ASUSTeK Computer Inc.
ASUS ESC8000 G4(Z11PG-D24) Server System
(3.60 GHz, Intel Xeon Gold 6244)

SPECspeed2017_fp_base = 114
SPECspeed2017_fp_peak = 115

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

### Threads

<table>
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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Specspeed2017_fp_base</th>
<th>Specspeed2017_fp_peak</th>
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<tr>
<td>603.bwaves_s</td>
<td>32</td>
<td>69.2</td>
<td>112</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<td>619.lbm_s</td>
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<td>621.wrf_s</td>
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<tr>
<td>644.nab_s</td>
<td>32</td>
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<td>178</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>32</td>
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<tr>
<td>654.roms_s</td>
<td>32</td>
<td>125</td>
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</tbody>
</table>

#### Hardware

- **CPU Name:** Intel Xeon Gold 6244
- **Max MHz.:** 4400
- **Nominal:** 3600
- **Enabled:** 16 cores, 2 chips, 2 threads/core
- **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:** 2.475 MB I+D on chip per core
- **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:** None
### SPEC CPU2017 Floating Point Speed Result

**ASUSTeK Computer Inc.**  
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#### Results Table

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<td>126</td>
<td>126</td>
<td>125</td>
<td>127</td>
<td>124</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"  
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  
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:  
SNC = Disabled  
IMC interleaving = AUTO

(Continued on next page)
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Platform Notes (Continued)

Patrol Scrub = Disabled
VT-d = Disabled
HyperThreading = Enabled
Sysinfo program /spec2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcede8f2999c33d61f64985e45859ea9
running on linux-gh78 Fri May 10 14:05:31 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) Gold 6244 CPU @ 3.60GHz
2 "physical id"s (chips)
32 "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 : 8
siblings : 16
physical 0: cores 2 3 4 16 17 20 24 27
physical 1: cores 2 3 11 17 20 24 25 27

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6244 CPU @ 3.60GHz
Stepping: 7
CPU MHz: 3600.000
CPU max MHz: 4400.0000
CPU min MHz: 1200.0000
BogoMIPS: 7200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-7,16-23

(Continued on next page)
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Platform Notes (Continued)

NUMA node1 CPU(s): 8-15,24-31
Flags: fpu vme de pse ts mce pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdoselgb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref tsc_know_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdbe fma cx16 xtrm pdcms pcid dca sse4_1 sse4_2 x2apic movbe popcnt
rdseed aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault
epb cat l3 cd [_l3 invpcid_single mba tr _shadow vmmi flexpriority ert vpid fsqgbase
tsc_adjust bni hle avx2 smep bmi2 erms invvpid rdt_a avx512f avx512dq
dseed adv smack clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsave
xgetbv1 xsaves cq_mll cqm_occup_llc cqm_mib_total cqm_mib_local ibpb ibrs stibp
dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pkp ospke avx512_vnni
arch_capabilities ssbd

/cache.data

cache size: 25344 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 16 17 18 19 20 21 22 31
node 0 size: 385568 MB
node 0 free: 384846 MB
node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
node 1 size: 386994 MB
node 1 free: 385552 MB
node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 791104052b
HugePages_Total: 0
Hugepagesize: 2048 KB

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"
SPEC CPU2017 Floating Point Speed Result

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Platform Notes (Continued)

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 10 14:04

SPEC is set to: /spec2017
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda4      xfs   929G   10G  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

==============================================================================
CC  619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_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.
------------------------------------------------------------------------------

==============================================================================
FC  607.cactuBSSN_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.
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)
### Compiler Version Notes (Continued)

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.

---

FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_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.

---

FC  603.bwaves_s(peak) 649.fotonik3d_s(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.

---

CC  621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)

---

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.
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  621.wrf_s(peak) 628.pop2_s(peak)

---

Intel (R) Fortran Intel (R) 64 Compiler for applications running on Intel (R)
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SPEC CPU2017 Floating Point Speed Result

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Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
ifort -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-nostandard-realloc-lhs

Benchmarks using both Fortran and C:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

(Continued on next page)
## SPEC CPU2017 Floating Point Speed Result

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</table>

---

**Base Optimization Flags (Continued)**

Benchmarks using Fortran, C, and C++:
- `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`
- `-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP`
- `nostandard-realloc-lhs`

---

**Peak Compiler Invocation**

C benchmarks:
```
icc -m64 -std=c11
```

Fortran benchmarks:
```
ifort -m64
```

Benchmarks using both Fortran and C:
```
ifort -m64 icc -m64 -std=c11
```

Benchmarks using Fortran, C, and C++:
```
icpc -m64 icc -m64 -std=c11 ifort -m64
```

---

**Peak Portability Flags**

Same as Base Portability Flags

---

**Peak Optimization Flags**

C benchmarks:
```
619.lbm_s: basepeak = yes
```
```
638.imagick_s: basepeak = yes
```
```
644.nab_s: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-DSPEC_OPENMP
```

Fortran benchmarks:
```
603.bwaves_s: -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP
-DSPEC_OPENMP -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3
-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=4
```

(Continued on next page)
## SPEC CPU2017 Floating Point Speed Result

### ASUSTeK Computer Inc.

ASUS ESC8000 G4(Z11PG-D24) Server System  
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<th>9016</th>
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**SPECspeed2017_fp_base = 114**  
**SPECspeed2017_fp_peak = 115**

### Peak Optimization Flags (Continued)

#### 603.bwaves_s (continued):
- `-qopenmp`  
- `-nostandard-realloc-lhs`

#### 649.fotonik3d_s:
- Same as 603.bwaves_s

#### 654.roms_s:
- `-DSPEC_OPENMP`  
- `-xCORE-AVX512`  
- `-ipo -O3 -no-prec-div`  
- `-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4`  
- `-qopenmp`  
- `-nostandard-realloc-lhs`

#### Benchmarks using both Fortran and C:

#### 621.wrf_s:
- `-prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512`  
- `-qopt-prefetch -ffinite-math-only -no-prec-div`  
- `-qopt-mem-layout-trans=4`  
- `-DSPEC_SUPPRESS_OPENMP`  
- `-qopenmp`  
- `-DSPEC_OPENMP`  
- `-nostandard-realloc-lhs`

#### 627.cam4_s:
- `basepeak = yes`

#### 628.pop2_s:
- Same as 621.wrf_s

#### Benchmarks using Fortran, C, and C++:

#### -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch

#### -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

#### -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:


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

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