## ZTE Corporation

**ZTE R5300G4X Server System**  
(2.30 GHz, Intel Xeon Platinum 8380)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>SPECrate®2017_fp_peak</th>
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<tbody>
<tr>
<td>489</td>
<td>Not Run</td>
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**CPU2017 License:** 9061  
**Test Sponsor:** ZTE Corporation  
**Tested by:** ZTE Corporation  
**Software Availability:** Dec-2020

| Test Date: | May-2021 |
| Hardware Availability: | Apr-2021 |

### Hardware

**CPU Name:** Intel Xeon Platinum 8380  
**Max MHz:** 3400  
**Nominal:** 2300  
**Enabled:** 80 cores, 2 chips, 2 threads/core  
**Orderable:** 1,2 chips

**Cache L1:** 32 KB I + 48 KB D on chip per core  
**L2:** 1.25 MB I+D on chip per core  
**L3:** 60 MB I+D on chip per chip  
**Other:** None  
**Memory:** 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R)  
**Storage:** 2 x 480 GB SATA SSD,RAID1  
**Other:** None

### Software

**OS:** Red Hat Enterprise Linux release 8.3 (Ootpa)  
**Compiler:**  
C/C++: Version 2021.1 of Intel oneAPI DPC++/C++  
Compiler Build 20201113 for Linux;  
Fortran: Version 2021.1 of Intel Fortran Compiler  
Classic Build 20201112 for Linux;  
C/C++: Version 2021.1 of Intel C/C++ Compiler  
Classic Build 20201112 for Linux

**Parallel:** No  
**Firmware:** Version 00.00.0001 released May-2021  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** Not Applicable  
**Other:** jemalloc memory allocator V5.0.1  
**Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage

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<th>SPECrate®2017_fp_peak</th>
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**Additional Information:**

- **Test Date:** May-2021  
- **Hardware Availability:** Apr-2021  
- **Software Availability:** Dec-2020
## Results Table

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</tr>
</tbody>
</table>

**SPECrate®2017_fp_base = 489**

**SPECrate®2017_fp_peak = Not Run**

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/speccpu2017/lib/intel64:/home/speccpu2017/je5.0.1-64"
MALLOCONF = "retain:true"

### General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Red Hat Enterprise Linux 8.1
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:

(Continued on next page)
ZTE Corporation
ZTE R5300G4X Server System
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SPECrate®2017_fp_base = 489
SPECrate®2017_fp_peak = Not Run

General Notes (Continued)

sync; echo 3 > /proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
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.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS Configuration:
Intel VT for Directed I/O (VT-d) = Disabled
Patrol Scrub = Disabled
ENERGY_PERF_BIAS_CFG mode = performance
SNC = Enabled
LLC dead line alloc = Disabled

Sysinfo program /home/speccpu2017/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost.localdomain Thu May 20 19:40:20 2021

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) Platinum 8380 CPU @ 2.30GHz
  2 "physical id"s (chips)
  160 "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 : 40
siblings : 80
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
  25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
  25 26 27 28 29 30 31 32 33 34 35 36 37 38 39

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit

(Continued on next page)
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CPU2017 License: 9061
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SPECrate®2017_fp_base = 489
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Test Date: May-2021
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Software Availability: Dec-2020

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Platform Notes (Continued)

Byte Order: Little Endian
CPU(s): 160
On-line CPU(s) list: 0-159
Thread(s) per core: 2
Core(s) per socket: 40
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Platinum 8380 CPU @ 2.30GHz
Stepping: 6
CPU MHz: 3000.000
CPU max MHz: 2301.0000
CPU min MHz: 800.0000
BogoMIPS: 4600.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 128K
L3 cache: 61440K
NUMA node0 CPU(s): 0-19, 80-99
NUMA node1 CPU(s): 20-39, 100-119
NUMA node2 CPU(s): 40-59, 120-139
NUMA node3 CPU(s): 60-79, 140-159
Flags: fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 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 ssbd mba ibrs ibpb stibp ibrs_enhanced fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaves xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local split_lock_detect wbinvd dtherm ida arat pln pts avx512vmbmi umip kpu ospke avx512_vmbmi2 gfnl vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpoptndq la57 rdpid md_clear pconfig flush_lld arch_capabilities

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99

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SPEC CPU®2017 Floating Point Rate Result
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ZTE R5300G4X Server System
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Platform Notes (Continued)

node 0 size: 124431 MB
node 0 free: 117584 MB
node 1 cpus: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119
node 1 size: 125441 MB
node 1 free: 121944 MB
node 2 cpus: 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139
node 2 size: 125271 MB
node 2 free: 120401 MB
node 3 cpus: 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159
node 3 size: 125260 MB
node 3 free: 120817 MB
node distances:
  node 0 1 2 3
  0: 10 11 20 20
  1: 11 10 20 20
  2: 20 20 10 11
  3: 20 20 11 10

From /proc/meminfo
  MemTotal:       527651520 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB

/sbin/tuned-adm active
  Current active profile: throughput-performance
/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has
  performance

From /etc/*release* /etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux"
    VERSION="8.3 (Ootpa)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="8.3"
    PLATFORM_ID="platform:el8"
    PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
    ANSI_COLOR="0;31"
  redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
  system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
  system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:

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SPEC CPU®2017 Floating Point Rate Result

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SPECrater®2017_fp_base = 489
SPECrater®2017_fp_peak = Not Run

Test Date: May-2021
Hardware Availability: Apr-2021
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Platform Notes (Continued)

Linux localhost.localdomain 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swapsgs barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2017-5715 (Spectre variant 2): Not affected
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 May 20 14:10

SPEC is set to: /home/speccpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 372G 164G 209G 44% /home

From /sys/devices/virtual/dmi/id
Vendor: ZTE
Product: R5300 G4X
Product Family: Server
Serial: 201234567890

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:
16x Hynix HMA84GR7DJR4N-XN 32 GB 2 rank 3200
16x NO DIMM NO DIMM

BIOS:
BIOS Vendor: ZTE
BIOS Version: 00.00.0001
BIOS Date: 2021/05/15
BIOS Revision: 0.0

(End of data from sysinfo program)
ZTE Corporation

**ZTE R5300G4X Server System**

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**Compiler Version Notes**

<table>
<thead>
<tr>
<th>Language</th>
<th>Programs Tested</th>
</tr>
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<tbody>
<tr>
<td>C</td>
<td>C</td>
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<tr>
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<td>lbm_r(base)</td>
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<td>imagick_r(base)</td>
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<td>nab_r(base)</td>
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<td>519.</td>
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<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,</td>
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<td>Version 2021.1 Build 20201113</td>
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<tr>
<td></td>
<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
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</table>

| C++      | C++             |
|          | namd_r(base)    |
|          | parest_r(base)  |
|          | 508.             |
|          | Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, |
|          | Version 2021.1 Build 20201113 |
|          | Copyright (C) 1985-2020 Intel Corporation. All rights reserved. |

| C++, C   | C++            |
|          | povray_r(base) |
|          | blender_r(base) |
|          | 511.           |
|          | Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, |
|          | Version 2021.1 Build 20201113 |
|          | Copyright (C) 1985-2020 Intel Corporation. All rights reserved. |

| C++, C, Fortran | C++, Fortran   |
|                | cactuBSSN_r(base) |
|                | 507.             |
|                | Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, |
|                | Version 2021.1 Build 20201113 |
|                | Copyright (C) 1985-2020 Intel Corporation. All rights reserved. |

| Fortran | Fortran         |
|         | bwaves_r(base)  |
|         | fotonik3d_r(base) |
|         | roms_r(base)    |
|         | 503.             |
|         | Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on |
|         | Intel(R) 64, Version 2021.1 Build 20201112_000000 |
|         | Copyright (C) 1985-2020 Intel Corporation. All rights reserved. |

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Compiler Version Notes (Continued)

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icx

Benchmarks using both C and C++:
icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifort

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char

(Continued on next page)
**SPEC CPU®2017 Floating Point Rate Result**

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### Base Portability Flags (Continued)

527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG  
538.imagick_r: -DSPEC_LP64  
544.nab_r: -DSPEC_LP64  
549.fotonik3d_r: -DSPEC_LP64  
554.roms_r: -DSPEC_LP64

### Base Optimization Flags

C benchmarks:
- `w -std=c11 -m64 -Wl,-z,-muldefs -xCORE-AVX512 -Ofast -ffast-math`  
- `-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`  
- `-mbranches-within-32B-boundaries -ljemalloc`  
- `-L/usr/local/jemalloc64-5.0.1/lib`

C++ benchmarks:
- `w -m64 -Wl,-z,-muldefs -xCORE-AVX512 -Ofast -ffast-math -flto`  
- `-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`  
- `-mbranches-within-32B-boundaries -ljemalloc`  
- `-L/usr/local/jemalloc64-5.0.1/lib`

Fortran benchmarks:
- `w -m64 -Wl,-z,-muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div`  
- `-qopt-prefetch -ffinite-math-only`  
- `-qopt-multiple-gather-scatter-by-shuffles -qopt-mem-layout-trans=4`  
- `-nostandard-realloc-lhs -align array32byte -auto`  
- `-mbranches-within-32B-boundaries -ljemalloc`  
- `-L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both Fortran and C:
- `w -m64 -std=c11 -Wl,-z,-muldefs -xCORE-AVX512 -Ofast -ffast-math`  
- `-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo`  
- `-no-prec-div -qopt-prefetch -ffinite-math-only`  
- `-qopt-multiple-gather-scatter-by-shuffles`  
- `-mbranches-within-32B-boundaries -nostandard-realloc-lhs`  
- `-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both C and C++:
- `w -m64 -std=c11 -Wl,-z,-muldefs -xCORE-AVX512 -Ofast -ffast-math`  
- `-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`  
- `-mbranches-within-32B-boundaries -ljemalloc`  
- `-L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using Fortran, C, and C++:
- `w -m64 -std=c11 -Wl,-z,-muldefs -xCORE-AVX512 -Ofast -ffast-math`

(Continued on next page)
**SPEC CPU®2017 Floating Point Rate Result**

**ZTE Corporation**

ZTE R5300G4X Server System
(2.30 GHz, Intel Xeon Platinum 8380)

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**CPU2017 License:** 9061  
**Test Sponsor:** ZTE Corporation  
**Tested by:** ZTE Corporation  
**Test Date:** May-2021  
**Hardware Availability:** Apr-2021  
**Software Availability:** Dec-2020  

**Base Optimization Flags (Continued)**

Benchmarks using Fortran, C, and C++ (continued):
- `flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3`
- `no-prec-div -qopt-prefetch -ffinite-math-only`
- `qopt-multiple-gather-scatter-by-shuffles`
- `mbranches-within-32B-boundaries -nostandard-realloc-lhs`
- `align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

The flags files that were used to format this result can be browsed at:
- [http://www.spec.org/cpu2017/flags/ZTE-Platform-Settings-V1.2.html](http://www.spec.org/cpu2017/flags/ZTE-Platform-Settings-V1.2.html)

You can also download the XML flags sources by saving the following links:
- [http://www.spec.org/cpu2017/flags/ZTE-Platform-Settings-V1.2.xml](http://www.spec.org/cpu2017/flags/ZTE-Platform-Settings-V1.2.xml)

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