Dell Inc.  
PowerEdge MX750c (Intel Xeon Platinum 8358, 2.60 GHz)

**SPEC CPU®2017 Floating Point Speed Result**

**Hardware**
- CPU Name: Intel Xeon Platinum 8358
- Max MHz: 3400
- Nominal: 2600
- 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
- Other: None
- Memory: 1 TB (32 x 32 GB 2Rx8 PC4-3200AA-R)
- Storage: 125 GB on tmpfs
- Other: None

**Software**
- OS: Red Hat Enterprise Linux 8.2 (Ootpa) 4.18.0-193.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 1.1.0 released Mar-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.

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

**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>
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<tr>
<td>607.cactuBSSN_s</td>
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<tr>
<td>619.ldm_s</td>
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<tr>
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<td>64</td>
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</tr>
<tr>
<td>627.cam4_s</td>
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</tr>
<tr>
<td>628.pop2_s</td>
<td>64</td>
<td>90.4</td>
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</tr>
<tr>
<td>638.imagick_s</td>
<td>64</td>
<td>213</td>
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<tr>
<td>644.nab_s</td>
<td>64</td>
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<td>442</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>64</td>
<td>114</td>
<td>494</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>64</td>
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</table>

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SPEC CPU®2017 Floating Point Speed Result

Dell Inc.
PowerEdge MX750c (Intel Xeon Platinum 8358, 2.60 GHz)

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

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

Test Date: Apr-2021
Hardware Availability: Apr-2021
Software Availability: Feb-2021

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tr>
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<td>288</td>
<td>55.1</td>
<td>286</td>
<td></td>
<td></td>
</tr>
</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"

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 8358, 2.60 GHz)

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 Fri Apr  2 21:53:09 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 8358 CPU @ 2.60GHz
  2  "physical id"s (chips)
  64 "processors"
core, 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
### Platform Notes (Continued)

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 8358 CPU @ 2.60GHz
- **Stepping**: 6
- **CPU MHz**: 3300.896
- **BogoMIPS**: 5200.00
- **Virtualization**: VT-x
- **L1d cache**: 48K
- **L1i cache**: 32K
- **L2 cache**: 1280K
- **L3 cache**: 49152K
- **NUMA node0 CPU(s)**:
  - 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62
- **NUMA node1 CPU(s)**:
  - 1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47,49,51,53,55,57,59,61,63
- **Flags**: fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dts  acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdelgbd rdtscp lm constant_tsc 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 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 invpcid_single ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm rdt_a avx512f auvx512dq rsxoid edx smap avx512ifma cflshopt cliwb intel_pt avx512cd sha_1 avx512bw avx512vl xsaveopt xsave xsaves cm312 cmom_occup llc cmom_mbb_total cmom_mbb_local wbenoind vdtm mca pln pts avx512vmbi umip pku oskpe avx512_vbmi2 gfn vaes vpcmldqavx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_lld arch_capabilities

```
/proc/cpucinfo cache data
cache size : 49152 KB
```

From `numactl --hardware` WARNING: a numactl 'node' might or might not correspond to a physical chip.

(Continued on next page)
Platform Notes (Continued)

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: 515456 MB
node 0 free: 507538 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: 516086 MB
node 1 free: 501781 MB
node distances:
    node 0 1
    0: 10 20
    1: 20 10

From /proc/meminfo
MemTotal:       1056299712 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="8.2 (Ootpa)"
    ID="rhel"
    ID_LIKE="fedora"
    VERSION_ID="8.2"
    PLATFORM_ID="platform:el8"
    PRETTY_NAME="Red Hat Enterprise Linux 8.2 (Ootpa)"
    ANSI_COLOR="0;31"
  redhat-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
  system-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
  system-release-cpe: cpe:/o:redhat:enterprise_linux:8.2:ga

uname -a:
    Linux localhost.localdomain 4.18.0-193.el8.x86_64 #1 SMP Fri Mar 27 14:35:58 UTC 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

(Continued on next page)
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Test Date: Apr-2021
Hardware Availability: Apr-2021
Software Availability: Feb-2021

Platform Notes (Continued)

CVE-2017-5753 (Spectre variant 1):
Bypass disabled via prctl and seccomp
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):
No status reported

CVE-2019-11135 (TSX Asynchronous Abort):
Not affected

run-level 3 Apr 2 18:44
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:
15x 00AD063200AD HMA84GR7CJR4N-XN 32 GB 2 rank 3200
17x 00AD063200AD HMAA4GR7AJR8N-XN 32 GB 2 rank 3200

BIOS:
BIOS Vendor: Dell Inc.
BIOS Version: 1.1.0
BIOS Date: 03/25/2021
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

(Continued on next page)
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Test Date: Apr-2021
Hardware Availability: Apr-2021
Software Availability: Feb-2021

Compiler Version Notes (Continued)

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

(Continued on next page)
Dell Inc.
PowerEdge MX750c (Intel Xeon Platinum 8358, 2.60 GHz)

Compiler Version Notes (Continued)

Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
Fortran, C
621.wrf_s(base, peak) 627.cam4_s(base, peak)
628.pop2_s(base, peak)

==============================================================================

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 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`

### 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

Fortran benchmarks:

- 603.bwaves_s: -m64 -Wl,\text{-}z,\text{-}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,\text{-}z,\text{-}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

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

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

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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 2021-04-02 22:53:06-0400.
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