



# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

Dell Inc.

SPECrate®2017\_int\_base = 230

PowerEdge R650xs (Intel Xeon Gold 6314U, 2.30 GHz)

SPECrate®2017\_int\_peak = Not Run

CPU2017 License: 55

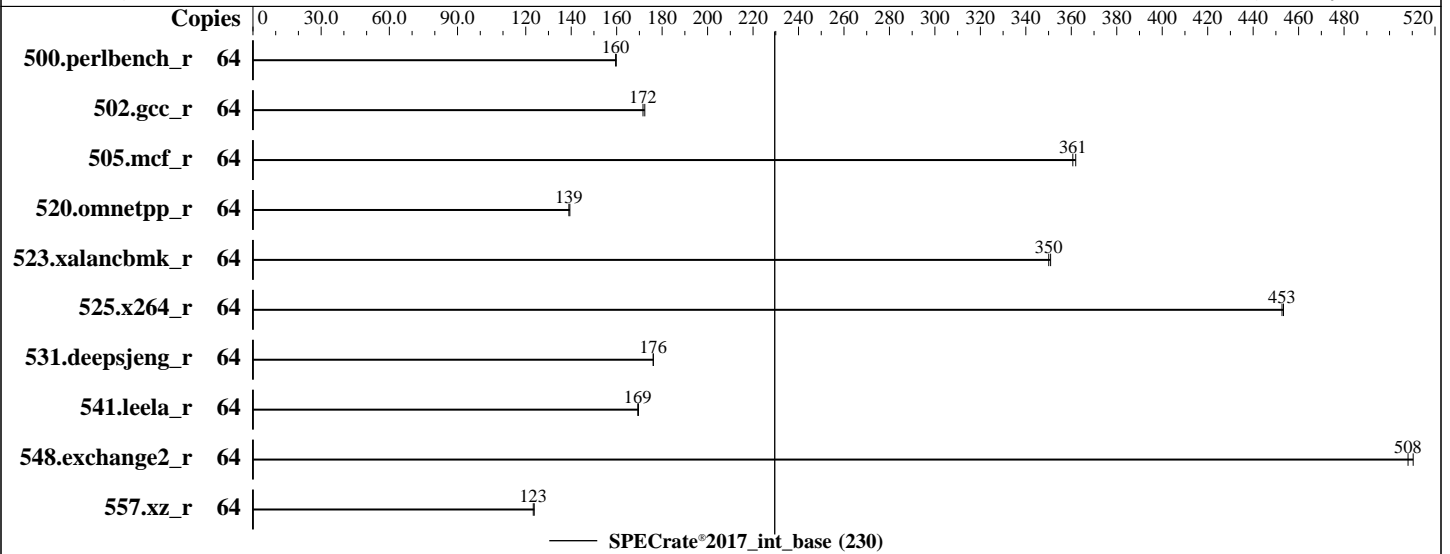
Test Date: Nov-2022

Test Sponsor: Dell Inc.

Hardware Availability: Jul-2021

Tested by: Dell Inc.

Software Availability: May-2022



## Hardware

CPU Name: Intel Xeon Gold 6314U  
 Max MHz: 3400  
 Nominal: 2300  
 Enabled: 32 cores, 1 chip, 2 threads/core  
 Orderable: 1 chip  
 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: 256 GB (8 x 32 GB 2Rx8 PC4-3200AA-R)  
 Storage: 60 GB on tmpfs  
 Other: None

## Software

OS: Red Hat Enterprise Linux 8.6 (Ootpa)  
 4.18.0-372.9.1.el8.x86\_64  
 Compiler: C/C++: Version 2022.1 of Intel oneAPI DPC++/C++  
 Compiler for Linux;  
 Fortran: Version 2022.1 of Intel Fortran Compiler  
 for Linux;  
 Parallel: No  
 Firmware: Version 1.7.4 released Jun-2022  
 File System: tmpfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 Other: None  
 Power Management: BIOS and OS set to prefer performance  
 at the cost of additional power usage.



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## Results Table

| Benchmark       | Base   |                   |                   |                   |                   |         |       | Peak   |         |       |         |       |         |       |
|-----------------|--------|-------------------|-------------------|-------------------|-------------------|---------|-------|--------|---------|-------|---------|-------|---------|-------|
|                 | Copies | Seconds           | Ratio             | Seconds           | Ratio             | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 500.perlbench_r | 64     | 637               | 160               | <b><u>639</u></b> | <b><u>160</u></b> |         |       |        |         |       |         |       |         |       |
| 502.gcc_r       | 64     | 526               | 172               | <b><u>528</u></b> | <b><u>172</u></b> |         |       |        |         |       |         |       |         |       |
| 505.mcf_r       | 64     | <b><u>287</u></b> | <b><u>361</u></b> | 286               | 362               |         |       |        |         |       |         |       |         |       |
| 520.omnetpp_r   | 64     | <b><u>604</u></b> | <b><u>139</u></b> | 602               | 139               |         |       |        |         |       |         |       |         |       |
| 523.xalancbmk_r | 64     | 193               | 351               | <b><u>193</u></b> | <b><u>350</u></b> |         |       |        |         |       |         |       |         |       |
| 525.x264_r      | 64     | <b><u>248</u></b> | <b><u>453</u></b> | 247               | 453               |         |       |        |         |       |         |       |         |       |
| 531.deepsjeng_r | 64     | <b><u>417</u></b> | <b><u>176</u></b> | 416               | 176               |         |       |        |         |       |         |       |         |       |
| 541.leela_r     | 64     | 625               | 170               | <b><u>626</u></b> | <b><u>169</u></b> |         |       |        |         |       |         |       |         |       |
| 548.exchange2_r | 64     | 329               | 510               | <b><u>330</u></b> | <b><u>508</u></b> |         |       |        |         |       |         |       |         |       |
| 557.xz_r        | 64     | <b><u>561</u></b> | <b><u>123</u></b> | 559               | 124               |         |       |        |         |       |         |       |         |       |

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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Compiler Notes

SPEC has ruled that the compiler used for this result was performing a compilation that specifically improves the performance of the 523.xalancbmk\_r / 623.xalancbmk\_s benchmarks using a priori knowledge of the SPEC code and dataset to perform a transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4 [https://www.spec.org/cpu2017/Docs/runrules.html#rule\\_1.4](https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4)), SPEC will no longer publish results using this optimization.

This result is left in the SPEC results database for historical reference.

## 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-ic2022.1/lib/intel64:/mnt/ramdisk/cpu2017-1.1.8-ic2022.1/lib/ia32:/mnt/ramdisk/cpu2017-1.1.8-ic2022.1/je5.0.1-32"
MALLOC_CONF = "retain:true"
```



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## General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM  
 memory using Red Hat Enterprise Linux 8.4  
 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>

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 60 GB ramdisk created with the cmd: "mount -t tmpfs -o size=60G tmpfs /mnt/ramdisk"

## Platform Notes

BIOS settings:

```

  DIMM Self Healing on
  Uncorrectable Memory Error : Disabled
  Virtualization Technology : Disabled
    Sub NUMA Cluster : 2-way Clustering
  DCU Streamer Prefetcher : Disabled
    LLC Prefetch : Disabled
  Dead Line LLC Alloc : Disabled
  Optimizer Mode : Enabled

  System Profile : Custom
  CPU Power Management : Maximum Performance
    C1E : Disabled
    C States : Autonomous
  Memory Patrol Scrub : Disabled
  Energy Efficiency Policy : Performance
  PCI ASPM L1 Link
  Power Management : Disabled

```

Sysinfo program /mnt/ramdisk/cpu2017-1.1.8-ic2022.1/bin/sysinfo  
 Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d  
 running on auvcetilleml1.corp.emc.com Sun Nov 13 14:02:34 2022

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 6314U CPU @ 2.30GHz
 1 "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 : 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

```

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## Platform Notes (Continued)

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):                 64
On-line CPU(s) list:   0-63
Thread(s) per core:    2
Core(s) per socket:    32
Socket(s):              1
NUMA node(s):          2
Vendor ID:              GenuineIntel
BIOS Vendor ID:        Intel
CPU family:             6
Model:                  106
Model name:             Intel(R) Xeon(R) Gold 6314U CPU @ 2.30GHz
BIOS Model name:       Intel(R) Xeon(R) Gold 6314U CPU @ 2.30GHz
Stepping:               6
CPU MHz:                3400.000
CPU max MHz:            3400.0000
CPU min MHz:            800.0000
BogoMIPS:               4600.00
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 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
aperfperf pni pclmulqdq dtes64 monitor ds_cpl smx est tm2 ssse3 sdbg fma cx16 xtpr
pdc_m 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_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced fsgsbase tsc_adjust bmi1 avx2 smep
bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt
clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves
cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local split_lock_detect wbnoinvd dtherm
ida arat pln pts avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq
avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid fsrm 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 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: 128110 MB
node 0 free: 121203 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: 129014 MB
node 1 free: 126697 MB
node distances:

```

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## Platform Notes (Continued)

```
node    0    1
0:     10   11
1:     11   10
```

```
From /proc/meminfo
MemTotal:      263295952 kB
HugePages_Total:       0
Hugepagesize:       2048 kB
```

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

```
/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has
performance
```

```
From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux"
VERSION="8.6 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.6"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.6 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.6 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.6 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8::baseos
```

```
uname -a:
Linux auvcetilleml1.corp.emc.com 4.18.0-372.9.1.el8.x86_64 #1 SMP Fri Apr 15 22:12:19
EDT 2022 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
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 Nov 13 13:57

```
SPEC is set to: /mnt/ramdisk/cpu2017-1.1.8-ic2022.1
Filesystem Type Size Used Avail Use% Mounted on
tmpfs tmpfs 60G 3.6G 57G 6% /mnt/ramdisk
```

```
From /sys/devices/virtual/dmi/id
Vendor: Dell Inc.
Product: PowerEdge R650xs
Product Family: PowerEdge
```

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## Platform Notes (Continued)

Serial: GL216S3

Additional information from dmidecode 3.3 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:

5x 002C00B3002C 18ASF4G72PDZ-3G2E1 32 GB 2 rank 3200  
3x 002C069D002C 18ASF4G72PDZ-3G2E1 32 GB 2 rank 3200

BIOS:

BIOS Vendor: Dell Inc.  
BIOS Version: 1.7.4  
BIOS Date: 06/27/2022  
BIOS Revision: 1.7

(End of data from sysinfo program)

## Compiler Version Notes

=====  
C | 500.perlbench\_r(base) 502.gcc\_r(base) 505.mcf\_r(base) 525.x264\_r(base) 557.xz\_r(base)  
=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316  
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.  
=====

=====  
C++ | 520.omnetpp\_r(base) 523.xalancbmk\_r(base) 531.deepsjeng\_r(base) 541.leela\_r(base)  
=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316  
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.  
=====

=====  
Fortran | 548.exchange2\_r(base)  
=====

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316  
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.  
=====

## Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifx



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## 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
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc

```

### C++ benchmarks:

```

-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc

```

### Fortran benchmarks:

```

-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc

```

The flags files that were used to format this result can be browsed at

[http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64\\_revA.html](http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.html)

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.2.html>

You can also download the XML flags sources by saving the following links:

[http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64\\_revA.xml](http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.xml)

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge-Intel-Xeon-v1.2.xml>



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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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