# SPEC CPU®2017 Integer Rate Result

**Altos Computing Inc.**

**BrainSphere T310 F5 (Intel Xeon E-2236)**

**SPECraten®2017_int_base = 47.7**

**SPECraten®2017_int_peak = Not Run**

**CPU2017 License:** 97

**Test Sponsor:** Altos Computing Inc.

**Tested by:** Altos Computing Inc.

**Test Date:** Apr-2020

**Hardware Availability:** Jan-2020

**Software Availability:** Nov-2019

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<td></td>
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<td>12</td>
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## Hardware

- **CPU Name:** Intel Xeon E-2236
- **Max MHz:** 4800
- **Nominal:** 3400
- **Enabled:** 6 cores, 1 chip, 2 threads/core
- **Orderable:** 1 chip
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **Cache L2:** 256 KB I+D on chip per core
- **Cache L3:** 12 MB I+D on chip per chip
- **Memory:** 64 GB (4 x 16 GB 2Rx4 PC4-2666V-U)
- **Storage:** 1 x 240 GB SATA SSD
- **Other:** None

## Software

- **OS:** Ubuntu 19.10
- **Compiler:** C/C++: Version 19.0.5.281 of Intel C/C++ Compiler Build 20190815 for Linux; Fortran: Version 19.0.5.281 of Intel Fortran Compiler Build 20190815 for Linux
- **Parallel:** No
- **Firmware:** Version 1.0b.V2 released Aug-2019
- **File System:** ext4
- **System State:** Run level 5 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** None

**Power Management:** BIOS set to prefer performance at the cost of additional power usage
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#### Results Table

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<td>468</td>
<td>27.7</td>
<td>469</td>
<td>27.6</td>
</tr>
</tbody>
</table>

Submit Notes

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

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
"/home/cpu2017/lib/intel64:/home/cpu2017/lib/ia32:/home/cpu2017/je5.0.1-32"

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:
sync; echo 3>/proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

(Continued on next page)
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CPU2017 License: 97
Test Sponsor: Altos Computing Inc.
Tested by: Altos Computing Inc.

SPECrate®2017_int_base = 47.7
SPECrate®2017_int_peak = Not Run

Test Date: Apr-2020
Hardware Availability: Jan-2020
Software Availability: Nov-2019

General Notes (Continued)
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.

Platform Notes

BIOS Configuration:
Boot Performance Mode set to Turbo Performance
C states set to Disabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011
running on ubuntu19 Mon Apr 6 09:36:29 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) E-2236 CPU @ 3.40GHz
  1 "physical id"s (chips)
  12 "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 : 6
  siblings : 12
  physical 0: cores 0 1 2 3 4 5

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 39 bits physical, 48 bits virtual
CPU(s): 12
On-line CPU(s) list: 0-11
Thread(s) per core: 2
Core(s) per socket: 6
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 158
Model name: Intel(R) Xeon(R) E-2236 CPU @ 3.40GHz

(Continued on next page)
Platform Notes (Continued)

Stepping:                        10
CPU MHz:                         4616.301
CPU max MHz:                     4800.0000
CPU min MHz:                     800.0000
BogoMIPS:                        6799.81
Virtualization:                  VT-x
L1d cache:                       192 KiB
L1i cache:                       192 KiB
L2 cache:                        1.5 MiB
L3 cache:                        12 MiB
NUMA node0 CPU(s):               0-11
Vulnerability L1tf:              Mitigation; PTE Inversion; VMX conditional cache
flushes, SMT vulnerable
Vulnerability MdS:               Mitigation; Clear CPU buffers; SMT vulnerable
Vulnerability Meltdown:          Mitigation; PTI
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via
prctl and seccomp
Vulnerability Spectre v1:        Mitigation; usercopy/swapgs barriers and __user
pointer sanitation
Vulnerability Spectre v2:         Mitigation; Full generic retpoline, IBPB
conditional, IBRS_FW, STIBP conditional, RSB filling
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
                                pdemts pdcm ret cmip cmipbxs cmipb xtopology
nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2
                                sse3 sse4_1 sse4_2 x2apic movbe popcnt
                                tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault
                                epb invpcid_single pti ssbd ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
                                ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm rdseed adx
                                smap clflushopt intel_pt xsaveopt xsavec xsave opt xsavec xsaveopt xaes dtherm
                                ida arat pln pts hwp hwp_act_window hwp_epp md_clear flush_l1d

/proc/cpuinfo cache data
  cache size : 12288 KB

From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
physical chip.
  available: 1 nodes (0)
  node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11
  node 0 size: 64234 MB
  node 0 free: 63372 MB
  node distances:
    node 0
    0: 10

From /proc/meminfo
  MemTotal:        65775956 kB
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**Platform Notes (Continued)**

- **HugePages_Total:** 0
- **Hugepagesize:** 2048 kB

```bash
/usr/bin/lsb_release -d
Ubuntu 19.10
```

- From `/etc/*release*` /etc/*version*
  ```bash
debian_version: buster/sid
os-release:
  NAME="Ubuntu"
  VERSION="19.10 (Eoan Ermine)"
  ID=ubuntu
  ID_LIKE=debian
  PRETTY_NAME="Ubuntu 19.10"
  VERSION_ID="19.10"
  HOME_URL="https://www.ubuntu.com/
  SUPPORT_URL="https://help.ubuntu.com/
```

```bash
uname -a:
Linux ubuntu19 5.3.0-18-generic #19-Ubuntu SMP Tue Oct 8 20:14:06 UTC 2019 x86_64
x86_64 x86_64 GNU/Linux
```

- Kernel self-reported vulnerability status:
  ```bash
CVE-2018-3620 (L1 Terminal Fault): Mitigation: PTE Inversion; VMX: conditional
cache flushes, SMT vulnerable
Microarchitectural Data Sampling: Mitigation: Clear CPU buffers; SMT vulnerable
CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled
via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swapgs barriers and __user
pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Full generic retpoline, IBPB:
conditional, IBRS_FW, STIBP: conditional, RSB
```

- **run-level 5 Apr 6 09:34**

- **SPEC is set to:** /home/cpu2017

  ```bash
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda2 ext4 219G 31G 177G 15% /
  ```

- From `/sys/devices/virtual/dmi/id`
  ```bash
  BIOS: American Megatrends Inc. 1.0b.V2 08/23/2019
  Vendor: Altos
  Product: BrainSphere T310 F5
  Product Family: BrainSphere
  ```

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Platform Notes (Continued)

Serial: USRLJTA0019380000B0V00

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:
4x 8945 HYE160ED102408-2666 16 GB 2 rank 2667
(End of data from sysinfo program)
The build date 20190815 in sw_compiler is correct, but the date in the compiler version notes is not

Compiler Version Notes

============================================== 19.0.5
C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base)
        | 525.x264_r(base) 557.xz_r(base)
 Intel(R) C Compiler for applications running on Intel(R) 64, Version 19.0.5
 NextGen Technology Build 20190729
 Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

============================================== 19.0.5
C++     | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
        | 541.leela_r(base)
 Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 19.0.5
 NextGen Technology Build 20190729
 Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

==============================================
Fortran | 548.exchange2_r(base)
 Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
 64, Version 19.0.5.281 Build 20190815
 Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc (Continued on next page)
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## Base Compiler Invocation (Continued)

**C++ benchmarks:**

- icpc

**Fortran benchmarks:**

- ifort

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## Base Portability Flags

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<tr>
<td>perlbench_r</td>
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</tr>
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## Base Optimization Flags

**C benchmarks:**

- `-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -flto -mfpmath=sse`
- `-funroll-loops -qnextgen -fuse-ld=gold -qopt-mem-layout-trans=4`
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin -lqkmalloc`

**C++ benchmarks:**

- `-m64 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -flto -mfpmath=sse`
- `-funroll-loops -qnextgen -fuse-ld=gold -qopt-mem-layout-trans=4`
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin -lqkmalloc`

**Fortran benchmarks:**

- `-m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ipo -no-prec-div`
- `-qopt-mem-layout-trans=4 -nostandard-realloc-lhs`
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.5.281/linux/compiler/lib/intel64_lin -lqkmalloc`
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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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