NEC Corporation

**Express5800/R120h-1M (Intel Xeon Gold 6230)**

| SPECspeed®2017_int_base = 9.87 |
| SPECspeed®2017_int_peak = 10.0 |

**CPU2017 License:** 9006  
**Test Sponsor:** NEC Corporation  
**Tested by:** NEC Corporation  
**Test Date:** Jul-2020  
**Hardware Availability:** Dec-2019  
**Software Availability:** Sep-2019

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<tr>
<th>Threads</th>
<th>SPECspeed®2017_int_base (9.87)</th>
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<td>602.gcc_s 80</td>
<td>9.18</td>
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<td>605.mcf_s 80</td>
<td>12.0</td>
<td>12.2</td>
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<tr>
<td>620.omnetpp_s 80</td>
<td>8.20</td>
<td>11.9</td>
</tr>
<tr>
<td>623.xalancbmk_s 80</td>
<td>12.0</td>
<td>12.0</td>
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<tr>
<td>625.x264_s 80</td>
<td>5.37</td>
<td>14.2</td>
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<td>631.deepsjeng_s 80</td>
<td>5.38</td>
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<tr>
<td>641.leela_s 80</td>
<td>4.56</td>
<td>15.6</td>
</tr>
<tr>
<td>648.exchange2_s 80</td>
<td>4.57</td>
<td>15.6</td>
</tr>
<tr>
<td>657.xz_s 80</td>
<td>23.2</td>
<td>23.2</td>
</tr>
</tbody>
</table>

**Hardware**

**CPU Name:** Intel Xeon Gold 6230  
**Max MHz:** 3900  
**Nominal:** 2100  
**Enabled:** 40 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:** 27.5 MB I+D on chip per chip  
**Other:** None  
**Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R)  
**Storage:** 1 x 1 TB SATA, 7200 RPM, RAID 0  
**Other:** None

**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.
## NEC Corporation

**Express5800/R120h-1M (Intel Xeon Gold 6230)**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base</th>
<th>Peak</th>
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**Tested by:** NEC Corporation  
**Test Date:** Jul-2020  
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### Results Table

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<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>80</td>
<td>276</td>
<td>6.43</td>
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<td>6.48</td>
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<td>6.44</td>
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<td>434</td>
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<td>433</td>
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<td>455</td>
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<td>mcf_s</td>
<td>80</td>
<td>394</td>
<td>12.0</td>
<td>408</td>
<td>11.6</td>
<td>393</td>
<td>12.0</td>
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<td>omnetpp_s</td>
<td>80</td>
<td>200</td>
<td>8.14</td>
<td>197</td>
<td>8.27</td>
<td>200</td>
<td>8.14</td>
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<tr>
<td>xalanchmk_s</td>
<td>80</td>
<td>118</td>
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<td>11.9</td>
<td>118</td>
<td>12.0</td>
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<td>x264_s</td>
<td>80</td>
<td>124</td>
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<tr>
<td>deepsjeng_s</td>
<td>80</td>
<td>267</td>
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<td>5.33</td>
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<td>exchange2_s</td>
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<td>15.5</td>
<td>188</td>
<td>15.6</td>
</tr>
<tr>
<td>xz_s</td>
<td>80</td>
<td>269</td>
<td>23.2</td>
<td>266</td>
<td>23.2</td>
<td>266</td>
<td>23.2</td>
</tr>
</tbody>
</table>

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

### 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

Files system 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)
SPEC CPU®2017 Integer Speed Result
Copyright 2017-2020 Standard Performance Evaluation Corporation

NEC Corporation
Express5800/R120h-1M (Intel Xeon Gold 6230)

SPECspeed®2017_int_base = 9.87
SPECspeed®2017_int_peak = 10.0

CPU2017 License: 9006
Test Sponsor: NEC Corporation
Test Date: Jul-2020
Tested by: NEC Corporation
Hardware Availability: Dec-2019
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 295195f888a3d7ed1e6e46a485a0011
running on r120h1m Wed Jul 22 14:25:37 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 6230 CPU @ 2.10GHz
  2 "physical id"s (chips)
  80 "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
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): 80
On-line CPU(s) list: 0-79
Thread(s) per core: 2
Core(s) per socket: 20
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel

(Continued on next page)
NEC Corporation

Express5800/R120h-1M (Intel Xeon Gold 6230)

| CPU2017 License | NEC Corporation
| Test Sponsor  | NEC Corporation
| Tested by     | NEC Corporation

**SPEC CPU®2017 Integer Speed Result**

| SPECspeed®2017_int_base = 9.87 |
| SPECspeed®2017_int_peak = 10.0 |

**CPU family**: 6
**Model**: 85
**Model name**: Intel(R) Xeon(R) Gold 6230 CPU @ 2.10GHz

**CPU MHz**: 2100.000
**BogoMIPS**: 4200.00
**Virtualization**: VT-x
**L1d cache**: 32K
**L1i cache**: 32K
**L2 cache**: 1024K
**L3 cache**: 28160K

**NUMA node0 CPU(s)**: 0-19,40-59
**NUMA node1 CPU(s)**: 20-39,60-79

**Flags**: fpu vme de pse tsc msr pae mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpes1gb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good xtopology nonstop_tsc aperffmr perf eagerfpu 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 epb cat_13 cdp l3 invvpclimd_single intel_pinn intel_pt ssbd mba ibrs ibbp stibp ibrs enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bml1 hle avx2 smep bmi2 erms invvpclmd rtm cmx mp px rt delivered avx512f avx512dq rdseed adx smap clflushopt clwb avx512bw avx512vl lsa sno opt xsaveopt xsavevc xgetbv1 cmq_llc cmq_occup_llc cmq_mbm_total cmq_mbm_local dtherm ida arat pin pts pku ospke avx512_vnni md_clear spec_ctrl intel_stibp 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: 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 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59
  - node 0 size: 196264 MB
  - node 0 free: 191538 MB
  - node 1 cpus: 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79
  - node 1 size: 196607 MB
  - node 1 free: 192015 MB
  - node distances:
    - 0: 10 21
    - 1: 21 10

From /proc/meminfo

- MemTotal: 395916808 KB

(Continued on next page)
NEC Corporation

Express5800/R120h-1M (Intel Xeon Gold 6230)

SPECSpeed®2017_int_base = 9.87
SPECSpeed®2017_int_peak = 10.0

Platform Notes (Continued)

HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
o-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 Jul 22 14:19

SPEC is set to: /home/cpu2017
Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda3      ext4  908G  181G  682G  21% /

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)
NEC Corporation

Express5800/R120h-1M (Intel Xeon Gold 6230)

| SPECspeed²017_int_base = 9.87 |
| SPECspeed²017_int_peak = 10.0 |

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

Test Date: Jul-2020
Hardware Availability: Dec-2019
Software Availability: Sep-2019

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 6230)**

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<tr>
<th>CPU2017 License</th>
<th>Test Sponsor</th>
<th>Tested by</th>
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<th>SPECspeed(^{\text{2017_int_peak}})</th>
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<td>NEC Corporation</td>
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### SPEC CPU\(^{\text{2017\_int\_base}}\) Result

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

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

NEC Corporation
Express5800/R120h-1M (Intel Xeon Gold 6230)

SPECspeed®2017_int_base = 9.87
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CPU2017 License: 9006
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Test Date: Jul-2020
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Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
600.perlbench
- 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
- 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
- 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
- Wl,-z,muldefs -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
- L/usr/local/je5.0.1-64/lib -ljemalloc

657.xz
- basepeak = yes

C++ benchmarks:
620.omnetpp
- basepeak = yes

623.xalancbmk

631.deepsjeng
- Same as 623.xalancbmk

641.leela
- Same as 623.xalancbmk

Fortran benchmarks:
- xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4 -nostandard-realloc-lhs
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You can also download the XML flags sources by saving the following links:


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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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