# SPEC CPU®2017 Floating Point Rate Result

## Tyrone Systems

(Test Sponsor: Netweb Pte Ltd)

DIT400TR-48RL

(2.70 GHz, Intel Xeon Platinum 8280L)

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>Test Sponsor</th>
<th>Hardware Availability</th>
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</thead>
<tbody>
<tr>
<td>006042</td>
<td>Netweb Pte Ltd</td>
<td>Sep-2019</td>
</tr>
</tbody>
</table>

**Test Date:** Feb-2020  
**Software Availability:** Aug-2019

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### SPECrate®2017_fp_base = 263

### SPECrate®2017_fp_peak = 265

### Hardware

- **CPU Name:** Intel Xeon Platinum 8280L
- **Max MHz:** 4000
- **Nominal:** 2700
- **Enabled:** 56 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:** 38.5 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

### 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
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None
- **Power Management:** Default

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### Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECrate®2017_fp_base</th>
<th>SPECrate®2017_fp_peak</th>
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<tbody>
<tr>
<td>503.bwaves_r</td>
<td>231</td>
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<tr>
<td>507.cactuBSSN_r</td>
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<td>508.namd_r</td>
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<td>549.fotonik3d_r</td>
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<td>554.roms_r</td>
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</tbody>
</table>

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**Note:** The result is shown as a table with each benchmark's SPECrate®2017_fp_base and SPECrate®2017_fp_peak values.
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DIT400TR-48RL  
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**SPECrater®2017_fp_base = 263**  
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**Results Table**

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<tr>
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</table>

SPECrater®2017_fp_base = 263  
SPECrater®2017_fp_peak = 265

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

**Compiler Notes**

SPECrater 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"
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DIT400TR-48RL
(2.70 GHz, Intel Xeon Platinum 8280L)

SPECrated®2017_fp_base = 263
SPECrated®2017_fp_peak = 265

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

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

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.

Platform Notes

The system was tested with a pre-production version of the Intel Xeon Platinum 8280L, which
had a nominal MHz of 2.6 GHz. Production chips have a nominal MHz of 2.7 GHz and therefore
performance may be slightly faster than what was tested.

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edeb1e6e46a485a0011
running on NODE4 Tue Feb 4 09:49:40 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) Platinum 8280L CPU @ 2.60GHz
  2 "physical id"s (chips)
  112 "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 : 28
siblings : 56
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian

(Continued on next page)
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**SPECrate®2017_fp_base = 263**  
**SPECrate®2017_fp_peak = 265**

**Platform Notes (Continued)**

- **CPU(s):** 112  
- **On-line CPU(s) list:** 0-111  
- **Thread(s) per core:** 2  
- **Core(s) per socket:** 28  
- **Socket(s):** 2  
- **NUMA node(s):** 2  
- **Vendor ID:** GenuineIntel  
- **CPU family:** 6  
- **Model:** 85  
- **Model name:** Intel(R) Xeon(R) Platinum 8280L CPU @ 2.60GHz  
- **Stepping:** 5  
- **CPU MHz:** 999.914  
- **CPU max MHz:** 3900.0000  
- **CPU min MHz:** 1000.0000  
- **BogoMIPS:** 5200.00  
- **Virtualization:** VT-x  
- **L1d cache:** 32K  
- **L1i cache:** 32K  
- **L2 cache:** 1024K  
- **L3 cache:** 39424K  
- **NUMA node0 CPU(s):** 0-27,56-83  
- **NUMA node1 CPU(s):** 28-55,84-111  
- **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 nni 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 eb1 cat_13 cd p cpuid msrGCC arch_capabilities

```
/proc/cpuinfo cache data
  cache size : 39424 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 20 21 22 23 24 25 26 27 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83  
  - node 0 size: 195228 MB  
  - node 0 free: 165308 MB  
  - node 1 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83

(Continued on next page)
 Platform Notes (Continued)

107 108 109 110 111
node 1 size: 196608 MB
node 1 free: 168726 MB
node distances:
  node  0  1
  0:  10  21
  1:  21  10

From /proc/meminfo
  MemTotal: 394852372 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 NODE4 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: Vulnerable: Clear CPU buffers attempted, no microcode; SMT vulnerable
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 06:00

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Copyright 2017-2020 Standard Performance Evaluation Corporation

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

Platform Notes (Continued)

SPEC is set to: /home/cpu2017
Filesystem    Type  Size  Used  Avail  Use%  Mounted on
/dev/mapper/centos-home xfs  392G  217G  176G  56%  /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.
Memory:
12x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C               | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
| 544.nab_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.
------------------------------------------------------------------------------
==============================================================================
C++             | 508.namd_r(base, peak) 510.parest_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.
------------------------------------------------------------------------------
==============================================================================
C++, C          | 511.povray_r(base, peak) 526.blender_r(base, peak)
------------------------------------------------------------------------------
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Compiler Version Notes (Continued)

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C++, C, Fortran | 507.cactuBSSN_r(base, peak)

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Intel (R) Fortran Intel (R) 64 Compiler for applications running on Intel (R) 64,
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ifort: NOTE: The evaluation period for this product ends on 2-nov-2019 UTC.

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Fortran | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
| 554.roms_r(base, peak)

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Fortran, C | 521.wrf_r(base, peak) 527.cam4_r(base, peak)

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### Base Compiler Invocation

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

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

- **Fortran benchmarks:**  
  `ifort -m64`

#### Benchmarks using both Fortran and C:

- `ifort -m64 icc -m64 -std=c11`

#### Benchmarks using both C and C++:

- `icpc -m64 icc -m64 -std=c11`

#### Benchmarks using Fortran, C, and C++:

- `icpc -m64 icc -m64 -std=c11 ifort -m64`

### Base Portability Flags

<table>
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<tr>
<th>Benchmark</th>
<th>Flags</th>
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</tr>
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<td>508.namd_r</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
<tr>
<td>510.parest_r</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
<tr>
<td>511.povray_r</td>
<td><code>-DSPEC_LP64</code></td>
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<tr>
<td>519.lbm_r</td>
<td><code>-DSPEC_LP64</code></td>
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<tr>
<td>521.wrf_r</td>
<td><code>-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian</code></td>
</tr>
<tr>
<td>526.blender_r</td>
<td><code>-DSPEC_LP64 -DSPEC_LINUX -funsigned-char</code></td>
</tr>
<tr>
<td>527.cam4_r</td>
<td><code>-DSPEC_LP64 -DSPEC_CASE_FLAG</code></td>
</tr>
<tr>
<td>538.imagick_r</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
<tr>
<td>544.nab_r</td>
<td><code>-DSPEC_LP64</code></td>
</tr>
<tr>
<td>549.fotonik3d_r</td>
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</tr>
<tr>
<td>554.roms_r</td>
<td><code>-DSPEC_LP64</code></td>
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### Base Optimization Flags

- **C benchmarks:**
  `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`

- **C++ benchmarks:**
  `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch`

(Continued on next page)
Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
DIT400TR-48RL
(2.70 GHz, Intel Xeon Platinum 8280L)

SPECrate®2017_fp_base = 263
SPECrate®2017_fp_peak = 265

Base Optimization Flags (Continued)

C++ benchmarks (continued):
-ffinite-math-only -qopt-mem-layout-trans=4

Fortran benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-nostandard- realloc-lhs -align array32byte

Benchmarks using both Fortran and C:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-nostandard- realloc-lhs -align array32byte

Benchmarks using both C and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

Benchmarks using Fortran, C, and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-nostandard- realloc-lhs -align array32byte

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
ifort -m64 icc -m64 -std=c11

Benchmarks using both C and C++:
icpc -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64
Tyrone Systems
(Test Sponsor: Netweb Pte Ltd)
DIT400TR-48RL
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SPECrate®2017_fp_base = 263
SPECrate®2017_fp_peak = 265

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
519.lbm_r -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512
-O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

538.imagick_r -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

544.nab_r: Same as 538.imagick_r

C++ benchmarks:
508.namd_r -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512
-O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

510.parest_r -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4

Fortran benchmarks:
503.bwaves_r -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-nostandard-realloc-lhs -align array32byte

549.fotonik3d_r: Same as 503.bwaves_r

554.roms_r -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512
-O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs
-align array32byte

Benchmarks using both Fortran and C:
-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512 -O3
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -auto -nostandard-realloc-lhs
-align array32byte

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

**Tyrone Systems**  
(Test Sponsor: Netweb Pte Ltd)  
DIT400TR-48RL  
(2.70 GHz, Intel Xeon Platinum 8280L)  

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>SPECrate®2017_fp_peak</th>
</tr>
</thead>
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<tr>
<td>263</td>
<td>265</td>
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</tbody>
</table>

**CPU2017 License:** 006042  
**Test Date:** Feb-2020  
**Test Sponsor:** Netweb Pte Ltd  
**Hardware Availability:** Sep-2019  
**Tested by:** Netweb  
**Software Availability:** Aug-2019

---

**Peak Optimization Flags (Continued)**

Benchmarks using both C and C++:

```
511.povray_r -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512
-O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4

526.blender_r -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4
```

Benchmarks using Fortran, C, and C++:

```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -auto
-nostandard-realloc-lhs -align array32byte
```

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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