# SPEC CPU®2017 Integer Rate Result

**Supermicro**  
SuperServer SYS-620U-TNR  
(X12DPU-6 , Intel Xeon Gold 5317)

**CPU2017 License:** 001176  
**Test Sponsor:** Supermicro  
**Tested by:** Supermicro

**SPECrate®2017_int_base = 203**  
**SPECrate®2017_int_peak = 210**

<table>
<thead>
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<th>Test Date:</th>
<th>Nov-2021</th>
<th>Hardware Availability:</th>
<th>Apr-2021</th>
</tr>
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<tbody>
<tr>
<td>Software Availability:</td>
<td>Jun-2021</td>
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</tbody>
</table>

## Hardware

<table>
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<tr>
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<th>perlbench_r</th>
<th>gcc_r</th>
<th>mcf_r</th>
<th>omnetpp_r</th>
<th>xalancbmk_r</th>
<th>x264_r</th>
<th>deepsjeng_r</th>
<th>leela_r</th>
<th>exchange2_r</th>
<th>xz_r</th>
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<td>149</td>
<td>110</td>
<td>108</td>
<td>110</td>
<td>110</td>
</tr>
</tbody>
</table>

**CPU Name:** Intel Xeon Gold 5317  
**Max MHz:** 3600  
**Nominal:** 3000  
**Enabled:** 24 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:** 18 MB I+D on chip per chip  
**Other:** None  
**Memory:** 512 GB  
(16 x 32 GB 2Rx4 PC4-3200AA-R, running at 2933)  
**Storage:** 1 x 1 TB NVMe SSD  
**Other:** None

## Software

<table>
<thead>
<tr>
<th>OS:</th>
<th>SUSE Linux Enterprise Server 15 SP3 5.3.18-57-default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler:</td>
<td>C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux; Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux; C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux</td>
</tr>
<tr>
<td>Parallel:</td>
<td>No</td>
</tr>
<tr>
<td>Firmware:</td>
<td>Version 1.1 released Apr-2021</td>
</tr>
<tr>
<td>File System:</td>
<td>xfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers:</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers:</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Other:</td>
<td>jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Power Management:</td>
<td>BIOS and OS set to prefer performance at the cost of additional power usage.</td>
</tr>
</tbody>
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Results Table

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<thead>
<tr>
<th>Benchmark</th>
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<td>477</td>
<td>109</td>
<td>480</td>
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</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"

Environment Variables Notes
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = 

"/home/cpu2017-1.1.8/lib/intel64:/home/cpu2017-1.1.8/lib/ia32:/home/cpu2017-1.1.8/je5.0.1-32"

MALLOCONF = "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:
sync; echo 3 > /proc/sys/vm/drop_caches

(Continued on next page)
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General Notes (Continued)

runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) 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.
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.


Platform Notes

BIOS Settings:
Power Technology = Custom
Power Performance Tuning = BIOS Controls EPB
ENERGY_PERF_BIAS_CFG mode = Extreme Performance
SNC (Sub NUMA) = Enable
KTI Prefetch = Enable
LLC Dead Line Alloc = Disable
DCU Streamer Prefetcher = Disable

Sysinfo program /home/cpu2017-1.1.8/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaafc64d
running on localhost Tue Nov 16 02:34:20 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 5317 CPU @ 3.00GHz
2 "physical id"s (chips)
48 "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 : 12
siblings : 24
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11

From lscpu from util-linux 2.36.2:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit

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

- **Byte Order:** Little Endian
- **Address sizes:** 46 bits physical, 57 bits virtual
- **CPU(s):** 48
- **On-line CPU(s) list:** 0-47
- **Thread(s) per core:** 2
- **Core(s) per socket:** 12
- **Socket(s):** 2
- **NUMA node(s):** 4
- **Vendor ID:** GenuineIntel
- **CPU family:** 6
- **Model:** 106
- **Model name:** Intel(R) Xeon(R) Gold 5317 CPU @ 3.00GHz
- **Stepping:** 6
- **CPU MHz:** 1587.190
- **BogoMIPS:** 6000.00
- **Virtualization:** VT-x
- **L1d cache:** 1.1 MiB
- **L1i cache:** 768 KiB
- **L2 cache:** 30 MiB
- **L3 cache:** 36 MiB

**NUMA node0 CPU(s):** 0-5, 24-29
**NUMA node1 CPU(s):** 6-11, 30-35
**NUMA node2 CPU(s):** 12-17, 36-41
**NUMA node3 CPU(s):** 18-23, 42-47

- **Vulnerability Itlb multihit:** Not affected
- **Vulnerability Lttf:** Not affected
- **Vulnerability Mds:** Not affected
- **Vulnerability Meltdown:** Not affected
- **Vulnerability Spec store bypass:** Mitigation; Speculative Store Bypass disabled via prctl and seccomp
- **Vulnerability Spectre v1:** Mitigation; usercopy/swapgs barriers and __user pointer sanitization
- **Vulnerability Spectre v2:** Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
- **Vulnerability Srbds:** Not affected
- **Vulnerability Txz async abort:** Not affected

**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 aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2
sse3 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 _13 invpcid_single ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmm
flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 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 xsaves xsavec xgetbv1 xsaves cqm_llc
cqm_occun llc cqm_mmb_total cqm_mmb_local split_lock_detect wbinvd dtherm ida arat

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(Continued on next page)
Platform Notes (Continued)

pln pts avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni
avx512_bitalg tme avx512_vpopcntdq la57 rdpid fsrm md_clear pconfig flush_l1d
arch_capabilities

From lscpu --cache:
NAME ONE-SIZE ALL-SIZE WAYS TYPE LEVEL SETS PHY-LINE COHERENCY-SIZE
L1d  48K   1.1M   12 Data    1  64    1       64
L1i  32K   768K    8 Instruction  1  64    1       64
L2   1.3M  30M    20 Unified  2 1024  1       64
L3   18M  36M    12 Unified  3 24576  1       64

/proc/cpuinfo cache data
cache size : 18432 KB

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 24 25 26 27 28 29
node 0 size: 128535 MB
node 0 free: 128199 MB
node 1 cpus: 6 7 8 9 10 11 30 31 32 33 34 35
node 1 size: 129020 MB
node 1 free: 128448 MB
node 2 cpus: 12 13 14 15 16 17 36 37 38 39 40 41
node 2 size: 129020 MB
node 2 free: 128777 MB
node 3 cpus: 18 19 20 21 22 23 42 43 44 45 46 47
node 3 size: 129017 MB
node 3 free: 128800 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:        527969672 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
os-release:
  NAME="SLES"
  VERSION="15-SP3"
  VERSION_ID="15.3"
  PRETTY_NAME="SUSE Linux Enterprise Server 15 SP3"

(Continued on next page)
Platform Notes (Continued)

ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp3"

uname -a:
    Linux localhost 5.3.18-57-default #1 SMP Wed Apr 28 10:54:41 UTC 2021 (ba3c2e9) 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): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Nov 16 02:30

SPEC is set to: /home/cpu2017-1.1.8
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/nvme0n1p4 xfs 815G 31G 784G 4% /home

From /sys/devices/virtual/dmi/id
    Vendor: Supermicro
    Product: Super Server
    Product Family: Family
    Serial: 0123456789

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:
        16x SK Hynix HMA84GR7DJR4N-XN 32 GB 2 rank 3200, configured at 2933
    BIOS:
        BIOS Vendor: American Megatrends International, LLC.
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Platform Notes (Continued)

BIOS Version: 1.1
BIOS Date: 04/21/2021
BIOS Revision: 5.22

(End of data from sysinfo program)

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Compiler Version Notes

C | 500.perlbench_r(peak) 557.xz_r(peak)
---

Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
64, Version 2021.1 Build 20201112_000000
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---

C | 502.gcc_r(peak)
---

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2021.1 Build 20201113
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C | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
525.x264_r(base, peak) 557.xz_r(base)
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C | 500.perlbench_r(peak) 557.xz_r(peak)
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---

C | 502.gcc_r(peak)
---

Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version
2021.1 Build 20201113

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

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---

### C
- `500.perlbench_r(base)`
- `502.gcc_r(base)`
- `505.mcf_r(base, peak)`
- `525.x264_r(base, peak)`
- `557.xz_r(base)`

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---

### C
- `500.perlbench_r(peak)`
- `557.xz_r(peak)`

---

### C
- `502.gcc_r(peak)`

---

### C
- `500.perlbench_r(base)`
- `502.gcc_r(base)`
- `505.mcf_r(base, peak)`
- `525.x264_r(base, peak)`
- `557.xz_r(base)`

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### C++
- `520.omnetpp_r(base, peak)`
- `523.xalancbmk_r(base, peak)`
- `531.deepsjeng_r(base, peak)`
- `541.leela_r(base, peak)`

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Test Date: Nov-2021
Hardware Availability: Apr-2021
Software Availability: Jun-2021

**Compiler Version Notes (Continued)**

Fortran | 548.exchange2_r(base, peak)

```
------------------------------------------------------------------
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.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:
- -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
- -flto -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

(Continued on next page)
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Software Availability: Jun-2021

Base Optimization Flags (Continued)

C++ benchmarks:
-w -m64 -Wall,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-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 -Wall,-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
**Peak Optimization Flags**

**C benchmarks:**

500.perlbench_r: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -fno-strict-overflow
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

502.gcc_r: `-m32
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/ia32_lin
-std=gnu89 -Wl,-z,muldefs -fprofile-generate
(fpass 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

525.x264_r: `-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-O3 -ffast-math -qopt-mem-layout-trans=4 -fno-alias
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

557.xz_r: `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

**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
Supermicro
SuperServer SYS-620U-TNR
(X12DPU-6, Intel Xeon Gold 5317)

SPECrate®2017_int_base = 203
SPECrate®2017_int_peak = 210

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Nov-2021
Hardware Availability: Apr-2021
Software Availability: Jun-2021

The flags files that were used to format this result can be browsed at:
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-ICX-revB.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-ICX-revB.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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