## SPEC CPU®2017 Floating Point Speed Result

### Dell Inc.

**PowerEdge MX750c (Intel Xeon Gold 5318S, 2.10 GHz)**

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>169</th>
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</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>172</td>
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</tbody>
</table>

### Test Details

- **CPU2017 License:** 55
- **Test Sponsor:** Dell Inc.
- **Test Date:** May-2021
- **Hardware Availability:** Apr-2021
- **Tested by:** Dell Inc.
- **Software Availability:** Dec-2020

### Software

- **OS:** Red Hat Enterprise Linux 8.3 (Ootpa) 4.18.0-240.el8.x86_64
- **Compiler:**
  - C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux;
  - Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux;
  - C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux
- **Parallel:** Yes
- **Firmware:** Version 1.1.3 released Apr-2021
- **File System:** tmpfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** jemalloc memory allocator V5.0.1
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage.

### Hardware

- **CPU Name:** Intel Xeon Gold 5318S
- **Max MHz:** 3400
- **Nominal:** 2100
- **Enabled:** 48 cores, 2 chips
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 48 KB D on chip per core
- **L2:** 1.25 MB I+D on chip per core
- **L3:** 36 MB I+D on chip per core
- **Other:** None
- **Memory:** 1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R, running at 2933)
- **Storage:** 125 GB on tmpfs
- **Other:** None

### Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
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<th>SPECspeed®2017_fp_peak</th>
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<td>48</td>
<td>207</td>
<td>636</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>48</td>
<td>123</td>
<td>640</td>
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<td>619.ibm_s</td>
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<td>621.wrf_s</td>
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<td>118</td>
<td>120</td>
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<tr>
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<td>48</td>
<td>74.5</td>
<td>150</td>
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<tr>
<td>628.pop2_s</td>
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<td>146</td>
<td>180</td>
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<tr>
<td>638.imagick_s</td>
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<td>649.fotonik3d_s</td>
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<th>Ratio</th>
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<td>213</td>
<td>74.0</td>
<td>213</td>
<td>74.0</td>
</tr>
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</table>

SPECspeed®2017_fp_base = 169
SPECspeed®2017_fp_peak = 172

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"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/mnt/ramdisk/cpu2017-1.1.7-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.7-ic2021.1/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0

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

(Continued on next page)
General Notes (Continued)

Filesystem page cache synced and cleared with:
sync; echo 3>/proc/sys/vm/drop_caches
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Benchmark run from a 125 GB ramdisk created with the cmd: "mount -t tmpfs -o size=125G tmpfs /mnt/ramdisk"

Platform Notes

BIOS settings:
 Logical Processor : Disabled
 Virtualization Technology : Disabled

 System Profile : Custom
 CPU Power Management : Maximum Performance
 C1E : Disabled
 C States : Autonomous
 Memory Patrol Scrub : Disabled
 Energy Efficiency Policy : Performance
 CPU Interconnect Bus Link
 Power Management : Disabled

Sysinfo program /mnt/ramdisk/cpu2017-1.1.7-ic2021.1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost.localdomain Sat May 22 22:33:44 2021

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 5318S CPU @ 2.10GHz
  2 "physical id"s (chips)
  48 "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 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
## Platform Notes (Continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
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<tr>
<td>CPUs</td>
<td>48</td>
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<tr>
<td>On-line CPU(s) list</td>
<td>0-47</td>
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<tr>
<td>Thread(s) per core</td>
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<tr>
<td>Core(s) per socket</td>
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<tr>
<td>Socket(s)</td>
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<tr>
<td>Model</td>
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<tr>
<td>Model name</td>
<td>Intel(R) Xeon(R) Gold 5318S CPU @ 2.10GHz</td>
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<tr>
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<td>CPU MHz</td>
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<td>L1i cache</td>
<td>32K</td>
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<td>L2 cache</td>
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<td>L3 cache</td>
<td>36864K</td>
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<tr>
<td>NUMA node0 CPU(s)</td>
<td>0-23</td>
</tr>
<tr>
<td>NUMA nodel CPU(s)</td>
<td>24-47</td>
</tr>
</tbody>
</table>

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 rdtsscp
- lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
- aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
- xtr prsd pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
- xsave avx f16c rdrand lahf_lm abhm 3nowprefetch cpuid_fault epb cat_l3 invpcid_single
- intel_pinn ssbd mb ams ibs ibpb stibp ibrs enhancements fsbudget tsc_adjust bmi1 hle
- avx2 smep bmi2 erms invpcmi cpuid rdtd spfd edx smap avx512fma
- clflushopt clwb intel_pt avx512cd sha Nielsen avx512bw avx512vl xsaveopt xsave xsetgbvl
- xsave cmm lcc cmm_occupa lcc cmm_mbm_total cmm_mbm_local split_lock_detect wbinvd
- dtherm ida arat pln pts avx512vbmi umip pku ospke avx512_vbm12 gfni vaes
- vpcmllq dq avx512_vni avx512_bitalg tme avx512_vpmcott dq 1a57 rdpid md_clear pconfig flush_l1d
- arch_capabilities

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 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: 495765 MB
node 0 free: 503819 MB
node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
node 1 size: 495945 MB
node 1 free: 510825 MB

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

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PowerEdge MX750c (Intel Xeon Gold 5318S, 2.10 GHz)

SPECspeed®2017_fp_base = 169
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CPU2017 License: 55

Test Date: May-2021

Test Sponsor: Dell Inc.

Hardware Availability: Apr-2021

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Platform Notes (Continued)

node distances:

node 0 1
  0: 10 20
  1: 20 10

From /proc/meminfo

MemTotal: 1056291644 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sbin/tuned-adm active

Current active profile: throughput-performance

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

os-release:

NAME="Red Hat Enterprise Linux"
VERSION="8.3 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.3"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:

Linux localhost.localdomain 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit):

Not affected

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

CVE-2020-0543 (Special Register Buffer Data Sampling):

Not affected

CVE-2019-11135 (TSX Asynchronous Abort):

Not affected

(Continued on next page)
Dell Inc.  

PowerEdge MX750c (Intel Xeon Gold 5318S, 2.10 GHz)

Specspeed\textsuperscript{\textregistered}2017\textsuperscript{\textregistered}fp\_peak = 172

Specspeed\textsuperscript{\textregistered}2017\textsuperscript{\textregistered}fp\_base = 169

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Platform Notes (Continued)

run-level 3 May 22 19:48

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.7-ic2021.1

Filesystem Type Size Used Avail Use\% Mounted on
	tmpfs tmpfs 125G 11G 115G 9\% /mnt/ramdisk

From /sys/devices/virtual/dmi/id

Vendor: Dell Inc.

Product: PowerEdge MX750c

Product Family: PowerEdge

Serial: 1234567

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:

16x 00AD063200AD HMAA8GR7AJR4N-XN 64 GB 2 rank 3200, configured at 2933

16x Not Specified Not Specified

BIOS:

BIOS Vendor: Dell Inc.

BIOS Version: 1.1.3

BIOS Date: 04/27/2021

BIOS Revision: 1.1

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C | 619.lbm\_s(base, peak) 638.imagick\_s(base, peak)
644.nab\_s(base)
==============================================================================

Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
64, Version 2021.1 Build 20201112\_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
C | 644.nab\_s(peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

(Continued on next page)
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**SPECspeed®2017_fp_peak = 172**  
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Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  
Intel (R) C Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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**Base Compiler Invocation**

C benchmarks:
icc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

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.population_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:
-m64 -std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch  
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP  
-mbranches-within-32B-boundaries

(Continued on next page)
Dell Inc.

PowerEdge MX750c (Intel Xeon Gold 5318S, 2.10 GHz)

SPECspeed®2017_fp_base = 169
SPECspeed®2017_fp_peak = 172

Base Optimization Flags (Continued)

Fortran benchmarks:
- m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3
- no-prec-div -qopt-prefetch -ffinite-math-only
- qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs
- mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib
- ljemalloc

Benchmarks using both Fortran and C:
- m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
- DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs
- L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
- m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
- DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs
- L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Peak Compiler Invocation

C benchmarks (except as noted below):
icc

644.nab_s: icx

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

Peak Portability Flags

Same as Base Portability Flags
Peak Optimization Flags

C benchmarks:
619.lbm_s: basepeak = yes
638.imagick_s: basepeak = yes
644.nab_s: -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-fito -mfpmath=sse -funroll-loops -fiopenmp
-DSPEC_OPENMP -gopt-mem-layout=trans=4
-fimf-accuracy-bits=14:sqrt
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:
603.bwaves_s: -m64 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -ipo -xCORE-AVX512
-O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout=trans=4 -qopenmp -nostandard-realloc-lhs
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
649.fotonik3d_s: Same as 603.bwaves_s
654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:
621.wrf_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1)
-prof-use(pass 2) -ipo -xCORE-AVX512 -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-mbranches-within-32B-boundaries -nostandard-realloc-lhs
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
627.cam4_s: basepeak = yes
628.pop2_s: basepeak = yes

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

PowerEdge MX750c (Intel Xeon Gold 5318S, 2.10 GHz)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_peak</th>
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CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: May-2021
Hardware Availability: Apr-2021
Software Availability: Dec-2020

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-ic2021-official-linux64_revA.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.1.7 on 2021-05-22 22:33:43-0400.
Originally published on 2021-07-06.