SPEC CPU®2017 Integer Rate Result

Dell Inc.
PowerEdge R750 (Intel Xeon Platinum 8380, 2.30 GHz)

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

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

SPECrate®2017_int_base = 550
SPECrate®2017_int_peak = 572

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**Hardware**

**CPU Name:** Intel Xeon Platinum 8380  
**Max MHz:** 3400  
**Nominal:** 2300  
**Enabled:** 80 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:** 60 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)  
4.18.0-240.15.1.el8_3.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:** 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.
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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</tbody>
</table>

### 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:

```bash
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) is mitigated in the system as tested and documented.
## General Notes (Continued)

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 e8664e66d2d7080afeaa89d4b38e2flc
running on localhost.localdomain Mon Apr 12 08:43:54 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 8380 CPU @ 2.30GHz
2 "physical id"s (chips)
160 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
```

(Continued on next page)
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**Test Date:** April 2021  
**Test Sponsor:** Dell Inc.  
**Hardware Availability:** May 2021  
**Tested by:** Dell Inc.  
**Software Availability:** February 2021

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**Platform Notes (Continued)**

```
cpu cores : 40
siblings : 80
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 32 33 34 35 36 37 38 39
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 32 33 34 35 36 37 38 39

From lscpu:
Architecture:      x86_64
CPU op-mode(s):    32-bit, 64-bit
Byte Order:        Little Endian
CPU(s):            160
On-line CPU(s) list: 0-159
Thread(s) per core: 2
Core(s) per socket: 40
Socket(s):         2
NUMA node(s):      4
Vendor ID:         GenuineIntel
CPU family:        6
Model:             106
Model name:        Intel(R) Xeon(R) Platinum 8380 CPU @ 2.30GHz
Stepping:          6
CPU MHz:           3000.195
BogoMIPS:          4600.00
Virtualization:    VT-x
L1d cache:         48K
L1i cache:         32K
L2 cache:          1280K
L3 cache:          61440K
NUMA node0 CPU(s):
  0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60,64,68,72,76,80,84,88,92,96,100,104,108,
  112,116,120,124,128,132,136,140,144,148,152,156
NUMA node1 CPU(s):
  2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74,78,82,86,90,94,98,102,106,110
  ,114,118,122,126,130,134,138,142,146,150,154,158
NUMA node2 CPU(s):
  1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61,65,69,73,77,81,85,89,93,97,101,105,109,
  113,117,121,125,129,133,137,141,145,149,153,157
NUMA node3 CPU(s):
  ,115,119,123,127,131,135,139,143,147,151,155,159
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 dtse64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtr pcdm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abtm 3dnowprefetch cpuid_fault epb cat_l3 invpcid_single
```

(Continued on next page)
**Platform Notes (Continued)**

```
intel_pinn ssbd mba ibrs ibpb stibp ibrs_enhanced fsqsbase tsc_adjust bmi1 hle avx2
smeip bmi1 erms invpccd cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma
clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsavec xgetbv1
xsavees cqm llc cqm_occup_llc cqm_mbm_total cqm_mbm_local split_lock_detect wbnoinvd
dtherm ida arat pln pts avx512vmi umip pku ospke avx512_vmimi2 gfni vaes vpclmuldq
avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d
arch_capabilities
```

```
../proc/cpuinfo cache data
cache size: 61440 KB
```

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
available: 4 nodes (0-3)
nod 0 cpus: 0 4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 64 68 72 76 80 84 88 92 96
100 104 108 112 116 120 124 128 132 136 140 144 148 152 156
node 0 size: 249683 MB
node 0 free: 256478 MB
node 1 cpus: 2 6 10 14 18 22 26 30 34 38 42 46 50 54 58 62 66 70 74 78 82 86 90 94 98
102 106 110 114 118 122 126 130 134 138 142 146 150 154 158
node 1 size: 250570 MB
node 1 free: 248373 MB
node 2 cpus: 1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61 65 69 73 77 81 85 89 93 97
101 105 109 113 117 121 125 129 133 137 141 145 149 153 157
node 2 size: 251276 MB
node 2 free: 257389 MB
node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47 51 55 59 63 67 71 75 79 83 87 91 95 99
103 107 111 115 119 123 127 131 135 139 143 147 151 155 159
node 3 size: 250770 MB
node 3 free: 257499 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: 1056266916 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

/sbin/tuned-adm active

```
Current active profile: throughput-performance
```

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

```
os-release:
```

(Continued on next page)
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CPU2017 License: 55
Test Sponsor: Dell Inc.
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Test Date: Apr-2021
Hardware Availability: May-2021
Software Availability: Feb-2021

Platform Notes (Continued)

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 4.18.0-240.15.1.el8_3.x86_64 #1 SMP Wed Feb 3 03:12:15 EST 2021 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): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2017-5715 (Spectre variant 2): Not affected
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Apr 12 03:43 last=5

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 R750
Product Family: PowerEdge

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...
Platform Notes (Continued)

frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
Memory:
  8x 00AD063200AD HMAA8GR7AJR4N-XN 64 GB 2 rank 3200
  8x 00AD069D00AD HMAA8GR7AJR4N-XN 64 GB 2 rank 3200
  16x Not Specified Not Specified

BIOS:
  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,
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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

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## Base Portability Flags

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| 502.gcc_r: -DSPEC_LP64 |
| 505.mcf_r: -DSPEC_LP64 |
| 520.omnetpp_r: -DSPEC_LP64 |
| 523.xalanchmk_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 |

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### 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`
- `lgkmalloc`

**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`
- `lgkmalloc`

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

### 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`

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SPEC CPU®2017 Integer Rate Result

Dell Inc.
PowerEdge R750 (Intel Xeon Platinum 8380, 2.30 GHz)

SPECrate®2017_int_base = 550
SPECrate®2017_int_peak = 572

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

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

Peak Portability Flags (Continued)

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

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
-Ofast(pass 1) -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

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Peak Optimization Flags (Continued)

523.xalancbmk_r: basepeak = yes
531.deepsjeng_r: basepeak = yes
541.leela_r: basepeak = yes

Fortran benchmarks:
548.exchange2_r: 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 2021-04-12 09:43:53-0400.
Report generated on 2021-05-18 19:30:30 by CPU2017 PDF formatter v6442.
Originally published on 2021-05-18.