# SPEC CPU®2017 Integer Rate Result

## ASUSTeK Computer Inc.

**ASUS RS700-E10(Z12PP-D32) Server System**

(3.60 GHz, Intel Xeon Gold 6334)

**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

## Hardware

| Benchmark     | Overall | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 | 195 | 210 | 225 | 240 | 255 | 270 | 285 | 300 |
|---------------|---------|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 500.perlbench | 32      | 97.1 |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |
| 502.gcc       | 32      |    | 132 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |
| 505.mcf       | 32      |    | 146 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |
| 520.omnetpp   | 32      |    |    | 108 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |
| 523.xalancbmk | 32      |    |    |    |    | 191 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |     |
| 525.x264      | 32      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 296 |     |
| 531.deepsjeng | 32      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 292 |     |
| 541.leela      | 32      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 296 |     |
| 548.exchange2 | 32      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 294 |     |
| 557.xz        | 32      |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 316 |     |

**CPU Name:** Intel Xeon Gold 6334  
**Max MHz:** 3700  
**Nominal:** 3600  
**Enabled:** 16 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:** 18 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.
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Test Sponsor: ASUSTeK Computer Inc.

Results Table

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<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
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<td>431</td>
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<td>429</td>
<td>80.6</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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 = "retain: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
runcpu command invoked through numactl i.e.:
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SPEC CPU®2017 Integer Rate Result  

SPECrate®2017_int_base = 149  
SPECrate®2017_int_peak = 154  

General Notes (Continued)

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.

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 982a61ec0915b55891ef0e16acaf64d
running on localhost.localdomain Mon Sep 27 12:07:25 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 6334 CPU @ 3.60GHz
  2 "physical id"s (chips)
  32 "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 : 8
siblings : 16
physical 0: cores 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7

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

(Continued on next page)
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Tested by: ASUSTeK Computer Inc.

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

Platform Notes (Continued)

CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 6334 CPU @ 3.60GHz
Stepping: 6
CPU MHz: 800.000
CPU max MHz: 3700.0000
CPU min MHz: 800.0000
BogoMIPS: 7200.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 18432K
NUMA node0 CPU(s): 0-3,16-19
NUMA node1 CPU(s): 4-7,20-23
NUMA node2 CPU(s): 8-11,24-27
NUMA node3 CPU(s): 12-15,28-31
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 arch_perfmon pebs bts rep_good nopmc xtopology nonstop_tsc cpuid
aperfmpni 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 ibpib stibp ibrs_stop tpr_shadow vni flexpriority ept
vpid ept_ad fsgrisbase tsc_adjust bml1 hle avx2 smep bmi2 erms invpcid cmp rdta
avx512f avx512dq rdseed adx smap avx512fma clflushopt clwb intel_pt avx512cd sha ni
avx512bw avx512vl xsaveopt xsaves xsavec xgetbv1 xsaves cmp_l1c cmp_occupa llc cmp_mbTotal
cmp_mb_local split_lock_detect wbnoinvd dtherm ida arat pln pts hwp hwp_act_window
hwp_epp hwp_pkg_req avx512vmbi umip pku ospke avx512_vmbi2 gfni vaes vpcmldqdq
avx512_vnni avx512_vbitalg tme avx512_vppcntdq la57 rdpid md_clear pconfig flush_l1d
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: 4 nodes (0-3)
  node 0 cpus: 0 1 2 3 16 17 18 19
  node 0 size: 255486 MB

(Continued on next page)
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Platform Notes (Continued)

node 0 free: 257075 MB
node 1 cpus: 4 5 6 7 20 21 22 23
node 1 size: 256007 MB
node 1 free: 257506 MB
node 2 cpus: 8 9 10 11 24 25 26 27
node 2 size: 255905 MB
node 2 free: 257436 MB
node 3 cpus: 12 13 14 15 28 29 30 31
node 3 size: 255771 MB
node 3 free: 257316 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: 1056483236 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

Kernel self-reported vulnerability status:

(Continued on next page)
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Platform Notes (Continued)

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

run-level 3 Sep 27 06:13

SPEC is set to: /home/cpu118
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home 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)
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Compiler Version Notes

==============================================================================
C       | 500.perlbench_r(peak) 557.xz_r(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.
==============================================================================
C       | 502.gcc_r(peak)
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.
==============================================================================
C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak) 557.xz_r(base)
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<td>Fortran</td>
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</table>
## 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.x264_r:** `-DSPEC_LP64`
- **531.deepsjeng_r:** `-DSPEC_LP64`
- **541.leela_r:** `-DSPEC_LP64`
- **548.exchange2_r:** `-DSPEC_LP64`
- **557.xz_r:** `-DSPEC_LP64`

## Base Optimization Flags

- **C benchmarks:**

- **C++ benchmarks:**

- **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`

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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):
ic
500.perlbench_r:icc
557.xz_r:icc
C++ benchmarks:
icpx
Fortran benchmarks:
ifort

Peak Portability Flags

500.perlbench_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.perlbench_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)
ASUSTeK Computer Inc.
ASUS RS700-E10(Z12PP-D32) Server System
(3.60 GHz, Intel Xeon Gold 6334)

SPEC CPU®2017 Integer Rate Result
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SPECrate®2017_int_base = 149
SPECrate®2017_int_peak = 154

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Test Date: Sep-2021
Tested by: ASUSTeK Computer Inc.
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(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto
-Ofast(pass 1) -O3 -ffast-math -qopt-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 -qopt-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
-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:

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: basepeak = yes

531.deepsjeng_r: basepeak = yes

541.leela_r: basepeak = yes

Fortran benchmarks:

548.x264_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
## SPEC CPU®2017 Integer Rate Result

### ASUSTeK Computer Inc.

ASUS RS700-E10(Z12PP-D32) Server System  
(3.60 GHz, Intel Xeon Gold 6334)

<table>
<thead>
<tr>
<th>Metric</th>
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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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