SPEC CPU®2017 Floating Point Speed Result

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NEC Corporation

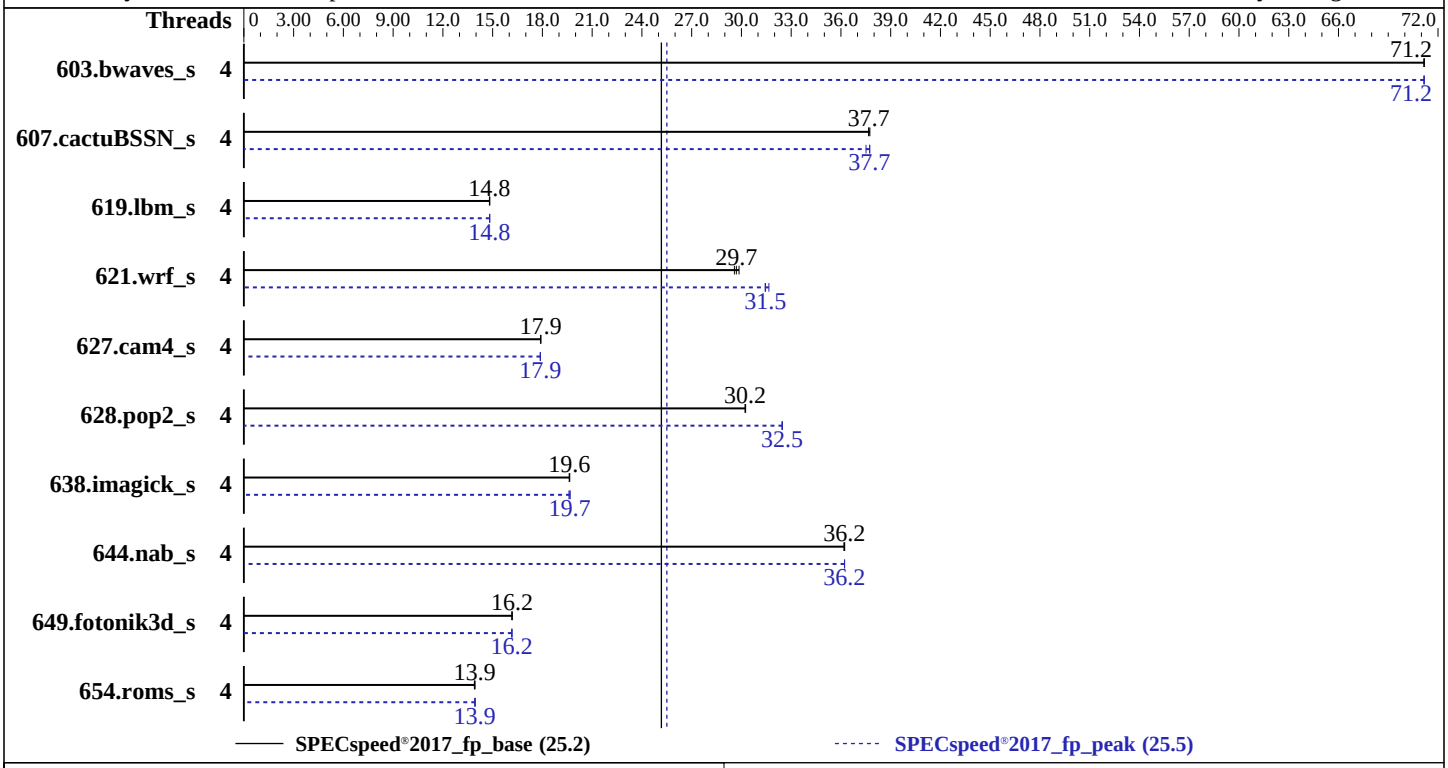
Express5800/T110j-S (Intel Core i3-9300)

SPECspeed®2017_fp_base = 25.2

SPECspeed®2017_fp_peak = 25.5

CPU2017 License: 9006
Test Sponsor: NEC Corporation
Tested by: NEC Corporation

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



Hardware

CPU Name:	Intel Core i3-9300
Max MHz:	4300
Nominal:	3700
Enabled:	4 cores, 1 chip
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:	8 MB I+D on chip per chip
Other:	None
Memory:	64 GB (4 x 16 GB 2Rx8 PC4-2666V-E, running at 2400)
Storage:	1 x 1 TB SATA, 7200 RPM
Other:	None

Software

OS:	Red Hat Enterprise Linux Server release 7.7 (Maipo) Kernel 3.10.0-1062.el7.x86_64
Compiler:	C/C++: Version 19.0.4.227 of Intel C/C++ Compiler Build 20190416 for Linux; Fortran: Version 19.0.4.227 of Intel Fortran Compiler Build 20190416 for Linux
Parallel:	Yes
Firmware:	NEC BIOS Version F01 08/21/2019 released Nov-2019
File System:	ext4
System State:	Run level 3 (multi-user)
Base Pointers:	64-bit
Peak Pointers:	64-bit
Other:	None
Power Management:	--

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Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
603.bwaves_s	4	**829**	**71.2**	829	71.2	829	71.2	4	829	71.2	**829**	**71.2**	829	71.2
607.cactuBSSN_s	4	442	37.7	**442**	**37.7**	443	37.7	4	444	37.5	442	37.7	**442**	**37.7**
619.lbm_s	4	354	14.8	**353**	**14.8**	353	14.8	4	353	14.8	**353**	**14.8**	354	14.8
621.wrf_s	4	443	29.9	**445**	**29.7**	447	29.6	4	**420**	**31.5**	418	31.7	421	31.4
627.cam4_s	4	495	17.9	495	17.9	**495**	**17.9**	4	496	17.9	496	17.9	**496**	**17.9**
628.pop2_s	4	393	30.2	**393**	**30.2**	392	30.3	4	366	32.4	366	32.5	**366**	**32.5**
638.imagick_s	4	**735**	**19.6**	734	19.6	735	19.6	4	736	19.6	**734**	**19.7**	733	19.7
644.nab_s	4	483	36.2	**482**	**36.2**	482	36.2	4	482	36.2	**482**	**36.2**	482	36.2
649.fotonik3d_s	4	564	16.2	564	16.2	**564**	**16.2**	4	564	16.2	**564**	**16.2**	564	16.2
654.roms_s	4	**1131**	**13.9**	1133	13.9	1130	13.9	4	1128	14.0	1131	13.9	**1130**	**13.9**

SPECspeed®2017_fp_base = 25.2

SPECspeed®2017_fp_peak = 25.5

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"
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64"
OMP_STACKSIZE = "192M"
```

General Notes

```
Binaries compiled on a system with 1x Intel Core i9-799X 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.
```

Platform Notes

```
BIOS Settings:
 VT-x: Disabled
 Energy Efficient P-state: Disabled
 Energy Efficient Turbo: Disabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
running on t110js Wed Oct 30 04:51:51 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) Core(TM) i3-9300 CPU @ 3.70GHz
      1  "physical id"s (chips)
      4 "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 : 4
      siblings  : 4
      physical 0: cores 0 1 2 3

From lscpu:
     Architecture:          x86_64
     CPU op-mode(s):        32-bit, 64-bit
     Byte Order:            Little Endian
     CPU(s):                4
     On-line CPU(s) list:   0-3
     Thread(s) per core:    1
     Core(s) per socket:    4
     Socket(s):             1
     NUMA node(s):          1
     Vendor ID:             GenuineIntel
     CPU family:            6
     Model:                 158
     Model name:            Intel(R) Core(TM) i3-9300 CPU @ 3.70GHz
     Stepping:              11
     CPU MHz:               4275.415
     CPU max MHz:           4300.0000
     CPU min MHz:           800.0000
     BogoMIPS:              7392.00
     Virtualization:        VT-x
     L1d cache:             32K
     L1i cache:             32K
     L2 cache:              256K
     L3 cache:              8192K
```

(Continued on next page)

Platform Notes (Continued)

```
      NUMA node0 CPU(s):     0-3
      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 est tm2 ssse3 sdbg fma
      cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
      avx f16c rdrand lahf_lm abm 3dnowprefetch intel_pt ssbd ibrs ibpb stibp tpr_shadow
      vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 avx2 smep bmi2 erms invpcid mpx
      rdseed adx smap clflushopt xsaveopt xsavec xgetbv1 dtherm ida arat pln pts hwp
      hwp_notify hwp_act_window hwp_epp md_clear spec_ctrl intel_stibp flush_l1d

/proc/cpuinfo cache data
   cache size : 8192 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
  node 0 size: 65284 MB
  node 0 free: 63398 MB
  node distances:
  node   0
    0:  10

From /proc/meminfo
   MemTotal:       65719160 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux Server"
      VERSION="7.7 (Maipo)"
      ID="rhel"
      ID_LIKE="fedora"
      VARIANT="Server"
      VARIANT_ID="server"
      VERSION_ID="7.7"
      PRETTY_NAME="Red Hat Enterprise Linux Server 7.7 (Maipo)"
   redhat-release: Red Hat Enterprise Linux Server release 7.7 (Maipo)
   system-release: Red Hat Enterprise Linux Server release 7.7 (Maipo)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:7.7:ga:server

uname -a:
   Linux t110js 3.10.0-1062.el7.x86_64 #1 SMP Thu Jul 18 20:25:13 UTC 2019 x86_64 x86_64
   x86_64 GNU/Linux
```

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Platform Notes (Continued)

```
 Kernel self-reported vulnerability status:

 CVE-2018-3620 (L1 Terminal Fault):        Mitigation: PTE Inversion
 Microarchitectural Data Sampling:         Mitigation: Clear CPU buffers; SMT disabled
 CVE-2017-5754 (Meltdown):                 Mitigation: PTI
 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 Oct 30 04:46

 SPEC is set to: /home/cpu2017
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda3      ext4  908G   72G  790G   9% /

 From /sys/devices/virtual/dmi/id
     BIOS:    American Megatrends Inc. F01 08/21/2019
     Vendor:  NEC
     Product: Express5800/T110j-S [N8100-2804Y]
     Serial:  0000002

 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:
     4x Samsung M391A2K43BB1-CTD 16 GB 2 rank 2667

 (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)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
------------------------------------------------------------------------------
```

(Continued on next page)

Compiler Version Notes (Continued)

```
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
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 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
Fortran, C      | 621.wrf_s(base, peak) 627.cam4_s(base, peak)
                | 628.pop2_s(base, peak)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 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:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX2 -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-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -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

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Peak Compiler Invocation (Continued)

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-AVX2 -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-AVX2 -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-AVX2 -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:

621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=4 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

627.cam4_s: -xCORE-AVX2 -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

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Peak Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.html
http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-T110j-RevF.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.xml
http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-T110j-RevF.xml

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