</table>

### Test Details:

#### Hardware

- **CPU Name:** Intel Xeon Gold 6338T
  - Max MHz: 3400
  - Nominal: 2100
  - Enabled: 48 cores, 2 chips, 2 threads/core
  - 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: 36 MB I+D on chip per chip
  - Other: None
  - Memory: 1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R)
  - 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; C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux
- **Parallel:** No
- **Firmware:** Version 0504 released May-2021
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 32/64-bit
- **Other:** jemalloc memory allocator V5.0.1
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage.

### Additional Details

<table>
<thead>
<tr>
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<th>Copies</th>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
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**Software Availability:** Mar-2021

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### Results Table

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<th>Benchmark</th>
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**Submit Notes**

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

---

**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:
LD_LIBRARY_PATH =  
"/home/cpu118/lib/intel64:/home/cpu118/lib/ia32:/home/cpu118/je5.0.1-32"
MALLOC_CONF = "retained: true"

---

**General Notes**

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM  
memory using Red Hat Enterprise Linux 8.1  
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

---

(Continued on next page)
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General Notes (Continued)

runcpu command invoked through numactl i.e.: numactl --interleave=all runcpu <etc>

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
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
SNC = Enable SNC2 (2-clusters)
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 982a61ec0915b55891ef0e16acafc64d
running on localhost.localdomain Wed Sep  8 14:24:07 2021

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 6338T CPU @ 2.10GHz
  2 "physical id"s (chips)
  96 "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 : 24
siblings : 48
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
  physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

From lscpu from util-linux 2.32.1:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit

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

CPU MHz: 2707.764
CPU max MHz: 3400.0000
CPU min MHz: 800.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 36864K
NUMA node0 CPU(s): 0-11,48-59
NUMA node1 CPU(s): 12-23,60-71
NUMA node2 CPU(s): 24-35,72-83
NUMA node3 CPU(s): 36-47,84-95

Platform Notes (Continued)

Byte Order: Little Endian
CPU(s): 96
On-line CPU(s) list: 0-95
Thread(s) per core: 2
Core(s) per socket: 24
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 6338T CPU @ 2.10GHz
Stepping: 6

/proc/cpuinfo cache data

From numactl --hardware

WARNING: a numactl 'node' might or might not correspond to a physical chip.

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

node 0 size: 251841 MB
node 0 free: 257224 MB
node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23 60 61 62 63 64 65 66 67 68 69 70 71
node 1 size: 252478 MB
node 1 free: 257539 MB
node 2 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 72 73 74 75 76 77 78 79 80 81 82 83
node 2 size: 252454 MB
node 2 free: 257567 MB
node 3 cpus: 36 37 38 39 40 41 42 43 44 45 46 47 84 85 86 87 88 89 90 91 92 93 94 95
node 3 size: 252273 MB
node 3 free: 257714 MB
node distances:
node 0 1 2 3
0: 10 11 20 20
1: 11 10 20 20
2: 20 20 10 11
3: 20 20 11 10

From /proc/meminfo
MemTotal: 1056468992 kB
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

(Continued on next page)
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---

#### Platform Notes (Continued)

**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  
  Mitigation: usercopy/swapgs barriers and __user pointer sanitation  
- **CVE-2017-5753 (Spectre variant 1):**  
- **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

---

**run-level 3 Sep 8 14:23**

- **SPEC is set to:** /home/cpu118  
- **Filesystem**  
  - Type  Size  Used Avail Use% Mounted on  
  - xfs  3.6T  30G  3.6T  1% /home

- **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

- **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

<table>
<thead>
<tr>
<th>Language</th>
<th>Compiler Options</th>
<th>Notes</th>
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<td>C</td>
<td>500.perlbench_r(peak) 557.xz_r(peak)</td>
<td>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.</td>
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<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2021.1 Build 20201113 Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
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<td>C</td>
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Copyright 2017-2021 Standard Performance Evaluation Corporation

Compiler Version Notes (Continued)

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==============================================================================
Fortran | 548.exchange2_r(base, peak)
Intel(R) Fortran 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.
Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.xmltostax_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
543.x264_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-auto -mbranches-within-32B-boundaries

(Continued on next page)
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### Base Optimization Flags (Continued)

Fortran benchmarks (continued):
- `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin`  
- `-lqkmalloc`

### Peak Compiler Invocation

**C** benchmarks (except as noted below):
- `icx`
- `500.perlbenc_r: icc`
- `557.xz_r: icc`

**C++** benchmarks:
- `icpx`

**Fortran** benchmarks:
- `ifort`

### Peak Portability Flags

500.perlbenc_r: `-DSPEC_LP64 -DSPEC_LINUX_X64`
502.gcc_r: `-D_FILE_OFFSET_BITS=64`
505.mcf_r: `-DSPEC_LP64`
520.omnetpp_r: `-DSPEC_LP64`
523.xalancbmk_r: `-DSPEC_LP64 -DSPEC_LINUX`
525.x264_r: `-DSPEC_LP64`
531.deepsjeng_r: `-DSPEC_LP64`
541.leela_r: `-DSPEC_LP64`
548.exchange2_r: `-DSPEC_LP64`
557.xz_r: `-DSPEC_LP64`

### Peak Optimization Flags

**C** benchmarks:
- `500.perlbenc_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)`
- `-xCORE-AVX512 -ipo -O3 -no-prec-div`
- `-qopt-mem-layout-trans=4 -fno-strict-overflow -mbranches-within-32B-boundaries`

(Continued on next page)
SPEC CPU®2017 Integer Rate Result

ASUSTeK Computer Inc.
ASUS RS700-E10(Z12PP-D32) Server System
(2.10 GHz, Intel Xeon Gold 6338T)

SPECrate®2017_int_base = 336
SPECrate®2017_int_peak = 348

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Sep-2021
Hardware Availability: May-2021
Software Availability: Mar-2021

Peak Optimization Flags (Continued)

500.perlbench_r (continued):
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

502.gcc_r: -m32
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/ia32_lin
-std=gnu89 -Wl,-z,muldefs -fprofile-generate(pass1)
-fprofile-use=default.profdata(pass2) -xCORE-AVX512 -flto
-Ofast(pass1) -O3 -ffast-math -gopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc32-5.0.1/lib -ljemalloc

505.mcf_r: basepeak = yes

525.x264_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-O3 -ffast-math -gopt-mem-layout-trans=4 -fno-alias
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

557.xz_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-gopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:

520.omnetpp_r: basepeak = yes
523.xalancbmk_r: basepeak = yes
531.deepsjeng_r: basepeak = yes
541.leela_r: basepeak = yes

Fortran benchmarks:

548.exchange2_r: 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

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-z12-V1.0.xml
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
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