Lenovo Global Technology

ThinkSystem ST50
(3.80 GHz, Intel Xeon E-2186G)

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

SPECspeed2017_fp_base = 29.6
SPECspeed2017_fp_peak = Not Run

**Threads**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed2017_fp_base</th>
</tr>
</thead>
<tbody>
<tr>
<td>603.bwaves_s</td>
<td>6</td>
<td></td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>6</td>
<td></td>
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<tr>
<td>619.lbm_s</td>
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<td>7.05</td>
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<tr>
<td>621.wrf_s</td>
<td>6</td>
<td>39.5</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>6</td>
<td>24.1</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>6</td>
<td>34.6</td>
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<tr>
<td>638.imagick_s</td>
<td>6</td>
<td>30.3</td>
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<tr>
<td>644.nab_s</td>
<td>6</td>
<td>57.0</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>6</td>
<td>17.3</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>6</td>
<td>16.7</td>
</tr>
</tbody>
</table>

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**Hardware**

CPU Name: Intel Xeon E-2186G
Max MHz.: 4700
Nominal: 3800
Enabled: 6 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 256 KB I+D on chip per core
L3: 12 MB I+D on chip per chip
Other: None
Memory: 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)
Storage: 1 x 480 GB SATA SSD
Other: None

**Software**

OS: Red Hat Enterprise Linux Server release 7.5 (Maipo)
Compiler: C/C++: Version 18.0.2.199 of Intel C/C++
Compiler for Linux:
Fortran: Version 18.0.2.199 of Intel Fortran
Compiler for Linux
Parallel: Yes
Firmware: Lenovo BIOS Version ITE101U released Sep-2018
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: jemalloc memory allocator V5.0.1
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**SPECspeed2017_fp_base** = 29.6

**SPECspeed2017_fp_peak** = Not Run

---

**Results Table**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Ratio</th>
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<td><strong>16.7</strong></td>
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</tbody>
</table>

**SPECspeed2017_fp_base** = 29.6

**SPECspeed2017_fp_peak** = Not Run

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"

---

**General Notes**

Environment variables set by runcpu before the start of the run:

- `KMP_AFFINITY = "granularity=fine,compact,1,0"
- `LD_LIBRARY_PATH = "/home/cpu2017-1.0.5-ic18.0u2/lib/ia32:/home/cpu2017-1.0.5-ic18.0u2/lib/intel64"
- `LD_LIBRARY_PATH = "$LD_LIBRARY_PATH:/home/cpu2017-1.0.5-ic18.0u2/je5.0.1-32:/home/cpu2017-1.0.5-ic18.0u2/je5.0.1-64"
- `OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-6700K 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`

Yes: 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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SPECspeed2017_fp_base = 29.6
SPECspeed2017_fp_peak = Not Run

CPU2017 License: 9017
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Oct-2018
Hardware Availability: Nov-2018
Software Availability: Aug-2018

Platform Notes

Sysinfo program /home/cpu2017-1.0.5-ic18.0u2/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on st50 Thu Oct 11 14:36:00 2018

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) E-2186G CPU @ 3.80GHz
        1 "physical id"s (chips)
        12 "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 : 6
        siblings : 12
        physical 0: cores 0 1 2 3 4 5

From lscpu:
    Architecture: x86_64
    CPU op-mode(s): 32-bit, 64-bit
    Byte Order: Little Endian
    CPU(s): 12
    On-line CPU(s) list: 0-11
    Thread(s) per core: 2
    Core(s) per socket: 6
    Socket(s): 1
    NUMA node(s): 1
    Vendor ID: GenuineIntel
    CPU family: 6
    Model: 158
    Model name: Intel(R) Xeon(R) E-2186G CPU @ 3.80GHz
    Stepping: 10
    CPU MHz: 936.315
    CPU max MHz: 4700.0000
    CPU min MHz: 800.0000
    BogoMIPS: 7584.00
    Virtualization: VT-x
    L1d cache: 32K
    L1i cache: 32K
    L2 cache: 256K
    L3 cache: 12288K
    NUMA node0 CPU(s): 0-11
    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 rdtsscp
    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

(Continued on next page)
**SPEC CPU2017 Floating Point Speed Result**

**Lenovo Global Technology**

ThinkSystem ST50  
(3.80 GHz, Intel Xeon E-2186G)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>Lenovo Global Technology</th>
<th>Test Date:</th>
<th>Oct-2018</th>
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<td>Software Availability:</td>
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**SPECspeed2017_fp_peak = Not Run**

**Platform Notes (Continued)**

```
fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch epb intel_pt ssbd ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt xsaveopt xsavec xgetbv1 dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp spec_ctrl intel_stibp flush_lld
```

```
/proc/cpuinfo cache data  
cache size : 12288 KB  
From numactl --hardware  
WARNING: a numactl 'node' might or might not correspond to a  
physical chip.  
available: 1 nodes (0)  
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11  
node 0 size: 65371 MB  
node 0 free: 62861 MB  
node distances:  
node 0  
0:  10  
From /proc/meminfo  
MemTotal: 65807636 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB  
From /etc/*release* /etc/*version*  
NAME="Red Hat Enterprise Linux Server"  
VERSION="7.5 (Maipo)"  
ID="rhel"  
ID_LIKE="fedora"  
VARIANT="Server"  
VARIANT_ID="server"  
VERSION_ID="7.5"  
PRETTY_NAME="Red Hat Enterprise Linux Server 7.5 (Maipo)"  
redhat-release: Red Hat Enterprise Linux Server release 7.5 (Maipo)  
system-release: Red Hat Enterprise Linux Server release 7.5 (Maipo)  
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.5:ga:server  
uname -a:  
Linux st50 3.10.0-862.11.6.el7.x86_64 #1 SMP Fri Aug 10 16:55:11 UTC 2018 x86_64  
x86_64 x86_64 GNU/Linux  
Kernel self-reported vulnerability status:  
CVE-2017-5754 (Meltdown): Mitigation: PTI  
CVE-2017-5753 (Spectre variant 1): Mitigation: Load fences, __user pointer sanitization  
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS (kernel)  
```

(Continued on next page)
Platform Notes (Continued)

run-level 3 Oct 11 12:07

SPEC is set to: /home/cpu2017-1.0.5-ic18.0u2

Filesystem     Type  Size  Used  Avail  Use% Mounted on
/dev/sda2      xfs   381G   13G  368G   4% /home

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.

BIOS LENOVO ITE101U 09/12/2018
Memory:
  4x SK Hynix HMA82GU7CJR8N-VK 16 GB 2 rank 2667

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)
==============================================================================

icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
fc  607.cactuBSSN_s(base)
==============================================================================

icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

==============================================================================
fc  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
==============================================================================

ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

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CC  621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)
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Compiler Version Notes (Continued)

ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

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:
-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

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**Base Optimization Flags (Continued)**

**Fortran benchmarks:**
- `-Wl,-z,muldefs`  
- `-DSPEC_OPENMP`  
- `-xCORE-AVX2`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=3`  
- `-qopenmp`  
- `-nostandard-realloc-lhs`  
- `-L/usr/local/je5.0.1-64/lib`  
- `-ljemalloc`

**Benchmarks using both Fortran and C:**
- `-Wl,-z,muldefs`  
- `-xCORE-AVX2`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=3`  
- `-qopenmp`  
- `-DSPEC_OPENMP`  
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**Benchmarks using Fortran, C, and C++:**
- `-Wl,-z,muldefs`  
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- `-ljemalloc`

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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Tested with SPEC CPU2017 v1.0.5 on 2018-10-11 02:36:00-0400.  
Originally published on 2018-11-06.