Nettrix
R620 G30 (Intel Xeon Gold 5218R)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>130</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed®2017_fp_peak</td>
<td>131</td>
</tr>
</tbody>
</table>

**Test Sponsor:** Nettrix

**Test Date:** Jul-2020

**Hardware Availability:** May-2020

**Software Availability:** Apr-2020

**CPU Name:** Intel Xeon Gold 5218R

**Max MHz:** 4000

**Nominal:** 2100

**Enabled:** 40 cores, 2 chips

**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:** 27.5 MB I+D on chip per chip

**Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-3200AA-R, running at 2667)

**Storage:** 1x 960 GB SATA SSD

**OS:** Red Hat Enterprise Linux release 8.0 (Ootpa)

4.18.0-80.el8.x86_64

**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:** Yes

**Firmware:**

Nettrix BIOS Version NJGS041227 released May-2020

**File System:** xfs

**System State:** Run level 3 (multi-user)

**Base Pointers:** 64-bit

**Peak Pointers:** 64-bit

**Other:**

jemalloc memory allocator V5.0.1

**Power Management:**

BIOS set to prefer performance at the cost of additional power usage.
SPEC CPU®2017 Floating Point Speed Result

Nettrix
R620 G30 (Intel Xeon Gold 5218R)

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

SPECspeed®2017_fp_base = 130
SPECspeed®2017_fp_peak = 131

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

Results Table

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<tr>
<th>Benchmark</th>
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<tr>
<td>603.bwaves_s</td>
<td>40</td>
<td>117</td>
<td>506</td>
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<td>499</td>
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<td>607.cactuBSSN_s</td>
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<td>54.7</td>
<td>95.7</td>
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<td>621.wrf_s</td>
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<td>131</td>
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<td>627.cam4_s</td>
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<td>235</td>
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<td>649.fotonik3d_s</td>
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<td>114</td>
<td>141</td>
<td>112</td>
<td>143</td>
<td>110</td>
</tr>
</tbody>
</table>

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

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.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
Tuning Kernel Parameters:
- sched_migration_cost_ns=600000
- sched_rt_runtime_us=950000
- sched_latency_ns=24000000
- sched_min_granularity_ns=8000000
- dirty_background_ratio=10
- dirty_ratio=20
- dirty_writeback_centisecs=400
- dirty_expire_centisecs=5000
- swappiness=10
- numa_balancing=0

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
- KMP_AFFINITY = "granularity=fine,compact"
- LD_LIBRARY_PATH = "/home/admin/benchmarks/cpu2017/lib/intel64:/home/admin/benchmarks/cpu2017/je5.0.1-64"
- MALLOCPHIN_CONF = "retain:1true"

(Continued on next page)
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

Platform Notes

Application Performance Profile Set to Computing Latency Mode
Hyper-Threading set to Disabled
MONITOR/MWAIT set to Enabled
Autonomous Core C-State set to Enabled
SNC set to Disabled
IMC set to Auto
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

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

(Continued on next page)
Platform Notes (Continued)

From /proc/cpuinfo

    model name : Intel(R) Xeon(R) Gold 5218R CPU @ 2.10GHz
        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 : 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
    physical 1: 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:  1
    Core(s) per socket:  20
    Socket(s):           2
    NUMA node(s):        4
    Vendor ID:           GenuineIntel
    CPU family:          6
    Model:               85
    Model name:          Intel(R) Xeon(R) Gold 5218R CPU @ 2.10GHz
    Stepping:            7
    CPU MHz:             2628.329
    CPU max MHz:         4000.0000
    CPU min MHz:         800.0000
    BogoMIPS:            4200.00
    Virtualization:      VT-x
    L1d cache:           32K
    L1i cache:           32K
    L2 cache:            1024K
    L3 cache:            28160K
    NUMA node0 CPU(s):   0-2,5,6,10-12,15,16
    NUMA node1 CPU(s):   3,4,7-9,13,14,17-19
    NUMA node2 CPU(s):   20-22,25,26,30-32,35,36
    NUMA node3 CPU(s):   23,24,27-29,33,34,37-39
    Flags:               fpu vme de pse tsc msr pae mce cmov 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
    aperf perfctr 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 3nowprefetch cpuid_fault ebx cat_13 cd8_13
    invpcid_single intel_pdpin ssebd mba ibrs ipbp stibp ibrs_enhanced tpr_shadow vnmi
    flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm

(Continued on next page)
Nettrix
R620 G30 (Intel Xeon Gold 5218R)

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

---

**Platform Notes (Continued)**

```
cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd
avx512bw avx512vl xsaveopt xsavec xgetbv1 xsave esqm_llc esqm_occup_llc esqm_mbm_total
esqm_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni flush_l1d
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: 4 nodes (0-3)
node 0 cpus: 0 1 2 5 6 10 11 12 15 16
node 0 size: 95094 MB
node 0 free: 91803 MB
node 1 cpus: 3 4 7 8 9 13 14 17 18 19
node 1 size: 96765 MB
node 1 free: 88979 MB
node 2 cpus: 20 21 22 25 26 30 31 32 35 36
node 2 size: 96765 MB
node 2 free: 93918 MB
node 3 cpus: 23 24 27 28 29 33 34 37 38 39
node 3 size: 96740 MB
node 3 free: 95089 MB
node distances:
node 0 1 2 3
0: 10 11 21 21
1: 11 10 21 21
2: 21 21 10 11
3: 21 21 11 10
```

From `/proc/meminfo`
```
MemTotal:       394615764 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)
```

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

- `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
  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 14 20:51**

**SPEC is set to:** /home/admin/benchmarks/cpu2017
- Filesysterm Type Size Used Avail Use% Mounted on
  - /dev/sda5 xfs 877G 133G 744G 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     | 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,**

*(Continued on next page)*
Nettrix
R620 G30 (Intel Xeon Gold 5218R)  

| SPECspeed®2017_fp_base = 130 | SPECspeed®2017_fp_peak = 131 |

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<td>Software Availability: Apr-2020</td>
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Nettrix
R620 G30 (Intel Xeon Gold 5218R)

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</table>
```

### Compiler Version Notes (Continued)

Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
C++, C, Fortran | 607.cactuBSSN_s(base, peak)
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
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.
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.
==============================================================================
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 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 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 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
```

### Base Compiler Invocation

C benchmarks:
icc

Fortran benchmarks:
ifort

(Continued on next page)
Base Compiler Invocation (Continued)

Benchmarks using both Fortran and C:

ifort icc

Benchmarks using Fortran, C, and C++:

icpc icc ifort

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.hm_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:

-m64 -std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
 -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
 -mbranches-within-32B-boundaries

Fortran benchmarks:

-m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3
 -no-prec-div -qopt-prefetch -ffinite-math-only
 -qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs
 -mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib
       -ljemalloc

Benchmarks using both Fortran and C:

-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
 -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
 -DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs
 -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

(Continued on next page)
## SPEC CPU®2017 Floating Point Speed Result

**Nettrix**

**R620 G30 (Intel Xeon Gold 5218R)**

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

### Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++:
- `-m64`  
- `-std=c11`  
- `-Wl,-z,muldefs`  
- `-xCORE-AVX512`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=4`  
- `-qopenmp`  
- `-DSPEC_OPENMP`  
- `-mbranches-within-32B-boundaries`  
- `-nostandard-realloc-lhs`  
- `-L/usr/local/jemalloc64-5.0.1/lib`  
- `-ljemalloc`

### Peak Compiler Invocation

**C benchmarks:**  
`icc`

**Fortran benchmarks:**  
`ifort`

**Benchmarks using both Fortran and C:**  
`ifort icc`

**Benchmarks using Fortran, C, and C++:**  
`icpc icc ifort`

### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

**C benchmarks:**

- `619.lbm_s`: `basepeak = yes`
- `638.imagick_s`: `basepeak = yes`

- `644.nab_s`: `-m64`  
- `-std=c11`  
- `-Wl,-z,muldefs`  
- `-xCORE-AVX512`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`  
- `-qopt-prefetch`  
- `-ffinite-math-only`  
- `-qopt-mem-layout-trans=4`  
- `-qopenmp`  
- `-DSPEC_OPENMP`  
- `-mbranches-within-32B-boundaries`  
- `-L/usr/local/jemalloc64-5.0.1/lib`  
- `-ljemalloc`

**Fortran benchmarks:**

(Continued on next page)
### SPEC CPU®2017 Floating Point Speed Result

**Nettrix**

**R620 G30 (Intel Xeon Gold 5218R)**

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

#### Peak Optimization Flags (Continued)

603.bwaves_s: -m64 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -ipo -xCORE-AVX512
-03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

649.fotonik3d_s: Same as 603.bwaves_s

654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf_s: -m64 -std=c11 -Wl,-z,muldefs -prof-gen(pass 1)
-prof-use(pass 2) -ipo -xCORE-AVX512 -03 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-mbranches-within-32B-boundaries -nostandard-realloc-lhs
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

627.cam4_s: basepeak = yes

628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: 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.

Tested with SPEC CPU®2017 v1.1.0 on 2020-07-15 03:23:51-0400.
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