**SPEC CPU®2017 Floating Point Rate Result**

**Inspur Corporation**

Inspur NF5180M6 (Intel Xeon Gold 6338)

<table>
<thead>
<tr>
<th>Software Availability: Dec-2020</th>
<th><strong>SPECrater®2017_fp_base = 401</strong></th>
</tr>
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<tbody>
<tr>
<td><strong>SPECrater®2017_fp_peak = 421</strong></td>
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</tbody>
</table>

**CPU2017 License:** 3358

**Test Sponsor:** Inspur Corporation

**Test Date:** Aug-2021

**Tested by:** Inspur Corporation

**Hardware Availability:** May-2021

**Test Sponsor:** Inspur Corporation

**Hardware Availability:** Dec-2020

**Tested by:** Inspur Corporation

**Software Availability:** Dec-2020

**Test Sponsor:** Inspur Corporation

**Hardware Availability:** Dec-2020

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**CPU Name:** Intel Xeon Gold 6338

**Max MHz:** 3200

**Nominal:** 2000

**Enabled:** 64 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:** 48 MB I+D on chip per chip

**Other:** None

**Memory:** 1 TB (32 x 32 GB 2Rx4 PC4-3200AA-R)

**Storage:** 1 x 4 TB NVME SSD

**Other:** None

**OS:** Red Hat Enterprise Linux release 8.2 (Ootpa)

4.18.0-193.el8.x86_64

**Compiler:**

C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux;

C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux;

Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux

**Parallel:** No

**Firmware:** Version 05.00.00 released Apr-2021

**File System:** xfs

**System State:** Run level 3 (multi-user)

**Base Pointers:** 64-bit

**Peak Pointers:** 64-bit

**Other:** jemalloc memory allocator V5.0.1

**Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage.
Results Table

<table>
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<tr>
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<th>Copies</th>
<th>Seconds</th>
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</tr>
</tbody>
</table>

SPECrater®2017 fp_base = 401
SPECrater®2017 fp_peak = 421

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"
SCALING_GOVERNOR set to Performance

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/ CPU2017/lib/intel64:/home/ CPU2017/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

(Continued on next page)
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**Inspur Corporation**

Inspur NF5180M6 (Intel Xeon Gold 6338)

**SPECrate®2017_fp_base = 401**

**SPECrate®2017_fp_peak = 421**

CPU2017 License: 3358  
Test Sponsor: Inspur Corporation  
Test Date: Aug-2021  
Tested by: Inspur Corporation  
Hardware Availability: May-2021  
Software Availability: Dec-2020

**General Notes (Continued)**

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.


**Platform Notes**

BIOS configuration:

- ENERGY_PERF_BIAS_CFG mode set to Performance
- Hardware Prefetch set to Disable
- VT Support set to Disable
- C1E Support set to Disable
- Sub NUMA Cluster (SNC) set to Enable

Sysinfo program /home/CPU2017/bin/sysinfo

Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost.localdomain Wed Aug 4 23:35:03 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

```text
model name : Intel(R) Xeon(R) Gold 6338 CPU @ 2.00GHz
  2 "physical id"s (chips)
  128 "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 : 32
  siblings : 64
  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
  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
```

(Continued on next page)
Inspur Corporation

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Test Date: Aug-2021
Hardware Availability: May-2021
Software Availability: Dec-2020

Platform Notes (Continued)

25 26 27 28 29 30 31

From lscpu from util-linux 2.32.1:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 128
On-line CPU(s) list: 0-127
Thread(s) per core: 2
Core(s) per socket: 32
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 6338 CPU @ 2.00GHz
Stepping: 6
CPU MHz: 2600.000
CPU max MHz: 3200.0000
CPU min MHz: 800.0000
BogoMIPS: 4000.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 49152K
NUMA node0 CPU(s): 0-15, 64-79
NUMA node1 CPU(s): 16-31, 80-95
NUMA node2 CPU(s): 32-47, 96-111
NUMA node3 CPU(s): 48-63, 112-127
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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref pni pclmulqdq dtes64 msr 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
rdseclahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 invpcid_single ssbd mba ibrs
ibpb stibp ibrs_enhanced tpr_shadow vgni flexpriority ept vpid fsgsbase tsc_adjust
bm1 hle avx2 smep bmi2 ertms invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap
avx512fma clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt
xsaves xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local wbnoinvvd
dt phenomena arat pln pts avx512vmbmi umip pku ospke avx512vmbmi qfn1 vaes vpcm1qdq
avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d
arch_capabilities

/proc/cpuinfo cache data
  cache size : 49152 KB

(Continued on next page)
Inspur Corporation

Inspur NF5180M6 (Intel Xeon Gold 6338)

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<td>3358</td>
<td>Aug-2021</td>
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| Software Availability: | |
|------------------------| |
| Dec-2020               | |

**SPECrate®2017_fp_base = 401**

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**Platform Notes (Continued)**

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 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79
node 0 size: 257635 MB
node 0 free: 242364 MB
node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95
node 1 size: 258040 MB
node 1 free: 245250 MB
node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111
node 2 size: 258040 MB
node 2 free: 245134 MB
node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 112 113 114 115 116 117
node 3 size: 258010 MB
node 3 free: 245236 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: 1056489904 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="8.2 (Ootpa)"
ID=rhel
ID_LIKE=fedora
VERSION_ID="8.2"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.2 (Ootpa)"
ANSI_COLOR="0;31"

(Continued on next page)
Inspur Corporation
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Platform Notes (Continued)

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): Not affected
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
CVE-2020-0543 (Special Register Buffer Data Sampling): No status reported
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Aug 4 14:52

SPEC is set to: /home/CPU2017

From /sys/devices/virtual/dmi/id
Vendor: Inspur
Product: NF5180M6
Product Family: Family
Serial: 380827124

Additional information from dmidecode 3.2 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:
   32x Micron 36ASF4G72PZ-3G2R1 32 GB 2 rank 3200

BIOS:
   BIOS Vendor: American Megatrends Inc.
   BIOS Version: 05.00.00

(Continued on next page)
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Platform Notes (Continued)

BIOS Date: 04/25/2021
BIOS Revision: 5.22

(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) 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.

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C++ | 508.namd_r(base, peak) 510.parest_r(base, peak)
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=================================================================================
C++, C | 511.povray_r(peak)
=================================================================================
Intel(R) C++ 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.
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64,
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C++, C | 511.povray_r(base) 526.blender_r(base, peak)
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Compiler Version Notes (Continued)

C++, C | 511.povray_r(peak)

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C++, C, Fortran | 507.cactuBSSN_r(base, peak)

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Fortran | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
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Fortran, C | 521.wrf_r(peak)

(Continued on next page)
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Copyright 2017-2021 Standard Performance Evaluation Corporation

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Fortran, C | 521.wrf_r(base) 527.cam4_r(base, peak)
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------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R)
64, Version 2021.1 Build 20201113
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Base Compiler Invocation

C benchmarks:
icx

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Inspur Corporation

Inspur NF5180M6 (Intel Xeon Gold 6338)

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base = 401</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_fp_peak = 421</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 3358

**Test Sponsor:** Inspur Corporation

**Tested by:** Inspur Corporation

**Test Date:** Aug-2021

**Hardware Availability:** May-2021

**Software Availability:** Dec-2020

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**Base Compiler Invocation (Continued)**

C++ benchmarks:

```bash
icpx
```

Fortran benchmarks:

```bash
ifort
```

Benchmarks using both Fortran and C:

```bash
ifort icx
```

Benchmarks using both C and C++:

```bash
icpx icx
```

Benchmarks using Fortran, C, and C++:

```bash
icpx icx ifort
```

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**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

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**Base Optimization Flags**

C benchmarks:

```bash
-w -std=gnu11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbraces-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

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SPEC CPU®2017 Floating Point Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

SPECrate®2017_fp_base = 401
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Base Optimization Flags (Continued)

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
-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
-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
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Peak Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

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Inspur NF5180M6 (Intel Xeon Gold 6338)

Peak Compiler Invocation (Continued)

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
521.wrf_r: ifort icc
527.cam4_r: ifort icx

Benchmarks using both C and C++:
511.povray_r: icpc icc
526.blender_r: icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx 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: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -gopt-mem-layout-trans=4
-flto
-Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -ffast-math
-m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -ffast-math
-m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -ffast-math
-m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -ffast-math
-m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -ffast-math
-m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -ffast-math
-m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -ffast-math
-m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -ffast-math
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-m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -ffast-math
-m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -ffast-math
-m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -ffast-math
-m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -ffast-math
-m64

C++ benchmarks:
508.namd_r: basepeak = yes
510.parest_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -ffast-math
-m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -ffast-math
-m64

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Peak Optimization Flags (Continued)

510.parest_r (continued):
-qpopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:

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

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 -qpopt-prefetch -ffinite-math-only
-qpopt-multiple-gather-scatter-by-shuffles
-qpopt-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 -qpopt-prefetch -ffinite-math-only
-qpopt-multiple-gather-scatter-by-shuffles
-qpopt-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.cactuBSSN_r: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V2.0.html
Inspur Corporation

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You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V2.0.xml

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