## SPEC CPU®2017 Floating Point Speed Result

### Dell Inc.
PowerEdge FC640 (Intel Xeon Gold 6212U, 2.40GHz)

<table>
<thead>
<tr>
<th>Thread</th>
<th>SPECspeed®2017_fp_base = 91.1</th>
<th>SPECspeed®2017_fp_peak = 91.6</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td></td>
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<tr>
<td>607.cactuBSSN_s</td>
<td></td>
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<tr>
<td>619.lbm_s</td>
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<tr>
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<td>627.cam4_s</td>
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</tr>
<tr>
<td>654.roms_s</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Hardware
- **CPU Name:** Intel Xeon Gold 6212U
- **Max MHz:** 3900
- **Nominal:** 2400
- **Enabled:** 24 cores, 1 chip
- **Orderable:** 1 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 1 MB I+D on chip per core
- **L3:** 35.75 MB I+D on chip per chip
- **Other:** None
- **Memory:** 192 GB (6 x 32 GB 2Rx4 PC4-2933Y-R)
- **Storage:** 1 x 480 GB SATA SSD
- **Other:** None

### Software
- **OS:** Ubuntu 18.04.2 LTS
- **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 2.2.11 released Jun-2019
- **File System:** ext4
- **System State:** Run level 5 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None
- **Power Management:** --

---

Test Date: Aug-2019
Hardware Availability: Apr-2019
Software Availability: Jul-2019
Dell Inc.
PowerEdge FC640 (Intel Xeon Gold 6212U, 2.40GHz)

SPECspeed®2017_fp_base = 91.1
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CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

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Results Table

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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
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</tbody>
</table>

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,scatter"
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64"
OMP_STACKSIZE = "192M"

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

Platform Notes

BIOS settings:
ADDDC setting disabled
Sub NUMA Cluster disabled
Virtualization Technology disabled

(Continued on next page)
Dell Inc.

PowerEdge FC640 (Intel Xeon Gold 6212U, 2.40GHz)

CPU2017 License: 55
Test Sponsor: Dell Inc.
Test Date: Aug-2019
Tested by: Dell Inc.

SPECspeed®2017_fp_base = 91.1
SPECspeed®2017_fp_peak = 91.6

Platform Notes (Continued)

DCU Streamer Prefetcher 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
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 9bcdc8f2999c33d61f64985e45859ea9
running on intel-sut Sun Aug 11 21:53:01 2019

SUT (System Under Test) info as seen by some common utilities.

From /proc/cpuinfo

model name : Intel(R) Xeon(R) Gold 6212U CPU @ 2.40GHz
  1 "physical id"s (chips)
  24 "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 : 24
  siblings : 24
  physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29

From lscpu:

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 24
On-line CPU(s) list: 0-23
Thread(s) per core: 1
Core(s) per socket: 24
Socket(s): 1
NUMA node(s): 1
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6212U CPU @ 2.40GHz
Stepping: 6
CPU MHz: 2509.357
BogoMIPS: 4800.00
Virtualization: VT-x

(Continued on next page)
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Hardware Availability: Apr-2019
Software Availability: Jul-2019

Platform Notes (Continued)

L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-23
Flags: fpu vme de pse tsc msr pae mce cx8 apa sep mtrr pge mca cmov
pat pse36 clflush dts ept est tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpnpe pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrm pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt aes xsave avx f16c rdrand
lahf_lm abm 3nowprefetch cpuid_fault ebpx cat_l3 cdp_l3 invpcid_single intel_pinn
ssbd mba ibrs ibp1 stibp ibrs_enhanced tpr_shadow vni1m flexpriority ept vpid
fs.gsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f
avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsaves cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local
dtherm ida arat pln pts pkup ospke avx512_vnni md_clear flush_lid arch_capabilities

/pro/cpuserinfo cache data
  cache size : 36608 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 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
  node 0 size: 191890 MB
  node 0 free: 183967 MB
  node distances:
    node 0 0: 10

From /proc/meminfo
  MemTotal: 196496000 KB
  HugePages_Total: 0
  Hugepagesize: 2048 KB

/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"

(Continued on next page)
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** SPECsped®2017_fp_base = 91.1 **

** SPECsped®2017_fp_peak = 91.6 **

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** Platform Notes (Continued) **

HOME_URL="https://www.ubuntu.com/"
SUPPORT_URL="https://help.ubuntu.com/"

uname -a:

```
Linux intel-sut 4.15.0-55-generic #60-Ubuntu SMP Tue Jul 2 18:22:20 UTC 2019 x86_64
x86_64 x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

- CVE-2017-5754 (Meltdown): Not affected
- CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
- CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 5 Aug 11 17:08

SPEC is set to: /home/cpu2017

```
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 ext4 439G 41G 376G 10% /
```

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. 2.2.11 06/14/2019
- Memory:
  - 6x 00AD063200AD HMA84GR7CJR4N-WM 32 GB 2 rank 2933
  - 10x Not Specified Not Specified

(End of data from sysinfo program)

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** 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,
Intel(R) C++    Intel(R) 64 Compiler for applications running on Intel(R) 64,
```

(Continued on next page)
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Compiler Version Notes (Continued)

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,
Version 19.0.4.227 Build 20190416
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.

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
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Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.hm_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=4 -qopenmp -DSPEC_OPENMP

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

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

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:
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=4 -qopenmp -nostandard-realloc-lhs

649.fotonik3d_s: Same as 603.bwaves_s

654.roms_s: -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs

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: -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs

628.pop2_s: Same as 621.wrf_s

(Continued on next page)
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**Peak Optimization Flags (Continued)**

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

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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