**SPEC CPU®2017 Integer Rate Result**

**Inspur Corporation**

Inspur NF5280M6 (Intel Xeon Gold 6338N)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>423</td>
<td>440</td>
</tr>
</tbody>
</table>

**Cpu2017 License:** 3358

**Test Sponsor:** Inspur Corporation

**Test Date:** May-2021

**Hardware Availability:** May-2021

**Tested by:** Inspur Corporation

**Software Availability:** Jan-2021

---

### Hardware

**CPU Name:** Intel Xeon Gold 6338N

**Max MHz:** 3500

**Nominal:** 2200

**Enabled:** 64 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:** 48 MB I+D on chip per chip

**Other:** None

**Memory:** 1 TB (32 x 32 GB 2Rx4 PC4-3200AA-R, running at 2666)

**Storage:** 1 x 1 TB SATA SSD

**Other:** None

---

### Software

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

4.18.0-193.el8.x86_64

**Compiler:**

- C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux;
- 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:** No

**Firmware:** Version 5.00.00 released Apr-2021

**File System:** xfs

**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.
Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<tr>
<td>548.exchange2_r</td>
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<td>586</td>
<td>236</td>
<td>584</td>
<td>237</td>
<td>586</td>
<td>236</td>
</tr>
</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/lib/ia32:/home/CPU2017/je5.0.1-32"

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
Filesystem page cache synced and cleared with:
Inspur Corporation
Inspur NF5280M6 (Intel Xeon Gold 6338N)

SPECrates®
SPECrates® 2017_int_base = 423
SPECrates® 2017_int_peak = 440

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

Test Date: May-2021
Hardware Availability: May-2021
Software Availability: Jan-2021

General Notes (Continued)

sync; echo 3 > /proc/sys/vm/drop_caches
runcpu command invoked through numacl i.e.:
numacl --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 Fri May 21 11:04:50 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 6338N CPU @ 2.20GHz
    2 "physical id"s (chips)
    128 "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 : 32
siblings : 64
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 28 29 30 31
physical 1: 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

(Continued on next page)
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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): 128
On-line CPU(s) list: 0-127
Thread(s) per core: 2
Core(s) per socket: 32
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 6338N CPU @ 2.20GHz
Stepping: 6
CPU MHz: 2800.000
CPU max MHz: 3500.0000
CPU min MHz: 800.0000
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 49152K
NUMA node0 CPU(s): 0-15, 64-79
NUMA node1 CPU(s): 16-31, 80-95
NUMA node2 CPU(s): 32-47, 96-111
NUMA node3 CPU(s): 48-63, 112-127
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 rep_good nopl xtopology nonstop_tsc cpuid
aperfmerf 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
rdand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 invpcid_single ssbd mba ibrs
ibpb stibp ibrs_enhanced tpr_shadow vnni flexpriority ept vpid fsgsbase tsc_adjust
bm1 hle avx2 smep bmi2 erms invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap
avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt
xsave xsetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbbm_total cqm_mbbm_local wbnoinvd
dtherm ida arat pln pts avx512vbm1 umip pku ospke avx512vbm1 qfni vaes vpcm1ldq
avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d
arch_capabilities

/proc/cpuinfo cache data
  cache size : 49152 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 70 71 72 73 74 75 76 77 78 79
- node 0 size: 257608 MB
- node 0 free: 257078 MB
- node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95
- node 1 size: 258040 MB
- node 1 free: 257760 MB
- node 2 cpus: 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 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111
- node 2 size: 258040 MB
- node 2 free: 257805 MB
- node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127
- node 3 size: 258038 MB
- node 3 free: 257794 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: 1056489916 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="8.2 (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"

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

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):** Not affected
- **CVE-2018-3639 (Speculative Store Bypass):** Mitigation: Speculative Store Bypass disabled via prctl and seccomp
- **CVE-2017-5753 (Spectre variant 1):** Mitigation: usercopy/swapgs barriers and __user pointer sanitization
- **CVE-2017-5715 (Spectre variant 2):** Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
- **CVE-2020-0543 (Special Register Buffer Data Sampling):** No status reported
- **CVE-2019-11135 (TSX Asynchronous Abort):** Not affected

run-level 3 May 21 11:03

SPEC is set to: /home/CPU2017

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/mapper/rhel-home</td>
<td>xfs</td>
<td>876G</td>
<td>127G</td>
<td>749G</td>
<td>15%</td>
<td>/home</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id

Vendor: MFR
Product: NF5280M6
Product Family: Family
Serial: 380321144

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 SMIOS" standard.

Memory:

32x Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200, configured at 2666

BIOS:

- BIOS Vendor: American Megatrends Inc.
- BIOS Version: 05.00.00

(Continued on next page)
Platform Notes (Continued)

BIOS Date: 04/25/2021
BIOS Revision: 5.22

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
<table>
<thead>
<tr>
<th>C</th>
<th>500.perlbench_r(peak) 557.xz_r(peak)</th>
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<tbody>
<tr>
<td>Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000</td>
<td></td>
</tr>
<tr>
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Compiler Version Notes (Continued)

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.

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

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.ommnpp_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:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-llto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbraches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-1qxmalloc

C++ benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto

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

C++ benchmarks (continued):
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-auto -mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

Peak Compiler Invocation

C benchmarks (except as noted below):
icx
500.perlbench_r: icc
557.xz_r: icc

C++ benchmarks:
icpx

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: -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
## Inspur Corporation

**Inspur NF5280M6 (Intel Xeon Gold 6338N)**

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**SPEC CPU®2017 Integer Rate Result**

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**CPU2017 License**: 3358

The **Peak Optimization Flags** for the benchmarks are as follows:

### C benchmarks:

- **500.perlbench_r**: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)`

- **502.gcc_r**: `-Wl,-z,muldefs -fprofile-generate(pass 1) -fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto -Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries -L/usr/local/jemalloc32-5.0.1/lib -ljemalloc`

- **505.mcf_r**: `basepeak = yes`


### C++ benchmarks:

- **520.omnetpp_r**: `basepeak = yes`

- **523.xalancbmk_r**: `basepeak = yes`

- **531.deepsjeng_r**: `basepeak = yes`

- **541.leela_r**: `basepeak = yes`

### Fortran benchmarks:

- **548.exchange2_r**: `basepeak = yes`
## SPEC CPU®2017 Integer Rate Result

### Test Information

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### Test Details

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:


### Performance Results

- **SPECrate®2017_int_base** = 423
- **SPECrate®2017_int_peak** = 440

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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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