



# SPEC CPU®2017 Floating Point Rate Result

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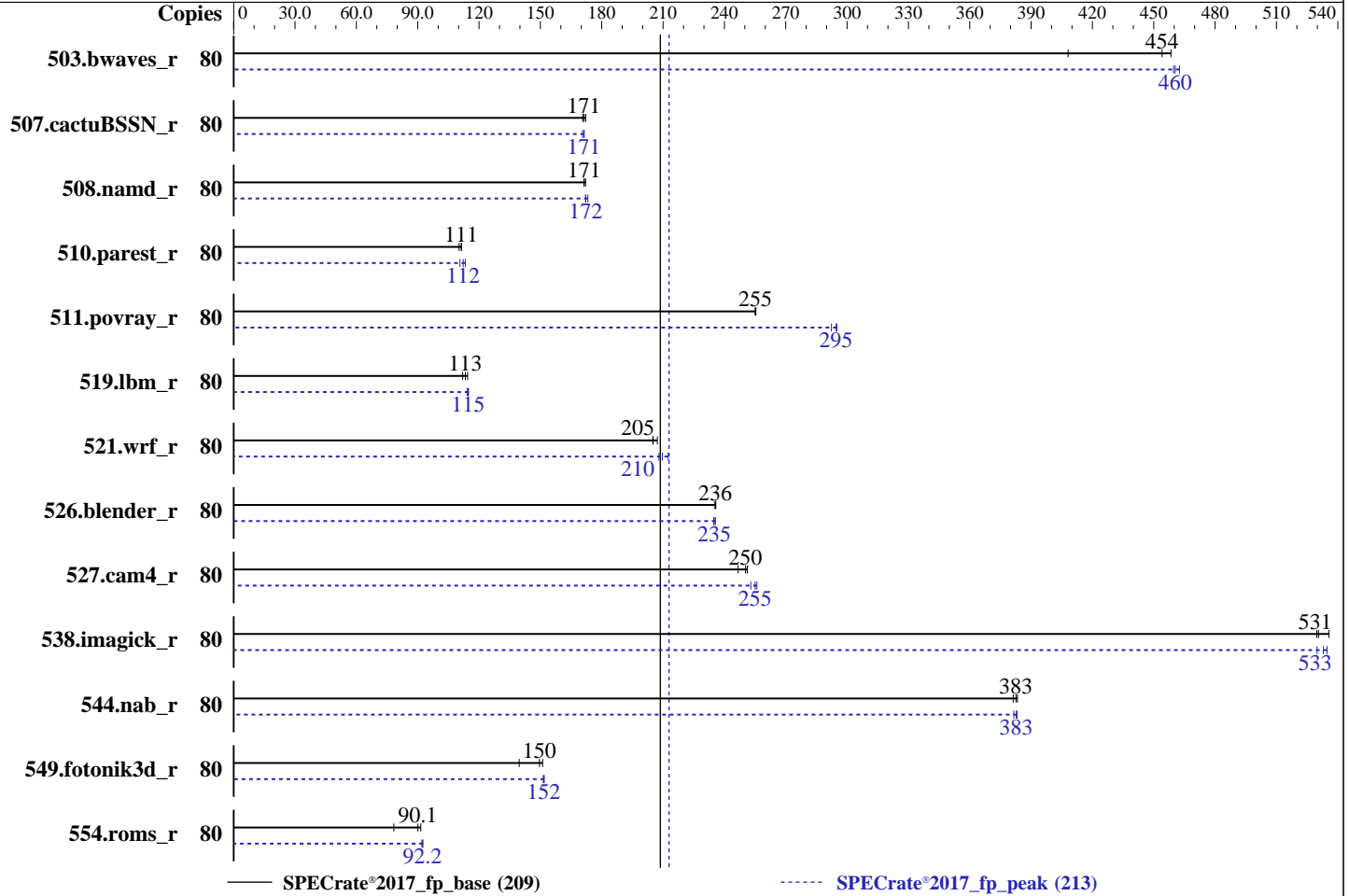
**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
DIT400TR-48RL  
(2.50 GHz, Intel Xeon Gold 6248)

**SPECrate®2017\_fp\_base = 209**

**SPECrate®2017\_fp\_peak = 213**

**CPU2017 License:** 006042  
**Test Sponsor:** Netweb Pte Ltd  
**Tested by:** Netweb

**Test Date:** Feb-2020  
**Hardware Availability:** Sep-2019  
**Software Availability:** Aug-2019



### Hardware

CPU Name: Intel Xeon Gold 6248  
Max MHz: 3900  
Nominal: 2500  
Enabled: 40 cores, 2 chips, 2 threads/core  
Orderable: 1, 2 (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 (12 x 32 GB 2Rx4 PC4-2933Y-R)  
Storage: 1 x 480 GB SSD  
Other: None

### Software

OS: CentOS Linux release 7.7.1908 (Core)  
3.10.0-1062.el7.x86\_64  
Compiler: C/C++: Version 19.0.4.243 of Intel C/C++  
Compiler Build 20190416 for Linux;  
Fortran: Version 19.0.4.243 of Intel Fortran  
Compiler Build 20190416 for Linux  
Parallel: No  
Firmware: Version V8.101 released Aug-2019  
File System: xfs  
System State: Run level 3 (multi-user)  
Base Pointers: 64-bit  
Peak Pointers: 64-bit  
Other: None  
Power Management: Default



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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	80	<b>1767</b>	<b>454</b>	1750	458	1966	408	80	1745	460	<b>1742</b>	<b>460</b>	1734	463
507.cactuBSSN_r	80	<b>591</b>	<b>171</b>	593	171	588	172	80	594	171	591	171	<b>591</b>	<b>171</b>
508.namd_r	80	<b>443</b>	<b>171</b>	442	172	444	171	80	442	172	<b>441</b>	<b>172</b>	439	173
510.parest_r	80	1898	110	<b>1880</b>	<b>111</b>	1878	111	80	1891	111	1847	113	<b>1864</b>	<b>112</b>
511.povray_r	80	732	255	731	255	<b>732</b>	<b>255</b>	80	633	295	639	292	<b>634</b>	<b>295</b>
519.lbm_r	80	<b>744</b>	<b>113</b>	753	112	737	114	80	738	114	<b>735</b>	<b>115</b>	734	115
521.wrf_r	80	874	205	865	207	<b>873</b>	<b>205</b>	80	<b>855</b>	<b>210</b>	843	213	862	208
526.blender_r	80	517	236	<b>517</b>	<b>236</b>	517	235	80	519	235	<b>518</b>	<b>235</b>	517	236
527.cam4_r	80	567	247	<b>559</b>	<b>250</b>	557	251	80	547	256	<b>549</b>	<b>255</b>	553	253
538.imagick_r	80	371	536	<b>375</b>	<b>531</b>	376	530	80	375	530	372	535	<b>373</b>	<b>533</b>
544.nab_r	80	<b>352</b>	<b>383</b>	351	383	353	381	80	<b>352</b>	<b>383</b>	353	382	351	383
549.fotonik3d_r	80	<b>2085</b>	<b>150</b>	2233	140	2063	151	80	2059	151	<b>2055</b>	<b>152</b>	2053	152
554.roms_r	80	<b>1411</b>	<b>90.1</b>	1623	78.3	1389	91.5	80	1373	92.6	1381	92.1	<b>1378</b>	<b>92.2</b>

SPECrate®2017\_fp\_base = 209

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

## Compiler Notes

SPEC has learned that this result, which used an evaluation compiler, was submitted contrary to the compiler license terms.  
Intel has granted a one-time waiver for this result.

## 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/ia32:/home/cpu2017/lib/intel64"



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## General Notes

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5

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>
```

NA: 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.

## Platform Notes

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011

running on NODE8 Wed Feb 5 04:04:43 2020

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 6248 CPU @ 2.50GHz

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

Thread(s) per core: 2

Core(s) per socket: 20

Socket(s): 2

(Continued on next page)



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## Platform Notes (Continued)

```

NUMA node(s):          2
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Gold 6248 CPU @ 2.50GHz
Stepping:              7
CPU MHz:               999.908
CPU max MHz:           3900.0000
CPU min MHz:           1000.0000
BogoMIPS:              5000.00
Virtualization:       VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              28160K
NUMA node0 CPU(s):    0-19,40-59
NUMA node1 CPU(s):    20-39,60-79

```

```

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 pdpe1gb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfperf eagerfpu 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 epb cat_l3 cdp_l3 intel_ppin
intel_pt ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept
vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt
xsavvec xgetbv1 cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln
pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke avx512_vnni md_clear spec_ctrl
intel_stibp flush_lld arch_capabilities

```

```

/proc/cpuinfo cache data
cache size : 28160 KB

```

```

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
available: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 40 41 42 43 44 45 46 47
48 49 50 51 52 53 54 55 56 57 58 59
node 0 size: 195228 MB
node 0 free: 171340 MB
node 1 cpus: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 60 61 62 63 64
65 66 67 68 69 70 71 72 73 74 75 76 77 78 79
node 1 size: 196608 MB
node 1 free: 174858 MB
node distances:
node  0  1
0:   10  21

```

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## Platform Notes (Continued)

1: 21 10

From /proc/meminfo

MemTotal: 394857620 kB  
HugePages\_Total: 0  
Hugepagesize: 2048 kB

From /etc/\*release\* /etc/\*version\*

centos-release: CentOS Linux release 7.7.1908 (Core)  
centos-release-upstream: Derived from Red Hat Enterprise Linux 7.7 (Source)  
os-release:  
NAME="CentOS Linux"  
VERSION="7 (Core)"  
ID="centos"  
ID\_LIKE="rhel fedora"  
VERSION\_ID="7"  
PRETTY\_NAME="CentOS Linux 7 (Core)"  
ANSI\_COLOR="0;31"  
CPE\_NAME="cpe:/o:centos:centos:7"  
redhat-release: CentOS Linux release 7.7.1908 (Core)  
system-release: CentOS Linux release 7.7.1908 (Core)  
system-release-cpe: cpe:/o:centos:centos:7

uname -a:

Linux NODE8 3.10.0-1062.el7.x86\_64 #1 SMP Wed Aug 7 18:08:02 UTC 2019 x86\_64 x86\_64  
x86\_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-3620 (L1 Terminal Fault): Not affected  
Microarchitectural Data Sampling: Not affected  
CVE-2017-5754 (Meltdown): Not affected  
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled  
via prctl and seccomp  
CVE-2017-5753 (Spectre variant 1): Mitigation: Load fences, \_\_user pointer  
sanitization  
CVE-2017-5715 (Spectre variant 2): Mitigation: Full retpoline, IBPB

run-level 3 Feb 4 18:18

SPEC is set to: /home/cpu2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/mapper/centos-home	xfs	392G	120G	273G	31%	/home

From /sys/devices/virtual/dmi/id

BIOS: American Megatrends Inc. V8.101 08/02/2019  
Vendor: Tyrone Systems

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## Platform Notes (Continued)

Product: DIT400TR-48RL  
Serial: empty

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.

(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) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.243 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.  
icc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.

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

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.243 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.  
icpc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.

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

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.243 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.  
icpc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.  
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
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Copyright (C) 1985-2019 Intel Corporation. All rights reserved.  
icc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.

```
=====
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
=====
```

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## Compiler Version Notes (Continued)

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icc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.0.4.243 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.  
ifort: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.

-----

=====

Fortran		503.bwaves_r(base, peak)	549.fotonik3d_r(base, peak)
		554.roms_r(base, peak)	

-----

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.0.4.243 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.  
ifort: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.

-----

=====

Fortran, C		521.wrf_r(base, peak)	527.cam4_r(base, peak)
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-----

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
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-----

## Base Compiler Invocation

C benchmarks:  
icc -m64 -std=c11

C++ benchmarks:  
icpc -m64

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## Base Compiler Invocation (Continued)

Fortran benchmarks:

```
ifort -m64
```

Benchmarks using both Fortran and C:

```
ifort -m64 icc -m64 -std=c11
```

Benchmarks using both C and C++:

```
icpc -m64 icc -m64 -std=c11
```

Benchmarks using Fortran, C, and C++:

```
icpc -m64 icc -m64 -std=c11 ifort -m64
```

## 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:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
```

```
-ffinite-math-only -qopt-mem-layout-trans=4
```

C++ benchmarks:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
```

```
-ffinite-math-only -qopt-mem-layout-trans=4
```

Fortran benchmarks:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
```

```
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
```

```
-nonstandard-realloc-lhs -align array32byte
```

(Continued on next page)





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## Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -auto  
-nostandard-realloc-lhs -align array32byte
```

Benchmarks using both C and C++:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4
```

Benchmarks using Fortran, C, and C++:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -auto  
-nostandard-realloc-lhs -align array32byte
```

## Peak Compiler Invocation

C benchmarks:

```
icc -m64 -std=c11
```

C++ benchmarks:

```
icpc -m64
```

Fortran benchmarks:

```
ifort -m64
```

Benchmarks using both Fortran and C:

```
ifort -m64 icc -m64 -std=c11
```

Benchmarks using both C and C++:

```
icpc -m64 icc -m64 -std=c11
```

Benchmarks using Fortran, C, and C++:

```
icpc -m64 icc -m64 -std=c11 ifort -m64
```

## Peak Portability Flags

Same as Base Portability Flags



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## Peak Optimization Flags

### C benchmarks:

519.lbm\_r: -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

538.imagick\_r: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4

544.nab\_r: Same as 538.imagick\_r

### C++ benchmarks:

508.namd\_r: -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

510.parest\_r: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4

### Fortran benchmarks:

503.bwaves\_r: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -auto  
-nostandard-realloc-lhs -align array32byte

549.fotonik3d\_r: Same as 503.bwaves\_r

554.roms\_r: -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 -auto -nostandard-realloc-lhs  
-align array32byte

### Benchmarks using both Fortran and C:

-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 -auto -nostandard-realloc-lhs  
-align array32byte

### Benchmarks using both C and C++:

511.povray\_r: -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

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# SPEC CPU®2017 Floating Point Rate Result

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**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
DIT400TR-48RL  
(2.50 GHz, Intel Xeon Gold 6248)

SPECrate®2017\_fp\_base = 209

SPECrate®2017\_fp\_peak = 213

**CPU2017 License:** 006042

**Test Sponsor:** Netweb Pte Ltd

**Tested by:** Netweb

**Test Date:** Feb-2020

**Hardware Availability:** Sep-2019

**Software Availability:** Aug-2019

## Peak Optimization Flags (Continued)

```
526.blender_r: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4
```

Benchmarks using Fortran, C, and C++:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-nostandard-realloc-lhs -align array32byte
```

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

<http://www.spec.org/cpu2017/flags/TyroneIT-Platform-Settings-V1-CLX-revA.html>

<http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-15.html>

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

<http://www.spec.org/cpu2017/flags/TyroneIT-Platform-Settings-V1-CLX-revA.xml>

<http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-15.xml>

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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