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

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

**SPECrate®2017_int_base = 253**  
**SPECrate®2017_int_peak = 262**

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**Hardware**

| Copies | 0 | 20.0 | 50.0 | 80.0 | 100 | 120 | 140 | 160 | 180 | 200 | 220 | 240 | 260 | 280 | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 |
|--------|---|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 500.perlbench_r | 88 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 502.gcc_r | 88 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 505.mcf_r | 88 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 520.omnetpp_r | 88 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 523.xalancbmk_r | 88 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 525.x264_r | 88 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 531.deepsjeng_r | 88 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 541.leela_r | 88 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 548.exchange2_r | 88 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 557.xz_r | 88 | | | | | | | | | | | | | | | | | | | | | | | | | |

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**Software**

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon Gold 6238T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz:</td>
<td>3700</td>
</tr>
<tr>
<td>Nominal:</td>
<td>1900</td>
</tr>
<tr>
<td>Enabled:</td>
<td>44 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable:</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Cache L1:</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2:</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3:</td>
<td>30.25 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)</td>
</tr>
<tr>
<td>Storage:</td>
<td>1 x 1 TB SATA SSD</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
</tbody>
</table>

- **OS:** SUSE Linux Enterprise Server 15  
- **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:** No  
- **Firmware:** Version 5102 released Feb-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:** --

---

**Test Sponsor:** ASUSTeK Computer Inc.  
**Hardware Availability:** Apr-2019  
**Software Availability:** Nov-2018  
**Test Date:** May-2019  
**Tested by:** ASUSTeK Computer Inc.
### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base</th>
<th>Peak</th>
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<tr>
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<td>Seconds</td>
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<tr>
<td>500.perlbench_r</td>
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<td>724</td>
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<td>625</td>
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<tr>
<td>523.xalanbmk_r</td>
<td>88</td>
<td>323</td>
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<td>525.x264_r</td>
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<td>336</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>88</td>
<td>487</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>88</td>
<td>757</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>88</td>
<td>535</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>88</td>
<td>546</td>
</tr>
</tbody>
</table>

SPECrater*2017_int_base = 253
SPECrater*2017_int_peak = 262

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

### Submit Notes

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

### General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/spec2017/lib/ia32:/spec2017/lib/intel64:
/spec2017/je5.0.1-32:/spec2017/je5.0.1-64"

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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
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;
jemalloc: sources available from jemalloc.net or

(Continued on next page)
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ASUS ESC8000 G4(Z11PG-D24) Server System
(1.90 GHz, Intel Xeon Gold 6238T)

SPECrate®2017_int_base = 253
SPECrate®2017_int_peak = 262

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

General Notes (Continued)

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
Patrol Scrub = Disabled
ENERGY_PERF_BIAS_CFG mode = performance
SNC = Enabled
IMC interleaving = 1-way
Engine Boost = Level3(Max)
Enforce POR = Disable
Memory Frequency = 2933
LLC dead line alloc = Disabled
SR-IOV Support = Disabled
CSM Support = Disabled
Sysinfo program /spec2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999e33d61f64985e45859ea9
running on linux-gh78 Fri May 24 01:34:23 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)
  88 "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 : 44
  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): 88

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Platform Notes (Continued)

On-line CPU(s) list: 0-87
Thread(s) per core: 2
Core(s) per socket: 22
Socket(s): 2
NUMA node(s): 4
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
CPU min MHz: 800.0000
BogoMIPS: 3800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 30976K
NUMA node0 CPU(s): 0-2,6-8,11-13,17,18,44-46,50-52,55-57,61,62
NUMA node1 CPU(s): 3-5,9,10,14-16,19-21,47-49,53,54,58-60,63-65
NUMA node2 CPU(s): 22-24,28-30,33-35,39,40,66-68,72-74,77-79,83,84
NUMA node3 CPU(s): 25-27,31,32,36-38,41-43,69-71,75,76,80-82,85-87
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 bpt每股_xtopology nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fx16 rdtscp pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single mba tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ersed invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_1lc cqm_occmap_1lc cqm_mbb_total cqm_mbb_local ibpb ibrs stibp dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke avx512_vnni arch_capabilities ssbd

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 6 7 8 11 12 13 17 18 44 45 46 50 51 52 55 56 57 61 62
node 0 size: 192061 MB
node 0 free: 191425 MB
node 1 cpus: 3 4 5 9 10 14 15 16 19 20 21 47 48 49 53 54 58 59 60 63 64 65
node 1 size: 30976 MB

(Continued on next page)
Platform Notes (Continued)

node 1 free: 192871 MB  
node 2 cpus: 22 23 24 28 29 30 33 34 35 39 40 66 67 68 72 73 74 77 78 79 83 84  
node 2 size: 193511 MB  
node 2 free: 192986 MB  
node 3 cpus: 25 26 27 31 32 36 37 38 41 42 43 69 70 71 75 76 80 81 82 85 86 87  
node 3 size: 193506 MB  
node 3 free: 192996 MB  
node distances:  
node 0 1 2 3  
0: 10 11 21 21  
1: 11 10 21 21  
2: 21 21 10 11  
3: 21 21 11 10

From /proc/meminfo  
MemTotal: 791102796 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB

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

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, IBBP, IBRS_FW

run-level 3 May 23 16:40

SPEC is set to: /spec2017  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/sda4 xfs 929G 11G 919G 2% /

(Continued on next page)
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**Test Date:** May-2019

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**Hardware Availability:** Apr-2019

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**Platform Notes (Continued)**

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)

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**Compiler Version Notes**

<table>
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<tr>
<th>C</th>
<th>502.gcc_r(peak)</th>
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## Compiler Version Notes (Continued)

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<tr>
<th>Compiler</th>
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</tr>
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<tr>
<td>C++</td>
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Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version 19.0.1.144 Build 20181018
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<table>
<thead>
<tr>
<th>C++</th>
<th>520.omnetpp_r(base, peak) 523.xalancbmk_r(base)</th>
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<tbody>
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<tr>
<th>Fortran</th>
<th>548.exchange2_r(base, peak)</th>
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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:
```bash
c -m64 -std=c11
```

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Base Compiler Invocation (Continued)

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
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-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

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:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc
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### 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_2019.1.144/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-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
-ffno-strict-overflow
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc
```

```
502.gcc_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
-L/usr/local/je5.0.1-32/lib -ljemalloc
```

```
505.mcf_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
```

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Peak Optimization Flags (Continued)

505.mcf_r (continued):
-/-usr/local/IntelCompiler19/compilers_and_LIBRARIES_2019.1.144/linux/compiler/lib/intel64
-/-lqkmalloc

525.x264_r -W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -fn0-alias
-/-usr/local/IntelCompiler19/compilers_and_LIBRARIES_2019.1.144/linux/compiler/lib/intel64
-/-lqkmalloc

557.xz_r: Same as 505.mcf_r

C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalancbmk_r -W1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
-/-usr/local/je5.0.1-32/lib -ljemalloc

531.deepsjeng_r -W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-/-usr/local/IntelCompiler19/compilers_and_LIBRARIES_2019.1.144/linux/compiler/lib/intel64
-/-lqkmalloc

541.leela_r: basepeak = yes

Fortran benchmarks:
-W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-/-usr/local/IntelCompiler19/compilers_and_LIBRARIES_2019.1.144/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:
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 CPU®2017 v1.0.5 on 2019-05-23 13:34:23-0400.
Report generated on 2020-12-30 17:12:43 by CPU2017 PDF formatter v6255.
Originally published on 2019-06-25.