Dell Inc.

PowerEdge T40 (Intel Pentium Gold G5400, 3.70GHz)  

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<td>Software Availability: Feb-2019</td>
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</tbody>
</table>

### CPU2017 License
- 55

### Tested by
- Dell Inc.

### Hardware
- **CPU Name:** Intel Pentium Gold G5400
- **Max MHz:** 3700
- **Nominal:** 3700
- **Enabled:** 2 cores, 1 chip, 2 threads/core
- **Orderable:** 1 chip
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 256 KB I+D on chip per core
- **L3:** 4 MB I+D on chip per core
- **Other:** None
- **Memory:** 64 GB (4 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)
- **Storage:** 1 x 960 GB SATA SSD
- **Other:** None

### Software
- **OS:** Ubuntu 18.04.2 LTS
- **Compiler:** C/C++: Version 19.0.0.117 of Intel C/C++ Compiler Build 20180804 for Linux;
  Fortran: Version 19.0.0.117 of Intel Fortran Compiler Build 20180804 for Linux
- **Parallel:** Yes
- **Firmware:** Version 0.1.3 released Apr-2019
- **File System:** ext4
- **System State:** Run level 5 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None
- **Power Management:** --

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_fp_base (13.3)</th>
<th>SPECspeed®2017_fp_peak (13.7)</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>2</td>
<td>15.7</td>
<td>17.8</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>2</td>
<td>10.6</td>
<td>13.7</td>
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<tr>
<td>619.lbm_s</td>
<td>2</td>
<td>6.48</td>
<td>14.0</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>2</td>
<td>8.34</td>
<td>12.3</td>
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<tr>
<td>627.cam4_s</td>
<td>2</td>
<td>10.8</td>
<td>16.2</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>2</td>
<td>13.4</td>
<td>16.9</td>
</tr>
<tr>
<td>638.imagick_s</td>
<td>2</td>
<td>4.56</td>
<td>13.5</td>
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<tr>
<td>644.nab_s</td>
<td>4</td>
<td>17.3</td>
<td>15.9</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>2</td>
<td>10.8</td>
<td>15.4</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>2</td>
<td>10.8</td>
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</tr>
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# SPEC CPU®2017 Floating Point Speed Result

## Dell Inc.

PowerEdge T40 (Intel Pentium Gold G5400, 3.70GHz)

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### SPECspeed®2017 fp_base = 13.3

### SPECspeed®2017 fp_peak = 13.7

## 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>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>2</td>
<td>908</td>
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<td>908</td>
<td>65.0</td>
<td>908</td>
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<tr>
<td>607.cactusBSSN_s</td>
<td>2</td>
<td>1050</td>
<td>15.7</td>
<td>1057</td>
<td>15.8</td>
<td>1053</td>
<td>15.8</td>
</tr>
<tr>
<td>619.lbm_s</td>
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<td>492</td>
<td>10.6</td>
<td>492</td>
<td>10.7</td>
<td>492</td>
<td>10.7</td>
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<tr>
<td>621.wrf_s</td>
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<td>948</td>
<td>14.0</td>
<td>865</td>
<td>15.3</td>
</tr>
<tr>
<td>627.cam4_s</td>
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<td>8.34</td>
<td>1063</td>
<td>8.34</td>
<td>819</td>
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<td>13.4</td>
<td>735</td>
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<td>3163</td>
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<td>13.5</td>
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<td>15.9</td>
<td>573</td>
<td>15.9</td>
<td>593</td>
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<tr>
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<td>1459</td>
<td>10.8</td>
<td>1459</td>
<td>10.8</td>
<td>1460</td>
<td>10.8</td>
</tr>
</tbody>
</table>

### 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,1,0"
- LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
- OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i9-799X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5

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:
- CPU Performance set to Maximum Performance
- C States set to Autonomous

(Continued on next page)
## Dell Inc.

PowerEdge T40 (Intel Pentium Gold G5400, 3.70GHz)

<table>
<thead>
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</table>

### Platform Notes (Continued)

C1E disabled  
Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
running on intel-sut Thu Apr 25 16:52:15 2019

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) Pentium(R) Gold G5400 CPU @ 3.70GHz
  1 "physical id"s (chips)
  4 "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 : 2
siblings : 4
physical 0: cores 0 1
```

From lscpu:

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 4
On-line CPU(s) list: 0-3
Thread(s) per core: 2
Core(s) per socket: 2
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 158
Model name: Intel(R) Pentium(R) Gold G5400 CPU @ 3.70GHz
Stepping: 10
CPU MHz: 3700.261
CPU max MHz: 3700.0000
CPU min MHz: 800.0000
BogoMIPS: 7392.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 4096K
NUMA node0 CPU(s): 0-3
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 nopl xtopology nonstop_tsc cpuid
```

(Continued on next page)
Dell Inc. PowerEdge T40 (Intel Pentium Gold G5400, 3.70GHz)

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

SPECspeed®2017_fp_base = 13.3
SPECspeed®2017_fp_peak = 13.7

Test Date: Apr-2019
Hardware Availability: Apr-2018
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Platform Notes (Continued)

aperfmperrf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 ssse3 sdbg
cx16 xtpr pdcms pcids se4_1 se4_2 x2apic movcr ept ptc prctl aes xsave
rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invpcid_single pti ssbd ibrs ibp
bstib tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust smp erms invpcid
mpx rdseed smap clflushopt intel_pt xsaveopt xsavec xgetbv1 xsavec dtherm arat pln
pts hwp hwp_notify hwp_act_window hwp_epp flush_l1d

/proc/cpuinfo cache data
cache size : 4096 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
available: 1 nodes (0)
node 0 cpus: 0 1 2 3
node 0 size: 64256 MB
node 0 free: 43989 MB
node distances:
node 0
0: 10

From /proc/meminfo
MemTotal: 65798712 kB
MemFree: 43989 MB

From /usr/bin/lsb_release -d
Ubuntu 18.04.2 LTS

From /etc/*release* /etc/*version*
debian_version: buster/sid
os-release:
NAME="Ubuntu"
VERSION="18.04.2 LTS (Bionic Beaver)"
ID=ubuntu
ID_LIKE=debian
PRETTY_NAME="Ubuntu 18.04.2 LTS"
VERSION_ID="18.04"
HOME_URL="https://www.ubuntu.com/
SUPPORT_URL="https://help.ubuntu.com/
uname -a:
Linux intel-sut 4.15.0-45-generic #48-Ubuntu SMP Tue Jan 29 16:28:13 UTC 2019 x86_64
x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2017-5754 (Meltdown): Mitigation: PTI

(Continued on next page)
Dell Inc.                                           SPECspeed®2017_fp_base = 13.3
PowerEdge T40 (Intel Pentium Gold G5400, 3.70GHz)  SPECspeed®2017_fp_peak = 13.7

CPU2017 License: 55                                    Test Date:    Apr-2019
Test Sponsor:        Dell Inc.                          Hardware Availability: Apr-2018
Tested by:          Dell Inc.                            Software Availability: Feb-2019

Platform Notes (Continued)
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Full generic retpoline, IBPB, IBRS_FW

run-level 5 Apr 24 13:22

SPEC is set to: /home/cpu2017
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda2      ext4  439G   36G  382G   9% /

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. 0.1.3 04/22/2019
Memory:
4x 80CE000080CE M391A2K43BB1-CTD 16 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
| 644.nab_s(base, peak)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
Fortran        | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
(Continued on next page)
Dell Inc.  
PowerEdge T40 (Intel Pentium Gold G5400, 3.70GHz)

SPEC CPU®2017 Floating Point Speed Result

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CPU2017 License: 55  
Test Sponsor: Dell Inc.  
Hardware Availability: Apr-2018

Compiler Version Notes (Continued)

<table>
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<tr>
<th>654.roms_s(base, peak)</th>
</tr>
</thead>
</table>
| Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.0.117 Build 20180804  
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

(Continued on next page)
SPEC CPU®2017 Floating Point Speed Result

Dell Inc.
PowerEdge T40 (Intel Pentium Gold G5400, 3.70GHz)

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

SPECspeed®2017_fp_base = 13.3
SPECspeed®2017_fp_peak = 13.7

Test Date: Apr-2019
Hardware Availability: Apr-2018
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Base Portability Flags (Continued)

644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
- xsSE4.2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
- qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
- DSPEC_OPENMP -xsSE4.2 -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:
- xsSE4.2 -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++:
- xsSE4.2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
- qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
- nostandard-realloc-lhs -align array32byte

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
Dell Inc.

PowerEdge T40 (Intel Pentium Gold G5400, 3.70GHz)

| SPECspeed\textsuperscript{\textregistered}2017\_fp\_base | 13.3 |
| SPECspeed\textsuperscript{\textregistered}2017\_fp\_peak | 13.7 |

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

Test Date: Apr-2019
Hardware Availability: Apr-2018
Software Availability: Feb-2019

**Peak Portability Flags**

Same as Base Portability Flags

**Peak Optimization Flags**

C benchmarks:

619.lbm\_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xSSE4.2
-qopt-prefetch -ipo -O3 -no-prec-div -ffinite-math-only
-qopt-mem-layout-trans=3 -DSPEC\_SUPPRESS\_OPENMP -qopenmp
-DSPEC\_OPENMP

638.imagick\_s: -xSSE4.2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC\_OPENMP

644.nab\_s: Same as 638.imagick\_s

Fortran benchmarks:

603.bwaves\_s: -prof-gen(pass 1) -prof-use(pass 2) -DSPEC\_SUPPRESS\_OPENMP
-DSPEC\_OPENMP -O2 -xSSE4.2 -qopt-prefetch -ipo -O3
-no-prec-div -ffinite-math-only -qopt-mem-layout-trans=3
-qopenmp -nostandard-realloc-lhs -align array32byte

649.fotonik3d\_s: Same as 603.bwaves\_s

654.roms\_s: -DSPEC\_OPENMP -xSSE4.2 -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:

621.wrf\_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xSSE4.2
-qopt-prefetch -ipo -O3 -no-prec-div -ffinite-math-only
-qopt-mem-layout-trans=3 -DSPEC\_SUPPRESS\_OPENMP -qopenmp
-DSPEC\_OPENMP -nostandard-realloc-lhs -align array32byte

627.cam4\_s: -xSSE4.2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC\_OPENMP -nostandard-realloc-lhs -align array32byte

628.pop2\_s: Same as 621.wrf\_s

(Continued on next page)
Dell Inc.

PowerEdge T40 (Intel Pentium Gold G5400, 3.70GHz)

| SPECspeed®2017_fp_base = 13.3 |
| SPECspeed®2017_fp_peak = 13.7 |

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

Test Date: Apr-2019
Hardware Availability: Apr-2018
Software Availability: Feb-2019

Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:
-xSSE4.2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -align array32byte

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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