**SPEC CPU®2017 Integer Rate Result**

**ASUSTeK Computer Inc.**

ASUS RS300-E10(P11C-C/4L) Server System (3.70 GHz, Intel Xeon E-2288G)

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Oct-2019</th>
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<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Oct-2019</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Sep-2019</td>
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</table>

**CPU2017 License:** 9016

**Test Sponsor:** ASUSTeK Computer Inc.

**Tested by:** ASUSTeK Computer Inc.

**Hardware**

- **CPU Name:** Intel Xeon E-2288G
  - **Max MHz:** 5000
  - **Nominal:** 3700
  - **Enabled:** 8 cores, 1 chip, 2 threads/core
  - **Orderable:** 1 chip
  - **Cache L1:** 32 KB I + 32 KB D on chip per core
  - **L2:** 256 KB I+D on chip per core
  - **L3:** 16 MB I+D on chip per core
  - **Other:** None
  - **Memory:** 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)
  - **Storage:** 1 x 1 TB SATA SSD
  - **Other:** None

**Software**

- **OS:** SUSE Linux Enterprise Server 15
  - **Kernel:** 4.12.14-150.17-default
- **Compiler:** C/C++: Version 19.0.4.227 of Intel C/C++ Compiler Build 20190416 for Linux;
  - **Fortran:** Version 19.0.4.227 of Intel Fortran Compiler Build 20190416 for Linux
- **Parallel:** No
- **Firmware:** Version 3102 released Oct-2019
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 32/64-bit
- **Other:** jemalloc: jemalloc memory allocator library V5.0.1
- **Power Management:** --

**SPEC CPU®2017**

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<tr>
<th>SPECrate®2017_int_base = 61.7</th>
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### SPECrate®2017_int_base = 61.7

| SPECrate®2017_int_peak = 64.9 |

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**SPECrate**

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<td>541.leela_r 16</td>
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SPEC CPU® 2017 Integer Rate Result

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SPECrate® 2017_int_peak = 64.9

Results Table

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SPECRate® 2017_int_base = 61.7
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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset 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"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = 
"/spec2017_110/lib/intel64:/spec2017_110/lib/ia32:/spec2017_110/je5.0.1-32"

General Notes

Binaries compiled on a system with 1x Intel Core i9-799X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5
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
jemalloc: configured and built at default for 32bit (i686) and 64bit (x86_64) targets;

(Continued on next page)
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CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

SPECrates®2017_int_base = 61.7
SPECrates®2017_int_peak = 64.9

Test Date: Oct-2019
Hardware Availability: Oct-2019
Software Availability: Sep-2019

General Notes (Continued)
jemalloc: built with the RedHat Enterprise 7.4,
and the system compiler gcc 4.8.5;
jemalloc: sources available from jemalloc.net or
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
Software Guard Extensions (SGX) = Disabled
AES = Disabled
Race to Halt (RTH) = Disabled
Hardware Prefetcher = Disabled
Adjacent Cache Line Prefetch = Disabled

Sysinfo program /spec2017_110/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed1b6e6a485a0011
running on linux-zeo2 Fri Oct 25 16:56:19 2019

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-2288G CPU @ 3.70GHz
    1 "physical id"s (chips)
    16 "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

From lscpu:

  Architecture: x86_64
  CPU op-mode(s): 32-bit, 64-bit
  Byte Order: Little Endian
  CPU(s): 16
  On-line CPU(s) list: 0-15
  Thread(s) per core: 2

(Continued on next page)
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Platform Notes (Continued)

Core(s) per socket: 8
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 158
Model name: Intel(R) Xeon(R) E-2288G CPU @ 3.70GHz
Stepping: 13
CPU MHz: 3700.000
CPU max MHz: 5000.0000
CPU min MHz: 800.0000
BogoMIPS: 7392.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 16384K
NUMA node0 CPU(s): 0-15
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 nopl xtopology nonstop_tsc cpuid
aperfmpref tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdbug fma cx16 xtpre pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer
xsavex f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invpcid_single ssbd
ibrs ibpb stibp ibrs_enhanced tpr_shadow vmm1 flexpriority ept vpid fsgsbase
tsc_adjust bmi1 hle avx2 smep bmi2 erva invpd crd fma clflushopt intel_pt xsaveopt xsavec xgetbv1 xsaves dtherm ida arat pln pts hwp hwp_notify
hwp_act_window hwp_epp md_clear flush_l1d arch_capabilities

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.

From /proc/cpuid

MemTotal: 65580092 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

(Continued on next page)
Platform Notes (Continued)

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

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

    uname -a:
        Linux linux-zeo2 4.12.14-150.17-default #1 SMP Thu May 2 15:15:46 UTC 2019 (bf13fb8)
        x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

    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: __user pointer sanitization
    CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

    run-level 3 Oct 25 16:53

    SPEC is set to: /spec2017_110
        Filesystem Type Size Used Avail Use% Mounted on
        /dev/sda4 xfs 929G 26G 904G 3% /

    From /sys/devices/virtual/dmi/id
        BIOS: American Megatrends Inc. 3102 10/04/2019
        Vendor: ASUSTeK COMPUTER INC.
        Product: P11C-C Series
        Product Family: Server
        Serial: System Serial Number

    Additional information from dmidecode 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:
        4x Samsung M391A2K43BB1-CTD 16 GB 2 rank 2667, configured at 2666

    (End of data from sysinfo program)
## Compiler Version Notes

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<thead>
<tr>
<th>Language</th>
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<th>Version</th>
<th>Build</th>
<th>Copyright Notice</th>
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Compiler Version Notes (Continued)

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------------------------------------------------------------------------------

C++ | 523.xalancbmk_r(peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------

C++ | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
      531.deepsjeng_r(base, peak) 541.leela_r(base, peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------

Fortran | 548.exchange2_r(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64

(Continued on next page)
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Base Portability Flags (Continued)

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:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

Peak Compiler Invocation

C benchmarks (except as noted below):
icc -m64 -std=c11

C++ benchmarks (except as noted below):
icpc -m64
523.xalancbmk_r: icpc -m32 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/ia32_lin

(Continued on next page)
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---

**Peak Compiler Invocation (Continued)**

Fortran benchmarks:  
`ifort -m64`

---

**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: -D_FILE_OFFSET_BITS=64  -DSPEC_LINUX  
525.x264_r: -DSPEC_LP64  
531.deepsjeng_r: -DSPEC_LP64  
541.leelad_r: -DSPEC_LP64  
548.exchange2_r: -DSPEC_LP64  
557.xz_r: -DSPEC_LP64

---

**Peak Optimization Flags**

C benchmarks:

500.perlbench_r: -Wall, -z, muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=4  
-fno-strict-overflow  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64  
-lqkmalloc

502.gcc_r: -Wall, -z, muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=4  
-L/usr/local/je5.0.1-32/lib -ljemalloc

505.mcf_r: -Wall, -z, muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64  
-lqkmalloc

525.x264_r: -Wall, -z, muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4 -fno-alias  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64  
-lqkmalloc

557.xz_r: Same as 505.mcf_r

(Continued on next page)
ASUSTeK Computer Inc.  
ASUS RS300-E10(P11C-C/4L) Server System  
(3.70 GHz, Intel Xeon E-2288G)  

**SPECrate®2017_int_base = 61.7**  
**SPECrate®2017_int_peak = 64.9**

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<th>Test Date: Oct-2019</th>
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<td>Tested by: ASUSTeK Computer Inc.</td>
<td>Software Availability: Sep-2019</td>
</tr>
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### Peak Optimization Flags (Continued)

**C++ benchmarks:**

520.omnetpp_r: -Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

523.xalancbmk_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=4
-L/usr/local/je5.0.1-32/lib -ljemalloc

531.deepsjeng_r: Same as 520.omnetpp_r

541.leela_r: Same as 520.omnetpp_r

**Fortran benchmarks:**

-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

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

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