**CPU2017 Floating Point Rate Result**

Tyrone Systems  
(Test Sponsor: Netweb Pte Ltd)  
Tyrone Camarero DIT400TR-28RL  
(2.90 GHz, Intel Xeon Gold 6226R)  

**CPU2017 License:** 006042  
**Test Date:** Sep-2022  
**Test Sponsor:** Netweb Pte Ltd  
**Hardware Availability:** Apr-2021  
**Tested by:** Tyrone Systems  
**Software Availability:** May-2022  

<table>
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<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate®2017_fp_base</th>
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<td>507.cactuBSSN_r</td>
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**Hardware**

- **CPU Name:** Intel Xeon Gold 6226R  
- **Max MHz:** 3900  
- **Nominal:** 2900  
- **Enabled:** 16 cores, 1 chip, 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 chip  
- **Other:** None  
- **Memory:** 512 GB (8 x 64 GB 2Rx4 PC4-3200AA-R, running at 2933)  
- **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:** No  
- **Firmware:** Version 3.6 released Jan-2022  
- **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>
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<td>45.5</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:

- `LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"`
- `MALLOC_CONF = "retain:true"`

**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
```

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

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(2.90 GHz, Intel Xeon Gold 6226R)

---

**General Notes (Continued)**

runcpu command invoked through numactl i.e.:  
numactl --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  
SNC (Sub NUMA) = Enable  
KTI Prefetch = Enable  
LLC Dead Line Alloc = Disable  
Hyper-Threading = Enabled

Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d  
running on icelake3 Sat Sep 17 20:10:15 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) Gold 6226R CPU @ 2.90GHz  
1 "physical id"s (chips)  
32 "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

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): 32  
On-line CPU(s) list: 0-31

(Continued on next page)
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SPECraten®2017_fp_base = 114
SPECraten®2017_fp_peak = 123

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

Thread(s) per core: 2
Core(s) per socket: 16
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
BIOS Vendor ID: Intel(R) Corporation
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6226R CPU @ 2.90GHz
BIOS Model name: Intel(R) Xeon(R) Gold 6226R CPU @ 2.90GHz
Stepping: 7
CPU MHz: 3900.000
CPU max MHz: 3900.0000
CPU min MHz: 1200.0000
BogoMIPS: 5800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0-31

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
aperfmprefx pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtr pdcm pcd id cd 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 intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ertz
invpcid cmq mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt
avx512cd avx512bw avx512vl saxvalept xsaves xsavec xgetbv1 xsaves cmq_llc cmq_occup_l1c
cmq_mb_total cmq_mb_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear
flush_l1d arch_capabilities

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 1 nodes (0)
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 24 25 26 27
28 29 30 31
node 0 size: 514642 MB
node 0 free: 490278 MB
node distances:
node 0
0: 10

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

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SPECrate®2017_fp_base = 114
SPECrate®2017_fp_peak = 123

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

Platform Notes (Continued)

From /proc/meminfo
MemTotal: 526993576 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 icelake3 4.18.0-348.el8.x86_64 #1 SMP Mon Oct 4 12:17:22 EDT 2021 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit):
KVM: Mitigation: VMX disabled
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 sanitization

CVE-2017-5753 (Spectre variant 1):
Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

CVE-2017-5715 (Spectre variant 2):
Not affected

CVE-2020-0543 (Special Register Buffer Data Sampling):
Mitigation: TSX disabled

(Continued on next page)
Platform Notes (Continued)

run-level 3 Sep 16 22:43

SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 402G 168G 234G 42% /home

From /sys/devices/virtual/dmi/id
Vendor: Tyrone Systems
Product: Tyrone Camarero DIT400TR-28RL
Product Family: SMC X11
Serial: TX20752209

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:
8x Samsung M393A8G40AB2-CWE 64 GB 2 rank 3200, configured at 2934

BIOS:
BIOS Vendor: American Megatrends Inc.
BIOS Version: 3.6
BIOS Date: 01/25/2022
BIOS Revision: 5.14

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C               | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
| 544.nab_r(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.
==============================================================================

C++             | 508.namd_r(base, peak) 510.parest_r(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.

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

==============================================================================
C++, C          | 511.povray_r(base, peak) 526.blender_r(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. 
==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(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         | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)  
   554.roms_r(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      | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
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| Tested by: | Tyrone Systems |
| Test Date: | Sep-2022 |
| Hardware Availability: | Apr-2021 |
| Software Availability: | May-2022 |

**Base Compiler Invocation**

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

Benchmarks using both C and C++:
icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifx

**Base Portability Flags**

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

**Base Optimization Flags**

C benchmarks:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

(Continued on next page)
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Test Sponsor: Netweb Pte Ltd
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Test Date: Sep-2022
Hardware Availability: Apr-2021
Software Availability: May-2022

Base Optimization Flags (Continued)

C++ benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both Fortran and C:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both C and C++:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using Fortran, C, and C++:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Peak Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

Benchmarks using both C and C++:
icpx icx

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

**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
Tyrone Camarero DIT400TR-28RL  
(2.90 GHz, Intel Xeon Gold 6226R)  

<table>
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<tr>
<th>SPECrate®2017_fp_base</th>
<th>SPECrate®2017_fp_peak</th>
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</thead>
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<td>114</td>
<td>123</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 006042  
**Test Sponsor:** Netweb Pte Ltd  
**Tested by:** Tyrone Systems  
**Test Date:** Sep-2022  
**Hardware Availability:** Apr-2021  
**Software Availability:** May-2022

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**Peak Compiler Invocation (Continued)**

Benchmarks using Fortran, C, and C++:

- icpx
- icx
- ifx

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**Peak Portability Flags**

Same as Base Portability Flags

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**Peak Optimization Flags**

**C benchmarks:**

519.lbm_r: basepeak = yes

538.imagick_r: basepeak = yes

544.nab_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -qopt-zmm-usage=high -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

**C++ benchmarks:**

508.namd_r: basepeak = yes

510.parest_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

**Fortran benchmarks:**

503.bwaves_r: basepeak = yes

549.fotonik3d_r: basepeak = yes


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Tyrone Camarero DIT400TR-28RL
(2.90 GHz, Intel Xeon Gold 6226R)

SPECrate®2017_fp_base = 114
SPECrate®2017_fp_peak = 123

Tyrone Systems

Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

Benchmarks using both C and C++:
511.povray_r: -w -m64 -std=c11 -Wl,-z,muldefs
-fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512
-Ofast -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

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:
http://www.spec.org/cpu2017/flags/Tyrone-Platform-Settings-V1.2-ICX-revA.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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