Dell Inc.

PowerEdge R740xd2 (Intel Xeon Gold 6140, 2.30GHz)

SPECspeed2017_fp_base = 105
SPECspeed2017_fp_peak = 107

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

Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
<th>SPECspeed2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>36</td>
<td>40.5</td>
<td></td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>36</td>
<td>89.3</td>
<td></td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>644.nab_s</td>
<td>36</td>
<td>84.6</td>
<td></td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hardware

CPU Name: Intel Xeon Gold 6140
Max MHz.: 3700
Nominal: 2300
Enabled: 36 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: 24.75 MB I+D on chip per core
Other: None
Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R)
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
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Base</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</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>36</td>
<td>126</td>
<td>470</td>
<td>128</td>
<td>461</td>
<td>128</td>
<td>460</td>
<td>36</td>
<td>127</td>
<td>466</td>
<td>127</td>
<td>463</td>
<td>126</td>
<td>467</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>36</td>
<td>121</td>
<td>138</td>
<td>119</td>
<td>140</td>
<td>120</td>
<td>139</td>
<td>36</td>
<td>118</td>
<td>141</td>
<td>117</td>
<td>143</td>
<td>117</td>
<td>143</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>36</td>
<td>129</td>
<td>40.5</td>
<td>133</td>
<td>39.3</td>
<td>128</td>
<td>40.9</td>
<td>36</td>
<td>128</td>
<td>41.1</td>
<td>128</td>
<td>41.1</td>
<td>128</td>
<td>40.8</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>36</td>
<td>156</td>
<td>84.8</td>
<td>157</td>
<td>84.2</td>
<td>156</td>
<td>84.6</td>
<td>36</td>
<td>148</td>
<td>89.5</td>
<td>148</td>
<td>89.3</td>
<td>149</td>
<td>88.7</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>36</td>
<td>114</td>
<td>77.8</td>
<td>114</td>
<td>77.8</td>
<td>114</td>
<td>78.0</td>
<td>36</td>
<td>111</td>
<td>79.7</td>
<td>111</td>
<td>79.6</td>
<td>111</td>
<td>79.6</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>36</td>
<td>193</td>
<td>61.6</td>
<td>192</td>
<td>61.8</td>
<td>194</td>
<td>61.2</td>
<td>36</td>
<td>189</td>
<td>62.9</td>
<td>189</td>
<td>62.7</td>
<td>192</td>
<td>61.9</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>36</td>
<td>143</td>
<td>101</td>
<td>145</td>
<td>99.2</td>
<td>147</td>
<td>97.9</td>
<td>36</td>
<td>143</td>
<td>101</td>
<td>145</td>
<td>99.2</td>
<td>147</td>
<td>97.9</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>36</td>
<td>91.0</td>
<td>192</td>
<td>89.3</td>
<td>196</td>
<td>88.6</td>
<td>197</td>
<td>36</td>
<td>91.0</td>
<td>192</td>
<td>89.3</td>
<td>196</td>
<td>88.6</td>
<td>197</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>36</td>
<td>120</td>
<td>76.2</td>
<td>117</td>
<td>77.7</td>
<td>122</td>
<td>74.8</td>
<td>36</td>
<td>120</td>
<td>76.2</td>
<td>117</td>
<td>77.7</td>
<td>122</td>
<td>74.8</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>36</td>
<td>148</td>
<td>106</td>
<td>147</td>
<td>107</td>
<td>145</td>
<td>109</td>
<td>36</td>
<td>143</td>
<td>110</td>
<td>147</td>
<td>107</td>
<td>144</td>
<td>110</td>
</tr>
</tbody>
</table>

**SPECspeed2017_fp_base = 105**

**SPECspeed2017_fp_peak = 107**

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

Dell Inc. PowerEdge R740xd2 (Intel Xeon Gold 6140, 2.30GHz)

SPECspeed2017_fp_base = 105
SPECspeed2017_fp_peak = 107

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

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 Sun Nov 11 17:19:33 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 6140 CPU @ 2.30GHz
   2 "physical id"s (chips)
   36 "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 : 18
   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: Little Endian
CPU(s): 36
On-line CPU(s) list: 0-35
Thread(s) per core: 1
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: 2294.619
BogoMIPS: 4589.23
Virtualization: VT-x

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

Dell Inc.

PowerEdge R740xd2 (Intel Xeon Gold 6140, 2.30GHz)

SPECspeed2017_fp_base = 105
SPECspeed2017_fp_peak = 107

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

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

Platform Notes (Continued)

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
NUMA node1 CPU(s): 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35
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 art arch_perfmon pebs bts rep_good nop1 xtopology nonstop_tsc
aperfimperf 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 rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts
dtherm intel_pt rsb_ctxsw spec_ctrl retpoline kaiser tpr_shadow vmii flexpriority
epi vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erts invpcid rtm cqm mpx
avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt
xsavec xgetbv1 cqm_llc cqm_occup_llc pku ospke

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
 available: 2 nodes (0-1)
ode 0 cpus: 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34
node 0 size: 95284 MB
node 0 free: 89617 MB
node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35
node 1 size: 96748 MB
node 1 free: 94245 MB
node distances:
ode 0 1
  0: 10 21
  1: 21 10

From /proc/meminfo
 MemTotal: 196641940 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)
SPEC CPU2017 Floating Point Speed Result

Dell Inc. PowerEdge R740xd2 (Intel Xeon Gold 6140, 2.30GHz)

SPECspeed2017_fp_base = 105
SPECspeed2017_fp_peak = 107

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

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 11 12:03 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 18ASF2G72FD2-2G6E1 16 GB 2 rank 2666
4x Not Specified Not Specified

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  619.ibm_s(base) 638.imagick_s(base) 644.nab_s(base)
==============================================================================
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
## Dell Inc.

PowerEdge R740xd2 (Intel Xeon Gold 6140, 2.30GHz)

<table>
<thead>
<tr>
<th>SPECspeak2017_fp_base</th>
<th>SPECspeak2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>105</td>
<td>107</td>
</tr>
</tbody>
</table>

### Compiler Version Notes (Continued)

<table>
<thead>
<tr>
<th>Compiler</th>
<th>Version</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>icc (ICC)</td>
<td>18.0.2</td>
<td>20180210</td>
</tr>
<tr>
<td>Copyright (C)</td>
<td>1985-2018</td>
<td>Intel Corporation. All rights reserved.</td>
</tr>
</tbody>
</table>

(Continued on next page)
Dell Inc.

PowerEdge R740xd2 (Intel Xeon Gold 6140, 2.30GHz)

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>Dell Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>105</td>
<td>Test Date: Nov-2018</td>
</tr>
<tr>
<td>SPECspeed2017_fp_pea</td>
<td>Test Sponsor: Dell Inc.</td>
</tr>
<tr>
<td>107</td>
<td>Hardware Availability: Dec-2018</td>
</tr>
</tbody>
</table>

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 6140, 2.30GHz)

<table>
<thead>
<tr>
<th>SPEC Speed2017_fp_base = 105</th>
<th>SPEC Speed2017_fp_peak = 107</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dell Inc.</td>
<td>Dell Inc.</td>
</tr>
</tbody>
</table>

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

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

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

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

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 6140, 2.30GHz) SPECspeed2017_fp_base = 105 SPECspeed2017_fp_peak = 107

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

603.bwaves_s: -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

649.fotonik3d_s: basepeak = yes

654.roms_s: Same as 603.bwaves_s

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
## SPEC CPU2017 Floating Point Speed Result

### Dell Inc.

**PowerEdge R740xd2 (Intel Xeon Gold 6140, 2.30GHz)**

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>105</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>107</td>
</tr>
</tbody>
</table>

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

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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 2018-11-11 18:19:32-0500.  
Report generated on 2018-12-26 13:02:26 by CPU2017 PDF formatter v6067.  
Originally published on 2018-12-25.