## SPEC CPU®2017 Integer Rate Result

**Dell Inc.**

PowerEdge MX750c (Intel Xeon Platinum 8358P, 2.60 GHz)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 442</th>
<th>SPECrate®2017_int_peak = 459</th>
</tr>
</thead>
</table>

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

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

### Hardware

- **CPU Name:** Intel Xeon Platinum 8358P
- **Max MHz:** 3400
- **Nominal:** 2600
- **Enabled:** 64 cores, 2 chips, 2 threads/core
- **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 (16 x 64 GB 2Rx4 PC4-3200AA-R)
- **Storage:** 125 GB on tmpfs
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux 8.3 (Ootpa)
- **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:** No
- **Firmware:**
  - Version 1.1.2 released Apr-2021
- **File System:** tmpfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 32/64-bit
- **Other:** jemalloc memory allocator V5.0.1
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage.

## SPECrate®2017 Performance Results

<table>
<thead>
<tr>
<th>Test</th>
<th>Copies</th>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
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</thead>
<tbody>
<tr>
<td>perlbench_r</td>
<td>128</td>
<td>362</td>
<td>459</td>
</tr>
<tr>
<td>gcc_r</td>
<td>128</td>
<td>338</td>
<td></td>
</tr>
<tr>
<td>mcf_r</td>
<td>128</td>
<td>410</td>
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<tr>
<td>omnetpp_r</td>
<td>128</td>
<td>254</td>
<td></td>
</tr>
<tr>
<td>xalancbmk_r</td>
<td>128</td>
<td>548</td>
<td></td>
</tr>
<tr>
<td>x264_r</td>
<td>128</td>
<td>935</td>
<td></td>
</tr>
<tr>
<td>deepsjeng_r</td>
<td>128</td>
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<tr>
<td>leela_r</td>
<td>128</td>
<td>356</td>
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<tr>
<td>exchange2_r</td>
<td>128</td>
<td>242</td>
<td></td>
</tr>
<tr>
<td>xz_r</td>
<td>128</td>
<td>238</td>
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Results Table

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<tr>
<th>Benchmark</th>
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<th>Seconds</th>
<th>Ratio</th>
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<tr>
<td>500.perlbench_r</td>
<td>128</td>
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<td>664</td>
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<td>536</td>
<td>338</td>
<td>128</td>
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<tr>
<td>505.mcf_r</td>
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<td>520.omnetpp_r</td>
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<td>523.xalancbmk_r</td>
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<td>531.deepsjeng_r</td>
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<td>962</td>
<td>128</td>
<td>347</td>
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<tr>
<td>557.xz_r</td>
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<td>568</td>
<td>243</td>
<td>572</td>
<td>242</td>
<td>128</td>
<td>579</td>
</tr>
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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

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:

```
LD_LIBRARY_PATH = 
"/mnt/ramdisk/cpu2017-1.1.7-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.7-ic2021.1/lib/ia32:/mnt/ramdisk/cpu2017-1.1.7-ic2021.1/je5.0.1-32"
MALLOC_CONF = "retain:true"
```

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Red Hat Enterprise Linux 8.1

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)
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General Notes (Continued)

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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
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:
  Sub NUMA Cluster : 2-Way Clustering
  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 Mon Apr 19 19:00:40 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 8358P CPU @ 2.60GHz
  2 "physical id"s (chips)
  128 "processors"
  cores, siblings (Caution: counting these is hw and system dependent. The following (Continued on next page)
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Platform Notes (Continued)

excerpts from /proc/cpuinfo might not be reliable. Use with caution.)

- cpu cores: 32
- siblings: 64
  - 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 24
    25 26 27 28 29 30 31
  - 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 24
    25 26 27 28 29 30 31

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 128
- On-line CPU(s) list: 0-127
- Thread(s) per core: 2
- Core(s) per socket: 32
- Socket(s): 2
- NUMA node(s): 4
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 106
- Model name: Intel(R) Xeon(R) Platinum 8358P CPU @ 2.60GHz
- Stepping: 6
- CPU MHz: 1662.663
- BogoMIPS: 5200.00
- Virtualization: VT-x
- L1d cache: 48K
- L1i cache: 32K
- L2 cache: 1280K
- L3 cache: 49152K
- NUMA node0 CPU(s): 0-15,64-79
- NUMA node1 CPU(s): 16-31,80-95
- NUMA node2 CPU(s): 32-47,96-111
- NUMA node3 CPU(s): 48-63,112-127
- 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 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
  xtrn pdcm pcid 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_pcin ssbd mba ibrs ibpb stibp ibrs_random fsgsbase tsc_adjust bmi1 hle avx2
  smep bmi2 ets rsr mvd avx2 smap mmxset f3sxd aes xsave xsaveopt xsaveprec xsaves
  cmov mmx cdqc pmovnbm cx8 ept vpid fmarit pmls vmx cmt media eff ret cmp mpx stp816
  fsgsbase tsc_diag lvmitc mssepd mssepd clflushopt clwb intel_pt avx512cd sha_ni
  avx512bw avx512vl xsavesopt xsavec xsaveopt xgetbv1 xsaves cmov mmx popcnt
  rdtscp msr aarch64 ts kg pef vme tm mtrr pse tsc msr pae mce cx8 mcmov xpat
  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 xtopology nonstop_tsc cpuid
  aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
  xtrn pdcm pcid 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_pcin ssbd mba ibrs ibpb stibp ibrs_random fsgsbase tsc_adjust bmi1 hle avx2
  smep bmi2 ets rsr mvd avx2 smap mmxset f3sxd aes xsave xsaveopt xsaveprec xsaves
  cmov mmx cdqc pmovnbm cx8 ept vpid fmarit pmls vmx cmt media eff ret cmp mpx stp816
  fsgsbase tsc_diag lvmitc mssepd mssepd clflushopt clwb intel_pt avx512cd sha_ni
  avx512bw avx512vl xsavesopt xsavec xsaveopt xgetbv1 xsaves cmov mmx popcnt
  rdtscp msr aarch64 ts kg pef vme tm mtrr pse tsc msr pae mce cx8 mcmov xpat

(Continued on next page)
Platform Notes (Continued)

/proc/cpuinfo cache data
    cache size : 49152 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
depth chip.
    available: 4 nodes (0-3)
    node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 64 65 66 67 68 69 70 71 72 73 74 75
    76 77 78 79
    node 0 size: 250566 MB
    node 0 free: 256997 MB
    node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 80 81 82 83 84 85 86 87 88
    89 90 91 92 93 94 95
    node 1 size: 251301 MB
    node 1 free: 248537 MB
    node 2 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 96 97 98 99 100 101 102
    103 104 105 106 107 108 109 110 111
    node 2 size: 250808 MB
    node 2 free: 257583 MB
    node 3 cpus: 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 112 113 114 115 116 117
    118 119 120 121 122 123 124 125 126 127
    node 3 size: 252092 MB
    node 3 free: 257494 MB
    node distances:
    node 0 1 2 3
    0:  10 11 20 20
    1:  11 10 20 20
    2:  20 20 10 11
    3:  20 20 11 10

From /proc/meminfo
    MemTotal:       1056274364 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)"

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Platform Notes (Continued)

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/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 Apr 19 18:29
SPEC is set to: /mnt/ramdisk/cpu2017-1.1.7-ic2021.1
Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 125G 4.4G 121G 4% /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:

(Continued on next page)
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Platform Notes (Continued)

BIOS Vendor: Dell Inc.
BIOS Version: 1.1.2
BIOS Date: 04/09/2021
BIOS Revision: 1.1

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C | 500.perlbench_r(peak) 557.xz_r(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.
------------------------------------------------------------------------------
==============================================================================
C | 502.gcc_r(peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
==============================================================================
C | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
 | 525.x264_r(base, peak) 557.xz_r(base)
------------------------------------------------------------------------------
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 | 500.perlbench_r(peak) 557.xz_r(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.
------------------------------------------------------------------------------
==============================================================================
C | 502.gcc_r(peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version

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

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```plaintext
| C   | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak) |
|     | 525.x264_r(base, peak) 557.xz_r(base) |
```

---

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.

---

```plaintext
| C   | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak) |
|     | 525.x264_r(base, peak) 557.xz_r(base) |
```

---

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
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---

```plaintext
| C++  | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak) |
|      | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak) |
```

---

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Compiler Version Notes (Continued)

```fortran
Fortran | 548.exchange2_r(base, peak)
```

Intel (R) Fortran Intel (R) 64 Compiler Classic for applications running on Intel (R) 64, Version 2021.1 Build 20201112_000000

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Base Compiler Invocation

C benchmarks:  
- icx  

C++ benchmarks:  
- icpx  

Fortran benchmarks:  
- ifort  

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64  
502.gcc_r: -DSPEC_LP64  
505.mcf_r: -DSPEC_LP64  
520.omnetpp_r: -DSPEC_LP64  
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX  
525.x264_r: -DSPEC_LP64  
531.deepsjeng_r: -DSPEC_LP64  
541.leela_r: -DSPEC_LP64  
548.exchange2_r: -DSPEC_LP64  
557.xz_r: -DSPEC_LP64  

Base Optimization Flags

C benchmarks:  
- -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math  
- -flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
- -mbranches-within-32B-boundaries  
- -L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin  
- -lqkmalloc  

(Continued on next page)
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### Base Optimization Flags (Continued)

- C++ benchmarks:
  -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
  -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
  -mbranches-within-32B-boundaries
  -L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
  -lqkmalloc

- Fortran benchmarks:
  -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
  -qopt-mem-layout-trans=4 -nostream -realloc-lhs -align array32byte
  -auto -mbranches-within-32B-boundaries
  -L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
  -lqkmalloc

### Peak Compiler Invocation

- C benchmarks (except as noted below):
  icx

  500.perlbench_r: icc

  557.xz_r: icc

- C++ benchmarks:
  icpx

- Fortran benchmarks:
  ifort

### Peak Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -D_FILE_OFFSET_BITS=64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64
SPEC CPU®2017 Integer Rate Result

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

SPECrate®2017_int_base = 442
SPECrate®2017_int_peak = 459

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

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

Peak Optimization Flags

C benchmarks:

500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -fno-strict-overflow
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

502.gcc_r: -m32
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/ia32_lin
-std=gnu89 -Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto
-O3 -ffast-math -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc32-5.0.1/lib -ljemalloc

505.mcf_r: basepeak = yes

525.x264_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-O3 -ffast-math -qopt-mem-layout-trans=4 -fno-alias
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

557.xz_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-lqkmalloc

C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: basepeak = yes

531.deepsjeng_r: basepeak = yes

541.leela_r: basepeak = yes

Fortran benchmarks:

548.exchange2_r: basepeak = yes
SPEC CPU®2017 Integer Rate Result

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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.

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