SPEC CPU®2017 Integer Rate Result

Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
DIT400TR-55R/55RL
(2.50 GHz, Intel Xeon Gold 6248)

SPECrates®2017_int_base = 230
SPECrates®2017_int_peak = 240

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

Test Date: Feb-2020
Hardware Availability: Sep-2019
Software Availability: Aug-2019

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
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

Hardware
CPU Name: Intel Xeon Gold 6248
Max MHz: 3900
Nominal: 2500
Enabled: 40 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: 27.5 MB I+D on chip per chip
Other: None
Memory: 384 GB (12 x 32 GB 2Rx4 PC4-2933Y-R)
Storage: 1 x 480 GB SSD
Other: None

SPECrate®2017_int_base (230)
SPECrate®2017_int_peak (240)

Copies

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<th>Benchmark</th>
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<td>xalancbmk_r</td>
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<td>x264_r</td>
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<tr>
<td>deepsjeng_r</td>
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<td>leela_r</td>
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500.perlbench_r 80
502.gcc_r 80
505.mcf_r 80
520.omnetpp_r 80
523.xalancbmk_r 80
525.x264_r 80
531.deepsjeng_r 80
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**SPECrate**<sup>®</sup>2017 <sup>int_base</sup> = 230

**SPECrate**<sup>®</sup>2017 <sup>int_peak</sup> = 240

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.:

```
(Continued on next page)"
Tyrone Systems
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Copyright 2017-2020 Standard Performance Evaluation Corporation

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Tested by: Netweb

General Notes (Continued)

umactl --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.


Platform Notes

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbe6e646a485a0011
running on NODE8 Thu Feb 13 20:38:14 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 6248 CPU @ 2.50GHz
  2 "physical id"s (chips)
  80 "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 : 20
siblings : 40
physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

From lscpu:

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 80
On-line CPU(s) list: 0-79
Thread(s) per core: 2
Core(s) per socket: 20
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85

(Continued on next page)
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**SPECrate®2017_int_base = 230**
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### Platform Notes (Continued)

- **Model name:** Intel(R) Xeon(R) Gold 6248 CPU @ 2.50GHz
- **Stepping:** 7
- **CPU MHz:** 999.908
- **CPU max MHz:** 3900.0000
- **CPU min MHz:** 1000.0000
- **BogoMIPS:** 5000.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 28160K
- **NUMA node0 CPU(s):** 0-19,40-59
- **NUMA node1 CPU(s):** 20-39,60-79
- **Flags:** fpu vme de pse tsc msr pae 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 ntop_stop_tsc aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3nowprefetch 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 xsavesve avx f16c rdrand lahf_lm abm 3nowprefetch 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 xsavesve

/proc/cpuinfo cache data

- **cache size:** 28160 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 10 11 12 13 14 15 16 17 18 19 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59
- **node 0 size:** 195228 MB
- **node 0 free:** 190462 MB
- **node 1 cpus:** 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79
- **node 1 size:** 196608 MB
- **node 1 free:** 191862 MB
- **node distances:**
  - **node 0 1**
  - 0: 10 21
  - 1: 21 10

From /proc/meminfo

- **MemTotal:** 394857620 KB

---

(Continued on next page)
Platform Notes (Continued)

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 NODE8 3.10.0-1062.el7.x86_64 #1 SMP Wed Aug 7 18:08:02 UTC 2019 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 retropoline, IBPB

run-level 3 Feb 13 12:58

SPEC is set to: /home/cpu2017
  Filesystem Type Size Used Avail Use% Mounted on
  /devmapper/centos-home xfs  392G  124G  269G  32% /home

From /sys/devices/virtual/dmi/id
  BIOS: American Megatrends Inc. V8.101 08/02/2019
  Vendor: Tyrone Systems
  Product: DIT400TR-55R
  Serial: empty

Additional information from dmidecode follows. WARNING: Use caution when you interpret
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Platform Notes (Continued)

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.

(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)
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**Hardware Availability:** Sep-2019  
**Software Availability:** Aug-2019

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**Compiler Version Notes (Continued)**

```plaintext
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)
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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.
icpc: 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)
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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.
icpc: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.

==============================================================================
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.
```

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Base Compiler Invocation

- C benchmarks:
  - `icc -m64 -std=c11`

- C++ benchmarks:
  - `icpc -m64`

- Fortran benchmarks:
  - `ifort -m64`

Base Portability Flags

- C benchmarks:
  - `-m64` `-DSPEC_LP64` `-DSPEC_LINUX_X64`
  - `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-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:
  - `-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`
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SPECrate®2017_int_peak = 240

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Test Sponsor: Netweb Pte Ltd
Tested by: Netweb

Peak Compiler Invocation

C benchmarks (except as noted below):
icc -m64 -std=c11

$02.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

$23.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

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/je5.0.1-32/lib -ljemalloc

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

(Continued on next page)
Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
DIT400TR-55R/55RL
(2.50 GHz, Intel Xeon Gold 6248)

SPEC CPU®2017 Integer Rate Result
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SPECrate®2017_int_base = 230
SPECrate®2017_int_peak = 240

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

Test Date: Feb-2020
Hardware Availability: Sep-2019
Software Availability: Aug-2019

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

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/TyroneIT-Platform-Settings-V1-CLX-revA.html

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

Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
DIT400TR-55R/55RL
(2.50 GHz, Intel Xeon Gold 6248)

SPECrate®2017_int_base = 230
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