



SPEC CPU®2017 Integer Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Dell Inc.

SPECrate®2017_int_base = 12.1

PowerEdge T40 (Intel Pentium Gold G5400, 3.70GHz)

SPECrate®2017_int_peak = 13.0

CPU2017 License: 55

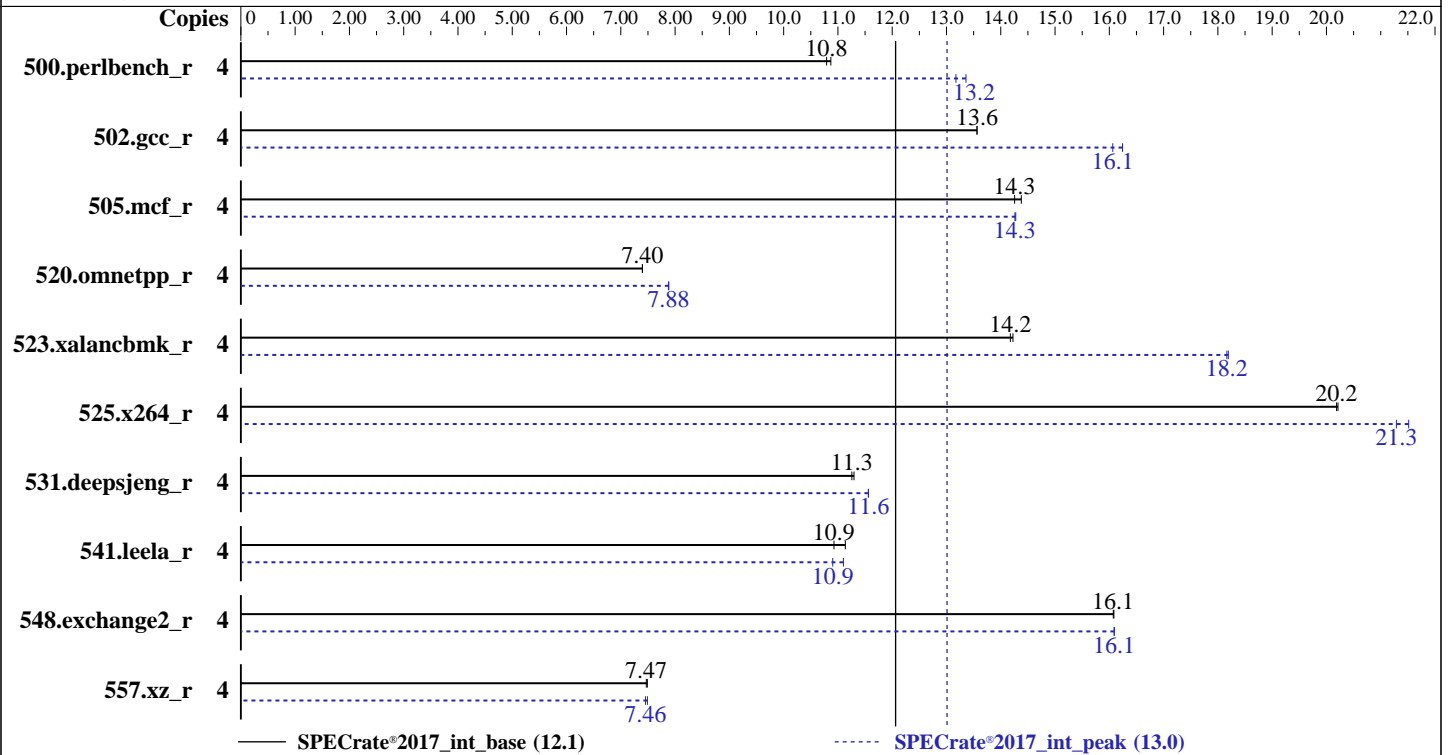
Test Date: Apr-2019

Test Sponsor: Dell Inc.

Hardware Availability: Apr-2018

Tested by: Dell Inc.

Software Availability: Feb-2019



Hardware

CPU Name: Intel Pentium Gold G5400
 Max MHz: 3700
 Nominal: 3700
 Enabled: 2 cores, 1 chip, 2 threads/core
 Orderable: 1 chip
 Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 256 KB I+D on chip per core
 L3: 4 MB I+D on chip per chip
 Other: None
 Memory: 64 GB (4 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)
 Storage: 1 x 600G SAS 10K RPM
 Other: None

Software

OS: Ubuntu 18.04.2 LTS
 4.15.0-45-generic
 Compiler: C/C++: Version 19.0.0.117 of Intel C/C++ Compiler Build 20180804 for Linux;
 Fortran: Version 19.0.0.117 of Intel Fortran Compiler Build 20180804 for Linux
 Parallel: No
 Firmware: Version 0.1.3 released Apr-2019
 File System: ext4
 System State: Run level 5 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: 32/64-bit
 Other: jemalloc memory allocator V5.0.1
 Power Management: --



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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 | 4 | 586 | 10.9 | 590 | 10.8 | | | 4 | 477 | 13.4 | 483 | 13.2 | | |
| 502.gcc_r | 4 | 418 | 13.6 | 418 | 13.6 | | | 4 | 353 | 16.1 | 349 | 16.2 | | |
| 505.mcf_r | 4 | 453 | 14.3 | 450 | 14.4 | | | 4 | 453 | 14.3 | 453 | 14.3 | | |
| 520.omnetpp_r | 4 | 709 | 7.40 | 709 | 7.40 | | | 4 | 666 | 7.88 | 666 | 7.88 | | |
| 523.xalancbmk_r | 4 | 297 | 14.2 | 298 | 14.2 | | | 4 | 233 | 18.2 | 232 | 18.2 | | |
| 525.x264_r | 4 | 347 | 20.2 | 347 | 20.2 | | | 4 | 329 | 21.3 | 326 | 21.5 | | |
| 531.deepsjeng_r | 4 | 406 | 11.3 | 407 | 11.3 | | | 4 | 396 | 11.6 | 396 | 11.6 | | |
| 541.leela_r | 4 | 595 | 11.1 | 606 | 10.9 | | | 4 | 597 | 11.1 | 607 | 10.9 | | |
| 548.exchange2_r | 4 | 652 | 16.1 | 652 | 16.1 | | | 4 | 651 | 16.1 | 651 | 16.1 | | |
| 557.xz_r | 4 | 578 | 7.47 | 577 | 7.49 | | | 4 | 579 | 7.46 | 577 | 7.49 | | |

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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"

General Notes

Environment variables set by runcpu before the start of the run:

LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"

Binaries compiled on a system with 1x Intel Core i9-799X CPU + 32GB RAM

memory using Redhat Enterprise Linux 7.5

Transparent Huge Pages enabled by default

Prior to runcpu invocation

Yes: 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.

jemalloc, a general purpose malloc implementation

built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>



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Platform Notes

BIOS settings:

CPU Performance set to Maximum Performance

C States set to Autonomous

C1E disabled

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9

running on intel-sut Wed Apr 24 13:24:38 2019

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) Pentium(R) Gold G5400 CPU @ 3.70GHz

1 "physical id"s (chips)

4 "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 : 2

siblings : 4

physical 0: cores 0 1

From lscpu:

Architecture: x86_64

CPU op-mode(s): 32-bit, 64-bit

Byte Order: Little Endian

CPU(s): 4

On-line CPU(s) list: 0-3

Thread(s) per core: 2

Core(s) per socket: 2

Socket(s): 1

NUMA node(s): 1

Vendor ID: GenuineIntel

CPU family: 6

Model: 158

Model name: Intel(R) Pentium(R) Gold G5400 CPU @ 3.70GHz

Stepping: 10

CPU MHz: 3700.426

CPU max MHz: 3700.0000

CPU min MHz: 800.0000

BogoMIPS: 7392.00

Virtualization: VT-x

L1d cache: 32K

L1i cache: 32K

L2 cache: 256K

L3 cache: 4096K

NUMA node0 CPU(s): 0-3

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Platform Notes (Continued)

```
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
aperfmpperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 ssse3 sdbg
cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invpcid_single pti ssbd ibrs ibpb
stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust smep erms invpcid
mpx rdseed smap clflushopt intel_pt xsaveopt xsavec xgetbv1 xsaves dtherm arat pln
pts hwp hwp_notify hwp_act_window hwp_epp flush_lli
```

```
/proc/cpuinfo cache data
cache size : 4096 KB
```

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

```
available: 1 nodes (0)
node 0 cpus: 0 1 2 3
node 0 size: 64256 MB
node 0 free: 63729 MB
node distances:
node 0
0: 10
```

```
From /proc/meminfo
MemTotal:      65798712 kB
HugePages_Total:      0
Hugepagesize:    2048 kB
```

```
/usr/bin/lsb_release -d
Ubuntu 18.04.2 LTS
```

```
From /etc/*release* /etc/*version*
debian_version: buster/sid
os-release:
NAME="Ubuntu"
VERSION="18.04.2 LTS (Bionic Beaver)"
ID=ubuntu
ID_LIKE=debian
PRETTY_NAME="Ubuntu 18.04.2 LTS"
VERSION_ID="18.04"
HOME_URL="https://www.ubuntu.com/"
SUPPORT_URL="https://help.ubuntu.com/"
```

```
uname -a:
Linux intel-sut 4.15.0-45-generic #48-Ubuntu SMP Tue Jan 29 16:28:13 UTC 2019 x86_64
x86_64 x86_64 GNU/Linux
```

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Platform Notes (Continued)

Kernel self-reported vulnerability status:

CVE-2017-5754 (Meltdown): Mitigation: PTI
 CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
 CVE-2017-5715 (Spectre variant 2): Mitigation: Full generic retpoline, IBPB, IBRS_FW

run-level 5 Apr 24 13:22

SPEC is set to: /home/cpu2017

| Filesystem | Type | Size | Used | Avail | Use% | Mounted on |
|------------|------|------|------|-------|------|------------|
| /dev/sda2 | ext4 | 439G | 19G | 398G | 5% | / |

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.

BIOS Dell Inc. 0.1.3 04/22/2019

Memory:

4x 80CE000080CE M391A2K43BB1-CTD 16 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

C | 502.gcc_r(peak)

 Intel(R) C Intel(R) 64 Compiler for applications running on IA-32, Version
 19.0.0.117 Build 20180804
 Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

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

 Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
 Version 19.0.0.117 Build 20180804
 Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

C | 502.gcc_r(peak)

 Intel(R) C Intel(R) 64 Compiler for applications running on IA-32, Version
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Compiler Version Notes (Continued)

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```

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

```

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.0.117 Build 20180804

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

```

=====
C++       | 523.xalanbmk_r(peak)
=====

```

Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version 19.0.0.117 Build 20180804

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

```

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

```

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.0.117 Build 20180804

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

```

=====
C++       | 523.xalanbmk_r(peak)
=====

```

Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version 19.0.0.117 Build 20180804

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

```

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

```

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.0.117 Build 20180804

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Compiler Version Notes (Continued)

Fortran | 548.exchange2_r(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:

icc -m64 -std=c11

C++ benchmarks:

icpc -m64

Fortran benchmarks:

ifort -m64

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:

-Wl,-z,muldefs -xSSE4.2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:

-Wl,-z,muldefs -xSSE4.2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

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Base Optimization Flags (Continued)

Fortran benchmarks:

```
-Wl,-z,muldefs -xSSE4.2 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte  
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

Peak Compiler Invocation

C benchmarks (except as noted below):

```
icc -m64 -std=c11
```

```
502.gcc_r: icc -m32 -std=c11 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.0.117/linux/compiler/lib/ia32_lin
```

C++ benchmarks (except as noted below):

```
icpc -m64
```

```
523.xalancbmk_r: icpc -m32 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.0.117/linux/compiler/lib/ia32_lin
```

Fortran benchmarks:

```
ifort -m64
```

Peak Portability Flags

```
500.perlbenc_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: -D_FILE_OFFSET_BITS=64 -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.perlbenc_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xSSE4.2 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-fno-strict-overflow -L/usr/local/je5.0.1-64/lib
```

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Peak Optimization Flags (Continued)

500.perlbench_r (continued):

-ljemalloc

502.gcc_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo

-xSSE4.2 -O3 -no-prec-div -qopt-mem-layout-trans=3

-L/usr/local/je5.0.1-32/lib -ljemalloc

505.mcf_r: -Wl,-z,muldefs -xSSE4.2 -ipo -O3 -no-prec-div

-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib

-ljemalloc

525.x264_r: -Wl,-z,muldefs -xSSE4.2 -ipo -O3 -no-prec-div

-qopt-mem-layout-trans=3 -fno-alias

-L/usr/local/je5.0.1-64/lib -ljemalloc

557.xz_r: Same as 505.mcf_r

C++ benchmarks:

520.omnetpp_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo

-xSSE4.2 -O3 -no-prec-div -qopt-mem-layout-trans=3

-L/usr/local/je5.0.1-64/lib -ljemalloc

523.xalancbmk_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo

-xSSE4.2 -O3 -no-prec-div -qopt-mem-layout-trans=3

-L/usr/local/je5.0.1-32/lib -ljemalloc

531.deepsjeng_r: Same as 520.omnetpp_r

541.leela_r: Same as 520.omnetpp_r

Fortran benchmarks:

-Wl,-z,muldefs -xSSE4.2 -ipo -O3 -no-prec-div

-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte

-L/usr/local/je5.0.1-64/lib -ljemalloc

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

<http://www.spec.org/cpu2017/flags/Intel-ic19.0ul-official-linux64.2019-07-09.html>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge14G-revE3.html>

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

<http://www.spec.org/cpu2017/flags/Intel-ic19.0ul-official-linux64.2019-07-09.xml>

<http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge14G-revE3.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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