**Dell Inc.**

**PowerEdge R240 (Intel Xeon E-2146G)**

**CPU2017 License:** 55

**Test Sponsor:** Dell Inc.

**Tested by:** Dell Inc.

**Test Date:** Apr-2019

**Hardware Availability:** Dec-2018

**Software Availability:** Apr-2018

### Hardware

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon E-2146G</td>
</tr>
<tr>
<td>Max MHz.</td>
<td>4500</td>
</tr>
<tr>
<td>Nominal</td>
<td>3500</td>
</tr>
<tr>
<td>Enabled</td>
<td>6 cores, 1 chip, 2 threads/core</td>
</tr>
<tr>
<td>Orderable</td>
<td>1 chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Cache L2</td>
<td>256 KB I+D on chip per core</td>
</tr>
<tr>
<td>Cache L3</td>
<td>12 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>64 GB (4 x 16 GB 2Rx8 PC4-2666V-R)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x 960 GB SATA SSD</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 12 SP3 4.4.126-94.22-default</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/C++: Version 18.0.2.20180210 of Intel C/C++ Compiler for Linux; Fortran: Version 18.0.2.20180210 of Intel Fortran Compiler for Linux</td>
</tr>
<tr>
<td>Parallel</td>
<td>No</td>
</tr>
<tr>
<td>Firmware</td>
<td>Version 1.0.1 released Oct-2018</td>
</tr>
<tr>
<td>File System</td>
<td>xfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
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</table>
SPEC CPU2017 Floating Point Rate Result

Dell Inc.

PowerEdge R240 (Intel Xeon E-2146G)

SPECrate2017_fp_base = 36.5
SPECrate2017_fp_peak = 35.3

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>503.bwaves_r</td>
<td>12</td>
<td>1708</td>
<td>70.5</td>
<td>1708</td>
<td>70.5</td>
<td>1711</td>
<td>70.3</td>
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<tr>
<td>507.cactuBSSN_r</td>
<td>12</td>
<td>406</td>
<td>37.4</td>
<td>412</td>
<td>36.9</td>
<td>414</td>
<td>36.7</td>
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<tr>
<td>508.namd_r</td>
<td>12</td>
<td>329</td>
<td>34.7</td>
<td>333</td>
<td>34.2</td>
<td>333</td>
<td>34.2</td>
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<tr>
<td>510.parest_r</td>
<td>12</td>
<td>1818</td>
<td>17.3</td>
<td>1823</td>
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<td>1820</td>
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<tr>
<td>511.povray_r</td>
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<td>535</td>
<td>52.3</td>
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<td>51.9</td>
<td>534</td>
<td>52.5</td>
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<tr>
<td>519.libm_r</td>
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<td>16.9</td>
<td>745</td>
<td>17.0</td>
<td>745</td>
<td>17.0</td>
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<tr>
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<td>855</td>
<td>31.4</td>
<td>856</td>
<td>31.4</td>
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<tr>
<td>526.blender_r</td>
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<td>373</td>
<td>49.0</td>
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<tr>
<td>527.cam4_r</td>
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<td>42.9</td>
<td>487</td>
<td>43.1</td>
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<tr>
<td>538.imagick_r</td>
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<td>264</td>
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<td>264</td>
<td>113</td>
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<td>544.nab_r</td>
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<td>259</td>
<td>78.1</td>
<td>259</td>
<td>77.9</td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
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<td>21.7</td>
<td>2156</td>
<td>21.7</td>
<td>2155</td>
<td>21.7</td>
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<tr>
<td>554.roms_r</td>
<td>12</td>
<td>1591</td>
<td>12.0</td>
<td>1593</td>
<td>12.0</td>
<td>1600</td>
<td>11.9</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 = "/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
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.
Transparent Huge Pages enabled by default
Prior to runcpu invocation

(Continued on next page)
Dell Inc.  
PowerEdge R240 (Intel Xeon E-2146G)  

| SPECrate2017_fp_peak = 35.3 |
| SPECrate2017_fp_base = 36.5 |

CPU2017 License: 55  
Test Sponsor: Dell Inc.  
Tested by: Dell Inc.  

**General Notes (Continued)**

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:  
Virtualization Technology disabled  
System Profile set to Custom  
CPU Performance set to Maximum Performance  
C States set to Autonomous  
C1E disabled  
Uncore Frequency set to Dynamic  
Energy Efficiency Policy set to Performance  
Memory Patrol Scrub disabled  
Logical Processor enabled  
CPU Interconnect Bus Link Power Management disabled  
PCI ASPM L1 Link Power Management disabled  
Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f6d4985e45859ea9  
running on linux-gw0u Thu Apr 18 18:08:07 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) E-2146G CPU @ 3.50GHz  
1 "physical id"s (chips)  
12 "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 : 6  
siblings : 12  
physical 0: cores 0 1 2 3 4 5

From lscpu:  
Architecture: x86_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 12  
On-line CPU(s) list: 0-11  
Thread(s) per core: 2  
Core(s) per socket: 6  
Socket(s): 1

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

## Dell Inc.

**PowerEdge R240 (Intel Xeon E-2146G)**

<table>
<thead>
<tr>
<th>SPECrate2017_fp_base</th>
<th>SPECrate2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>36.5</td>
<td>35.3</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Apr-2019  
**Hardware Availability:** Dec-2018  
**Software Availability:** Apr-2018

### Platform Notes (Continued)

- **NUMA node(s):** 1
- **Vendor ID:** GenuineIntel
- **CPU family:** 6
- **Model:** 158
- **Model name:** Intel(R) Xeon(R) E-2146G CPU @ 3.50GHz
- **Stepping:** 10
- **CPU MHz:** 4071.357
- **CPU max MHz:** 4500.0000
- **CPU min MHz:** 800.0000
- **BogoMIPS:** 7007.96
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 256K
- **L3 cache:** 12288K
- **NUMA node0 CPU(s):** 0-11

Flags: fpu vme de pse tsc msr xsave cpuid 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 aperf perfctr eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epccode single pln pts dtherm hwp hwp_act_window hwp_epp intel_pt rsb_cts sw spec_ctrl stibp retopology kaiser tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpd invpcid rtm mpx rdseed adx smap clflushopt xsaveopt xsavec xtopo

From `numactl --hardware`

```
WARNING: a numactl 'node' might or might not correspond to a physical chip.
```

Available: 1 nodes (0)

Node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11

Node 0 size: 64276 MB

Node 0 free: 63797 MB

Node distances:

<table>
<thead>
<tr>
<th>Node</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

From `/proc/meminfo`

```
MemTotal: 65818632 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

From `/usr/bin/lsb_release -d`

```
SUSE Linux Enterprise Server 12 SP3
```

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

From `/etc/*release* `/etc/*version*`

```sh
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 3
  # 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-SP3"
  VERSION_ID="12.3"
  PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
  ID="sles"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:12:sp3"
```

```
uname -a:
  Linux linux-gw0u 4.4.126-94.22-default #1 SMP Wed Apr 11 07:45:03 UTC 2018 (9649989)
  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 Apr 18 10:19 last=5

SPEC is set to: `/home/cpu2017`

Filesystem | Type | Size | Used | Avail | Use% | Mounted on
--- | --- | --- | --- | --- | --- | ---
/dev/sda2  | xfs | 301G | 17G | 285G | 6% | /

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 Dell Inc. 1.0.1 10/19/2018
- Memory:
  - 3x 00AD00000A02 HMA82GU7CJR8N-VK 16 GB 2 rank 2666
  - 1x 00AD00000A07 HMA82GU7CJR8N-VK 16 GB 2 rank 2666

(End of data from `sysinfo` program)
Dell Inc.

PowerEdge R240 (Intel Xeon E-2146G)

<table>
<thead>
<tr>
<th>CPU2017 License: 55</th>
<th>Test Date: Apr-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: Dell Inc.</td>
<td>Hardware Availability: Dec-2018</td>
</tr>
<tr>
<td>Tested by: Dell Inc.</td>
<td>Software Availability: Apr-2018</td>
</tr>
</tbody>
</table>

**SPEC CPU2017 Floating Point Rate Result**

**SPEClrate2017_fp_base = 36.5**

**SPEClrate2017_fp_peak = 35.3**

---

**Compiler Version Notes**

```plaintext
==============================================================================
CC  519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CC  519.lbm_r(peak) 538.imagick_r(peak) 544.nab_r(peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CXXC 508.namd_r(base) 510.parest_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CXXC 508.namd_r(peak) 510.parest_r(peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CC  511.povray_r(base) 526.blender_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CC  511.povray_r(peak) 526.blender_r(peak)
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Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

(Continued on next page)
### Dell Inc.

**PowerEdge R240 (Intel Xeon E-2146G)**

<table>
<thead>
<tr>
<th>SPECerate2017_fp_base</th>
<th>36.5</th>
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<tbody>
<tr>
<td>SPECerate2017_fp_peak</td>
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</table>

**CPU2017 License:** 55  
**Test Date:** Apr-2019  
**Hardware Availability:** Dec-2018  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Software Availability:** Apr-2018

**Compiler Version Notes (Continued)**

```plaintext
FC  507.cactuBSSN_r(base)
-----------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```plaintext
FC  507.cactuBSSN_r(peak)
-----------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```plaintext
FC  503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
-------------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```plaintext
FC  503.bwaves_r(peak) 549.fotonik3d_r(peak) 554.roms_r(peak)
-------------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```plaintext
CC  521.wrf_r(base) 527.cam4_r(base)
-------------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
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```

```plaintext
CC  521.wrf_r(peak) 527.cam4_r(peak)
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Dell Inc.
PowerEdge R240 (Intel Xeon E-2146G)  SPECrate2017_fp_base = 36.5
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Compiler Version Notes (Continued)

ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Base 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

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

Dell Inc.
PowerEdge R240 (Intel Xeon E-2146G)  SPECrate2017_fp_base = 36.5
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CPU2017 License: 55
Test Sponsor: Dell Inc.
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Hardware Availability: Dec-2018
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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 -auto -nostandard-realloc-lhs

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

Benchmarks using both C and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

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
SPEC CPU2017 Floating Point Rate Result

Dell Inc.

PowerEdge R240 (Intel Xeon E-2146G)

SPECrate2017_fp_base = 36.5
SPECrate2017_fp_peak = 35.3

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Apr-2019
Hardware Availability: Dec-2018
Software Availability: Apr-2018

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

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

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:
-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 -auto -nostandard-realloc-lhs

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 -auto -nostandard-realloc-lhs

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 -auto -nostandard-realloc-lhs

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:
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.xml
### SPEC CPU2017 Floating Point Rate Result

#### Dell Inc.

**PowerEdge R240 (Intel Xeon E-2146G)**

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- **CPU2017 License**: 55
- **Test Sponsor**: Dell Inc.
- **Tested by**: Dell Inc.
- **Test Date**: Apr-2019
- **Hardware Availability**: Dec-2018
- **Software Availability**: Apr-2018

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU2017 v1.0.5 on 2019-04-18 19:08:07-0400.