## SPEC CPU®2017 Floating Point Speed Result

**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
**Tyrone Camarero DS400TR-212R4**  
(2.20 GHz, Intel Xeon Gold 5220R)

<table>
<thead>
<tr>
<th>SPECspeed®2017 fp_base</th>
<th>131</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017 fp_peak</td>
<td>132</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 006042  
**Test Date:** Jan-2021  
**Test Sponsor:** Netweb Pte Ltd  
**Hardware Availability:** Aug-2020  
**Tested by:** Tyrone Systems  
**Software Availability:** Dec-2020

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>48</td>
<td>156</td>
<td>132</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>48</td>
<td>91.5</td>
<td>74.6</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>48</td>
<td>124</td>
<td>104</td>
</tr>
<tr>
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<td>129</td>
<td>99.3</td>
</tr>
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<td>64.0</td>
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</tr>
<tr>
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<td>48</td>
<td></td>
<td>141</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>644.nab_s</td>
<td>96</td>
<td>249</td>
<td>278</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>48</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Gold 5220R  
- **Max MHz:** 4000  
- **Nominal:** 2200  
- **Enabled:** 48 cores, 2 chips, 2 threads/core  
- **Orderable:** 1,2 (chip)s  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **Cache L2:** 1 MB I+D on chip per core  
- **Cache L3:** 35.75 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)  
- **Storage:** 1 x 480 GB SATA SSD  
- **Other:** None

### Software

- **OS:** CentOS Linux release 8.3.2011 4.18.0-240.el8.x86_64  
- **Compiler:** C/C++: Version 19.1.1.217 of Intel C/C++ Compiler for Linux Build 20200306;  
  Fortran: Version 19.1.1.217 of Intel Fortran Compiler for Linux Build 20200306;  
- **Parallel:** Yes  
- **Firmware:** Version 3.4 released Oct-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 set to prefer performance at the cost of additional power usage
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SPECspeed® 2017_fp_base = 131
SPECspeed® 2017_fp_peak = 132

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>Base</td>
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<table>
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SPECspeed® 2017_fp_base = 131
SPECspeed® 2017_fp_peak = 132

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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,1,0"
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
MALLOCONF = "retain:true"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 2x Intel Cascade Lake CPU + 384GB RAM
memory using Centos 8.2 x86_64
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.
jemalloc, a general purpose malloc implementation
built with the Centos 8.2 x86_64, and the system compiler gcc 8.3.1

(Continued on next page)
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Test Sponsor: Netweb Pte Ltd  
Tested by: Tyrone Systems

Test Date: Jan-2021  
Hardware Availability: Aug-2020  
Software Availability: Dec-2020

General Notes (Continued)


Platform Notes

BIOS Settings:
Power Technology = Custom
Power Performance Tuning = BIOS Controls EPB
ENERGY_PERF_BIAS_CFG mode = Extreme Performance
SNC = Enable
Stale AtoS = Disable
IMC Interleaving = 1-way Interleave
Patrol Scrub = Disable

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on spec Sun Jan 31 03:12:08 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 5220R CPU @ 2.20GHz
  2 "physical id"s (chips)
  96 "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 : 24
siblings : 48
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 96
On-line CPU(s) list: 0-95
Thread(s) per core: 2
Core(s) per socket: 24
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5220R CPU @ 2.20GHz

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Platform Notes (Continued)

Stepping: 7
CPU MHz: 2900.039
CPU max MHz: 4000.0000
CPU min MHz: 1000.0000
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-3,7-9,13-15,19,20,48-51,55-57,61-63,67,68
NUMA node1 CPU(s): 4-6,10-12,16-18,21-23,52-54,58-60,64-66,69-71
NUMA node2 CPU(s): 24-27,31-33,37-39,43,44,72-75,79-81,85-87,91,92
NUMA node3 CPU(s): 28-30,34-36,40-42,45-47,76-78,82-84,88-90,93-95
Flags: fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dts acpi mpx cmov st 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 arch_capabilities

/platforminfo cache data
  cache size : 36608 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 7 8 9 13 14 15 19 20 48 49 50 51 55 56 57 61 62 63 67 68
node 0 size: 90171 MB
node 0 free: 78394 MB
node 1 cpus: 4 5 6 10 11 12 16 17 18 21 22 23 52 53 54 58 59 60 64 65 66 69 70 71
node 1 size: 91538 MB
node 1 free: 77147 MB
node 2 cpus: 24 25 26 27 31 32 33 37 38 43 44 72 73 74 75 79 80 81 85 86 87 91 92
node 2 size: 92546 MB
node 2 free: 81918 MB
node 3 cpus: 28 29 30 34 35 36 40 41 42 45 46 47 76 77 78 82 83 84 88 89 90 93 94 95
node 3 size: 92030 MB
node 3 free: 81549 MB
node distances:
  node   0   1   2   3
  0: 10 11 21 21

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Platform Notes (Continued)

1: 11 10 21 21
2: 21 21 10 11
3: 21 11 11 10

From /proc/meminfo
MemTotal: 394855232 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*
centos-release: CentOS Linux release 8.3.2011
centos-release-upstream: Derived from Red Hat Enterprise Linux 8.3
os-release:
NAME="CentOS Linux"
VERSION="8"
ID="centos"
ID_LIKE="rhel fedora"
VERSION_ID="8"
PLATFORM_ID="platform:el8"
PRETTY_NAME="CentOS Linux 8"
ANSI_COLOR="0;31"
redhat-release: CentOS Linux release 8.3.2011
system-release: CentOS Linux release 8.3.2011
system-release-cpe: cpe:/o:centos:centos:8

uname -a:
Linux spec 4.18.0-240.el8.x86_64 #1 SMP Fri Sep 25 19:48:47 UTC 2020 x86_64 x86_64
x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2018-12207 (iTLB Multihit):
CVE-2018-3620 (L1 Terminal Fault):
Microarchitectural Data Sampling:
CVE-2017-5754 (Meltdown):
CVE-2018-3639 (Speculative Store Bypass):
CVE-2017-5753 (Spectre variant 1):

KVM: Mitigation: Split huge pages
Not affected
Not affected
Not affected
Mitigation: Speculative Store Bypass disabled via prctl and seccomp
Mitigation: usercopy/swapgs barriers and __user pointer sanitization

(Continued on next page)
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SPECSpeed

Platform Notes (Continued)

CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected

run-level 3 Jan 29 11:22
SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/cl-home xfs 372G 154G 218G 42% /home

From /sys/devices/virtual/dmi/id
Vendor: Tyron Systems
Product: Tyrone Camarero DS400E1
Serial: S263875X9527668

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 NO DIMM NO DIMM
12x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2666

BIOS:
BIOS Vendor: American Megatrends Inc.
BIOS Version: 3.4
BIOS Date: 10/30/2020
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, peak)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.1.1217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

C++, C, Fortran | 607.cactuBSSN_s(base, peak)

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**Compiler Version Notes (Continued)**

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Intel (R) C Intel (R) 64 Compiler for applications running on Intel (R) 64,
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Intel (R) Fortran Intel (R) 64 Compiler for applications running on Intel (R) 64,
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**Fortran**

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

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**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.

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**Fortran, C**

| 621.wrf_s(base, peak) |
| 627.cam4_s(base, peak) |
| 628.pop2_s(base, peak) |

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**Intel (R) Fortran Intel (R) 64 Compiler for applications running on Intel (R) 64,**
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**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
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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
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

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/je5.0.1-64/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/je5.0.1-64/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/je5.0.1-64/lib -ljemalloc

Peak Compiler Invocation

C benchmarks:
icc

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(2.20 GHz, Intel Xeon Gold 5220R)

SPECspeed®2017_fp_base = 131
SPECspeed®2017_fp_peak = 132

CPU2017 License: 006042
Test Sponsor: Netweb Pte Ltd
Tested by: Tyrone Systems

Test Date: Jan-2021
Hardware Availability: Aug-2020
Software Availability: Dec-2020

Peak Compiler Invocation (Continued)

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
644.nab_s: -m64 -std=gnu -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -gopenmp -DSPEC_OPENMP
-mbranches-within-32B-boundaries
-L/usr/local/je5.0.1-64/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-AVX512
-03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -gopenmp -nostandard-realloc-lhs
-mbranches-within-32B-boundaries
-L/usr/local/je5.0.1-64/lib -ljemalloc

649.fotonik3d_s: Same as 603.bwaves_s
654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:

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

## Tyrone Systems

**Test Sponsor:** Netweb Pte Ltd  
**Tyrone Camarero DS400TR-212R4**  
(2.20 GHz, Intel Xeon Gold 5220R)  

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>131</td>
<td>132</td>
</tr>
</tbody>
</table>

| CPU2017 License: | 006042 |
| Test Sponsor: | Netweb Pte Ltd |
| Tested by: | Tyrone Systems |
| Test Date: | Jan-2021 |
| Hardware Availability: | Aug-2020 |
| Software Availability: | Dec-2020 |

## Peak Optimization Flags (Continued)

621.wrf_s:  
- m64  
- -std=c11  
- -Wl,-z,muldefs  
- -prof-gen(pass 1)  
- -prof-use(pass 2)  
- -ipo  
- -xCORE-AVX512  
- -O3  
- -no-prec-div  
- -Wl,-z,muldefs  
- -prof-gen(pass 1)  
- -prof-use(pass 2)  
- -ipo  
- -xCORE-AVX512  
- -O3  
- -no-prec-div  
- -DSPEC_SUPPRESS_OPENMP  
- -openmp  
- -DSPEC_OPENMP  
- -mbranches-within-32B-boundaries  
- -nostandard-realloc-lhs  
- -L/usr/local/je5.0.1-64/lib  
- -ljemalloc

627.cam4_s: basepeak = yes

628.pop2_s: basepeak = yes

Benmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes

---

The flags files that were used to format this result can be browsed at


http://www.spec.org/cpu2017/flags/Tyrone-Platform-Settings-V1.2-CLX-revB.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.xml

http://www.spec.org/cpu2017/flags/Tyrone-Platform-Settings-V1.2-CLX-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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