## SPEC® CPU2017 Floating Point Speed Result

**Dell Inc.**

PowerEdge C6420 (Intel Xeon Bronze 3104, 1.70 GHz)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>36.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

### Threads

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>12</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>12</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>12</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>12</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>12</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>12</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>12</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>12</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>12</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>12</td>
</tr>
</tbody>
</table>

### Hardware

<table>
<thead>
<tr>
<th>CPU Name</th>
<th>Intel Xeon Bronze 3104</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz.</td>
<td>1700</td>
</tr>
<tr>
<td>Nominal</td>
<td>1700</td>
</tr>
<tr>
<td>Enabled</td>
<td>12 cores, 2 chips</td>
</tr>
<tr>
<td>Orderable</td>
<td>1.2 chips</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3</td>
<td>8.25 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2133)</td>
</tr>
<tr>
<td>Storage</td>
<td>480GB SATA SSD</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>OS</th>
<th>CentOS Linux release 7.4.1708 (Core)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiler</td>
<td>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</td>
</tr>
<tr>
<td>Parallel</td>
<td>Yes</td>
</tr>
<tr>
<td>Firmware</td>
<td>Version 1.0.8 released Jul-2017</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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SPECspeed2017_fp_base = 36.6
SPECspeed2017_fp_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>12</td>
<td>275</td>
<td>214</td>
<td>276</td>
<td>214</td>
<td>277</td>
<td>213</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>12</td>
<td>369</td>
<td>45.1</td>
<td>369</td>
<td>45.1</td>
<td>368</td>
<td>45.2</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>12</td>
<td>211</td>
<td>24.8</td>
<td>211</td>
<td>24.9</td>
<td>211</td>
<td>24.8</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>12</td>
<td>492</td>
<td>26.9</td>
<td>476</td>
<td>27.8</td>
<td>486</td>
<td>27.2</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>12</td>
<td>520</td>
<td>17.0</td>
<td>520</td>
<td>17.0</td>
<td>520</td>
<td>17.1</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>12</td>
<td>429</td>
<td>27.7</td>
<td>431</td>
<td>27.6</td>
<td>431</td>
<td>27.5</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>12</td>
<td>660</td>
<td>21.8</td>
<td>662</td>
<td>21.8</td>
<td>669</td>
<td>21.6</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>12</td>
<td>442</td>
<td>39.5</td>
<td>442</td>
<td>39.5</td>
<td>442</td>
<td>39.5</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>12</td>
<td>206</td>
<td>44.2</td>
<td>207</td>
<td>44.1</td>
<td>207</td>
<td>44.1</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>12</td>
<td>427</td>
<td>36.9</td>
<td>429</td>
<td>36.7</td>
<td>425</td>
<td>37.0</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 36.6
SPECspeed2017_fp_peak = Not Run

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
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
No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
No: 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.
No: 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.

This benchmark result is intended to provide perspective on past performance using the historical hardware and/or software described on this result page.

The system as described on this result page was formerly
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CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Dec-2017
Hardware Availability: Sep-2017
Software Availability: Sep-2017

General Notes (Continued)

generally available. At the time of this publication, it may not be shipping, and/or may not be supported, and/or may fail to meet other tests of General Availability described in the SPEC OSG Policy document, http://www.spec.org/osg/policy.html

This measured result may not be representative of the result that would be measured were this benchmark run with hardware and software available as of the publication date.

Platform Notes

BIOS settings:
Virtualization Technology disabled
System Profile set to Custom
CPU Power Management set to Maximum Performance
Memory Frequency set to Maximum Performance
Turbo Boost enabled
C States disabled
Memory Patrol Scrub disabled
PCI ASPM L1 Link Power Management disabled
Sysinfo program /root/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e456ad54c135fd618bccc091c0f
running on localhost.localdomain Fri Dec 15 05:50:00 2017

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see http://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
model name : Intel(R) Xeon(R) Bronze 3104 CPU @ 1.70GHz
  2 "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 : 6
  physical 0: cores 0 1 2 3 4 5
  physical 1: 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: 1

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

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**Dell Inc.**

**PowerEdge C6420 (Intel Xeon Bronze 3104, 1.70 GHz)**

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---

**Platform Notes (Continued)**

- Core(s) per socket: 6
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Bronze 3104 CPU @ 1.7GHz
- Stepping: 4
- CPU MHz: 1700.000
- BogoMIPS: 3400.00
- Virtualization: VT-x
- L1d cache: 32K
- L1i cache: 32K
- L2 cache: 1024K
- L3 cache: 8448K
- NUMA node0 CPU(s): 0,2,4,6,8,10
- NUMA nodel CPU(s): 1,3,5,7,9,11
- Flags: fpu vme de pse tsc msr pae mce cmovpat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 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 cpb cat_13 cdp_13 intel_pt tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavevc xsaves cqm_llc cqm_occmap_llc cqm_mbb_total cqm_mbb_local dtherm arat pln pts

`/proc/cpuinfo` cache data  
  `cache size : 8448 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  
  node 0 size: 96965 MB  
  node 0 free: 91223 MB  
  node 1 cpus: 1 3 5 7 9 11  
  node 1 size: 98304 MB  
  node 1 free: 94893 MB  
  node distances:  
    node 0 1  
    0: 10 21  
    1: 21 10

From `/proc/meminfo`  
  MemTotal: 196690028 KB

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

HugePages_Total: 128  
Hugepagesize: 2048 kB  

From /etc/*release* /etc/*version*  
- centos-release: CentOS Linux release 7.4.1708 (Core)  
- centos-release-upstream: Derived from Red Hat Enterprise Linux 7.4 (Source)  
- os-release:  
  - NAME="CentOS Linux"  
  - VERSION="7 (Core)"  
  - ID="centos"  
  - ID_LIKE="rhel fedora"  
  - VERSION_ID="7"  
  - PRETTY_NAME="CentOS Linux 7 (Core)"  
  - ANSI_COLOR="0;31"  
  - CPE_NAME="cpe:/o:centos:centos:7"  
- redhat-release: CentOS Linux release 7.4.1708 (Core)  
- system-release: CentOS Linux release 7.4.1708 (Core)  
- system-release-cpe: cpe:/o:centos:centos:7  

uname -a:  
```
Linux localhost.localdomain 3.10.0-693.5.2.el7.x86_64 #1 SMP Fri Oct 20 20:32:50 UTC 2017 x86_64 x86_64 x86_64 GNU/Linux
```
run-level 3 Dec 15 00:07  

SPEC is set to: /root/cpu2017  
- Filesystem Type Size Used Avail Use% Mounted on  
  - /dev/sda2 xfs 433G 21G 412G 5% /  

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. 1.0.8 07/12/2017  
- Memory:  
  - 12x 002C00B3002C 18ASF2G7PDZ-2G6D1 16 GB 2 rank 2666, configured at 2133  
  - 4x Not Specified Not Specified  

(End of data from sysinfo program)
Dell Inc.

PowerEdge C6420 (Intel Xeon Bronze 3104, 1.70 GHz)

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**SPEC CPU2017 Floating Point Speed Result**

**SPECspeed2017_fp_base = 36.6**

**SPECspeed2017_fp_peak = Not Run**

---

**Compiler Version Notes (Continued)**

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

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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  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.

---

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

---

**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
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---

**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
-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`

(Continued on next page)
Dell Inc.  
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**Base Other Flags (Continued)**

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

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