## SPEC CPU®2017 Integer Rate Result

**Nokia**

OE19 (Intel Xeon Gold 6210U, 2.50GHz)  

<table>
<thead>
<tr>
<th>Spec CPU®2017_int_base = 118</th>
<th>SPECrate®2017_int_peak = 123</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2017 License: 6037</td>
<td>Test Date: Dec-2019</td>
</tr>
<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>

### 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  
- **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:** 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 Result

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<td>525.x264_r</td>
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**Copies (123)**

---

Nokia

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## Results Table

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<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

---

### 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) 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 enabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7eddb1e6e46a485a0011
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)
```

(Continued on next page)
Platform Notes (Continued)

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:
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 rdtsscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtr Wich dcid cda sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single intel_pni ssbd mba ibrs ibpb stibp tpr_shadow vnni flexpriority ept
vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mxp rdt_a
avx512f avx512dq rdseed adx smap clfushopt clwb intel_pt avx512cd avx512bw avx512vl
xsavesopt xsaves xgetbv1 xsaves cqm_llc cqm_occu llc cqm_mbb_total cqm_mbb_local
dtherm ida arat pln pts pku ospke avx512_vnni flush_lld arch_capabilities

/spec/cpuinfo cache data
cache size : 28160 KB
Platform Notes (Continued)

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:
      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

(Continued on next page)
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Platform Notes (Continued)

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% /

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

Compiler Version Notes

==============================================================================
C | 502.gcc_r(peak)
==============================================================================

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.
==============================================================================

==============================================================================
C | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
| 525.x264_r(base, peak) 557.xz_r(base, peak)
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Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
icc: NOTE: The evaluation period for this product ends on 21-jan-2020 UTC.
==============================================================================
C++     | 523.xalancbmk_r(peak)
==============================================================================
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.
icpc: NOTE: The evaluation period for this product ends on 21-jan-2020 UTC.
==============================================================================
C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
        | 531.deepsjeng_r(base, peak) 541.leela_r(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.
==============================================================================
C++     | 523.xalancbmk_r(peak)
==============================================================================
Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version 19.1.0.166 Build 20191121
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icpc: NOTE: The evaluation period for this product ends on 21-jan-2020 UTC.
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**Test Sponsor:** Nokia

**Tested by:** Nokia

**Test Date:** Dec-2019

**Hardware Availability:** Apr-2019

**Software Availability:** Dec-2019

### Compiler Version Notes (Continued)

```plaintext
C++ | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
    | 531.deepsjeng_r(base, peak) 541.leela_r(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.
icpp: NOTE: The evaluation period for this product ends on 21-jan-2020 UTC.
```

```plaintext
Fortran | 548.exchange2_r(base, peak)
```

### Base Compiler Invocation

**C benchmarks:**
```
icc -m64 -std=c11
```

**C++ benchmarks:**
```
icpc -m64
```

**Fortran benchmarks:**
```
ifort -m64
```

### Base Portability Flags

```plaintext
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
```
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**Base Optimization Flags**

**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`

**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`
- `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`

(Continued on next page)
Nokia

OE19 (Intel Xeon Gold 6210U, 2.50GHz)

**SPEC CPU®2017 Integer Rate Result**

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**SPECrate®2017_int_base = 118**

**SPECrate®2017_int_peak = 123**

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<tr>
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<th>6037</th>
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<td>Test Sponsor:</td>
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<td>Tested by:</td>
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<tr>
<td>Test Date:</td>
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</tbody>
</table>

**Peak Portability Flags (Continued)**

- 531.deepsjeng_r: -DSPEC_LP64
- 541.leela_r: -DSPEC_LP64
- 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 -03 -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 -03 -no-prec-div -qopt-mem-layout-trans=4
  -L/usr/local/je5.2.1-32/lib -ljemalloc

- 505.mcf_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -03 -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 -03 -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 -03 -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 -03 -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

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

Nokia

OE19 (Intel Xeon Gold 6210U, 2.50GHz)

SPECrate® 2017_int_base = 118
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Peak Optimization Flags (Continued)

541.leela_r: Same as 520.omnetpp_r

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

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

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

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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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