**SPEC CPU®2017 Integer Rate Result**

**Tyrone Systems**
(Test Sponsor: Netweb)
DIT400TR-28RL
(2.20 GHz, Intel Xeon Silver 4210)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
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<tbody>
<tr>
<td>= 111</td>
<td>= 115</td>
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CPU2017 License: 006042  
Test Sponsor: Netweb  
Tested by: Netweb  
Test Date: Oct-2019  
Hardware Availability: Sep-2019  
Software Availability: Aug-2019

<table>
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<th>SPECrate®2017_int_peak (115)</th>
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<td>525.x264_r</td>
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<td>151</td>
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<tr>
<td>557.xz_r</td>
<td>40</td>
<td>72.8</td>
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</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Silver 4210  
- **Max MHz:** 3200  
- **Nominal:** 2200  
- **Enabled:** 20 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:** 13.75 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

**Software**

- **OS:** CentOS Linux release 7.7.1908 (Core)  
- **Compiler:** 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  
- **Parallel:** No  
- **Firmware:** Version V8.101 released Aug-2019  
- **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:** None
## Results Table

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<tr>
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</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"

### 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"
```

### 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>
```

(Continued on next page)
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---

**CPU2017 License:** 006042  
**Test Sponsor:** Netweb  
**Tested by:** Netweb  
**Test Date:** Oct-2019  
**Hardware Availability:** Sep-2019  
**Software Availability:** Aug-2019

---

**General Notes (Continued)**

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.  

---

**Platform Notes**

Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r6365 of 2019-08-21 295195f888a3d7ed1eb6e4e485a0011  
running on NODE2 Tue Oct 8 10:07:32 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 4210 CPU @ 2.20GHz  
  2 "physical id"s (chips)  
  40 "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: 10  
siblings: 20  
physical 0: cores 0 1 2 3 4 8 9 10 11 12  
physical 1: cores 0 1 2 3 4 8 9 10 11 12

From lscpu:  
Architecture: x86_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: LittleEndian  
CPU(s): 40  
On-line CPU(s) list: 0-39  
Thread(s) per core: 2  
Core(s) per socket: 10  
Socket(s): 2  
NUMA node(s): 2  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Silver 4210 CPU @ 2.20GHz

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

Tyrone Systems
(Test Sponsor: Netweb)
DIT400TR-28RL
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SPECrater®2017_int_base = 111
SPECrater®2017_int_peak = 115

CPU2017 License: 006042
Test Sponsor: Netweb
Tested by: Netweb

 SPECrate®2017_int_base = 111
 SPECrate®2017_int_peak = 115

Platform Notes (Continued)

Stepping: 7
CPU MHz: 999.963
CPU max MHz: 3200.0000
CPU min MHz: 1000.0000
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 10480K
NUMA node0 CPU(s): 0-9,20-29
NUMA node1 CPU(s): 10-19,30-39

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
aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 ssse3 sdbg
fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx fl64 rdrand lahf_lm abm 3nowprefetch epb cat_13 cd8 13 intel_patin
tm ssbd mba ibrs ibpb stibp ibrs enhancing tpr_shadow vmx11 flexiblepriority 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_mbb_total cqm_mbb_local dtherm ida arat
pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke avx512_vni md_clear spec_ctrl
intel_stibp flush_l1d arch_capabilities

/proc/cpuinfo cache data
  cache size : 14080 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 20 21 22 23 24 25 26 27 28 29
  node 0 size: 195229 MB
  node 0 free: 190477 MB
  node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
  node 1 size: 196608 MB
  node 1 free: 192026 MB
  node distances:
    node 0 1
     0: 10 21
     1: 21 10

From /proc/meminfo
  MemTotal: 394864496 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

(Continued on next page)
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SPECrate®2017_int_peak = 115

Test Date: Oct-2019
Hardware Availability: Sep-2019
Software Availability: Aug-2019

Platform Notes (Continued)

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 NODE2 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 sanitation
CVE-2017-5715 (Spectre variant 2): Mitigation: Full retpoline, IBPB

run-level 3 Oct 8 10:00

SPEC is set to: /home/cpu2017
   Filesystem Type Size Used Avail Use% Mounted on
   /dev/mapper/centos-home xfs 392G 80G 313G 21% /home

From /sys/devices/virtual/dmi/id
   BIOS: American Megatrends Inc. V8.101 08/02/2019
   Vendor: Tyrone Systems
   Product: TP12XH-L2I
   Serial: empty

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.

(Continued on next page)
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Test Sponsor: Netweb
Tested by: Netweb

Platform Notes (Continued)

Memory:
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, |
| 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. |

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| C  | 502.gcc_r(peak) |
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| 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. |

(Continued on next page)
**Compiler Version Notes (Continued)**

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**C++**

---

```
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.
```
---

---

```
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.
```
---

---

```
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.
```
---

---

```
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.
```
---

---

```
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.
```
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CPU2017 License: 006042
Test Sponsor: Netweb
Tested by: Netweb

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:
-W1, -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

C++ benchmarks:
-W1, -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:
-W1, -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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SPECrate®2017_int_peak = 115

CPU2017 License: 006042
Test Sponsor: Netweb
Tested by: Netweb

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.ommnetpp_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: -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
-1qkmalloc
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/jemalloc
505.mcf_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4

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

**Tyrone Systems**
(Test Sponsor: Netweb)
DIT400TR-28RL
(2.20 GHz, Intel Xeon Silver 4210)

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**SPECrate®2017_int_base = 111**
**SPECrate®2017_int_peak = 115**

| CPU2017 License: 006042 | Test Date: Oct-2019 |
| Test Sponsor: Netweb | Hardware Availability: Sep-2019 |
| Tested by: Netweb | Software Availability: Aug-2019 |

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Peak Optimization Flags (Continued)

505.mcf_r (continued):
-`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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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:


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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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