



# SPEC CPU®2017 Floating Point Rate Result

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## Tyrone Systems

(Test Sponsor: Netweb Pte Ltd)

Tyrone Camarero SDI200C3R-28  
(2.00 GHz, Intel Xeon Silver 4410Y)

SPECrate®2017\_fp\_base = 306

SPECrate®2017\_fp\_peak = 308

CPU2017 License: 006042

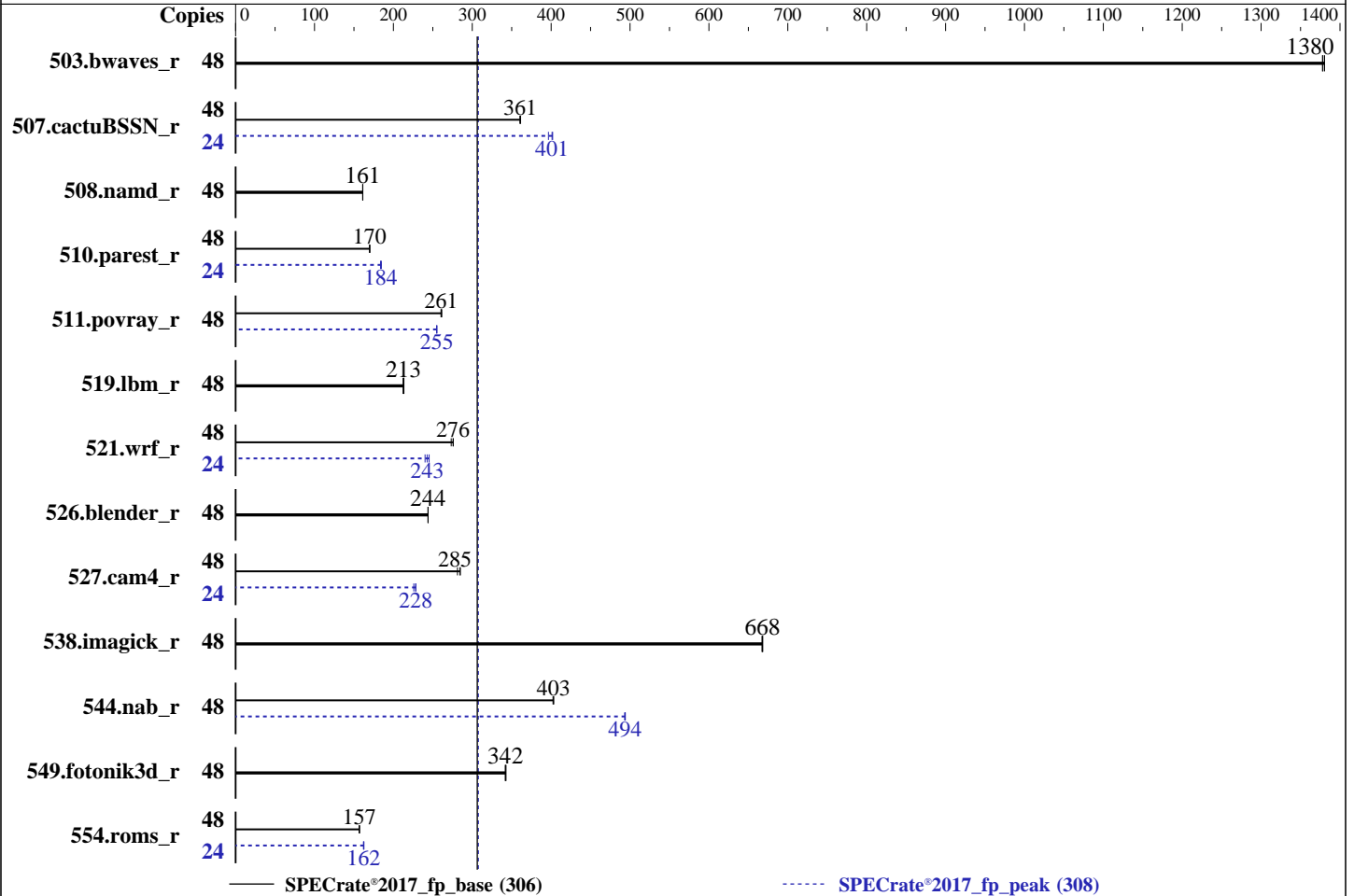
Test Sponsor: Netweb Pte Ltd

Tested by: Tyrone Systems

Test Date: Sep-2023

Hardware Availability: Jan-2023

Software Availability: May-2022



### Hardware

CPU Name: Intel Xeon Silver 4410Y  
 Max MHz: 3900  
 Nominal: 2000  
 Enabled: 24 cores, 2 chips, 2 threads/core  
 Orderable: 1,2 chips  
 Cache L1: 32 KB I + 48 KB D on chip per core  
 L2: 2 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 PC5-4800B-R, running at 4000)  
 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 1.3 released Jun-2023  
 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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## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	48	<b><u>349</u></b>	<b><u>1380</u></b>	349	1380	349	1380	48	<b><u>349</u></b>	<b><u>1380</u></b>	349	1380	349	1380
507.cactuBSSN_r	48	<b><u>168</u></b>	<b><u>361</u></b>	169	360	168	361	24	75.6	402	<b><u>75.7</u></b>	<b><u>401</u></b>	76.6	397
508.namd_r	48	283	161	<b><u>283</u></b>	<b><u>161</u></b>	283	161	48	283	161	<b><u>283</u></b>	<b><u>161</u></b>	283	161
510.parest_r	48	740	170	738	170	<b><u>739</u></b>	<b><u>170</u></b>	24	<b><u>341</u></b>	<b><u>184</u></b>	341	184	340	185
511.povray_r	48	429	261	430	260	<b><u>430</u></b>	<b><u>261</u></b>	48	<b><u>440</u></b>	<b><u>255</u></b>	440	255	439	255
519.lbm_r	48	238	212	<b><u>237</u></b>	<b><u>213</u></b>	237	213	48	238	212	<b><u>237</u></b>	<b><u>213</u></b>	237	213
521.wrf_r	48	<b><u>390</u></b>	<b><u>276</u></b>	390	276	393	273	24	224	240	<b><u>221</u></b>	<b><u>243</u></b>	219	245
526.blender_r	48	300	244	300	244	<b><u>300</u></b>	<b><u>244</u></b>	48	300	244	300	244	<b><u>300</u></b>	<b><u>244</u></b>
527.cam4_r	48	<b><u>295</u></b>	<b><u>285</u></b>	295	285	298	281	24	184	228	186	226	<b><u>184</u></b>	<b><u>228</u></b>
538.imagick_r	48	<b><u>179</u></b>	<b><u>668</u></b>	179	667	179	668	48	<b><u>179</u></b>	<b><u>668</u></b>	179	667	179	668
544.nab_r	48	201	402	200	403	<b><u>200</u></b>	<b><u>403</u></b>	48	164	493	<b><u>164</u></b>	<b><u>494</u></b>	164	494
549.fotonik3d_r	48	<b><u>547</u></b>	<b><u>342</u></b>	546	343	547	342	48	<b><u>547</u></b>	<b><u>342</u></b>	546	343	547	342
554.roms_r	48	<b><u>486</u></b>	<b><u>157</u></b>	486	157	487	157	24	<b><u>235</u></b>	<b><u>162</u></b>	234	163	235	162

**SPECrate®2017\_fp\_base = 306**

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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## 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  
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.

(Continued on next page)



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## General Notes (Continued)

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.

jemalloc, a general purpose malloc implementation

built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

## 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: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197

running on Tyronespec Mon Sep 4 16:55:54 2023

SUT (System Under Test) info as seen by some common utilities.

-----  
Table of contents  
-----

1. uname -a
2. w
3. Username
4. ulimit -a
5. sysinfo process ancestry
6. /proc/cpuinfo
7. lscpu
8. numactl --hardware
9. /proc/meminfo
10. who -r
11. Systemd service manager version: systemd 239 (239-51.el8)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. tuned-adm active
16. systemctl
17. /sys/kernel/mm/transparent\_hugepage
18. /sys/kernel/mm/transparent\_hugepage/khugepaged
19. OS release
20. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities
21. Disk information
22. /sys/devices/virtual/dmi/id
23. dmidecode
24. BIOS

-----  
1. uname -a  
Linux Tyronespec 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  
-----

2. w  
16:55:54 up 6:22, 2 users, load average: 36.25, 45.33, 47.03  
-----

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## Platform Notes (Continued)

USER	TTY	FROM	LOGIN@	IDLE	JCPU	PCPU	WHAT
root	tty1	-	10:33	6:21m	0.91s	0.01s	-bash
root	tty2	-	10:34	6:20m	0.01s	0.01s	-bash

### 3. Username

From environment variable \$USER: root

### 4. ulimit -a

```

core file size          (blocks, -c) 0
data seg size          (kbytes, -d) unlimited
scheduling priority    (-e) 0
file size              (blocks, -f) unlimited
pending signals        (-i) 4126885
max locked memory      (kbytes, -l) 64
max memory size        (kbytes, -m) unlimited
open files             (-n) 1024
pipe size              (512 bytes, -p) 8
POSIX message queues   (bytes, -q) 819200
real-time priority     (-r) 0
stack size             (kbytes, -s) unlimited
cpu time               (seconds, -t) unlimited
max user processes     (-u) 4126885
virtual memory         (kbytes, -v) unlimited
file locks             (-x) unlimited

```

### 5. sysinfo process ancestry

```

/usr/lib/systemd/systemd --switched-root --system --deserialize 18
login -- root
-bash
-bash
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=48 -c
  ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=24 --define physicalfirst
  --define invoke_with_interleave --define drop_caches --tune base,peak -o all fprate
runcpu --nobuild --action validate --define default-platform-flags --define numcopies=48 --configfile
  ic2022.1-lin-core-avx512-rate-20220316.cfg --define smt-on --define cores=24 --define physicalfirst
  --define invoke_with_interleave --define drop_caches --tune base,peak --output_format all --nopower
  --runmode rate --tune base:peak --size refrate fprate --nopreenv --note-preenv --logfile
  $SPEC/tmp/CPU2017.002/templogs/preenv.fprate.002.0.log --lognum 002.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017

```

### 6. /proc/cpuinfo

```

model name      : Intel(R) Xeon(R) Silver 4410Y
vendor_id      : GenuineIntel
cpu family     : 6
model          : 143
stepping       : 8
microcode      : 0x2b000461
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs
cpu cores      : 12
siblings       : 24
2 physical ids (chips)
48 processors (hardware threads)
physical id 0: core ids 0-11
physical id 1: core ids 0-11
physical id 0: apicids 0-23

```

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## Platform Notes (Continued)

physical id 1: apicids 128-151

Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for virtualized systems. Use the above data carefully.

### 7. lscpu

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):                 48
On-line CPU(s) list:   0-47
Thread(s) per core:    2
Core(s) per socket:    12
Socket(s):              2
NUMA node(s):          2
Vendor ID:              GenuineIntel
BIOS Vendor ID:        Intel(R) Corporation
CPU family:             6
Model:                  143
Model name:             Intel(R) Xeon(R) Silver 4410Y
BIOS Model name:       Intel(R) Xeon(R) Silver 4410Y
Stepping:               8
CPU MHz:                2001.000
CPU max MHz:           2001.0000
CPU min MHz:           800.0000
BogoMIPS:               4000.00
Virtualization:        VT-x
L1d cache:              48K
L1i cache:              32K
L2 cache:               2048K
L3 cache:               30720K
NUMA node0 CPU(s):     0-11,24-35
NUMA node1 CPU(s):     12-23,36-47
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 aperfmperf
                        tsc_known_freq 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 cat_l2 cdp_l3
                        invpcid_single cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
                        flexpriority ept vpid ept_ad fsgsbase tsc_adjust sgx bml hle avx2 smep bmi2 erms
                        invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt
                        avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc
                        cqm_mbm_total cqm_mbm_local split_lock_detect avx_vnni avx512_bf16 wbnoinvd dtherm ida
                        arat pln pts avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni vaes vpclmulqdq
                        avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid bus_lock_detect cldemote
                        movdiri movdir64b enqcmd sgx_lc fsrm md_clear serialize tsxldtrk pconfig arch_lbr
                        avx512_fp16 flush_lld arch_capabilities

```

### 8. numactl --hardware

NOTE: a numactl 'node' might or might not correspond to a physical chip.

```

available: 2 nodes (0-1)
node 0 cpus: 0-11,24-35
node 0 size: 515692 MB
node 0 free: 501448 MB
node 1 cpus: 12-23,36-47
node 1 size: 516088 MB

```

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## Platform Notes (Continued)

node 1 free: 503821 MB

node distances:

```
node 0 1
0: 10 21
1: 21 10
```

9. /proc/meminfo

MemTotal: 1056542912 kB

10. who -r

run-level 3 Sep 4 10:33

11. Systemd service manager version: systemd 239 (239-51.e18)

```
Default Target Status
multi-user running
```

12. Services, from systemctl list-unit-files

STATE UNIT FILES

```
enabled ModemManager NetworkManager NetworkManager-dispatcher NetworkManager-wait-online accounts-daemon
atd auditd autovt@ avahi-daemon bluetooth chronyd crond cups display-manager firewallld gdm
getty@ import-state insights-client-boot irqbalance iscsi iscsi-onboot kdump ksm ksmtuned
libstoragemgmt libvirt loadmodules lvm2-monitor mcelog mdmonitor microcode multipathd
nis-domainname nvidia-hibernate nvidia-resume nvidia-suspend nvme-fc-boot-connections
ostree-remount qemu-guest-agent rhsmcertd rpcbind rsyslog rtkit-daemon selinux-autorelabel-mark
sep5 smartd sshd sssd syslog timedatex tuned udisks2 vdo vgauthd vmtoolsd
disabled arp-ethers blk-availability brltty canberra-system-bootup canberra-system-shutdown
canberra-system-shutdown-reboot chrony-wait console-getty cpupower cups-browsed debug-shell
dnsmasq ebtables gssproxy httpd httpd@ initial-setup initial-setup-reconfiguration iprdump
iprinit iprupdate iscsid iscsiui kpatch kvm_stat ledmon man-db-restart-cache-update
ndctl-monitor netcf-transaction nfs-blkmap nfs-convert nfs-server nftables numad nvidia-powerd
nvme-autoconnect oddjobd podman podman-auto-update podman-restart psacct radvd ras-mc-ctl
rasdaemon rdisc rhcd rhsm rhsm-facts saslauthd serial-getty@ snmpd snmptrapd speech-dispatcher
sshd-keygen@ switcheroo-control systemd-nspawn@ systemd-resolved tcsd tog-pegasus upower
virtinterfaced virtnetworkd virtnodevd virtnwfilterd virtproxyd virtqemud virtsecret
virtstoraged wpa_supplicant
generated SystemTap compile-server gcc-toolset-10-stap-server gcc-toolset-10-systemtap
gcc-toolset-11-stap-server gcc-toolset-11-systemtap gcc-toolset-9-stap-server
gcc-toolset-9-systemtap scripts startup
indirect spice-vdagentd sssd-autofs sssd-kcm sssd-nss sssd-pac sssd-pam sssd-ssh sssd-sudo virtlockd
virtlogd
masked systemd-timedated
```

13. Linux kernel boot-time arguments, from /proc/cmdline

```
BOOT_IMAGE=(hd1,gpt2)/vmlinuz-4.18.0-348.el8.x86_64
root=/dev/mapper/rhel-root
ro
resume=/dev/mapper/rhel-swap
rd.lvm.lv=rhel/root
rd.lvm.lv=rhel/swap
rhgb
quiet
```

14. cpupower frequency-info

analyzing CPU 0:

(Continued on next page)



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## Platform Notes (Continued)

current policy: frequency should be within 800 MHz and 2.00 GHz.  
The governor "performance" may decide which speed to use within this range.

boost state support:

Supported: yes

Active: yes

-----  
15. tuned-adm active

Current active profile: throughput-performance

-----  
16. sysctl

kernel.numa_balancing	1
kernel.randomize_va_space	2
vm.compaction_proactiveness	0
vm.dirty_background_bytes	0
vm.dirty_background_ratio	10
vm.dirty_bytes	0
vm.dirty_expire_centisecs	3000
vm.dirty_ratio	40
vm.dirty_writeback_centisecs	500
vm.dirtytime_expire_seconds	43200
vm.extfrag_threshold	500
vm.min_unmapped_ratio	1
vm.nr_hugepages	0
vm.nr_hugepages_mempolicy	0
vm.nr_overcommit_hugepages	0
vm.swappiness	10
vm.watermark_boost_factor	15000
vm.watermark_scale_factor	10
vm.zone_reclaim_mode	0

-----  
17. /sys/kernel/mm/transparent\_hugepage

defrag	always	defer	defer+madvise	[madvise]	never
enabled	[always]	madvise	never		
hpage_pmd_size	2097152				
shmem_enabled	always	within_size	advise	[never]	deny force

-----  
18. /sys/kernel/mm/transparent\_hugepage/khugepaged

alloc_sleep_millisecs	60000
defrag	1
max_ptes_none	511
max_ptes_swap	64
pages_to_scan	4096
scan_sleep_millisecs	10000

-----  
19. OS release

From /etc/*-release /etc/*-version	
os-release	Red Hat Enterprise Linux 8.5 (Ootpa)
redhat-release	Red Hat Enterprise Linux release 8.5 (Ootpa)
system-release	Red Hat Enterprise Linux release 8.5 (Ootpa)

-----  
20. Kernel self-reported vulnerability status, from /sys/devices/system/cpu/vulnerabilities

itlb_multihit	Not affected
l1tf	Not affected

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## Platform Notes (Continued)

```

mds                Not affected
meltdown           Not affected
spec_store_bypass  Mitigation: Speculative Store Bypass disabled via prctl and seccomp
spectre_v1         Mitigation: usercopy/swappgs barriers and __user pointer sanitization
spectre_v2         Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
srbds              Not affected
tsx_async_abort    Not affected

```

For more information, see the Linux documentation on hardware vulnerabilities, for example <https://www.kernel.org/doc/html/latest/admin-guide/hw-vuln/index.html>

### 21. Disk information

```

SPEC is set to: /home/cpu2017
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs   402G  374G   29G  94% /home

```

### 22. /sys/devices/virtual/dmi/id

```

Vendor:          Tyrone Systems
Product:         Tyrone Camarero SDI200C3R-28
Product Family: Family
Serial:          A497867X3106771

```

### 23. dmidecode

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 M321R8GA0BB0-CQKZH 64 GB 2 rank 4800, configured at 4000

```

### 24. BIOS

(This section combines info from /sys/devices and dmidecode.)

```

BIOS Vendor:      American Megatrends International, LLC.
BIOS Version:     1.3
BIOS Date:        06/01/2023
BIOS Revision:    5.31

```

## 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.
=====

```

```

=====
C++, C    | 511.povray_r(base, peak) 526.blender_r(base, peak)
=====

```

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# SPEC CPU®2017 Floating Point Rate Result

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**Tyrone Systems**

(Test Sponsor: Netweb Pte Ltd)

**Tyrone Camarero SDI200C3R-28**  
(2.00 GHz, Intel Xeon Silver 4410Y)

**SPECrate®2017\_fp\_base = 306**

**SPECrate®2017\_fp\_peak = 308**

**CPU2017 License:** 006042

**Test Sponsor:** Netweb Pte Ltd

**Tested by:** Tyrone Systems

**Test Date:** Sep-2023

**Hardware Availability:** Jan-2023

**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.
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)
-----
```

```
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.
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.
-----
```

## 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



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## 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
```

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
```

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## Base Optimization Flags (Continued)

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

Benchmarks using Fortran, C, and C++:

icpx icx ifx

## Peak Portability Flags

Same as Base Portability Flags

## 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
```

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## Peak Optimization Flags (Continued)

544.nab\_r (continued):

```
-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

```
554.roms_r: -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++:

```
511.povray_r: -w -m64 -std=c11 -Wl,-z,muldefs  
-fprofile-generate(pass 1)  
-fprofile-use=default.profddata(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
```

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## Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):  
-L/usr/local/jemalloc64-5.0.1/lib

The flags files that were used to format this result can be browsed at

[http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64\\_revA.html](http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.html)  
<http://www.spec.org/cpu2017/flags/Tyrone-Platform-Settings-V1.2-SPR-revC.html>

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

[http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64\\_revA.xml](http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.xml)  
<http://www.spec.org/cpu2017/flags/Tyrone-Platform-Settings-V1.2-SPR-revC.xml>

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