



SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

Nokia

SPECspeed®2017_fp_base = 85.1

OE19 (Intel Xeon Gold 6210U, 2.50GHz)

SPECspeed®2017_fp_peak = 85.1

CPU2017 License: 6037

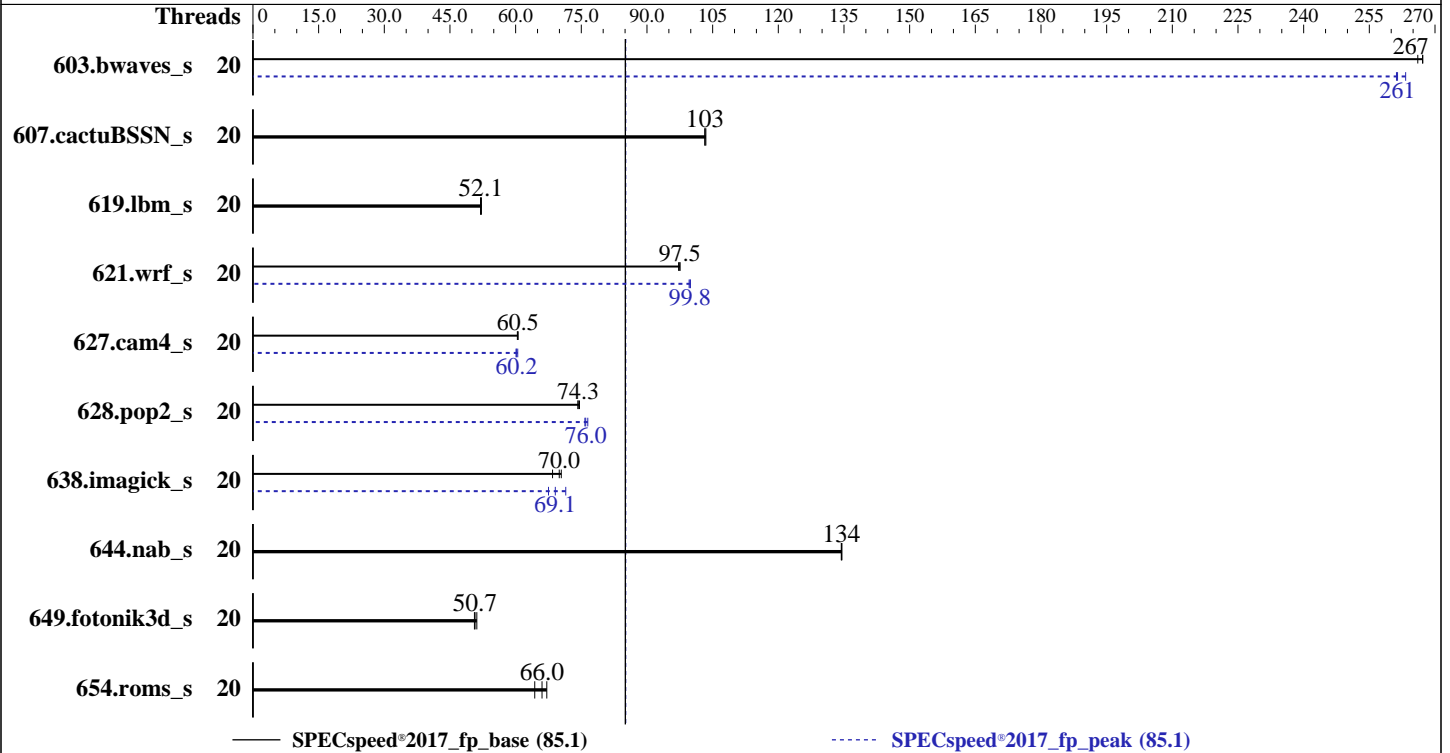
Test Sponsor: Nokia

Tested by: Nokia

Test Date: Dec-2019

Hardware Availability: Apr-2019

Software Availability: Dec-2019



Hardware

CPU Name: Intel Xeon Gold 6210U
 Max MHz: 3900
 Nominal: 2500
 Enabled: 20 cores, 1 chip
 Orderable: 1 chip
 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: 192 GB (6 x 32 GB 2Rx4 PC4-2933Y-R)
 Storage: 1 x 480 GB SATA SSD
 Other: None

Software

OS: SUSE Linux Enterprise Server 12 SP4
 4.12.14-94.41-default
 Compiler: C/C++: Version 19.1.0.166 of Intel C/C++
 Compiler for Linux;
 Fortran: Version 19.1.0.166 of Intel Fortran
 Compiler for Linux
 Parallel: Yes
 Firmware: Version 3B17 released Dec-2019
 File System: xfs
 System State: Run level 5 (multi-user with network and display
 manager)
 Base Pointers: 64-bit
 Peak Pointers: 64-bit
 Other: None
 Power Management: BIOS set to prefer performance at the cost of additional power usage



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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	20	221	267	<u>221</u>	<u>267</u>	222	266	20	224	263	<u>226</u>	<u>261</u>	226	261
607.cactuBSSN_s	20	<u>161</u>	<u>103</u>	162	103	161	103	20	<u>161</u>	<u>103</u>	162	103	161	103
619.lbm_s	20	<u>101</u>	<u>52.1</u>	101	52.0	100	52.2	20	<u>101</u>	<u>52.1</u>	101	52.0	100	52.2
621.wrf_s	20	136	97.5	136	97.2	<u>136</u>	<u>97.5</u>	20	132	99.9	<u>132</u>	<u>99.8</u>	133	99.6
627.cam4_s	20	146	60.6	<u>147</u>	<u>60.5</u>	147	60.4	20	148	60.1	<u>147</u>	<u>60.2</u>	147	60.5
628.pop2_s	20	159	74.6	<u>160</u>	<u>74.3</u>	160	74.2	20	157	75.8	<u>156</u>	<u>76.0</u>	155	76.5
638.imagick_s	20	205	70.4	211	68.4	<u>206</u>	<u>70.0</u>	20	202	71.5	214	67.5	<u>209</u>	<u>69.1</u>
644.nab_s	20	130	135	130	134	<u>130</u>	<u>134</u>	20	130	135	130	134	<u>130</u>	<u>134</u>
649.fotonik3d_s	20	178	51.1	180	50.6	<u>180</u>	<u>50.7</u>	20	178	51.1	180	50.6	<u>180</u>	<u>50.7</u>
654.roms_s	20	235	67.1	<u>238</u>	<u>66.0</u>	245	64.4	20	235	67.1	<u>238</u>	<u>66.0</u>	245	64.4

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

Compiler Notes

SPEC 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.

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/ia32:/home/cpu2017/lib/intel64"
OMP_STACKSIZE = "192M"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.2.1-32:/home/cpu2017/je5.2.1-64"
OMP_STACKSIZE = "192M"
Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5
NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

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General Notes (Continued)

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.

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
```

Platform Notes

BIOS settings:

ADDDC setting disabled

Sub NUMA Cluster disabled

Virtualization Technology disabled

DCU Streamer Prefetcher disabled

System Profile set to Custom

CPU Performance set to Maximum Performance

C States set to Autonomous

C1E disabled

Uncore Frequency set to Dynamic

Energy Efficiency Policy set to Performance

Memory Patrol Scrub disabled

Logical Processor disabled

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011

running on linux-2yq5 Thu Dec 26 09:54:47 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 6210U CPU @ 2.50GHz

1 "physical id"s (chips)

20 "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 : 20

physical 0: 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

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Platform Notes (Continued)

```

Byte Order:           Little Endian
CPU(s):               20
On-line CPU(s) list: 0-19
Thread(s) per core:  1
Core(s) per socket:  20
Socket(s):            1
NUMA node(s):         1
Vendor ID:            GenuineIntel
CPU family:           6
Model:                85
Model name:           Intel(R) Xeon(R) Gold 6210U CPU @ 2.50GHz
Stepping:             6
CPU MHz:              2500.000
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

```

```

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 cpuid
aperfmpperf 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 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single intel_ppin ssbd mba ibrs ibpb stibp tpr_shadow vnmi flexpriority ept
vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
dtherm ida arat pln pts pku ospke avx512_vnni flush_lld arch_capabilities

```

```

/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: 1 nodes (0)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
node 0 size: 192485 MB
node 0 free: 190958 MB
node distances:
node 0
0: 10

```

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Platform Notes (Continued)

```

From /proc/meminfo
MemTotal:      197104640 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

/usr/bin/lsb_release -d
    SUSE Linux Enterprise Server 12 SP4

From /etc/*release* /etc/*version*
SuSE-release:
    SUSE Linux Enterprise Server 12 (x86_64)
    VERSION = 12
    PATCHLEVEL = 4
    # This file is deprecated and will be removed in a future service pack or release.
    # Please check /etc/os-release for details about this release.
os-release:
    NAME="SLES"
    VERSION="12-SP4"
    VERSION_ID="12.4"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12:sp4"

uname -a:
    Linux linux-2yq5 4.12.14-94.41-default #1 SMP Wed Oct 31 12:25:04 UTC 2018 (3090901)
    x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-3620 (L1 Terminal Fault):      Not affected
Microarchitectural Data Sampling:      No status reported
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: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):      Mitigation: Indirect Branch Restricted
                                          Speculation, IBPB, IBRS_FW

run-level 5 Dec 26 09:35

SPEC is set to: /home/cpu2017
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/mapper/vg00-lv_root xfs  436G  206G  231G  48% /

From /sys/devices/virtual/dmi/id
BIOS:      American Megatrends Inc. 3B17 10/09/2019

```

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Platform Notes (Continued)

Vendor: Nokia Solutions and Networks
Product: AE-SER1U-B/AF1802.01
Product Family: AirFrame
Serial: QTFCWN8460001

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:

2x NO DIMM NO DIMM
6x 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)

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.0.166 Build 20191121

Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

icc: NOTE: The evaluation period for this product ends on 21-jan-2020 UTC.

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

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.0.166 Build 20191121

Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

icpc: NOTE: The evaluation period for this product ends on 21-jan-2020 UTC.

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.0.166 Build 20191121

Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

icc: NOTE: The evaluation period for this product ends on 21-jan-2020 UTC.

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)

64, Version 19.1.0.166 Build 20191121

Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

ifort: NOTE: The evaluation period for this product ends on 21-jan-2020 UTC.

=====
Fortran | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)

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Test Sponsor: Nokia

Tested by: Nokia

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Software Availability: Dec-2019

Compiler Version Notes (Continued)

| 654.roms_s(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.0.166 Build 20191121
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
ifort: NOTE: The evaluation period for this product ends on 21-jan-2020 UTC.

=====
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 19.1.0.166 Build 20191121
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
ifort: NOTE: The evaluation period for this product ends on 21-jan-2020 UTC.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.0.166 Build 20191121
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icc: NOTE: The evaluation period for this product ends on 21-jan-2020 UTC.

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

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Base Portability Flags (Continued)

```
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
```

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
```




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Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

619.lbm_s: basepeak = yes

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

644.nab_s: basepeak = yes

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: basepeak = yes

654.roms_s: basepeak = yes

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
-qopt-mem-layout-trans=4 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_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++:

607.cactuBSSN_s: basepeak = yes



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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.html>

<http://www.spec.org/cpu2017/flags/Nokia-Platform-Flags-OE19.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.xml>

<http://www.spec.org/cpu2017/flags/Nokia-Platform-Flags-OE19.xml>

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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