SPEC CPU®2017 Floating Point Speed Result

Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
Tyrone Camarero IDI100C2R-28
(2.30 GHz, Intel Xeon Silver 4316)

SPECspeed®2017_fp_base = 179
SPECspeed®2017_fp_peak = 180

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

Test Date: Sep-2022
Hardware Availability: Apr-2021
Software Availability: May-2022

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base (179)</th>
<th>SPECspeed®2017_fp_peak (180)</th>
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<tbody>
<tr>
<td>603.bwaves_s 40</td>
<td>217</td>
<td></td>
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<tr>
<td>607.cactuBSSN_s 40</td>
<td></td>
<td></td>
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<tr>
<td>619.lbm_s 40</td>
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<td>621.wrf_s 40</td>
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<td>627.cam4_s 40</td>
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<td>628.pop2_s 40</td>
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<td>638.imagick_s 40</td>
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<td>77.8</td>
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<tr>
<td>644.nab_s 40</td>
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<td>649.fotonik3d_s 40</td>
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<td>286</td>
</tr>
<tr>
<td>654.roms_s 40</td>
<td></td>
<td>162</td>
</tr>
</tbody>
</table>

Hardware
CPU Name: Intel Xeon Silver 4316
Max MHz: 3400
Nominal: 2300
Enabled: 40 cores, 2 chips, 2 threads/core
Orderable: 1.2 Chips
Cache L1: 32 KB I + 48 KB D on chip per core
L2: 1.25 MB I+D on chip per core
L3: 30 MB I+D on chip per chip
Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R, running at 2666)
Storage: 1 x 512 GB NVMe SSD
Other: None

Software
OS: Red Hat Enterprise Linux release 8.5 (Ootpa)
Kernel 4.18.0-348.el8.x86_64
Compiler: C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux;
Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;
Parallel: Yes
Firmware: Version SE5C620.86B.01.01.0004.2110190142 released Oct-2021
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 and OS 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>
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<td>97.4</td>
<td>162</td>
<td>97.3</td>
<td>162</td>
</tr>
</tbody>
</table>

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

**General Notes**

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using Red Hat Enterprise Linux 8.4
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.:

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

**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
**Tyrone Camarero ID1100C2R-28**  
(2.30 GHz,Intel Xeon Silver 4316)

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<td>Hardware Availability: Apr-2021</td>
</tr>
<tr>
<td>Tested by: Tyrone Systems</td>
<td>Software Availability: May-2022</td>
</tr>
</tbody>
</table>

### General Notes (Continued)

```bash
cnumactl --interleave=all runcpu <etc>
```

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.


### Platform Notes

**BIOS Settings:**  
Power Technology = Custom  
ENERGY_PERF_BIAS_CFG mode = Maximum Performance  
KTI Prefetch = Enable  
LLC Dead Line Alloc = Disable  
Hyper-Threading = Enabled

Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aaca5f3d4d  
running on icelakespec Tue Sep 27 11:23:27 2022

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 4316 CPU @ 2.30GHz  
  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 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
- physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

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): 80  
On-line CPU(s) list: 0-79  
Thread(s) per core: 2

(Continued on next page)
Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
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SPECspeed\textsuperscript{\textregistered}2017\_fp\_base = 179
SPECspeed\textsuperscript{\textregistered}2017\_fp\_peak = 180

Platform Notes (Continued)

Core(s) per socket: 20
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
BIOS Vendor ID: Intel(R) Corporation
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Silver 4316 CPU @ 2.30GHz
BIOS Model name: Intel(R) Xeon(R) Silver 4316 CPU @ 2.30GHz
Stepping: 6
CPU MHz: 2301.000
CPU max MHz: 2301.0000
CPU min MHz: 800.0000
BogoMIPS: 4600.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 30720K
NUMA node0 CPU(s): 0-9, 40-49
NUMA node1 CPU(s): 10-19, 50-59
NUMA node2 CPU(s): 20-29, 60-69
NUMA node3 CPU(s): 30-39, 70-79
Flags: ...fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov...

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 4 5 6 7 8 9 40 41 42 43 44 45 46 47 48 49
node 0 size: 257668 MB
node 0 free: 242234 MB
node 1 cpus: 10 11 12 13 14 15 16 17 18 19 50 51 52 53 54 55 56 57 58 59

(Continued on next page)
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Platform Notes (Continued)

node 1 size: 258043 MB  
node 1 free: 246100 MB  
node 2 cpus: 20 21 22 23 24 25 26 27 28 29 60 61 62 63 64 65 66 67 68 69  
node 2 size: 258043 MB  
node 2 free: 240124 MB  
node 3 cpus: 30 31 32 33 34 35 36 37 38 39 70 71 72 73 74 75 76 77 78 79  
node 3 size: 258003 MB  
node 3 free: 245074 MB  
node distances:  
node 0 1 2 3  
0: 10 11 20 20  
1: 11 10 20 20  
2: 20 20 10 11  
3: 20 20 11 10

From /proc/meminfo  
MemTotal: 1056521128 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*  
oS-release:  
NAME="Red Hat Enterprise Linux"  
VERSION="8.5 (Ootpa)"  
ID="rhel"  
ID_LIKE="fedora"  
VERSION_ID="8.5"  
PLATFORM_ID="platform:el8"  
PRETTY_NAME="Red Hat Enterprise Linux 8.5 (Ootpa)"  
ANSI_COLOR="0;31"  
redhat-release: Red Hat Enterprise Linux release 8.5 (Ootpa)  
system-release: Red Hat Enterprise Linux release 8.5 (Ootpa)  
system-release-cpe: cpe:/o:redhat:enterprise_linux:8::baseos

uname -a:  
Linux icelakespec 4.18.0-348.el8.x86_64 #1 SMP Mon Oct 4 12:17:22 EDT 2021 x86_64  
x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:  
CVE-2018-12207 (iTLB Multithit): Not affected

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

Standard Performance Evaluation Corporation (info@spec.org)
https://www.spec.org/

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Platform Notes (Continued)

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/swapgs barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1):
CVE-2017-5715 (Spectre variant 2):
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Sep 26 08:50
SPEC is set to: /home/cpu2017
From /sys/devices/virtual/dmi/id
Vendor: Tyrone_Systems
Product: Tyrone_Camarero_IDI100C2R-28
Product Family: Family
Serial: 2X22462203

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:
16x Samsung M393A8G40AB2-CWE 64 GB 2 rank 3200, configured at 2666
BIOS:
BIOS Vendor: Intel Corporation
BIOS Version: SE5C620.86B.01.01.0004.2110190142
BIOS Date: 10/19/2021

(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)
==============================================================================

(Continued on next page)
SPEC CPU²017 Floating Point Speed Result

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Tyrone Camarero IDI100C2R-28
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SPECspeed®2017_fp_base = 179
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CPU2017 License: 006042
Test Sponsor: Netweb Pte Ltd
Tested by: Tyrone Systems

Test Date: Sep-2022
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Software Availability: May-2022

Compiler Version Notes (Continued)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

===============================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
===============================================================================
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

===============================================================================
Fortran         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
                   | 654.roms_s(base, peak)
===============================================================================
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
2022.1.0 Build 20220316
Copyright (C) 1985-2022 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 Compiler for applications running on Intel(R) 64, Version
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Base Compiler Invocation

C benchmarks:
icx

(Continued on next page)
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---

**Base Compiler Invocation (Continued)**

Fortran benchmarks:

`ifx`

Benchmarks using both Fortran and C:

`ifx icx`

Benchmarks using Fortran, C, and C++:

`icpx icx ifx`

---

**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 -g -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Fortran benchmarks:

```
-m64 -g -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX2 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Benchmarks using both Fortran and C:

```
-m64 -g -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

(Continued on next page)
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---

**Base Optimization Flags (Continued)**

Benchmarks using Fortran, C, and C++:

- `m64 -g -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -ffast-math`
- `flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp`
- `DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte -auto`
- `-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

---

**Peak Compiler Invocation**

C benchmarks:

`icx`

Fortran benchmarks:

`ifx`

Benchmarks using both Fortran and C:

`ifx icx`

Benchmarks using Fortran, C, and C++:

`icpx icx ifx`

---

**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: basepeak = yes`

Fortran benchmarks:

- `603.bwaves_s: -m64 -g -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX2 -Ofast`
- `ffast-math -flto -mfpmath=sse -funroll-loops`
- `qopt-mem-layout-trans=4 -fiopenmp -nostandard-realloc-lhs`
- `align array32byte -auto -L/usr/local/jemalloc64-5.0.1/lib`

(Continued on next page)
Tyrone Systems  
(Test Sponsor: Netweb Pte Ltd) 
Tyrone Camarero IDI100C2R-28  
(2.30 GHz, Intel Xeon Silver 4316) 

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<tr>
<th>SPECspeed®2017_fp_base</th>
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<td>SPECspeed®2017_fp_peak</td>
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**CPU2017 License:** 006042  
**Test Date:** Sep-2022

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<td>Software Availability:</td>
<td>May-2022</td>
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**Peak Optimization Flags (Continued)**

```
603.bwaves_s (continued):
  -ljemalloc

649.fotonik3d_s: basepeak = yes

654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf_s: basepeak = yes

627.cam4_s: -m64 -g -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -Ofast
  -ffast-math -flto -mfpmath=sse -funroll-loops
  -qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP
  -nostandard-realloc-lhs -align array32byte -auto
  -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

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:


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


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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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