**SPEC® CPU2017 Integer Rate Result**

## Inspur Corporation

**Inspur NS5162M5 (Intel Xeon Silver 4109T)**

### SPECrate2017_int_base = 69.8

### SPECrate2017_int_peak = 73.9

<table>
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<tr>
<th>Test Date:</th>
<th>Jun-2019</th>
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<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Oct-2017</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Mar-2018</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Silver 4109T
- **Max MHz.:** 3000
- **Nominal:** 2000
- **Enabled:** 16 cores, 2 chips, 2 threads/core
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 1 MB I+D on chip per core
- **L3:** 11 MB I+D on chip per chip
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)
- **Storage:** 1 x 480 GB SATA SSD
- **Other:** None

### Software

- **OS:** SUSE Linux Enterprise Server 12 SP2 4.4.120-92.70-default
- **Compiler:** C/C++: Version 18.0.0.128 of Intel C/C++
- **Parallel:** No
- **Firmware:** Version 4.0.1 released Aug-2018
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 32/64-bit
- **Other:** jemalloc: jemalloc memory allocator library V5.0.1

---

**Copies**

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<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate2017_int_peak</th>
<th>SPECrate2017_int_base</th>
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**SPECrate2017_int_base (69.8)**

---

**SPECrate2017_int_peak (73.9)**
Standards Performance Evaluation Corporation

SPEC CPU2017 Integer Rate Result

Inspur Corporation
Inspur NS5162M5 (Intel Xeon Silver 4109T)

**Results Table**

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</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"

**General Notes**

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

```
LD_LIBRARY_PATH = "/home/CPU2017/lib/ia32:/home/CPU2017/lib/intel64:/home/CPU2017/je5.0.1-32:/home/CPU2017/je5.0.1-64"
```

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.4

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>
```

Yes: 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.

(Continued on next page)
SPEC CPU2017 Integer Rate Result
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Inspur Corporation
Inspur NS5162M5 (Intel Xeon Silver 4109T)

| SPECrate2017_int_base | 69.8 |
| SPECrate2017_int_peak | 73.9 |

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

Test Date: Jun-2019
Hardware Availability: Oct-2017
Software Availability: Mar-2018

General Notes (Continued)

jemalloc: configured and built at default for
32bit (i686) and 64bit (x86_64) targets;
jemalloc: built with the RedHat Enterprise 7.4,
and the system compiler gcc 4.8.5;
jemalloc: sources available from jemalloc.net or

Platform Notes

BIOS and OS configuration:
SCALING_GOVERNOR set to Performance
Hardware Prefetch set to Disable
VT Support set to Disable
C1E Support set to Disable
IMC (Integrated memory controller) Interleaving set to 1-way
Sub NUMA Cluster (SNC) set to Enable
Sysinfo program /home/CPU2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-q537 Wed Jun 19 11:24:42 2019

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) Silver 4109T CPU @ 2.00GHz
  2 "physical id"s (chips)
  32 "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 : 8
  siblings : 16
  physical 0: cores 0 1 2 3 4 5 6 7
  physical 1: cores 0 1 2 3 4 5 6 7

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel

(Continued on next page)
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**Hardware Availability:** Oct-2017  
**Software Availability:** Mar-2018

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#### Platform Notes (Continued)

```plaintext
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Silver 4109T CPU @ 2.00GHz
Stepping:              4
CPU MHz:               2299.999
CPU max MHz:           3000.0000
CPU min MHz:           800.0000
BogoMIPS:              3990.61
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              11264K
NUMA node0 CPU(s):     0-7,16-23
NUMA node1 CPU(s):     8-15,24-31
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
                       aperfmperf eagerfpu 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 3nowprefetch ida arat epb invpncid_single pin pts dtherm
                       hwlp_act_window hwlp_epp hwlp_pkg_req intel_pt rsb_ctxtsw spec_ctrl stibp retpoline
                       kaiser tpr_shadow vmmi flexpriority ept vpid fsgsbases tsc_adjust bmi1 hle avx2 smep
                       bmi2 erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb
                       avx512cd avx512bw avx512vl xsaveopt xsaves xgetbv1 cqm_l1c cmq_occup_l1c
```

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

```plaintext
available: 2 nodes (0-1)  
node 0 cpus: 0 1 2 3 4 5 6 7 16 17 18 19 20 21 22 23  
node 0 size: 192963 MB  
node 0 free: 192471 MB  
node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31  
node 1 size: 193384 MB  
node 1 free: 193014 MB  
node distances:  
node 0 1  
0: 10 21  
1: 21 10  
```

From `/proc/meminfo`:

```plaintext
MemTotal:       395620848 kB  
HugePages_Total:       0  
Hugepagesize:       2048 kB
```

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Test Sponsor: Inspur Corporation
Test Date: Jun-2019
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Platform Notes (Continued)

/usr/bin/lsb_release -d
  SUSE Linux Enterprise Server 12 SP2

From /etc/*release* /etc/*version*
  SuSE-release:
    SUSE Linux Enterprise Server 12 (x86_64)
    VERSION = 12
    PATCHLEVEL = 2
    # This file is deprecated and will be removed in a future service pack or release.
    # Please check /etc/os-release for details about this release.
  os-release:
    NAME="SLES"
    VERSION="12-SP2"
    VERSION_ID="12.2"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:
  Linux linux-q537 4.4.120-92.70-default #1 SMP Wed Mar 14 15:59:43 UTC 2018 (52a83de)
  x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

run-level 3 Jun 19 11:23 last=5

SPEC is set to: /home/CPU2017
  Filesystem   Type     Size  Used Avail Use% Mounted on
  /dev/sdb3     xfs     407G   64G  344G  16%   /home

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.

  BIOS Inspur 4.0.1 08/30/2018
  Memory:
    4x NO DIMM NO DIMM
    12x Samsung M393A4K40CB2-CTD 32 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)
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Compiler Version Notes

==============================================================================
CC  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
   525.x264_r(base, peak) 557.xz_r(base, peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
==============================================================================
CC   500.perlbench_r(peak) 502.gcc_r(peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
==============================================================================
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
   541.leela_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
==============================================================================
CXXC 520.omnetpp_r(peak) 523.xalancbmk_r(peak) 531.deepsjeng_r(peak)
   541.leela_r(peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
==============================================================================
FC  548.exchange2_r(base, peak)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

Base Compiler Invocation

C benchmarks:
iccc

C++ benchmarks:
icpc

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### Base Compiler Invocation (Continued)

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:

-W1, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

**C++** benchmarks:

-W1, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

**Fortran** benchmarks:

-W1, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc

---

### Base Other Flags

**C** benchmarks:

-m64 -std=c11

**C++** benchmarks:

-m64

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(Continued on next page)
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Base Other Flags (Continued)

Fortran benchmarks:
- m64

Peak Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

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: -D_FILE_OFFSET_BITS=64 -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

Peak Optimization Flags

C benchmarks:

500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-fno-strict-overflow -L/usr/local/je5.0.1-64/lib
-ljemalloc

502.gcc_r: -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32
-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-L/usr/local/je5.0.1-32/lib -ljemalloc

(Continued on next page)
Peak Optimization Flags (Continued)

505.mcf_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib
-ljemalloc

525.x264_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -fno-alias
-L/usr/local/je5.0.1-64/lib -ljemalloc

557.xz_r: Same as 505.mcf_r

C++ benchmarks:

520.omnetpp_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-L/usr/local/je5.0.1-64/lib -ljemalloc

523.xalancbmk_r: -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32
-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3
-L/usr/local/je5.0.1-32/lib -ljemalloc

531.deepsjeng_r: Same as 520.omnetpp_r

541.leela_r: Same as 520.omnetpp_r

Fortran benchmarks:

-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc

Peak Other Flags

C benchmarks (except as noted below):
- m64 -std=c11

502.gcc_r: -m32 -std=c11

C++ benchmarks (except as noted below):
- m64

523.xalancbmk_r: -m32

(Continued on next page)
## SPEC CPU2017 Integer Rate Result

### Inspur Corporation

**Inspur NS5162M5 (Intel Xeon Silver 4109T)**

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>SPECrate2017_int_peak</th>
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<tbody>
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<td>69.8</td>
<td>73.9</td>
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**CPU2017 License:** 3358  
**Test Sponsor:** Inspur Corporation  
**Tested by:** Inspur Corporation  
**Test Date:** Jun-2019  
**Hardware Availability:** Oct-2017  
**Software Availability:** Mar-2018

### Peak Other Flags (Continued)

Fortran benchmarks:

- -m64

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

http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.html  
http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V1.3-SKL.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.xml  
http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V1.3-SKL.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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