## SPEC CPU®2017 Integer Speed Result

**ASUSTeK Computer Inc.**  
ASUS ESC8000 G4(Z11PG-D24) Server System  
(3.10 GHz, Intel Xeon Gold 6242R)

**CPU2017 License:** 9016  
**Test Sponsor:** ASUSTeK Computer Inc.  
**Tested by:** ASUSTeK Computer Inc.  
**Test Date:** Jun-2020  
**Hardware Availability:** Feb-2020  
**Software Availability:** Apr-2020

### Hardware

**CPU Name:** Intel Xeon Gold 6242R  
**Max MHz:** 4100  
**Nominal:** 3100  
**Enabled:** 40 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:** 35.75 MB I+D on chip per chip  
**Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)  
**Storage:** 1 x 1 TB SATA SSD  
**Other:** None

### Software

**OS:** SUSE Linux Enterprise Server 15 SP1  
**Kernel:** 4.12.14-195-default  
**Compiler:** C/C++: Version 19.1.1.217 of Intel C/C++ Compiler Build 20200306 for Linux; Fortran: Version 19.1.1.217 of Intel Fortran Compiler Build 20200306 for Linux  
**Parallel:** Yes  
**Firmware:** Version 6102 released Dec-2019  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 64-bit  
**Other:** jemalloc: jemalloc memory allocator library V5.0.1  
**Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage

### Benchmark Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_s</td>
<td>40</td>
<td>7.08</td>
<td>8.08</td>
</tr>
<tr>
<td>gcc_s</td>
<td>40</td>
<td>11.2</td>
<td></td>
</tr>
<tr>
<td>mcf_s</td>
<td>40</td>
<td>11.8</td>
<td></td>
</tr>
<tr>
<td>omnetpp_s</td>
<td>40</td>
<td>11.3</td>
<td></td>
</tr>
<tr>
<td>xalanchmk_s</td>
<td>40</td>
<td>14.3</td>
<td></td>
</tr>
<tr>
<td>x264_s</td>
<td>40</td>
<td>16.8</td>
<td>17.4</td>
</tr>
<tr>
<td>deepsjeng_s</td>
<td>40</td>
<td>6.11</td>
<td>17.4</td>
</tr>
<tr>
<td>leela_s</td>
<td>40</td>
<td>5.04</td>
<td></td>
</tr>
<tr>
<td>exchange2_s</td>
<td>40</td>
<td>17.4</td>
<td></td>
</tr>
<tr>
<td>xz_s</td>
<td>40</td>
<td>25.1</td>
<td></td>
</tr>
</tbody>
</table>
ASUSTeK Computer Inc.

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SPECspeed®2017_int_base = 11.9

SPECspeed®2017_int_peak = 12.1

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>40</td>
<td>254</td>
<td>6.99</td>
<td>251</td>
<td>7.08</td>
<td>7.08</td>
<td>251</td>
<td>7.08</td>
<td>40</td>
<td>220</td>
<td>8.08</td>
<td>221</td>
<td>8.02</td>
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<tr>
<td>602.mcf_s</td>
<td>40</td>
<td>356</td>
<td>11.2</td>
<td>356</td>
<td>11.2</td>
<td>11.2</td>
<td>356</td>
<td>11.2</td>
<td>40</td>
<td>344</td>
<td>11.6</td>
<td>341</td>
<td>11.7</td>
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<tr>
<td>605.mcf_s</td>
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<td>239</td>
<td>19.7</td>
<td>237</td>
<td>19.9</td>
<td>19.8</td>
<td>238</td>
<td>19.8</td>
<td>40</td>
<td>239</td>
<td>19.7</td>
<td>237</td>
<td>19.9</td>
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<tr>
<td>620.omnetpp_s</td>
<td>40</td>
<td>145</td>
<td>11.3</td>
<td>142</td>
<td>11.5</td>
<td>11.0</td>
<td>145</td>
<td>11.3</td>
<td>40</td>
<td>145</td>
<td>11.3</td>
<td>142</td>
<td>11.5</td>
</tr>
<tr>
<td>623.xalanchmk_s</td>
<td>40</td>
<td>99.2</td>
<td>14.3</td>
<td>99.0</td>
<td>14.3</td>
<td>14.2</td>
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<tr>
<td>625.x264_s</td>
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<td>105</td>
<td>16.8</td>
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<td>16.8</td>
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<td>17.4</td>
<td>101</td>
<td>17.4</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>40</td>
<td>234</td>
<td>6.11</td>
<td>235</td>
<td>6.11</td>
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<td>235</td>
<td>6.11</td>
<td>40</td>
<td>234</td>
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<td>235</td>
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</tr>
<tr>
<td>641.leela_s</td>
<td>40</td>
<td>338</td>
<td>5.04</td>
<td>338</td>
<td>5.04</td>
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<td>338</td>
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<td>40</td>
<td>338</td>
<td>5.04</td>
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<td>5.04</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>40</td>
<td>170</td>
<td>17.3</td>
<td>169</td>
<td>17.4</td>
<td>17.4</td>
<td>169</td>
<td>17.4</td>
<td>40</td>
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<tr>
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<td>40</td>
<td>246</td>
<td>25.1</td>
<td>246</td>
<td>25.1</td>
<td>25.1</td>
<td>246</td>
<td>25.1</td>
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<td>246</td>
<td>25.1</td>
<td>246</td>
<td>25.1</td>
</tr>
</tbody>
</table>

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

Compiler Notes

The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler.
The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux
The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

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 = "/191u1/lib/intel64:/191u1/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: 
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<table>
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**CPU2017 License:** 9016

**Test Sponsor:** ASUSTeK Computer Inc.

**Tested by:** ASUSTeK Computer Inc.

**Test Date:** Jun-2020

**Hardware Availability:** Feb-2020

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---

**General Notes (Continued)**

```
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.

The jemalloc library was configured and built at default for 32bit (i686) and 64bit (x86_64) targets; built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5; sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases

---

**Platform Notes**

**BIOS Configuration:**

- VT-d = Disabled
- Patrol Scrub = Disabled
- ENERGY_PERF_BIAS_CFG mode = performance
- HyperThreading = Disabled
- CSM Support = Disabled
- Engine Boost = Level3(Max)
- Enforce POR = Disable
- Memory Frequency = 2933
- LLC dead line allc = Disabled
- SR-IOV Support = Disabled

Sysinfo program /191u1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011
running on linux-628j Tue Jun 30 04:40:20 2020

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) Gold 6242R CPU @ 3.10GHz
  2 "physical id"s (chips)
  40 "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 : 20
siblings : 20
```

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

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**SPECspeed®2017_int_base = 11.9**  
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---

**Platform Notes (Continued)**

physical 0: cores 0 1 2 3 5 6 8 9 10 11 12 13 16 17 18 19 20 21 27 29  
physical 1: cores 1 2 3 5 6 10 12 13 16 17 18 19 20 21 24 25 26 27 28 29

---

From /proc/cpuinfo, cache data

```
Cache size : 36608 KB
```

---

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

(Continued on next page)
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Platform Notes (Continued)

physical chip.
  available: 2 nodes (0-1)
  node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
  node 0 size: 385614 MB
  node 0 free: 385196 MB
  node 1 cpus: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
  node 1 size: 387037 MB
  node 1 free: 385672 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 791195896 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
  os-release:
    NAME="SLES"
    VERSION="15-SP1"
    VERSION_ID="15.1"
    PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
    ID="sles"
    ID_LIKE="suse"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:15:sp1"

  uname -a:
    Linux linux-628j 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
    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 Jun 29 17:07

SPEC is set to: /191u1

(Continued on next page)
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Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 932G 27G 905G 3% /

From /sys/devices/virtual/dmi/id
BIOS: American Megatrends Inc. 6102 12/19/2019
Vendor: ASUSTeK COMPUTER INC.
Product: Z11PG-D24 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:
24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
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) C Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==============================================================================

C | 600.perlbench_s(peak)

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.1.217 Build 20200306
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) C Compiler for applications running on Intel(R) 64, Version 2021.1
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(Continued on next page)
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Compiler Version Notes (Continued)

---
C | 600.perlbench_s(peak)
---
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
---
C++ | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak)
---
Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
---
Fortran | 648.exchange2_s(base, peak)
---
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
---

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

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
SPEC CPU®2017 Integer Speed Result
Copyright 2017-2020 Standard Performance Evaluation Corporation

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SPECspeed®2017_int_base = 11.9
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Base Portability Flags (Continued)

623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leea_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
- -m64 -qmnextgen -std=c11
- -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
- -xCORE-avX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
- -fuse-ld=gold -qopt-mem-layout-trans=4 -fopenmp -DSPEC_OPENMP
- -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

C++ benchmarks:
- -m64 -qmnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
- -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse
- -funroll-loops -fuse-ld=gold -qopt-mem-layout-trans=4
- -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
  -lqkmalloc

Fortran benchmarks:
- -m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -xCORE-AVX512
- -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
- -nostandard-realloc-lhs -align array32byte
- -mbranches-within-32B-boundaries

Peak Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort
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Peak Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64(*) -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

(*) Indicates a portability flag that was found in a non-portability variable.

Peak Optimization Flags

C benchmarks:

600.perlbench_s: -Wl, -z, muldefs -prof-gen(pass 1) -prof-use(pass 2)
-xCORE-AVX512 -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 -qnextgen -std=c11 -fuse-ld=gold
-Wl, -plugin-opt=-x86-branches-within-32B-boundaries
-Wl, -z, muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdatal -xCORE-AVX512 -flto
-ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

605.mcf_s: basepeak = yes

625.x264_s: -m64 -qnextgen -std=c11
-Wl, -plugin-opt=-x86-braches-within-32B-boundaries
-Wl, -z, muldefs -xCORE-AVX512 -fllto -O3 -ffast-math
-fuse-ld=gold -qopt-mem-layout-trans=4 -fno-alias
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

657.xz_s: basepeak = yes

C++ benchmarks:

620.omnetpp_s: basepeak = yes

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

623.xalancbmk_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

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.xml

SPECSpecification of Benchmark Software and Hardware

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

Tested with SPEC CPU®2017 v1.1.0 on 2020-06-29 16:40:20-0400.
Originally published on 2020-08-18.