## SPEC® CPU2017 Floating Point Rate Result

### Dell Inc.

**PowerEdge R740xd (Intel Xeon Silver 4114, 2.20 GHz)**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate2017_fp_base</th>
<th>SPECrate2017_fp_peak</th>
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<tbody>
<tr>
<td>503.bwaves_r</td>
<td>40</td>
<td>86.0</td>
<td>245</td>
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<tr>
<td>507.cactuBSSN_r</td>
<td>40</td>
<td>84.2</td>
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<tr>
<td>508.namd_r</td>
<td>40</td>
<td>72.1</td>
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<tr>
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<tr>
<td>549.fotonik3d_r</td>
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<td></td>
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<tr>
<td>554.roms_r</td>
<td>40</td>
<td>54.1</td>
<td></td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name**: Intel Xeon Silver 4114
- **Max MHz.**: 3000
- **Nominal**: 2200
- **Enabled**: 20 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**: 13.75 MB I+D on chip per chip
- **Other**: None
- **Memory**: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)
- **Storage**: 460 GB SATA SSD
- **Other**: None

### Software

- **OS**: SUSE Linux Enterprise Server 12 SP2 4.4.21-69-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 1.1.7 released Oct-2017
- **File System**: xfs
- **System State**: Run level 3 (multi-user)
- **Base Pointers**: 64-bit
- **Peak Pointers**: 64-bit
- **Other**: None

### Test Details

- **CPU2017 License**: 55
- **Test Sponsor**: Dell Inc.
- **Test Date**: Nov-2017
- **Hardware Availability**: Oct-2017
- **Tested by**: Dell Inc.
- **Software Availability**: Sep-2017

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SPEC CPU2017 Floating Point Rate Result

Dell Inc.
PowerEdge R740xd (Intel Xeon Silver 4114, 2.20 GHz)

SPECrate2017_fp_base = 98.0
SPECrate2017_fp_peak = 99.5

Results Table

<table>
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<tr>
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<th>Ratio</th>
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</tr>
</tbody>
</table>

SPECrate2017_fp_base = 98.0
SPECrate2017_fp_peak = 99.5

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 = "/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>
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Dell Inc.
PowerEdge R740xd (Intel Xeon Silver 4114, 2.20 GHz)

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

Test Date: Nov-2017
Hardware Availability: Oct-2017
Software Availability: Sep-2017

Platform Notes

BIOS settings:
Sub NUMA Cluster enabled
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: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on linux-wwko Sat Nov 11 02:04:32 2017

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 4114 CPU @ 2.20GHz
  2 "physical id"s (chips)
  40 "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 : 10
siblings : 20
physical 0: cores 0 1 2 3 4 8 9 10 11 12
physical 1: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 2
Core(s) per socket: 10
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4114 CPU @ 2.20GHz
Stepping: 4

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

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Platform Notes (Continued)

CPU MHz: 2194.949
BogoMIPS: 4389.89
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 14080K
NUMA node0 CPU(s): 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38
NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39
Flags: fpu vme de pse tsc mcr 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 rdtsscp
lm constant_tsc art arch_perfmon pebs bts rep_good ncpu xtopology nonstop_tsc
aperfmpref perfregpnu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtpref pdc mcli pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx fl64 rdrand lahf_lm abm 3dnowprefetch ida arat epb pln pts dtherm intel_pt
tpf_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap cldflushopt clwb avx512cd
avx512bw avx512vl xsaveopt xsaveopt xgetbv1 cqm_llc cqm_occup_llc

/proc/cpuinfo cache data
  cache size : 14080 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 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38
  node 0 size: 193053 MB
  node 0 free: 192313 MB
  node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39
  node 1 size: 193504 MB
  node 1 free: 192842 MB
  node distances:
    node  0  1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 395835032 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)

(Continued on next page)
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</table>

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

**Platform Notes (Continued)**

```plaintext
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-wwko 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016 (9464f67)  
x86_64 x86_64 x86_64 GNU/Linux
```

run-level 3 Nov 10 14:40  

SPEC is set to: /home/cpu2017  
```
Filesystem   Type  Size  Used  Avail  Use% Mounted on
/dev/sda2    xfs   892G  22G  871G   3% /
```

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. 1.1.7 08/10/2017  
Memory:  
24x 00AD00B300AD HMA82GR7AFR8N-VK 16 GB 2 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)
------------------------------------------------------------------------------
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
```
### Compiler Version Notes (Continued)

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

---

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

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

---

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

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)
```

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.

---

```plaintext
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.

---

```plaintext
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.

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Compiler Version Notes (Continued)

C benchmarks:

icc

Base Compiler Invocation

(Continued on next page)
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Base Compiler Invocation (Continued)

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.ibm_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

(Continued on next page)
Dell Inc.
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Base Optimization Flags (Continued)

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

(Continued on next page)
**Peak Compiler Invocation (Continued)**

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: 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:

*(Continued on next page)*
Dell Inc.
PowerEdge R740xd (Intel Xeon Silver 4114, 2.20 GHz)

SPECrate2017_fp_base = 98.0
SPECrate2017_fp_peak = 99.5

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.
Test Date: Nov-2017
Hardware Availability: Oct-2017
Software Availability: Sep-2017

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)
### Dell Inc.  
**PowerEdge R740xd (Intel Xeon Silver 4114, 2.20 GHz)**  

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</table>

#### SPECrate2017_fp_base = 98.0  
#### SPECrate2017_fp_peak = 99.5

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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:

- [Dell-Platform-Flags-PowerEdge14G-revC.xml](http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge14G-revC.xml)

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

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