



SPEC® CPU2017 Integer Rate Result

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NEC Corporation

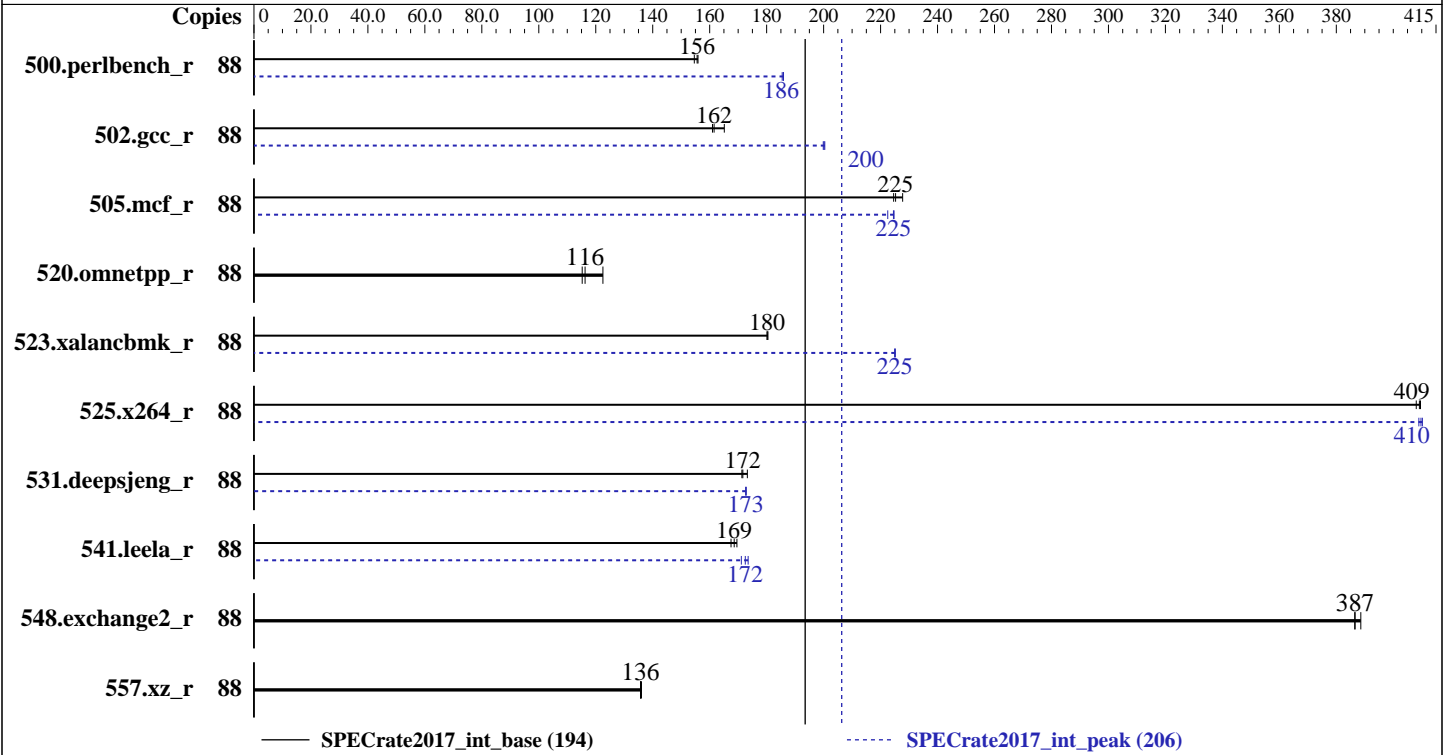
SPECrate2017_int_base = 194

Express5800/R120h-2E (Intel Xeon Gold 6152)

SPECrate2017_int_peak = 206

CPU2017 License: 9006
Test Sponsor: NEC Corporation
Tested by: NEC Corporation

Test Date: Jul-2018
Hardware Availability: Nov-2017
Software Availability: Mar-2018



Hardware

CPU Name: Intel Xeon Gold 6152
Max MHz.: 3700
Nominal: 2100
Enabled: 44 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: 30.25 MB I+D on chip per chip
Other: None
Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R)
Storage: 1 x 600 GB SAS, 15000 RPM, RAID 0
Other: None

Software

OS: Red Hat Enterprise Linux Server release 7.4 (Maipo)
Kernel 3.10.0-693.21.1.el7.x86_64
Compiler: C/C++: Version 18.0.2.199 of Intel C/C++ Compiler for Linux;
Fortran: Version 18.0.2.199 of Intel Fortran Compiler for Linux
Parallel: No
Firmware: NEC BIOS Version U31 02/14/2018 released Mar-2018
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



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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 | 88 | 899 | 156 | 900 | 156 | 906 | 155 | 88 | 755 | 185 | 754 | 186 | 754 | 186 |
| 502.gcc_r | 88 | 755 | 165 | 771 | 162 | 774 | 161 | 88 | 623 | 200 | 622 | 200 | 623 | 200 |
| 505.mcf_r | 88 | 624 | 228 | 631 | 225 | 633 | 225 | 88 | 633 | 225 | 633 | 225 | 639 | 223 |
| 520.omnetpp_r | 88 | 942 | 123 | 993 | 116 | 1002 | 115 | 88 | 942 | 123 | 993 | 116 | 1002 | 115 |
| 523.xalancbmk_r | 88 | 516 | 180 | 516 | 180 | 515 | 180 | 88 | 413 | 225 | 413 | 225 | 413 | 225 |
| 525.x264_r | 88 | 376 | 410 | 378 | 408 | 377 | 409 | 88 | 376 | 410 | 376 | 410 | 377 | 409 |
| 531.deepsjeng_r | 88 | 582 | 173 | 589 | 171 | 588 | 172 | 88 | 584 | 173 | 584 | 173 | 584 | 173 |
| 541.leela_r | 88 | 870 | 167 | 864 | 169 | 859 | 170 | 88 | 840 | 174 | 845 | 172 | 852 | 171 |
| 548.exchange2_r | 88 | 593 | 389 | 597 | 386 | 596 | 387 | 88 | 593 | 389 | 597 | 386 | 596 | 387 |
| 557.xz_r | 88 | 699 | 136 | 700 | 136 | 700 | 136 | 88 | 699 | 136 | 700 | 136 | 700 | 136 |

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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 i7-6700K 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>

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.

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General Notes (Continued)

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 Settings:

Thermal Configuration: Maximum Cooling
Workload Profile: General Throughput Compute
Memory Patrol Scrubbing: Disabled
LLC Dead Line Allocation: Disabled
LLC Prefetch: Enabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on r120h2e Fri Jul 20 19:52:03 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 6152 CPU @ 2.10GHz
 2 "physical id"s (chips)
 88 "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 : 22
siblings : 44
physical 0: cores 0 1 2 3 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
physical 1: cores 0 1 2 3 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
```

From lscpu:

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 88
On-line CPU(s) list: 0-87
Thread(s) per core: 2
Core(s) per socket: 22
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
```

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Platform Notes (Continued)

```

Model: 85
Model name: Intel(R) Xeon(R) Gold 6152 CPU @ 2.10GHz
Stepping: 4
CPU MHz: 2100.000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 30976K
NUMA node0 CPU(s): 0-10,44-54
NUMA node1 CPU(s): 11-21,55-65
NUMA node2 CPU(s): 22-32,66-76
NUMA node3 CPU(s): 33-43,77-87
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
aperfmpperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 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 invpcid_single
intel_pt spec_ctrl ibpb_support 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 avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1
cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts

```

```

/proc/cpuinfo cache data
cache size : 30976 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 4 5 6 7 8 9 10 44 45 46 47 48 49 50 51 52 53 54
node 0 size: 48811 MB
node 0 free: 47015 MB
node 1 cpus: 11 12 13 14 15 16 17 18 19 20 21 55 56 57 58 59 60 61 62 63 64 65
node 1 size: 49152 MB
node 1 free: 47874 MB
node 2 cpus: 22 23 24 25 26 27 28 29 30 31 32 66 67 68 69 70 71 72 73 74 75 76
node 2 size: 49152 MB
node 2 free: 48000 MB
node 3 cpus: 33 34 35 36 37 38 39 40 41 42 43 77 78 79 80 81 82 83 84 85 86 87
node 3 size: 49151 MB
node 3 free: 48006 MB
node distances:
node  0  1  2  3
 0:  10  21  31  31
 1:  21  10  31  31

```

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Platform Notes (Continued)

```
2: 31 31 10 21
3: 31 31 21 10
```

```
From /proc/meminfo
MemTotal:      197740132 kB
HugePages_Total:      0
Hugepagesize:    2048 kB
```

```
From /etc/*release* /etc/*version*
```

```
os-release:
  NAME="Red Hat Enterprise Linux Server"
  VERSION="7.4 (Maipo)"
  ID="rhel"
  ID_LIKE="fedora"
  VARIANT="Server"
  VARIANT_ID="server"
  VERSION_ID="7.4"
  PRETTY_NAME="Red Hat Enterprise Linux Server 7.4 (Maipo)"
redhat-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server
```

```
uname -a:
Linux r120h2e 3.10.0-693.21.1.el7.x86_64 #1 SMP Fri Feb 23 18:54:16 UTC 2018 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: Load fences
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS (kernel)
```

```
run-level 3 Jul 20 19:46
```

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

```
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda3       ext4  542G  342G  173G  67% /
```

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 NEC U31 02/14/2018
```

```
Memory:
```

```
4x UNKNOWN NOT AVAILABLE
12x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666
```

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Platform Notes (Continued)

(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.

=====
CC 500.perlbench_r(peak) 502.gcc_r(peak) 505.mcf_r(peak) 525.x264_r(peak)
557.xz_r(peak)

icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

=====
CXXC 520.omnetpp_r(base) 523.xalanbmk_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.

=====
CXXC 520.omnetpp_r(peak) 523.xalanbmk_r(peak) 531.deepsjeng_r(peak)
541.leela_r(peak)

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.

=====
FC 548.exchange2_r(peak)

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Compiler Version Notes (Continued)

ifort (IFORT) 18.0.2 20180210

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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
```

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Base Optimization Flags (Continued)

Fortran benchmarks (continued):

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

Peak Compiler Invocation

C benchmarks (except as noted below):

```
icc -m64 -std=c11
```

```
502.gcc_r: icc -m32 -std=c11 -L/home/prasadj/specdev/IC18u2_Internal/lin_18_0_20180210/compiler/lib/ia32_lin
```

C++ benchmarks (except as noted below):

```
icpc -m64
```

```
523.xalancbmk_r: icpc -m32 -L/home/prasadj/specdev/IC18u2_Internal/lin_18_0_20180210/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
```

Peak Optimization Flags

C benchmarks:

```
500.perlbench_r: -w1,-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
```

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Peak Optimization Flags (Continued)

```
502.gcc_r: -w1,-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: -w1,-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
```

```
525.x264_r: -w1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -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: -w1,-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: -w1,-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/Intel-ic18.0-official-linux64.2017-12-21.html>

<http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-V1.2-R120h-RevB.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/NEC-Platform-Settings-V1.2-R120h-RevB.xml>



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

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