## SPEC CPU®2017 Integer Speed Result

### ASUSTeK Computer Inc.

**ASUS RS300-E11(P12R-M) Server System**  
(3.20 GHz, Intel Xeon E-2356G)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9016</th>
<th>Test Date:</th>
<th>Jan-2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>ASUSTeK Computer Inc.</td>
<td>Hardware Availability:</td>
<td>Oct-2021</td>
</tr>
<tr>
<td>Tested by:</td>
<td>ASUSTeK Computer Inc.</td>
<td>Software Availability:</td>
<td>Sep-2021</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon E-2356G  
  - Max MHz: 5000  
  - Nominal: 3200  
  - Enabled: 6 cores, 1 chip, 2 threads/core  
  - Orderable: 1 chip  
  - Cache L1: 32 KB I + 48 KB D on chip per core  
  - L2: 512 KB I+D on chip per core  
  - L3: 12 MB I+D on chip per chip  
  - Other: None  
- **Memory:** 128 GB (4 x 32 GB 2Rx8 PC4-3200AA-E, running at 2933)  
- **Storage:** 1 x 960 GB SATA SSD  
- Other: None

### Software

- **OS:** Red Hat Enterprise Linux release 8.4 (Ootpa)  
  - 4.18.0-305.19.1.el8_4.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:** Yes  
- **Firmware:** Version 0401 released Oct-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.

### SPECspeed®2017_int_base = 15.0

### SPECspeed®2017_int_peak = 15.4

---

**Threads**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base (15.0)</th>
<th>SPECspeed®2017_int_peak (15.4)</th>
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<tbody>
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<td>12</td>
<td>9.63</td>
<td>11.2</td>
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</tr>
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<td>8.39</td>
<td>24.6</td>
</tr>
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<td>6.85</td>
<td>25.9</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>12</td>
<td>16.4</td>
<td>29.1</td>
</tr>
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<td>8.39</td>
<td>24.6</td>
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<tr>
<td>657.xz_s</td>
<td>12</td>
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<td>25.9</td>
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**Testing Environment:**  
- **ASUS RS300-E11(P12R-M) Server System**  
- **CPU:** Intel Xeon E-2356G  
- **Memory:** 128 GB (4 x 32 GB 2Rx8 PC4-3200AA-E, running at 2933)  
- **Storage:** 1 x 960 GB SATA SSD  
- **Other:** None

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**Specified Test Configuration:**  
- **Test Sponsor:** ASUSTeK Computer Inc.  
- **Hardware Availability:** Oct-2021  
- **Software Availability:** Sep-2021  
- **Initial Test Date:** Jan-2022  
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**ASUSTeK Computer Inc.**

ASUS RS300-E11(P12R-M) Server System (3.20 GHz, Intel Xeon E-2356G)

---

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

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## Results Table

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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>16.4</td>
<td>378</td>
<td>16.4</td>
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</tr>
</tbody>
</table>

---

**SPECspeed®2017_int_base** = 15.0  
**SPECspeed®2017_int_peak** = 15.4

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"  
MALLOCONF = "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.

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(Continued on next page)
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ASUS RS300-E11(P12R-M) Server System
(3.20 GHz, Intel Xeon E-2356G)

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

SPECspeed®2017_int_base = 15.0
SPECspeed®2017_int_peak = 15.4

Test Date: Jan-2022
Hardware Availability: Oct-2021
Software Availability: Sep-2021

General Notes (Continued)

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
AES = Disabled
Intel Speed Shift Technology = Native Mode
Engine Boost = Level3(Max)

Sysinfo program /home/cpu118/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16a6a6c64d
running on localhost.localdomain Thu Jan 13 04:46:09 2022

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) E-2356G CPU @ 3.20GHz
 1 "physical id"s (chips)
 12 "processors"
core(s), siblings (Caution: counting these is hw and system dependent. The following
excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 6
siblings : 12
physical 0: cores 0 1 2 3 4 5

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): 12
On-line CPU(s) list: 0-11
Thread(s) per core: 2
Core(s) per socket: 6
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
BIOS Vendor ID: Intel(R) Corporation
CPU family: 6
Model: 167
Model name: Intel(R) Xeon(R) E-2356G CPU @ 3.20GHz
BIOS Model name: Intel(R) Xeon(R) E-2356G CPU @ 3.20GHz

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

Platform Notes (Continued)

Stepping: 1
CPU MHz: 4013.959
CPU max MHz: 5000.0000
CPU min MHz: 800.0000
BogoMIPS: 6384.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 512K
L3 cache: 12288K
NUMA node0 CPU(s): 0-11
Flags:

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 1 nodes (0)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11
node 0 size: 128710 MB
node 0 free: 127895 MB
node distances:
node 0
0: 10

From /proc/meminfo
MemTotal: 131799576 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

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

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

```bash
os-release:
  NAME="Red Hat Enterprise Linux"
  VERSION="8.4 (Ootpa)"
  ID="rhel"
  ID_LIKE="fedora"
  VERSION_ID="8.4"
  PLATFORM_ID="platform:el8"
  PRETTY_NAME="Red Hat Enterprise Linux 8.4 (Ootpa)"
  ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.4:ga
```

`uname -a`:

```
Linux localhost.localdomain 4.18.0-305.19.1.el8_4.x86_64 #1 SMP Tue Sep 7 07:07:31 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):** 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/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 Jan 13 04:45`

`SPEC is set to: /home/cpu118`

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/mapper/rhel-home</td>
<td>xfs</td>
<td>807G</td>
<td>11G</td>
<td>797G</td>
<td>2%</td>
<td>/home</td>
</tr>
</tbody>
</table>

From `/sys/devices/virtual/dmi/id`

- **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
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Platform Notes (Continued)

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:
4x Apacer Technology D33.27306S.003 32 GB 2 rank 3200, configured at 2933

BIOS:
BIOS Vendor: American Megatrends Inc.
BIOS Version: 0401
BIOS Date: 10/26/2021
BIOS Revision: 4.1

(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.
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------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2021.1 Build 20201113

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## Compiler Version Notes (Continued)

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.

## Base Compiler Invocation

**C benchmarks:**
- icx

**C++ benchmarks:**
- icpx

**Fortran benchmarks:**
- ifort

## 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
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Copyright 2017-2022 Standard Performance Evaluation Corporation

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Base Optimization Flags
C benchmarks:
-DSPEC_OPENMP -std=c11 -m64 -flopenmp -Wl,-z,muldefs -xCORE-AVX2
-O3 -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-AVX2 -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:
-m64 -xCORE-AVX2 -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

Fortran benchmarks:
ifort

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags
C benchmarks:

(Continued on next page)
ASUSTeK Computer Inc.
ASUS RS300-E11(P12R-M) Server System
(3.20 GHz, Intel Xeon E-2356G)

Peak Optimization Flags (Continued)

600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-xCORE-AVX2 -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-AVX2 -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-AVX2 -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.xalancbk_s: basepeak = yes
631.deepsjeng_s: basepeak = yes
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-p12-V1.2.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/ASUSTeKPlatform-Settings-p12-V1.2.xml
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
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| SPECspeed\(^\text{®}2017\)\_int\_base | 15.0 |
| SPECspeed\(^\text{®}2017\)\_int\_peak | 15.4 |

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