ASUSTeK Computer Inc.
ASUS RS300-E10(P11C-C/4L) Server System
(3.60 GHz, Intel Xeon E-2246G)

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.
Hardware Availability: Oct-2019
Software Availability: May-2019

Test Date: Dec-2019

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>48.1</td>
<td>50.4</td>
</tr>
</tbody>
</table>

Hardware

CPU Name: Intel Xeon E-2246G
Max MHz: 4800
Nominal: 3600
Enabled: 6 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: 12 MB I+D on chip per chip
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
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: Prefer performance at the cost of additional power usage.

<table>
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<tr>
<th>SPECrate®2017_int_peak</th>
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Results Table

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<td>557.xz_r</td>
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<td>432</td>
<td>30.0</td>
<td></td>
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</tr>
</tbody>
</table>

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"
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 = "/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 i9-7900X 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

(Continued on next page)
ASUSTeK Computer Inc.
ASUS RS300-E10(P11C-C/4L) Server System
(3.60 GHz, Intel Xeon E-2246G)

| SPECrate®2017_int_base = 48.1 |
| SPECrate®2017_int_peak = 50.4 |

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

---

**General Notes (Continued)**

32bit (i686) and 64bit (x86_64) targets;
jemalloc: built with the RedHat Enterprise 7.4,
and the system compiler gcc 4.8.5;
jemalloc: sources available from jemalloc.net or
Yes: The test sponsor attest, as of date of publication, that CVE-2017-5754 (Meltdown)
is mitigated in the system as tested and documented.
Yes: The test sponsor attest, 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 attest, 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
Race to Halt (RTH) = Disabled
AES = Disabled
Hardware Prefetcher = Disabled
Adjacent Cache Line Prefetch = Disabled

Sysinfo program /spec2017_110/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011
running on linux-zeo2 Fri Dec 6 05:58:31 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-2246G CPU @ 3.60GHz
 1 "physical id"s (chips)
 12 "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 : 6
siblings : 12
physical 0: cores 0 1 2 3 4 5
```

From lscpu:

```
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
```

(Continued on next page)
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Software Availability: May-2019

Platform Notes (Continued)

Core(s) per socket:  6
Socket(s):  1
NUMA node(s):  1
Vendor ID:  GenuineIntel
CPU family:  6
Model:  158
Model name:  Intel(R) Xeon(R) E-2246G CPU @ 3.60GHz
Stepping:  10
CPU MHz:  3600.000
CPU max MHz:  4800.0000
CPU min MHz:  800.0000
BogoMIPS:  7200.00
Virtualization:  VT-x
L1c cache:  32K
L1i cache:  32K
L2 cache:  256K
L3 cache:  12288K
NUMA node0 CPU(s):  0-11
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
aperfmpcr tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdbg fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer
xsafe avx fl64 rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invpcid_single pti
ssbd ibrs ibpb stibp tpr_shadow vmvi flexpriority ept vpid fsgsbase tsc_adjust bm1
hle avx2 smep bmi2 ersed invpcid rtm mpx rdsed adx smap clflushopt intel阡nt xsaveopt
xsavec xgetbv1 xsaves dtm mpia atd pln pts hwp hwp_notify hwp_act_window hwp_epp
md clear flush ll1d

/proc/cpuinfo cache data
  cache size : 12288 KB

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:  64043 MB
    node 0 free:  62684 MB
    node distances:
      node 0
        0:  10

From /proc/meminfo
  MemTotal:  65580920 kB
  HugePages_Total:  0
  Hugepagesize:  2048 kB

(Continued on next page)
SPECCPU®2017 Integer Rate Result

ASUSTeK Computer Inc.
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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): Mitigation: PTE Inversion; VMX: conditional cache flushes, SMT vulnerable
Microarchitectural Data Sampling:
CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2018-3639 (Speculative Store Bypass):
CVE-2017-5753 (Spectre variant 1):
CVE-2017-5715 (Spectre variant 2): Mitigation: Full generic retpoline, IBPB: conditional, IBRS_FW, STIBP: conditional, RSB filling

run-level 3 Dec 5 16:44

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

(Continued on next page)
ASUSTeK Computer Inc.

ASUS RS300-E10(P11C-C/4L) Server System
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SPEC CPU®2017 Integer Rate Result
Copyright 2017-2020 Standard Performance Evaluation Corporation

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SPECrate®2017_int_base = 48.1
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Test Date: Dec-2019
Hardware Availability: Oct-2019
Software Availability: May-2019

Platform Notes (Continued)

(End of data from sysinfo program)

Compiler Version Notes

C       | 502.gcc_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       | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
       | 525.x264_r(base, peak) 557.xz_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.

C       | 502.gcc_r(peak)
---------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on IA-32, Version
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Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

C       | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
       | 525.x264_r(base, peak) 557.xz_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.

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.

(Continued on next page)
ASUSTeK Computer Inc.

ASUS RS300-E10(P11C-C/4L) Server System
(3.60 GHz, Intel Xeon E-2246G)

SPEC CPU®2017 Integer Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

SPECrating®2017_int_base = 48.1
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ASUS RS300-E10(P11C-C/4L) Server System
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Compiler Version Notes (Continued)

==============================================================================
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.
==============================================================================

C++ | 523.xalancbmk_r(peak)
==============================================================================
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
# SPEC CPU®2017 Integer Rate Result

**ASUSTeK Computer Inc.**
ASUS RS300-E10(P11C-C/4L) Server System
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**SPECrate®2017_int_base = 48.1**
**SPECrate®2017_int_peak = 50.4**

---

**Base Portability Flags**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
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<tbody>
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<td>500.perlbench</td>
<td>-DSPEC_LP64 -DSPEC_LINUX_X64</td>
</tr>
<tr>
<td>502.gcc</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>505.mcf</td>
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</tr>
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</tr>
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<td>541.leela</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>548.exchange2</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>557.xz</td>
<td>-DSPEC_LP64</td>
</tr>
</tbody>
</table>

---

**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):**

```bash
icc -m64 -std=c11
```

```bash
```

**C++ benchmarks (except as noted below):**

```bash
icpc -m64
```
ASUSTeK Computer Inc.
ASUS RS300-E10(P11C-C/4L) Server System
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</table>

Peak Compiler Invocation (Continued)

523.xalancbmk_r: icpc -m32 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/ia32_lin

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.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Peak Optimization Flags

C benchmarks:

500.perlbench_r: -Wl,-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: -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/jge5.0.1-32/lib -ljemalloc

505.mcf_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

525.x264_r: -Wl,-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

(Continued on next page)
ASUSTeK Computer Inc.
ASUS RS300-E10(P11C-C/4L) Server System
(3.60 GHz, Intel Xeon E-2246G)

SPECrater®2017_int_base = 48.1
SPECrater®2017_int_peak = 50.4

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Test Date: Dec-2019
Hardware Availability: Oct-2019
Tested by: ASUSTeK Computer Inc.
Software Availability: May-2019

Peak Optimization Flags (Continued)

557.xz_r: Same as 505.mcf_r

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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Tested with SPEC CPU®2017 v1.1.0 on 2019-12-05 16:58:30-0500.
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