SPEC CPU®2017 Integer Rate Result

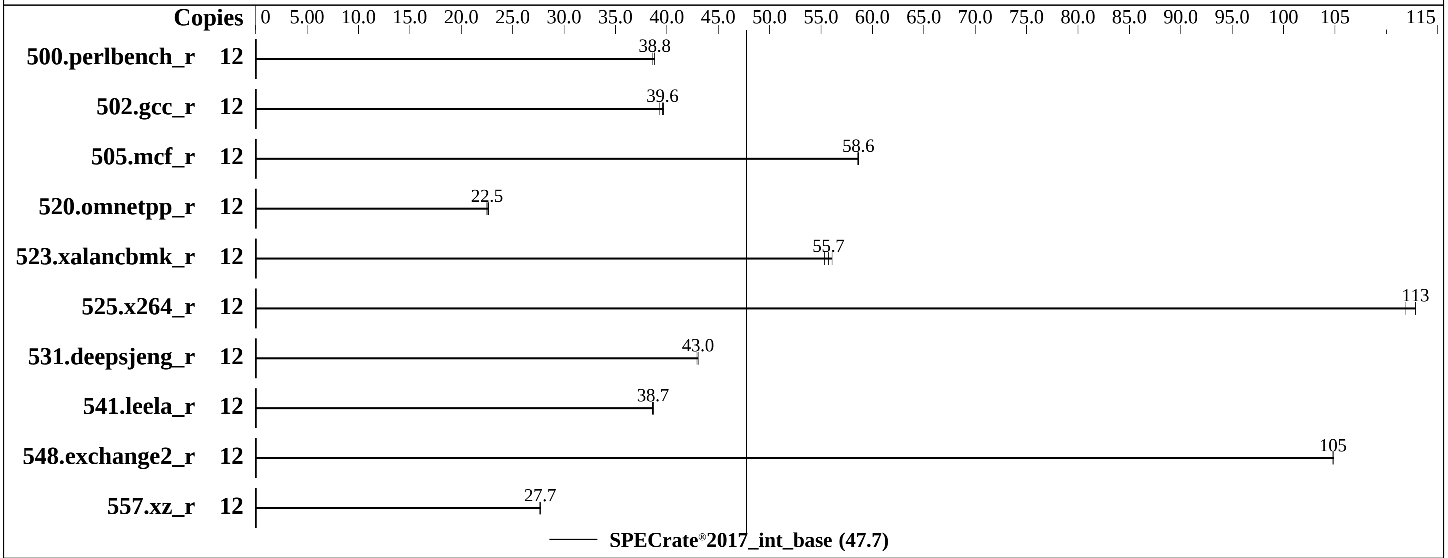
Altos Computing Inc.

BrainSphere T310 F5 (Intel Xeon E-2236)

SPECrate®2017_int_base = 47.7

SPECrate®2017_int_peak = Not Run

CPU2017 License:	97	**Test Date:**	Apr-2020
Test Sponsor:	Altos Computing Inc.	**Hardware Availability:**	Jan-2020
Tested by:	Altos Computing Inc.	**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

	Base							Peak						
Benchmark	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	12	494	38.6	492	38.8	**492**	**38.8**							
502.gcc_r	12	433	39.3	**429**	**39.6**	428	39.7							
505.mcf_r	12	331	58.7	331	58.5	**331**	**58.6**							
520.omnetpp_r	12	700	22.5	695	22.7	**699**	**22.5**							
523.xalancbmk_r	12	229	55.4	**227**	**55.7**	226	56.1							
525.x264_r	12	188	112	**186**	**113**	186	113							
531.deepsjeng_r	12	320	42.9	320	43.0	**320**	**43.0**							
541.leela_r	12	515	38.6	**514**	**38.7**	514	38.7							
548.exchange2_r	12	**300**	**105**	300	105	300	105							
557.xz_r	12	467	27.7	**468**	**27.7**	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 295195f888a3d7edb1e6e46a485a0011
 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 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
      pdpe1gb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
      nonstop_tsc cpuid aperfmperf 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_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
```

(Continued on next page)

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/swapgs 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
```

(Continued on next page)

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
-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
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/Altos-Platform-Settings-V1.0-revA.2020-04-28.xml

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

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