## SPEC CPU®2017 Floating Point Speed Result

**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
Tyrone Camarero DS400E1U-224R4  
(2.10 GHz, Intel Xeon Gold 6252)

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base = 133</th>
<th>SPECspeed®2017_fp_peak = 135</th>
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<td>510</td>
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</table>

### Hardware

- **CPU Name:** Intel Xeon Gold 6252  
- **Max MHz:** 3700  
- **Nominal:** 2100  
- **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  
- **L2:** 1 MB I+D on chip per core  
- **L3:** 35.75 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)  
- **Storage:** 1 x 480 GB SATA SSD  
- **Other:** None

### Software

- **OS:** CentOS Linux release 8.3.2011  
- **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
Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>48</td>
<td>116</td>
<td>507</td>
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<td>607.cactuBSSN_s</td>
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<td>100</td>
<td>88.5</td>
<td>100</td>
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<td>88.2</td>
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<td>48</td>
<td>96.9</td>
<td>163</td>
<td>96.8</td>
<td>163</td>
</tr>
</tbody>
</table>

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"
  - MALLOC_CONF = "retain:true"
  - OMP_STACKSIZE = "192M"

General Notes

- Binaries compiled on a system with 2x Intel Cascade Lake CPU 4214R + 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
  - runcpu command invoked through numactl i.e.:
    - numactl --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.
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<th>SPECspeed®2017_fp_peak = 135</th>
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<table>
<thead>
<tr>
<th>CPU2017 License: 006042</th>
<th>Test Date: Feb-2021</th>
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<tbody>
<tr>
<td>Test Sponsor: Netweb Pte Ltd</td>
<td>Hardware Availability: Aug-2020</td>
</tr>
<tr>
<td>Tested by: Tyrone Systems</td>
<td>Software Availability: Dec-2020</td>
</tr>
</tbody>
</table>

**General Notes (Continued)**

jemalloc, a general purpose malloc implementation  
built with the Centos 8.2 x86_64, 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 = Enable  
Stale AtoS = Disable  
IMC Interleaving = 1-way Interleave  
Patreol Scrub = Disable

Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c  
running on spec Thu Feb 18 14:21:00 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 6252 CPU @ 2.10GHz  
  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 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29  
  physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 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): 2  
Vendor ID: GenuineIntel  
CPU family: 6

(Continued on next page)
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SPECspeed®2017_fp_base = 133
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CPU2017 License: 006042
Test Sponsor: Netweb Pte Ltd
Tested by: Tyrone Systems

Platform Notes (Continued)

Model: 85
Model name: Intel(R) Xeon(R) Gold 6252 CPU @ 2.10GHz
Stepping: 7
CPU MHz: 1804.490
CPU max MHz: 3700.0000
CPU min MHz: 1000.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-23,48-71
NUMA node1 CPU(s): 24-47,72-95
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 pdelgb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref perf pni pclmulqdq dtes64 monitor ds cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtpr pdcm pclid dca sse4_1 sse4_2 x2apic movbe popcnt tgct tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single intel_pplin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmm
flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 urs
invpcid cqm mp xdt a vms he axx2 smep bmi2 urs
invpcid cqm mp xdt a vms he axx2 smep bmi2 urs
From /proc/cpuinfo cache data
  cache size: 36608 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
  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 48 49 50 51
  52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71
  node 0 size: 177651 MB
  node 0 free: 160613 MB
  node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 72
  73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95
  node 1 size: 180636 MB
  node 1 free: 158275 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

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

Platform Notes (Continued)

MemTotal: 394855904 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"
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 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): KVM: Mitigation: Split huge pages
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling:
CVE-2017-5754 (Meltdown):
CVE-2018-3639 (Speculative Store Bypass):
CVE-2017-5753 (Spectre variant 1):
CVE-2017-5715 (Spectre variant 2):
CVE-2020-0543 (Special Register Buffer Data Sampling):
CVE-2019-11135 (TSX Asynchronous Abort):

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CPU2017 License: 006042
Test Date: Feb-2021
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Software Availability: Dec-2020

Platform Notes (Continued)

run-level 3 Feb 16 11:45
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: Tyrone 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 2934

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 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

================================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
================================================================================
Intel(R) C++ 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.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
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**Compiler Version Notes (Continued)**

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  
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.

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

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.

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

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.  
Intel (R) C Intel (R) 64 Compiler for applications running on Intel (R) 64,  
Version 19.1.1.217 Build 20200306  
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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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| Test Date: | Feb-2021 |
| Hardware Availability: | Aug-2020 |
| Software Availability: | Dec-2020 |

### Base Portability Flags

- 603.bwaves_s: -DSPEC_LP64
- 607.cactusBB_s: -DSPEC_LP64
- 619.hm_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

(Continued on next page)
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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=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
-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:

(Continued on next page)
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
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-mbranches-within-32B-boundaries -nostandard-realloc-lhs
-1/usr/local/je5.0.1-64/lib -ljemalloc

627.cam4_s: basepeak = yes
628.pop2_s: basepeak = yes

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-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