# SPEC CPU®2017 Integer Speed Result

**ASUSTeK Computer Inc.**  
ASUS RS700-E10(Z12PP-D32) Server System  
(2.40 GHz, Intel Xeon Silver 4314)

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

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_s</td>
<td>32</td>
<td>8.13</td>
<td>11.7</td>
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<tr>
<td>gcc_s</td>
<td>32</td>
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<td>mcf_s</td>
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<td>9.95</td>
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<tr>
<td>omnetpp_s</td>
<td>32</td>
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<td></td>
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<tr>
<td>xalanchmk_s</td>
<td>32</td>
<td>13.3</td>
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<tr>
<td>x264_s</td>
<td>32</td>
<td>16.5</td>
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<tr>
<td>deepsjeng_s</td>
<td>32</td>
<td>5.84</td>
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<tr>
<td>leela_s</td>
<td>32</td>
<td>4.72</td>
<td></td>
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<tr>
<td>exchange2_s</td>
<td>32</td>
<td></td>
<td>18.8</td>
</tr>
<tr>
<td>xz_s</td>
<td>32</td>
<td></td>
<td>22.4</td>
</tr>
</tbody>
</table>

**Software**  
**OS:** Red Hat Enterprise Linux release 8.3 (Ootpa)  
**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:** 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.

**Hardware**  
**CPU Name:** Intel Xeon Silver 4314  
**Max MHz:** 3400  
**Nominal:** 2400  
**Enabled:** 32 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:** 24 MB I+D on chip per chip  
**Other:** None  
**Memory:** 1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R, running at 2666)  
**Storage:** 1 x 4 TB PCIE NVME SSD  
**Other:** None
## SPEC CPU®2017 Integer Speed Result

### ASUSTeK Computer Inc.

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(2.40 GHz, Intel Xeon Silver 4314)

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**ASUSTeK Computer Inc.**  
(2.40 GHz, Intel Xeon Silver 4314)  
ASUS RS700-E10(Z12PP-D32) Server System

**SPECspeed®2017_int_base = 11.5**  
**SPECspeed®2017_int_peak = 11.7**

---

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
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<td>11.3</td>
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<td>620.omnetpp_s</td>
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<td>9.95</td>
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<td>13.3</td>
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<td>648.exchange2_s</td>
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<td>277</td>
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<td>22.4</td>
</tr>
</tbody>
</table>

**SPECspeed®2017_int_base = 11.5**  
**SPECspeed®2017_int_peak = 11.7**

---

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,scatter"  
LD_LIBRARY_PATH = "/home/cpu118/lib/intel64:/home/cpu118/je5.0.1-64"  
MALLOC_CONF = "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  
Filesystem 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)
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 982a61ec0915b55891ef0e16aca6d
running on localhost.localdomain Tue Dec 28 20:19:18 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) Silver 4314 CPU @ 2.40GHz
  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 : 16
siblings : 16
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

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): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 1
Core(s) per socket: 16
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106

(Continued on next page)
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SPECspeed®2017_int_base = 11.5
SPECspeed®2017_int_peak = 11.7

Platform Notes (Continued)

Model name:         Intel(R) Xeon(R) Silver 4314 CPU @ 2.40GHz
Stepping:           6
CPU MHz:            1782.707
CPU max MHz:        3400.0000
CPU min MHz:        800.0000
BogoMIPS:           4800.00
Virtualization:     VT-x
L1d cache:          48K
L1i cache:          32K
L2 cache:           1280K
L3 cache:           24576K
NUMA node0 CPU(s):  0-15
NUMA node1 CPU(s):  16-31
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
                     rdtsdp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
                     nonstop_tsc cpuid aperfmperf 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 3nowprefetch cpuid_fault epb cat_l3 invpcid_single intel_pdpin
                     ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmmi flexpriority
                     ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms
                     invpcid cmq rdt_a avx512f avx512dq rdseed adx smap avx512ifma
                     clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl
                     xsaveopt xsavec xgsave xor vbv1 xsaves cmq_llc cmq_occmap llc
                     cmq_mbm_total
                     cmq_mbm_local split_lock_detect bmov noinvd dtherm ida arat pln
                     pts hwp hwp_act_window hwp_epp hwp_pkg_req avx512vmbi umip
                     pku ospke avx512_bvmi2 gfin vaes vpcmuleq
                     dq avx512_vnni avx512_bitalg tme avx512_vpopcntdq
                     la57 rdpid md_clear pconfig flush_l1d
                     arch_capabilities

/proc/cpuinfo cache data
  cache size: 24576 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 12 13 14 15
  node 0 size: 503282 MB
  node 0 free: 514814 MB
  node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
  node 1 size: 503317 MB
  node 1 free: 514526 MB

From /proc/meminfo
  MemTotal: 1056483544 kB

(Continued on next page)
ASUSTeK Computer Inc.  
ASUS RS700-E10(Z12PP-D32) Server System  
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SPECspeed\textsuperscript{®}2017\_int\_peak = 11.7  
SPECspeed\textsuperscript{®}2017\_int\_base = 11.5

<table>
<thead>
<tr>
<th>Platform Notes (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HugePages_Total: 0</td>
</tr>
<tr>
<td>Hugepagesize: 2048 kB</td>
</tr>
<tr>
<td>/sbin/tuned-adm active</td>
</tr>
<tr>
<td>Current active profile: throughput-performance</td>
</tr>
<tr>
<td>sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance</td>
</tr>
<tr>
<td>From /etc/<em>release</em> /etc/<em>version</em></td>
</tr>
<tr>
<td>os-release:</td>
</tr>
<tr>
<td>NAME=&quot;Red Hat Enterprise Linux&quot;</td>
</tr>
<tr>
<td>VERSION=&quot;8.3 (Ootpa)&quot;</td>
</tr>
<tr>
<td>ID=&quot;rhel&quot;</td>
</tr>
<tr>
<td>ID_LIKE=&quot;fedora&quot;</td>
</tr>
<tr>
<td>VERSION_ID=&quot;8.3&quot;</td>
</tr>
<tr>
<td>PLATFORM_ID=&quot;platform:el8&quot;</td>
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<tr>
<td>PRETTY_NAME=&quot;Red Hat Enterprise Linux 8.3 (Ootpa)&quot;</td>
</tr>
<tr>
<td>ANSI_COLOR=&quot;0;31&quot;</td>
</tr>
<tr>
<td>redhat_release: Red Hat Enterprise Linux release 8.3 (Ootpa)</td>
</tr>
<tr>
<td>system_release: Red Hat Enterprise Linux release 8.3 (Ootpa)</td>
</tr>
<tr>
<td>system_release_cpe: cpe:/o:redhat:enterprise_linux:8.3:ga</td>
</tr>
<tr>
<td>uname -a:</td>
</tr>
<tr>
<td>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</td>
</tr>
</tbody>
</table>

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 sanitation
- 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 Dec 28 12:18

SPEC is set to: /home/cpu118

(Continued on next page)
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SPECspeed®2017_int_base = 11.5
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Platform Notes (Continued)

Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 3.6T 31G 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, configured at 2666

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       | 600.perlbench_s(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       | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
       | 625.x264_s(base, peak) 657.xz_s(base, 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       | 600.perlbench_s(peak)
==============================================================================

(Continued on next page)
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<th>Software Availability</th>
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<td>9016</td>
<td>Dec-2021</td>
<td>ASUSTeK Computer Inc.</td>
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<td>ASUSTeK Computer Inc.</td>
<td>Mar-2021</td>
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</table>

**SPECspeed®2017_int_base = 11.5**  
**SPECspeed®2017_int_peak = 11.7**

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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  
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---------------
C
600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(base, 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++
620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.leela_s(base, 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.

---------------
Fortran
648.exchange2_s(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.

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### Base Compiler Invocation

**C benchmarks:**  
`icx`

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

**Fortran benchmarks:**  
`ifort`
ASUSTeK Computer Inc.
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Software Availability: Mar-2021

Base Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-DSPEC_OPENMP -std=c11 -m64 -fiopenmp -Wl,-z,muldefs -xCORE-AVX512
-03 -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:
-DSPEC_OPENMP -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/
-1qkmalloc

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

Peak Compiler Invocation

C benchmarks (except as noted below):
icx

600.perlbench_s: icc

C++ benchmarks:
icpx

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

Fortran benchmarks:
ifort

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
600.perlbench_s: -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
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

602.gcc_s: -m64 -std=c11 -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/jemalloc64-5.0.1/lib -ljemalloc

605.mcf_s: basepeak = yes

625.x264_s: -DSPEC_OPENMP -fiopenmp -std=c11 -m64 -Wl,-z,muldefs
-xCORE-AVX512 -flto -O3 -ffast-math
-qopt-mem-layout-trans=4 -fno-alias
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

657.xz_s: basepeak = yes

C++ benchmarks:
620.omnetpp_s: basepeak = yes
623.xalancbmk_s: basepeak = yes
631.deepsjeng_s: basepeak = yes

(Continued on next page)
ASUSTeK Computer Inc.
ASUS RS700-E10(Z12PP-D32) Server System
(2.40 GHz, Intel Xeon Silver 4314)

SPEC CPU®2017 Integer Speed Result

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SPECspeed®2017_int_base = 11.5
SPECspeed®2017_int_peak = 11.7

Peak Optimization Flags (Continued)

641.leela_s: basepeak = yes

Fortran benchmarks:

648.exchange2_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-V1.2.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-z12-V1.2.xml
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml

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