Dell Inc.

Dell Inc.

PowerEdge R740xd2 (Intel Xeon Gold 5115, 2.40GHz)

SPECspeed2017_fp_base = 73.4
SPECspeed2017_fp_peak = 74.8

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

Threads

<table>
<thead>
<tr>
<th>Test Date: Nov-2018</th>
<th>Hardware Availability: Dec-2018</th>
<th>Software Availability: Feb-2018</th>
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<tbody>
<tr>
<td>603.bwaves_s 20</td>
<td>89.6</td>
<td></td>
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<tr>
<td>607.cactuBSSN_s 20</td>
<td>92.3</td>
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<td>619.ibm_s 20</td>
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<tr>
<td>621.wrf_s 20</td>
<td>59.6</td>
<td>64.2</td>
</tr>
<tr>
<td>627.cam4_s 20</td>
<td>47.0</td>
<td>47.1</td>
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<tr>
<td>628.pop2_s 20</td>
<td>55.8</td>
<td>57.4</td>
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<tr>
<td>638.imagick_s 20</td>
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<tr>
<td>644.nab_s 20</td>
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<tr>
<td>649.fotonik3d_s 20</td>
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</tr>
<tr>
<td>654.roms_s 20</td>
<td>73.9</td>
<td>78.1</td>
</tr>
</tbody>
</table>

---

Hardware

CPU Name: Intel Xeon Gold 5115
Max MHz.: 3200
Nominal: 2400
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 core
Other: None
Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)
Storage: 1 x 250 GB M.2 SATA SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 12 SP3
kernel 4.4.114-94.11-default
Compiler: 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
Parallel: Yes
Firmware: Version 1.0.3 released Oct-2018
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None
Dell Inc.
PowerEdge R740xd2 (Intel Xeon Gold 5115, 2.40GHz)

CPU2017 License: 55
Test Sponsor: Dell Inc.
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Results Table

<table>
<thead>
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<th>Benchmark</th>
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<tr>
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<td>73.9</td>
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<td>73.9</td>
<td>213</td>
<td>74.0</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 73.4
SPECspeed2017_fp_peak = 74.8

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"
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64"

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)
**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/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-m8ku Tue Nov 6 16:26:35 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) Gold 5115 CPU @ 2.40GHz
  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) Gold 5115 CPU @ 2.40GHz
Stepping: 4
CPU MHz: 2394.376
BogoMIPS: 4788.75
Virtualization: VT-x

(Continued on next page)
Dell Inc.
PowerEdge R740xd2 (Intel Xeon Gold 5115, 2.40GHz)

SPEC CPU2017 Floating Point Speed Result
Copyright 2017-2018 Standard Performance Evaluation Corporation

SPECspeed2017_fp_base = 73.4
SPECspeed2017_fp_peak = 74.8

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

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 cmov pmxs cmov 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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpref eagercpu 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_lm abm 3dnowprefetch ida arat epb invdpc pidvcr single pln pts
dtherm intel_pt rsb_cxsw spec_ctrl retpoline kaiser tpr_shadow vmmi flexpriority
ept vpid fsgsbase tsc_adjust bni hil hle avx2 smep bmi2 erms invpcid rtm cqm mpx
avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt
xsavec xgetbv1 cqm_1lc cqm_occup_1lc pku ospke

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: 95285 MB
node 0 free: 89093 MB
node 1 cpus: 1 3 5 7 9 11 13 15 17 19
node 1 size: 96749 MB
node 1 free: 94658 MB
node distances:
node 0 1
 0: 10 21
 1: 21 10

From /proc/meminfo
MemTotal: 196644052 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP3

From /etc/*release* /etc/*version*
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 3

(Continued on next page)
Dell Inc.
PowerEdge R740xd2 (Intel Xeon Gold 5115, 2.40GHz)

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</table>

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

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-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-m8ku 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
```

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: Barriers
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

```
run-level 3 Nov 6 10:00 last=5
```

```
SPEC is set to: /home/cpu2017
   Filesystem    Type     Size  Used  Avail Use% Mounted on
   /dev/sdz4      xfs     182G   10G  172G   6% /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. 1.0.3 10/25/2018
Memory:
12x 002C04B3002C 18ASF2G72PDZ-2G6E1 16 GB 2 rank 2666, configured at 2400
4x Not Specified Not Specified

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
<table>
<thead>
<tr>
<th>CC 619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)</th>
</tr>
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<tbody>
<tr>
<td>icc (ICC) 18.0.2 20180210</td>
</tr>
<tr>
<td>Copyright (C) 1985-2018 Intel Corporation. All rights reserved.</td>
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**SPEC CPU2017 Floating Point Speed Result**

**Dell Inc.**

PowerEdge R740xd2 (Intel Xeon Gold 5115, 2.40GHz)

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

---

Compiler Version Notes (Continued)

---

**CC**  
619.lbm_s(peak) 638.imagick_s(peak) 644.nab_s(peak)

---

icc (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.  
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.

---

FC 607.cactuBSSN_s(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.

---

FC 607.cactuBSSN_s(peak)

---

icpc (ICC) 18.0.2 20180210  
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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.

---

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

---

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

---

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

---

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

---

CC 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)

(Continued on next page)
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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

Fortran benchmarks:
ifort -m64

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

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64

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
**SPEC CPU2017 Floating Point Speed Result**

**Dell Inc.**
PowerEdge R740xd2 (Intel Xeon Gold 5115, 2.40GHz)

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### Base Optimization Flags

C benchmarks:
- `-xCORE-AVX2`  
- `-ipo`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=3`  
- `-qopenmp`  
- `-DSPEC_OPENMP`

Fortran benchmarks:
- `-DSPEC_OPENMP`  
- `-xCORE-AVX2`  
- `-ipo`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=3`  
- `-qopenmp`  
- `-nostandard-realloc-lhs`

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

Benchmarks using Fortran, C, and C++:
- `-xCORE-AVX2`  
- `-ipo`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=3`  
- `-qopenmp`  
- `-DSPEC_OPENMP`  
- `-nostandard-realloc-lhs`

### Peak Compiler Invocation

C benchmarks:
- `icc -m64 -std=c11`

Fortran benchmarks:
- `ifort -m64`

Benchmarks using both Fortran and C:
- `ifort -m64 icc -m64 -std=c11`

Benchmarks using Fortran, C, and C++:
- `icpc -m64 icc -m64 -std=c11 ifort -m64`

### Peak Portability Flags

Same as Base Portability Flags
Dell Inc.
PowerEdge R740xd2 (Intel Xeon Gold 5115, 2.40GHz)

SPECspeed2017_fp_base = 73.4
SPECspeed2017_fp_peak = 74.8

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

Peak Optimization Flags

C benchmarks:
619.ibm_s: basepeak = yes
638.imagick_s: basepeak = yes
644.nab_s: basepeak = yes

Fortran benchmarks:
-prof-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-1hs

Benchmarks using both Fortran 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-1hs

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-1hs

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

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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 2018-11-06 17:26:35-0500.
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