### CPU2017 Integer Rate Result

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

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

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<tr>
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</tr>
</tbody>
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**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  
- **Other:** None  
- **Memory:** 128 GB (8 x 16 GB 2Rx4 PC4-2400T-R, running at 2133)  
- **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;
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Ratio</th>
<th>Seconds</th>
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</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>32</td>
<td>1076</td>
<td>47.4</td>
<td>1076</td>
<td>47.3</td>
<td>1077</td>
<td>47.3</td>
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<tr>
<td>502.gcc_r</td>
<td>32</td>
<td>761</td>
<td>59.5</td>
<td>768</td>
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<td>775</td>
<td>58.5</td>
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<tr>
<td>505.mcf_r</td>
<td>32</td>
<td>630</td>
<td>82.1</td>
<td>654</td>
<td>79.1</td>
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<td>78.9</td>
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<tr>
<td>520.omnetpp_r</td>
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<td>45.8</td>
<td>916</td>
<td>45.9</td>
<td>929</td>
<td>45.2</td>
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<tr>
<td>523.xalancbmk_r</td>
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<td>555</td>
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<td>540</td>
<td>62.6</td>
<td>537</td>
<td>62.9</td>
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<tr>
<td>525.x264_r</td>
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<td>132</td>
<td>421</td>
<td>133</td>
<td>421</td>
<td>133</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>32</td>
<td>630</td>
<td>58.2</td>
<td>645</td>
<td>56.9</td>
<td>647</td>
<td>56.6</td>
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<tr>
<td>541.leela_r</td>
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<td>54.6</td>
<td>964</td>
<td>55.0</td>
<td>973</td>
<td>54.5</td>
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<tr>
<td>548.exchange2_r</td>
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<td>122</td>
<td>689</td>
<td>122</td>
<td>689</td>
<td>122</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>32</td>
<td>713</td>
<td>48.5</td>
<td>719</td>
<td>48.1</td>
<td>720</td>
<td>48.0</td>
</tr>
</tbody>
</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; built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5 sources available via jemalloc.net;
### SPEC CPU2017 Integer Rate Result

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

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**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

**Platform Notes**

BIOS Configuration: Default  
Sysinfo program /usr/cpu2017/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcede8f2999c33d61f64985e45859ea9  
running on localhost.localdomain Fri Aug 17 13:59:44 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
2 "physical id"s (chips)
32 "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 : 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:               2942.486
CPU max MHz:           3000.0000
CPU min MHz:           1200.0000
BogoMIPS:              4190.31
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)
**SPEC CPU2017 Integer Rate Result**

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

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

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**Platform Notes (Continued)**

pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtsscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtpic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch epb cat_l3 cdp_l3 intel_pinn intel_pt ssbd ibrs 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 cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts spec_ctrl intel_stibp

```
/p Proc/cpuinfo cache data
cache size : 20480 KB
```

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

```text
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: 65439 MB  
node 0 free: 63320 MB  
node 1 cpus: 8 9 10 11 12 13 14 15 24 25 26 27 28 29 30 31  
node 1 size: 65536 MB  
node 1 free: 63809 MB 
node distances:  
node 0 1  
0: 10 21  
1: 21 10
```

From /proc/meminfo

```text
MemTotal: 131740776 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB
```

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

```text
os-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 17 13:59

SPEC is set to: /usr/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-root xfs 50G 35G 16G 70% /

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:
  16x NO DIMM NO DIMM
  8x Samsung M393A2G40DB0-CPB 16 GB 2 rank 2133, configured at 2134

(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.leea_r(base)
==============================================================================
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================
FC  548.exchange2_r(base)

(Continued on next page)
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Copyright 2017-2018 Standard Performance Evaluation Corporation

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Compiler Version Notes (Continued)

ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

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:
-Wl, -z, muldefs -xCORE-AVX2 -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-AVX2 -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-AVX2 -ipo -O3 -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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