**SPEC CPU®2017 Integer Rate Result**

### Inspur Corporation

**Inspur NF5180M5 (Intel Xeon Silver 4210)**

<table>
<thead>
<tr>
<th>Copies</th>
<th>SPECrate®2017_int_base (107)</th>
<th>SPECrate®2017_int_peak (111)</th>
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</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>83.2</td>
<td>96.2</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>83.7</td>
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<td>505.mcf_r</td>
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<td>523.xalancbmk_r</td>
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<tr>
<td>525.x264_r</td>
<td>90.7</td>
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<tr>
<td>531.deepsjeng_r</td>
<td>83.8</td>
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</tr>
<tr>
<td>557.xz_r</td>
<td>68.1</td>
<td>68.2</td>
</tr>
</tbody>
</table>

#### Hardware

- **CPU Name:** Intel Xeon Silver 4210
  - Max MHz: 3200
  - Nominal: 2200
  - Enabled: 20 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: 13.75 MB I+D on chip per chip
  - Other: None
  - Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2666V-R, running at 2400)
  - Storage: 1 x 2 TB NVME SSD
  - Other: None

#### Software

- **OS:** SUSE Linux Enterprise Server 12 SP4
  - 4.12.14-94.41-default
- **Compiler:** C/C++: Version 19.0.4.227 of Intel C/C++ Compiler Build 20190416 for Linux:
  - Fortran: Version 19.0.4.227 of Intel Fortran Compiler Build 20190416 for Linux
- **Parallel:** No
- **Firmware:** Version 4.1.5 released May-2019
- **File System:** ext4
- **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

Test Date: Apr-2020
Test Sponsor: Inspur Corporation
Hardware Availability: Apr-2019
Software Availability: May-2019
CPU2017 License: 3358
Tested by: Inspur Corporation
Insapur Corporation

Insapur NF5180M5 (Intel Xeon Silver 4210)

SPEC®2017 Integer Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

SPEC®2017_int_base = 107
SPEC®2017_int_peak = 111

Results Table

<table>
<thead>
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<td>68.2</td>
<td>633</td>
<td>68.2</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"
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/lib/ia32:/home/CPU2017/je5.0.1-32"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
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 numacll i.e.:

(Continued on next page)
General Notes (Continued)

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
IMC (Integrated memory controller) Interleaving set to 2-way
Sub NUMA Cluster (SNC) set to Disable

Sysinfo program /home/CPU2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbl6e46a485a0011 running on linux-1ycj Thu Apr 30 02:35:04 2020

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 4210 CPU @ 2.20GHz
  2 "physical id"s (chips)
  40 "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 : 10
    siblings : 20
    physical 0: cores 0 1 2 3 4 8 9 10 11 12
    physical 1: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:
  Architecture: x86_64

(Continued on next page)
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SPECrate®2017_int_base = 107
SPECrate®2017_int_peak = 111

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

Test Date: Apr-2020
Hardware Availability: Apr-2019
Software Availability: May-2019

Platform Notes (Continued)

CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 2
Core(s) per socket: 10
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4210 CPU @ 2.20GHz
Stepping: 6
CPU MHz: 2200.000
CPU max MHz: 3200.0000
CPU min MHz: 1000.0000
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 14080K
NUMA node0 CPU(s): 0-9, 20-29
NUMA node1 CPU(s): 10-19, 30-39
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 ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtask pdcm
pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx avx2
rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single
intel_pinn ssbd mba ibrs ibrs ibpb tpr_shadow vnmi flexpriority ept vpid fsgsbase
tsc_adjust bmi1 hle avx2 smep bmi2 ersed invpcid rtm cmqm pxr dt_b bmi512f axv512f
rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec
gxgetbv1 xsaves cmq_llc cmq_occup_llc cmq_mbm_total cmq_mbm_local dtherm ida arat pln
pts pku ospke avx512_vnni flush_lld arch_capabilities

/proc/cpuinfo cache data
cache size: 14080 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 20 21 22 23 24 25 26 27 28 29
node 0 size: 385549 MB
node 0 free: 384809 MB
node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
node 1 size: 386849 MB

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

```
node 1 free: 386387 MB
node distances:
    node  0  1
    0: 10 21
    1: 21 10
```

From `/proc/meminfo`

- MemTotal: 790937236 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

```
/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP4
```

From `/etc/*release*` /etc/*version*

- SuSE-release:
  - SUSE Linux Enterprise Server 12 (x86_64)
  - VERSION = 12
  - PATCHLEVEL = 4
  - # 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-SP4"
  - VERSION_ID="12.4"
  - PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
  - ID="sles"
  - ANSI_COLOR="0;32"
  - CPE_NAME="cpe:/o:suse:sles:12:sp4"

```
uname -a:
x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

- CVE-2018-3620 (L1 Terminal Fault): Not affected
- Microarchitectural Data Sampling: No status reported
- 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: __user pointer sanitization
- CVE-2017-5715 (Spectre variant 2): Mitigation: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

```
run-level 3 Apr 30 02:34 last=5
```

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(Continued on next page)
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CPU2017 License: 3358
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Platform Notes (Continued)

SPEC is set to: /home/CPU2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/nvme0n1p4 ext4 1.8T 57G 1.7T 4% /home

From /sys/devices/virtual/dmi/id
BIOS: American Megatrends Inc. 4.1.5 05/21/2019
Vendor: Inspur
Product: NF5280M5
Serial: 219243920

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 Hynix HMAA4GR7AJR8N-WM 32 GB 2 rank 2933, configured at 2400

Compiler Version Notes

==============================================================================
C       | 502.gcc_r(peak)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on IA-32, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C       | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
| 525.x264_r(base, peak) 557.xz_r(base, peak)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
==============================================================================

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

==============================================================================
| C       | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak) |
|         | 525.x264_r(base, peak) 557.xz_r(base, peak)                      |
==============================================================================

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, 
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

==============================================================================
| C++     | 523.xalancbmk_r(peak) |
==============================================================================

Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version 
19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

==============================================================================
| C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base) |
|         | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak) |
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Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, 
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==============================================================================
| C++     | 523.xalancbmk_r(peak) |
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| C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base) |
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Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, 
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

==============================================================================
| Fortran | 548.exchange2_r(base, peak) |
==============================================================================

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 
(Continued on next page)
## Compiler Version Notes (Continued)

64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

## Base Compiler Invocation

C benchmarks:
```bash
icc -m64 -std=c11
```

C++ benchmarks:
```bash
icpc -m64
```

Fortran benchmarks:
```bash
ifort -m64
```

## 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:
```bash
-W1, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```

C++ benchmarks:
```bash
-W1, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```
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Base Optimization Flags (Continued)

Fortran benchmarks:
-W1, -z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-ll/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

Peak Compiler Invocation

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

C++ benchmarks (except as noted below):
icpc -m64
523.xalancbmk_r: icpc -m32 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/ia32_lin

Fortran benchmarks:
ifort -m64

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:

(Continued on next page)
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**Hardware Availability:** Apr-2019  
**Software Availability:** May-2019

**Peak Optimization Flags (Continued)**

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=4  
-fno-strict-overflow  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64 -lqkmalloc`

502.gcc_r: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4  
-L/usr/local/je5.0.1-32/lib -ljemalloc`

505.mcf_r: `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64 -lqkmalloc`

525.x264_r: `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4 -fno-alias  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64 -lqkmalloc`

557.xz_r: Same as 505.mcf_r

C++ benchmarks:

520.omnetpp_r: `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64 -lqkmalloc`

523.xalancbmk_r: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4  
-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=4 -nostandard-realloc-lhs -align array32byte  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64 -lqkmalloc`
### SPEC CPU®2017 Integer Rate Result

#### Inspur Corporation

**Inspur NF5180M5 (Intel Xeon Silver 4210)**

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
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<td>107</td>
<td>111</td>
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</tbody>
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**CPU2017 License:** 3358  
**Test Sponsor:** Inspur Corporation  
**Tested by:** Inspur Corporation  
**Test Date:** Apr-2020  
**Hardware Availability:** Apr-2019  
**Software Availability:** May-2019

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


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


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