SPEC CPU®2017 Integer Rate Result

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Inspur Corporation

Inspur NF5180M5 (Intel Xeon Gold 6242)

$SPECrate®2017\_int\_base = 209$

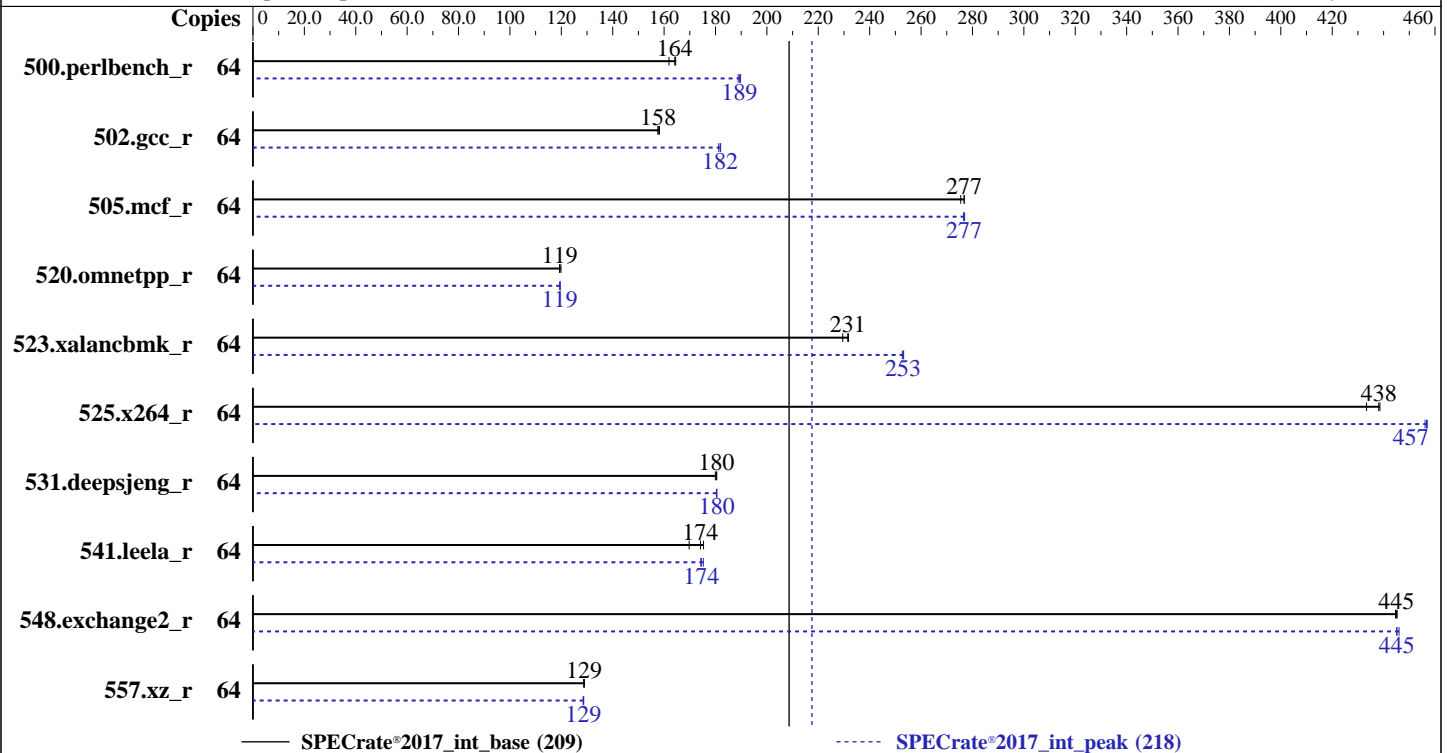$SPECrate®2017\_int\_peak = 218$

CPU2017 License: 3358

Test Sponsor: Inspur Corporation

Tested by: Inspur Corporation

Test Date: Apr-2020

Hardware Availability: Apr-2019

Software Availability: May-2019

Benchmark	Copies	base	peak
500.perlbench_r	64	164	189
502.gcc_r	64	158	182
505.mcf_r	64	277	277
520.omnetpp_r	64	119	119
523.xalancbmk_r	64	231	253
525.x264_r	64	438	457
531.deepsjeng_r	64	180	180
541.leela_r	64	174	174
548.exchange2_r	64	445	445
557.xz_r	64	129	129

SPECrate®2017_int_base (209)   SPECrate®2017_int_peak (218)

Hardware

CPU Name: Intel Xeon Gold 6242

Max MHz: 3900

Nominal: 2800

Enabled: 32 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: 22 MB I+D on chip per chip

Other: None

Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)

Storage: 1 x 2 TB SATA SSD

Other: None

Software

OS: SUSE Linux Enterprise Server 12 SP4
4.12.14-94.41-default

Compiler: C/C++: Version 19.0.4.227 of Intel C/C++
Compiler Build 20190416 for Linux;
Fortran: Version 19.0.4.227 of Intel Fortran
Compiler Build 20190416 for Linux

Parallel: No

Firmware: Version 4.1.5 released May-2019

File System: ext4

System State: Run level 3 (multi-user)

Base Pointers: 64-bit

Peak Pointers: 32/64-bit

Other: jemalloc memory allocator V5.0.1

Power Management: BIOS and OS set to prefer performance at the cost of additional power usage.

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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	64	629	162	**621**	**164**	619	165	64	540	189	**538**	**189**	537	190
502.gcc_r	64	573	158	575	158	**575**	**158**	64	498	182	**498**	**182**	500	181
505.mcf_r	64	**374**	**277**	374	277	375	275	64	374	277	**374**	**277**	373	277
520.omnetpp_r	64	**703**	**119**	704	119	701	120	64	703	119	702	120	**703**	**119**
523.xalancbmk_r	64	292	232	294	230	**292**	**231**	64	**267**	**253**	267	253	267	253
525.x264_r	64	256	439	**256**	**438**	259	433	64	246	456	**245**	**457**	245	457
531.deepsjeng_r	64	**407**	**180**	408	180	406	180	64	407	180	**406**	**180**	406	180
541.leela_r	64	**609**	**174**	624	170	604	175	64	**607**	**174**	608	174	605	175
548.exchange2_r	64	**377**	**445**	377	445	377	445	64	**377**	**445**	376	446	377	445
557.xz_r	64	536	129	**536**	**129**	537	129	64	537	129	538	128	**537**	**129**
SPECrate®2017_int_base =	**209**											
SPECrate®2017_int_peak =	**218**											

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"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
     "/home/CPU2017/lib/intel64:/home/CPU2017/lib/ia32:/home/CPU2017/je5.0.1-
     32"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
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>

NA: 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, a general purpose malloc implementation
built with the RedHat Enterprise 7.5,
and the system compiler gcc 4.8.5;
sources available from jemalloc.net or
https://github.com/jemalloc/jemalloc/releases
```

Platform Notes

```
BIOS configuration:
SCALING_GOVERNOR set to Performance
Hardware Prefetch set to Disable
VT Support set to Disable
C1E Support set to Disable
IMC (Integrated memory controller) Interleaving set to 1-way
Sub NUMA Cluster (SNC) set to Enable

Sysinfo program /home/CPU2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
running on linux-1ycj Sun Apr 26 04:06:03 2020

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 6242 CPU @ 2.80GHz
      2  "physical id"s (chips)
      64 "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

From lscpu:
     Architecture:          x86_64
```

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Platform Notes (Continued)

```
        CPU op-mode(s):        32-bit, 64-bit
        Byte Order:            Little Endian
        CPU(s):                64
        On-line CPU(s) list:   0-63
        Thread(s) per core:    2
        Core(s) per socket:    16
        Socket(s):             2
        NUMA node(s):          4
        Vendor ID:             GenuineIntel
        CPU family:            6
        Model:                 85
        Model name:            Intel(R) Xeon(R) Gold 6242 CPU @ 2.80GHz
        Stepping:              5
        CPU MHz:               2800.000
        CPU max MHz:           3900.0000
        CPU min MHz:           1000.0000
        BogoMIPS:              5600.00
        Virtualization:        VT-x
        L1d cache:             32K
        L1i cache:             32K
        L2 cache:              1024K
        L3 cache:              22528K
        NUMA node0 CPU(s):     0-3,8-11,32-35,40-43
        NUMA node1 CPU(s):     4-7,12-15,36-39,44-47
        NUMA node2 CPU(s):     16-19,24-27,48-51,56-59
        NUMA node3 CPU(s):     20-23,28-31,52-55,60-63
        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 cpuid
    aperfmperf pni pclmulqdq dtes64 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 cpuid_fault epb cat_l3 cdp_l3 invpcid_single
    intel_ppin ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase
    tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq
    rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec
    xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln
    pts pku ospke flush_l1d arch_capabilities

  /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: 4 nodes (0-3)
    node 0 cpus: 0 1 2 3 8 9 10 11 32 33 34 35 40 41 42 43
    node 0 size: 192047 MB
    node 0 free: 191460 MB
```

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Platform Notes (Continued)

```
   node 1 cpus: 4 5 6 7 12 13 14 15 36 37 38 39 44 45 46 47
   node 1 size: 193530 MB
   node 1 free: 193250 MB
   node 2 cpus: 16 17 18 19 24 25 26 27 48 49 50 51 56 57 58 59
   node 2 size: 193530 MB
   node 2 free: 193277 MB
   node 3 cpus: 20 21 22 23 28 29 30 31 52 53 54 55 60 61 62 63
   node 3 size: 193290 MB
   node 3 free: 193030 MB
   node distances:
   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:       790936712 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 /usr/bin/lsb_release -d
    SUSE Linux Enterprise Server 12 SP4

 From /etc/*release* /etc/*version*
    SuSE-release:
       SUSE Linux Enterprise Server 12 (x86_64)
       VERSION = 12
       PATCHLEVEL = 4
       # 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-SP4"
       VERSION_ID="12.4"
       PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
       ID="sles"
       ANSI_COLOR="0;32"
       CPE_NAME="cpe:/o:suse:sles:12:sp4"

 uname -a:
    Linux linux-1ycj 4.12.14-94.41-default #1 SMP Wed Oct 31 12:25:04 UTC 2018 (3090901)
    x86_64 x86_64 x86_64 GNU/Linux

 Kernel self-reported vulnerability status:

 CVE-2018-3620 (L1 Terminal Fault):        Not affected
```

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Platform Notes (Continued)

```
Microarchitectural Data Sampling:        No status reported
CVE-2017-5754 (Meltdown):                Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled
                                         via prctl and seccomp
CVE-2017-5753 (Spectre variant 1):       Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):       Mitigation: Indirect Branch Restricted
                                         Speculation, IBPB, IBRS_FW


  run-level 3 Apr 26 04:03 last=5


  SPEC is set to: /home/CPU2017
     Filesystem      Type  Size  Used Avail Use% Mounted on
     /dev/nvme0n1p4 ext4  1.8T   65G  1.7T   4% /home


  From /sys/devices/virtual/dmi/id
     BIOS:    American Megatrends Inc. 4.1.5 05/21/2019
     Vendor:  Inspur
     Product: NF5280M5
     Serial:  219243920


  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.
    Memory:
      24x Hynix HMAA4GR7AJR8N-WM 32 GB 2 rank 2933


  (End of data from sysinfo program)
```

Compiler Version Notes

```
================================================================================
C          | 502.gcc_r(peak)
--------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on IA-32, Version
  19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
--------------------------------------------------------------------------------



================================================================================
C          | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
           | 525.x264_r(base, peak) 557.xz_r(base, peak)
--------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
```

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Compiler Version Notes (Continued)

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

================================================================================
C        | 502.gcc_r(peak)
--------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on IA-32, Version
  19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
--------------------------------------------------------------------------------

================================================================================
C        | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
         | 525.x264_r(base, peak) 557.xz_r(base, peak)
--------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
--------------------------------------------------------------------------------

================================================================================
C++      | 523.xalancbmk_r(peak)
--------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version
  19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
--------------------------------------------------------------------------------

================================================================================
C++      | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
         | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
--------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
--------------------------------------------------------------------------------

================================================================================
C++      | 523.xalancbmk_r(peak)
--------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version
  19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
--------------------------------------------------------------------------------

================================================================================
C++      | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
         | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
```

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Compiler Version Notes (Continued)

```
------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------


========================================================================
Fortran | 548.exchange2_r(base, peak)
------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 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`

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Base Optimization Flags

C benchmarks:
```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```

C++ benchmarks:
```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```

Fortran benchmarks:
```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```

Peak Compiler Invocation

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

502.gcc_r: `icc -m32 -std=c11 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/ia32_lin`

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

523.xalancbmk_r: `icpc -m32 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/ia32_lin`

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`

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Peak Portability Flags (Continued)

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=4`
`-fno-strict-overflow`
`-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64`
`-lqkmalloc`

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=4`
`-L/usr/local/je5.0.1-32/lib -ljemalloc`

505.mcf_r: `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
`-qopt-mem-layout-trans=4`
`-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64`
`-lqkmalloc`

525.x264_r: `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
`-qopt-mem-layout-trans=4 -fno-alias`
`-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64`
`-lqkmalloc`

557.xz_r: `Same as 505.mcf_r`

C++ benchmarks:

520.omnetpp_r: `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
`-qopt-mem-layout-trans=4`
`-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64`
`-lqkmalloc`

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=4`
`-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-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.html
http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V1.6.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.xml
http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V1.6.xml

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

Tested with SPEC CPU®2017 v1.1.0 on 2020-04-26 04:06:02-0400.
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