## SPEC CPU®2017 Integer Speed Result

**NEC Corporation**

**Express5800/R120h-1M (Intel Xeon Gold 6238L)**

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base = 9.50</th>
<th>SPECspeed®2017_int_peak = 9.64</th>
</tr>
</thead>
</table>

### CPU2017 License: 9006
Test Sponsor: NEC Corporation
Tested by: NEC Corporation

<table>
<thead>
<tr>
<th>Threads</th>
<th>2017_int_base</th>
<th>2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s 88</td>
<td>7.09</td>
<td>8.66</td>
</tr>
<tr>
<td>602.gcc_s 88</td>
<td>8.90</td>
<td>11.5</td>
</tr>
<tr>
<td>605.mcf_s 88</td>
<td>11.6</td>
<td>13.6</td>
</tr>
<tr>
<td>620.omnetpp_s 88</td>
<td>8.11</td>
<td>11.4</td>
</tr>
<tr>
<td>623.xalancbmk_s 88</td>
<td>11.4</td>
<td>14.8</td>
</tr>
<tr>
<td>625.x264_s 88</td>
<td>13.6</td>
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<tr>
<td>631.deepsjeng_s 88</td>
<td>5.15</td>
<td>8.90</td>
</tr>
<tr>
<td>641.leela_s 88</td>
<td>4.33</td>
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</tr>
<tr>
<td>648.exchange2_s 88</td>
<td>4.33</td>
<td>4.33</td>
</tr>
<tr>
<td>657.xz_s 88</td>
<td>22.8</td>
<td>22.8</td>
</tr>
</tbody>
</table>

---

### Hardware

<table>
<thead>
<tr>
<th>CPU Name: Intel Xeon Gold 6238L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz: 3700</td>
</tr>
<tr>
<td>Nominal: 2100</td>
</tr>
<tr>
<td>Enabled: 44 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable: 1.2 chips</td>
</tr>
<tr>
<td>Cache L1: 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2: 1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3: 30.25 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other: None</td>
</tr>
<tr>
<td>Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R)</td>
</tr>
<tr>
<td>Storage: 1 x 1 TB SATA, 7200 RPM, RAID 0</td>
</tr>
<tr>
<td>Other: None</td>
</tr>
</tbody>
</table>

### Software

| OS: Red Hat Enterprise Linux Server release 7.7 (Maipo) |
| Compiler: C/C++: Version 19.0.4.227 of Intel C/C++ Compiler Build 20190416 for Linux; Fortran: Version 19.0.4.227 of Intel Fortran Compiler Build 20190416 for Linux |
| Parallel: Yes |
| Firmware: NEC BIOS Version U32 v2.32 03/09/2020 released Jun-2020 |
| File System: ext4 |
| 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. |

---

Test Date: Sep-2020
Hardware Availability: Dec-2019
Software Availability: Sep-2019
## NEC Corporation

Express5800/R120h-1M (Intel Xeon Gold 6238L)

### SPEC CPU®2017 Integer Speed Result

<table>
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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>88.0</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>88</td>
<td>289</td>
<td>6.15</td>
<td>287</td>
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<td>447</td>
<td>8.90</td>
<td>8.92</td>
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<td>605.mcf_s</td>
<td>88</td>
<td>409</td>
<td>11.5</td>
<td>409</td>
<td>11.5</td>
<td>425</td>
<td>11.1</td>
<td>406</td>
<td>11.6</td>
<td>403</td>
<td>11.7</td>
<td>406</td>
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<td>88</td>
<td>196</td>
<td>8.31</td>
<td>201</td>
<td>8.11</td>
<td>206</td>
<td>7.92</td>
<td>196</td>
<td>8.31</td>
<td>201</td>
<td>8.11</td>
<td>206</td>
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<td>271</td>
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<td>22.6</td>
<td>271</td>
<td>22.8</td>
<td>271</td>
<td>22.8</td>
<td>274</td>
</tr>
</tbody>
</table>

### 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:
- KMP_AFFINITY = "granularity=fine,scatter"
- LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
- OMP_STACKSIZE = "192M"

### General Notes

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5

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
```

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.

jemalloc, a general purpose malloc implementation

(Continued on next page)
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CPU2017 License: 9006
Test Sponsor: NEC Corporation
Test Date: Sep-2020
Hardware Availability: Dec-2019
Tested by: NEC Corporation
Software Availability: Sep-2019

General Notes (Continued)
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS Settings:
Thermal Configuration: Maximum Cooling
Workload Profile: General Peak Frequency Compute
Memory Patrol Scrubbing: Disabled
LLC Dead Line Allocation: Disabled
LLC Prefetch: Enabled
Enhanced Processor Performance: Enabled
Workload Profile: Custom
Advanced Memory Protection: Advanced ECC Support
NUMA Group Size Optimization: Flat

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
running on r120h1m Wed Sep 30 16:53:34 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) Gold 6238L CPU @ 2.10GHz
  2 "physical id"s (chips)
  88 "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 : 22
siblings : 44
physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 88
On-line CPU(s) list: 0-87
Thread(s) per core: 2
Core(s) per socket: 22
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel

(Continued on next page)
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Test Date: Sep-2020
Hardware Availability: Dec-2019
Software Availability: Sep-2019

Platform Notes (Continued)

CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6238L CPU @ 2.10GHz
Stepping: 7
CPU MHz: 2100.000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 30976K
NUMA node0 CPU(s): 0-21,44-65
NUMA node1 CPU(s): 22-43,66-87
Flags: fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dtes64 mtrr pge mca cmov(pat pse36 clflush dtes64 mtrr pge mca cmov(pat pse36 clflush dtes64 mtrr pge mca cmov(pat pse36 clflush dtes64 mtrr pge mca cmov(pat pse36 clflush dtes64 mtrr pge mca cmov(pat pse36 clflush dtes64 mtrr pge mca cmov(pat pse36 clflush dtes64 mtrr pge mca cmov(pat pse36 clflush dtes64 mtrr pge mca cmov(pat pse36 clflush dtes64 mtrr pge mca cmov(pat pse36 clflush dtes64 mtrr pge mca cmov(pat pse36 clflush dtes64 mtrr pge mca cmov(pat pse36 clflush dtes64 mtrr pge mca cmov(pat pse36 clflush dtes64 mtrr pge mca cmov(pat pse36 clflush dtes64 mtrr pge mca cmov(pat pse36 clflush dtes64 mtrr pge mca cmov

/proc/cpuinfo cache data
cache size: 30976 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 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65
node 0 size: 196264 MB
node 0 free: 191582 MB
node 1 cpus: 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87
node 1 size: 196607 MB
node 1 free: 191945 MB
node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 395915592 KB

(Continued on next page)
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Platform Notes (Continued)

HugePages_Total:       0
Hugepagesize:       2048 kB

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

os-release:
    NAME="Red Hat Enterprise Linux Server"
    VERSION="7.7 (Maipo)"
    ID="rhel"
    ID_LIKE="fedora"
    VARIANT="Server"
    VARIANT_ID="server"
    VERSION_ID="7.7"
    PRETTY_NAME="Red Hat Enterprise Linux Server 7.7 (Maipo)"
    redhat-release: Red Hat Enterprise Linux Server release 7.7 (Maipo)
    system-release: Red Hat Enterprise Linux Server release 7.7 (Maipo)
    system-release-cpe: cpe:/o:redhat:enterprise_linux:7.7:ga:server

uname -a:
    Linux r120h1m 3.10.0-1062.1.1.el7.x86_64 #1 SMP Tue Aug 13 18:39:59 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: Not affected
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: Load fences, usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Full retpoline, IBPB

run-level 3 Sep 30 16:47

SPEC is set to: /home/cpu2017
    Filesystem  Type    Size  Used Avail Use% Mounted on
    /dev/sda3    ext4  908G  183G  680G  22% /

From /sys/devices/virtual/dmi/id
    BIOS: NEC U32 03/09/2020
    Vendor: NEC
    Product: Express5800/R120h-1M
    Serial: JPN0084094

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

(Continued on next page)
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Platform Notes (Continued)

frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
Memory:
24x HPE P03050-091 16 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

C
600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(base, peak)

Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

C++
620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Fortran
648.exchange2_s(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64
## NEC Corporation

**Express5800/R120h-1M (Intel Xeon Gold 6238L)**

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<td><strong>Software Availability:</strong> Sep-2019</td>
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### Base Portability Flags

- `600.perlbench_s`: `-DSPEC_LP64 -DSPEC_LINUX_X64`
- `602.gcc_s`: `-DSPEC_LP64`
- `605.mcf_s`: `-DSPEC_LP64`
- `620.omnetpp_s`: `-DSPEC_LP64`
- `623.xalancbmk_s`: `-DSPEC_LP64 -DSPEC_LINUX`
- `625.x264_s`: `-DSPEC_LP64`
- `631.deepsjeng_s`: `-DSPEC_LP64`
- `641.leela_s`: `-DSPEC_LP64`
- `648.exchange2_s`: `-DSPEC_LP64`
- `657.xz_s`: `-DSPEC_LP64`

### Base Optimization Flags

**C benchmarks:**

- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
- `-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP`
- `-L/usr/local/je5.0.1-64/lib -ljemalloc`

**C++ benchmarks:**

- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`
- `-qopt-mem-layout-trans=4`
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64 -lqkmalloc`

**Fortran benchmarks:**

- `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4`
- `-nostandard-realloc-lhs`

### Peak Compiler Invocation

**C benchmarks:**

- `icc -m64 -std=c11`

**C++ benchmarks:**

- `icpc -m64`

**Fortran benchmarks:**

- `ifort -m64`
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- **Software Availability:** Sep-2019

### Peak Portability Flags

Same as Base Portability Flags

### Peak Optimization Flags

#### C benchmarks:

- `600.perlbench_s`: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2`  
  `-xCORE-AVX512 -qopt-mem-layout-trans=4 -ipo -O3`  
  `-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp`  
  `-DSPEC_OPENMP -fno-strict-overflow`  
  `-L/usr/local/je5.0.1-64/lib -ljemalloc`

- `602.gcc_s`: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2`  
  `-xCORE-AVX512 -qopt-mem-layout-trans=4 -ipo -O3`  
  `-no-prec-div -DSPEC_SUPPRESS_OPENMP`  
  `-L/usr/local/je5.0.1-64/lib -ljemalloc`

- `605.mcf_s`: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo`  
  `-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4`  
  `-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP`  
  `-L/usr/local/je5.0.1-64/lib -ljemalloc`

- `625.x264_s`: `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`  
  `-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP`  
  `-L/usr/local/je5.0.1-64/lib -ljemalloc`

- `657.xz_s`: `basepeak = yes`

#### C++ benchmarks:

- `620.omnetpp_s`: `basepeak = yes`

- `623.xalancbmk_s`: `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`  
  `-qopt-mem-layout-trans=4`  
  `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64 -lqkmalloc`

- `631.deepsjeng_s`: Same as `623.xalancbmk_s`

- `641.leela_s`: Same as `623.xalancbmk_s`

#### Fortran benchmarks:

- `-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4`  
  `-nostandard-realloc-lhs`
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The flags files that were used to format this result can be browsed at:
http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-V1.2-R120h-RevE.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-V1.2-R120h-RevE.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 2020-09-30 03:53:34-0400.
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