



# SPEC® CPU2017 Integer Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Dell Inc.

SPECrate2017\_int\_base = 134

PowerEdge R440 (Intel Xeon Gold 5120, 2.20 GHz)

SPECrate2017\_int\_peak = Not Run

CPU2017 License: 55

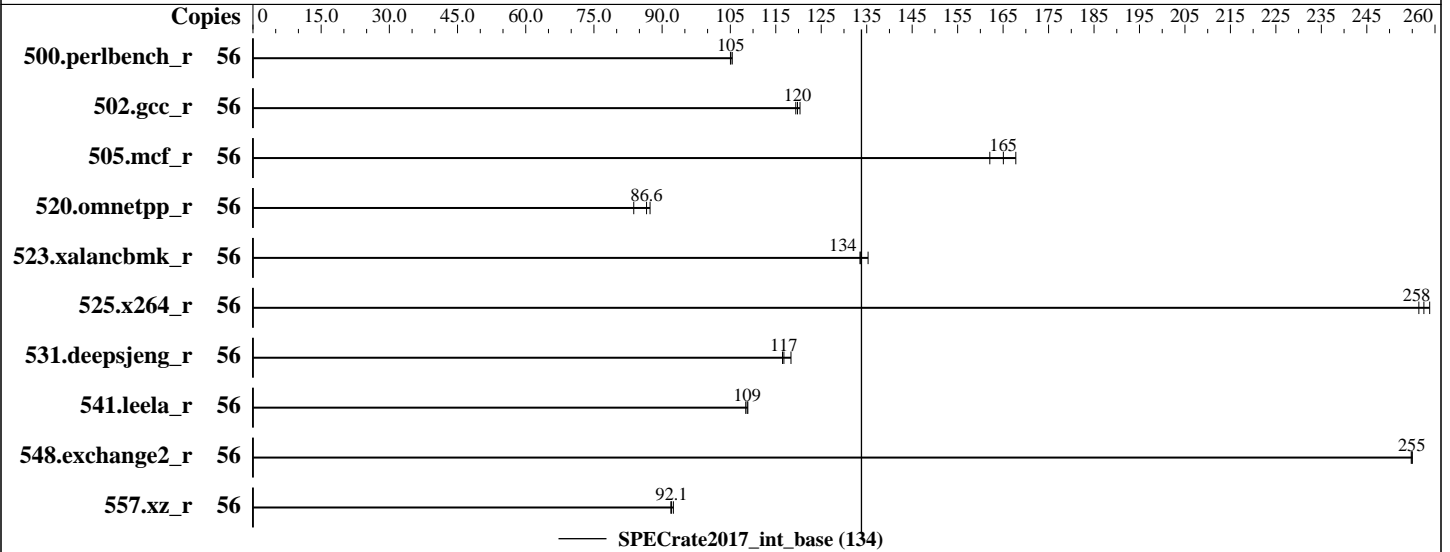
Test Date: Oct-2017

Test Sponsor: Dell Inc.

Hardware Availability: Sep-2017

Tested by: Dell Inc.

Software Availability: Sep-2017



## Hardware

CPU Name: Intel Xeon Gold 5120  
 Max MHz.: 3200  
 Nominal: 2200  
 Enabled: 28 cores, 2 chips, 2 threads/core  
 Orderable: 1,2 chip  
 Cache L1: 32 KB I + 32 KB D on chip per core  
 L2: 1 MB I+D on chip per core  
 L3: 19.25 MB I+D on chip per chip  
 Other: None  
 Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)  
 Storage: 480 GB SATA SSD  
 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 1.3.1 released Sep-2017  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 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 via jemalloc.net



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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	56	849	105	846	105	<b>848</b>	<b>105</b>							
502.gcc_r	56	659	120	<b>662</b>	<b>120</b>	664	119							
505.mcf_r	56	539	168	<b>548</b>	<b>165</b>	558	162							
520.omnetpp_r	56	841	87.3	<b>849</b>	<b>86.6</b>	877	83.8							
523.xalancbmk_r	56	437	135	443	134	<b>443</b>	<b>134</b>							
525.x264_r	56	382	256	<b>381</b>	<b>258</b>	379	259							
531.deepsjeng_r	56	542	118	<b>550</b>	<b>117</b>	551	116							
541.leela_r	56	852	109	<b>853</b>	<b>109</b>	856	108							
548.exchange2_r	56	576	255	575	255	<b>576</b>	<b>255</b>							
557.xz_r	56	654	92.5	<b>657</b>	<b>92.1</b>	658	91.9							

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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 = "/root/cpu2017/lib/ia32:/root/cpu2017/lib/intel64:/root/cpu2017/je5.0.1-32:/root/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>

## Platform Notes

BIOS settings:  
Logical Processor Enabled

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## Platform Notes (Continued)

Virtualization Technology Disabled  
 Sub NUMA Cluster Enabled  
 System Profile set to Custom  
 CPU Performance set to Maximum Performance  
 ClE 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 /root/cpu2017/bin/sysinfo  
 Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f  
 running on linux-jlsy Tue Oct 24 17:22:10 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 5120 CPU @ 2.20GHz  
 2 "physical id"s (chips)  
 56 "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 : 14  
 siblings : 28  
 physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14  
 physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14

From lscpu:  
 Architecture: x86\_64  
 CPU op-mode(s): 32-bit, 64-bit  
 Byte Order: Little Endian  
 CPU(s): 56  
 On-line CPU(s) list: 0-55  
 Thread(s) per core: 2  
 Core(s) per socket: 14  
 Socket(s): 2  
 NUMA node(s): 4  
 Vendor ID: GenuineIntel  
 CPU family: 6  
 Model: 85  
 Model name: Intel(R) Xeon(R) Gold 5120 CPU @ 2.20GHz  
 Stepping: 4  
 CPU MHz: 2194.943  
 BogoMIPS: 4389.88

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## Platform Notes (Continued)

```

Virtualization:      VT-x
L1d cache:          32K
L1i cache:          32K
L2 cache:           1024K
L3 cache:           19712K
NUMA node0 CPU(s): 0,4,8,12,16,20,24,28,32,36,40,44,48,52
NUMA node1 CPU(s): 1,5,9,13,17,21,25,29,33,37,41,45,49,53
NUMA node2 CPU(s): 2,6,10,14,18,22,26,30,34,38,42,46,50,54
NUMA node3 CPU(s): 3,7,11,15,19,23,27,31,35,39,43,47,51,55
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 : 19712 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
node 0 size: 46899 MB
node 0 free: 46622 MB
node 1 cpus: 1 5 9 13 17 21 25 29 33 37 41 45 49 53
node 1 size: 48369 MB
node 1 free: 48130 MB
node 2 cpus: 2 6 10 14 18 22 26 30 34 38 42 46 50 54
node 2 size: 48369 MB
node 2 free: 48140 MB
node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47 51 55
node 3 size: 48245 MB
node 3 free: 48010 MB
node distances:
node  0  1  2  3
0:  10  21  11  21
1:  21  10  21  11
2:  11  21  10  21
3:  21  11  21  10

```

```

From /proc/meminfo
MemTotal:      196489456 kB
HugePages_Total:      0

```

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## Platform Notes (Continued)

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-jlsy 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016 (9464f67)
x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Oct 24 17:20
```

```
SPEC is set to: /root/cpu2017
```

```
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2        xfs   371G  42G  330G  12% /
```

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. 1.2.9 10/06/2017
```

```
Memory:
```

```
12x 00AD063200AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666, configured at 2400
```

```
4x Not Specified Not Specified
```

(End of data from sysinfo program)

## Compiler Version Notes

```
====
CC 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base)
```

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## Compiler Version Notes (Continued)

557.xz\_r(base)

-----  
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.  
-----

=====  
FC 548.exchange2\_r(base)  
-----

-----  
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

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## Base Portability Flags (Continued)

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

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

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

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-10-19.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-linux64.2017-10-19.xml>

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