## SPEC CPU®2017 Floating Point Speed Result

### Tyrone Systems

(Test Sponsor: Netweb Pte Ltd)

DS400TG-424RT

(2.50 GHz, Intel Xeon Gold 6248)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>133</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>137</td>
</tr>
</tbody>
</table>

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

### Threads

<table>
<thead>
<tr>
<th>SPECspeed®2017</th>
<th>137</th>
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<tbody>
<tr>
<td>Threads</td>
<td>133</td>
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<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_fp_peak</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>40</td>
<td>149</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>40</td>
<td>149</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>40</td>
<td>96.3</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>40</td>
<td>96.4</td>
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<tr>
<td>627.cam4_s</td>
<td>40</td>
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<td>628.pop2_s</td>
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<td>117</td>
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<tr>
<td>638.imagick_s</td>
<td>40</td>
<td>122</td>
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<tr>
<td>644.nab_s</td>
<td>80</td>
<td>226</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>40</td>
<td>238</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>40</td>
<td>130</td>
</tr>
</tbody>
</table>

### 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:** Yes
- **Firmware:** Version 3.1 released Apr-2019
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** None

### Hardware

- **CPU Name:** Intel Xeon Gold 6248
- **Max MHz:** 3900
- **Nominal:** 2500
- **Enabled:** 40 cores, 2 chips, 2 threads/core
- **Orderable:** 1, 2 chips
- **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:** 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)
- **Storage:** 1 x 480 GB SSD
- **Other:** None

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Test Date: Nov-2019

Hardware Availability: Sep-2019

Software Availability: Aug-2019

Tyrone Systems

(2.50 GHz, Intel Xeon Gold 6248)
Tyrone Systems  
(Test Sponsor: Netweb Pte Ltd)  
DS400TG-424RT  
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CPU2017 License: 006042  
Test Sponsor: Netweb  
Tested by: Netweb

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
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</tr>
</tbody>
</table>

SPECspeed®2017_fp_base = 133  
SPECspeed®2017_fp_peak = 137

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

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:
KMP_AFFINITY = "granularity=fine,compact,1,0"
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64"
OMP_STACKSIZE = "192M"

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

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.
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DS400TG-424RT
(2.50 GHz, Intel Xeon Gold 6248)

SPECspeed®2017_fp_base = 133
SPECspeed®2017_fp_peak = 137

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

Platform Notes

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edblle6e46a485a0011
running on NODE1 Fri Nov 29 11:12:23 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) 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
  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 mce cx8 apic sep mtrr pge mca cmov

(Continued on next page)
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Platform Notes (Continued)

pat pse36 clflush dtc acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nolock xtopology nonstop_tsc
aperfperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtrig pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3nowprefetch epb cat_l3 cdp_l3 intel_p6
intel_pt ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vni flexpriority ept
vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ets invpcid rtm cmp mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt
xsavevc xgetbv1 cmq llc cmq_occump_llc cmq_mbm_total cmq_mbm_local dtherm ida arat pln
pts pku ospk avx512_vnni md clear spec_ctrl intel_stibp flush_l1d arch_capabilities

From /proc/cpuinfo cache data

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: 391844 MB
node 0 free: 351293 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: 393216 MB
node 1 free: 357467 MB
node distances:
node  0  1
  0: 10 21
  1: 21 10

From /proc/meminfo

MemTotal:       791227332 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"

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Platform Notes (Continued)

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 NODE1 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 Nov 28 01:29
SPEC is set to: /home/cpu2017
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/mapper/centos-home xfs 392G 191G 202G 49% /home

From /sys/devices/virtual/dmi/id
    BIOS: American Megatrends Inc. 3.1 04/30/2019
    Vendor: Tyrone Systems
    Product: DS400TG-424RT
    Serial: 4X25811911

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:
    24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C            619.lbm_s(base, peak) 638.imagick_s(base, peak)
            644.nab_s(base, peak)
==============================================================================

(Continued on next page)
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Test Date: Nov-2019
Hardware Availability: Sep-2019
Software Availability: Aug-2019

Compiler Version Notes (Continued)

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++, C, Fortran | 607.cactuBSSN_s(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.
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.
-----------------------------------------------------------------------------
Fortran | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
       | 654.roms_s(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.
-----------------------------------------------------------------------------
Fortran, C | 621.wrf_s(base, peak) 627.cam4_s(base, peak)
           | 628.pop2_s(base, peak)
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Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
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Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64

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

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

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

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

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

Base Optimization Flags (Continued)

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

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64

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

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
603.bwaves_s: -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP
-DSPEC_OPENMP -O2 -xCORE-AVX512 -qopt-prefetch -ipo -O3
-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=4
-qopenmp -nostandard-realloc-lhs

649.fotonik3d_s: Same as 603.bwaves_s

654.roms_s: -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4

(Continued on next page)
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Tested by: Netweb  

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**Peak Optimization Flags (Continued)**

654.roms_s (continued):
- `-qopenmp`  
- `-nostandard-realloc-lhs`

Benchmarks using both Fortran and C:

621.wrf_s:  
- `-prof-gen(pass 1)`  
- `-prof-use(pass 2)`  
- `-O2`  
- `-xCORE-AVX512`  
- `-qopt-prefetch`  
- `-ipo`  
- `-o3`  
- `-ffinite-math-only`  
- `-no-prec-div`  
- `-DSPEC_OPENMP`  
- `-qopenmp`  
- `-DSPEC_SUPPRESS_OPENMP`  
- `-nostandard-realloc-lhs`

627.cam4_s:  
- `-xCORE-AVX512`  
- `-ipo`  
- `-o3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=4`  
- `-qopenmp`  
- `-DSPEC_OPENMP`  
- `-nostandard-realloc-lhs`

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:

- `-xCORE-AVX512`  
- `-ipo`  
- `-o3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=4`  
- `-qopenmp`  
- `-DSPEC_OPENMP`  
- `-nostandard-realloc-lhs`

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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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