SPEC® CPU2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

ASUSTeK Computer Inc.

ASUS RS720Q-E9(Z11PH-D12) Server System
(3.20 GHz, Intel Xeon Gold 6146)

SPECrate2017_int_base =   168
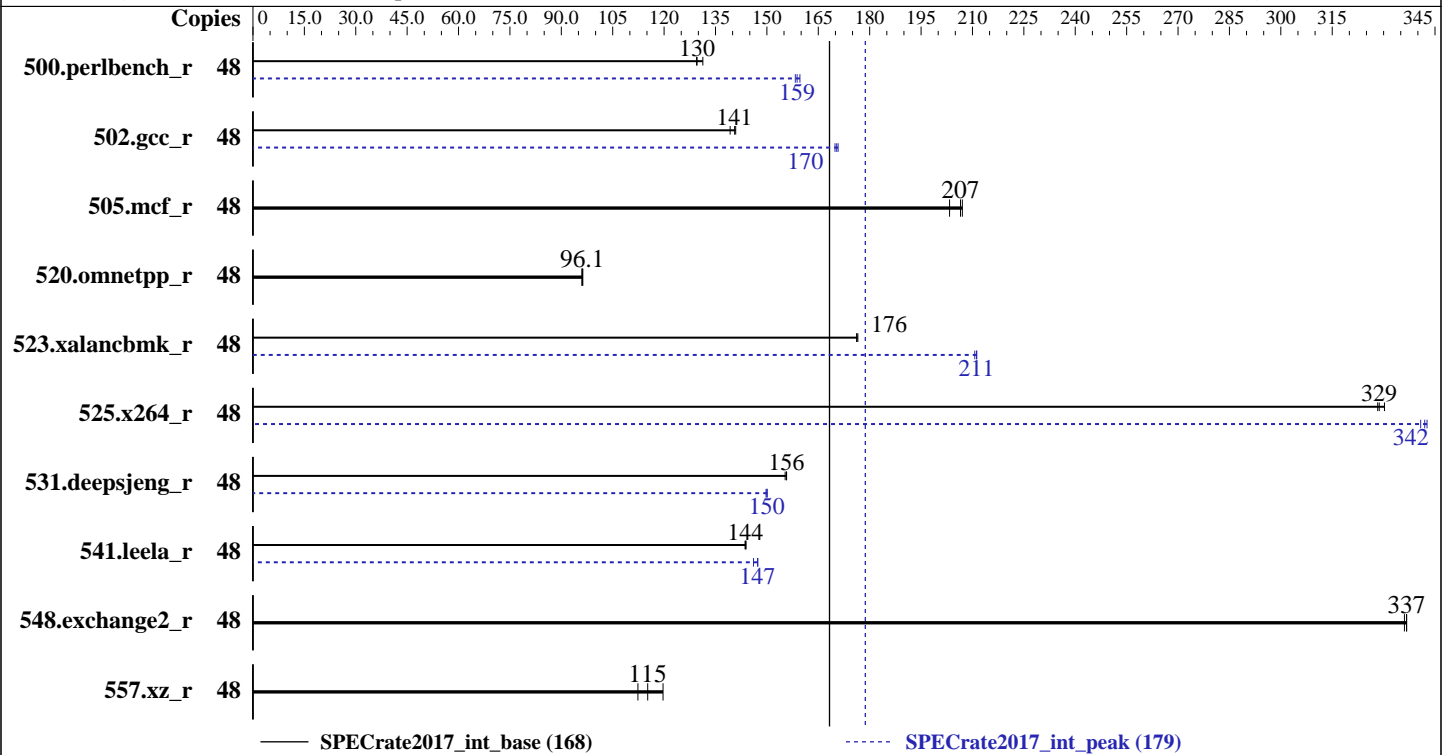
SPECrate2017_int_peak =   179

CPU2017 License: 9016

Test Sponsor: ASUSTeK Computer Inc.

Tested by: ASUSTeK Computer Inc.

Test Date: Jul-2018

Hardware Availability: Mar-2018

Software Availability: Mar-2018

Copies		
500.perlbench_r	48	130 / 159
502.gcc_r	48	141 / 170
505.mcf_r	48	207
520.omnetpp_r	48	96.1
523.xalancbmk_r	48	176 / 211
525.x264_r	48	329 / 342
531.deepsjeng_r	48	156 / 150
541.leela_r	48	144 / 147
548.exchange2_r	48	337
557.xz_r	48	115

Graph scale: 0 15.0 30.0 45.0 60.0 75.0 90.0 105 120 135 150 165 180 195 210 225 240 255 270 285 300 315 345

——— SPECrate2017_int_base (168)

- - - - SPECrate2017_int_peak (179)

Hardware

CPU Name: Intel Xeon Gold 6146

 Max MHz.:   4200

 Nominal: 3200

Enabled: 24 cores, 2 chips, 2 threads/core

Orderable: 1, 2 chip(s)

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: 384 GB (12 x 32 GB 2Rx4 PC4-2666V-R)

Storage: 1 x 240 GB SATA SSD

Other: None

Software

OS: SUSE Linux Enterprise Server 12 (x86_64) SP3
Kernel 4.4.120-94.17-default

Compiler: C/C++: Version 18.0.3.222 of Intel C/C++
Compiler for Linux;
Fortran: Version 18.0.3.222 of Intel Fortran
Compiler for Linux

Parallel: No

Firmware: Version 0905 released Mar-2018

File System: btrfs

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

SPEC CPU2017 Integer Rate Result
Copyright 2017-2019 Standard Performance Evaluation Corporation

ASUSTeK Computer Inc.

ASUS RS720Q-E9(Z11PH-D12) Server System
(3.20 GHz, Intel Xeon Gold 6146)

SPECrate2017_int_base = 168

SPECrate2017_int_peak = 179

CPU2017 License: 9016

Test Sponsor: ASUSTeK Computer Inc.

Tested by: ASUSTeK Computer Inc.

Test Date: Jul-2018

Hardware Availability: Mar-2018

Software Availability: Mar-2018

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	48	582	131	**590**	**130**	590	129	48	479	160	483	158	**481**	**159**
502.gcc_r	48	482	141	**483**	**141**	488	139	48	398	171	**399**	**170**	400	170
505.mcf_r	48	**376**	**207**	375	207	382	203	48	**376**	**207**	375	207	382	203
520.omnetpp_r	48	**655**	**96.1**	656	96.0	654	96.3	48	**655**	**96.1**	656	96.0	654	96.3
523.xalancbmk_r	48	**288**	**176**	287	177	288	176	48	241	211	240	211	**240**	**211**
525.x264_r	48	**256**	**329**	256	328	254	330	48	247	341	245	343	**246**	**342**
531.deepsjeng_r	48	353	156	354	155	**353**	**156**	48	366	150	367	150	**367**	**150**
541.leela_r	48	552	144	**553**	**144**	553	144	48	**540**	**147**	544	146	539	147
548.exchange2_r	48	374	336	**374**	**337**	373	337	48	374	336	**374**	**337**	373	337
557.xz_r	48	433	120	**450**	**115**	461	112	48	433	120	**450**	**115**	461	112
SPECrate2017_int_base =	**168**													
SPECrate2017_int_peak =	**179**													

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 = "/spec2017/lib/ia32:/spec2017/lib/intel64:/spec2017/je5.0.1-32:/spec2017/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>
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
https://github.com/jemalloc/jemalloc/releases

(Continued on next page)

SPEC CPU2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

ASUSTeK Computer Inc.

ASUS RS720Q-E9(Z11PH-D12) Server System
(3.20 GHz, Intel Xeon Gold 6146)

SPECrate2017_int_base = 168

SPECrate2017_int_peak = 179

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Jul-2018
Hardware Availability: Mar-2018
Software Availability: Mar-2018

General Notes (Continued)

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.

Platform Notes

```
BIOS Configuration:
SNC = Enabled
IMC interleaving = 1 way
Patrol Scrub = Disabled
VT-d = Disabled
ENERGY_PERF_BIAS_CFG mode = Performance
HyperThreading = Enabled
 Sysinfo program /spec2017/bin/sysinfo
 Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
 running on linux-pmm5 Wed Jul 25 10:01:50 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 6146 CPU @ 3.20GHz
       2  "physical id"s (chips)
       48 "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 : 12
       siblings  : 24
       physical 0: cores 0 1 2 3 4 8 9 11 17 18 19 20
       physical 1: cores 0 1 2 3 8 9 10 11 18 19 24 27

 From lscpu:
      Architecture:          x86_64
      CPU op-mode(s):        32-bit, 64-bit
      Byte Order:            Little Endian
      CPU(s):                48
      On-line CPU(s) list:   0-47
      Thread(s) per core:    2
      Core(s) per socket:    12
      Socket(s):             2
      NUMA node(s):          4
      Vendor ID:             GenuineIntel
```

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS720Q-E9(Z11PH-D12) Server System
(3.20 GHz, Intel Xeon Gold 6146)

SPECrate2017_int_base = 168

SPECrate2017_int_peak = 179

CPU2017 License: 9016

Test Sponsor: ASUSTeK Computer Inc.

Tested by: ASUSTeK Computer Inc.

Test Date: Jul-2018

Hardware Availability: Mar-2018

Software Availability: Mar-2018

Platform Notes (Continued)

```
        CPU family:            6
        Model:                 85
        Model name:            Intel(R) Xeon(R) Gold 6146 CPU @ 3.20GHz
        Stepping:              4
        CPU MHz:               3201.000
        CPU max MHz:           3201.0000
        CPU min MHz:           1200.0000
        BogoMIPS:              6528.24
        Virtualization:        VT-x
        L1d cache:             32K
        L1i cache:             32K
        L2 cache:              1024K
        L3 cache:              25344K
        NUMA node0 CPU(s):     0-2,5,6,8,24-26,29,30,32
        NUMA node1 CPU(s):     3,4,7,9-11,27,28,31,33-35
        NUMA node2 CPU(s):     12-14,16,17,22,36-38,40,41,46
        NUMA node3 CPU(s):     15,18-21,23,39,42-45,47
        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: 4 nodes (0-3)
    node 0 cpus: 0 1 2 5 6 8 24 25 26 29 30 32
    node 0 size: 95306 MB
    node 0 free: 95097 MB
    node 1 cpus: 3 4 7 9 10 11 27 28 31 33 34 35
    node 1 size: 96759 MB
    node 1 free: 96567 MB
    node 2 cpus: 12 13 14 16 17 22 36 37 38 40 41 46
    node 2 size: 96759 MB
    node 2 free: 96527 MB
    node 3 cpus: 15 18 19 20 21 23 39 42 43 44 45 47
    node 3 size: 96756 MB
    node 3 free: 96530 MB
    node distances:
```

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS720Q-E9(Z11PH-D12) Server System
(3.20 GHz, Intel Xeon Gold 6146)

SPECrate2017_int_base =   168

SPECrate2017_int_peak =   179

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Jul-2018
Hardware Availability: Mar-2018
Software Availability: Mar-2018

Platform Notes (Continued)

```
   node   0   1   2   3
     0:  10  11  21  21
     1:  11  10  21  21
     2:  21  21  10  11
     3:  21  21  11  10

 From /proc/meminfo
    MemTotal:       394835376 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 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-pmm5 4.4.120-94.17-default #1 SMP Wed Mar 14 17:23:00 UTC 2018 (cf3a7bb)
    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 Jul 25 10:01

 SPEC is set to: /spec2017
    Filesystem      Type    Size  Used Avail Use% Mounted on
    /dev/sda2       btrfs   203G   93G  109G  47% /

 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.
```

(Continued on next page)

SPEC CPU2017 Integer Rate Result

ASUSTeK Computer Inc.

ASUS RS720Q-E9(Z11PH-D12) Server System
(3.20 GHz, Intel Xeon Gold 6146)

SPECrate2017_int_base = 168

SPECrate2017_int_peak = 179

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Jul-2018
Hardware Availability: Mar-2018
Software Availability: Mar-2018

Platform Notes (Continued)

```
   BIOS American Megatrends Inc. 0905 03/19/2018
   Memory:
    12x Kingston D4-26662R4-32G 32 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) 18.0.3 20180410
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
 CC   500.perlbench_r(peak) 502.gcc_r(peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.3 20180410
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
 CXXC 520.omnetpp_r(base, peak) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
      541.leela_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.3 20180410
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
 CXXC 523.xalancbmk_r(peak) 531.deepsjeng_r(peak) 541.leela_r(peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.3 20180410
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
 FC   548.exchange2_r(base, peak)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.3 20180410
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

SPEC CPU2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

ASUSTeK Computer Inc.

ASUS RS720Q-E9(Z11PH-D12) Server System
(3.20 GHz, Intel Xeon Gold 6146)

SPECrate2017_int_base = 168

SPECrate2017_int_peak = 179

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Jul-2018
Hardware Availability: Mar-2018
Software Availability: Mar-2018

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 -align array32byte`
`-L/usr/local/je5.0.1-64/lib -ljemalloc`

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

ASUSTeK Computer Inc.

ASUS RS720Q-E9(Z11PH-D12) Server System
(3.20 GHz, Intel Xeon Gold 6146)

SPECrate2017_int_base = 168

SPECrate2017_int_peak = 179

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Jul-2018
Hardware Availability: Mar-2018
Software Availability: Mar-2018

Peak Compiler Invocation

C benchmarks (except as noted below):
`icc -m64 -std=c11`

 502.gcc_r: `icc -m32 -std=c11 -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32`

C++ benchmarks (except as noted below):
`icpc -m64`

 523.xalancbmk_r: `icpc -m32 -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32`

Fortran benchmarks:
`ifort -m64`

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`
 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-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3`
`-fno-strict-overflow -L/usr/local/je5.0.1-64/lib`
`-ljemalloc`

 502.gcc_r: `-Wl,-z,muldefs` -prof-gen(pass 1) -prof-use(pass 2) `-ipo`
`-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3`
`-L/usr/local/je5.0.1-32/lib -ljemalloc`

 505.mcf_r: basepeak = yes

(Continued on next page)

ASUSTeK Computer Inc.

ASUS RS720Q-E9(Z11PH-D12) Server System
(3.20 GHz, Intel Xeon Gold 6146)

SPECrate2017_int_base = 168

SPECrate2017_int_peak = 179

CPU2017 License: 9016

Test Sponsor: ASUSTeK Computer Inc.

Tested by: ASUSTeK Computer Inc.

Test Date: Jul-2018

Hardware Availability: Mar-2018

Software Availability: Mar-2018

Peak Optimization Flags (Continued)

525.x264_r: `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
`-qopt-mem-layout-trans=3 -fno-alias`
`-L/usr/local/je5.0.1-64/lib -ljemalloc`

557.xz_r: `basepeak = yes`

C++ benchmarks:

520.omnetpp_r: `basepeak = yes`

523.xalancbmk_r: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo`
`-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3`
`-L/usr/local/je5.0.1-32/lib -ljemalloc`

531.deepsjeng_r: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo`
`-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3`
`-L/usr/local/je5.0.1-64/lib -ljemalloc`

541.leela_r: `Same as 531.deepsjeng_r`

Fortran benchmarks:

548.exchange2_r: `basepeak = yes`

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-z11-V2.0-revD.html
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-z11-V2.0-revD.xml
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.xml

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

Tested with SPEC CPU2017 v1.0.5 on 2018-07-24 22:01:50-0400.
Report generated on 2019-03-08 20:40:26 by CPU2017 PDF formatter v6067.
Originally published on 2018-08-21.