



# SPEC® CPU2017 Floating Point Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Inspur Corporation

**SPECrate2017\_fp\_base = 165**

Inspur NF5280M5 (Intel Xeon Gold 6136)

**SPECrate2017\_fp\_peak = 169**

CPU2017 License: 3358

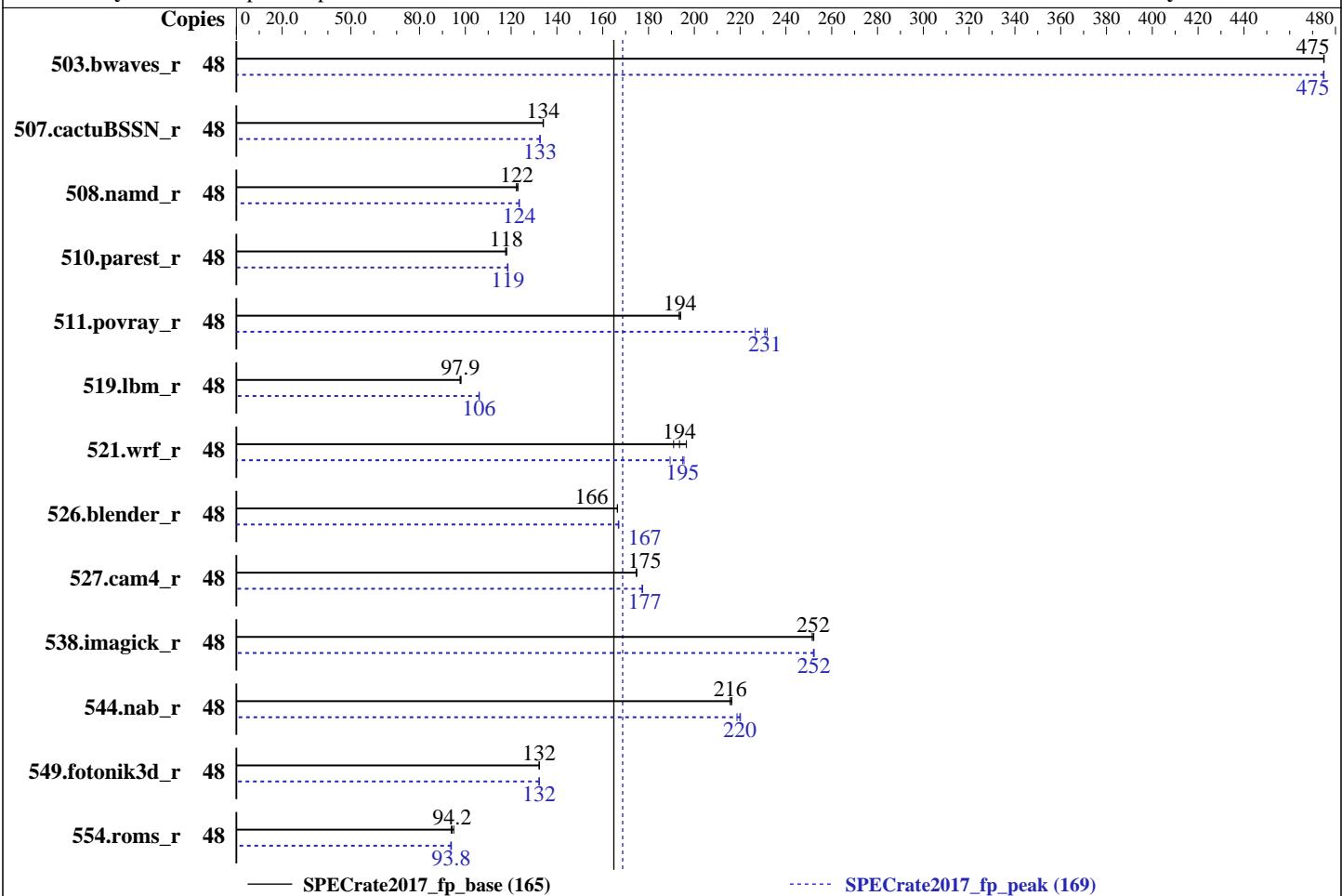
**Test Date:** Jul-2019

**Test Sponsor:** Inspur Corporation

**Hardware Availability:** Oct-2017

**Tested by:** Inspur Corporation

**Software Availability:** Mar-2018



— SPECrate2017\_fp\_base (165)

----- SPECrate2017\_fp\_peak (169)

## Hardware

CPU Name: Intel Xeon Gold 6136  
 Max MHz.: 3700  
 Nominal: 3000  
 Enabled: 24 cores, 2 chips, 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: 24.75 MB I+D on chip per chip  
 Other: None  
 Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2666V-R)  
 Storage: 1 x 480 GB SATA SSD  
 Other: None

## Software

OS: SUSE Linux Enterprise Server 12 SP2 4.4.120-92.70-default  
 Compiler: C/C++: Version 18.0.0.128 of Intel C/C++ Compiler for Linux;  
 Fortran: Version 18.0.0.128 of Intel Fortran Compiler for Linux  
 Parallel: No  
 Firmware: Version 4.0.8 released Oct-2018  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 64-bit  
 Other: None



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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	1013	475	1014	475	<b>1014</b>	<b>475</b>	48	1013	475	<b>1014</b>	<b>475</b>	1014	475
507.cactuBSSN_r	48	454	134	<b>454</b>	<b>134</b>	453	134	48	<b>458</b>	<b>133</b>	458	133	<b>459</b>	133
508.namd_r	48	<b>372</b>	<b>122</b>	373	122	371	123	48	<b>369</b>	<b>124</b>	369	124	<b>369</b>	123
510.parest_r	48	1068	118	<b>1065</b>	<b>118</b>	1064	118	48	1061	118	<b>1059</b>	<b>119</b>	1059	119
511.povray_r	48	<b>578</b>	<b>194</b>	580	193	578	194	48	483	232	<b>485</b>	<b>231</b>	495	227
519.lbm_r	48	<b>517</b>	<b>97.9</b>	518	97.7	516	98.1	48	<b>477</b>	<b>106</b>	477	106	<b>477</b>	106
521.wrf_r	48	<b>556</b>	<b>194</b>	547	197	563	191	48	<b>552</b>	<b>195</b>	568	189	<b>550</b>	195
526.blender_r	48	<b>439</b>	<b>166</b>	439	166	439	166	48	438	167	<b>438</b>	<b>167</b>	438	167
527.cam4_r	48	480	175	481	175	<b>481</b>	<b>175</b>	48	<b>474</b>	<b>177</b>	474	177	<b>473</b>	177
538.imagick_r	48	475	251	473	252	<b>474</b>	<b>252</b>	48	473	252	<b>473</b>	<b>252</b>	474	252
544.nab_r	48	374	216	<b>374</b>	<b>216</b>	373	216	48	369	219	367	220	<b>367</b>	<b>220</b>
549.fotonik3d_r	48	1415	132	1413	132	<b>1414</b>	<b>132</b>	48	1414	132	1415	132	<b>1414</b>	<b>132</b>
554.roms_r	48	<b>810</b>	<b>94.2</b>	813	93.9	803	94.9	48	<b>813</b>	<b>93.8</b>	815	93.6	812	93.9

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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"

## General Notes

Environment variables set by runcpu before the start of the run:

LD\_LIBRARY\_PATH = "/home/CPU2017/lib/ia32:/home/CPU2017/lib/intel64:/home/CPU2017/je5.0.1-32:/home/CPU2017/je5.0.1-64"

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM memory using Redhat Enterprise Linux 7.4

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-2017-5754 (Meltdown)

(Continued on next page)



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## General Notes (Continued)

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

BIOS and OS configuration:

SCALING\_GOVERNOR set to Performance

Hardware Prefetch set to Disable

VT Support set to Disable

C1E Support set to Disable

IMC (Integrated memory controller) Interleaving set to 1-way

Sub NUMA Cluster (SNC) set to Enable

Sysinfo program /home/CPU2017/bin/sysinfo

Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9

running on linux-q537 Fri Jul 19 15:45:25 2019

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 6136 CPU @ 3.00GHz

2 "physical id"s (chips)

48 "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 : 12

siblings : 24

physical 0: cores 0 1 2 3 8 9 10 11 18 19 24 27

physical 1: cores 0 3 4 5 6 7 16 18 19 20 21 22

From lscpu:

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): 4

Vendor ID: GenuineIntel

(Continued on next page)



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Software Availability: Mar-2018

## Platform Notes (Continued)

CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Gold 6136 CPU @ 3.00GHz  
Stepping: 4  
CPU MHz: 3599.967  
CPU max MHz: 3700.0000  
CPU min MHz: 1200.0000  
BogoMIPS: 5985.90  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 25344K  
NUMA node0 CPU(s): 0-2,4,5,10,24-26,28,29,34  
NUMA node1 CPU(s): 3,6-9,11,27,30-33,35  
NUMA node2 CPU(s): 12-14,18-20,36-38,42-44  
NUMA node3 CPU(s): 15-17,21-23,39-41,45-47  
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 aperfmpfperf eagerfpu pni pclmulqdq dtes64 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 ida arat epb invpcid\_single pln pts dtherm hwp hwp\_act\_window hwp\_epp hwp\_pkg\_req intel\_pt rsb\_ctxsw spec\_ctrl stibp retpoline kaiser tpr\_shadow vnmi flexpriority ept vpid fsgsbase tsc\_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqmq mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cqmq\_llc cqmq\_occup\_llc

/proc/cpuinfo cache data  
cache size : 25344 KB

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 4 5 10 24 25 26 28 29 34
node 0 size: 192024 MB
node 0 free: 184063 MB
node 1 cpus: 3 6 7 8 9 11 27 30 31 32 33 35
node 1 size: 193528 MB
node 1 free: 187249 MB
node 2 cpus: 12 13 14 18 19 20 36 37 38 42 43 44
node 2 size: 193528 MB
node 2 free: 187287 MB
node 3 cpus: 15 16 17 21 22 23 39 40 41 45 46 47
node 3 size: 193391 MB
node 3 free: 187153 MB
node distances:
```

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## Platform Notes (Continued)

```
node   0   1   2   3
 0: 10  11  21  21
 1: 11  10  21  21
 2: 21  21  10  11
 3: 21  21  11  10
```

```
From /proc/meminfo
  MemTotal:      791012488 kB
  HugePages_Total:       0
  Hugepagesize:     2048 kB
```

```
/usr/bin/lsb_release -d
  SUSE Linux Enterprise Server 12 SP2
```

```
From /etc/*release* /etc/*version*
  SuSE-release:
    SUSE Linux Enterprise Server 12 (x86_64)
    VERSION = 12
    PATCHLEVEL = 2
    # This file is deprecated and will be removed in a future service pack or release.
    # Please check /etc/os-release for details about this release.
  os-release:
    NAME="SLES"
    VERSION="12-SP2"
    VERSION_ID="12.2"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12:sp2"
```

```
uname -a:
  Linux linux-q537 4.4.120-92.70-default #1 SMP Wed Mar 14 15:59:43 UTC 2018 (52a83de)
  x86_64 x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

```
CVE-2017-5754 (Meltdown):           Mitigation: PTI
CVE-2017-5753 (Spectre variant 1):  Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):  Mitigation: IBRS+IBPB
```

```
run-level 3 Jul 18 12:29 last=5
```

```
SPEC is set to: /home/CPU2017
  Filesystem  Type  Size  Used Avail Use% Mounted on
  /dev/sdb3    xfs   407G   50G  357G  13%  /home
```

Additional information from dmidecode follows. WARNING: Use caution when you interpret

(Continued on next page)



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## Platform Notes (Continued)

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.

BIOS Inspur 4.0.8 10/17/2018

Memory:

24x Samsung M393A4K40CB2-CTD 32 GB 2 rank 2666

(End of data from sysinfo program)

## Compiler Version Notes

=====

CC 519.lbm\_r(base) 538.imagick\_r(base, peak) 544.nab\_r(base)

=====

-----

icc (ICC) 18.0.0 20170811

Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

-----

=====

CC 519.lbm\_r(peak) 544.nab\_r(peak)

=====

-----

icc (ICC) 18.0.0 20170811

Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

-----

=====

CXXC 508.namd\_r(base) 510.parest\_r(base)

=====

-----

icpc (ICC) 18.0.0 20170811

Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

-----

=====

CXXC 508.namd\_r(peak) 510.parest\_r(peak)

=====

-----

icpc (ICC) 18.0.0 20170811

Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

-----

=====

CC 511.povray\_r(base) 526.blender\_r(base)

=====

-----

icpc (ICC) 18.0.0 20170811

Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

icc (ICC) 18.0.0 20170811

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(Continued on next page)



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Hardware Availability: Oct-2017

Tested by: Inspur Corporation

Software Availability: Mar-2018

## Compiler Version Notes (Continued)

=====

CC 511.povray\_r(peak) 526.blender\_r(peak)

icpc (ICC) 18.0.0 20170811

Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

icc (ICC) 18.0.0 20170811

Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

=====

FC 507.cactubSSN\_r(base)

icpc (ICC) 18.0.0 20170811

Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

icc (ICC) 18.0.0 20170811

Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

ifort (IFORT) 18.0.0 20170811

Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

=====

FC 507.cactubSSN\_r(peak)

icpc (ICC) 18.0.0 20170811

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icc (ICC) 18.0.0 20170811

Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

ifort (IFORT) 18.0.0 20170811

Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

=====

FC 503.bwaves\_r(base, peak) 549.fotonik3d\_r(base, peak) 554.roms\_r(base)

ifort (IFORT) 18.0.0 20170811

Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

=====

FC 554.roms\_r(peak)

ifort (IFORT) 18.0.0 20170811

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## Compiler Version Notes (Continued)

=====

CC 521.wrf\_r(base) 527.cam4\_r(base)

=====

ifort (IFORT) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
icc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

=====

CC 521.wrf\_r(peak) 527.cam4\_r(peak)

=====

ifort (IFORT) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
icc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

=====

## Base Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

Fortran benchmarks:

fort

Benchmarks using both Fortran and C:

fort icc

Benchmarks using both C and C++:

icpc icc

Benchmarks using Fortran, C, and C++:

icpc icc fort

## Base Portability Flags

503.bwaves\_r: -DSPEC\_LP64  
507.cactusBSSN\_r: -DSPEC\_LP64  
508.namd\_r: -DSPEC\_LP64

(Continued on next page)



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## Base Portability Flags (Continued)

```
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-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3
```

C++ benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3
```

Fortran benchmarks:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
```

Benchmarks using both Fortran and C:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
```

Benchmarks using both C and C++:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3
```

Benchmarks using Fortran, C, and C++:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
```

## Base Other Flags

C benchmarks:

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

(Continued on next page)



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## Base Other Flags (Continued)

C++ benchmarks:

-m64

Fortran benchmarks:

-m64

Benchmarks using both Fortran and C:

-m64 -std=c11

Benchmarks using both C and C++:

-m64 -std=c11

Benchmarks using Fortran, C, and C++:

-m64 -std=c11

## Peak Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

Fortran benchmarks:

ifort

Benchmarks using both Fortran and C:

ifort icc

Benchmarks using both C and C++:

icpcicc

Benchmarks using Fortran, C, and C++:

icpciccifort

## 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-AVX2 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3
```

```
538.imagick_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3
```

544.nab\_r: Same as 519.lbm\_r

C++ benchmarks:

```
-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3
```

Fortran benchmarks:

```
503.bwaves_r: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=3  
-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-AVX2 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs  
-align array32byte
```

Benchmarks using both Fortran and C:

```
-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
```

Benchmarks using both C and C++:

```
-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3
```

Benchmarks using Fortran, C, and C++:

```
-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
```



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## Peak Other Flags

C benchmarks:

-m64 -std=c11

C++ benchmarks:

-m64

Fortran benchmarks:

-m64

Benchmarks using both Fortran and C:

-m64 -std=c11

Benchmarks using both C and C++:

-m64 -std=c11

Benchmarks using Fortran, C, and C++:

-m64 -std=c11

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

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.html>

<http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V1.3-SKL.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.xml>

<http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V1.3-SKL.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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