**SPEC® CPU2017 Floating Point Rate Result**

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

**Epsilon 210 RE1 (Intel Xeon Silver 4109T, 2.00 GHz)**

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
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<tbody>
<tr>
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**CPU2017 License:** 9081

**Test Sponsor:** Epsylon Sp. z o.o. Sp. Komandytowa

**Test Date:** Apr-2018

**Hardware Availability:** Sep-2017

**Tested by:** Epsylon Sp. z o.o. Sp. Komandytowa

**Software Availability:** Mar-2018

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</tr>
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**Copies**

|          | 15.0 | 30.0 | 45.0 | 60.0 | 75.0 | 90.0 | 105  | 115  | 125  | 135  | 145  | 155  | 165  | 175  | 185  | 195  | 205  | 215  | 225  | 235  | 245  | 255  | 265  |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 503.bwaves_r | 63.2 | 62.7 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 507.cactuBSSN_r | 54.5 | 54.3 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 508.namd_r | 55.0 | 55.2 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 510.parest_r | 82.3 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 511.povray_r | 57.5 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 519.lbm_r | 67.1 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 521.wrf_r | 65.6 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 526.blender_r | 64.4 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 527.cam4_r | 105  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 538.imagick_r | 91.9 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 544.nab_r | 72.4 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 549.fotonik3d_r | 45.6 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 554.roms_r | 72.4 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |

**Hardware**

- **CPU Name:** Intel Xeon Silver 4109T
- **Max MHz.:** 3000
- **Nominal:** 2000
- **Enabled:** 16 cores, 2 chips, 2 threads/core
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **Cache L2:** 1 MB I+D on chip per core
- **Cache L3:** 11 MB I+D on chip per chip
- **Other:** None
- **Memory:** 128 GB (8 x 16 GB 2Rx4 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)
- **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 2.0b released Mar-2018
- **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**

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

**Results Table**

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<td>45.6</td>
<td>1117</td>
<td>45.5</td>
</tr>
</tbody>
</table>

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 = "/cpu2017.1.0/lib/ia32:/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)
## General Notes (Continued)

Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:

```bash
sync; echo 3>/proc/sys/vm/drop_caches
```

runcpu command invoked through numactl i.e.:
```bash
numactl --interleave=all runcpu <etc>
```

## Platform Notes

BIOS Settings:
- Power Technology = Custom
- Turbo Mode = Enable
- Enhanced Halt State (C1E) = Disable
- CPU C6 report = Disabled
- Package C State = No limit
- Software Controlled T-States = Disable
- Hyper-Threading (All) = Enable
- Enforce POR = Disable
- Memory Frequency = Auto
- Patrol Scrub = Disabled
- IMC Interleaving = Auto
- SNC = Disabled

Sysinfo program /cpu2017.1.0/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on SUT Wed Apr 4 05:22:46 2018

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 4109T CPU @ 2.00GHz
  2 "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 : 8
  siblings : 16
  physical 0: cores 0 1 2 3 4 5 6 7
  physical 1: cores 0 1 2 3 4 5 6 7
```

From lscpu:
```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
```
SPEC CPU2017 Floating Point Rate Result

Epsylon Sp. z o.o. Sp. Komandytowa

Platform Notes (Continued)

Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4109T CPU @ 2.00GHz
Stepping: 4
CPU MHz: 2001.000
CPU max MHz: 2001.0000
CPU min MHz: 800.0000
BogoMIPS: 4000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0-7,16-23
NUMA node1 CPU(s): 8-15,24-31
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 aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 fma cx16 xtrp 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 cd lp1t 3invvpicid_single intel_pt spec_ctrl ibp support tpr_shadow vmx flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cmq mpx rd_t_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cmp_llc cmp_occ related mm_mm related dtherm ida arat pln pts /proc/cpuinfo cache data

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 16 17 18 19 20 21 22 23
node 0 size: 65196 MB
node 0 free: 63085 MB
node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
node 1 size: 65536 MB
node 1 free: 63771 MB
node distances:

(Continued on next page)
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Platform Notes (Continued)

node 0 1
 0: 10 21
 1: 21 10

From /proc/meminfo
  MemTotal: 131460424 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)
  system-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
  system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server

uname -a:
  Linux SUT 3.10.0-693.21.1.el7.x86_64 #1 SMP Fri Feb 23 18:54:16 UTC 2018 x86_64 x86_64 GNU/Linux

run-level 3 Apr 3 17:42

SPEC is set to: /cpu2017.1.0
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sdal ext4 825G 85G 699G 11% /

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 American Megatrends Inc. 2.0b 03/06/2018
  Memory:
    8x Samsung M393A2G40EB2-CTD 16 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)
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Compiler Version Notes

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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.

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

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## Compiler Version Notes (Continued)

```
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)
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ifort (IFORT) 18.0.0 20170811
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FC  554.roms_r(peak)
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CC  521.wrf_r(peak) 527.cam4_r(peak)
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## Compiler Version Notes (Continued)

- 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:
- 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
## Base Optimization Flags

**C benchmarks:**
- `xCORE-AVX512`  
- `-ipo`  
- `-03`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=3`

**C++ benchmarks:**
- `xCORE-AVX512`  
- `-ipo`  
- `-03`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=3`

**Fortran benchmarks:**
- `xCORE-AVX512`  
- `-ipo`  
- `-03`  
- `-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`  
- `-03`  
- `-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`  
- `-03`  
- `-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`
Epsylon Sp. z o.o. Sp. Komandytowa
eterio 210 RE1 (Intel Xeon Silver 4109T, 2.00 GHz)

SPECrate2017_fp_base = 76.5
SPECrate2017_fp_peak = 77.4

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

Test Date: Apr-2018
Hardware Availability: Sep-2017
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

(Continued on next page)
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

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=3 -n ostandard-realloc-lhs

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 -n ostandard-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 -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

Peak Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64
## Epsylon Sp. z o.o. Sp. Komandytowa

**eterio 210 RE1 (Intel Xeon Silver 4109T, 2.00 GHz)**

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<tr>
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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:** Apr-2018  
**Hardware Availability:** Sep-2017  
**Software Availability:** Mar-2018

### Peak Other Flags (Continued)

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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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