Nettrix
R620 G30 (Intel Xeon Platinum 8280)

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

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SPEC CPU®2017 Floating Point Speed Result

**Nettrix**

**R620 G30 (Intel Xeon Platinum 8280)**

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>56</td>
<td>169</td>
<td>170</td>
</tr>
</tbody>
</table>

**Threads**

- 603.bwaves_s 56
- 607.cactuBSSN_s 56
- 619.lbm_s 56
- 621.wrf_s 56
- 627.cam4_s 56
- 628.pop2_s 56
- 638.imagick_s 56
- 644.nab_s 56
- 649.fotonik3d_s 56
- 654.roms_s 56

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**Hardware**

**CPU Name:** Intel Xeon Platinum 8280
**Max MHz:** 4000
**Nominal:** 2700
**Enabled:** 56 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:** 38.5 MB I+D on chip per chip
**Other:** None
**Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-3200AA-R, running at 2667)
**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:** 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.

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**Test Date:** Jun-2020
**Hardware Availability:** May-2020
**Software Availability:** Apr-2020
### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
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<th>Seconds</th>
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<th>Seconds</th>
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<th>Seconds</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
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<td>44.4</td>
<td>118</td>
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<td>118</td>
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<td>117</td>
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<tr>
<td>621.wrf_s</td>
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<td>86.3</td>
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<td>62.3</td>
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<td>64.6</td>
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<tr>
<td>638.imagick_s</td>
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<td>354</td>
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<td>649.fotonik3d_s</td>
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<td>180</td>
<td>87.2</td>
<td>181</td>
<td>87.9</td>
<td>179</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"
- `MALLOCONF = "retain: true"`

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

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| SPECspeed®2017_fp_base = 169 |
| SPECspeed®2017_fp_peak = 170 |

**CPU2017 License:** 6138

**Test Sponsor:** Nettrix

**Test Date:** Jun-2020

**Tested by:** Nettrix

**Hardware Availability:** May-2020

**Software Availability:** Apr-2020

---

**Environment Variables Notes (Continued)**

OMP_STACKSIZE = "192M"

---

**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

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 Latency Mode

Hyper-Thread 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

Rev: r6365 of 2019-08-21 295195f888a3d7ed6e46a485a0011

running on localhost.localdomain Sun Jun  7 01:12:01 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

(Continued on next page)
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Platform Notes (Continued)

From /proc/cpuinfo

model name : Intel(R) Xeon(R) Platinum 8280 CPU @ 2.70GHz
2 "physical id"s (chips)
56 "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 : 28
siblings : 28
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27 28 29 30

From lscpu:

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 56
On-line CPU(s) list: 0-55
Thread(s) per core: 1
Core(s) per socket: 28
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8280 CPU @ 2.70GHz
Stepping: 6
CPU MHz: 3159.405
CPU max MHz: 4000.0000
CPU min MHz: 1000.0000
BogoMIPS: 5400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 39424K
NUMA node0 CPU(s): 0-27
NUMA node1 CPU(s): 28-55
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 rdtrunc
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfperf pni pclmulqdq dtes64 monitor ds_cpl vmx est tm2 ssse3 sdbg fma cx16
xtrunc 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
invvpcl_single intel_pppin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm

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Platform Notes (Continued)

cqm mpx rdt_a avx512f avx512dq rsseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsaves xgetbv1 xsave vmm svm cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local dtherm ida arat pln pts pku ospke avx512_vnni flush_lid arch_capabilities

/proc/cpuinfo cache data
  cache size : 39424 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 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
  node 0 size: 191859 MB
  node 0 free: 191187 MB
  node 1 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
  node 1 size: 193505 MB
  node 1 free: 192833 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 394613372 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
  x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

(Continued on next page)
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Platform Notes (Continued)

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 Jun 7 01:04

SPEC is set to: /home/admin/benchmarks/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda5 xfs 877G 109G 768G 13% /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,  |
| Version 19.1.1.217 Build 20200306 |
| Copyright (C) 1985-2020 Intel Corporation. All rights reserved. |
==============================================================================

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

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Compiler Version Notes (Continued)

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
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Base 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
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## Base Portability Flags

- 603.bwaves_s: -DSPEC_LP64
- 607.cactuBSSN_s: -DSPEC_LP64
- 619.libm_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 byte_recl
- 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 -fL,-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 -fL,-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

### Benchmarks using Fortran, C, and C++:

- -m64 -std=c11 -fL,-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

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SPECspeed®2017_fp_base = 169
SPECspeed®2017_fp_peak = 170

Peak Compiler Invocation (Continued)

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 -gopenmp -DSPEC_OPENMP
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:
603.bwaves_s: -m64 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -ipo -xCORE-AVX512
-O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -gopenmp -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

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Peak Optimization Flags (Continued)

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 -O3 -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 2020-06-06 13:12:01-0400.
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