## SPEC CPU®2017 Integer Rate Result

**Tyrone Systems**
(Test Sponsor: Netweb Pte Ltd)

**Tyrone Camarero IDI100C2R-28**
(2.20 GHz, Intel Xeon Gold 6338N)

- **CPU2017 License:** 006042
- **Test Sponsor:** Netweb Pte Ltd
- **Tested by:** Tyrone Systems
- **Test Date:** Sep-2022
- **Hardware Availability:** Apr-2021
- **Software Availability:** May-2022
- **Software:**
  - **OS:** Red Hat Enterprise Linux release 8.5 (Ootpa)
  - **Kernel:** 4.18.0-348.el8.x86_64
  - **Compiler:** C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux;
    Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;
  - **Parallel:** No
  - **Firmware:** Version SESC620.86B.01.01.0004.2110190142 released Oct-2021
  - **File System:** xfs
  - **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.

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 407</th>
<th>SPECrate®2017_int_peak = 421</th>
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<tbody>
<tr>
<td><strong>Hardware</strong></td>
<td><strong>Software</strong></td>
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<tr>
<td>CPU Name: Intel Xeon Gold 6338N</td>
<td>OS: Red Hat Enterprise Linux release 8.5 (Ootpa)</td>
</tr>
<tr>
<td>Max MHz: 3500</td>
<td>Kernel 4.18.0-348.el8.x86_64</td>
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<tr>
<td>Nominal: 2200</td>
<td>Compiler: C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;</td>
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<tr>
<td>Enabled: 64 cores, 2 chips, 2 threads/core</td>
<td>Parallel: No</td>
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<tr>
<td>Orderable: 1.2 Chips</td>
<td>Firmware: Version SESC620.86B.01.01.0004.2110190142 released Oct-2021</td>
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<tr>
<td>Cache L1: 32 KB I + 48 KB D on chip per core</td>
<td>File System: xfs</td>
</tr>
<tr>
<td>L2: 1.25 MB I+D on chip per core</td>
<td>System State: Run level 3 (multi-user)</td>
</tr>
<tr>
<td>L3: 48 MB I+D on chip per chip</td>
<td>Base Pointers: 64-bit</td>
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<tr>
<td>Other: None</td>
<td>Peak Pointers: 32/64-bit</td>
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<tr>
<td>Memory: 1 TB (16 x 64 GB 2Rx4 PC4-3200AA-R, running at 2666)</td>
<td>Other: jemalloc memory allocator V5.0.1</td>
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<tr>
<td>Storage: 1 x 512 GB NVMe SSD</td>
<td>Power Management: BIOS and OS set to prefer performance at the cost of additional power usage.</td>
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### SPECrate®2017 Int Results

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<th>SPECrate®2017_int_base</th>
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<td>366</td>
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<td>gcc_r</td>
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<td>omnetpp_r</td>
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<td>x264_r</td>
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<td>deepsjeng_r</td>
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<td>leela_r</td>
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<tr>
<td>exchange2_r</td>
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<tr>
<td>xz_r</td>
<td>128</td>
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**Hardware**

**Software**

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**Tyrone Systems**

**Tyrone Camarero IDI100C2R-28**

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- **L2:** 1.25 MB I+D on chip per core
- **L3:** 48 MB I+D on chip per chip
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SPEC CPU®2017 Integer Rate Result

SPECrate®2017_int_base = 407
SPECrate®2017_int_peak = 421

CPU2017 License: 006042
Test Sponsor: Netweb Pte Ltd
Tested by: Tyrone Systems

Results Table

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<td>628</td>
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</tr>
</tbody>
</table>

Compiler Notes

SPEC has ruled that the compiler used for this result was performing a compilation that specifically improves the performance of the 523.xalancbmk_r / 623.xalanchmk_s benchmarks using a priori knowledge of the SPEC code and dataset to perform a transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4 https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4), SPEC will no longer publish results using this optimization.

This result is left in the SPEC results database for historical reference.

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"
MALLOC_CONF = "retain:true"
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(2.20 GHz, Intel Xeon Gold 6338N)

SPECrate®2017_int_base = 407
SPECrate®2017_int_peak = 421

General Notes
Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using Red Hat Enterprise Linux 8.4
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-2017-5715 (Spectre variant 2) 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.
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) 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

Platform Notes
BIOS Settings:
Power Technology = Custom
ENERGY_PERF_BIAS_CFG mode = Maximum Performance
KTI Prefetch = Enable
LLC Dead Line Alloc = Disable
Hyper-Threading = Enabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca6c64d
running on icelakespec Tue Sep 20 08:16:12 2022
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 6338N CPU @ 2.20GHz
  2 "physical id"s (chips)
  128 "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 : 32
siblings : 64
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
25 26 27 28 29 30 31
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
25 26 27 28 29 30 31

From lscpu from util-linux 2.32.1:
Architecture:             x86_64
CPU op-mode(s):          32-bit, 64-bit
Byte Order:              Little Endian
CPU(s):                  128
On-line CPU(s) list:     0-127
Thread(s) per core:      2
Core(s) per socket:      32
Socket(s):               2
NUMA node(s):            4
Vendor ID:               GenuineIntel

(Continued on next page)
<table>
<thead>
<tr>
<th>Platform Notes (Continued)</th>
</tr>
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<tbody>
<tr>
<td>BIOS Vendor ID:</td>
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<td>NUMA node1 CPU(s):</td>
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<td>NUMA node2 CPU(s):</td>
</tr>
<tr>
<td>NUMA node3 CPU(s):</td>
</tr>
<tr>
<td>Flags:</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>/proc/cpuinfo cache data</td>
</tr>
<tr>
<td>cache size :</td>
</tr>
<tr>
<td>From numactl --hardware</td>
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<td>WARNING: a numactl 'node' might or might not correspond to a physical chip.</td>
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<tr>
<td>available: 4 nodes (0-3)</td>
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<td>node 0 cpus:</td>
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<td>node 0 size:</td>
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Test Date: Sep-2022
Hardware Availability: Apr-2021
Software Availability: May-2022

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3:  20  20  11  10

From /proc/meminfo
MemTotal:       1056510740 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

/sbin/tuned-adm active
Current active profile: throughput-performance
/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance

From /etc/*release* /etc/*version*
os-release:
NAME="Red Hat Enterprise Linux"
VERSION="8.5 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.5"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.5 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.5 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.5 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8::baseos
uname -a:
Linux icelakespec 4.18.0-348.el8.x86_64 #1 SMP Mon Oct 4 12:17:22 EDT 2021 x86_64
x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2018-12207 (iTLB Multihit):
Not affected
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: usercopy/swaps barriers and __user pointer sanitation
CVE-2017-5715 (Spectre variant 2):
Mitigation: Enhanced IBRS, IBPB:
conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling):
Not affected
CVE-2019-11135 (TSX Asynchronous Abort):
Not affected

run-level 3 Sep 20 08:06
SPEC Is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 402G 214G 189G 54% /home

From /sys/devices/virtual/dmi/id
Vendor: Tyrone_Systems
Product: Tyrone_Camarero_IDI100C2R-28
Product Family: Family
Serial: 2X22462203

(Continued on next page)
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Platform Notes (Continued)

Additional information from dmidecode 3.2 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:
16x Samsung M393A8G40AB2-CWE 64 GB 2 rank 3200, configured at 2666

BIOS:
BIOS Vendor: Intel Corporation
BIOS Version: SESC620.86B.01.01.0004.2110190142
BIOS Date: 10/19/2021

(End of data from sysinfo program)

Compiler Version Notes

```
C       | 502.gcc_r(peak)
       |----------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 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) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

C       | 502.gcc_r(peak)
       |----------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 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) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak) 531.deepsjeng_r(base, peak)
       | 541.leela_r(base, peak)
       |----------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Fortran | 548.exchange2_r(base, peak)
       |----------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
```

(Continued on next page)
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<td>Software Availability: May-2022</td>
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### Compiler Version Notes (Continued)

**Base Compiler Invocation**

- **C benchmarks:** icx
- **C++ benchmarks:** icpx
- **Fortran benchmarks:** ifx

### 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:**

```bash
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -gopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc
```

**C++ benchmarks:**

```bash
-w -m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -gopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
-lqkmalloc
```

**Fortran benchmarks:**

```bash
-w -m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto
```

(Continued on next page)
## SPEC CPU®2017 Integer Rate Result

**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
Tyrone Camarero ID1100C2R-28  
(2.20 GHz, Intel Xeon Gold 6338N)  

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_base</td>
<td>407</td>
</tr>
<tr>
<td>SPECrate®2017_int_peak</td>
<td>421</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 006042  
**Test Sponsor:** Netweb Pte Ltd  
**Tested by:** Tyrone Systems  

**Test Date:** Sep-2022  
**Hardware Availability:** Apr-2021  
**Software Availability:** May-2022

### Base Optimization Flags (Continued)

Fortran benchmarks (continued):
- `mfpmath=sse`  
- `funroll-loops`  
- `qopt-mem-layout-trans=4`  
- `nostandard-realloc-lhs`  
- `align array32byte`  
- `auto`  
- `L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin`  
- `lgkmalloc`

### Peak Compiler Invocation

**C benchmarks:**  
`icx`

**C++ benchmarks:**  
`icpx`

**Fortran benchmarks:**  
`ifx`

### 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`: `-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`

### Peak Optimization Flags

**C benchmarks:**
- `500.perlbench_r`:  
  `-w -std=c11 -m64 -Wl,-z,muldefs`  
  `-fprofile-generate(pass 1)`  
  `-fprofile-use=default.profdata(pass 2) -xCORE-AVX2 -Ofast`  
  `-ffast-math -flto -mfpmath=sse -funroll-loops`  
  `-qopt-mem-layout-trans=4 -fno-strict-overflow`  
  `-L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin`

(Continued on next page)
**Peak Optimization Flags (Continued)**

500.perlbench_r (continued):
- lqkmalloc

502.gcc_r: -m32
- L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/ia32_lin
- std=gnu89 -Wl,-z,muldefs -fprofile-generate(pass 1)
- fprofile-use=default.profdata(pass 2) -xCORE-AVX2 -Ofast
- ffasm -flto -mfpmath=sse -funroll-loops
- qopt-mem-layout-trans=4 -L/usr/local/jemalloc32-5.0.1/lib
- ljemalloc

505.mcf_r: basepeak = yes

525.x264_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX2 -Ofast
- ffasm -flto -mfpmath=sse -funroll-loops
- qopt-mem-layout-trans=4 -fnl-alias
- L/usr/local/intel/compiler/2022.1.0/linux/compiler/lib/intel64_lin
- lqkmalloc

557.xz_r: basepeak = yes

C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: basepeak = yes

531.deepsjeng_r: basepeak = yes

541.leela_r: basepeak = yes

Fortran benchmarks:

548.exchange2_r: basepeak = yes

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

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Tyrone-Platform-Settings-V1.2-ICX-revA.xml
### SPEC CPU®2017 Integer Rate Result

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**SPECrate®2017_int_base = 407**

**SPECrate®2017_int_peak = 421**

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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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