



# SPEC® CPU2017 Integer Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

## Dell Inc.

PowerEdge R940  
(Intel Xeon Gold 6130, 2.10 GHz)

SPECrate2017\_int\_base = 321

SPECrate2017\_int\_peak = 339

CPU2017 License: 55

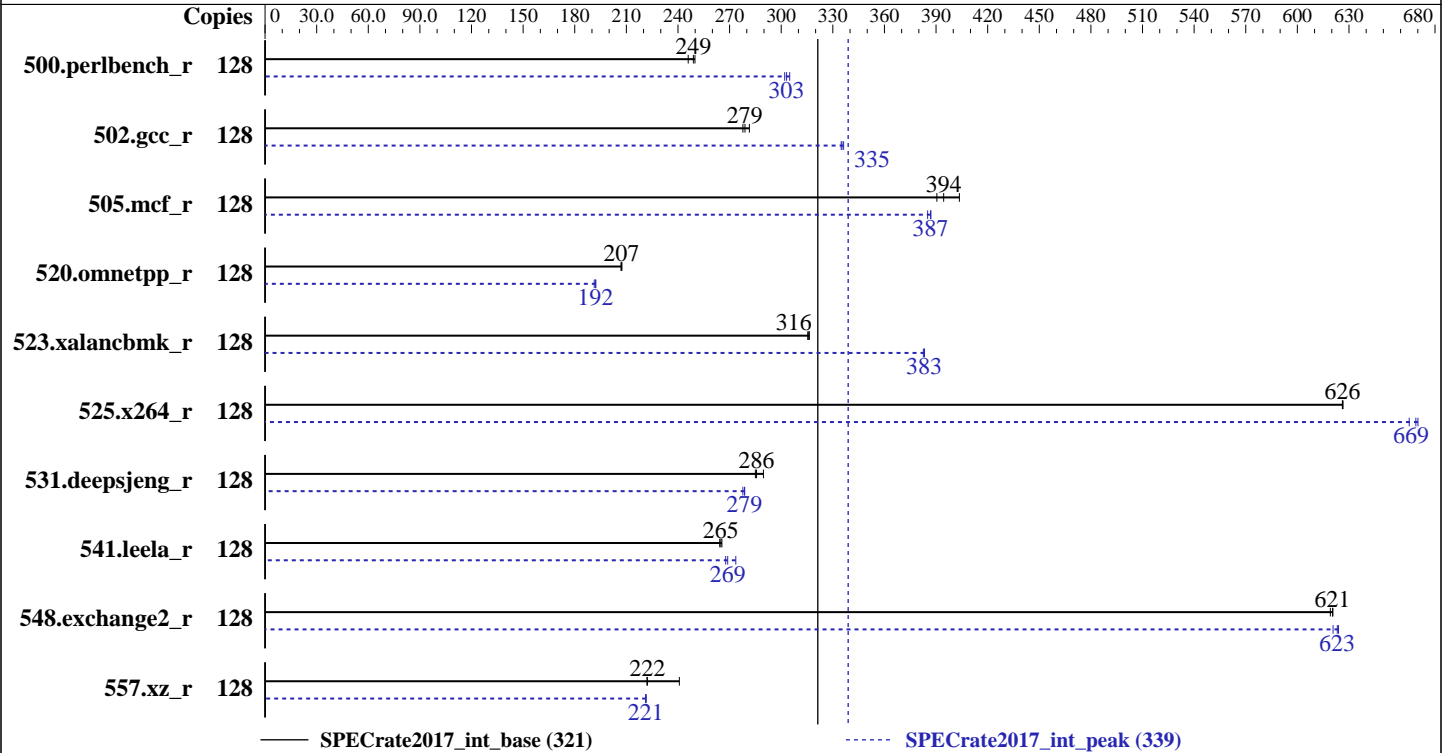
Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Oct-2017

Hardware Availability: Sep-2017

Software Availability: Sep-2017



### Hardware

CPU Name: Intel Xeon Gold 6130  
 Max MHz.: 3700  
 Nominal: 2100  
 Enabled: 64 cores, 4 chips, 2 threads/core  
 Orderable: 2,4 chip  
 Cache L1: 32 KB I + 32 KB D on chip per core  
 L2: 1 MB I+D on chip per core  
 L3: 22 MB I+D on chip per chip  
 Other: None  
 Memory: 768 GB (48 x 16 GB 2Rx8 PC4-2666V-R)  
 Storage: 1 x 900 GB 15K RPM SAS12  
 Other: None

### Software

OS: SUSE Linux Enterprise Server 12 SP2  
 4.4.21-69-default  
 Compiler: C/C++: Version 18.0.0.128 of Intel C/C++  
 Compiler for Linux;  
 Fortran: Version 18.0.0.128 of Intel Fortran  
 Compiler for Linux  
 Parallel: No  
 Firmware: Version 1.1.7 released Sep-2017  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 32/64-bit  
 Other: jemalloc: jemalloc memory allocator library  
 V5.0.1;  
 jemalloc: configured and built at default for  
 32bit (i686) and 64bit (x86\_64) targets;  
 jemalloc: built with the RedHat Enterprise 7.4,  
 and the system compiler gcc 4.8.5;  
 jemalloc: sources available from jemalloc.net or  
 releases



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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	128	829	246	<b>819</b>	<b>249</b>	815	250	128	668	305	675	302	<b>672</b>	<b>303</b>
502.gcc_r	128	653	278	<b>650</b>	<b>279</b>	644	282	128	<b>541</b>	<b>335</b>	539	336	541	335
505.mcf_r	128	513	404	<b>524</b>	<b>394</b>	530	390	128	<b>535</b>	<b>387</b>	535	387	537	385
520.omnetpp_r	128	<b>811</b>	<b>207</b>	810	207	812	207	128	<b>875</b>	<b>192</b>	878	191	873	192
523.xalancbmk_r	128	427	316	429	315	<b>428</b>	<b>316</b>	128	<b>353</b>	<b>383</b>	353	383	353	383
525.x264_r	128	<b>358</b>	<b>626</b>	358	626	358	627	128	334	670	<b>335</b>	<b>669</b>	337	665
531.deepsjeng_r	128	506	290	515	285	<b>513</b>	<b>286</b>	128	528	278	<b>526</b>	<b>279</b>	526	279
541.leela_r	128	798	266	802	264	<b>800</b>	<b>265</b>	128	775	274	<b>788</b>	<b>269</b>	792	268
548.exchange2_r	128	540	621	<b>540</b>	<b>621</b>	542	619	128	538	624	<b>538</b>	<b>623</b>	540	621
557.xz_r	128	574	241	623	222	<b>622</b>	<b>222</b>	128	<b>625</b>	<b>221</b>	625	221	624	221

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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 i7-4790 CPU + 32GB RAM  
memory using Redhat Enterprise Linux 7.4

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>
```



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## Platform Notes

BIOS settings:

Logical Processor Enabled  
 Virtualization Technology Disabled  
 Sub NUMA Cluster Enabled  
 System Profile set to Custom  
 CPU Performance set to Maximum Performance  
 C1E Disabled  
 C States set to Autonomous  
 Uncore Frequency set to Dynamic  
 Memory Patrol Scrub Disabled  
 Energy Efficiency Policy set to Performance  
 CPU Interconnect Bus Link Power Management Disabled  
 PCI ASPM L1 Link Power Management Disabled  
 Sysinfo program /home/cpu2017/bin/sysinfo  
 Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f  
 running on linux-2h8y Wed Oct 25 03:26:55 2017

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 6130 CPU @ 2.10GHz
 4 "physical id"s (chips)
 128 "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 : 16
siblings : 32
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 2: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
physical 3: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

```

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:    16
Socket(s):              4
NUMA node(s):          8
Vendor ID:              GenuineIntel
CPU family:             6
Model:                  85

```

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## Platform Notes (Continued)

```

Model name: Intel(R) Xeon(R) Gold 6130 CPU @ 2.10GHz
Stepping: 4
CPU MHz: 2095.070
BogoMIPS: 4190.14
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0,8,16,24,32,40,48,56,64,72,80,88,96,104,112,120
NUMA node1 CPU(s): 1,9,17,25,33,41,49,57,65,73,81,89,97,105,113,121
NUMA node2 CPU(s): 2,10,18,26,34,42,50,58,66,74,82,90,98,106,114,122
NUMA node3 CPU(s): 3,11,19,27,35,43,51,59,67,75,83,91,99,107,115,123
NUMA node4 CPU(s): 4,12,20,28,36,44,52,60,68,76,84,92,100,108,116,124
NUMA node5 CPU(s): 5,13,21,29,37,45,53,61,69,77,85,93,101,109,117,125
NUMA node6 CPU(s): 6,14,22,30,38,46,54,62,70,78,86,94,102,110,118,126
NUMA node7 CPU(s): 7,15,23,31,39,47,55,63,71,79,87,95,103,111,119,127
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
aperfmpperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl 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 3dnowprefetch ida arat epb pln pts dtherm intel_pt
tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd
avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc

```

```

/proc/cpuinfo cache data
cache size : 22528 KB

```

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

```

available: 8 nodes (0-7)
node 0 cpus: 0 8 16 24 32 40 48 56 64 72 80 88 96 104 112 120
node 0 size: 95359 MB
node 0 free: 94972 MB
node 1 cpus: 1 9 17 25 33 41 49 57 65 73 81 89 97 105 113 121
node 1 size: 96760 MB
node 1 free: 96447 MB
node 2 cpus: 2 10 18 26 34 42 50 58 66 74 82 90 98 106 114 122
node 2 size: 96760 MB
node 2 free: 96432 MB
node 3 cpus: 3 11 19 27 35 43 51 59 67 75 83 91 99 107 115 123
node 3 size: 96760 MB
node 3 free: 96439 MB
node 4 cpus: 4 12 20 28 36 44 52 60 68 76 84 92 100 108 116 124
node 4 size: 96760 MB

```

(Continued on next page)



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## Platform Notes (Continued)

```

node 4 free: 96441 MB
node 5 cpus: 5 13 21 29 37 45 53 61 69 77 85 93 101 109 117 125
node 5 size: 96760 MB
node 5 free: 96448 MB
node 6 cpus: 6 14 22 30 38 46 54 62 70 78 86 94 102 110 118 126
node 6 size: 96760 MB
node 6 free: 96423 MB
node 7 cpus: 7 15 23 31 39 47 55 63 71 79 87 95 103 111 119 127
node 7 size: 96757 MB
node 7 free: 96433 MB
node distances:
node  0  1  2  3  4  5  6  7
  0: 10 21 21 21 11 21 21 21
  1: 21 10 21 21 21 11 21 21
  2: 21 21 10 21 21 21 11 21
  3: 21 21 21 10 21 21 21 11
  4: 11 21 21 21 10 21 21 21
  5: 21 11 21 21 21 10 21 21
  6: 21 21 11 21 21 21 10 21
  7: 21 21 21 11 21 21 21 10

```

From /proc/meminfo

MemTotal: 791224272 kB

HugePages\_Total: 0

Hugepagesize: 2048 kB

/usr/bin/lsb\_release -d

SUSE Linux Enterprise Server 12 SP2

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

SuSE-release:

SUSE Linux Enterprise Server 12 (x86\_64)

VERSION = 12

PATCHLEVEL = 2

# This file is deprecated and will be removed in a future service pack or release.

# Please check /etc/os-release for details about this release.

os-release:

NAME="SLES"

VERSION="12-SP2"

VERSION\_ID="12.2"

PRETTY\_NAME="SUSE Linux Enterprise Server 12 SP2"

ID="sles"

ANSI\_COLOR="0;32"

CPE\_NAME="cpe:/o:suse:sles:12:sp2"

uname -a:

Linux linux-2h8y 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016 (9464f67)

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## Platform Notes (Continued)

x86\_64 x86\_64 x86\_64 GNU/Linux

run-level 3 Oct 25 03:26

SPEC is set to: /home/cpu2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda4	xfs	796G	17G	779G	3%	/home

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. 1.1.7 08/10/2017

Memory:

48x 00CE063200CE M393A2K43BB1-CTD 16 GB 2 rank 2666

(End of data from sysinfo program)

## Compiler Version Notes

```
=====  
CC 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)  
525.x264_r(base, peak) 557.xz_r(base, peak)  
-----
```

```
icc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
-----
```

```
=====  
CC 500.perlbench_r(peak) 502.gcc_r(peak)  
-----
```

```
icc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
-----
```

```
=====  
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)  
541.leela_r(base)  
-----
```

```
icpc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
-----
```

```
=====  
CXXC 520.omnetpp_r(peak) 523.xalancbmk_r(peak) 531.deepsjeng_r(peak)  
541.leela_r(peak)  
-----
```

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## Compiler Version Notes (Continued)

-----  
icpc (ICC) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
-----

=====

-----  
FC 548.exchange2\_r(base, peak)  
-----  
ifort (IFORT) 18.0.0 20170811  
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.  
-----

## Base Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

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:

-Wl,-z,muldefs -xCORE-AVX2 -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)

C++ benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc
```

Fortran benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte  
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

## Base Other Flags

C benchmarks:

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

C++ benchmarks:

```
-m64
```

Fortran benchmarks:

```
-m64
```

## Peak Compiler Invocation

C benchmarks:

```
icc
```

C++ benchmarks:

```
icpc
```

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
```

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## Peak Portability Flags (Continued)

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.perlbench\_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-fno-strict-overflow -L/usr/local/je5.0.1-64/lib  
-ljemalloc

502.gcc\_r: -L/opt/intel/compilers\_and\_libraries\_2018/linux/lib/ia32  
-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-L/usr/local/je5.0.1-32/lib -ljemalloc

505.mcf\_r: -Wl,-z,muldefs -xCORE-AVX2 -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 -xCORE-AVX2 -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  
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-L/usr/local/je5.0.1-64/lib -ljemalloc

523.xalancbmk\_r: -L/opt/intel/compilers\_and\_libraries\_2018/linux/lib/ia32  
-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX2 -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

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## Peak Optimization Flags (Continued)

541.leela\_r: Same as 520.omnetpp\_r

Fortran benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX2 -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 Other Flags

C benchmarks (except as noted below):

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

502.gcc\_r: -m32 -std=c11

C++ benchmarks (except as noted below):

```
-m64
```

523.xalancbmk\_r: -m32

Fortran benchmarks:

```
-m64
```

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

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.html>

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

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

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.xml>

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

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