**SPEC CPU®2017 Integer Speed Result**

**ASUSTeK Computer Inc.**
ASUS ESC8000 G4(Z11PG-D24) Server System
(1.90 GHz, Intel Xeon Gold 6238T)

<table>
<thead>
<tr>
<th>Thread</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>44</td>
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<tr>
<td>602.gcc_s</td>
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<td>605.mcf_s</td>
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<td>620.omnetpp_s</td>
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<td>12.1</td>
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<td>623.xalanchmk_s</td>
<td>44</td>
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</tr>
<tr>
<td>625.x264_s</td>
<td>44</td>
<td>14.2</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>44</td>
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<tr>
<td>641.leela_s</td>
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<td>4.61</td>
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<tr>
<td>648.exchange2_s</td>
<td>44</td>
<td>13.6</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>44</td>
<td>23.6</td>
</tr>
</tbody>
</table>

### Hardware
- **CPU Name:** Intel Xeon Gold 6238T
- **Max MHz:** 3700
- **Nominal:** 1900
- **Enabled:** 44 cores, 2 chips
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **Cache L2:** 1 MB I+D on chip per core
- **Cache L3:** 30.25 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
- **Kernel:** 4.12.14-23-default
- **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 Feb-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:** --
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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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<tr>
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<td>396</td>
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<tr>
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<td>44</td>
<td>370</td>
<td>4.61</td>
<td>370</td>
<td>4.61</td>
<td>370</td>
<td>4.61</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>44</td>
<td>216</td>
<td>13.6</td>
<td>216</td>
<td>13.6</td>
<td>216</td>
<td>13.6</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>44</td>
<td>262</td>
<td>23.6</td>
<td>262</td>
<td>23.6</td>
<td>262</td>
<td>23.6</td>
</tr>
</tbody>
</table>

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,compact,1,0"
- 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: configured and built at default for 32bit (i686) and 64bit (x86_64) targets;
- jemalloc: built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5;

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.
SPEC CPU®2017 Integer Speed Result
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SPECspeed®2017_int_base = 10.0
SPECspeed®2017_int_peak = 10.3

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

Platform Notes

BIOS Configuration:
VT-d = Disabled
Patrol Scrub = Disabled
HyperThreading = Disabled
ENERGY_PERF_BIAS_CFG mode = performance
CSM Support = Disabled
Engine Boost = Level3(Max)
Enforce POR = Disable
Memory Frequency = 2933
LLC dead line alloc = Disabled
SR-IOV Support = Disabled
Sysinfo program /spec2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-gh78 Tue May 28 01:37:23 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) Gold 6238T CPU @ 1.90GHz
  2 "physical id"s (chips)
  44 "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 : 22
siblings : 22
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 44
On-line CPU(s) list: 0-43
Thread(s) per core: 1
Core(s) per socket: 22
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6238T CPU @ 1.90GHz
Stepping: 6
CPU MHz: 1900.000
CPU max MHz: 3700.0000

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU min MHz:</td>
<td>800.0000</td>
</tr>
<tr>
<td>BogoMIPS:</td>
<td>3800.00</td>
</tr>
<tr>
<td>Virtualization:</td>
<td>VT-x</td>
</tr>
<tr>
<td>L1d cache:</td>
<td>32K</td>
</tr>
<tr>
<td>L1i cache:</td>
<td>32K</td>
</tr>
<tr>
<td>L2 cache:</td>
<td>1024K</td>
</tr>
<tr>
<td>L3 cache:</td>
<td>30976K</td>
</tr>
<tr>
<td>NUMA node0 CPU(s):</td>
<td>0-21</td>
</tr>
<tr>
<td>NUMA node1 CPU(s):</td>
<td>22-43</td>
</tr>
<tr>
<td>Flags:</td>
<td></td>
</tr>
<tr>
<td>/proc/cpuinfo cache data</td>
<td></td>
</tr>
<tr>
<td>cache size :</td>
<td>30976 KB</td>
</tr>
</tbody>
</table>

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 12 13 14 15 16 17 18 19 20 21 |
| node 0 size:                   | 386304 MB        |
| node 0 free:                   | 384824 MB        |
| node 1 cpus:                   | 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 |
| node 1 size:                   | 387021 MB        |
| node 1 free:                   | 386557 MB        |
| node distances:                |                  |
| node 0                          | 0 1              |
| node 1                          | 1 21             |

From /proc/meminfo

| MemTotal:                      | 791885728 kB     |
| HugePages_Total:               | 0                |
| Hugepagesize:                  | 2048 kB          |

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

    os-release:
      NAME="SLES"

(Continued on next page)
Platform Notes (Continued)

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-gh78 4.12.14-23-default #1 SMP Tue May 29 21:04:44 UTC 2018 (cd0437b)
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Not affected
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

run-level 3 May 27 16:32

SPEC is set to: /spec2017

Filesystem     Type   Size  Used  Avail Use% Mounted on
/dev/sda4      xfs  929G   11G  919G   2%  /

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 M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2934

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
| C       | 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_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.

(Continued on next page)
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Compiler Version Notes (Continued)

C++  
| 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak)
| 631.deepsjeng_s(base, peak) 641.leela_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.

Fortran  
| 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  
Copyright (C) 1985-2018 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

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
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Hardware Availability: Apr-2019
Software Availability: Nov-2018

### Base Optimization Flags

C benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -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-AVX512 -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

### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

C benchmarks:
600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -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

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- **Tested by:** ASUSTeK Computer Inc.

**Hardware Availability:** Apr-2019  
**Software Availability:** Nov-2018

### Peak Optimization Flags (Continued)

- **602.gcc_s:** `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2`  
  `-xCORE-AVX512 -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,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo`  
  `-xCORE-AVX512 -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,-z,muldefs -xCORE-AVX512 -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,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`  
  `-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP`  
  `-L/usr/local/je5.0.1-64/lib -ljemalloc`

### C++ benchmarks:

- **620.omnetpp_s:** `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo`  
  `-xCORE-AVX512 -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,-z,muldefs -xCORE-AVX512 -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`

- **631.deepsjeng_s:** Same as 623.xalancbmk_s

- **641.leela_s:** Same as 623.xalancbmk_s

### Fortran benchmarks:

- `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4`  
  `-nostandard-realloc-lhs`
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**Software Availability:** Nov-2018

You can also download the XML flags sources by saving the following links:

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