## SPEC CPU®2017 Floating Point Speed Result

### Hardware

- **CPU Name:** Intel Xeon Gold 6148
- **Max MHz:** 3700
- **Nominal:** 2400
- **Enabled:** 80 cores, 4 chips, 2 threads/core
- **Orderable:** 1,2,4 (chip)s
- **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 (24 x 16 GB 1Rx4 PC4-2933Y-R, running at 2666)
- **Storage:** 1 x 480 GB SATA SSD
- **Other:** None

### Software

- **OS:** CentOS Linux release 8.3.2111
  - Kernel 4.18.0-240.el8.x86_64
  - 4.18.0-240.el8.x86_64
- **Compiler:**
  - C/C++: Version 19.1.2.254 of Intel C/C++ Compiler for Linux Build 20200623;
  - Fortran: Version 19.1.2.254 of Intel Fortran Compiler for Linux Build 20200623;
- **Parallel:** Yes
- **Firmware:** Version 3.4 released Nov-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.

### Tests

<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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<tr>
<td>654.roms_s</td>
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## Results Table

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<td>207</td>
<td>74.7</td>
<td><strong>208</strong></td>
<td>75.7</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 4214R CPU + 384 GB 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
```
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.
jemalloc, a general purpose malloc implementation built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

(Continued on next page)
Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
Tyrone Camarero QS400TU-224R4
(2.40 GHz, Intel Xeon Gold 6148)

SPECspeed®2017_fp_base = 160
SPECspeed®2017_fp_peak = 160

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 localhost.localdomain Sun Feb 21 05:21:14 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
  4 "physical id"s (chips)
  160 "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
  physical 2: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
  physical 3: 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): 160
On-line CPU(s) list: 0-159
Thread(s) per core: 2
Core(s) per socket: 20
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6

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

SPEC CPU®2017 Floating Point Speed Result

Tyrone Camarero QS400TU-224R4
(2.40 GHz, Intel Xeon Gold 6148)

SPECspeed®2017_fp_base = 160
SPECspeed®2017_fp_peak = 160

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

Hardware Availability: Aug-2020
Software Availability: Dec-2020

Platform Notes (Continued)

Model: 85
Model name: Intel(R) Xeon(R) Gold 6148 CPU @ 2.40GHz
Stepping: 4
CPU MHz: 1070.635
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): 0-19,80-99
NUMA node1 CPU(s): 20-39,100-119
NUMA node2 CPU(s): 40-59,120-139
NUMA node3 CPU(s): 60-79,140-159
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
aperfperf 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 cdp_l3
invpcid_single pti intel_pni ssbd mba ibrs ibpb stibp tpr_shadow vnmi f1xpr
epi vgicid tsc_ad jsfgbase tsc_adjust bmi1 hle avx2 smep bmi2 3ms invpcid rtm cmq
mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw
avx512vl xsaveopt xsavec xgetbv1 xsaveas cmq_llc cmq_occup_llc cmq_msbm_total
cmq_msbm_local dtvmm 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.

/proc/cpuinfo cache data

cache size : 28160 KB

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

Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
Tyrone Camarero QS400TU-224R4
(2.40 GHz, Intel Xeon Gold 6148)

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<td>160</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:** Dec-2020

**Platform Notes (Continued)**

```
143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159
  node 3 size: 92128 MB
  node 3 free: 74667 MB
  node distances:
    node 0 1 2 3
    0: 10 21 21 21
    1: 21 10 21 21
    2: 21 21 10 21
    3: 21 21 21 10

From /proc/meminfo
  MemTotal:       394580636 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 localhost.localdomain 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):
  Mitigation: Split huge pages
  CVE-2018-3620 (L1 Terminal Fault):
  Mitigation: PTE Inversion; VMX: conditional cache flushes, SMT vulnerable
```

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

Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
Tyrone Camarero QS400TU-224R4
(2.40 GHz, Intel Xeon Gold 6148)

SPECspeed®2017_fp_base = 160
SPECspeed®2017_fp_peak = 160

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

Platform Notes (Continued)

Microarchitectural Data Sampling:
Mitigation: Clear CPU buffers; SMT vulnerable
CVE-2017-5754 (Meltdown):
Mitigation: PTI
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: Full generic retpoline, IBPB: conditional, IBRS_FW, STIBP: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort):
Mitigation: Clear CPU buffers; SMT vulnerable

run-level 3 Mar 19 16:16
SPEC is set to: /home/cpu2017

Filesystem          Type  Size  Used Avail Use% Mounted on
/dev/mapper/cl-home xfs   372G  100G  273G  27% /home

From /sys/devices/virtual/dmi/id
Vendor:         Tyrone Systems
Product:        Tyrone Camarero DS400TU-224R4
Product Family: SMC X11
Serial:         123456789

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:
24x NO DIMM NO DIMM
24x Samsung M393A2K40DB2-CVF 16 GB 1 rank 2933, configured at 2666

BIOS:
BIOS Vendor: American Megatrends Inc.
BIOS Version: 3.4
BIOS Date: 11/04/2020
BIOS Revision: 5.14

(End of data from sysinfo program)
Sysinfo incorrectly parsed dmidecode output. Configured memory speed is 2933.
## SPEC CPU®2017 Floating Point Speed Result

**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
Tyrone Camarero QS400TU-224R4  
(2.40 GHz, Intel Xeon Gold 6148)

| SPECspeed®2017_fp_base | 160 |
| SPECspeed®2017_fp_peak | 160 |

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

### Compiler Version Notes

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Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
Tyrone Camarero QS400TU-224R4
(2.40 GHz, Intel Xeon Gold 6148)

spec

SPEC CPU®2017 Floating Point Speed Result
Copyright 2017-2021 Standard Performance Evaluation Corporation

SPECspeed®2017_fp_base = 160
SPECspeed®2017_fp_peak = 160

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

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.cactusBSSN_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

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

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### Tyrone Systems

(TestMethod: Netweb Pte Ltd)

**Tyrone Camarero QS400TU-224R4**

(2.40 GHz, Intel Xeon Gold 6148)

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### Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):

- 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

**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

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

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Peak Optimization Flags (Continued)

644.nab_s (continued):
- 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 -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:
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 -gopenmp -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

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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