Inspur Corporation

Inspur NE5260M5 (Intel Xeon Gold 5220)

**SPECspeed®2017_fp_base = 115**

**SPECspeed®2017_fp_peak = 117**

**CPU2017 License:** 3358

**Test Sponsor:** Inspur Corporation

**Tested by:** Inspur Corporation

**Test Date:** Nov-2020

**Hardware Availability:** Apr-2019

**Software Availability:** Apr-2020

---

### Hardware

**CPU Name:** Intel Xeon Gold 5220

**Max MHz:** 3900

**Nominal:** 2200

**Enabled:** 36 cores, 2 chips

**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:** 24.75 MB I+D on chip per chip

**Other:** None

**Memory:** 192 GB (12 x 16 GB 2Rx4 PC4-2933Y-R, running at 2666)

**Storage:** 1 x 4 TB SATA, 7200 RPM

**Other:** None

---

### Software

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

4.18.0-193.el8.x86_64

**Compiler:**

C/C++: Version 19.1.1.217 of Intel C/C++ Compiler Build 20200306 for Linux;

Fortran: Version 19.1.1.217 of Intel Fortran Compiler Build 20200306 for Linux

**Parallel:** Yes

**Firmware:** Version 2.12.0 released Mar-2020

**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.

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**603.bwaves_s 36**

**607.cactuBSSN_s 36**

**619.lbm_s 36**

**621.wrf_s 36**

**627.cam4_s 36**

**628.pop2_s 36**

**638.imagick_s 36**

**644.nab_s 36**

**649.fotonik3d_s 36**

**654.roms_s 36**
Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td><strong>146</strong></td>
<td>108</td>
</tr>
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SPECspeed®2017_fp_base = 115
SPECspeed®2017_fp_peak = 117

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:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/CPU2017/lib/intel64:/home/CPU2017/je5.0.1-64"
MALLO_CONF = "retain:true"
OMP_STACKSIZE = "192M"

General Notes
Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0
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)
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.


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 1-way
Sub NUMA Cluster (SNC) set to Enable
Intel Hyper Threading Technology set to Disable

Sysinfo program /home/CPU2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed6e6e46a485a0011
running on localhost.localdomain Thu Nov 5 22:15:53 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) Gold 5220 CPU @ 2.20GHz
  2 "physical id"s (chips)
  36 "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 : 18
siblings : 18
  physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
Inspur NE5260M5 (Intel Xeon Gold 5220)

spec

SPEC CPU®2017 Floating Point Speed Result

Inspur Corporation

**SPECspeed®2017_fp_base = 115**

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<td>Software Availability:</td>
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</tbody>
</table>

**Platform Notes (Continued)**

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 36
- On-line CPU(s) list: 0-35
- Thread(s) per core: 1
- Core(s) per socket: 18
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 5220 CPU @ 2.20GHz
- Stepping: 7
- CPU MHz: 2699.782
- CPU max MHz: 3900.0000
- CPU min MHz: 1000.0000
- BogoMIPS: 4400.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 25344K
- NUMA node0 CPU(s): 0-17
- NUMA node1 CPU(s): 18-35
- Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 5220 CPU @ 2.20GHz
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- NUMA node1 CPU(s): 18-35
- Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
- 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 cpuid
- aperfmpref 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 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single
- intel_pni ssbd mba ibrs ibpb stibp ibrs_removed trp_shadow vmx flexpriority ept
- vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ets invpcid rtm cmq mpx rdt_a
- avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
- xsaveopt xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local
- dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke avx512_vnni
- md_clear flush_l1d arch_capabilities

/proc/cpuinfo cache data

```
cache size : 25344 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 10 11 12 13 14 15 16 17
  node 0 size: 95315 MB
```
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Platform Notes (Continued)

```
node 0 free: 94508 MB
node 1 cpus: 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35
node 1 size: 96763 MB
node 1 free: 88938 MB
node distances:
node 0 1
0: 10 21
1: 21 10
```

From `/proc/meminfo`

```
MemTotal:       196688284 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

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"
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:

```
itlb_multihit:             KVM: Mitigation: Split huge pages
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 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5715 (Spectre variant 1): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
tsx_async_abort: Mitigation: Clear CPU buffers; SMT disabled
run-level 3 Nov 5 16:33
```

(Continued on next page)
Insipur Corporation

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Platform Notes (Continued)

SPEC is set to: /home/CPU2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 3.5T 81G 3.4T 3% /home

From /sys/devices/virtual/dmi/id
BIOS: Inspur 2.12.0 03/02/2020
Vendor: Inspur
Product: NE5260M5
Product Family: Not specified
Serial: 220658095

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:
12x Hynix HMA82GR7JJR8N-WM 16 GB 2 rank 2933
4x NO DIMM NO DIMM

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
                 | 644.nab_s(base, peak)
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==============================================================================

C++, C, Fortran | 607.cactuBSSN_s(base, peak)
==============================================================================
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==============================================================================

(Continued on next page)
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Inspur Corporation
Inspur NE5260M5 (Intel Xeon Gold 5220)

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Compiler Version Notes (Continued)

Fortran
| 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak) |

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306
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Fortran, C
| 621.wrf_s(base, peak) 627.cam4_s(base, peak) 628.pop2_s(base, peak) |

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG

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

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**Base Portability Flags (Continued)**

628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian  
-assume bytelecl  
638.imagick_s: -DSPEC_LP64  
644.nab_s: -DSPEC_LP64  
649.fotonik3d_s: -DSPEC_LP64  
654.roms_s: -DSPEC_LP64

---

**Base Optimization Flags**

**C benchmarks:**

-m64 -std=c11 -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP  
-mbranches-within-32B-boundaries

**Fortran benchmarks:**

-m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp  
-nostandard-realloc-lhs -mbranches-within-32B-boundaries  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

**Benchmarks using both Fortran and C:**

-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp  
-DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

**Benchmarks using Fortran, C, and C++:**

-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp  
-DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

---

**Peak Compiler Invocation**

**C benchmarks:**

-icc

**Fortran benchmarks:**

-ifort

**Benchmarks using both Fortran and C:**

-ifort icc

---

(Continued on next page)
**Peak Compiler Invocation (Continued)**

Benchmarks using Fortran, C, and C++:
- icpc icc ifort

**Peak Portability Flags**

Same as Base Portability Flags

**Peak Optimization Flags**

C benchmarks:

- `619.lbm_s`: `basepeak = yes`
- `638.imagick_s`: `basepeak = yes`
- `644.nab_s`: `m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP -mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

Fortran benchmarks:

- `603.bwaves_s`: `m64 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs -mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`
- `649.fotonik3d_s`: Same as `603.bwaves_s`
- `654.roms_s`: `basepeak = yes`

Benchmarks using both Fortran and C:

- `621.wrf_s`: `m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP`
### SPEC CPU®2017 Floating Point Speed Result

**Inspur Corporation**

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<td>Test Date: Nov-2020</td>
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<td>Test Sponsor: Inspur Corporation</td>
<td>Hardware Availability: Apr-2019</td>
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<td>Tested by: Inspur Corporation</td>
<td>Software Availability: Apr-2020</td>
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</tbody>
</table>

#### Peak Optimization Flags (Continued)

621.wrf_s (continued):
- `-mbranches-within-32B-boundaries` `-nostandard-realloc-lhs`
- `-L/usr/local/jemalloc64-5.0.1/lib` `-ljemalloc`

627.cam4_s: basepeak = yes

628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes

---

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

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