## Dell Inc.

**PowerEdge MX750c (Intel Xeon Platinum 8362, 2.80 GHz)**

### SPEC CPU 2017 Floating Point Speed Result

<table>
<thead>
<tr>
<th>Test Date:</th>
<th>Jun-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Apr-2021</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2020</td>
</tr>
</tbody>
</table>

### Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>64</td>
<td>275</td>
<td>340</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>64</td>
<td>131</td>
<td>165</td>
</tr>
<tr>
<td>619.ibm_s</td>
<td>64</td>
<td></td>
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</tr>
<tr>
<td>621.wrf_s</td>
<td>64</td>
<td>216</td>
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</tr>
<tr>
<td>627.cam4_s</td>
<td>64</td>
<td>165</td>
<td></td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>64</td>
<td>88.9</td>
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<tr>
<td>638.imagick_s</td>
<td>64</td>
<td>218</td>
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</tr>
<tr>
<td>644.nab_s</td>
<td>64</td>
<td>460</td>
<td></td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>64</td>
<td>115</td>
<td></td>
</tr>
<tr>
<td>654.roms_s</td>
<td>64</td>
<td>273</td>
<td></td>
</tr>
</tbody>
</table>

### Hardware

- **CPU Name:** Intel Xeon Platinum 8362
- **Max MHz:** 3600
- **Nominal:** 2800
- **Enabled:** 64 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:** 48 MB I+D on chip per chip
- **Memory:** 1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R)
- **Storage:** 125 GB on tmpfs
- **Other:** None

### 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.
## 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>64</td>
<td>79.8</td>
<td>80.6</td>
<td>740</td>
<td>80.6</td>
<td>732</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<td>59.9</td>
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<td>139</td>
<td>37.7</td>
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<td>64</td>
<td>60.5</td>
<td>61.3</td>
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<td>53.6</td>
<td>53.6</td>
<td>165</td>
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<td>134</td>
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<td>88.9</td>
<td>134</td>
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<td>638.imagick_s</td>
<td>64</td>
<td>66.2</td>
<td>66.2</td>
<td>218</td>
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<tr>
<td>644.nab_s</td>
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<td>649.fotonik3d_s</td>
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<td>654.roms_s</td>
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<td>56.1</td>
<td>273</td>
<td>56.1</td>
<td>281</td>
<td>56.1</td>
</tr>
</tbody>
</table>

**SPECspeed\textsuperscript{\textregistered}2017\_fp\_base = 220**

**SPECspeed\textsuperscript{\textregistered}2017\_fp\_peak = 222**

- 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)
Dell Inc.
PowerEdge MX750c (Intel Xeon Platinum 8362, 2.80 GHz)

SPECspeed®2017_fp_base = 220
SPECspeed®2017_fp_peak = 222

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

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

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
PCI ASPM L1 Link
  Power Management : Disabled

Sysinfo program /mnt/ramdisk/cpu2017-1.1.7-ic2021.1/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080af6ea89d4b38e2f1c
running on localhost.localdomain Thu Jun 17 01:47:48 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) Platinum 8362 CPU @ 2.80GHz
  2 "physical id"s (chips)
  64 "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 : 32
siblings : 32
physical 0: cores 0 1 2 3 4 5 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
  28 29 30 31
physical 1: cores 0 1 2 3 4 5 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
  28 29 30 31
(Continued on next page)
From lscpu:

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 64
On-line CPU(s) list: 0-63
Thread(s) per core: 1
Core(s) per socket: 32
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Platinum 8362 CPU @ 2.80GHz
Stepping: 6
CPU MHz: 3500.000
BogoMIPS: 5600.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 49152K
NUMA node0 CPU(s):
0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58
NUMA node1 CPU(s):
1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47,49,51,53,55,57,59
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 arch_perfmon pebs bts rep_good nopl xtopology nonstop-tsc cpuid
aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 ssbd fma cx16
xtrr pdcm dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 invpcid_single
intel_pinn ssbd mba ibrs ibpb stibp ibrs_enhanced fs.gsbase tsc_adjust bmi1 hle avx2
smep bmi2 erms invpcid cmqm rdts a avx512f avx512dq rdseed adx smap avx512ifma
clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaves opt xsave xgetbv
xsaves cmqm llc cmqm_occup_llc cmqm_mb_total cmqm_mb_local split_lock_detect wbinvnd
dtherm ida arat pln pts avx512vbmi umip pku ospke avx512_vbmi2 gfn vaes vpclmulqdq
avx512_vnni avx512_bitalg tme avx512_vpopcntdq lal57 rdpid md_clear pconfig flush_lld
arch_capabilities

/proc/cpuinfo cache data
cache size: 49152 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a

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

Dell Inc.

PowerEdge MX750c (Intel Xeon Platinum 8362, 2.80 GHz)

SPECspeed®2017_fp_base = 220
SPECspeed®2017_fp_peak = 222

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

Test Date: Jun-2021
Hardware Availability: Apr-2021
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Platform Notes (Continued)

physical chip.
available: 2 nodes (0-1)
node 0 cpus: 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
52 54 56 58 60 62
node 0 size: 485087 MB
node 0 free: 512119 MB
node 1 cpus: 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51
53 55 57 59 61 63
node 1 size: 489994 MB
node 1 free: 502472 MB
node distances:
node 0 1
0: 10 20
1: 20 10

From /proc/meminfo
MemTotal: 1056288184 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

(Continued on next page)
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Platform Notes (Continued)

CVE-2018-3639 (Speculative Store Bypass):
Mitigation: Speculative Store Bypass disabled via prctl and seccomp

CVE-2017-5753 (Spectre variant 1):
Mitigation: usercopy/swapgs 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

run-level 3 Jun 16 22:54

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
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)
Dell Inc.
PowerEdge MX750c (Intel Xeon Platinum 8362, 2.80 GHz)

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

Compiler Version Notes (Continued)

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.

-------------------------------------------------------------------
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.

-------------------------------------------------------------------
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
-------------------------------------------------------------------
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.
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.
Intel(R) Fortran 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.

-------------------------------------------------------------------
Fortran | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
  654.roms_s(base, peak)
-------------------------------------------------------------------
(Continued on next page)
Compiler Version Notes (Continued)

Intel(R) Fortran 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.

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.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byteorder
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
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Base Portability Flags (Continued)
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

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:

Benchmarks using Fortran, C, and C++:

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

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

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
-1L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:
603.fotonik3d_s: -m64 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)

654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:
621.wrf_s: basepeak = yes
627.cam4_s: basepeak = yes

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

628.pop2_s: basepeak = yes

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:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-ICX-rev1.4.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 2021-06-17 01:47:48-0400.
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