**Nettrix**

**R620 G30 (Intel Xeon Silver 4210R)**

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<tr>
<th>Benchmark</th>
<th>Copies</th>
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**CPU2017 License:** 6138  
**Test Date:** Jul-2020  
**Hardware Availability:** May-2020

**Test Sponsor:** Nettrix  
**Test Date:** Jul-2020  
**Software Availability:** Apr-2020

**Tested by:** Nettrix  
**Hardware Availability:** May-2020

---

### Hardware

- **CPU Name:** Intel Xeon Silver 4210R  
- **Max MHz:** 3200  
- **Nominal:** 2400  
- **Enabled:** 20 cores, 2 chips, 2 threads/core  
- **Orderable:** 1,2 Chips  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **L2:** 1 MB I+D on chip per core  
- **L3:** 13.75 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-3200AA-R, running at 2400)  
- **Storage:** 1x 960 GB SATA SSD  
- **Other:** None

---

### Software

- **OS:** Red Hat Enterprise Linux release 8.0 (Ootpa)  
- **Compiler:** C/C++: Version 19.1.1.217 of Intel C/C++ Compiler for Linux Build 20200306;  
  Fortran: Version 19.1.1.217 of Intel Fortran Compiler for Linux Build 20200306;  
- **Parallel:** No  
- **Firmware:** Nettrix BIOS Version NJGS041227 released May-2020  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 32/64-bit  
- **Other:** jemalloc memory allocator V5.0.1  
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage.
## Results Table

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**Compiler Notes**

The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler. The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux. The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux.

**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"

Tuning Kernel Parameters:
- sched_migration_cost_ns=1000
- sched_rt_runtime_us=990000
- sched_latency_ns=24000000
- sched_min_granularity_ns=8000000
- dirty_background_ratio=10
- dirty_ratio=40
- dirty_writeback_centisecs=1500
- dirty_expire_centisecs=10000
- swappiness=10
- numa_balancing=0
Nettrix
R620 G30 (Intel Xeon Silver 4210R)

SPEC CPU®2017 Integer Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

CPU2017 License: 6138
Test Sponsor: Nettrix
Tested by: Nettrix

SPECrate®2017_int_base = 132
SPECrate®2017_int_peak = 135

Test Date: Jul-2020
Hardware Availability: May-2020
Software Availability: Apr-2020

Environment Variables Notes

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

LD_LIBRARY_PATH = 
"/home/admin/benchmarks/cpu2017/lib/intel64:/home/admin/benchmarks/cpu2017/lib/ia32:/home/admin/benchmarks/cpu2017/je5.0.1-32"

MALLOC_CONF = "retain:true"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0
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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

Application Performance Profile Set to Computing Throughput Mode
Hyper-Threading set to Enabled
MONITOR/MWAIT set to Enabled
Autonomous Core C-State set to Enabled
SNC set to Enabled
IMC set to 1-Way Interleaving
XPT Prefetch set to Enabled
KTI Prefetch set to Disabled
Stale AtoS set to Enabled
Patrol Scrub set to Disabled
LLC Dead Line Allocation set to Disabled
BMC Settings:
  Cooling Policy set to Manual Mode
  Fan Duty set to 95

Sysinfo program /home/admin/benchmarks/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f808a3d7ed1b6e46a485a0011

(Continued on next page)
Platform Notes (Continued)

running on localhost.localdomain Thu Jul 23 10:19:48 2020

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) Silver 4210R CPU @ 2.40GHz
  2 "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: 10
  siblings: 20
  physical 0: cores 0 1 2 3 4 8 9 10 11 12
  physical 1: cores 0 1 2 3 4 8 9 10 11 12

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: 10
  Socket(s): 2
  NUMA node(s): 2
  Vendor ID: GenuineIntel
  CPU family: 6
  Model: 85
  Model name: Intel(R) Xeon(R) Silver 4210R CPU @ 2.40GHz
  Stepping: 7
  CPU MHz: 1700.405
  CPU max MHz: 3200.0000
  CPU min MHz: 1000.0000
  BogoMIPS: 4800.00
  Virtualization: VT-x
  L1d cache: 32K
  L1i cache: 32K
  L2 cache: 1024K
  L3 cache: 14080K
  NUMA node0 CPU(s): 0-9,20-29
  NUMA node1 CPU(s): 10-19,30-39
  Flags: fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpeslb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16

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

**Nettrix**

**R620 G30 (Intel Xeon Silver 4210R)**

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**SPECrate®2017_int_base = 132**

**SPECrate®2017_int_peak = 135**

**Platform Notes (Continued)**

xtpr pdcm pcid dca 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_pinn ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cmq mpx rdt_a avx512f avx512dq rdsd edx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xcase xcetbvl xsavec cmp_llc cmp_occLP LLC cmp_mbm_total cmp_mbm_local dtherm ida arat pln pts pkup ospe avx512_vnni flush_lld arch_capabilities

/proc/cpuinfo cache data

cache size : 14080 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.

available: 2 nodes (0-1)
	node 0 cpus: 0 1 2 3 4 5 6 7 8 9 20 21 22 23 24 25 26 27 28 29
	node 0 size: 192804 MB
	node 0 free: 179894 MB
	node 1 cpus: 10 11 12 13 14 15 16 17 18 19 30 31 32 33 34 35 36 37 38 39
	node 1 size: 193506 MB
	node 1 free: 182839 MB
	node distances:
	node 0 1
0: 10 21
1: 21 10

From /proc/meminfo

MemTotal: 395583092 kB

HugePages_Total: 0

Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*

os-release:

NAME="Red Hat Enterprise Linux"

VERSION="8.0 (Ootpa)"

ID="rhel"

ID_LIKE="fedora"

VERSION_ID="8.0"

PLATFORM_ID="platform:el8"

PRETTY_NAME="Red Hat Enterprise Linux 8.0 (Ootpa)"

ANSI_COLOR="0;31"

redhat-release: Red Hat Enterprise Linux release 8.0 (Ootpa)

system-release: Red Hat Enterprise Linux release 8.0 (Ootpa)

system-release-cpe: cpe:/o:redhat:enterprise_linux:8.0:ga

uname -a:

Linux localhost.localdomain 4.18.0-80.el8.x86_64 #1 SMP Wed Mar 13 12:02:46 UTC 2019

(Continued on next page)
Nettrix
R620 G30 (Intel Xeon Silver 4210R)

**CPU2017 License:** 6138
**Test Sponsor:** Nettrix
**Tested by:** Nettrix
**Test Date:** Jul-2020
**Hardware Availability:** May-2020
**Software Availability:** Apr-2020

---

**Platform Notes (Continued)**

- 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: Enhanced IBRS, IBPB: conditional, RSB filling
- run-level 3 Jul 22 09:42
- SPEC is set to: /home/admin/benchmarks/cpu2017
  - Filesystem Type Size Used Avail Use% Mounted on
    - /dev/sda5 xfs 877G 139G 738G 16% /home
- From /sys/devices/virtual/dmi/id
  - BIOS: American Megatrends Inc. NJGS041227 05/16/2020
  - Vendor: Nettrix
  - Product: R620 G30
  - Product Family: Rack
  - Serial: 302000666

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:
  - 24x Samsung M393A2K43DB2-CWE 16 GB 2 rank 3200

(End of data from sysinfo program)

---

**Compiler Version Notes**

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

Intel(R) C Compiler for applications running on IA-32, Version 2021.1 NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

(Continued on next page)
Nettrix
R620 G30 (Intel Xeon Silver 4210R)

SPEC CPU®2017 Integer Rate Result
Copyright 2017-2020 Standard Performance Evaluation Corporation

CPU2017 License: 6138
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SPECrate®2017_int_base = 132
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Compiler Version Notes (Continued)

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

## Nettrix

R620 G30 (Intel Xeon Silver 4210R)

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## Compiler Version Notes (Continued)

```plaintext
c  | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
   | 525.x264_r(base, peak) 557.xz_r(base)

Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

C  | 500.perlbench_r(peak) 557.xz_r(peak)

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

C++ | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak)
     | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)

Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Fortran | 548.exchange2_r(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
```

## Base Compiler Invocation

C benchmarks:
- icc

C++ benchmarks:
- icpc

Fortran benchmarks:
- ifort
Nettrix
R620 G30 (Intel Xeon Silver 4210R)

SPEC CPU®2017 Integer Rate Result
Copyright 2017-2020 Standard Performance Evaluation Corporation

**SPECrate®2017_int_base = 132**
**SPECrate®2017_int_peak = 135**

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**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:
- -m64 -qnextgen -std=c11
- -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
- -xCORE-AVX512 -O3 -ffast-math -fto -mfpmath=sse -funroll-loops
- -fuse-ld=gold -qopt-mem-layout-trans=4
- -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
  -lqkmalloc

C++ benchmarks:
- -m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
- -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -fto -mfpmath=sse
- -funroll-loops -fuse-ld=gold -qopt-mem-layout-trans=4
- -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
  -lqkmalloc

Fortran benchmarks:
- -m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs
- -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
- -nostandard-realloc-lhs -align array32byte -auto
- -mbranches-within-32B-boundaries
- -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
  -lqkmalloc

**Peak Compiler Invocation**

C benchmarks:
icc

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

<table>
<thead>
<tr>
<th>Nettrix R620 G30 (Intel Xeon Silver 4210R)</th>
<th>SPECrate®2017_int_base = 132</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SPECrate®2017_int_peak = 135</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 6138  
**Test Sponsor:** Nettrix  
**Test Date:** Jul-2020  
**Tested by:** Nettrix  
**Hardware Availability:** May-2020  
**Software Availability:** Apr-2020

### Peak Compiler Invocation (Continued)

**C++ benchmarks:**  
`icpc`

**Fortran benchmarks:**  
`ifort`

### Peak Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
</table>
| 500.perlb | `-DSPEC_LP64` `-DSPEC_LINUX_X64`
| 502.gcc  | `-D_FILE_OFFSET_BITS=64`
| 505.mcf  | `-DSPEC_LP64`
| 520.omnetpp | `-DSPEC_LP64`
| 523.xalancbmk | `-DSPEC_LP64` `-DSPEC_LINUX`
| 525.x264 | `-DSPEC_LP64`
| 531.deepsjeng | `-DSPEC_LP64`
| 541.leela | `-DSPEC_LP64`
| 548.exchange2 | `-DSPEC_LP64`
| 557.xz    | `-DSPEC_LP64`

### Peak Optimization Flags

**C benchmarks:**

```
500.perlb_r: ` -W1,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -fno-strict-overflow
-mbranches-within-32B-boundaries
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
-lqkmalloc

502.gcc_r: `-m32
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/ia32_lin
-std=gnu89
-W1,-plugin-opt=-x86-branches-within-32B-boundaries
-W1,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto
-Ofast(pass 1) -O3 -ffast-math -qnextgen -fuse-ld=gold
-qopt-mem-layout-trans=4 -L/usr/local/jemalloc32-5.0.1/lib
-ljemalloc

505.mcf_r: basepeak = yes
```

(Continued on next page)
## Nettrix
### R620 G30 (Intel Xeon Silver 4210R)

<table>
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<th>SPECrate®2017_int_base</th>
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### Peak Optimization Flags (Continued)

525.x264_r: -m64 -qnextgen -std=c11  
-W1,-plugin-opt=-x86-branches-within-32B-boundaries  
-W1,-z,muldefs -xCORE-AVX512 -flto -O3 -ffast-math  
-fuse-ld=gold -qopt-mem-layout-trans=4 -fno-alias  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin  
-lqkmalloc

557.xz_r: -W1,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin  
-lqkmalloc

**C++ benchmarks:**

520.omnetpp_r: basepeak = yes
523.xalancbmk_r: basepeak = yes
531.deepsjeng_r: basepeak = yes
541.leela_r: basepeak = yes

**Fortran benchmarks:**

548.exchange2_r: basepeak = yes

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:

http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.xml  
http://www.spec.org/cpu2017/flags/Nettrix-Platform-Settings-V3.0-CLX-revB.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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