ASUSTeK Computer Inc.

ASUS RS720A-E11(KMPP-D32) Server System
3.20 GHz, AMD EPYC 7343

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SPECspeed®2017_int_base = 13.3
SPECspeed®2017_int_peak = 13.3

Hardware

CPU Name: AMD EPYC 7343
Max MHz: 3900
Nominal: 3200
Enabled: 32 cores, 2 chips, 2 threads/core
Orderable: 1.2 chips
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 512 KB I+D on chip per core
L3: 128 MB I+D on chip per chip, 32 MB shared / 4 cores
Other: None
Memory: 1 TB (16 x 64 GB 4Rx4 PC4-3200AA-L)
Storage: 1 x 240 GB SATA SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP2 (x86_64)
Kernel 5.3.18-22-default
Compiler: C/C++/Fortran: Version 3.0.0 of AOCC
Parallel: Yes
Firmware: Version 0404 released Feb-2021
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: jemalloc; jemalloc memory allocator library v5.1.0
Power Management: BIOS and OS set to prefer performance at the cost of additional power usage.

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ASUS RS720A-E11(KMPP-D32) Server System
3.20 GHz, AMD EPYC 7343

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

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

600.perlbench_s 32
602.gcc_s 32
605.mcf_s 32
620.omnetpp_s 32
623.xalancbmk_s 32
625.x264_s 32
631.deepsjeng_s 32
641.leela_s 32
648.exchange2_s 32
657.xz_s 32

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SPEC CPU®2017 Integer Speed Result
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SPECspeed®2017_int_base = 13.3
SPECspeed®2017_int_peak = 13.3

Results Table

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<th>Benchmark</th>
<th>Threads</th>
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<th>Ratio</th>
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<td>605.mcf_s</td>
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<td>620.omnetpp_s</td>
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<td>631.deepsjeng_s</td>
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<td>641.leela_s</td>
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<td>648.exchange2_s</td>
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<td>657.xz_s</td>
<td>32</td>
<td>232</td>
<td>26.7</td>
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<td>26.8</td>
<td>234</td>
<td>26.4</td>
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</table>

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

Compiler Notes
The AMD64 AOCC Compiler Suite is available at http://developer.amd.com/amd-aocc/

Submit Notes
The config file option 'submit' was used.
'numactl' was used to bind copies to the cores.
See the configuration file for details.

Operating System Notes
'ulimit -s unlimited' was used to set environment stack size limit
'ulimit -l 2097152' was used to set environment locked pages in memory limit
OS set to performance mode via cpupower frequency-set -g performance
runcpu command invoked through numactl i.e.: numactl --interleave=all runcpu <etc>
'echo 8 > /proc/sys/vm/dirty_ratio' run as root to limit dirty cache to 8% of memory.
'echo 1 > /proc/sys/vm/swappiness' run as root to limit swap usage to minimum necessary.
'echo 1 > /proc/sys/vm/zone_reclaim_mode' run as root to free node-local memory and avoid remote memory usage.
'sync; echo 3 > /proc/sys/vm/drop_caches' run as root to reset filesystem caches.
'echo 0 > /proc/sys/vm/drop_caches' run as root to reset filesystem caches.
'sysctl -w kernel.randomize_va_space=0' run as root to disable address space layout randomization (ASLR) to reduce run-to-run variability.
To enable Transparent Hugepages (THP) for all allocations,

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

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**CPU2017 License:** 9016  
**Test Date:** Sep-2021

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</tr>
</tbody>
</table>

**Test Sponsor:** ASUSTeK Computer Inc.

---

### Operating System Notes (Continued)

'echo always > /sys/kernel/mm/transparent_hugepage/enabled' and 'echo always > /sys/kernel/mm/transparent_hugepage/defrag' run as root.

---

### Environment Variables Notes

Environment variables set by runcpu before the start of the run:

- **GOMP_CPU_AFFINITY** = "0-63"
- **LD_LIBRARY_PATH** = 
  
  
  "/cpu118/amd_speed_aocc300_milan_B_lib/64;/cpu118/amd_speed_aocc300_milan_B_lib/32:"
- **MALLOCCONF** = "retain:true"
- **OMP_DYNAMIC** = "false"
- **OMP_SCHEDULE** = "static"
- **OMP_STACKSIZE** = "128M"
- **OMP_THREADLIMIT** = "64"

Environment variables set by runcpu during the 600.perlbench_s peak run:

- **GOMP_CPU_AFFINITY** = "0"

Environment variables set by runcpu during the 602.gcc_s peak run:

- **GOMP_CPU_AFFINITY** = "0"

Environment variables set by runcpu during the 605.mcf_s peak run:

- **GOMP_CPU_AFFINITY** = "0"

Environment variables set by runcpu during the 620.omnetpp_s peak run:

- **GOMP_CPU_AFFINITY** = "0"

Environment variables set by runcpu during the 625.x264_s peak run:

- **GOMP_CPU_AFFINITY** = "0"

Environment variables set by runcpu during the 641.leela_s peak run:

- **GOMP_CPU_AFFINITY** = "0"

Environment variables set by runcpu during the 657.xz_s peak run:

- **GOMP_CPU_AFFINITY** = "0-31"

---

### General Notes

Binaries were compiled on a system with 2x AMD EPYC 7742 CPU + 1TiB Memory using OpenSUSE 15.2

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.

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

General Notes (Continued)

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: configured and built with GCC v4.8.2 in RHEL 7.4 (No options specified)
jemalloc 5.1.0 is available here:
https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2

Platform Notes

BIOS Configuration:
DLWM Support = Disabled
SVM Mode = Disabled
NUMA nodes per socket = NPS2
APBDIS = 1
Fix SOC P-state = P0
Engine Boost = Enabled

Sysinfo program /cpu118/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaf64d
running on localhost Thu Sep 2 22:11:05 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 : AMD EPYC 7343 16-Core Processor
  2 "physical id"s (chips)
  64 "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 : 32
  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 2.33.1:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 48 bits physical, 48 bits virtual
CPU(s): 64
On-line CPU(s) list: 0–63
Thread(s) per core: 2
Core(s) per socket: 16

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

Platform Notes (Continued)

Socket(s): 2
NUMA node(s): 4
Vendor ID: AuthenticAMD
CPU family: 25
Model: 1
Model name: AMD EPYC 7343 16-Core Processor
Stepping: 1
CPU MHz: 1812.644
CPU max MHz: 3200.0000
CPU min MHz: 1500.0000
BogoMIPS: 6387.86
Virtualization: AMD-V
L1d cache: 32K
L1i cache: 32K
L2 cache: 512K
L3 cache: 32768K
NUMA node0 CPU(s): 0-7,32-39
NUMA node1 CPU(s): 8-15,40-47
NUMA node2 CPU(s): 16-23,48-55
NUMA node3 CPU(s): 24-31,56-63
Flags: fpu vme de pse tsc msr pae mce cmov pat pse36 clflush mmx fxsr sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp lm constant_tsc rep_good nopl nonstop_tsc cpuid extd_apicid aperfmperf pni pclmulqdq monitor ssse3 fma cx16 pcid sse4_1 sse4_2 movbe popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm ssbe4a misalignsse 3dnowprefetch osvw ibs skinit wdt tce topoext perfcnt_core perfcnt_nb bext perfcnt_llc mwaitx cpb cat_13 cdp_13 invpcid_single hu_pstate ssbd mba ibrs ibpb stibp vmmcall fsgsbase bmi1 avx2 smep bmi2 erms invpcid cqm rdt_a rdseed adx smap vmmcall fsgsbase bmi1 avx2 smep bmi2 erms invpcid cqm rdt_a rdseed adx smap vmmcall fsgsbase bmi1 avx2 smep bmi2 erms invpcid cqm rdt_a rdseed adx smap vmmcall fsgsbase

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 4 5 6 7 32 33 34 35 36 37 38 39
node 0 size: 257800 MB
node 0 free: 257566 MB
node 1 cpus: 8 9 10 11 12 13 14 15 40 41 42 43 44 45 46 47
node 1 size: 258029 MB
node 1 free: 257819 MB
node 2 cpus: 16 17 18 19 20 21 22 23 48 49 50 51 52 53 54 55
node 2 size: 258041 MB

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

```
node 2 free: 257683 MB
node 3 cpus: 24 25 26 27 28 29 30 31 56 57 58 59 60 61 62 63
node 3 size: 258042 MB
node 3 free: 257771 MB
node distances:
  node 0  1  2  3
  0: 10 12 32 32
  1: 12 10 32 32
  2: 32 32 10 12
  3: 32 32 12 10
```

From `/proc/meminfo`

- MemTotal: 1056680380 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

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

From `/etc/*release* /etc/*version*`

```
os-release:
  NAME="SLES"
  VERSION="15-SP2"
  VERSION_ID="15.2"
  PRETTY_NAME="SUSE Linux Enterprise Server 15 SP2"
  ID="sles"
  ID_LIKE="suse"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:15:sp2"
```

```
uname -a:
Linux localhost 5.3.18-22-default #1 SMP Wed Jun 3 12:16:43 UTC 2020 (720aeba) 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/swapsgs barriers and __user pointer sanitation
- CVE-2017-5753 (Spectre variant 1): Mitigation: Full AMD retpoline,
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Platform Notes (Continued)

IBPB: conditional, IBRS_FW, STIBP: always-on, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Sep 2 15:14
SPEC is set to: /cpu118
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda4      xfs   199G   46G  154G  23% /

From /sys/devices/virtual/dmi/id
Vendor: ASUSTeK COMPUTER INC.
Product: RS720A-E11-RS12E
Product Family: Server
Serial: 123456789012

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 Samsung M386A8K40DM2-CWE 64 GB 4 rank 3200
16x Unknown Unknown

BIOS:
BIOS Vendor: American Megatrends Inc.
BIOS Version: 0404
BIOS Date: 02/02/2021
BIOS Revision: 4.4

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C  | 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(base, peak)
==============================================================================
AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

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CPU2017 License: 9016
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Compiler Version Notes (Continued)

C++ 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak)
| 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)

AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

Fortran 648.exchange2_s(base, peak)

AMD clang version 12.0.0 (CLANG: AOCC_3.0.0-Build#78 2020_12_10) (based on LLVM Mirror.Version.12.0.0)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /opt/AMD/aocc-compiler-3.0.0/bin

---

Base Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++

Fortran benchmarks:
flang

---

Base Portability Flags

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

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

#### C benchmarks:
- `-m64` `-mno-adx` `-mno-sse4a` `-W1`, `-allow-multiple-definition`
- `-W1`, `-mllvm` `-W1`, `-enable-licm-vrp` `-W1`, `-mllvm` `-W1`, `-region-vectorize`
- `-W1`, `-mllvm` `-W1`, `-function-specialize`
- `-W1`, `-mllvm` `-W1`, `-align-all-nofallthru-blocks=6`
- `-W1`, `-mllvm` `-W1`, `-reduce-array-computations=3 `-O3`, `-march=znver3`
- `-fveclib=AMDLIBM` `-ffast-math` `-flto` `-fstruct-layout=5`
- `-mllvm` `-unroll-threshold=50` `-mllvm` `-inline-threshold=1000`
- `-freemap-arrays` `-mllvm` `-function-specialize` `-flv-function-specialization`
- `-mllvm` `-enable-gvn-hoist` `-mllvm` `-global-vectorize-slp=true`
- `-mllvm` `-enable-licm-vrp` `-mllvm` `-reduce-array-computations=3 `-z muldefs`
- `-DSPEC_OPENMP` `-fopenmp` `-fopenmp=libomp` `-lomp` `-lamdlibm` `-ljemalloc`
- `-lflang` `-lflangrti`

#### C++ benchmarks:
- `-m64` `-std=c++98` `-mno-adx` `-mno-sse4a`
- `-W1`, `-mllvm` `-W1`, `-do-block-reorder-aggressive`
- `-W1`, `-mllvm` `-W1`, `-region-vectorize` `-W1`, `-mllvm` `-W1`, `-function-specialize`
- `-W1`, `-mllvm` `-W1`, `-align-all-nofallthru-blocks=6`
- `-W1`, `-mllvm` `-W1`, `-reduce-array-computations=3 `-O3`, `-march=znver3`
- `-fveclib=AMDLIBM` `-ffast-math` `-flto` `-mllvm` `-enable-partial-unswitch`
- `-mllvm` `-unroll-threshold=100` `-finline-aggressive`
- `-flv-function-specialization` `-mllvm` `-loop-unswitch-threshold=200000`
- `-mllvm` `-reroll-loops` `-mllvm` `-aggressive-loop-unswitch`
- `-mllvm` `-extra-vectorizer-passes` `-mllvm` `-reduce-array-computations=3`
- `-mllvm` `-global-vectorize-slp=true` `-mllvm` `-convert-pow-exp-to-int=false`
- `-z muldefs` `-mllvm` `-do-block-reorder=aggressive`
- `-fvirtual-function-elimination` `-fvisibility=hidden` `-DSPEC_OPENMP`
- `-fopenmp` `-fopenmp=libomp` `-lomp` `-lamdlibm` `-ljemalloc`
- `-lflang` `-lflangrti`

#### Fortran benchmarks:
- `-m64` `-mno-adx` `-mno-sse4a` `-W1`, `-mllvm` `-W1`, `-inline-recursion=4`
- `-W1`, `-mllvm` `-W1`, `-lsr-in-nested-loop` `-W1`, `-mllvm` `-W1`, `-enable-iv-split`
- `-W1`, `-mllvm` `-W1`, `-region-vectorize` `-W1`, `-mllvm` `-W1`, `-function-specialize`
- `-W1`, `-mllvm` `-W1`, `-align-all-nofallthru-blocks=6`
- `-W1`, `-mllvm` `-W1`, `-reduce-array-computations=3 `-O3`, `-march=znver3`
- `-fveclib=AMDLIBM` `-ffast-math` `-flto` `-z muldefs`
- `-mllvm` `-unroll-aggressive` `-mllvm` `-unroll-threshold=150` `-DSPEC_OPENMP`
- `-fopenmp` `-fopenmp=libomp` `-lomp` `-lamdlibm` `-ljemalloc` `-lflang`

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Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-lflangrti

Base Other Flags

C benchmarks:
- Wno-unused-command-line-argument -Wno-return-type

C++ benchmarks:
- Wno-unused-command-line-argument -Wno-return-type

Fortran benchmarks:
- Wno-return-type

Peak Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++

Fortran benchmarks:
flang

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
- m64 -mno-adx -mno-sse4a -Wl,-allow-multiple-definition
- Wl,-mlllvm -Wl,-enable-licm-vrp -Wl,-mlllvm -Wl,-function-specialize
- Wl,-mlllvm -Wl,-align-all-nofallthru-blocks=6
- Wl,-mlllvm -Wl,-reduce-array-computations=3 -Ofast -march=znver3
- fveclib=AMDLIBM -ffast-math -flto -fstruct-layout=5

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

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ASUSTeK Computer Inc.
ASUS RS720A-E11(KMPP-D32) Server System
3.20 GHz, AMD EPYC 7343

SPECspeed®2017_int_base = 13.3
SPECspeed®2017_int_peak = 13.3

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

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

Peak Optimization Flags (Continued)

C benchmarks (continued):
-mllvm -unroll-threshold=50 -fremap-arrays -flv-function-specialization
-mllvm -inline-threshold=1000 -mllvm -enable-gvn-hoist
-mllvm -global-vectorize-slp=true -mllvm -function-specialize
-mllvm -enable-lcm-vrp -mllvm -reduce-array-computations=3
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm -ljemalloc
-llflang

C++ benchmarks:

620.omnetpp_s: -m64 -std=c++98 -mno-adx -mno-sse4a
-W1,-mllvm -W1,-do-block-reorder=aggressive
-W1,-mllvm -W1,-function-specialize
-W1,-mllvm -W1,-align-all-nofallthru-blocks=6
-W1,-mllvm -W1,-reduce-array-computations=3 -Ofast
-march=znver3 -fveclib=AMDLIBM -ffast-math -flto
-finline-aggressive -mllvm -unroll-threshold=100
-flv-function-specialization -mllvm -enable-lcm-vrp
-mllvm -reroll-loops -mllvm -aggressive-loop-unswitch
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp=true
-mllvm -do-block-reorder=aggressive
-fvirtual-function-elimination -fvisibility=hidden
-DSPEC_OPENMP -fopenmp -fopenmp=libomp -lomp -lamdlibm
-ljemalloc -llflang

623.xalancbmk_s: basepeak = yes

631.deepsjeng_s: basepeak = yes

641.leela_s: Same as 620.omnetpp_s

Fortran benchmarks:

648.exchange2_s: basepeak = yes

Peak Other Flags

C benchmarks:
-Wno-unused-command-line-argument -Wno-return-type

C++ benchmarks:
-Wno-unused-command-line-argument -Wno-return-type

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

**ASUSTeK Computer Inc.**  
ASUS RS720A-E11(KMPP-D32) Server System  
3.20 GHz, AMD EPYC 7343  

<table>
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| Software Availability: | Mar-2021 |

**Peak Other Flags (Continued)**

Fortran benchmarks:

-Wno-return-type

The flags files that were used to format this result can be browsed at


You can also download the XML flags sources by saving the following links:


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