## SPEC® CPU2017 Floating Point Rate Result

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

**eterio 220 RF0 Type3 (Intel Xeon E5-2620 v4, 2.10 GHz)**

**SPECrate2017_fp_base = 72.9**

**SPECrate2017_fp_peak = 74.5**

<table>
<thead>
<tr>
<th>Software</th>
<th>SPECrate2017_fp_base</th>
<th>SPECrate2017_fp_peak</th>
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<tbody>
<tr>
<td>503.bwaves_r</td>
<td>52.4</td>
<td>75.6</td>
</tr>
<tr>
<td>507.cactuBSSN_r</td>
<td>47.5</td>
<td>75.6</td>
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<tr>
<td>508.namd_r</td>
<td>51.4</td>
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</tr>
<tr>
<td>510.parest_r</td>
<td>51.7</td>
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<td>511.povray_r</td>
<td>90.5</td>
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<td>519.hmmer_r</td>
<td>53.1</td>
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<td>521.wrf_r</td>
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<td>526.blender_r</td>
<td>69.5</td>
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<tr>
<td>527.cam4_r</td>
<td>69.5</td>
<td>75.6</td>
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<td>538.imagick_r</td>
<td>103</td>
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<td>544.nab_r</td>
<td>86.4</td>
<td>75.6</td>
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<tr>
<td>549.fotonik3d_r</td>
<td>83</td>
<td>75.6</td>
</tr>
<tr>
<td>554.roms_r</td>
<td>44.1</td>
<td>75.6</td>
</tr>
</tbody>
</table>

### Hardware

**CPU Name:** Intel Xeon E5-2620 v4  
**Max MHz.:** 3000  
**Nominal:** 2100  
**Enabled:** 16 cores, 2 chips, 2 threads/core  
**Orderable:** 1.2 chips  
**Cache L1:** 32 KB I + 32 KB D on chip per core  
**L2:** 256 KB I+D on chip per core  
**L3:** 20 MB I+D on chip per chip  
**Other:** None  
**Memory:** 512 GB (16 x 32 GB 2Rx4 PC4-2666V-R, running at 2133)  
**Storage:** 2 x 480 GB SSD configured as RAID1 volume  
**Other:** None

### Software

**OS:** CentOS Linux release 7.5.1804 (Core)  
**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 4E4C206G released Oct-2018  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 64-bit  
**Other:** None
Epsylon Sp. z o.o. Sp. Komandytowa

erito 220 RF0 Type3 (Intel Xeon E5-2620 v4, 2.10 GHz)

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
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<th>Ratio</th>
<th>Seconds</th>
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<td>1153</td>
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</tr>
</tbody>
</table>

SPECrat2017_fp_base = 72.9
SPECrat2017_fp_peak = 74.5

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)
### SPEC CPU2017 Floating Point Rate Result

**Epsylon Sp. z o.o. Sp. Komandytowa**
eterio 220 RF0 Type3 (Intel Xeon E5-2620 v4, 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

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Hardware Availability: Sep-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct-2018</td>
<td></td>
</tr>
</tbody>
</table>

**Test Date:** Oct-2018  
**Hardware Availability:** Sep-2017  
**Software Availability:** Sep-2018

---

### General Notes (Continued)

- Transparent Huge Pages enabled by default  
- Prior to runcpu invocation  
- Filesystem page cache synced and cleared with:
  ```sh
  sync; echo 3> /proc/sys/vm/drop_caches
  runcpu command invoked through numactl i.e.:
  numactl --interleave=all runcpu <etc>
  ```

- Submitted by: <stanislaw.rejowski@eterio.eu>
- Submitted: Mon Nov 5 12:16:38 EST 2018  
- Submission: cpu2017-20181105-09478.sub

---

### Platform Notes

**BIOS Default + NUMA = Enabled**

Sysinfo program `/cpu2017.1.0/bin/sysinfo`  
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618b091c0f  
runtime on SUT Wed Oct 31 22:57:09 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`

```text
model name: Intel(R) Xeon(R) CPU E5-2620 v4 @ 2.10GHz
  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`

```text
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
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
```

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

Epsylon Sp. z o.o. Sp. Komandytowa

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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

Platform Notes (Continued)

CPU family: 6
Model: 79
Model name: Intel(R) Xeon(R) CPU E5-2620 v4 @ 2.10GHz
Stepping: 1
CPU MHz: 1199.963
CPU max MHz: 3000.0000
CPU min MHz: 1200.0000
BogoMIPS: 4190.41
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 20480K
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 acpichp mepx mce sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtsscp
lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperfmperf
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
rdx rdtscp lahf_lm abm 3dnowprefetch ebti cat_i3 cdpi_l3 intel_pni intel_pt ssbd ibrs
ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2
smep bmi2 erms invpcid rtm cqm rdt_a rdseed adx smap xsaveopt cqm_llc cqm_occupp_llc
cqm_mbms_total cqm_mbms_local dtherm ida arat pln pts spec_ctrl intel_stibp flush_l1d

/proc/cpuinfo cache data
cache size : 204800 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 16 17 18 19 20 21 22 23
node 0 size: 262037 MB
node 0 free: 246084 MB
node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
node 1 size: 262144 MB
node 1 free: 248051 MB
node distances:
    node 0 1
    0:  10 21
    1:  21 10

From /proc/meminfo
MemTotal: 528089208 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

(Continued on next page)
Epsylon Sp. z o.o. Sp. Komandytowa
Eterio 220 RF0 Type3 (Intel Xeon E5-2620 v4, 2.10 GHz)

SPECrate\textsubscript{2017\_fp\_peak} = 74.5
SPECrate\textsubscript{2017\_fp\_base} = 72.9

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

Platform Notes (Continued)

From /etc/*release* /etc/*version*
\texttt{centos-release}: CentOS Linux release 7.5.1804 (Core)
\texttt{centos-release-upstream}: Derived from Red Hat Enterprise Linux 7.5 (Source)
\texttt{os-release}:
\begin{Verbatim}
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"
\end{Verbatim}
\texttt{redhat-release}: CentOS Linux release 7.5.1804 (Core)
\texttt{system-release}: CentOS Linux release 7.5.1804 (Core)
\texttt{system-release-cpe}: cpe:/o:centos:centos:7

\texttt{uname -a}:
\begin{Verbatim}
Linux SUT 3.10.0-862.14.4.el7.x86_64 #1 SMP Wed Sep 26 15:12:11 UTC 2018 x86_64 x86_64 x86_64 GNU/Linux
\end{Verbatim}
run-level 3 Oct 31 10:56
SPEC is set to: /cpu2017.1.0

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. 4E4C206G 10/15/2018
Memory:
\begin{Verbatim}
16x Samsung M393A4K40CB2-CTD 32 GB 2 rank 2667, configured at 2133
\end{Verbatim}

(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.

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

Epsylon Sp. z o.o. Sp. Komandytowa

**Entrepreneur 220 RF0 Type3 (Intel Xeon E5-2620 v4, 2.10 GHz)**

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<tr>
<th>CPU2017 License:</th>
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<th>Oct-2018</th>
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<tr>
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**SPECrated2017_fp_base = 72.9**

**SPECrated2017_fp_peak = 74.5**

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## Compiler Version Notes (Continued)

### CC 519.lbm_r(peak) 544.nab_r(peak)

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### CXXC 508.namd_r(base) 510.parest_r(base)

<table>
<thead>
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### CC 511.povray_r(base) 526.blender_r(base)

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### CC 511.povray_r(peak) 526.blender_r(peak)

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### FC 507.cactuBSSN_r(base)

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<td>Software Availability: Sep-2018</td>
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**Compiler Version Notes (Continued)**

```plaintext
FC  507.cactuBSSN_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.
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
```

```plaintext
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.
```

```plaintext
FC  554.roms_r(peak)

ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
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CC  521.wrf_r(base) 527.cam4_r(base)

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Tested by: Epsylon Sp. z o.o. Sp. Komandytowa
Test Date: Oct-2018
Hardware Availability: Sep-2017
Software Availability: Sep-2018

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-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

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

Epsylon Sp. z o.o. Sp. Komandytowa

Eterio 220 RF0 Type3 (Intel Xeon E5-2620 v4, 2.10 GHz)

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<tr>
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**Base Optimization Flags (Continued)**

C++ benchmarks (continued):
- `-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`

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

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:

(Continued on next page)
Epsylon Sp. z o.o. Sp. Komandytowa
eterio 220 RF0 Type3 (Intel Xeon E5-2620 v4, 2.10 GHz)

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**Test Sponsor:** Epsylon Sp. z o.o. Sp. Komandytowa  
**Tested by:** Epsylon Sp. z o.o. Sp. Komandytowa  
**Test Date:** Oct-2018  
**Hardware Availability:** Sep-2017  
**Software Availability:** Sep-2018

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### Peak Optimization Flags (Continued)

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

---

### 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

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

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Peak Other Flags (Continued)

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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