ZTE Corporation
ZTE R5300G4 Server System
(2.70 GHz, Intel Xeon Platinum 8280)

SPECrate®2017_fp_base = 298
SPECrate®2017_fp_peak = 318

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

### Hardware
- CPU Name: Intel Xeon Platinum 8280
- Max MHz: 4000
- Nominal: 2700
- Enabled: 56 cores, 2 chips, 2 threads/core
- Orderable: 1, 2 chip(s)
- Cache L1: 32 KB I + 32 KB D on chip per core
- L2: 1 MB I+D on chip per core
- L3: 38.5 MB I+D on chip per chip
- Other: None
- Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R)
- Storage: 2 x 1200 GB SAS HDD 10000 RPM,RAID1
- Other: None

### Software
- OS: Red Hat Enterprise Linux release 8.2 (Ootpa) 4.18.0-193.el8.x86_64
- Compiler: C/C++: Version 19.1.1.217 of Intel C/C++ Compiler Build 20200306 for Linux;
  Fortran: Version 19.1.1.217 of Intel Fortran Compiler Build 20200306 for Linux
- Parallel: No
- Firmware: Version 03.20.0200 released Dec-2020
- File System: xfs
- System State: Run level 3 (multi-user)
- Base Pointers: 64-bit
- Peak Pointers: 64-bit
- Other: jemalloc: jemalloc memory allocator library V5.0.1
- Power Management: BIOS and OS set to prefer performance at the cost of additional power usage

---

503.bwaves_r  112  56  544
507.cactuBSSN_r  112  426
508.namd_r  112  271
510.parest_r  112  189  353
511.povray_r  112  427  496
519.lbm_r  112  130
521.wrf_r  112  239  349
526.blender_r  112  170  997
527.cam4_r  112  614
538.imagick_r  112  544
544.nab_r  112
549.fotonik3d_r  112  105  554.roms_r  112  56  126

SPECrate®2017_fp_base (298) SPECrate®2017_fp_peak (318)
## Results Table

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</table>

**Compiler Notes**

The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler.

The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

**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"

OS set to performance mode via cpupower frequency-set -g performance

**Environment Variables Notes**

Environment variables set by runcpu before the start of the run:

LD_LIBRARY_PATH = "/home/spec/lib/intel64:/home/spec/je5.0.1-64"

MALLOCONF = "retain:true"
ZTE Corporation
ZTE R5300G4 Server System
(2.70 GHz, Intel Xeon Platinum 8280)

SPECrate®2017_fp_base = 298
SPECrate®2017_fp_peak = 318

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>

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.

The jemalloc library was
configured and built at default for
32bit (i686) and 64bit (x86_64) targets;
built with the RedHat Enterprise 7.5,
and the system compiler gcc 4.8.5;
sources available from jemalloc.net or

Platform Notes

BIOS Configuration:
VT-d = Disabled
Patrol Scrub = Disabled
ENERGY_PERF_BIAS_CFG mode = performance
SNC = Enabled
IMC interleaving = 1-way
SR-IOV Support = Disabled

Sysinfo program /home/spec/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost.localdomain Thu Feb 18 22:26:48 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 8280 CPU @ 2.70GHz
  2 "physical id"s (chips)
  112 "processors"

(Continued on next page)
ZTE Corporation
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SPECrate®2017_fp_base = 298
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Platform Notes (Continued)
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 : 28
siblings : 56
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 112
On-line CPU(s) list: 0-111
Thread(s) per core: 2
Core(s) per socket: 28
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8280 CPU @ 2.70GHz
Stepping: 6
CPU MHz: 3300.511
CPU max MHz: 4000.0000
CPU min MHz: 1000.0000
BogoMIPS: 5400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 39424K
NUMA node0 CPU(s): 0-3,7-9,14-17,21-23,56-59,63-65,70-73,77-79
NUMA node1 CPU(s): 4-6,10-13,18-20,24-27,60-62,66-69,74-76,80-83
NUMA node2 CPU(s): 28-31,35-37,42-45,49-51,58-61,64-67,70-73,77-79
NUMA node3 CPU(s): 32-34,38-41,46-48,52-55,58-61,64-67,70-73,77-79
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 ablp abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_c3 l1d_t Shadow l1d_t_sc l1d_t_tsc l1d_t_icsi l1d_t_isi l1d_t_nohash l1d_t_trace
(Continued on next page)
ZTE Corporation
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CPU2017 License: 9061
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Test Date: Feb-2021
Tested by: ZTE Corporation
Hardware Availability: Dec-2020
Software Availability: Dec-2020

Platform Notes (Continued)

    dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_lld arch_capabilities

    /proc/cpuinfo cache data
      cache size : 39424 KB

    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 7 8 9 14 15 16 17 21 22 23 56 57 58 59 63 64 65 70 71 72 73 77 78
      79
    node 0 size: 95079 MB
    node 0 free: 79667 MB
    node 1 cpus: 4 5 6 10 11 12 13 18 19 20 24 25 26 27 60 61 62 66 67 68 69 74 75 76 80 81
      82 83
    node 1 size: 96761 MB
    node 1 free: 85130 MB
    node 2 cpus: 28 29 30 31 35 36 37 42 43 44 45 49 50 51 84 85 86 87 91 92 93 98 99 100
      101 105 106 107
    node 2 size: 96734 MB
    node 2 free: 85863 MB
    node 3 cpus: 32 33 34 38 39 40 41 46 47 48 52 53 54 55 88 89 90 94 95 96 97 102 103 104
      108 109 110 111
    node 3 size: 96728 MB
    node 3 free: 85720 MB
    node distances:
      node 0 1 2 3
    0: 10 11 21 21
    1: 11 10 21 21
    2: 21 21 10 11
    3: 21 21 11 10

    From /proc/meminfo
      MemTotal:       394551536 kB
      HugePages_Total:       0
      Hugepagesize:       2048 kB

    /sbin/tuned-adm active
      Current active profile: latency-performance

    /sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance

    From /etc/*release* /etc/*version*
    os-release:
      NAME="Red Hat Enterprise Linux"
      VERSION="8.2 (Ootpa)"
      ID="rhel"

(Continued on next page)
ZTE Corporation
ZTE R5300G4 Server System
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SPECraten®2017_fp_base = 298
SPECraten®2017_fp_peak = 318

CPU2017 License: 9061
Test Sponsor: ZTE Corporation
Tested by: ZTE Corporation

Test Date: Feb-2021
Hardware Availability: Dec-2020
Software Availability: Dec-2020

Platform Notes (Continued)

ID_LIKE="fedora"
VERSION_ID="8.2"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.2 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.2:ga

uname -a:
Linux localhost.localdomain 4.18.0-193.el8.x86_64 #1 SMP Fri Mar 27 14:35:58 UTC 2020
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): KVM: Mitigation: Split huge pages
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling:
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 sanitation
CVE-2017-5715 (Spectre variant 2):
Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): No status reported
CVE-2019-11135 (TSX Asynchronous Abort):
Mitigation: Clear CPU buffers; SMT vulnerable

run-level 3 Feb 18 14:25

SPEC is set to: /home/spec
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 1.1T 58G 1005G 6% /home

From /sys/devices/virtual/dmi/id
Vendor: ZTE
Product Family: Server

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 M393A2K43DB2-CVF 16 GB 2 rank 2933, configured at 2934

(Continued on next page)
ZTE Corporation
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CPU2017 License: 9061
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Tested by: ZTE Corporation

Test Date: Feb-2021
Hardware Availability: Dec-2020
Software Availability: Dec-2020

Platform Notes (Continued)

BIOS:
  BIOS Vendor: ZTE
  BIOS Version: 03.20.0200
  BIOS Date: 12/12/2020
  BIOS Revision: 3.20

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
| C               | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
|                 | 544.nab_r(base, peak)
|-----------------|--------------------------------------------------
| Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
| NextGen Build 20200304
| Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
|-----------------|--------------------------------------------------

==============================================================================
| C++             | 508.namd_r(base, peak) 510.parest_r(base, peak)
|-----------------|--------------------------------------------------
| Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
| NextGen Build 20200304
| Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
|-----------------|--------------------------------------------------

==============================================================================
| C++, C          | 511.povray_r(base) 526.blender_r(base, peak)
|-----------------|--------------------------------------------------
| Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
| NextGen Build 20200304
| Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
| Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
| NextGen Build 20200304
| Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
|-----------------|--------------------------------------------------

==============================================================================
| C++, C          | 511.povray_r(peak)
|-----------------|--------------------------------------------------
| Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
| Version 19.1.1.217 Build 20200306
| Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
| Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,

(Continued on next page)
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Compiler Version Notes (Continued)

Version 19.1.1.217 Build 20200306
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C++, C          | 511.povray_r(peak)
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==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
==============================================================================
Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
Fortran         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
| 554.roms_r(base, peak)
==============================================================================
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64,
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(Continued on next page)
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Software Availability: Dec-2020

Compiler Version Notes (Continued)

==============================================================================
Fortran, C      | 521.wrf_r(base) 527.cam4_r(base, peak)
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
   64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
Fortran, C      | 521.wrf_r(peak)
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
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Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
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Fortran, C      | 521.wrf_r(base) 527.cam4_r(base, peak)
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
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Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
Fortran, C      | 521.wrf_r(peak)
## Base Compiler Invocation

C benchmarks:
- icc

C++ benchmarks:
- icpc

Fortran benchmarks:
- ifort

Benchmarks using both Fortran and C:
- ifort icc

Benchmarks using both C and C++:
- icpc icc

Benchmarks using Fortran, C, and C++:
- icpc icc 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`
- `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:
- `-m64 -mnextgen -std=c11`
- `-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs`
- `-fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse`
- `-funroll-loops -gopt-mem-layout-trans=4`
- `-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

(Continued on next page)
### Base Optimization Flags (Continued)

C++ benchmarks:

```bash
-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -fuse-ld=gold -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-ld/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Fortran benchmarks:

```bash
-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-f fuse-ld=gold -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
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Benchmarks using both Fortran and C:

```bash
-m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-f fuse-ld=gold -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
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Benchmarks using both C and C++:

```bash
-m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-f fuse-ld=gold -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
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Benchmarks using Fortran, C, and C++:

```bash
-m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
-f fuse-ld=gold -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
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```
## Peak Compiler Invocation

C benchmarks:
- icc

C++ benchmarks:
- icpc

Fortran benchmarks:
- ifort

Benchmarks using both Fortran and C:
- ifort icc

Benchmarks using both C and C++:
- icpc icc

Benchmarks using Fortran, C, and C++:
- icpc icc ifort

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:
- 519.lbm_r: basepeak = yes
- 538.imagick_r: basepeak = yes
- 544.nab_r: basepeak = yes

C++ benchmarks:
- 508.namd_r: basepeak = yes

(Continued on next page)
ZTE Corporation
ZTE R5300G4 Server System
(2.70 GHz, Intel Xeon Platinum 8280)

SPECrater®2017_fp_base = 298
SPECrater®2017_fp_peak = 318

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

Peak Optimization Flags (Continued)

Fortran benchmarks:

503.bwaves_r: -m64 -W1,-plugin-opt=x86-branches-within-32B-boundaries
-W1, -z, muldefs -fuse-ld=gold -xCORE-AVX512 -O3 -ipo
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-align array32byte -auto -nostandard-realloc-lhs
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

549.fotonik3d_r: basepeak = yes

554.roms_r: Same as 503.bwaves_r

Benchmarks using both Fortran and C:

521.wrf_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3
-ipo -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3
-ipo -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactusBSSN_r: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/ZTE-Platform-Settings-V1.1.html
**ZTE Corporation**

ZTE R5300G4 Server System  
(2.70 GHz, Intel Xeon Platinum 8280)  

| SPECrate®2017_fp_base = 298 | SPECrate®2017_fp_peak = 318 |

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

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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