Inspur Corporation

Inspur NF5180M6 (Intel Xeon Gold 6348)

CPU2017 License: 3358
Test Sponsor: Inspur Corporation
 Tested by: Inspur Corporation

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

Copies

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
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<tbody>
<tr>
<td>503.bwaves_r</td>
<td>112</td>
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<tr>
<td>507.cactuBSSN_r</td>
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<td>508.namd_r</td>
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<td>510.parest_r</td>
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<td>511.povray_r</td>
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<td>519.lbm_r</td>
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<td>521.wrf_r</td>
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<td>544.nab_r</td>
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<tr>
<td>549.fotonik3d_r</td>
<td>112</td>
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<tr>
<td>554.roms_r</td>
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Hardware

- CPU Name: Intel Xeon Gold 6348
- Max MHz: 3500
- Nominal: 2600
- Enabled: 56 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: 42 MB I+D on chip per core
- Other: None
- Memory: 1 TB (32 x 32 GB 2Rx4 PC4-3200AA-R)
- Storage: 1 x 4 TB NVME SSD
- Other: None

Software

- 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;
  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 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>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
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</tbody>
</table>

**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"

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

(Continued on next page)
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.

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 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
Intel Hyper Threading Technology set to Enable

Sysinfo program /home/CPU2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost.localdomain Mon Jun 21 23:23:48 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) Gold 6348 CPU @ 2.60GHz
  2 "physical id"s (chips)
  112 "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 : 28
siblings : 56
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

(Continued on next page)
Insipr Corporation

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

*Inspur NF5180M6 (Intel Xeon Gold 6348)*

---

**CPU2017 License:** 3358  
**Test Sponsor:** Inspur Corporation  
**Tested by:** Inspur Corporation

---

**SPECrate®2017_fp_base = 408**  
**SPECrate®2017_fp_peak = 431**

---

**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):              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:               106  
Model name:          Intel(R) Xeon(R) Gold 6348 CPU @ 2.60GHz  
Stepping:            6  
CPU MHz:             3400.000  
CPU max MHz:         3500.0000  
CPU min MHz:         800.0000  
BogoMIPS:            5200.00  
Virtualization:      VT-x  
L1d cache:           48K  
L1i cache:           32K  
L2 cache:            1280K  
L3 cache:            43008K  
NUMA node0 CPU(s):   0-13,56-69  
NUMA node1 CPU(s):   14-27,70-83  
NUMA node2 CPU(s):   28-41,84-97  
NUMA node3 CPU(s):   42-55,98-111

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
  aperfmperf pni pclmulqdq dtes64 ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm
  pclmulqdq xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local wbnoinvd
  dtherm ida arat pln pts avx512vnni fma tm2 tcr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust
```

```
/profile/cpuinfo cache data  
```

```
  cache size : 43008 KB
```

(Continued on next page)
**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 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69
node 0 size: 257636 MB
node 0 free: 243787 MB

node 1 cpus: 10 11 20 20
node 1 size: 258014 MB
node 1 free: 246656 MB

node 2 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 80 81 82 83
node 2 size: 258041 MB
node 2 free: 246714 MB

node 3 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 80 81 82 83
node 3 size: 258039 MB
node 3 free: 246704 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: 1056493268 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sbin/tuned-adm active
It seems that tuned daemon is not running, preset profile is not activated.
Preset 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)"

(Continued on next page)
Inspur Corporation

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Platform Notes (Continued)

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):
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/swapgs barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1):
Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2017-5715 (Spectre variant 2):
No status reported
CVE-2020-0543 (Special Register Buffer Data Sampling):
Not affected
CVE-2019-11135 (TSX Asynchronous Abort):
Not affected

run-level 3 Jun 21 16:35

SPEC is set to: /home/CPU2017
FS Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 3.6T 95G 3.5T 3% /home

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 Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200

BIOS:
BIOS Vendor: American Megatrends Inc.

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

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Platform Notes (Continued)

- BIOS Version: 05.00.00
- 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
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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
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Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
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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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Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
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C++, C | 511.povray_r(base) 526.blender_r(base, peak)

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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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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)

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Compiler Version Notes (Continued)

Fortran, C      | 521.wrf_r(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
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
64, Version 2021.1 Build 20201112_000000
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Fortran, C      | 521.wrf_r(base) 527.cam4_r(base, peak)
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## Inspur Corporation

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**Software Availability:** Dec-2020

### 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`
- `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`

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Inspur Corporation

Inspur NF5180M6 (Intel Xeon Gold 6348)

SPEC®2017 Floating Point Rate Result

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SPEC CPU®2017 Floating Point Rate Result

Test Sponsor: Inspur Corporation
Tested by: Inspur Corporation

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

SPECrate®2017_fp_base = 408
SPECrate®2017_fp_peak = 431

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

(Continued on next page)
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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 -qopt-mem-layout-trans=4
-fimf-accuracy-bits=14:sqrt
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

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

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Spec CPU®2017 Floating Point Rate Result

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Peak Optimization Flags (Continued)

510.parest_r (continued):
-qopt-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 -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

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.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
### SPEC CPU®2017 Floating Point Rate Result

**Inspur Corporation**

**Inspur NF5180M6 (Intel Xeon Gold 6348)**

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**CPU2017 License:** 3358  
**Test Sponsor:** Inspur Corporation  
**Tested by:** Inspur Corporation  
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You can also download the XML flags sources by saving the following links:

- [Intel ic2021-official-linux64_revA.xml](http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml)
- [Inspur Platform Settings V2.0.xml](http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V2.0.xml)

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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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