## SPEC CPU®2017 Floating Point Speed Result

### Hardware

<table>
<thead>
<tr>
<th>Thread</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>32</td>
<td>128</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>32</td>
<td>81.0</td>
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<tr>
<td>619.hm_s</td>
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<td>107</td>
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<tr>
<td>621.wrf_s</td>
<td>32</td>
<td>71.1</td>
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<tr>
<td>627.cam4_s</td>
<td>32</td>
<td>63.7</td>
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<td>628.pop2_s</td>
<td>32</td>
<td>64.5</td>
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<tr>
<td>638.imagick_s</td>
<td>32</td>
<td>73.8</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>32</td>
<td>166</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>32</td>
<td>73.9</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>32</td>
<td>137</td>
</tr>
</tbody>
</table>

### Software

- **OS:** CentOS Linux release 8.4.2105
- **Compiler:** C/C++, Fortran: Classic Build 20201112 for Linux
- **Firmware:** Version V8.104 released Jul-2021
- **System State:** Run level 3 (multi-user)
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage.

### CPU Name: Intel Xeon Silver 4216
- **Max MHz:** 3200
- **Nominal:** 2100
- **Enabled:** 32 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:** 22 MB I+D on chip per core
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933P-R, running at 2400)
- **Storage:** 1 x 480 GB SATA SSD
- **Other:** None

### Test Sponsor: Netweb Pte Ltd
- **Test Sponsor:** Netweb Pte Ltd
- **Test Date:** Aug-2021
- **Hardware Availability:** Apr-2019
- **Software Availability:** Jun-2021

---

Standard Performance Evaluation Corporation (info@spec.org)  https://www.spec.org/
## SPEC CPU®2017 Floating Point Speed Result

**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
Tyrone Camarero DIT400TR-436R  
(2.10 GHz, Intel Xeon Silver 4216)

**CPU2017 License:** 006042  
**Test Sponsor:** Netweb Pte Ltd  
**Tested by:** Tyrone Systems  
**Test Date:** Aug-2021

**Hardware Availability:** Apr-2019  
**Software Availability:** Jun-2021

### Results Table

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<tr>
<th>Benchmark</th>
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<th>Ratio</th>
<th>Seconds</th>
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<td>115</td>
<td>137</td>
<td>115</td>
<td>137</td>
</tr>
</tbody>
</table>

**SPECspeed®2017_fp_base = 109**  
**SPECspeed®2017_fp_peak = 112**

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

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

Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)

Tyrone Camarero DIT400TR-436R
(2.10 GHz, Intel Xeon Silver 4216)

SPECspeed®2017_fp_base = 109
SPECspeed®2017_fp_peak = 112

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

Test Date: Aug-2021
Hardware Availability: Apr-2019
Software Availability: Jun-2021

General Notes (Continued)

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

Platform Notes

BIOS Settings:
Power Technology set to Custom
Power Performance Tuning set to BIOS Controls EPB
ENERGY_PERF_BIAS_CFG mode set to Performance
LLC Dead Line Alloc set to Disable

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaf64d
running on spec Fri Aug 13 15:05:55 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) Silver 4216 CPU @ 2.10GHz
  2 "physical id"s (chips)
  64 "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 : 16
siblings : 32
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

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): 64
On-line CPU(s) list: 0-63
Thread(s) per core: 2
Core(s) per socket: 16

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

Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
BIOS Vendor ID: Intel(R) Corporation
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4216 CPU @ 2.10GHz
BIOS Model name: Intel(R) Xeon(R) Silver 4216 CPU @ 2.10GHz
Stepping: 7
CPU MHz: 800.070
CPU max MHz: 3200.0000
CPU min MHz: 800.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0-15,32-47
NUMA node1 CPU(s): 16-31,48-63
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush dts acp lmm 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 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 ablm abm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3
invcpcid_single intel_pstate ssbd mba ibrs ibpb ibrs_enhanced tpr_shadow vmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 4ers ivpvid cmq mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512vd avx512bw avx512vl xsaveopt xsaev xsave xasaves 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 pkg ospke avx512_vnni md_clear flush_l1d arch_capabilities

```
/proc/cpuinfo cache data
cache size : 22528 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 32 33 34 35 36 37 38 39 40 41 42 43
44 45 46 47
node 0 size: 192069 MB
node 0 free: 168627 MB
node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 48 49 50 51 52 53 54 55 56
57 58 59 60 61 62 63
node 1 size: 193528 MB
node 1 free: 167117 MB
```

(Continued on next page)
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CPU2017 License: 006042
Test Sponsor: Netweb Pte Ltd
Tested by: Tyrone Systems

Platform Notes (Continued)

node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 394851996 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sbin/tuned-adm active
Current active profile: throughput-performance

/sbin/lsb_release
CentOS Linux release 8.4.2105

From /etc/*release, /etc/*version
centos-release: CentOS Linux release 8.4.2105
centos-release-upstream: Derived from Red Hat Enterprise Linux 8.4
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 8.4.2105
system-release: CentOS Linux release 8.4.2105
system-release-cpe: cpe:/o:centos:centos:8

uname -a:
Linux spec 4.18.0-305.3.1.el8.x86_64 #1 SMP Tue Jun 1 16:14:33 UTC 2021 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):
Not affected

Microarchitectural Data Sampling:
Not affected

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

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

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

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Tyrone Systems
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Tyrone Camarero DIT400TR-436R
(2.10 GHz, Intel Xeon Silver 4216)

SPECspeed®2017_fp_base = 109
SPECspeed®2017_fp_peak = 112

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

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

CVE-2019-11135 (TSX Asynchronous Abort):
Mitigation: TSX disabled

run-level 3 Aug 12 05:10

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/cl-home</td>
<td>xfs</td>
<td>372G</td>
<td>198G</td>
<td>174G</td>
<td>54%</td>
<td>/home</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id

Vendor: Tyrone Systems
Product: Tyrone Camarero DIT400TR-436R
Product Family: empty
Serial: empty

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:
12x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933, configured at 2400

BIOS:
BIOS Vendor: American Megatrends Inc.
BIOS Version: V8.104
BIOS Date: 07/27/2021
BIOS Revision: 5.14
Firmware Revision: 6.1

(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.

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

<table>
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<tr>
<th>C</th>
<th>644.nab_s(peak)</th>
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<tbody>
<tr>
<td>Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113</td>
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Test Date: Aug-2021  
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Compiler Version Notes (Continued)

| Fortran, C | 621.wrf\_s(base, peak) 627.cam4\_s(base, peak) 628.pop2\_s(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.

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:  
\texttt{icc}

Fortran benchmarks:  
\texttt{ifort}

Benchmarks using both Fortran and C:  
\texttt{ifort icc}

Benchmarks using Fortran, C, and C++:  
\texttt{icpc icc ifort}

Base Portability Flags

\begin{verbatim}
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
\end{verbatim}
SPEC CPU®2017 Floating Point Speed Result

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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 (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
SPEC CPU®2017 Floating Point Speed Result

Tyrone Systems
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Tyrone Camarero DIT400TR-436R
(2.10 GHz, Intel Xeon Silver 4216)

SPECspeed®2017_fp_base = 109
SPECspeed®2017_fp_peak = 112

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

Test Date: Aug-2021
Hardware Availability: Apr-2019
Software Availability: Jun-2021

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 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -fopenmp
-DSPEC_OPENMP -qopt-mem-layout-trans=4
-fimf-accuracy-bits=14:sqrt
-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
-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
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/je5.0.1-64/lib -ljemalloc
627.cam4_s: basepeak = yes
628.pop2_s: basepeak = yes

(Continued on next page)
Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
Tyrone Camarero DIT400TR-436R
(2.10 GHz, Intel Xeon Silver 4216)

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Peak Optimization Flags (Continued)

Benchmarks 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-revI.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/Tyrone-Platform-Settings-V1.2-CLX-revI.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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