# SPEC® CPU2017 Floating Point Speed Result

## Dell Inc.

### PowerEdge M640 (Intel Xeon Gold 6140, 2.30 GHz)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base =</th>
<th>103</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak =</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 55  
**Test Date:** Nov-2017

**Test Sponsor:** Dell Inc.  
**Hardware Availability:** Sep-2017

**Tested by:** Dell Inc.  
**Software Availability:** Sep-2017

### Threads

<table>
<thead>
<tr>
<th>Thread</th>
<th>Threads</th>
<th>SPECspeed2017_fp_base (103)</th>
</tr>
</thead>
<tbody>
<tr>
<td>bwaves</td>
<td>72</td>
<td>128</td>
</tr>
<tr>
<td>cactuBSSN</td>
<td>72</td>
<td>38.9</td>
</tr>
<tr>
<td>lbm</td>
<td>72</td>
<td>77.8</td>
</tr>
<tr>
<td>wrf</td>
<td>72</td>
<td>94.2</td>
</tr>
<tr>
<td>cam4</td>
<td>72</td>
<td>59.9</td>
</tr>
<tr>
<td>pop2</td>
<td>72</td>
<td>101</td>
</tr>
<tr>
<td>imagick</td>
<td>72</td>
<td>199</td>
</tr>
<tr>
<td>nab</td>
<td>72</td>
<td>75.4</td>
</tr>
<tr>
<td>fotonik3d</td>
<td>72</td>
<td>101</td>
</tr>
<tr>
<td>roms</td>
<td>72</td>
<td>394</td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Gold 6140  
- **Max MHz.:** 3700
- **Nominal:** 2300
- **Enabled:** 36 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:** 24.75 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 SP3 (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
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SPECspeed2017_fp_base = 103
SPECspeed2017_fp_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base Threads</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Peak Threads</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>72</td>
<td>146</td>
<td>403</td>
<td>152</td>
<td>388</td>
<td>150</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>72</td>
<td>131</td>
<td>128</td>
<td>130</td>
<td>128</td>
<td>131</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>72</td>
<td>135</td>
<td>38.9</td>
<td>134</td>
<td>39.1</td>
<td>138</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>72</td>
<td>170</td>
<td>78.0</td>
<td>170</td>
<td>77.8</td>
<td>171</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>72</td>
<td>94.3</td>
<td>93.9</td>
<td>94.1</td>
<td>94.2</td>
<td>94.1</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>72</td>
<td>197</td>
<td>60.4</td>
<td>200</td>
<td>59.5</td>
<td>198</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>72</td>
<td>143</td>
<td>101</td>
<td>143</td>
<td>101</td>
<td>143</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>72</td>
<td>87.8</td>
<td>199</td>
<td>87.7</td>
<td>199</td>
<td>87.9</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>72</td>
<td>122</td>
<td>74.8</td>
<td>120</td>
<td>75.9</td>
<td>121</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>72</td>
<td>155</td>
<td>102</td>
<td>157</td>
<td>100</td>
<td>155</td>
</tr>
</tbody>
</table>

SPECspeed2017_fp_base = 103
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.

(Continued on next page)
Dell Inc. 

PowerEdge M640 (Intel Xeon Gold 6140, 2.30 GHz)

**SPEC CPU2017 Floating Point Speed Result**

Dell Inc. 

**SPECspeed2017_fp_base = 103**

**SPECspeed2017_fp_peak = Not Run**

---

**General Notes (Continued)**

The system as described on this result page was formerly 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 96c45e4568ad54c135fd618bcc091c0f
running on linux-ejwa Fri Nov 17 06:42:00 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

From /proc/cpuinfo

```
model name : Intel(R) Xeon(R) Gold 6140 CPU @ 2.30GHz
  2 "physical id"s (chips)
  72 "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 : 18
siblings : 36
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
```

From lscpu:

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: LittleEndian
CPU(s): 72
On-line CPU(s) list: 0-71
```

(Continued on next page)
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**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.

#### Platform Notes (Continued)

| Thread(s) per core: | 2 |
| Core(s) per socket: | 18 |
| Socket(s): | 2 |
| NUMA node(s): | 2 |
| Vendor ID: | GenuineIntel |
| CPU family: | 6 |
| Model: | 85 |
| Model name: | Intel(R) Xeon(R) Gold 6140 CPU @ 2.30GHz |
| Stepping: | 4 |
| CPU MHz: | 2294.595 |
| BogoMIPS: | 4589.19 |
| Virtualization: | VT-x |
| L1d cache: | 32K |
| L1i cache: | 32K |
| L2 cache: | 1024K |
| L3 cache: | 25344K |

NUMA node0 CPU(s):  
0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62,64,66,68,70

NUMA node1 CPU(s):  
1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47,49,51,53,55,57,59,61,63,65,67,69,71

**Flags:**  
<table>
<thead>
<tr>
<th>fpu</th>
<th>vme</th>
<th>de</th>
<th>pse</th>
<th>msr</th>
<th>pe</th>
<th>mce</th>
<th>cx8</th>
<th>apic</th>
<th>sep</th>
<th>mtrr</th>
<th>pge</th>
<th>mca</th>
<th>cmov</th>
</tr>
</thead>
<tbody>
<tr>
<td>pat</td>
<td>pse36</td>
<td>clflush</td>
<td>dts</td>
<td>acpi</td>
<td>mmx</td>
<td>fxsr</td>
<td>sse</td>
<td>sse2</td>
<td>ss</td>
<td>ht</td>
<td>tm</td>
<td>pbe</td>
<td>syscall</td>
</tr>
</tbody>
</table>

/proc/cpuinfo cache data  
cache size : 25344 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 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 |
| node 0 size: | 95335 MB |
| node 0 free: | 91691 MB |

| node 1 cpus: | 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71 |
| node 1 size: | 96736 MB |
| node 1 free: | 95255 MB |

**node distances:**

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

```
node 0 1
  0: 10 21
  1: 21 10
```

From `/proc/meminfo`

```
MemTotal:       196682072 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

From `/etc/*release* /etc/*version*`

```
SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 3
  # 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-ejwa 4.4.70-2-default #1 SMP Wed Jun 7 15:12:06 UTC 2017 (4502c76) x86_64
  x86_64 x86_64 GNU/Linux
```

```
run-level 3 Nov 17 03:48
```

```
SPEC is set to: /root/cpu2017
```

```
    Filesystem      Type  Size  Used Avail Use% Mounted on
  /dev/sda3      btrfs  855G  28G  828G   4% /
```

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:
  9x 002C00B3002C 18ASF2G72PDZ-2G6D1 16 GB 2 rank 2666
  3x 00AD00B300AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666
  4x Not Specified Not Specified
```

(End of data from sysinfo program)
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### Compiler Version Notes

```plaintext
==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)  
------------------------------------------------------------------------------
icc (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.  
ncc (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)  
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ifort (IFORT) 18.0.0 20170811  
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Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
ncc (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`

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

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:

- [Dell-Platform-Flags-PowerEdge14G-revD.xml](http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge14G-revD.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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