**ASUSTeK Computer Inc.**

ASUS RS700-E9(Z11PP-D24) Server System
(2.10 GHz, Intel Xeon Silver 4116)

<table>
<thead>
<tr>
<th>Test Sponsor:</th>
<th>ASUSTeK Computer Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested by:</td>
<td>ASUSTeK Computer Inc.</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Feb-2019</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Nov-2018</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9016

**Test Date:** Mar-2019

**Software**

- OS: SUSE Linux Enterprise Server 12 (x86_64) SP3
- Compiler: C/C++: Version 19.0.1.144 of Intel C/C++
- Compiler Build 20181018 for Linux;
- Fortran: Version 19.0.1.144 of Intel Fortran
- Compiler Build 20181018 for Linux
- Parallel: Yes
- Firmware: Version 5102 released Mar-2019 tested as Feb-2019
- File System: btrfs
- System State: Run level 3 (multi-user)
- Base Pointers: 64-bit
- Peak Pointers: 64-bit
- Other: jemalloc memory allocator library V5.0.1

<table>
<thead>
<tr>
<th>Software</th>
<th>SPECspeed2017_int_base = 7.66</th>
<th>SPECspeed2017_int_peak = 7.81</th>
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</table>

<table>
<thead>
<tr>
<th>Thread</th>
<th>SPECspeed2017_int_base</th>
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<tr>
<td>600.perlbench_s</td>
<td>6.16</td>
<td>7.81</td>
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<tr>
<td>602.gcc_s</td>
<td>7.89</td>
<td>10.1</td>
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<tr>
<td>605.mcf_s</td>
<td>5.60</td>
<td>10.1</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>5.33</td>
<td>9.68</td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>9.64</td>
<td>11.0</td>
</tr>
<tr>
<td>625.x264_s</td>
<td>11.0</td>
<td>11.0</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>4.29</td>
<td>4.30</td>
</tr>
<tr>
<td>641.leela_s</td>
<td>3.64</td>
<td>3.64</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>10.8</td>
<td>11.0</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>16.9</td>
<td>17.3</td>
</tr>
</tbody>
</table>

**Hardware**

- CPU Name: Intel Xeon Silver 4116
- Max MHz.: 3000
- Nominal: 2100
- Enabled: 24 cores, 2 chips
- Orderable: 1, 2 chip(s)
- Cache L1: 32 KB I + 32 KB D on chip per core
- L2: 1 MB I+D on chip per core
- L3: 16.5 MB I+D on chip per chip
- Other: None
- Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)
- Storage: 1 x 1 TB SATA SSD
- Other: None
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CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Results Table

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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>48</td>
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<td>5.24</td>
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<td>5.26</td>
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<td>605.mcf_s</td>
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<tr>
<td>625.x264_s</td>
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<td>11.0</td>
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<td>4.30</td>
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<td>3.64</td>
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<td>274</td>
<td>10.7</td>
<td>273</td>
<td>10.8</td>
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<tr>
<td>657.xz_s</td>
<td>48</td>
<td>368</td>
<td>16.8</td>
<td>365</td>
<td>16.9</td>
<td>365</td>
<td>16.9</td>
</tr>
</tbody>
</table>

SPECspeed2017_int_base = 7.66
SPECspeed2017_int_peak = 7.81

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"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/spec2017_2019u1/lib/ia32:/spec2017_2019u1/lib/intel64:
/spec2017_2019u1/je5.0.1-32:/spec2017_2019u1/je5.0.1-64"
OMP_STACKSIZE = "192M"

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: jemalloc, a general purpose malloc implementation
jemalloc: built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
Yes: 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.
SPEC CPU2017 Integer Speed Result

ASUSTeK Computer Inc.
ASUS RS700-E9(Z11PP-D24) Server System
(2.10 GHz, Intel Xeon Silver 4116)

SPECspeed2017_int_base = 7.66
SPECspeed2017_int_peak = 7.81

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Test Date: Mar-2019
Hardware Availability: Feb-2019
Tested by: ASUSTeK Computer Inc.
Software Availability: Nov-2018

Platform Notes

BIOS Configuration:
SNC = Disabled
IMC interleaving = AUTO
Patrol Scrub = Disabled
VT-d = Disabled
HyperThreading = Disabled
Sysinfo program /spec2017_2019u1/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-pmm5 Sat Mar 30 02:53:41 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) Silver 4116 CPU @ 2.10GHz
  2 "physical id"s (chips)
  24 "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 : 12
siblings : 12
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 24
On-line CPU(s) list: 0-23
Thread(s) per core: 1
Core(s) per socket: 12
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4116 CPU @ 2.10GHz
Stepping: 4
CPU MHz: 2776.813
CPU max MHz: 3000.0000
CPU min MHz: 800.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K

(Continued on next page)
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Platform Notes (Continued)

L2 cache: 1024K
L3 cache: 16896K
NUMA node0 CPU(s): 0-11
NUMA node1 CPU(s): 12-23
Flags: fpu vmx de pse tsc mtrr pae mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmrperf eagerfpu 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 ida arat epb invpcid_single pln pts
dtherm hwlp act_window hwp_epp hwp_pkg_req intel_pt rsb_ctxsw spec_ctrl stibp
retpoline kaiser tpr_shadow vmvi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle
avx2 smep bmi2 ets invpcid rtm cqm mxv avx512f avx512dq rdseed adx smap clflushopt
clwb avx512cd avx512sw avx512vl xsaveopt xsaves cvtsid xgetbv1 cqm_llc cqm_occu llc pku
ospke

/proc/cpuinfo cache data
cache size: 16896 KB

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

available: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11
node 0 size: 386333 MB
node 0 free: 384633 MB
node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23
node 1 size: 387036 MB
node 1 free: 384733 MB
node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 791931416 KB
HugePages_Total: 0
Hugepagesize: 2048 KB

From /etc/*release* /etc/*version*
SuSE-release:

SUSE Linux Enterprise Server 12 (x86_64)
VERSION = 12
PATCHLEVEL = 3

# This file is deprecated and will be removed in a future service pack or release.
# Please check /etc/os-release for details about this release.
os-release:
NAME="SLES"

(Continued on next page)
SPEC CPU2017 Integer Speed Result

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SPECspeed2017_int_base = 7.66
SPECspeed2017_int_peak = 7.81

Platform Notes (Continued)

VERSION="12-SP3"
VERSION_ID="12.3"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
    Linux linux-pmm5 4.4.120-94.17-default #1 SMP Wed Mar 14 17:23:00 UTC 2018 (cf3a7bb)
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

run-level 3 Mar 29 09:11

SPEC is set to: /spec2017_2019u1
    Filesystem     Type   Size  Used Avail Use% Mounted on
    /dev/sda2      btrfs  933G   70G  863G   8% /

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.
    BIOS American Megatrends Inc. 5102 02/11/2019
    Memory:
        24x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base, peak) 657.xz_s(base)
==============================================================================

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
    Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
CC  600.perlbench_s(peak) 602.gcc_s(peak) 605.mcf_s(peak) 657.xz_s(peak)

(Continued on next page)
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SPEC CPU2017 Integer Speed Result

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SPECspeed2017_int_base = 7.66
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CPU2017 License: 9016
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Tested by: ASUSTeK Computer Inc.
Test Date: Mar-2019
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Compiler Version Notes (Continued)

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.lee1a_s(base, peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

CXXC 620.omnetpp_s(peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.1.144 Build 20181018
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

FC 648.exchange2_s(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.1.144 Build 20181018
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Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64
SPEC CPU2017 Integer Speed Result

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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
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
- Wl, -z, muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
- qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
- L/usr/local/jemalloc

C++ benchmarks:
- Wl, -z, muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
- qopt-mem-layout-trans=4
- L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
- lqkmalloc

Fortran benchmarks:
- xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
- nostandard-realloc-lhs

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64
SPEC CPU2017 Integer Speed Result

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Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
600.perlbench_s: -Wl,-zmuldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX2 -qopt-mem-layout-trans=4 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -fno-strict-overflow
-L/usr/local/je5.0.1-64/lib -ljemalloc

602.gcc_s: -Wl,-zmuldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX2 -qopt-mem-layout-trans=4 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

605.mcf_s: -Wl,-zmuldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=4
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

625.x264_s: -Wl,-zmuldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

657.xz_s: -Wl,-zmuldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX2 -qopt-mem-layout-trans=4 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
620.omnetpp_s: -Wl,-zmuldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=4
-DSPEC_SUPPRESS_OPENMP
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

623.xalancbmk_s: -Wl,-zmuldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

(Continued on next page)
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Peak Optimization Flags (Continued)

631.deepsjeng_s: Same as 623.xalancbmk_s

641.leela_s: Same as 623.xalancbmk_s

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs

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:
http://www.spec.org/cpu2017/flags/ASUSTeKPlatform-Settings-z11-V2.0-revD.xml

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

Tested with SPEC CPU2017 v1.0.5 on 2019-03-29 14:53:40-0400.
Originally published on 2019-05-01.