## SPEC® CPU2017 Integer Rate Result

**Format sp. z o.o.**

Intel R1304WT2GSR (Intel Xeon E5-2620 v4, 2.10 GHz)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>66.7</th>
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</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

### CPU2017 License: 9032
Test Sponsor: Format sp. z o.o.
Tested by: Piotr Mankiewicz
Test Date: Aug-2018
Hardware Availability: Aug-2018
Software Availability: Apr-2018

### Hardware
- **CPU Name:** Intel Xeon E5-2620 v4
- **Max MHz.:** 3000
- **Nominal:** 2100
- **Enabled:** 16 cores, 2 chips, 2 threads/core
- **Orderable:** 1-2 chip
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 256 KB I+D on chip per core
- **L3:** 20 MB I+D on chip per chip
- **Memory:** 256 GB (16 x 16 GB 2Rx4 PC4-2400T-R, running at 1866)
- **Storage:** 1x 240GB SATA SSD
- **Other:** None

### Software
- **OS:** Red Hat Enterprise Linux Server release 7.5 (Maipo)
  3.10.0-862.9.1.el7.x86_64
- **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 R01.01.0027 released Jul-2018
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **Other:** jemalloc: jemalloc memory allocator library V5.0.1;

## Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate2017_int_base</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_r</td>
<td>32</td>
<td>47.3</td>
</tr>
<tr>
<td>gcc_r</td>
<td>32</td>
<td>59.1</td>
</tr>
<tr>
<td>mcf_r</td>
<td>32</td>
<td>45.6</td>
</tr>
<tr>
<td>omnetpp_r</td>
<td>32</td>
<td>62.3</td>
</tr>
<tr>
<td>xalancbmk_r</td>
<td>32</td>
<td>133</td>
</tr>
<tr>
<td>x264_r</td>
<td>32</td>
<td>58.3</td>
</tr>
<tr>
<td>deepsjeng_r</td>
<td>32</td>
<td>54.9</td>
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<td>leela_r</td>
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<tr>
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**SPEC® CPU2017**

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</table>

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 = "/usr/cpu2017/lib/ia32:/usr/cpu2017/lib/intel64:/usr/cpu2017/je5.0.1-32:/usr/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
Transparent Huge Pages enabled by default
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: configured and built at default for 32bit (i686) and 64bit (x86_64) targets; builtin with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5
sources available via jemalloc.net;
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**Platform Notes**

BIOS Configuration: Default  
Sysinfo program /usr/cpu2017/bin/sysinfo  
Rev: r5974 of 2018-05-19 9b6d8f2999c33d61f64985e45859ea9  
running on localhost.localdomain Tue Aug 14 14:43:29 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) CPU E5-2620 v4 @ 2.10GHz  
 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 : 8  
siblings : 16  
physical 0: cores 0 1 2 3 4 5 6 7  
physical 1: cores 0 1 2 3 4 5 6 7
```

From lscpu:  
Architecture: x86_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 32  
On-line CPU(s) list: 0-31  
Thread(s) per core: 2  
Core(s) per socket: 8  
Socket(s): 2  
NUMA node(s): 2  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 79  
Model name: Intel(R) Xeon(R) CPU E5-2620 v4 @ 2.10GHz  
Stepping: 1  
CPU MHz: 1482.202  
CPU max MHz: 3000.0000  
CPU min MHz: 1200.0000  
BogoMIPS: 4189.98  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 256K  
L3 cache: 20480K  
NUMA node0 CPU(s): 0-7,16-23  
NUMA node1 CPU(s): 8-15,24-31  
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov

(Continued on next page)
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---

**Platform Notes (Continued)**

```plaintext
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdelgb rdtscp
lm constant_tsc 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
xtr 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_pni intel_pt ssbd
ibr ibpb stibp tpr_shadow vmx flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle
avx2 smep bmi2 erms invpcid rdt_a rdseed adx smap xsaveopt cqm_llc
qemm_occup_llc qemm_mb_total qemm_mb_local dtherm ida arat pln pts spec_ctrl
intel_stibp
```

```plaintext
/platforminfo cache data
   cache size : 20480 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 16 17 18 19 20 21 22 23
   node 0 size: 12750 MB
   node 0 free: 12750 MB
   node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31
   node 1 size: 12750 MB
   node 1 free: 12750 MB
   node distances:
      node 0   1
      0:  10  21
      1:  21  10
```

From `/proc/meminfo`
```
   MemTotal:       263854664 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB
```

From `/etc/*release*/etc/*version`  
```
o-release:
   NAME="Red Hat Enterprise Linux Server"
   VERSION="7.5 (Maipo)"
   ID="rhel"
   ID_LIKE="fedora"
   VARIANT="Server"
   VARIANT_ID="server"
   VERSION_ID="7.5"
   PRETTY_NAME="Red Hat Enterprise Linux"
   redhat-release: Red Hat Enterprise Linux Server release 7.5 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.5 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.5:ga:server
```

uname -a:

(Continued on next page)
Platform Notes (Continued)

Linux localhost.localdomain 3.10.0-862.9.1.el7.x86_64 #1 SMP Wed Jun 27 04:30:39 EDT 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: Full retpoline

run-level 3 Aug 14 14:41

SPEC is set to: /usr/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-root xfs 50G 27G 24G 53% /

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 Intel Corporation SE5C610.86B.01.01.0027.071020182329 07/10/2018
Memory:
8x NO DIMM NO DIMM
16x Samsung M393A2G40DB0-CPB 16 GB 2 rank 2133, configured at 1866

(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) 18.0.0 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.
------------------------------------------------------------------------------

FC 548.exchange2_r(base)

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Compiler Version Notes (Continued)

ifort (IFORT) 18.0.0 20170811
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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:
-W1,-z,muldefs -xCORE-AVX2 -ipo -03 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-W1,-z,muldefs -xCORE-AVX2 -ipo -03 -no-prec-div
-qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-W1,-z,muldefs -xCORE-AVX2 -ipo -03 -no-prec-div

(Continued on next page)
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Base Optimization Flags (Continued)

Fortran benchmarks (continued):
-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

The flags file that was used to format this result can be browsed at

You can also download the XML flags source by saving the following link:

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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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