SPEC CPU®2017 Integer Rate Result

Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
DIT400TR-48RL
(2.20 GHz, Intel Xeon Gold 5220)

Copyright 2017-2020 Standard Performance Evaluation Corporation

Test Sponsor: Netweb Pte Ltd
Test Date: Feb-2020
Hardware Availability: Sep-2019
Software Availability: Aug-2019

CPU2017 License: 006042
Tested by: Netweb

SPECrate®2017_int_base = 200
SPECrate®2017_int_peak = 208

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<td>xalancbmk_r</td>
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<td>x264_r</td>
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<td>leela_r</td>
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<td>395</td>
</tr>
<tr>
<td>xz_r</td>
<td>72</td>
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</tbody>
</table>

Hardware

CPU Name: Intel Xeon Gold 5220
Max MHz: 3900
Nominal: 2200
Enabled: 36 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: 24.75 MB I+D on chip per chip
Other: None
Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R, running at 2667)
Storage: 1 x 480 GB SSD
Other: None

Software

OS: CentOS Linux release 7.7.1908 (Core)
3.10.0-1062.el7.x86_64
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: Default
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### SPECrate®2017_int_peak = 208

**Results Table**

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<td>588</td>
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<td>587</td>
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</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

**Compiler Notes**

SPEC has learned that this result, which used an evaluation compiler, was submitted contrary to the compiler license terms. Intel has granted a one-time waiver for this result.

**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"
```
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SPECrate®2017_int_base = 200
SPECrate®2017_int_peak = 208

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**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>
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.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

**Platform Notes**

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed4b1e6e46a485a0011
running on NODE2 Tue Feb 4 14:25:08 2020

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 5220 CPU @ 2.20GHz
  2 "physical id"s (chips)
  72 "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 : 18
  siblings : 36
  physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
  physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27

From lscpu:
  Architecture: x86_64
  CPU op-mode(s): 32-bit, 64-bit
  Byte Order: Little Endian
  CPU(s): 72
  On-line CPU(s) list: 0-71

(Continued on next page)
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Thread(s) per core: 2
Core(s) per socket: 18
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5220 CPU @ 2.20GHz
Stepping: 7
CPU MHz: 999.963
CPU max MHz: 3900.0000
CPU min MHz: 1000.0000
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-17, 36-53
NUMA node1 CPU(s): 18-35, 54-71
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 smx est tm2 ssse3 sdbg fma cx16 xtpdr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave f16c rdrand lahf_lm abm 3nowprefetch ebpx cat_13 cdp_l3 intel_ppln intel_pt ssbd mba ibp stibp ibrs Enhanced_tpr_shadow vmm flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdঁt_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaeopt xsaveopt xsave xgetbv1 cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts hwp_act_window hwp_epp hwp_pkg_req pku ospke avx512_vnni md_clear spec_ctrl intel_stibp flush_lld arch_capabilities

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

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

(Continued on next page)
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**Platform Notes (Continued)**

```plaintext
node distances:
node  0  1
  0:  10  21
  1:  21  10

From /proc/meminfo
MemTotal:       394858872 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

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

run-level 3 Feb 4 13:47

SPEC is set to: /home/cpu2017
  Filesystem   Type     Size  Used Avail Use% Mounted on
  /dev/mapper/centos-home xfs   392G  132G  261G   34% /home
```

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Tested by: Netweb

Platform Notes (Continued)

From /sys/devices/virtual/dmi/id
BIOS: American Megatrends Inc. V8.101 08/02/2019
Vendor: Tyrone Systems
Product: DIT400TR-48RL
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.
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)
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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
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(Continued on next page)
## Compiler Version Notes (Continued)

### 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)

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Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
icc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.

==============================================================================

### C++
- 523.xalancbmk_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.
icpc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.

==============================================================================

### C++
- 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
- 531.deepsjeng_r(base, peak) 541.leela_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.
icpc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.

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### C++
- 523.xalancbmk_r(peak)

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- 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
- 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)

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### C++
- 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
- 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.243 Build 20190416
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Test Date: Feb-2020
Hardware Availability: Sep-2019
Software Availability: Aug-2019

Compiler Version Notes (Continued)

Fortran | 548.exchange2_r(base, peak)

-------------------------------------------------------------------
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.
-------------------------------------------------------------------

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
-乙/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.243/linux/compiler/lib/intel64
-lqkmalloc

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**SPECrate®2017_int_base = 200**  
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**Base Optimization Flags (Continued)**

C++ benchmarks:
- `-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`

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`

---

**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.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`
**SPEC CPU®2017 Integer Rate Result**

**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
DIT400TR-48RL  
(2.20 GHz, Intel Xeon Gold 5220)  

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 200</th>
<th>SPECrate®2017_int_peak = 208</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU2017 License:</strong> 006042</td>
<td><strong>Test Date:</strong> Feb-2020</td>
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<td><strong>Test Sponsor:</strong> Netweb Pte Ltd</td>
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<td><strong>Software Availability:</strong> Aug-2019</td>
</tr>
</tbody>
</table>

**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  
-lqkmalloc

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/je5.0.1-32/lib -ljemalloc

505.mcf_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

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
## SPEC CPU®2017 Integer Rate Result

**Tyrone Systems**  
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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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