## SPEC CPU®2017 Integer Rate Result

**ASUSTeK Computer Inc.**

ASUS RS700-E10(Z12PP-D32) Server System (2.60 GHz, Intel Xeon Platinum 8358)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>505</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_peak</td>
<td>525</td>
</tr>
</tbody>
</table>

**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

### Hardware

- **CPU Name:** Intel Xeon Platinum 8358  
- **Max MHz:** 3400  
- **Nominal:** 2600  
- **Enabled:** 64 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:** 48 MB I+D on chip per core  
- **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.

### SPECrate®2017 Integer Results

<table>
<thead>
<tr>
<th>Program</th>
<th>Copies</th>
<th>SPECrate®2017_int_base (505)</th>
<th>SPECrate®2017_int_peak (525)</th>
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<td>502.gcc</td>
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<td>462</td>
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<td>505.mcf</td>
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<td>520.omnetpp</td>
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<tr>
<td>523.xalancbmk</td>
<td>128</td>
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<td>1080</td>
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<tr>
<td>525.x264</td>
<td>128</td>
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<td>531.deepsjeng</td>
<td>128</td>
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<td>394</td>
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<tr>
<td>541.leela</td>
<td>128</td>
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<td>387</td>
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<tr>
<td>548.exchange2</td>
<td>128</td>
<td>281</td>
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</tr>
<tr>
<td>557.xz</td>
<td>128</td>
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Results Table

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<th>Benchmark</th>
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<td>1060</td>
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<td>1070</td>
<td>316</td>
<td>1060</td>
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<td>128</td>
<td>491</td>
<td>281</td>
<td>491</td>
<td>282</td>
<td>493</td>
<td>280</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.:
ASUSTeK Computer Inc.

ASUS RS700-E10(Z12PP-D32) Server System
(2.60 GHz, Intel Xeon Platinum 8358)

SPECrate®2017_int_base = 505
SPECrate®2017_int_peak = 525

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

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 982a61ec0915b55891ef0e16aaca64d
running on localhost.localdomain Thu Oct 14 17:57:47 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) Platinum 8358 CPU @ 2.60GHz
2 "physical id"s (chips)
128 "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 : 32
siblings : 64
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 24
25 26 27 28 29 30 31
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 24
25 26 27 28 29 30 31

From lscpu from util-linux 2.32.1:
Architecture: x86_64

(Continued on next page)
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SPECrate®2017_int_base = 505
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Test Date: Oct-2021
Hardware Availability: May-2021
Software Availability: Mar-2021

Platform Notes (Continued)

CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 128
On-line CPU(s) list: 0-127
Thread(s) per core: 2
Core(s) per socket: 32
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Platinum 8358 CPU @ 2.60GHz
Stepping: 6
CPU MHz: 3300.000
CPU max MHz: 3400.0000
CPU min MHz: 800.0000
BogoMIPS: 5200.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 49152K
NUMA node0 CPU(s): 0-15, 64-79
NUMA node1 CPU(s): 16-31, 80-95
NUMA node2 CPU(s): 32-47, 96-111
NUMA node3 CPU(s): 48-63, 112-127
Flags: fpu vme de pse tsc msr pae mce 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 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 3dnowprefetch cpuid_fault epb cat_l3 invpcid_single intel_pni ssbd mba ibrs ibpb stibp ibrsenhanced tpr_shadow vnmi flexpriority ept vpd ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 3dnow invvpid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl vsxevopt xsaves xgtechv1 xsaves cqm_llc cqm_occup_llc cqm_mmib_total cqm_mmb_local split_lock_detect wbnoinvd dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req avx512vbm_muimp kpu ospke avx512_vbmif gfni vaes vtclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconf config flush_l1d arch_capabilities

/proc/cpuinfo cache data
cache size : 49152 KB

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)

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

<table>
<thead>
<tr>
<th>node 0 cpus:</th>
<th>0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>node 0 size:</td>
<td>250817 MB</td>
</tr>
<tr>
<td>node 0 free:</td>
<td>256746 MB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>node 1 cpus:</th>
<th>16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79</th>
</tr>
</thead>
<tbody>
<tr>
<td>node 1 size:</td>
<td>251386 MB</td>
</tr>
<tr>
<td>node 1 free:</td>
<td>257186 MB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>node 2 cpus:</th>
<th>32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79</th>
</tr>
</thead>
<tbody>
<tr>
<td>node 2 size:</td>
<td>251488 MB</td>
</tr>
<tr>
<td>node 2 free:</td>
<td>257308 MB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>node 3 cpus:</th>
<th>48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79</th>
</tr>
</thead>
<tbody>
<tr>
<td>node 3 size:</td>
<td>251950 MB</td>
</tr>
<tr>
<td>node 3 free:</td>
<td>257018 MB</td>
</tr>
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</table>

**node distances:**

<table>
<thead>
<tr>
<th>node 0</th>
<th>1 11 20 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>node 1</td>
<td>11 10 20 20</td>
</tr>
<tr>
<td>node 2</td>
<td>20 20 10 11</td>
</tr>
<tr>
<td>node 3</td>
<td>20 20 11 10</td>
</tr>
</tbody>
</table>

From `/proc/meminfo`

<table>
<thead>
<tr>
<th>MemTotal:</th>
<th>1056462032 kB</th>
</tr>
</thead>
<tbody>
<tr>
<td>HugePages_Total:</td>
<td>0</td>
</tr>
<tr>
<td>Hugepagesize:</td>
<td>2048 kB</td>
</tr>
</tbody>
</table>

/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

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Platform Notes (Continued)

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): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swapgs 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

run-level 3 Oct 14 10:57

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

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Platform Notes (Continued)

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C       | 500.perlbench_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, peak)
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<td>Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000</td>
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</tr>
</tbody>
</table>
```
ASUSTeK Computer Inc.
ASUS RS700-E10(Z12PP-D32) Server System (2.60 GHz, Intel Xeon Platinum 8358)

SPECrate®2017_int_base = 505
SPECrate®2017_int_peak = 525

Compiler Version Notes (Continued)
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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:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-fflt0 -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 -fflt0
-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

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

ASUSTeK Computer Inc.  
ASUS RS700-E10(Z12PP-D32) Server System  
(2.60 GHz, Intel Xeon Platinum 8358)  

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

**Base Optimization Flags (Continued)**

C++ benchmarks (continued):
- `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`
- `-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.perlbm_r: `icc`

C++ benchmarks:
`icpx`

Fortran benchmarks:
`ifort`

**Peak Portability Flags**

500.perlbm_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:

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

ASUSTeK Computer Inc.
ASUS RS700-E10(Z12PP-D32) Server System
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Peak Optimization Flags (Continued)

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
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-1qkmalloc

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 -fnof-alias
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-1qkmalloc

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

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