SPEC® CPU2017 Integer Rate Result

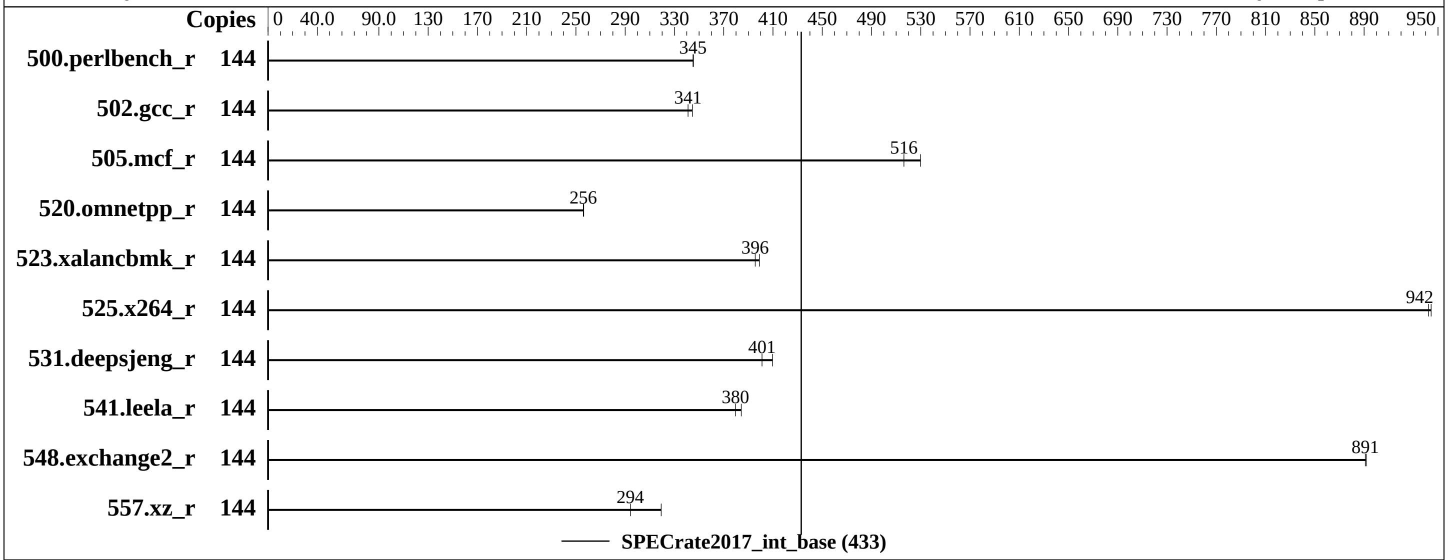
Dell Inc.

PowerEdge R940xa (Intel Xeon Gold 6154, 3.00GHz)

SPECrate2017_int_base = 433

SPECrate2017_int_peak = Not Run

CPU2017 License:	55	**Test Date:**	Dec-2018
Test Sponsor:	Dell Inc.	**Hardware Availability:**	Oct-2018
Tested by:	Dell Inc.	**Software Availability:**	Apr-2018



Hardware

CPU Name:	Intel Xeon Gold 6154
Max MHz.:	3700
Nominal:	3000
Enabled:	72 cores, 4 chips, 2 threads/core
Orderable:	2,4 chips
Cache L1:	32 KB I + 32 KB D on chip per core
L2:	1 MB I+D on chip per core
L3:	24.75 MB I+D on chip per chip
Other:	None
Memory:	768 GB (48 x 16 GB 2Rx8 PC4-2666V-R)
Storage:	1 x 480 GB SATA SSD
Other:	None

Software

OS:	SUSE Linux Enterprise Server 12 SP3 kernel 4.4.126-94.22-default
Compiler:	C/C++: Version 18.0.2.20180210 of Intel C/C++ Compiler for Linux; Fortran: Version 18.0.2.20180210 of Intel Fortran Compiler for Linux
Parallel:	No
Firmware:	Version 1.2.4 released Oct-2018
File System:	xfs
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	Not Applicable
Other:	jemalloc memory allocator v5.0.1

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	144	**664**	**345**	664	345									
502.gcc_r	144	**598**	**341**	592	345									
505.mcf_r	144	439	530	**451**	**516**									
520.omnetpp_r	144	737	256	**738**	**256**									
523.xalancbmk_r	144	381	399	**384**	**396**									
525.x264_r	144	**268**	**942**	267	944									
531.deepsjeng_r	144	403	410	**411**	**401**									
541.leela_r	144	**628**	**380**	621	384									
548.exchange2_r	144	423	892	**423**	**891**									
557.xz_r	144	487	319	**529**	**294**									

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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
 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.
 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.:
```

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General Notes (Continued)

```
numactl --interleave=all runcpu <etc>
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5
sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases
```

Platform Notes

```
BIOS settings:
Sub NUMA Cluster enabled
Virtualization Technology disabled
DCU Streamer Prefetcher disabled
System Profile set to Custom
CPU Performance set to Maximum Performance
C States set to Autonomous
C1E disabled
Uncore Frequency set to Dynamic
Energy Efficiency Policy set to Performance
Memory Patrol Scrub disabled
Logical Processor enabled
CPU Interconnect Bus Link Power Management disabled
PCI ASPM L1 Link Power Management disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-h835 Thu Dec  6 22:49:39 2018

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 6154 CPU @ 3.00GHz
      4  "physical id"s (chips)
      144 "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 : 18
      siblings  : 36
      physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
      physical 3: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

From lscpu:
     Architecture:          x86_64
     CPU op-mode(s):        32-bit, 64-bit
     Byte Order:            Little Endian
```


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Platform Notes (Continued)

```
     CPU(s):                144
     On-line CPU(s) list:   0-143
     Thread(s) per core:    2
     Core(s) per socket:    18
     Socket(s):             4
     NUMA node(s):          8
     Vendor ID:             GenuineIntel
     CPU family:            6
     Model:                 85
     Model name:            Intel(R) Xeon(R) Gold 6154 CPU @ 3.00GHz
     Stepping:              4
     CPU MHz:               2992.995
     BogoMIPS:              5985.99
     Virtualization:        VT-x
     L1d cache:             32K
     L1i cache:             32K
     L2 cache:              1024K
     L3 cache:              25344K
     NUMA node0 CPU(s):     0,8,16,24,32,40,48,56,64,72,80,88,96,104,112,120,128,136
     NUMA node1 CPU(s):     1,9,17,25,33,41,49,57,65,73,81,89,97,105,113,121,129,137
     NUMA node2 CPU(s):     2,10,18,26,34,42,50,58,66,74,82,90,98,106,114,122,130,138
     NUMA node3 CPU(s):     3,11,19,27,35,43,51,59,67,75,83,91,99,107,115,123,131,139
     NUMA node4 CPU(s):     4,12,20,28,36,44,52,60,68,76,84,92,100,108,116,124,132,140
     NUMA node5 CPU(s):     5,13,21,29,37,45,53,61,69,77,85,93,101,109,117,125,133,141
     NUMA node6 CPU(s):     6,14,22,30,38,46,54,62,70,78,86,94,102,110,118,126,134,142
     NUMA node7 CPU(s):     7,15,23,31,39,47,55,63,71,79,87,95,103,111,119,127,135,143
     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
     aperfmperf 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 invpcid_single pln pts
     dtherm intel_pt rsb_ctxsw spec_ctrl stibp retpoline kaiser 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 pku ospke

 /proc/cpuinfo cache data
    cache size : 25344 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 96 104 112 120 128 136
   node 0 size: 95230 MB
   node 0 free: 95029 MB
   node 1 cpus: 1 9 17 25 33 41 49 57 65 73 81 89 97 105 113 121 129 137
```

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Platform Notes (Continued)

```
    node 1 size: 96761 MB
    node 1 free: 96592 MB
    node 2 cpus: 2 10 18 26 34 42 50 58 66 74 82 90 98 106 114 122 130 138
    node 2 size: 96761 MB
    node 2 free: 96605 MB
    node 3 cpus: 3 11 19 27 35 43 51 59 67 75 83 91 99 107 115 123 131 139
    node 3 size: 96761 MB
    node 3 free: 96599 MB
    node 4 cpus: 4 12 20 28 36 44 52 60 68 76 84 92 100 108 116 124 132 140
    node 4 size: 96761 MB
    node 4 free: 96611 MB
    node 5 cpus: 5 13 21 29 37 45 53 61 69 77 85 93 101 109 117 125 133 141
    node 5 size: 96761 MB
    node 5 free: 96590 MB
    node 6 cpus: 6 14 22 30 38 46 54 62 70 78 86 94 102 110 118 126 134 142
    node 6 size: 96761 MB
    node 6 free: 96601 MB
    node 7 cpus: 7 15 23 31 39 47 55 63 71 79 87 95 103 111 119 127 135 143
    node 7 size: 96758 MB
    node 7 free: 96572 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:       791097680 kB
     HugePages_Total:       0
     Hugepagesize:       2048 kB

  /usr/bin/lsb_release -d
     SUSE Linux Enterprise Server 12 SP3

  From /etc/*release* /etc/*version*
     SuSE-release:
        SUSE Linux Enterprise Server 12 (x86_64)
        VERSION = 12
        PATCHLEVEL = 3
        # 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:
```

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Platform Notes (Continued)

```
      NAME="SLES"
      VERSION="12-SP3"
      VERSION_ID="12.3"
      PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
   Linux linux-h835 4.4.126-94.22-default #1 SMP Wed Apr 11 07:45:03 UTC 2018 (9649989)
   x86_64 x86_64 x86_64 GNU/Linux

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: IBRS+IBPB

run-level 3 Dec 6 22:48

SPEC is set to: /home/cpu2017
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda4      xfs   405G   36G  370G   9% /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. 1.2.4 10/18/2018
  Memory:
   36x 00AD00B300AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666
   10x 00AD063200AD HMA82GR7AFR8N-VK 16 GB 2 rank 2666
   2x 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) 525.x264_r(base)
      557.xz_r(base)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

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Compiler Version Notes (Continued)

```
==============================================================================
 CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
      541.leela_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 FC  548.exchange2_r(base)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
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 -xCORE-AVX512 -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-AVX512 -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-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=3 -nostandard-realloc-lhs -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-ic18.0-official-linux64.2017-12-21.html
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge14G-revD.2018-07-24.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.xml
http://www.spec.org/cpu2017/flags/Dell-Platform-Flags-PowerEdge14G-revD.2018-07-24.xml

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