SPEC CPU®2017 Integer Rate Result

Dell Inc.

PowerEdge R750xs (Intel Xeon Gold 6338, 2.00 GHz)

SPECrate®2017_int_base = 401
SPECrate®2017_int_peak = 417

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

Test Date: Oct-2021
Hardware Availability: Jul-2021

Software Availability: May-2021

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PowerEdge R750xs (Intel Xeon Gold 6338, 2.00 GHz)

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500.perlbench_r 128
502.gcc_r 128
505.mcf_r 128
520.omnetpp_r 128
523.xalancbmk_r 128
525.x264_r 128
531.deepsjeng_r 128
541.leela_r 128
548.exchange2_r 128
557.xz_r 128

Hardware
CPU Name: Intel Xeon Gold 6338
Max MHz: 3200
Nominal: 2000
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: 512 GB (16 x 32 GB 2Rx8 PC4-3200AA-R)
Storage: 225 GB on tmpfs
Other: None

Software
OS: Red Hat Enterprise Linux 8.4 (Ootpa)
4.18.0-305.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: No
Firmware: Version 1.2.1 released May-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>
<th>Ratio</th>
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<tbody>
<tr>
<td>perbench_r</td>
<td>128</td>
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</tr>
<tr>
<td>x264_r</td>
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<tr>
<td>deepsjeng_r</td>
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<tr>
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<tr>
<td>exchange2_r</td>
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<td>596</td>
<td>232</td>
<td></td>
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</table>

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/cpu2017-1.1.8-ic2021.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.8-ic2021.1/lib/ia32:/mnt/ramdisk/cpu2017-1.1.8-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
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"

(Continued on next page)
General Notes (Continued)

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

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.

Benchmark run from a 225 GB ramdisk created with the cmd: "mount -t tmpfs -o size=225G 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
PCI ASPM L1 Link
Power Management : Disabled

Sysinfo program /mnt/ramdisk/cpu2017-1.1.8-ic2021.1/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acac64d
running on r750xs.jzjpm83.inside.dell.com Wed Oct 6 14:11:11 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 6338 CPU @ 2.00GHz
  2 "physical id"s (chips)
  128 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following

(Continued on next page)
Dell Inc.

PowerEdge R750xs (Intel Xeon Gold 6338, 2.00 GHz)

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**Test Sponsor:** Dell Inc.  
**Tested by:** Dell Inc.  
**Test Date:** Oct-2021  
**Hardware Availability:** Jul-2021  
**Software Availability:** May-2021

**Platform Notes (Continued)**

```
extcerpts from /proc/cpuinfo might not be reliable. Use with caution.

cpu cores : 32
siblings : 64
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

From lscpu from util-linux 2.32.1:

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
BIOS Vendor ID:      Intel
CPU family:          6
Model:               106
Model name:          Intel(R) Xeon(R) Gold 6338 CPU @ 2.00GHz
BIOS Model name:     Intel(R) Xeon(R) Gold 6338 CPU @ 2.00GHz
Stepping:            6
CPU MHz:             2623.268
BogoMIPS:            4000.00
Virtualization:      VT-x
L1d cache:           48K
L1i cache:           32K
L2 cache:            1280K
L3 cache:            49152K
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
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
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
NUMA node3 CPU(s):
,115,119,123,127
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
```
Dell Inc. PowerEdge R750xs (Intel Xeon Gold 6338, 2.00 GHz)

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**Platform Notes (Continued)**

aperfmperf pni pclmulqdq dtes64 monitor ds_cpi vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 invpcid_single intel_pni ssbd mba ibrs ibpb stibp ibrs_enhanced fsgsbase tsc_adjust bmi1 hle avx2 smp bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_hwi avx512bw avx512vl xsaveopt xsaves cmov cm_legacy cqm_occup_llc cqm_mbb_total cqm_mbb_local split_lock_detect wbnoinvalid dtherm ida arat pln pts avx512vbmi umip puck ospe avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq lfsr dt pid md_clear pconfig flush_l1d arch_capabilities

/proc/cpuinfo cache data
- cache size: 49152 KB

From numactl --hardware

WARNING: a numactl 'node' might or might not correspond to a physical chip.
- available: 4 nodes (0-3)
  - node 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
  - node 1 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
  - node 2 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
  - 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

From /proc/meminfo
- MemTotal: 527529944 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

/sbin/tuned-adm active
- Current active profile: throughput-performance

(Continued on next page)
SPEC CPU®2017 Integer Rate Result
Copyright 2017-2021 Standard Performance Evaluation Corporation

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Platform Notes (Continued)

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

os-release:
  NAME="Red Hat Enterprise Linux"
  VERSION="8.4 (Ootpa)"
  ID="rhel"
  ID_LIKE="fedora"
  VERSION_ID="8.4"
  PLATFORM_ID="platform:el8"
  PRETTY_NAME="Red Hat Enterprise Linux 8.4 (Ootpa)"
  ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.4:ga

uname -a:
  Linux r750xs.jzjpm83.inside.dell.com 4.18.0-305.el8.x86_64 #1 SMP Thu Apr 29 08:54:30
  EDT 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): 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/swaps
  barriers and __user pointer
  sanitation
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 Oct 6 13:51

SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-ic2021.1

Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 225G 4.4G 221G 2% /mnt/ramdisk

From /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge R750xs
Product Family: PowerEdge
Serial: JZJPM83

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### SPEC CPU®2017 Integer Rate Result

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### Platform Notes (Continued)

Additional information from dmidecode 3.2 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 002C069D002C 18ASF4G72PDZ-3G2E1 32 GB 2 rank 3200

**BIOS:**

- BIOS Vendor: Dell Inc.
- BIOS Version: 1.2.1
- BIOS Date: 05/28/2021
- BIOS Revision: 1.2

(End of data from sysinfo program)

### Compiler Version Notes

C | 500.perlbench_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, peak)

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

C | 500.perlbench_r(peak)

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

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## Compiler Version Notes (Continued)

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

```
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  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
```

## 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
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Dell Inc.

PowerEdge R750xs (Intel Xeon Gold 6338, 2.00 GHz)

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**Base Optimization Flags**

C benchmarks:
- -w -std=c11 -m64 -W1,-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

C++ benchmarks:
- -w -m64 -W1,-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 -W1,-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
- -lqkmalloc

**Peak Compiler Invocation**

C benchmarks (except as noted below):
- icx
- 500.perlbench_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

(Continued on next page)
**Dell Inc.**

PowerEdge R750xs (Intel Xeon Gold 6338, 2.00 GHz)

**SPEC CPU®2017 Integer Rate Result**

**Dell Inc.**

PowerEdge R750xs (Intel Xeon Gold 6338, 2.00 GHz)

**SPECrate®2017_int_base = 401**

**SPECrate®2017_int_peak = 417**

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

**Test Date:** Oct-2021  
**Hardware Availability:** Jul-2021  
**Software Availability:** May-2021

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### Peak Portability Flags (Continued)

525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leea_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

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

557.xz_r: basepeak = yes

**C++ benchmarks:**

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: basepeak = yes

531.deepsjeng_r: basepeak = yes

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# SPEC CPU®2017 Integer Rate Result

## Dell Inc.

**PowerEdge R750xs (Intel Xeon Gold 6338, 2.00 GHz)**

<table>
<thead>
<tr>
<th>SPECrate®2017 int_base</th>
<th>401</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017 int_peak</td>
<td>417</td>
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</tbody>
</table>

| CPU2017 License: | 55 |
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**Test Date:** Oct-2021  
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### Peak Optimization Flags (Continued)

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

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.

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