Dell Inc.  
PowerEdge R740xd (Intel Xeon Bronze 3206R, 1.90 GHz)  

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base = 58.0</th>
<th>SPECspeed®2017_fp_peak = 58.7</th>
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<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base (58.0)</th>
<th>SPECspeed®2017_fp_peak (58.7)</th>
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<tbody>
<tr>
<td>603.bwaves_s 16</td>
<td>60.5</td>
<td>60.5</td>
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<tr>
<td>607.cactuBSSN_s 16</td>
<td>46.1</td>
<td>46.1</td>
</tr>
<tr>
<td>619.lbm_s 16</td>
<td>60.1</td>
<td>60.1</td>
</tr>
<tr>
<td>621.wrf_s 16</td>
<td>64.9</td>
<td>64.9</td>
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<tr>
<td>627.cam4_s 16</td>
<td>29.7</td>
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<tr>
<td>628.pop2_s 16</td>
<td>41.8</td>
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</tr>
<tr>
<td>638.imagick_s 16</td>
<td>34.7</td>
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<tr>
<td>644.nab_s 16</td>
<td>62.8</td>
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<tr>
<td>649.fotonik3d_s 16</td>
<td>53.2</td>
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</tr>
<tr>
<td>654.roms_s 16</td>
<td>61.2</td>
<td>61.2</td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Bronze 3206R  
- **Max MHz:** 1900  
- **Nominal:** 1900  
- **Enabled:** 16 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:** 11 MB I+D on chip per core  
- **Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2933V-R, running at 2133)  
- **Storage:** 1 x 960 GB SATA SSD  
- **Other:** None

**Software**

- **OS:** Ubuntu 18.04.2 LTS  
- **kernel 4.15.0-65-generic**  
- **Compiler:** C/C++: Version 19.0.4.227 of Intel C/C++ Compiler Build 20190416 for Linux; Fortran: Version 19.0.4.227 of Intel Fortran Compiler Build 20190416 for Linux
- **Parallel:** Yes  
- **Firmware:** Version 2.4.5 released Sep-2019  
- **File System:** ext4  
- **System State:** Run level 5 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 64-bit  
- **Other:** None  
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>259</td>
<td>259</td>
<td>259</td>
<td>259</td>
<td>259</td>
</tr>
</tbody>
</table>

### Operating System Notes

- Stack size set to unlimited using "ulimit -s unlimited"

### Environment Variables Notes

- Environment variables set by runcpu before the start of the run:
  - KMP_AFFINITY = "granularity=fine,compact"
  - LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64"
  - OMP_STACKSIZE = "192M"

### General Notes

- Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5
- NA: 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:
  ```
sync; echo 3 > /proc/sys/vm/drop_caches
  ```
Dell Inc.
PowerEdge R740xd (Intel Xeon Bronze 3206R, 1.90 GHz)

SPEC®2017_fp_base = 58.0
SPEC®2017_fp_peak = 58.7

Platform Notes

BIOS settings:
Virtualization Technology disabled
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
CPU Interconnect Bus Link Power Management enabled
PCI ASPM L1 Link Power Management enabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbe6e46a485a0011
running on intel-sut Mon Oct 21 23:32:42 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) Xeon(R) Bronze 3206R CPU @ 1.90GHz
  2 "physical id"'s (chips)
  16 "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 : 8
siblings : 8
physical 0: cores 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 1
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Bronze 3206R CPU @ 1.90GHz
Stepping: 7
CPU MHz: 1838.519
Dell Inc.
PowerEdge R740xd (Intel Xeon Bronze 3206R, 1.90 GHz)

SPEC CPU®2017 Floating Point Speed Result

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Dell Inc.

SPECspeed®2017_fp_base = 58.0
SPECspeed®2017_fp_peak = 58.7

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.
Test Date: Oct-2019
Hardware Availability: Feb-2020
Software Availability: Oct-2019

Platform Notes (Continued)

BogoMIPS: 3800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0,2,4,6,8,10,12,14
NUMA node1 CPU(s): 1,3,5,7,9,11,13,15
Flags: fpu vme de pse mcr pse36 cmip mx救 ssse2 sse3 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl apic 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 apic 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 apic 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 apic 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 apic 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 apic cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm 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avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm arat pin pts pku ospke avx512_vnni md_clear flush_l1d arch_capabilities
/prOC/cpuinfo cache data
  cache size : 11264 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
  node 0 size: 191895 MB
  node 0 free: 189971 MB
  node 1 cpus: 1 3 5 7 9 11 13 15
  node 1 size: 193533 MB
  node 1 free: 187616 MB
  node distances:
    node   0   1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 394680180 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

/usr/bin/lsb_release -d
  Ubuntu 18.04.2 LTS

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

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

Dell Inc.
PowerEdge R740xd (Intel Xeon Bronze 3206R, 1.90 GHz)

| SPECspeed®2017_fp_base = 58.0 |
| SPECspeed®2017_fp_peak = 58.7 |

**CPU2017 License:** 55
**Test Sponsor:** Dell Inc.
**Tested by:** Dell Inc.
**Test Date:** Oct-2019
**Hardware Availability:** Feb-2020
**Software Availability:** Oct-2019

Platform Notes (Continued)

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 4.15.0-65-generic #74-Ubuntu SMP Tue Sep 17 17:06:04 UTC 2019 x86_64
  x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swapsgs barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 5 Oct 21 14:16

SPEC is set to: /home/cpu2017
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda2 ext4 439G 42G 375G 10% /

From /sys/devices/virtual/dmi/id
  BIOS: Dell Inc. 2.4.5 09/22/2019
  Vendor: Dell Inc.
  Product: PowerEdge R740xd
  Product Family: PowerEdge
  Serial: F5BMCS2

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.

Memory:
  12x 002C069D002C 18ASF2G72PDZ-2G9E1 16 GB 2 rank 2933, configured at 2133
  7x 00AD00B300AD HMA82GR7CJR8N-WM 16 GB 2 rank 2933, configured at 2133

(Continued on next page)
## Dell Inc.

**PowerEdge R740xd (Intel Xeon Bronze 3206R, 1.90 GHz)**

<table>
<thead>
<tr>
<th>SPECspeed(^{®}2017) fp(_{\text{peak}})</th>
<th>58.7</th>
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<tbody>
<tr>
<td>SPECspeed(^{®}2017) fp(_{\text{base}})</td>
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**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Oct-2019  
**Hardware Availability:** Feb-2020  
**Software Availability:** Oct-2019

### Platform Notes (Continued)

5x 00AD063200AD HMA82GR7CJR8N-WM 16 GB 2 rank 2933, configured at 2133

(End of data from sysinfo program)

### Compiler Version Notes

#### C

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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 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 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

---

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,  
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Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

---

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

---

#### Fortran

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Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64,  
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---

#### Fortran, C

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---

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
## Dell Inc.

**PowerEdge R740xd (Intel Xeon Bronze 3206R, 1.90 GHz)**

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**CPU2017 License:** 55  
**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Oct-2019  
**Hardware Availability:** Feb-2020  
**Software Availability:** Oct-2019

### Compiler Version Notes (Continued)

Version 19.0.4.227 Build 20190416  
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### 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`  
- **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 -gopt-prefetch  
-ffinite-math-only -gopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
```

Fortran benchmarks:
```
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -gopt-prefetch  
-ffinite-math-only -gopt-mem-layout-trans=4 -qopenmp
```

(Continued on next page)
Dell Inc.
PowerEdge R740xd (Intel Xeon Bronze 3206R, 1.90 GHz)

<table>
<thead>
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</tbody>
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### Base Optimization Flags (Continued)

For Fortran benchmarks (continued):
- `-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=4 -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=4 -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

### Peak Optimization Flags

C benchmarks:
- `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`
- `-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP`

Fortran benchmarks:
Dell Inc.  
PowerEdge R740xd (Intel Xeon Bronze 3206R, 1.90 GHz)

SPECspeed®2017_fp_base = 58.0  
SPECspeed®2017_fp_peak = 58.7

CPU2017 License: 55  
Test Sponsor: Dell Inc.

Test Date: Oct-2019
Tested by: Dell Inc.
Hardware Availability: Feb-2020  
Software Availability: Oct-2019

Peak Optimization Flags (Continued)

603.bwaves_s: basepeak = yes
649.fotonik3d_s: basepeak = yes
654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:
621.wrf_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=4 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

627.cam4_s: basepeak = yes
628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:
607.cactuBSSN_s: basepeak = yes

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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