# SPEC CPU®2017 Integer Rate Result

## Nokia

OE19 (Intel Xeon Gold 6210U, 2.50GHz)

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>Nokia</th>
<th>Dec-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor</td>
<td>Nokia</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Tested by</td>
<td>Nokia</td>
<td>Dec-2019</td>
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</table>

### Hardware

- **CPU Name**: Intel Xeon Gold 6210U
- **Max MHz**: 3900
- **Nominal**: 2500
- **Enabled**: 20 cores, 1 chip, 2 threads/core
- **Orderable**: 1 chip
- **Cache L1**: 32 KB I + 32 KB D on chip per core
- **Cache L2**: 1 MB I+D on chip per core
- **Cache L3**: 27.5 MB I+D on chip per chip
- **Memory**: 192 GB (6 x 32 GB 2Rx4 PC4-2933Y-R)
- **Storage**: 1 x 480 GB SATA SSD
- **Software**: SUSE Linux Enterprise Server 12 SP4
- **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**: No
- **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**: 32/64-bit
- **Other**: jemalloc memory allocator V5.2.1
- **Power Management**: BIOS set to prefer performance at the cost of additional power usage

### SPEC CPU®2017 Rate Results

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
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<tr>
<td>118</td>
<td>123</td>
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### SPECrate®2017 Int Base

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<td>502.gcc_r</td>
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CPU2017 License: 6037
Test Sponsor: Nokia
Tested by: Nokia

Test Date: Dec-2019
Hardware Availability: Apr-2019
Software Availability: Dec-2019

Results Table

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<td>563</td>
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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:/home/cpu2017/je5.2.1-32:/home/cpu2017/je5.2.1-64"

General Notes

Environment variables set by runcpu before the start of the run:
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.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)

(Continued on next page)
General Notes (Continued)

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
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

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 enabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbe1e6e46a485a0011
running on linux-2yyq5 Mon Dec 23 15:36:38 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)
        40 "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

From lscpu:

(Continued on next page)
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CPU2017 License: 6037
Test Sponsor: Nokia
Tested by: Nokia

SPECrate®2017_int_base = 118
SPECrate®2017_int_peak = 123

Copyright 2017-2020 Standard Performance Evaluation Corporation

Platform Notes (Continued)

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 40
On-line CPU(s) list: 0-39
Thread(s) per core: 2
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): 0-39
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 arch_perfmon pebs bts rep_good nopl nonstop_tsc cpuid
aernperf2 pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault ebpx cat_l3 cdp_l3
invpcid_single intel_pmm sbbd mba ibrs ibpb tpr_shadow vmmi flexpriority ept
vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ertm invpcid rtm cmx mxsx rdts_a
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occwp llc cqm_mbb_total cqm_mbb_local
dtherm ida arat pni pts pkus ospke avx512_vnni flush_lld arch_capabilities

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 20 21 22 23 24 25 26 27
28 29 30 31 32 33 34 35 36 37 38 39
node 0 size: 192481 MB
node 0 free: 191052 MB
node distances:

(Continued on next page)
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CPU2017 License: 6037
Test Sponsor: Nokia
Tested by: Nokia

Test Date: Dec-2019
Hardware Availability: Apr-2019
Software Availability: Dec-2019

Platform Notes (Continued)

```plaintext
node 0
  0: 10

From /proc/meminfo
  MemTotal:       197100800 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:
  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 23 15:34

SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/vg00-lv_root xfs 436G 184G 253G 43% /
```

(Continued on next page)
## Platform Notes (Continued)

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

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### Compiler Version Notes

<table>
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<th>502.gcc_r(peak)</th>
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Intel(R) C Intel(R) 64 Compiler for applications running on IA-32, 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.

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C | 502.gcc_r(peak)

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**Compiler Version Notes (Continued)**

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

-----------------------------------------------------------------------------

Fortran | 548.exchange2_r(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.

-----------------------------------------------------------------------------

**Base Compiler Invocation**

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

**Base Portability Flags**

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

**Base Optimization Flags**

C benchmarks:
-W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4

(Continued on next page)
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#### Base Optimization Flags (Continued)

**C benchmarks (continued):**

- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.0.166/linux/compiler/lib/intel64`  
- `-lqkmalloc`

**C++ benchmarks:**

- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`  
- `-qopt-mem-layout-trans=4`  
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.0.166/linux/compiler/lib/intel64`  
- `-lqkmalloc`

**Fortran benchmarks:**

- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`  
- `-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte`  
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.0.166/linux/compiler/lib/intel64`  
- `-lqkmalloc`

#### Peak Compiler Invocation

**C benchmarks (except as noted below):**

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

502.gcc_r:  
```
icc -m32 -std=c11 -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.0.166/linux/compiler/lib/ia32_lin
```

**C++ benchmarks (except as noted below):**

```
icpc -m64
```

523.xalancbmk_r:  
```
icpc -m32 -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.0.166/linux/compiler/lib/ia32_lin
```

**Fortran benchmarks:**

```
ifort -m64
```

#### Peak Portability Flags

500.perlbench_r: `-DSPEC_LP64 -DSPEC_LINUX_X64`
502.gcc_r: `-D_FILE_OFFSET_BITS=64`
505.mcf_r: `-DSPEC_LP64`
520.omnetpp_r: `-DSPEC_LP64`
523.xalancbmk_r: `-D_FILE_OFFSET_BITS=64 -DSPEC_LINUX`
525.x264_r: `-DSPEC_LP64`
531.deepsjeng_r: `-DSPEC_LP64`
541.leea_r: `-DSPEC_LP64`

(Continued on next page)
### SPEC CPU®2017 Integer Rate Result

**Nokia**

OE19 (Intel Xeon Gold 6210U, 2.50GHz)

<table>
<thead>
<tr>
<th>CPU2017 License: 6037</th>
<th>Test Date: Dec-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: Nokia</td>
<td>Hardware Availability: Apr-2019</td>
</tr>
<tr>
<td>Tested by: Nokia</td>
<td>Software Availability: Dec-2019</td>
</tr>
</tbody>
</table>

#### SPECrate®2017_int_base = 118

#### SPECrate®2017_int_peak = 123

### Peak Portability Flags (Continued)

548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

### Peak Optimization Flags

#### C benchmarks:

500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
-fno-strict-overflow
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.0.166/linux/compiler/lib/intel64
-lqkmalloc

502.gcc_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
-L/user/local/je5.2.1-32/lib -ljemalloc

505.mcf_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.0.166/linux/compiler/lib/intel64
-lqkmalloc

525.x264_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -fno-alias
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.0.166/linux/compiler/lib/intel64
-lqkmalloc

557.xz_r: Same as 505.mcf_r

#### C++ benchmarks:

520.omnetpp_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.0.166/linux/compiler/lib/intel64
-lqkmalloc

523.xalancbmk_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
-L/usr/local/je5.2.1-32/lib -ljemalloc

531.deepsjeng_r: Same as 520.omnetpp_r

541.leela_r: Same as 520.omnetpp_r

(Continued on next page)
## Peak Optimization Flags (Continued)

Fortran benchmarks:
- \(-Wl,-z,muldefs\)
- \(-xCORE-AVX512\)
- \(-ipo\)
- \(-O3\)
- \(-no-prec-div\)
- \(-qopt-mem-layout-trans=4\)
- \(-nostandard-realloc-lhs\)
- \(-align\)
- \(32\) byte
- \(-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.0.166/linux/compiler/lib/intel64\)
- \(-lqkmalloc\)

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: