SPEC® CPU2017 Integer Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge MX740c (Intel Xeon Platinum 8176, 2.10GHz)

SPECrate2017_int_base = 250

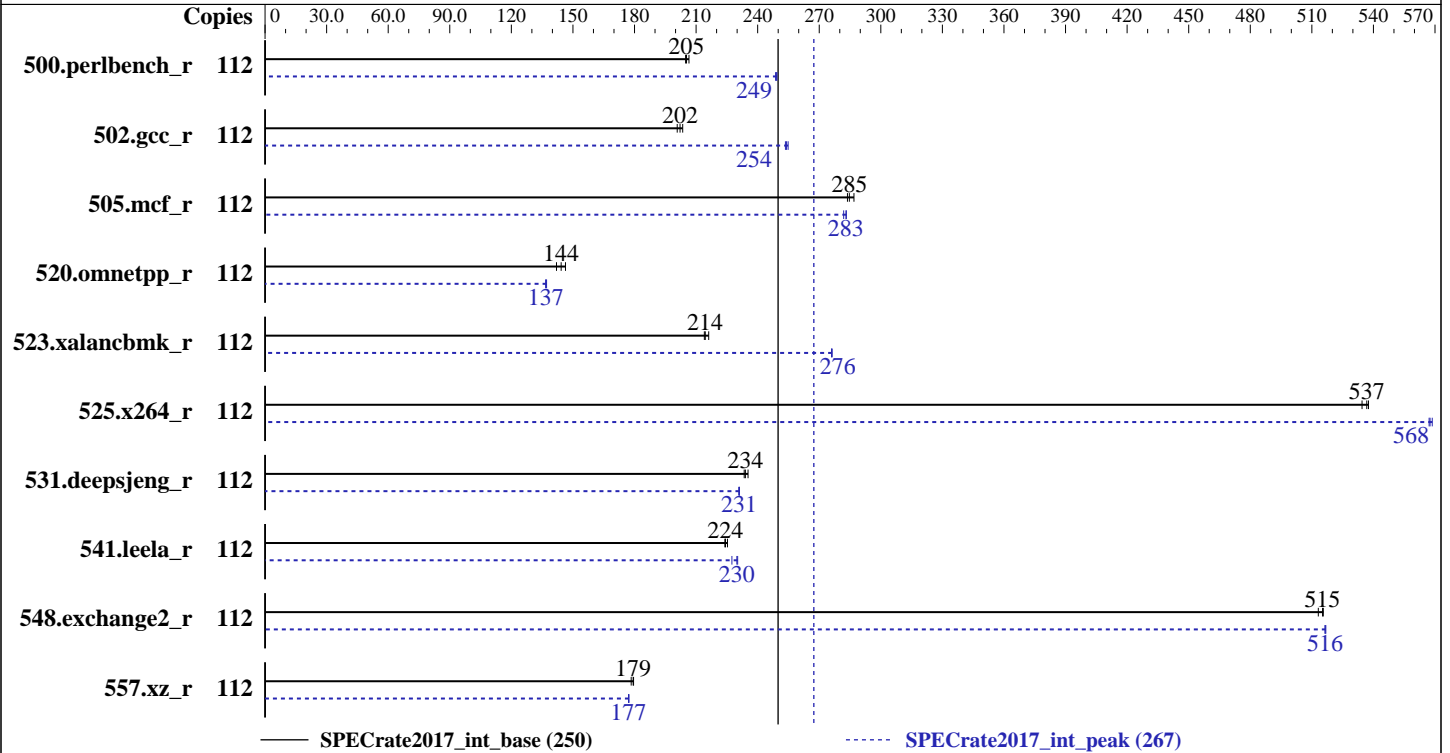SPECrate2017_int_peak = 267

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Feb-2018
Hardware Availability: Sep-2018
Software Availability: Feb-2018

Copies	
500.perlbench_r	112
502.gcc_r	112
505.mcf_r	112
520.omnetpp_r	112
523.xalancbmk_r	112
525.x264_r	112
531.deepsjeng_r	112
541.leela_r	112
548.exchange2_r	112
557.xz_r	112

Benchmark values (base / peak): 500.perlbench_r 205 / 249; 502.gcc_r 202 / 254; 505.mcf_r 285 / 283; 520.omnetpp_r 144 / 137; 523.xalancbmk_r 214 / 276; 525.x264_r 537 / 568; 531.deepsjeng_r 234 / 231; 541.leela_r 224 / 230; 548.exchange2_r 515 / 516; 557.xz_r 179 / 177

——— **SPECrate2017_int_base (250)**   - - - - - **SPECrate2017_int_peak (267)**

Hardware

CPU Name: Intel Xeon Platinum 8176
 Max MHz.: 3800
 Nominal: 2100
Enabled: 56 cores, 2 chips, 2 threads/core
Orderable: 1,2 chips
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 38.5 MB I+D on chip per chip
 Other: None
Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R)
Storage: 960 GB SAS SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 12 SP3
 4.4.114-94.11-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 0.3.12 released Feb-2018
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: jemalloc memory allocator library, version 5.0.1

SPEC CPU2017 Integer Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge MX740c (Intel Xeon Platinum 8176, 2.10GHz)

SPECrate2017_int_base = 250

SPECrate2017_int_peak = 267

CPU2017 License: 55	**Test Date:** Feb-2018
Test Sponsor: Dell Inc.	**Hardware Availability:** Sep-2018
Tested by: Dell Inc.	**Software Availability:** Feb-2018

Results Table

Benchmark	Base						Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	112	870	205	**868**	**205**	863	207	112	715	249	717	249	**716**	**249**
502.gcc_r	112	790	201	779	203	**784**	**202**	112	622	255	**624**	**254**	626	254
505.mcf_r	112	631	287	638	284	**636**	**285**	112	**639**	**283**	639	283	642	282
520.omnetpp_r	112	1004	146	**1019**	**144**	1035	142	112	1075	137	1071	137	**1074**	**137**
523.xalancbmk_r	112	547	216	553	214	**551**	**214**	112	428	276	429	276	**428**	**276**
525.x264_r	112	367	534	365	538	**365**	**537**	112	345	569	**346**	**568**	346	567
531.deepsjeng_r	112	545	235	**548**	**234**	550	233	112	556	231	555	231	**556**	**231**
541.leela_r	112	828	224	823	225	**827**	**224**	112	**807**	**230**	805	230	815	227
548.exchange2_r	112	572	513	569	516	**570**	**515**	112	**568**	**516**	568	516	568	517
557.xz_r	112	674	180	**675**	**179**	678	178	112	**683**	**177**	682	177	683	177
SPECrate2017_int_base =	**250**												
SPECrate2017_int_peak =	**267**												

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
 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: sources available via jemalloc.net
 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

(Continued on next page)

Dell Inc.

PowerEdge MX740c (Intel Xeon Platinum 8176, 2.10GHz)

SPECrate2017_int_base = 250

SPECrate2017_int_peak = 267

CPU2017 License: 55

Test Sponsor: Dell Inc.

Tested by: Dell Inc.

Test Date: Feb-2018

Hardware Availability: Sep-2018

Software Availability: Feb-2018

General Notes (Continued)

```
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
```

Platform Notes

```
BIOS settings:
Sub NUMA Cluster Disabled
Virtualization Technology Disabled
System Profile set to Custom
CPU Performance set to Maximum Performance
C States set to Autonomous
C1EE 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 /root/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on linux-5y3r Tue Feb  6 08:18:45 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) Platinum 8176 CPU @ 2.10GHz
      2  "physical id"s (chips)
      112 "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 : 28
      siblings  : 56
      physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
      28 29 30
      physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
      28 29 30

From lscpu:
   Architecture:         x86_64
   CPU op-mode(s):       32-bit, 64-bit
   Byte Order:           Little Endian
   CPU(s):               112
   On-line CPU(s) list:  0-111
   Thread(s) per core:   2
```

(Continued on next page)

Dell Inc.

PowerEdge MX740c (Intel Xeon Platinum 8176, 2.10GHz)

SPECrate2017_int_base = 250

SPECrate2017_int_peak = 267

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Feb-2018
Hardware Availability: Sep-2018
Software Availability: Feb-2018

Platform Notes (Continued)

```
     Core(s) per socket:       28
     Socket(s):                2
     NUMA node(s):             4
     Vendor ID:                GenuineIntel
     CPU family:               6
     Model:                    85
     Model name:               Intel(R) Xeon(R) Platinum 8176 CPU @ 2.10GHz
     Stepping:                 4
     CPU MHz:                  2095.177
     BogoMIPS:                 4190.35
     Virtualization:           VT-x
     L1d cache:                32K
     L1i cache:                32K
     L2 cache:                 1024K
     L3 cache:                 39424K
     NUMA node0 CPU(s):
     0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60,64,68,72,76,80,84,88,92,96,100,104,108
     NUMA node1 CPU(s):
     1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61,65,69,73,77,81,85,89,93,97,101,105,109
     NUMA node2 CPU(s):
     2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62,66,70,74,78,82,86,90,94,98,102,106,110
     NUMA node3 CPU(s):
     3,7,11,15,19,23,27,31,35,39,43,47,51,55,59,63,67,71,75,79,83,87,91,95,99,103,107,111
     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 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 : 39424 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 56 60 64 68 72 76 80 84 88 92 96
     100 104 108
     node 0 size: 95359 MB
     node 0 free: 95018 MB
     node 1 cpus: 1 5 9 13 17 21 25 29 33 37 41 45 49 53 57 61 65 69 73 77 81 85 89 93 97
     101 105 109
     node 1 size: 96756 MB
```

(Continued on next page)

Dell Inc.

PowerEdge MX740c (Intel Xeon Platinum 8176, 2.10GHz)

SPECrate2017_int_base = 250

SPECrate2017_int_peak = 267

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Feb-2018
Hardware Availability: Sep-2018
Software Availability: Feb-2018

Platform Notes (Continued)

```
   node 1 free: 96450 MB
   node 2 cpus: 2 6 10 14 18 22 26 30 34 38 42 46 50 54 58 62 66 70 74 78 82 86 90 94 98
   102 106 110
   node 2 size: 96756 MB
   node 2 free: 96381 MB
   node 3 cpus: 3 7 11 15 19 23 27 31 35 39 43 47 51 55 59 63 67 71 75 79 83 87 91 95 99
   103 107 111
   node 3 size: 96754 MB
   node 3 free: 96492 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:       394883064 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:
       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-5y3r 4.4.114-94.11-default #1 SMP Thu Feb 1 19:28:26 UTC 2018 (4309ff9)
    x86_64 x86_64 x86_64 GNU/Linux

 run-level 3 Feb 6 07:59

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

(Continued on next page)

Dell Inc.

PowerEdge MX740c (Intel Xeon Platinum 8176, 2.10GHz)

SPECrate2017_int_base = 250

SPECrate2017_int_peak = 267

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Feb-2018
Hardware Availability: Sep-2018
Software Availability: Feb-2018

Platform Notes (Continued)

```
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda3       xfs   882G   16G  867G   2% /


 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. 0.3.12 02/06/2018
   Memory:
     7x 00AD00B300AD HMA84GR7AFR4N-VK 32 GB 2 rank 2666
     5x 00AD063200AD HMA84GR7AFR4N-VK 32 GB 2 rank 2666
     12x 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, 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)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
```

(Continued on next page)

SPEC CPU2017 Integer Rate Result

Dell Inc.

PowerEdge MX740c (Intel Xeon Platinum 8176, 2.10GHz)

SPECrate2017_int_base =   250

SPECrate2017_int_peak =   267

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Feb-2018
Hardware Availability: Sep-2018
Software Availability: Feb-2018

Compiler Version Notes (Continued)

```
--------------------------------------------------------------------------

==========================================================================
  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`

C++ benchmarks:
`-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div`

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org)   https://www.spec.org/

Dell Inc.

PowerEdge MX740c (Intel Xeon Platinum 8176, 2.10GHz)

SPECrate2017_int_base = 250

SPECrate2017_int_peak = 267

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Feb-2018
Hardware Availability: Sep-2018
Software Availability: Feb-2018

Base Optimization Flags (Continued)

C++ benchmarks (continued):
```
-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`
523.xalancbmk_r: `-D_FILE_OFFSET_BITS=64 -DSPEC_LINUX`
525.x264_r: `-DSPEC_LP64`
531.deepsjeng_r: `-DSPEC_LP64`

(Continued on next page)

Dell Inc.

PowerEdge MX740c (Intel Xeon Platinum 8176, 2.10GHz)

SPECrate2017_int_base = 250

SPECrate2017_int_peak = 267

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Feb-2018
Hardware Availability: Sep-2018
Software Availability: Feb-2018

Peak Portability Flags (Continued)

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`

541.leela_r: `Same as 520.omnetpp_r`

(Continued on next page)

Copyright 2017-2018 Standard Performance Evaluation Corporation

Dell Inc.

PowerEdge MX740c (Intel Xeon Platinum 8176, 2.10GHz)

SPECrate2017_int_base = 250

SPECrate2017_int_peak = 267

CPU2017 License: 55
Test Sponsor: Dell Inc.
Tested by: Dell Inc.

Test Date: Feb-2018
Hardware Availability: Sep-2018
Software Availability: Feb-2018

Peak Optimization Flags (Continued)

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-linux64.2017-10-19.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

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU2017 v1.0.2 on 2018-02-05 19:18:44-0500.
Report generated on 2018-10-31 19:06:52 by CPU2017 PDF formatter v6067.
Originally published on 2018-10-16.