## SPEC® CPU2017 Floating Point Rate Result

**Epsylon Sp. z o.o. Sp. Komandytowa**

**eterio 220 RA1 (Intel Xeon Silver 4116, 2.10 GHz)**

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Feb-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2017 License:</td>
<td>9081</td>
</tr>
<tr>
<td>Test Sponsor:</td>
<td>Epsylon Sp. z o.o. Sp. Komandytowa</td>
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<td>Tested by:</td>
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<tr>
<td>Hardware Availability:</td>
<td>Sep-2017</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Mar-2018</td>
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</table>

### Copies

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate2017_fp_base</th>
<th>SPECrate2017_fp_peak</th>
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<tr>
<td>503.bwaves_r</td>
<td>48</td>
<td>93.9</td>
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<tr>
<td>507.cactuBSSN_r</td>
<td>48</td>
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<tr>
<td>508.namd_r</td>
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<td>521.wrf_r</td>
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<td>554.roms_r</td>
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</tbody>
</table>

### SPECrate2017_fp_base = 114
### SPECrate2017_fp_peak = 115

#### Hardware

- **CPU Name:** Intel Xeon Silver 4116
- **Max MHz.:** 3000
- **Nominal:** 2100
- **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:** 16.5 MB I+D on chip per chip
- **Other:** None
- **Memory:** 384 GB (24 x 16 GB 1Rx4 PC4-2666V-R, running at 2400)
- **Storage:** 1 x 960 GB SSD SATA III
- **Other:** None

#### Software

- **OS:** Red Hat Enterprise Linux Server release 7.4 (Maipo) 3.10.0-693.21.1.el7.x86_64
- **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 BIOS R0016 released Feb-2019
- **File System:** ext4
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None
### SPEC CPU2017 Floating Point Rate Result

**Epsylon Sp. z o.o. Sp. Komandytowa**

**Eterio 220 RA1 (Intel Xeon Silver 4116, 2.10 GHz)**

**CPU2017 License:** 9081  
**Test Sponsor:** Epsylon Sp. z o.o. Sp. Komandytowa  
**Tested by:** Epsylon Sp. z o.o. Sp. Komandytowa  
**Test Date:** Feb-2019  
**Hardware Availability:** Sep-2017  
**Software Availability:** Mar-2018

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### Results Table

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</tbody>
</table>

**SPECrate2017_fp_base =** 114  
**SPECrate2017_fp_peak =** 115

---

### 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 = "/cpu2017.1.0/lib/intel64:/cpu2017.1.0/je5.0.1-32:/cpu2017.1.0/je5.0.1-64"

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

Yes: 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.

(Continued on next page)
Epsylon Sp. z o.o. Sp. Komandytowa 220 RA1 (Intel Xeon Silver 4116, 2.10 GHz)

SPECrate2017_fp_base = 114
SPECrate2017_fp_peak = 115

CPU2017 License: 9081
Test Sponsor: Epsylon Sp. z o.o. Sp. Komandytowa
Tested by: Epsylon Sp. z o.o. Sp. Komandytowa

General Notes (Continued)

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>

Platform Notes

BIOS Settings:
Intel(R) Hyper-Threading Tech = Enabled
CPU Power and Performance Policy = Performance
Intel(R) Turbo Boost Technology = Enabled
C1E = Disabled
Processor C6 = Disabled
IMC Interleaving = Auto
Sub_NUMA Cluster = Disabled
Set FAN Profile = Performance
Patrol Scrub = Disabled
Memory Operating Speed Selection = 2400

Sysinfo program /cpu2017.1.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on SUT Sat Feb 16 05:00:51 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) Silver 4116 CPU @ 2.10GHz
  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 4 5 8 9 10 11 12 13
  physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 48

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

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SPECrate2017_fp_peak = 115

CPU2017 License: 9081
Test Sponsor: Epsylon Sp. z o.o. Sp. Komandytowa
Tested by: Epsylon Sp. z o.o. Sp. Komandytowa

Hardware Availability: Sep-2017
Software Availability: Mar-2018

Platform Notes (Continued)

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
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4116 CPU @ 2.10GHz
Stepping: 4
CPU MHz: 1948.406
CPU max MHz: 3000.0000
CPU min MHz: 800.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1l cache: 32K
L2 cache: 1024K
L3 cache: 16896K
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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpref perf_event pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 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 cpb cat_l3 cdp_l3 invpcid_single
intel_pt spec_ctrl ibpb_support tpr_shadow vmmi flexpriority ept vpid fsgsbase
tsc_adjust bmi1 hle avx2 smep bmi2 erva invpcid rtm cqm mpx rdts_a avx512f avx512dq
rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsave xgetbv1
cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts hwp
hwp_act_window hwp_epp hwp_pkg_req

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 24 25 26 27 28 29 30 31 32 33 34 35
node 0 size: 195270 MB
node 0 free: 190375 MB
node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23 36 37 38 39 40 41 42 43 44 45 46 47
node 1 size: 196608 MB
node 1 free: 191821 MB
node distances:
node 0 1

(Continued on next page)
### Platform Notes (Continued)

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<th>0:</th>
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<tbody>
<tr>
<td>1:</td>
<td>21</td>
<td>10</td>
</tr>
</tbody>
</table>

From `/proc/meminfo`
- MemTotal: 394680272 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From `/etc/*release*/` /`/etc/*version*/`
- os-release:
  - NAME = "Red Hat Enterprise Linux Server"
  - VERSION = "7.4 (Maipo)"
  - ID = "rhel"
  - ID_LIKE = "fedora"
  - VARIANT = "Server"
  - VARIANT_ID = "server"
  - VERSION_ID = "7.4"
  - PRETTY_NAME = "Red Hat Enterprise Linux"

redhat-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)

run-level 3 Feb 15 17:33

SPEC is set to: /cpu2017.1.0

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<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
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<tbody>
<tr>
<td>/dev/sda1</td>
<td>ext4</td>
<td>825G</td>
<td>90G</td>
<td>694G</td>
<td>12%</td>
<td>/</td>
</tr>
</tbody>
</table>

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.

BIOS Intel Corporation SE5C620.86B.00.01.0016.020120190930 02/01/2019

Memory:
- 24x Samsung M393A2K40CB2-CTD 16 GB 1 rank 2666, configured at 2400

(End of data from sysinfo program)

### Compiler Version Notes

```
CC  519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base)
```

(Continued on next page)
## Epsylon Sp. z o.o. Sp. Komandytowa

<table>
<thead>
<tr>
<th>CPU2017 License: 9081</th>
<th>Test Date: Feb-2019</th>
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<tr>
<td>Tested by: Epsylon Sp. z o.o. Sp. Komandytowa</td>
<td>Software Availability: Mar-2018</td>
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### SPEC CPU2017 Floating Point Rate Result

| SPECrate2017_fp_base = 114 | SPECrate2017_fp_peak = 115 |

#### Compiler Version Notes (Continued)

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

---

```plaintext
CC 519.lbm_r(peak) 544.nab_r(peak)
```

---

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

---

```plaintext
CXXC 508.namd_r(base) 510.parest_r(base)
```

---

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

---

```plaintext
CXXC 508.namd_r(peak) 510.parest_r(peak)
```

---

```plaintext
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

---

```plaintext
CC 511.povray_r(base) 526.blender_r(base)
```

---

```plaintext
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

---

```plaintext
CC 511.povray_r(peak) 526.blender_r(peak)
```

---

```plaintext
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

---

```plaintext
FC 507.cactuBSSN_r(base)
```

---

(Continued on next page)
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eterio 220 RA1 (Intel Xeon Silver 4116, 2.10 GHz)

SPECrater2017_fp_base = 114
SPECrater2017_fp_peak = 115

Compiler Version Notes (Continued)

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(base, peak)
==============================================================================
icpc (ICC) 18.0.0 20170811
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ifort (IFORT) 18.0.0 20170811
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==============================================================================
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.

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FC 554.roms_r(base, peak)
==============================================================================
ifort (IFORT) 18.0.0 20170811
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iccc (ICC) 18.0.0 20170811
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==============================================================================
CC 521.wrf_r(base, peak) 527.cam4_r(base, peak)
==============================================================================
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

(Continued on next page)
### Base 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++:
- `icpc icc`

Benchmarks using Fortran, C, and C++:
- `icpc icc ifort`

### 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`
## SPEC CPU2017 Floating Point Rate Result

Epsylon Sp. z o.o. Sp. Komandytowa

Eterio 220 RA1 (Intel Xeon Silver 4116, 2.10 GHz)

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**CPU2017 License:** 9081  
**Test Sponsor:** Epsylon Sp. z o.o. Sp. Komandytowa  
**Tested by:** Epsylon Sp. z o.o. Sp. Komandytowa  
**Test Date:** Feb-2019  
**Hardware Availability:** Sep-2017  
**Software Availability:** Mar-2018

### Base Optimization Flags

**C benchmarks:**
- `-xCORE-AVX512`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=3`

**C++ benchmarks:**
- `-xCORE-AVX512`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
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**Fortran benchmarks:**
- `-xCORE-AVX512`  
- `-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-AVX512`  
- `-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-AVX512`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=3`

**Benchmarks using Fortran, C, and C++:**
- `-xCORE-AVX512`  
- `-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`

**C++ benchmarks:**
- `-m64`

**Fortran benchmarks:**
- `-m64`

**Benchmarks using both Fortran and C:**
- `-m64`  
- `-std=c11`

**Benchmarks using both C and C++:**
- `-m64`  
- `-std=c11`

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SPEC CPU2017 Floating Point Rate Result

Epsilon Sp. z o.o. Sp. Komandytowa
eterio 220 RA1 (Intel Xeon Silver 4116, 2.10 GHz)

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Tested by: Epsilon Sp. z o.o. Sp. Komandytowa
Software Availability: Mar-2018

Base Other Flags (Continued)

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++:
icpc icc
Benchmarks using Fortran, C, and C++:
icpc icc ifort

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
519.lbm_r: -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512
-03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

538.imagick_r: -xCORE-AVX512 -ipo -03 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3

544.nab_r: Same as 519.lbm_r

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## SPEC CPU2017 Floating Point Rate Result

**Epsylon Sp. z o.o. Sp. Komandytowa**

**eterio 220 RA1** (Intel Xeon Silver 4116, 2.10 GHz)

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### Peak Optimization Flags (Continued)

**C++ benchmarks:**
- `-prof-gen(pass 1)`  
- `-prof-use(pass 2)`  
- `-ipo -xCORE-AVX512 -O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=3`

**Fortran benchmarks:**
- `503.bwaves_r -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=3`  
- `-nostandard-realloc-lhs`  
- `-align array32byte`

- `503.bwaves_r -xCORE-AVX512 -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:**
- `-prof-gen(pass 1)`  
- `-prof-use(pass 2)`  
- `-ipo -xCORE-AVX512 -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-AVX512 -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-AVX512 -O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
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- `-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`

(Continued on next page)
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Peak Other Flags (Continued)

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

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

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