# SPEC® CPU2017 Floating Point Speed Result

## Dell Inc.

**PowerEdge R740xd2 (Intel Xeon Gold 5118, 2.30GHz)**

<table>
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<tr>
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### Hardware

<table>
<thead>
<tr>
<th>Threads</th>
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<tr>
<td>603.bwaves_s 24</td>
<td>104</td>
<td>379p</td>
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<td>35.3</td>
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<td>379p</td>
</tr>
<tr>
<td>654.roms_s 24</td>
<td>88.0</td>
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### Software

**CPU Name:** Intel Xeon Gold 5118  
**Max MHz.:** 3200  
**Nominal:** 2300  
**Enabled:** 24 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:** 16.5 MB I+D on chip per chip  
**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  

**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
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### Results Table

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<td>179</td>
<td>87.7</td>
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**SPECspeed2017_fp_base =** 80.4

**SPECspeed2017_fp_peak =** 81.4

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:
  ```bash
  sync; echo 3> /proc/sys/vm/drop_caches
  ```

### Platform Notes

- BIOS settings:
  - Sub NUMA Cluster disabled
  - Virtualization Technology disabled

(Continued on next page)
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**CPU2017 License:** 55

**Test Sponsor:** Dell Inc.

**Test Date:** Nov-2018

**Tested by:** Dell Inc.

**Hardware Availability:** Dec-2018

**Software Availability:** Feb-2018

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**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 Mon Nov 19 16:04:53 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 5118 CPU @ 2.30GHz
  2 "physical id"s (chips)
  24 "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 : 12
  siblings : 12
  physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
  physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13
```

From lscpu:

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 24
On-line CPU(s) list: 0-23
Thread(s) per core: 1
Core(s) per socket: 12
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5118 CPU @ 2.30GHz
Stepping: 4
CPU MHz: 2294.626
BogoMIPS: 4589.25
Virtualization: VT-x
```

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

```
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 16896K  
NUMA node0 CPU(s): 0,2,4,6,8,10,12,14,16,18,20,22  
NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23  
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 rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl apicexec nonstop_tsc aperffeature 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 rdrnd lahf_lm abm 3dnowprefetch ida arat epbi invpcid_single pni dtherm intel_pt rsb_ctxtsw spec_ctrl retpoline kaiser tpr_shadow vmx flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 iberms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavesec xgetbv1 cqm_llc cqm_occup_llc pku ospke

From /proc/cpuinfo cache data
  cache size : 16896 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
  node 0 size: 95285 MB
  node 0 free: 89345 MB
  node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23
  node 1 size: 96749 MB
  node 1 free: 94905 MB
  node distances:
    node 0 1
    0:  10 21
    1:  21 10

From /proc/meminfo
  MemTotal: 196643524 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

/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)
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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 19 09:47 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 SMI BIOS" standard.

BIOS Dell Inc. 1.0.3 10/25/2018
Memory:
   12x 002C04B3002C 18ASF2G72PD2-2G6E1 16 GB 2 rank 2666, configured at 2400
   4x Not Specified Not Specified

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
  CC  619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)
==============================================================================
  icc (ICC) 18.0.2 20180210
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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
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**Base Optimization Flags**

C benchmarks:
-xCORE-AVX512
-ipo
-no-prec-div
-qopt-prefetch
-ffinite-math-only
-qopt-mem-layout-trans=3
-qopenmp
-DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP
-xCORE-AVX512
-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-AVX512
-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-AVX512
-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
SPEC CPU2017 Floating Point Speed Result

Dell Inc. PowerEdge R740xd2 (Intel Xeon Gold 5118, 2.30GHz)

SPECspeed2017_fp_base = 80.4
SPECspeed2017_fp_peak = 81.4

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

Test Date: Nov-2018
Hardware Availability: Dec-2018
Software Availability: Feb-2018

Peak Optimization Flags

C benchmarks:
619.lbm_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP

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-AVX512 -qopt-prefetch -ipo -O3
-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs

Benchmarks using both Fortran and C:
-prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512 -qopt-prefetch
-ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs

Benchmarks using Fortran, C, and C++:
-prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX512 -qopt-prefetch
-ipo -O3 -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP -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

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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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