Dell Inc.
PowerEdge FC640 (Intel Xeon Platinum 8153, 2.00 GHz)

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

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base = 90.7</th>
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<tbody>
<tr>
<td>SPECspeed2017_fp_peak = Not Run</td>
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</tbody>
</table>

**Threads**

<table>
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<tr>
<th>SPECspeed2017_fp_base (90.7)</th>
</tr>
</thead>
</table>

**Hardware**

CPU Name: Intel Xeon Platinum 8153
Max MHz.: 2800
Nominal: 2000
Enabled: 32 cores, 2 chips, 2 threads/core
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: 22 MB I+D on chip per chip
Other: None
Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R)
Storage: 960 GB SATA SSD
Other: None

**Software**

OS: SUSE Linux Enterprise Server 12 SP2 (x86_64)
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 1.0.0 released Aug-2017
File System: btrfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None
## SPEC CPU2017 Floating Point Speed Result

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**SPECspeed2017_fp_base =** 90.7  
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### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>64</td>
<td>130</td>
<td>455</td>
<td>130</td>
<td>455</td>
<td>129</td>
<td>456</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>64</td>
<td>146</td>
<td>114</td>
<td>145</td>
<td>115</td>
<td>145</td>
<td>115</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>64</td>
<td>134</td>
<td>39.1</td>
<td>135</td>
<td>38.8</td>
<td>135</td>
<td>38.8</td>
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<tr>
<td>621.wrf_s</td>
<td>64</td>
<td>208</td>
<td>63.7</td>
<td>209</td>
<td>63.4</td>
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<td>63.6</td>
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<tr>
<td>627.cam4_s</td>
<td>64</td>
<td>123</td>
<td>72.0</td>
<td>123</td>
<td>71.8</td>
<td>123</td>
<td>72.1</td>
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<tr>
<td>628.pop2_s</td>
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<td>219</td>
<td>54.2</td>
<td>218</td>
<td>54.6</td>
<td>217</td>
<td>54.7</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>64</td>
<td>204</td>
<td>70.8</td>
<td>204</td>
<td>70.7</td>
<td>204</td>
<td>70.7</td>
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<tr>
<td>644.nab_s</td>
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<td>114</td>
<td>154</td>
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<td>114</td>
<td>154</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>64</td>
<td>131</td>
<td>69.6</td>
<td>130</td>
<td>69.9</td>
<td>137</td>
<td>66.8</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>64</td>
<td>161</td>
<td>97.7</td>
<td>159</td>
<td>99.1</td>
<td>161</td>
<td>98.1</td>
</tr>
</tbody>
</table>

**SPECspeed2017_fp_base =** 90.7  
**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

(Continued on next page)
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---

**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](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 96c45e4568ad54c135fd618bccc091c0f  
running on linux-u8yg Tue Nov 21 06:44:49 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

From /proc/cpuinfo

model name : Intel(R) Xeon(R) Platinum 8153 CPU @ 2.00GHz  
2 "physical id"s (chips)  
64 "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 : 16
siblings : 32
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
```

From lscpu:

Architecture: x86_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 64  
On-line CPU(s) list: 0-63  
Thread(s) per core: 2

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

Core(s) per socket: 16
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8153 CPU @ 2.00GHz
Stepping: 4
CPU MHz: 2000.093
BogoMIPS: 4000.18
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60
NUMA node1 CPU(s): 1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61
NUMA node2 CPU(s): 2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62
NUMA node3 CPU(s): 3,7,11,15,19,23,27,31,35,39,43,47,51,55,59,63
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 rdtsdp
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 sdbg
fma cx16 xtrm pdcn pcid cca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb pln pts dtherm intel_pt
tpr_shadow vmmx flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
ers invpcid rtm cmp mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd
avx512bw avx512vl xsaveopt xsavec xgetbv1 cmp_11c cmp_occup_llc

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 4 8 12 16 20 24 28 32 36 40 44 48 52 56 60
node 0 size: 46971 MB
node 0 free: 43345 MB
node 1 cpus: 1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61
node 1 size: 48369 MB
node 1 free: 47150 MB
node 2 cpus: 2 6 10 14 18 22 26 30 34 38 42 46 50 54 58 62
node 2 size: 48369 MB
node 2 free: 47839 MB
node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47 51 55 59 63
node 3 size: 48366 MB
node 3 free: 47226 MB

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

```plaintext
node distances:
node   0   1   2   3
0:  10  21  11  21
1:  21  10  21  11
2:  11  21  10  21
3:  21  11  21  10
```

From `/proc/meminfo`
- MemTotal: 196687100 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

From `/etc/*release* /etc/*version*`
- SuSE-release:
  - SUSE Linux Enterprise Server 12 (x86_64)
  - 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-u8yg 4.4.16-56-default #1 SMP Mon Aug 8 14:24:26 UTC 2016 (5b281a8) x86_64 x86_64 GNU/Linux

run-level 3 Nov 18 02:07

SPEC is set to: /root/cpu2017

```
<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda1</td>
<td>btrfs</td>
<td>921G</td>
<td>37G</td>
<td>883G</td>
<td>5%</td>
<td></td>
</tr>
</tbody>
</table>
```

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. 1.0.0 08/10/2017
- Memory:
  - 12x 00AD00B300AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666
  - 4x Not Specified Not Specified

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**Platform Notes (Continued)**

(End of data from sysinfo program)

**Compiler Version Notes**

```plaintext
==============================================================================
 CC 619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)
 i cc (ICC) 18.0.0 20170811
 Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

==============================================================================
 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

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

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-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
```

**Fortran benchmarks:**
```
-DSPEC_OPENMP -xCORE-AVX512 -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-AVX512 -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-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -align array32byte
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### 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`

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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