Supermicro
SuperServer SYS-620U-TNR
(X12DPU-6 , Intel Xeon Platinum 8368Q)

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

CPU Name: Intel Xeon Platinum 8368Q
Max MHz: 3700
Nominal: 2600
Enabled: 76 cores, 2 chips
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: 57 MB I+D on chip per chip
Other: None
Memory: 1 TB
(32 x 32 GB 2Rx4 PC4-3200AA-R)
Storage: 1 x 800 GB SATA III SSD
Other: None

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;
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
Parallel: Yes
Firmware: Version 1.1 released Apr-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.
## SPEC CPU®2017 Floating Point Speed Result

**Supermicro**  
SuperServer SYS-620U-TNR  
(X12DPU-6 , Intel Xeon Platinum 8368Q)  

### CPU2017 License: 001176
Test Date: May-2021  
Test Sponsor: Supermicro  
Hardware Availability: Apr-2021  
Tested by: Supermicro  
Software Availability: Dec-2020

### Results Table

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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>256</td>
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<td>260</td>
</tr>
</tbody>
</table>

**SPECspeed®2017_fp_base = 232**  
**SPECspeed®2017_fp_peak = 235**

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 = 
"/root/cpu2017-1.1.7/lib/intel64:/root/cpu2017-1.1.7/je5.0.1-64"  
MALLOCONF = "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  
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.  
jemalloc, a general purpose malloc implementation

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

Supermicro
SuperServer SYS-620U-TNR (X12DPU-6, Intel Xeon Platinum 8368Q)

SPECspeed®2017_fp_base = 232
SPECspeed®2017_fp_peak = 235

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

Test Date: May-2021
Hardware Availability: Apr-2021
Software Availability: Dec-2020

General Notes (Continued)

built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

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
Hyper-Threading = Disable

Sysinfo program /root/cpu2017-1.1.7/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on 161-241.pnet Sun May 2 18:07:55 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) Platinum 8368Q CPU @ 2.60GHz
  2. "physical id"s (chips)
    76 "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 : 38
siblings : 38
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 32 33 34 35 36 37
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
  25 26 27 28 29 30 31 32 33 34 35 36 37

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 76
On-line CPU(s) list: 0-75
Thread(s) per core: 1
Core(s) per socket: 38
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel

(Continued on next page)
Supermicro
SuperServer SYS-620U-TNR
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SPECspeed®2017_fp_base = 232
SPECspeed®2017_fp_peak = 235

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

Platform Notes (Continued)

CPU family:          6
Model:               106
Model name:          Intel(R) Xeon(R) Platinum 8368Q CPU @ 2.60GHz
Stepping:            6
CPU MHz:             3598.270
CPU max MHz:         3700.000
CPU min MHz:         800.000
BogoMIPS:            5200.00
Virtualization:      VT-x
L1d cache:           48K
L1i cache:           32K
L2 cache:            1280K
L3 cache:            58368K
NUMA node0 CPU(s):   0-37
NUMA node1 CPU(s):   38-75
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 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 invpcid_single
                      intel_pni ssbd mba ibrs ibpb stibp ibrs_enabled tpr_shadow vnmi flexpriority ept
                      vpid ept_ad fsgressor tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cqm rdtp_a
                      avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_ni
                      avx512bw avx512vl xsaveopt xSAVE xavvec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbb_total
                      cqm_mbb_local split_lock_detect wbnoind dtimind ida arat pin pts avx512vbmi umip pku
                      ospke avx512_vbmi2 gfnl vaes vpclmulqdq avx512_vnni avx512_bitalg tme
                      avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities

/cache data
    cache size : 58368 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 20 21 22 23 24 25 26 27
    28 29 30 31 32 33 34 35 36 37
    node 0 size: 488369 MB
    node 0 free: 511364 MB
    node 1 cpus: 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
    node 1 size: 486376 MB
    node 1 free: 511985 MB
    node distances:
    node 0 1
    0: 10 20
    1: 20 10

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

### Supermicro

**SuperServer SYS-620U-TNR**  
(X12DPU-6 , Intel Xeon Platinum 8368Q)

<table>
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<th>232</th>
</tr>
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<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
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<td>Test Sponsor:</td>
<td>Supermicro</td>
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<td>Tested by:</td>
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<td>Hardware Availability:</td>
<td>Apr-2021</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2020</td>
</tr>
</tbody>
</table>

### Platform Notes (Continued)

From `/proc/meminfo`
- MemTotal: 1056443096 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 161-241.pnet 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020 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

(Continued on next page)
Platform Notes (Continued)

run-level 3 May 2 13:12

SPEC is set to: /root/cpu2017-1.1.7

<table>
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<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
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<tr>
<td>/dev/sda4</td>
<td>xfs</td>
<td>739G</td>
<td>194G</td>
<td>545G</td>
<td>27%</td>
<td>/</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id
Vendor: Supermicro
Product: SYS-620U-TNR
Product Family: Ultra
Serial: 0123456789

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:
32x SK Hynix HMA84GR7DR4N-XN 32 GB 2 rank 3200

BIOS:
BIOS Vendor: American Megatrends International, LLC.
BIOS Version: 1.1
BIOS Date: 04/21/2021
BIOS Revision: 5.22

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
<table>
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<tr>
<th>C</th>
<th>619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base)</th>
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<td>Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000</td>
</tr>
<tr>
<td>Copyright (C)</td>
<td>1985-2020 Intel Corporation. All rights reserved.</td>
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### Compiler Version Notes (Continued)

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<tr>
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<tr>
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</tr>
<tr>
<td><strong>Fortran, C</strong></td>
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Compiler Version Notes (Continued)

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.

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.ibm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -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:
-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

(Continued on next page)
Supermicro
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SPECspeed®2017_fp_base = 232
SPECspeed®2017_fp_peak = 235

Base Optimization Flags (Continued)

Fortran benchmarks:
-m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -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-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
### 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.cactusBSSN_s**: basepeak = yes
## SPEC CPU®2017 Floating Point Speed Result

### Supermicro
SuperServer SYS-620U-TNR
(X12DPU-6, Intel Xeon Platinum 8368Q)

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### SPECspeed®2017 fp_base = 232
### SPECspeed®2017 fp_peak = 235

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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