SPEC CPU®2017 Integer Rate Result

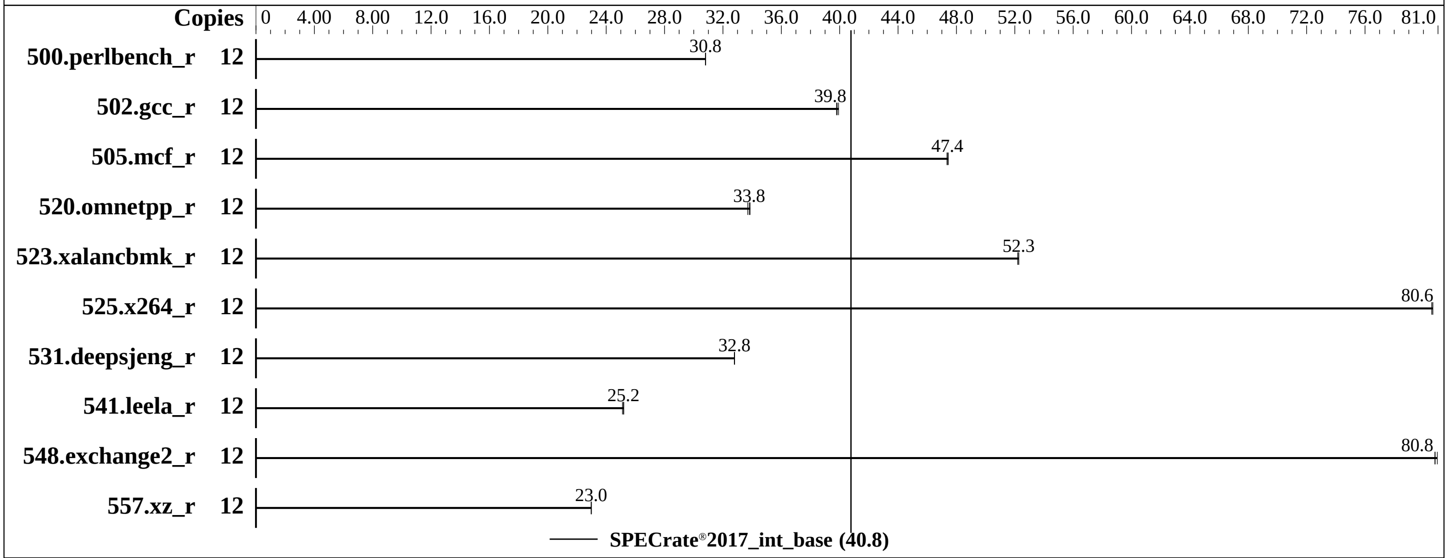
Altos Computing Inc.

BrainSphere R389 F4 (Intel Xeon Bronze 3204)

SPECrate®2017_int_base = 40.8

SPECrate®2017_int_peak = Not Run

CPU2017 License:	97	**Test Date:**	Mar-2020
Test Sponsor:	Altos Computing Inc.	**Hardware Availability:**	Nov-2019
Tested by:	Altos Computing Inc.	**Software Availability:**	Jan-2020



Hardware

CPU Name:	Intel Xeon Bronze 3204
Max MHz:	1900
Nominal:	1900
Enabled:	12 cores, 2 chips
Orderable:	1,2 chips
Cache L1:	32 KB I + 32 KB D on chip per core
L2:	1 MB I+D on chip per core
L3:	8.25 MB I+D on chip per chip
Other:	None
Memory:	384 GB (24 x 16 GB 1Rx4 PC4-2933V-R, running at 2133)
Storage:	1 x 240 GB SATA SSD
Other:	None

Software

OS:	Ubuntu 19.10 Kernel 5.3.0-40-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 R11 released Feb-2020
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

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	12	**620**	**30.8**	620	30.8	620	30.8							
502.gcc_r	12	427	39.8	**427**	**39.8**	426	39.9							
505.mcf_r	12	410	47.4	**409**	**47.4**	409	47.4							
520.omnetpp_r	12	465	33.9	**466**	**33.8**	467	33.7							
523.xalancbmk_r	12	242	52.3	**242**	**52.3**	243	52.2							
525.x264_r	12	261	80.6	261	80.6	**261**	**80.6**							
531.deepsjeng_r	12	**419**	**32.8**	419	32.8	420	32.8							
541.leela_r	12	791	25.1	**789**	**25.2**	788	25.2							
548.exchange2_r	12	388	81.0	**389**	**80.8**	389	80.8							
557.xz_r	12	564	23.0	**564**	**23.0**	564	23.0							

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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"
```

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.:
```

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General Notes (Continued)

```
 numactl --interleave=all runcpu &lt;etc&gt;
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:
Power Policy Quick Settings set to Performance
IMC set to 1-way interleaving
Sub_NUMA Cluster set to enabled

 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
 running on r389f4 Tue Mar 17 03:58:49 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) Bronze 3204 CPU @ 1.90GHz
       2  "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  : 6
       physical 0: cores 0 1 2 3 4 5
       physical 1: 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:                   46 bits physical, 48 bits virtual
      CPU(s):                          12
      On-line CPU(s) list:             0-11
      Thread(s) per core:              1
      Core(s) per socket:              6
      Socket(s):                       2
      NUMA node(s):                    2
      Vendor ID:                       GenuineIntel
```

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Platform Notes (Continued)

```
      CPU family:                      6
      Model:                           85
      Model name:                      Intel(R) Xeon(R) Bronze 3204 CPU @ 1.90GHz
      Stepping:                        6
      CPU MHz:                         800.002
      CPU max MHz:                     1900.0000
      CPU min MHz:                     800.0000
      BogoMIPS:                        3800.00
      Virtualization:                  VT-x
      L1d cache:                       384 KiB
      L1i cache:                       384 KiB
      L2 cache:                        12 MiB
      L3 cache:                        16.5 MiB
      NUMA node0 CPU(s):               0-5
      NUMA node1 CPU(s):               6-11
      Vulnerability Itlb multihit:     KVM: Mitigation: Split huge pages
      Vulnerability L1tf:              Not affected
      Vulnerability Mds:               Not affected
      Vulnerability Meltdown:          Not affected
      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; Enhanced IBRS, IBPB conditional, RSB
      filling
      Vulnerability Tsx async abort:   Mitigation; TSX disabled
      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 dca sse4_1 sse4_2 x2apic movbe popcnt
      tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault
      epb cat_l3 cdp_l3 invpcid_single intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced
      tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep
      bmi2 erms invpcid cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb
      intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc
      cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm arat pln pts hwp hwp_act_window
      hwp_epp hwp_pkg_req pku ospke avx512_vnni md_clear flush_l1d arch_capabilities

 /proc/cpuinfo cache data
    cache size : 8448 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
   node 0 size: 192094 MB
```

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Platform Notes (Continued)

```
    node 0 free: 191577 MB
    node 1 cpus: 6 7 8 9 10 11
    node 1 size: 193533 MB
    node 1 free: 192849 MB
    node distances:
    node   0   1
      0:  10  21
      1:  21  10

  From /proc/meminfo
     MemTotal:       394882912 kB
     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 r389f4 5.3.0-40-generic #32-Ubuntu SMP Fri Jan 31 20:24:34 UTC 2020 x86_64
     x86_64 x86_64 GNU/Linux

  Kernel self-reported vulnerability status:

  itlb_multihit:                               KVM: Mitigation: Split huge pages
  CVE-2018-3620 (L1 Terminal Fault):           Not affected
  Microarchitectural Data Sampling:            Not affected
  CVE-2017-5754 (Meltdown):                    Not affected
  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: Enhanced IBRS, IBPB: conditional,
                                               RSB filling
  tsx_async_abort:                             Mitigation: TSX disabled
```

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Platform Notes (Continued)

```
run-level 5 Mar 17 03:55

SPEC is set to: /home/cpu2017
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda2      ext4  219G   32G  177G  16% /

From /sys/devices/virtual/dmi/id
    BIOS:    GIGABYTE R11 02/25/2020
    Vendor:  ALTOS
    Product: BrainSphere R389 F4
    Product Family: Server
    Serial:  GIGBN8521A0007

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:
    24x Samsung M393A2K40CB2-CVF 16 GB 1 rank 2933

(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)
------------------------------------------------------------------------------
```

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Tested by: Altos Computing Inc.
Test Date: Mar-2020
Hardware Availability: Nov-2019
Software Availability: Jan-2020

Compiler Version Notes (Continued)

```
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`

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
```

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Base Optimization Flags (Continued)

C++ benchmarks (continued):
-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

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.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.xml

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

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