



# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

## Tyrone Systems

(Test Sponsor: Netweb Pte Ltd)

DS400TR-54/R  
(2.10 GHz, Intel Xeon Silver 4216)

**SPECrate®2017\_int\_base = 174**

**SPECrate®2017\_int\_peak = 181**

CPU2017 License: 006042

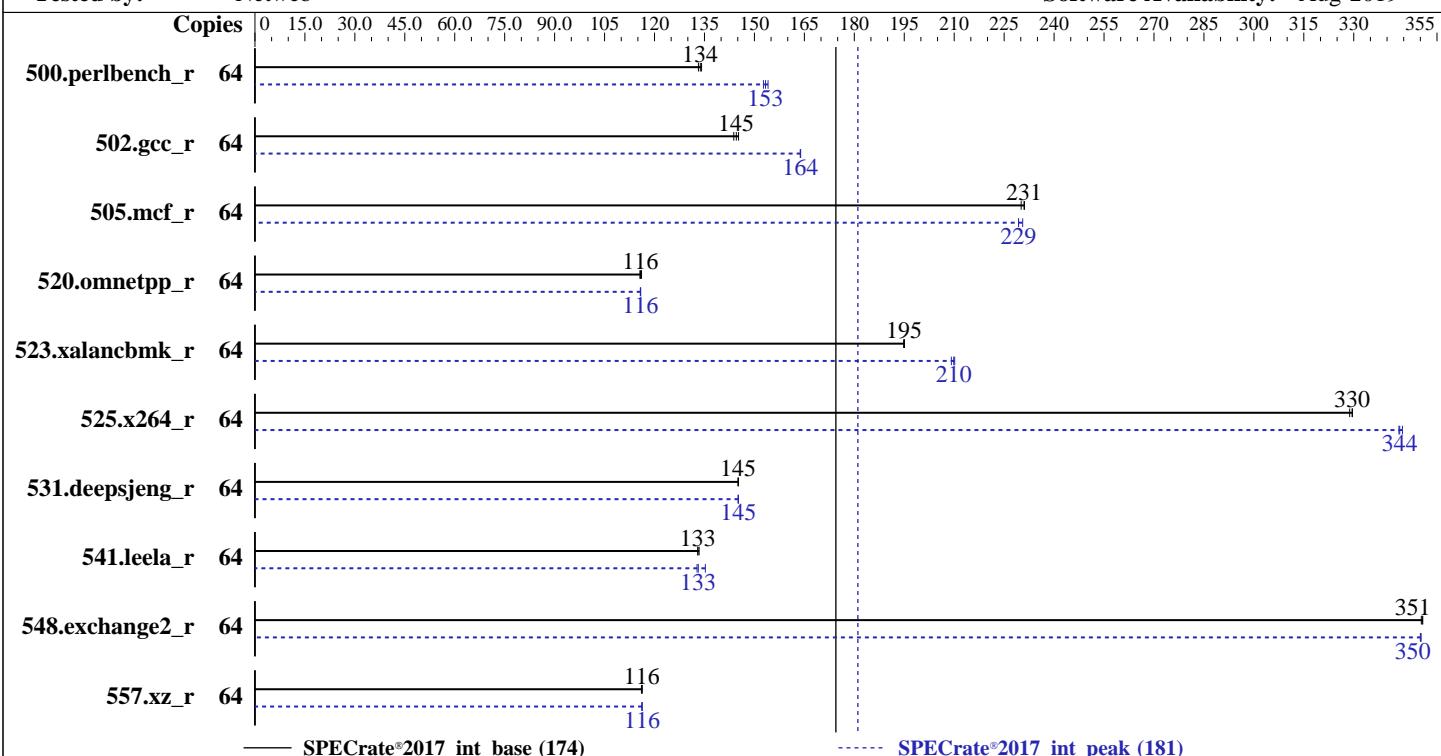
**Test Date:** Nov-2019

**Test Sponsor:** Netweb Pte Ltd

**Hardware Availability:** Sep-2019

**Tested by:** Netweb

**Software Availability:** Aug-2019



— SPECrate®2017\_int\_base (174)

— SPECrate®2017\_int\_peak (181)

## Hardware

CPU Name: Intel Xeon Silver 4216  
Max MHz: 3200  
Nominal: 2100  
Enabled: 32 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: 22 MB I+D on chip per chip  
Other: None  
Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2933P-R, running at 2400)  
Storage: 1 x 480 GB SSD  
Other: None

## OS:

CentOS Linux release 7.7.1908 (Core)

3.10.0-1062.el7.x86\_64

C/C++: Version 19.0.4.243 of Intel C/C++ Compiler Build 20190416 for Linux;

Fortran: Version 19.0.4.243 of Intel Fortran Compiler Build 20190416 for Linux

## Compiler:

No

Firmware: Version 3.1a released Jun-2019

## Parallel:

xfs

## File System:

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:

None

## Software



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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	<b>762</b>	<b>134</b>	760	134	765	133	64	667	153	661	154	<b>665</b>	<b>153</b>
502.gcc_r	64	630	144	<b>627</b>	<b>145</b>	624	145	64	<b>553</b>	<b>164</b>	553	164	<b>553</b>	164
505.mcf_r	64	449	230	<b>448</b>	<b>231</b>	448	231	64	449	231	<b>451</b>	<b>229</b>	451	229
520.omnetpp_r	64	<b>725</b>	<b>116</b>	723	116	726	116	64	<b>725</b>	<b>116</b>	726	116	<b>725</b>	116
523.xalancbmk_r	64	347	195	347	195	<b>347</b>	<b>195</b>	64	322	210	<b>322</b>	<b>210</b>	323	209
525.x264_r	64	341	329	<b>340</b>	<b>330</b>	340	330	64	<b>326</b>	<b>344</b>	325	345	326	344
531.deepsjeng_r	64	<b>505</b>	<b>145</b>	505	145	505	145	64	506	145	<b>505</b>	<b>145</b>	505	145
541.leela_r	64	797	133	795	133	<b>797</b>	<b>133</b>	64	798	133	<b>796</b>	<b>133</b>	784	135
548.exchange2_r	64	478	351	<b>478</b>	<b>351</b>	479	350	64	479	350	479	350	<b>479</b>	<b>350</b>
557.xz_r	64	594	116	<b>595</b>	<b>116</b>	596	116	64	594	116	<b>595</b>	<b>116</b>	595	116

**SPECrate®2017\_int\_base = 174**

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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Compiler Notes

SPEC has learned that this result, which used an evaluation compiler, was submitted contrary to the compiler license terms.

Intel has granted a one-time waiver for this result.

## 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/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"



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## 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.:

```
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](http://jemalloc.net) or <https://github.com/jemalloc/jemalloc/releases>

## Platform Notes

```
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011
running on NODE8 Sat Nov 2 13:16:54 2019
```

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) Silver 4216 CPU @ 2.10GHz
        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
CPU op-mode(s):	32-bit, 64-bit
Byte Order:	Little Endian
CPU(s):	64
On-line CPU(s) list:	0-63

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## Platform Notes (Continued)

```

Thread(s) per core: 2
Core(s) per socket: 16
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Silver 4216 CPU @ 2.10GHz
Stepping: 7
CPU MHz: 799.932
CPU max MHz: 3200.0000
CPU min MHz: 800.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0-15,32-47
NUMA node1 CPU(s): 16-31,48-63
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
aperfmpfperf 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 epb cat_l3 cdp_l3 intel_ppin
intel_pt ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept
vpid fsgsbase tsc_adjust bmil hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt
xsavec xgetbv1 cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln
pts pku ospke avx512_vnni md_clear spec_ctrl intel_stibp 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: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 32 33 34 35 36 37 38 39 40 41 42 43
44 45 46 47
node 0 size: 195229 MB
node 0 free: 190257 MB
node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 48 49 50 51 52 53 54 55 56
57 58 59 60 61 62 63
node 1 size: 196608 MB
node 1 free: 191849 MB
node distances:
```

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## Platform Notes (Continued)

```
node    0    1
      0: 10  21
      1: 21  10
```

```
From /proc/meminfo
  MemTotal:       394860940 kB
  HugePages_Total:        0
  Hugepagesize:     2048 kB
```

```
From /etc/*release* /etc/*version*
  centos-release: CentOS Linux release 7.7.1908 (Core)
  centos-release-upstream: Derived from Red Hat Enterprise Linux 7.7 (Source)
  os-release:
    NAME="CentOS Linux"
    VERSION="7 (Core)"
    ID="centos"
    ID_LIKE="rhel fedora"
    VERSION_ID="7"
    PRETTY_NAME="CentOS Linux 7 (Core)"
    ANSI_COLOR="0;31"
    CPE_NAME="cpe:/o:centos:centos:7"
  redhat-release: CentOS Linux release 7.7.1908 (Core)
  system-release: CentOS Linux release 7.7.1908 (Core)
  system-release-cpe: cpe:/o:centos:centos:7
```

```
uname -a:
  Linux NODE8 3.10.0-1062.el7.x86_64 #1 SMP Wed Aug 7 18:08:02 UTC 2019 x86_64 x86_64
                                         x86_64 GNU/Linux
```

Kernel self-reported vulnerability status:

CVE-2018-3620 (L1 Terminal Fault):	Not affected
Microarchitectural Data Sampling:	Not affected
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: Load fences, __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):	Mitigation: Full retpoline, IBPB

run-level 3 Nov 2 13:05

SPEC is set to: /home/cpu2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/mapper/centos-home	xfs	392G	114G	279G	30%	/home

From /sys/devices/virtual/dmi/id

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## Platform Notes (Continued)

BIOS: American Megatrends Inc. 3.1a 06/11/2019

Vendor: Tyrone Systems

Product: X11DAi-N

Serial: 123456789

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:

4x NO DIMM NO DIMM

12x Samsung M393A4K40CB2-CVF 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  
19.0.4.243 Build 20190416

Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

icc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.

=====

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,  
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C | 502.gcc\_r(peak)

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Test Date: Nov-2019

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## Compiler Version Notes (Continued)

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 19.0.4.243 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.  
icc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.

=====  
C++ | 523.xalancbmk\_r(peak)

-----  
Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version  
19.0.4.243 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.  
icpc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.

=====  
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 19.0.4.243 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.  
icpc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.

=====  
C++ | 523.xalancbmk\_r(peak)

-----  
Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version  
19.0.4.243 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.  
icpc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.

=====  
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,  
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Hardware Availability: Sep-2019

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## Compiler Version Notes (Continued)

=====  
Fortran | 548.exchange2\_r(base, peak)

-----  
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)  
64, Version 19.0.4.243 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.  
ifort: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.

## 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  
-fopt-mem-layout-trans=4  
-L/usr/local/IntelCompiler19/compilers\_and\_libraries\_2019.4.243/linux/compiler/lib/intel64  
-lqkmalloc

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## Base Optimization Flags (Continued)

C++ benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.243/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_2019.4.243/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_2019.4.243/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_2019.4.243/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
```

```
531.deepsjeng_r: -DSPEC_LP64
```

```
541.leela_r: -DSPEC_LP64
```

```
548.exchange2_r: -DSPEC_LP64
```

```
557.xz_r: -DSPEC_LP64
```



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## 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_2019.4.243/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_2019.4.243/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_2019.4.243/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_2019.4.243/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

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_2019.4.243/linux/compiler/lib/intel64  
-lqkmalloc
```



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Tyrone Systems

(Test Sponsor: Netweb Pte Ltd)

DS400TR-54/R

(2.10 GHz, Intel Xeon Silver 4216)

SPECrate®2017\_int\_base = 174

SPECrate®2017\_int\_peak = 181

CPU2017 License: 006042

Test Date: Nov-2019

Test Sponsor: Netweb Pte Ltd

Hardware Availability: Sep-2019

Tested by: Netweb

Software Availability: Aug-2019

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

<http://www.spec.org/cpu2017/flags/Intel-ic19.Ou1-official-linux64.2019-07-15.html>

<http://www.spec.org/cpu2017/flags/Default-Platform-Flags.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2017/flags/Intel-ic19.Ou1-official-linux64.2019-07-15.xml>

<http://www.spec.org/cpu2017/flags/Default-Platform-Flags.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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