



# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

## Altos Computing Inc.

SPECrate®2017\_int\_base = 47.7

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

SPECrate®2017\_int\_peak = Not Run

CPU2017 License: 97

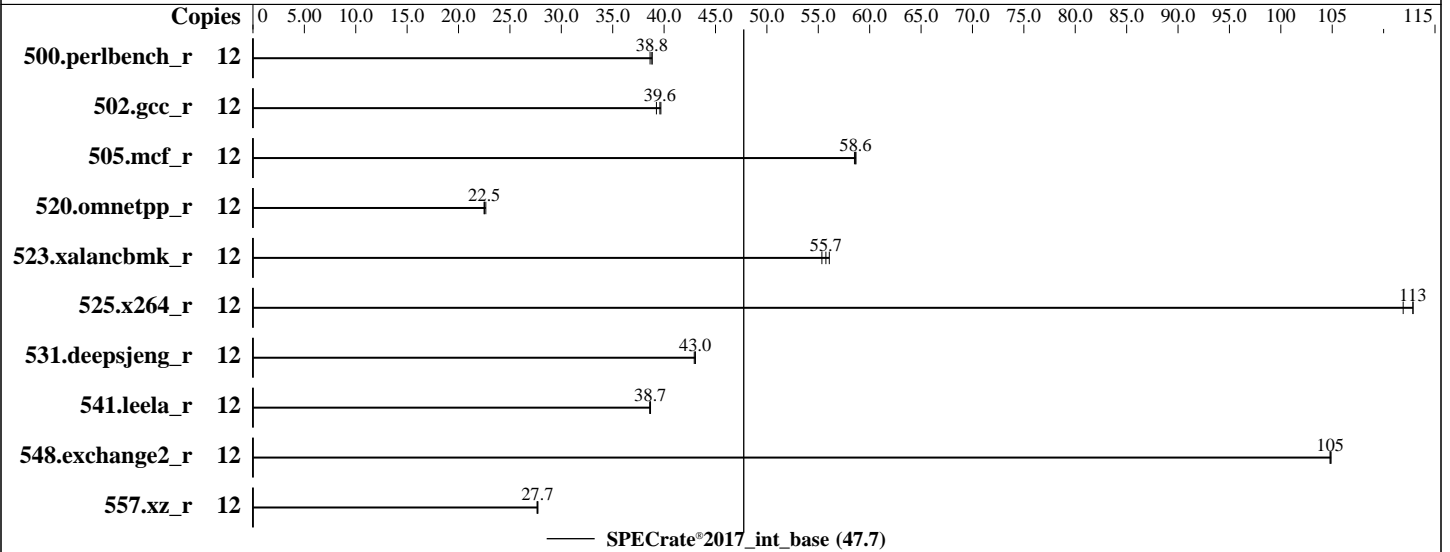
Test Sponsor: Altos Computing Inc.

Tested by: Altos Computing Inc.

Test Date: Apr-2020

Hardware Availability: Jan-2020

Software Availability: Nov-2019



### 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  
 L2: 256 KB I+D on chip per core  
 L3: 12 MB I+D on chip per chip  
 Other: None  
 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  
 Kernel 5.3.0-18-generic  
 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

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	12	494	38.6	492	38.8	<b>492</b>	<b>38.8</b>							
502.gcc_r	12	433	39.3	<b>429</b>	<b>39.6</b>	428	39.7							
505.mcf_r	12	331	58.7	331	58.5	<b>331</b>	<b>58.6</b>							
520.omnetpp_r	12	700	22.5	695	22.7	<b>699</b>	<b>22.5</b>							
523.xalancbmk_r	12	229	55.4	<b>227</b>	<b>55.7</b>	226	56.1							
525.x264_r	12	188	112	<b>186</b>	<b>113</b>	186	113							
531.deepsjeng_r	12	320	42.9	320	43.0	<b>320</b>	<b>43.0</b>							
541.leela_r	12	515	38.6	<b>514</b>	<b>38.7</b>	514	38.7							
548.exchange2_r	12	<b>300</b>	<b>105</b>	300	105	300	105							
557.xz_r	12	467	27.7	<b>468</b>	<b>27.7</b>	469	27.6							

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

## 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>

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## 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

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## 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 sanitization
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
pdpelgb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
nonstop_tsc cpuid aperfmpperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2
ssse3 sdbg fma cx16 xtpr pdcm pcid 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 mpx rdseed adx
smap clflushopt intel_pt xsaveopt xsavec xgetbv1 xsaves dtherm ida arat pln pts hwp
hwp_notify hwp_act_window hwp_epp md_clear flush_lld
```

```
/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

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

```
From /etc/*release* /etc/*version*
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/"
```

```
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:

```
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/swaps barriers and __user
pointer sanitization
CVE-2017-5715 (Spectre variant 2):      Mitigation: Full generic retpoline, IBPB:
conditional, IBRS_FW, STIBP: conditional, RSB
filling
```

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

```
SPEC is set to: /home/cpu2017
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2        ext4  219G   31G  177G  15% /
```

```
From /sys/devices/virtual/dmi/id
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

=====  
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.  
=====

=====  
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

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## Base Compiler Invocation (Continued)

C++ benchmarks:

icpc

Fortran benchmarks:

ifort

## 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:

```
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -flto -mfpmath=sse
-funroll-loops -qnextgen -fuse-ld=gold -qopt-mem-layout-trans=4
-I/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
-I/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
-I/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

[http://www.spec.org/cpu2017/flags/Intel-ic19.0u5-official-linux64\\_revD.html](http://www.spec.org/cpu2017/flags/Intel-ic19.0u5-official-linux64_revD.html)

<http://www.spec.org/cpu2017/flags/Altos-Platform-Settings-V1.0-revA.2020-04-28.html>

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

[http://www.spec.org/cpu2017/flags/Intel-ic19.0u5-official-linux64\\_revD.xml](http://www.spec.org/cpu2017/flags/Intel-ic19.0u5-official-linux64_revD.xml)

<http://www.spec.org/cpu2017/flags/Altos-Platform-Settings-V1.0-revA.2020-04-28.xml>

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

Tested with SPEC CPU®2017 v1.1.0 on 2020-04-06 05:36:28-0400.

Report generated on 2020-04-30 10:26:05 by CPU2017 PDF formatter v6255.

Originally published on 2020-04-29.