### SPEC CPU®2017 Floating Point Speed Result

**Inspur Corporation**

Inspur NF5280M5 (Intel Xeon Gold 5218R)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
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</table>

#### Hardware

- **CPU Name**: Intel Xeon Gold 5218R
- **Max MHz**: 4000
- **Nominal**: 2100
- **Enabled**: 40 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**: 27.5 MB I+D on chip per chip
- **Other**: None
- **Memory**: 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)
- **Storage**: 1 x 480 GB SATA SSD
- **Other**: None

#### 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**: Yes
- **Firmware**: Version 4.1.22 released Dec-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

| Benchmark  | Threads | Base  |  |  |  | Peak  |  |  |  |
|------------|---------|-------|  |  |  |       |  |  |  |
|            | Threads | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 603.bwaves_s | 80 | 134 | 440 | 134 | 439 | 134 | 441 | 80 | 134 | 440 | 134 | 441 | 135 | 438 |
| 607.cactuBSSN_s | 80 | 114 | 147 | 116 | 143 | 117 | 143 | 80 | 114 | 147 | 116 | 143 | 117 | 143 |
| 619.lbm_s | 80 | 65.3 | 80.2 | 63.6 | 82.4 | 62.5 | 83.9 | 80 | 65.3 | 80.2 | 63.6 | 82.4 | 62.5 | 83.9 |
| 621.wrf_s | 80 | 109 | 121 | 109 | 121 | 109 | 122 | 80 | 113 | 117 | 112 | 118 | 112 | 118 |
| 627.cam4_s | 80 | 77.5 | 114 | 77.5 | 114 | 77.6 | 114 | 80 | 77.5 | 114 | 77.5 | 114 | 77.6 | 114 |
| 628.pop2_s | 80 | 189 | 123 | 191 | 62.1 | 190 | 62.5 | 80 | 189 | 123 | 191 | 62.1 | 190 | 62.5 |
| 638.imagick_s | 80 | 170 | 84.7 | 171 | 84.4 | 171 | 84.3 | 80 | 170 | 84.7 | 171 | 84.4 | 171 | 84.3 |
| 644.nab_s | 80 | 74.1 | 236 | 74.2 | 236 | 74.2 | 236 | 80 | 67.0 | 261 | 66.8 | 262 | 67.3 | 260 |
| 649.fotonik3d_s | 80 | 113 | 80.7 | 112 | 81.2 | 112 | 81.2 | 80 | 114 | 79.6 | 116 | 78.8 | 113 | 81.0 |
| 654.roms_s | 80 | 140 | 113 | 141 | 112 | 138 | 114 | 80 | 140 | 113 | 141 | 112 | 138 | 114 |

---

### 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:

- KMP_AFFINITY = "granularity=fine,compact"
- LD_LIBRARY_PATH = "/home/CPU2017.IC21/lib/intel64:/home/CPU2017.IC21/je5.0.1-64"
- MALLOC_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
```

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.
Inspur Corporation
Inspur NF5280M5 (Intel Xeon Gold 5218R)

SPECspeed®2017_fp_base = 123
SPECspeed®2017_fp_peak = 124

General Notes (Continued)

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
C1E Support set to Disable
Scaling_Governor set to Performance

Sysinfo program /home/CPU2017.IC21/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca61ec64d
running on localhost.localdomain Wed Dec 22 21:52:33 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 5218R CPU @ 2.10GHz
  2 "physical id"s (chips)
    80 "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 : 20
    siblings : 40
    physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
    physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

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): 80
  On-line CPU(s) list: 0-79
  Thread(s) per core: 2
  Core(s) per socket: 20
  Socket(s): 2
  NUMA node(s): 2
  Vendor ID: GenuineIntel
Inspur Corporation
Inspur NF5280M5 (Intel Xeon Gold 5218R)

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

Test Date: Dec-2021
Hardware Availability: Feb-2020
Software Availability: Dec-2020

SPEC CPU®2017 Floating Point Speed Result
Copyright 2017-2022 Standard Performance Evaluation Corporation

SPECspeed®2017_fp_base = 123
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Platform Notes (Continued)

CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5218R CPU @ 2.10GHz
Stepping: 7
CPU MHz: 806.317
CPU max MHz: 4000.0000
CPU min MHz: 800.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 28160K
NUMA node0 CPU(s): 0-19,40-59
NUMA node1 CPU(s): 20-39,60-79

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 cpuid
aperfmpref pni pclmulqdq dtes64 monitor 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_ppn sbbd mba ibrs ibpb stibp ibrs_enabled fsgsbase tsc_adjust
bm1 hle avx2 smep bm12 erms invpcid cmq mpzx rdt_a avx512f avx512dq rdseed adx smap
clfushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsavees
cmq_llc cmq_occup_llc cmq_mbb_total cmq_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 : 28160 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 18 19 40 41 42 43 44 45 46 47
          48 49 50 51 52 53 54 55 56 57 58 59
     node 0 size: 364747 MB
     node 0 free: 384999 MB
     node 1 cpus: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 60 61 62 63 64
          65 66 67 68 69 70 71 72 73 74 75 76 77 78 79
     node 1 size: 363400 MB
     node 1 free: 386548 MB
     node distances:
       node 0 1
         0: 10 21
         1: 21 10

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Test Date: Dec-2021
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Platform Notes (Continued)

From /proc/meminfo
MemTotal: 791206268 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)
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):
KVM: Mitigation: Split huge pages
Not affected

CVE-2018-3620 (L1 Terminal Fault):
Microarchitectural Data Sampling:
Not affected
Not affected

CVE-2017-5754 (Meltdown):
Mitigation: Speculative Store Bypass disabled via prctl and seccomp

CVE-2018-3639 (Speculative Store Bypass):
Mitigation: usercopy/swapps barriers and __user pointer sanitization

CVE-2017-5753 (Spectre variant 1):
Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

CVE-2017-5715 (Spectre variant 2):
Not affected

CVE-2020-0543 (Special Register Buffer Data Sampling):
CVE-2019-11135 (TSX Asynchronous Abort):
Mitigation: TSX disabled

run-level 3 Dec 22 21:51

(Continued on next page)
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Test Sponsor: Inspur Corporation
Tested by: Inspur Corporation

Platform Notes (Continued)

SPEC is set to: /home/CPU2017.IC21

Filesystem | Type | Size | Used | Avail | Use% | Mounted on
-----------|------|------|------|-------|------|--------------
/dev/mapper/rhel-home | xfs | 372G | 37G | 335G | 10% | /home

From /sys/devices/virtual/dmi/id
Vendor: Inspur
Product: NF5280M5
Serial: 217453240

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:
24x Micron 18ASF4G72PZ-2G9E1 32 GB 1 rank 2933, configured at 2666

BIOS:
BIOS Vendor: American Megatrends Inc.
BIOS Version: 4.1.22
BIOS Date: 12/10/2021
BIOS Revision: 5.14

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
   644.nab_s(base)
==============================================================================
Intel(R) C 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.
==============================================================================
C | 644.nab_s(peak)
==============================================================================
Intel(R) oneAPI DPC+/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==============================================================================
C | 619.lbm_s(base, peak) 638.imagick_s(base, peak)

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

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Inspur Corporation

Inspur NF5280M5 (Intel Xeon Gold 5218R)

**SPECs**peed\textsuperscript{®}2017\_fp\_peak = 124

**SPECs**peed\textsuperscript{®}2017\_fp\_base = 123

---

**CPU2017 License:** 3358

**Test Sponsor:** Inspur Corporation

**Test Date:** Dec-2021

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**Hardware Availability:** Feb-2020

**Tested by:** Inspur Corporation

**Software Availability:** Dec-2020

---

**Compiler Version Notes (Continued)**

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### Base Compiler Invocation

**C benchmarks:**

```plaintext
icc
```

**Fortran benchmarks:**

```plaintext
ifort
```

**Benchmarks using both Fortran and C:**

```plaintext
ifort icc
```

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

```plaintext
icpc icc ifort
```

### Base Portability Flags

603.bwaves\_s: -DSPEC\_LP64

607.cam4\_s: -DSPEC\_CASE\_FLAG -convert big\_endian

619.lbm\_s: -DSPEC\_CASE\_FLAG -convert big\_endian

628.pop2\_s: -DSPEC\_CASE\_FLAG -convert big\_endian -assume byterecl

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:**

```plaintext
-m64 -std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC\_OPENMP
-mbranches-within-32B-boundaries
```

**Fortran benchmarks:**

```plaintext
-m64 -Wl,-z,muldefs -DSPEC\_OPENMP -xCORE-AVX512 -ipo -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
```

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**Base Optimization Flags (Continued)**

Fortran benchmarks (continued):
- `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-AVX512` `-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-AVX512` `-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 (except as noted below):
- `icc`
- `644.nab_s: icx`

Fortran benchmarks:
- `ifort`

Benchmarks using both Fortran and C:
- `ifort icc`

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

---

**Peak Portability Flags**

Same as Base Portability Flags
**Inspur Corporation**

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### Peak Optimization Flags

**C benchmarks:**

- **619.lbm_s:** basepeak = yes
- **638.imagick_s:** basepeak = yes

**Fortran benchmarks:**

- **603.bwaves_s:** `-m64 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -ipo -xCORE-AVX512 -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-AVX512 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -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
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**Software Availability:** Dec-2020  

The flags files that were used to format this result can be browsed at:
- [http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V2.3.html](http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V2.3.html)

You can also download the XML flags sources by saving the following links:
- [http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V2.3.xml](http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V2.3.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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