## SPEC CPU®2017 Integer Rate Result

### Inspur Corporation

**Inspur NF5280M6 (Intel Xeon Gold 6338)**

**SPECrates:**
- **SPECrates®2017_int_base = 425**
- **SPECrates®2017_int_peak = 438**

---

**Hardware**

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon Gold 6338</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz:</td>
<td>3200</td>
</tr>
<tr>
<td>Nominal:</td>
<td>2000</td>
</tr>
<tr>
<td>Enabled:</td>
<td>64 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable:</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Cache L1:</td>
<td>32 KB I + 48 KB D on chip per core</td>
</tr>
<tr>
<td>L2:</td>
<td>1.25 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3:</td>
<td>48 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>1 TB (32 x 32 GB 2Rx8 PC4-3200AA-R)</td>
</tr>
<tr>
<td>Storage:</td>
<td>1 x 2 TB NVME SSD</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
</tbody>
</table>

**Software**

- **OS:** Red Hat Enterprise Linux release 8.3 (Ootpa) 4.18.0-240.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 04.12.02 released Apr-2021
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 32/64-bit
- **Other:** jemalloc memory allocator V5.0.1
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage.

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### Graph

<table>
<thead>
<tr>
<th>SPECrate®2017</th>
<th>Copies</th>
</tr>
</thead>
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<tr>
<td>SPECrate®2017_int_base</td>
<td>425</td>
</tr>
<tr>
<td>SPECrate®2017_int_peak</td>
<td>438</td>
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</tbody>
</table>

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**Test Details**

- **CPU2017 License:** 3358
- **Test Sponsor:** Inspur Corporation
- **Test Date:** Apr-2022
- **Hardware Availability:** Apr-2021
- **Tested by:** Inspur Corporation
- **Software Availability:** Dec-2020
- **Tested by:** Inspur Corporation
- **Software Availability:** Dec-2020

---

**Benchmark Results**

- **500.perlbench_r:** 341
- **502.gcc_r:** 402
- **505.mcf_r:** 712
- **520.omnetpp_r:** 269
- **523.xalancbmk_r:** 556
- **525.x264_r:** 874
- **531.deepsjeng_r:** 312
- **541.leela_r:** 305
- **548.exchange2_r:** 863
- **557.xz_r:** 236
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Results Table

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<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>678</td>
<td>301</td>
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<td>343</td>
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<td>712</td>
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<td>623</td>
<td>270</td>
<td>624</td>
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<td>305</td>
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<tr>
<td>548.exchange2_r</td>
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<td>863</td>
<td>388</td>
<td>863</td>
<td>391</td>
<td>857</td>
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<tr>
<td>557.xz_r</td>
<td>128</td>
<td>571</td>
<td>242</td>
<td>568</td>
<td>243</td>
<td>568</td>
<td>243</td>
</tr>
</tbody>
</table>

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"
   MALLOC_CONF = "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:
   sync; echo 3> /proc/sys/vm/drop_caches

(Continued on next page)
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Test Date: Apr-2022
Hardware Availability: Apr-2021
Software Availability: Dec-2020

General Notes (Continued)

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;
sources available from jemalloc.net or

Platform Notes

BIOS and OS configuration:
ENERGY_PERF_BIAS_CFG mode set to Performance
Hardware Prefetch set to Disable
VT Support set to Disable
Sub NUMA Cluster (SNC) set to enable
Scaling_Governor set to Performance

Sysinfo program /home/CPU2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acfc64d
running on localhost.localdomain Tue Apr 26 07:39:32 2022

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) 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
                 25 26 27 28 29 30 31

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Platform Notes (Continued)

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: 2600.082
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 cmovPAT apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtsscp
lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperf perf AFFINITY pni pclmulqdq dtstes64 dts_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 avx f16c
rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single
intel_pentium_sbd sbb ibrs ibrs Enhanced fsx sb base tsc_adjust bmi1 hle avx2
smep bmi2 erms invpcid cq gsm dtd_t a avx512f avx512dq rdseed adx smap avx512ifma
clflushopt clwb intel_pt avx512cd sha_test avx512bw avx512vl xsaveopt xsave vgetbv1
xsave cargo mgc_load llc_cnm_mbm_total cgm_mbm_local split_lock Detect xbono nd
idt da ef an pts avx512vbmi umip pkt ospek avx512 vbmi2 gfn vaes vpcm1uldq
avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md clear pconfi grit flush_l1d
arch_capabilities

/proc/cpuinfo cache data
  cache size : 49152 KB

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

(Continued on next page)
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**Platform Notes (Continued)**

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: 250011 MB
node 0 free: 257100 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: 250427 MB
node 1 free: 257670 MB
node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 96 97 98 100 101 102 103 104 105 106 107 108 109 110 111
node 2 size: 250280 MB
node 2 free: 257723 MB
node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127
node 3 size: 250470 MB
node 3 free: 257771 MB
node distances:

<table>
<thead>
<tr>
<th>node 0</th>
<th>node 1</th>
<th>node 2</th>
<th>node 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0:</td>
<td>10 11 20 20</td>
<td>20 20 10 11</td>
<td>20 20 11 10</td>
</tr>
<tr>
<td>1:</td>
<td>11 10 20 20</td>
<td>20 20 10 11</td>
<td>20 20 11 10</td>
</tr>
<tr>
<td>2:</td>
<td>20 20 10 11</td>
<td>20 20 10 11</td>
<td>20 20 11 10</td>
</tr>
<tr>
<td>3:</td>
<td>20 20 11 10</td>
<td>20 20 11 10</td>
<td>20 20 11 10</td>
</tr>
</tbody>
</table>

From /proc/meminfo

MemTotal: 1056476792 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)

(Continued on next page)
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Platform Notes (Continued)

```
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:
    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): 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): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Apr 26 07:38

SPEC is set to: /home/CPU2017
    Filesystem           Type  Size  Used Avail Use% Mounted on
    /dev/mapper/rhel-home xfs   1.4T   19G  1.4T   2% /home

From /sys/devices/virtual/dmi/id
    Vendor:  Inspur
    Product: NFS280M6
    Product Family: Family
    Serial:  380251214

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 18ASF4G72PDZ-3G2E1 32 GB 2 rank 3200

BIOS:
    BIOS Vendor: American Megatrends Inc.
    BIOS Version: 04.12.02
    BIOS Date: 04/02/2021
    BIOS Revision: 5.21

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Platform Notes (Continued)
(End of data from sysinfo program)

Compiler Version Notes

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<table>
<thead>
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<th>C</th>
<th>500.perlbench_r(peak) 557.xz_r(peak)</th>
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<tbody>
<tr>
<td>Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)</td>
<td></td>
</tr>
<tr>
<td>64, Version 2021.1 Build 20201112_000000</td>
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<tr>
<td>Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
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<td>--------------------------------------</td>
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<tr>
<td>C</td>
<td>502.gcc_r(peak)</td>
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<tr>
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<tr>
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### Compiler Version Notes (Continued)

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</tr>
<tr>
<td>Fortran</td>
<td>548.exchange2_r(base, peak)</td>
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<td>Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on IA-32, Version 2021.1 Build 20201113 Copyright (C) 1985-2020 Intel Corporation. All rights reserved.</td>
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Compiler Version Notes (Continued)

Intel(R) 64, Version 2021.1 Build 20201112_000000
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Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

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:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-1qkmalloc

C++ benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries

(Continued on next page)
Inspur Corporation

Inspur NF5280M6 (Intel Xeon Gold 6338)

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<th>SPECrate®2017_int_base = 425</th>
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**Base Optimization Flags (Continued)**

C++ benchmarks (continued):
- `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin`
- `-lqkmalloc`

Fortran benchmarks:
- `-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div`
- `-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte`
- `-auto -mbranches-within-32B-boundaries`
- `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin`
- `-lqkmalloc`

**Peak Compiler Invocation**

C benchmarks (except as noted below):
- `icx`
- `500.perlbench_r: icc`
- `557.xz_r: icc`

C++ benchmarks:
- `icpx`

Fortran benchmarks:
- `ifort`

**Peak Portability Flags**

500.perlbench_r: `-DSPEC_LP64 -DSPEC_LINUX_X64`
502.gcc_r: `-D_FILE_OFFSET_BITS=64`
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`
## SPEC CPU®2017 Integer Rate Result

### Inspur Corporation

**Inspur NF5280M6 (Intel Xeon Gold 6338)**

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### Peak Optimization Flags

#### C benchmarks:

- **500.perlbench_r:** `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)`
  - `xCORE-AVX512 -ipo -O3 -no-prec-div`
  - `qopt-mem-layout-trans=4 -fno-strict-overflow`
  - `mbranches-within-32B-boundaries`
  - `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin`
  - `-lqkmalloc`

- **502.gcc_r:** `-m32`
  - `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/ia32_lin`
  - `-std=gnu89 -Wl,-z,muldefs -fprofile-generate(pass 1)`
  - `-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto`
  - `-Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4`
  - `mbranches-within-32B-boundaries`
  - `-L/usr/local/jemalloc32-5.0.1/lib -ljemalloc`

- **505.mcf_r:** `basepeak = yes`

- **525.x264_r:** `-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto`
  - `-O3 -ffast-math -qopt-mem-layout-trans=4 -fno-alias`
  - `mbranches-within-32B-boundaries`
  - `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin`
  - `-lqkmalloc`

- **557.xz_r:** `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
  - `qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries`
  - `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin`
  - `-lqkmalloc`

#### C++ benchmarks:

- **520.omnetpp_r:** `basepeak = yes`

- **523.xalancbmk_r:** `basepeak = yes`

- **531.deepsjeng_r:** `basepeak = yes`

- **541.leela_r:** `basepeak = yes`

#### Fortran benchmarks:

- **548.exchange2_r:** `basepeak = yes`
### SPEC CPU®2017 Integer Rate Result

**Inspur Corporation**

**Inspur NF5280M6 (Intel Xeon Gold 6338)**

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The flags files that were used to format this result can be browsed at


http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V2.5.html

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-V2.5.xml

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

Tested with SPEC CPU®2017 v1.1.8 on 2022-04-26 07:39:31-0400.