## SPEC CPU®2017 Floating Point Speed Result

### Hardware

**CPU Name:** Intel Xeon Gold 6148  
**Max MHz:** 3700  
**Nominal:** 2400  
**Enabled:** 40 cores, 2 chips, 2 threads/core  
**Orderable:** 1.2 (chip)  
**Cache L1:** 32 KB I + 32 KB D on chip per core  
**L2:** 1 MB I+D on chip per core  
**L3:** 27.5 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 8.2.2004 (Core)  
4.18.0-193.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 3.3 released Feb-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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**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
**Tyrone Camarero DS400TOG-424RT2**  
(2.40 GHz, Intel Xeon Gold 6148)

**SPECspeed®2017_fp_base = 119**  
**SPECspeed®2017_fp_peak = 122**

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<table>
<thead>
<tr>
<th>Threads</th>
<th>Specmark (122)</th>
</tr>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>80.1</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>80.1</td>
</tr>
<tr>
<td>619.ibm_s</td>
<td>80.1</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>89.2</td>
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<tr>
<td>627.cam4_s</td>
<td>64.6</td>
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<tr>
<td>628.pop2_s</td>
<td>88.7</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>88.7</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>76.4</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>76.5</td>
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<tr>
<td>654.roms_s</td>
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**CPU2017 License:** 006042  
**Test Date:** Feb-2021  
**Test Sponsor:** Netweb Pte Ltd  
**Hardware Availability:** Aug-2020  
**Tested by:** Tyrone Systems  
**Software Availability:** Jun-2020

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## 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>112</td>
<td>144</td>
</tr>
</tbody>
</table>

**SPECspeed®2017_fp_base = 119**

**SPECspeed®2017_fp_peak = 122**

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"
- **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 numa1 i.e.:
- numa1 --interleave=all runcpu <etc>

Yes: 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.

(Continued on next page)
### 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 = Maximum 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 e8664e66d2d7080afeaa89d4b3e2f1c 
running on localhost.localdomain Tue Feb 16 21:06:43 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 6148 CPU @ 2.40GHz 
- 2 "physical id"s (chips) 
- 80 "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 : 20
  - siblings : 40
  - physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  - physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 80
- On-line CPU(s) list: 0-79
- Core(s) per socket: 20
- Thread(s) per core: 2
- Socket(s): 2
- NUMA node(s): 4
- Vendor ID: GenuineIntel
- CPU family: 6

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

Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
Tyrone Camarero DS400TOG-424RT2
(2.40 GHz, Intel Xeon Gold 6148)

SPECspeed®2017_fp_base = 119
SPECspeed®2017_fp_peak = 122

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

Platform Notes (Continued)

Model: B5
Model name: Intel(R) Xeon(R) Gold 6148 CPU @ 2.40GHz
Stepping: 4
CPU MHz: 2099.656
CPU max MHz: 3700.0000
CPU min MHz: 1000.0000
BogoMIPS: 4800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 28160K
NUMA node0 CPU(s): 0-2, 5, 6, 10-12, 15, 16, 40-42, 45, 46, 50-52, 55, 56
NUMA node1 CPU(s): 3, 4, 7-9, 13, 14, 17-19, 43, 44, 47-49, 53, 54, 57-59
NUMA node2 CPU(s): 20-22, 25, 26, 30-32, 35, 36, 60-62, 65, 66, 70-72, 75, 76
NUMA node3 CPU(s): 23, 24, 27-29, 33, 34, 37-39, 63, 64, 67-69, 73, 74, 77-79
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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmperf pni pclmulqdq dtsc64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrm pqcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcic_single pti intel_ppln ssbd mba ibrs ibbp stibp tpr_shadow vnmi flexpriority
ept vpid fsgsbase tsc_adjust bm1 hle avx2 smep bmi2 erms invpcic rtm cqm mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavexc xsavec xaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local
dtherm ida arat pln pts pku ospke md_clear flush_l1d

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 5 6 10 11 12 15 16 40 41 42 45 46 50 51 52 55 56
node 0 size: 95325 MB
node 0 free: 81148 MB
node 1 cpus: 3 4 7 8 9 13 14 17 18 19 43 44 47 48 49 53 54 57 58 59
node 1 size: 96763 MB
node 1 free: 77484 MB
node 2 cpus: 20 21 22 25 26 30 31 32 35 36 60 61 62 65 66 70 71 72 75 76
node 2 size: 96763 MB
node 2 free: 84433 MB
node 3 cpus: 23 24 27 28 29 33 34 37 38 39 63 64 67 68 69 73 74 77 78 79
node 3 size: 96762 MB
node 3 free: 84525 MB
node distances:

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

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Tyrone Camarero DS400TOG-424RT2
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CPU2017 License: 006042
Test Sponsor: Netweb Pte Ltd
Tested by: Tyrone Systems

Platform Notes (Continued)

node 0 1 2 3
0: 10 11 21 21
1: 11 10 21 21
2: 21 21 10 11
3: 21 21 11 10

From /proc/meminfo
MemTotal: 394870504 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 8.2.2004 (Core)
centos-release-upstream: Derived from Red Hat Enterprise Linux 8.2 (Source)
os-release:
NAME="CentOS Linux"
VERSION="8 (Core)"
ID="centos"
ID_LIKE="rhel fedora"
VERSION_ID="8"
PLATFORM_ID="platform:el8"
PRETTY_NAME="CentOS Linux 8 (Core)"
ANSI_COLOR="0;31"
redhat-release: CentOS Linux release 8.2.2004 (Core)
system-release: CentOS Linux release 8.2.2004 (Core)
system-release-cpe: cpe:/o:centos:centos:8

uname -a:
Linux localhost.localdomain 4.18.0-193.el8.x86_64 #1 SMP Fri May 8 10:59:10 UTC 2020
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit):
KVM: Vulnerable
Mitigation: PTE Inversion
CVE-2018-3620 (L1 Terminal Fault):
Mitigation: Clear CPU buffers; SMT vulnerable
Microarchitectural Data Sampling:
CVE-2017-5754 (Meltdown):
Mitigation: PTI
CVE-2018-3639 (Speculative Store Bypass):
Mitigation: Speculative Store Bypass disabled via prctl and seccomp

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

- **CVE-2017-5753** (Spectre variant 1): Mitigation: usercopy/swapgs barriers and __user pointer sanitization
- **CVE-2017-5715** (Spectre variant 2):
- **CVE-2020-0543** (Special Register Buffer Data Sampling): No status reported
- **CVE-2019-11135** (TSX Asynchronous Abort): Mitigation: Clear CPU buffers; SMT vulnerable

run-level 3 Feb 15 10:24

SPEC is set to: /home/cpu2017

Filesystem          Type  Size  Used Avail Use% Mounted on
/dev/mapper/cl-home  xfs   392G  143G  250G  37%  /home

From /sys/devices/virtual/dmi/id
- Vendor: Tyrone Systems
- Product: Tyrone Camarero DS400TOG-424RT2
- Product Family: SMC X11
- Serial: A309085X0907231

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: 3.3
- BIOS Date: 02/21/2020
- BIOS Revision: 5.14

(End of data from sysinfo program)

### Compiler Version Notes

<table>
<thead>
<tr>
<th>C</th>
<th>619.lbm_s(base, peak) 638.imagick_s(base, peak)</th>
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<tbody>
<tr>
<td></td>
<td>644.nab_s(base, peak)</td>
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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
SPEC CPU®2017 Floating Point Speed Result
Copyright 2017-2021 Standard Performance Evaluation Corporation

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

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

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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,
Version 19.1.1.217 Build 20200306
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.

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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.

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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
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Base Compiler Invocation

C benchmarks:
  icc
Fortran benchmarks:
  ifort

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Base Compiler Invocation (Continued)

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.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

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

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**Tyrone Camarero DS400TOG-424RT2**
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**CPU2017 License**: 006042

**Test Sponsor**: Netweb Pte Ltd

**Tested by**: Tyrone Systems

**Test Date**: Feb-2021

**Hardware Availability**: Aug-2020

**Software Availability**: Jun-2020

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### Base Optimization Flags (Continued)

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`

**Fortran benchmarks**:

- `ifort`

**Benchmarks using both Fortran and C**:

- `ifort icc`

**Benchmarks using Fortran, C, and C++**:

- `icpc icc ifort`

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### Peak Portability Flags

Same as Base Portability Flags

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### 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**:  

(Continued on next page)
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SPECspeed®2017_fp_base = 119
SPECspeed®2017_fp_peak = 122

Peak Optimization Flags (Continued)

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 -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 -03 -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

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: basepeak = yes

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.