Altos Computing Inc.  

**SPEC CPU®2017 Integer Rate Result**  
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**SPEC CPU®2017 Integer Rate Result**  

**Altos Computing Inc.**  

**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  
**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

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**Copies**  

<table>
<thead>
<tr>
<th>SPECbench</th>
<th>Copies</th>
<th>SPECrate 2017_int_base</th>
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<tbody>
<tr>
<td>500.perlbench_r</td>
<td>12</td>
<td>40.0</td>
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<tr>
<td>502.gcc_r</td>
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<td>505.mcf_r</td>
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<td>523.xalancbmk_r</td>
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<td>557.xz_r</td>
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<td>23.0</td>
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</table>

**SPECrate®2017_int_base = 40.8**  

**SPECrate®2017_int_peak = Not Run**  

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

**CPU2017 License:** 97  
**Tested by:** Altos Computing Inc.  
**Hardware Availability:** Nov-2019  
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BrainSphere R369 F4 (Intel Xeon Bronze 3204)

SPEC®2017 Integer Rate Result

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SPECrate®2017_int_base = 40.8
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Results Table

<table>
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<tr>
<th>Benchmark</th>
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<td>563</td>
<td>23.0</td>
</tr>
</tbody>
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SPECrate®2017_int_base = 40.8
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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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SPECrates\textsuperscript{2017\_int\_base} = 40.8
SPECrates\textsuperscript{2017\_int\_peak} = Not Run

**General Notes (Continued)**

- numactl --interleave=all runcpu <etc>
- 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 295195f888a3d7edbl6e646a485a00ff
  running on r389f4 Wed Mar 11 09:01:17 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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CPU2017 License: 97
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Hardware Availability: Nov-2019
Software Availability: Jan-2020

Platform Notes (Continued)

CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Bronze 3204 CPU @ 1.90GHz
Stepping: 6
CPU MHz: 800.012
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 sanitation
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
Vulnerability Tsx async abort: Mitigation; TSX disabled
Flags:

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: 192118 MB
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Platform Notes (Continued)

node 0 free: 190874 MB  
node 1 cpus: 6  7  8  9  10  11  
node 1 size: 193509 MB  
node 1 free: 192524 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 11 08:54

SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 ext4 219G 23G 186G 11% /

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
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==============================================================================
| Fortran | 548.exchange2_r(base) |
==============================================================================

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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:
\texttt{icc}

C++ benchmarks:
\texttt{icpc}

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

C++ benchmarks:
\texttt{-m64 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -flto -mfpmath=sse}  
\texttt{-funroll-loops -qnextgen -fuse-ld=gold -qopt-mem-layout-trans=4}  
\texttt{-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:

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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