## Dell Inc.

PowerEdge R740xd (Intel Xeon Silver 4114, 2.20GHz)

<table>
<thead>
<tr>
<th>SPECspeed2017 fp_base</th>
<th>SPECspeed2017 fp_peak</th>
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<tbody>
<tr>
<td>70.4</td>
<td>71.7</td>
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### threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Value</th>
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<tbody>
<tr>
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<tr>
<td>607.cactuBSSN_s</td>
<td>88.3</td>
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<tr>
<td>619.lbm_s</td>
<td>34.7</td>
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<tr>
<td>621.wrf_s</td>
<td>52.8</td>
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<tr>
<td>627.cam4_s</td>
<td>43.3</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>54.4</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>53.6</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>94.3</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>66.3</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>74.4</td>
</tr>
</tbody>
</table>

### Hardware

#### CPU
- Name: Intel Xeon Silver 4114
- Max MHz.: 3000
- Nominal: 2200
- Enabled: 20 cores, 2 chips
- 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: 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: 480 GB SATA SSD
- Other: None

### Software

#### OS
- SUSE Linux Enterprise Server 12 SP2
- 4.4.114-94.11-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
- Yes

#### Firmware
- Version 1.3.7 released Feb-2018
- File System: xfs

#### System State
- Run level 3 (multi-user)

#### Base Pointers
- 64-bit

#### Peak Pointers
- 64-bit

#### Other
- None
Dell Inc. PowerEdge R740xd (Intel Xeon Silver 4114, 2.20GHz)

SPECspeed2017_fp_base = 70.4
SPECspeed2017_fp_peak = 71.7

Results Table

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<td>211</td>
<td>74.5</td>
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SPECspeed2017_fp_base = 70.4
SPECspeed2017_fp_peak = 71.7

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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:
KMP_AFFINITY = "granularity=fine,compact"
OMP_STACKSIZE = "192M"

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
Filesystem page cache synced and cleared with:
sync; echo 3>/proc/sys/vm/drop_caches

Platform Notes

BIOS settings:
Sub NUMA Cluster disabled
Virtualization Technology disabled

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

SPECspeed2017_fp_base = 70.4
SPECspeed2017_fp_peak = 71.7

CPU2017 License: 55
Test Sponsor: Dell Inc.
Test Date: Feb-2018
Hardware Availability: Sep-2017
Tested by: Dell Inc.
Software Availability: Feb-2018

Platform Notes (Continued)

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 disabled
CPU Interconnect Bus Link Power Management disabled
PCI ASPM L1 Link Power Management disabled
Sysinfo program /home/cpu2017rev5/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on linux-bgfp Tue Feb 27 19:11:02 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 4114 CPU @ 2.20GHz
  2 "physical id"s (chips)
  20 "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 : 10
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): 20
On-line CPU(s) list: 0-19
Thread(s) per core: 1
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
CPU MHz: 2194.847
BogoMIPS: 4389.69
Virtualization: VT-x

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

```
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
NUMA node1 CPU(s):     1,3,5,7,9,11,13,15,17,19
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 rdtsscp
                       lm constant_tsc arch_perfmon pebs bts rep_good nopl mce tsc_deadline_timer aes
                       xsave avx f16c rdrand lahf_l1m abm 3dnowprefetch ida arat pbe syndicated_pln
                       dtc hypervisorisen eagerfpu pni pclmulqdq dtes64 monitor 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 rdrand lahf_l1m abm 3dnowprefetch ida arat pbe syndicated_pln
                       dtc hypervisorisen eagerfpu pni pclmulqdq dtes64 monitor 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 rdrand lahf_l1m abm 3dnowprefetch ida arat pbe syndicated_pln
                       dtc hypervisorisen eagerfpu pni pclmulqdq dtes64 monitor 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 rdrand lahf_l1m abm 3dnowprefetch ida arat pbe syndicated_pln
                       dtc hypervisorisen eagerfpu pni pclmulqdq dtes64 monitor 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

From `/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
  node 0 size: 191989 MB
  node 0 free: 188085 MB
  node 1 cpus: 1 3 5 7 9 11 13 15 17 19
  node 1 size: 193517 MB
  node 1 free: 189233 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From `/proc/meminfo`
  MemTotal:          394759496 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)
    VERSION = 12
    PATCHLEVEL = 2
```

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

SPECspeed2017_fp_base = 70.4
SPECspeed2017_fp_peak = 71.7

Platform Notes (Continued)

# 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-bgfp 4.4.114-94.11-default #1 SMP Thu Feb 1 19:28:26 UTC 2018 (4309ff9)
  x86_64 x86_64 x86_64 GNU/Linux

run-level 3 Feb 27 12:35

SPEC is set to: /home/cpu2017rev5/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda4 xfs 405G 59G 347G 15% /home

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. 1.3.7 02/08/2018
Memory:
  22x 00AD00B300AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666, configured at 2400
  2x 00CE063200CE M393A2K43BB1-CTD 16 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak)
==============================================================================
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================

==============================================================================
CC  619.lbm_s(peak)
==============================================================================
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

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

## Dell Inc.

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

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<tr>
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<tr>
<th>CPU2017 License</th>
<th>Test Date</th>
<th>Hardware Availability</th>
<th>Software Availability</th>
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</thead>
<tbody>
<tr>
<td>55</td>
<td>Feb-2018</td>
<td>Sep-2017</td>
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<th>Tested by</th>
</tr>
</thead>
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</table>

---

## Compiler Version Notes (Continued)

```
FC 607.cactuBSSN_s(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 607.cactuBSSN_s(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.
```

```
FC 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)

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

```
FC 603.bwaves_s(peak) 649.fotonik3d_s(peak) 654.roms_s(peak)

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

```
CC 621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base)

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

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CPU2017 License: 55  
Test Sponsor: Dell Inc.  
Tested by: Dell Inc.  
Test Date: Feb-2018  
Hardware Availability: Sep-2017  
Software Availability: Feb-2018

== Compiler Version Notes (Continued) ==

```
CC   621.wrf_s(peak) 628.pop2_s(peak)
```

```
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
```

Fortran benchmarks:

```
ifort
```

Benchmarks using both Fortran and C:

```
ifort icc
```

Benchmarks using Fortran, C, and C++:

```
icpc icc ifort
```

== Base Portability Flags ==

```
603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64
```

== Base Optimization Flags ==

```
C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
```

(Continued on next page)
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#### Base Optimization Flags (Continued)

- **C benchmarks (continued):**
  - -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP

- **Fortran benchmarks:**
  - -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
  - -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
  - -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 -qopenmp -DSPEC.OPENMP
  - -nostandard-realloc-lhs -align array32byte

- **Benchmarks using Fortran, C, and C++:**
  - -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
  - -qopt-mem-layout-trans=3 -qopenmp -DSPEC.OPENMP
  - -nostandard-realloc-lhs -align array32byte

#### Base Other Flags

- **C benchmarks:**
  - -m64 -std=c11

- **Fortran benchmarks:**
  - -m64

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

- **Benchmarks using Fortran, C, and C++:**
  - -m64 -std=c11

#### Peak Compiler Invocation

- **C benchmarks:**
  - icc

- **Fortran benchmarks:**
  - ifort

- **Benchmarks using both Fortran and C:**
  - ifort icc

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

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

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
```
619.lbm_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP
```
```
638.imagick_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OPENMP
```
```
644.nab_s: Same as 638.imagick_s
```

Fortran benchmarks:
```
-pref-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP
-DSPEC_OPENMP -O2 -xCORE-AVX2 -qopt-prefetch -ipo -O3
-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs -align array32byte
```

Benchmarks using both Fortran and C:
```
621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte
```
```
627.cam4_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte
```

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

SPECspeed2017_fp_base = 70.4
SPECspeed2017_fp_peak = 71.7

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

Test Date: Feb-2018
Hardware Availability: Sep-2017
Software Availability: Feb-2018

Peak Optimization Flags (Continued)

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:
-prof-gen(pass 1)  -prof-use(pass 2) -O2  -xCORE-AVX2  -qopt-prefetch
-ipo  -O3  -ffinite-math-only  -no-prec-div  -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP  -qopenmp  -DSPEC_OPENMP  -nostandard-realloc-lhs
-align array32byte

Peak Other Flags

C benchmarks:
-m64  -std=c11

Fortran benchmarks:
-m64

Benchmarks using both Fortran 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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