NEC Corporation
Express5800/D120h (Intel Xeon Gold 6130)

CPU2017 License: 9006  Test Date:  Jul-2018
Test Sponsor: NEC Corporation  Hardware Availability: Jan-2018
Tested by: NEC Corporation  Software Availability: Mar-2018

Hardware
CPU Name: Intel Xeon Gold 6130
Max MHz.: 3700
Nominal: 2100
Enabled: 16 cores, 1 chip, 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: 22 MB I+D on chip per chip
Other: None
Memory: 192 GB (6 x 32 GB 2Rx4 PC4-2666V-R)
Storage: 1 x 1 TB SATA, 7200 RPM
Other: None

Software
OS: Red Hat Enterprise Linux Server release 7.4 (Maipo)
Kernel 3.10.0-693.21.1.el7.x86_64
Compiler: C/C++: Version 18.0.0.128 of Intel C/C++ Compiler for Linux;
Fortran: Version 18.0.0.128 of Intel Fortran Compiler for Linux
Parallel: No
Firmware: Version F21 02/22/2018 released Apr-2018
File System: ext4
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: jemalloc memory allocator library V5.0.1
## NEC Corporation

Expression5800/D120h (Intel Xeon Gold 6130)

**SPECrate2017_int_base = 82.2**

**SPECrate2017_int_peak = 87.1**

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### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
<th>Seconds</th>
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<tbody>
<tr>
<td>500.perlbench</td>
<td>32</td>
<td>796</td>
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<td>502.gcc</td>
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<td>623</td>
<td>72.7</td>
<td>625</td>
<td>72.5</td>
<td>632</td>
<td>71.7</td>
<td>32</td>
<td>529</td>
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<td>505.mcf</td>
<td>32</td>
<td>499</td>
<td>104</td>
<td>505</td>
<td>102</td>
<td>514</td>
<td>101</td>
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<tr>
<td>520.omnetpp</td>
<td>32</td>
<td>797</td>
<td>52.7</td>
<td>798</td>
<td>52.6</td>
<td>808</td>
<td>52.0</td>
<td>32</td>
<td>797</td>
</tr>
<tr>
<td>523.xalancbmk</td>
<td>32</td>
<td>396</td>
<td>85.2</td>
<td>397</td>
<td>85.1</td>
<td>399</td>
<td>84.6</td>
<td>32</td>
<td>336</td>
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<td>525.x264</td>
<td>32</td>
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<td>159</td>
<td>356</td>
<td>158</td>
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<td>32</td>
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<td>72.5</td>
<td>515</td>
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<td>532</td>
<td>158</td>
<td>32</td>
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<tr>
<td>557.xz</td>
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<td>616</td>
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<td>32</td>
<td>566</td>
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**SPECrate2017_int_base = 82.2**

**SPECrate2017_int_peak = 87.1**

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

### 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"

### General Notes

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

```
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
```

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM

memory using Redhat Enterprise Linux 7.4

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: configured and built at default for 32bit (i686) and 64bit (x86_64) targets;

jemalloc: built with the RedHat Enterprise 7.4, and the system compiler gcc 4.8.5;


Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)

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**SPEC CPU2017 Integer Rate Result**

**NEC Corporation**

**Express5800/D120h (Intel Xeon Gold 6130)**

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**General Notes (Continued)**

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.

**Platform Notes**

BIOS Settings:
- ENERGY_PERF_BIAS_CFG mode: Performance
- SNC: Enable
- IMC Interleaving: 1-way Interleave
- LLC dead line alloc: Disable
- Patrol Scrub: Disable

Sysinfo program: /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on d120h Fri Jul 20 17:46:49 2018

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 6130 CPU @ 2.10GHz
  1 "physical id"s (chips)
  32 "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 : 16
siblings : 32
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
```

From lscpu:
```
Architecture:        x86_64
CPU op-mode(s):      32-bit, 64-bit
Byte Order:          Little Endian
CPU(s):              32
On-line CPU(s) list: 0-31
Thread(s) per core: 2
Core(s) per socket: 16
Socket(s):           1
NUMA node(s):        2
Vendor ID:           GenuineIntel
CPU family:          6
Model:               85
```

(Continued on next page)
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Platform Notes (Continued)

Model name: Intel(R) Xeon(R) Gold 6130 CPU @ 2.10GHz
Stepping: 4
CPU MHz: 2891.109
CPU max MHz: 3700.0000
CPU min MHz: 1000.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 2048K
L3 cache: 22528K
NUMA node0 CPU(s): 0-3,8-11,16-19,24-27
NUMA node1 CPU(s): 4-7,12-15,20-23,28-31
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 pdpe1gb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good xtopology nonstop_tsc aperfmperf eagerfpu pai pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 fma cx16 xtopr pdcm pccd dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx fl64 rdrand lahf_lm abm 3dnowprefetch epb cat_l3 cdp_l3 invpcid_single intel_pt spec_ctrl ibpb_support tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdtd a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cqmm llc cqmm_occup_llc cqmm_mbmeta cqmm_mbmeta lctx dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req

From /proc/cpuinfo cache data

   cache size: 22528 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 8 9 10 11 16 17 18 19 24 25 26 27
   node 0 size: 96932 MB
   node 0 free: 94222 MB
   node 1 cpus: 4 5 6 7 12 13 14 15 20 21 22 23 28 29 30 31
   node 1 size: 98304 MB
   node 1 free: 95738 MB
   node distances:
   node 0 1
   0: 10 11
   1: 11 10

From /proc/meminfo

   MemTotal: 196476032 kB
   HugePages_Total: 0
   Hugepagesize: 2048 kB

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Platform Notes (Continued)

From /etc/*release* /etc/*version*
  os-release:
    NAME="Red Hat Enterprise Linux Server"
    VERSION="7.4 (Maipo)"
    ID="rhel"
    ID_LIKE="fedora"
    VARIANT="Server"
    VARIANT_ID="server"
    VERSION_ID="7.4"
    PRETTY_NAME="Red Hat Enterprise Linux Server 7.4 (Maipo)"
  redhat-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
  system-release: Red Hat Enterprise Linux Server release 7.4 (Maipo)
  system-release-cpe: cpe:/o:redhat:enterprise_linux:7.4:ga:server

uname -a:
  Linux d120h 3.10.0-693.21.1.el7.x86_64 #1 SMP Fri Feb 23 18:54:16 UTC 2018 x86_64
  x86_64 x86_64 GNU/Linux

run-level 3 Jul 20 17:41

SPEC is set to: /home/cpu2017
  Filesystem   Type  Size  Used  Avail  Use% Mounted on
  /dev/sda3     ext4  909G  404G  458G  47% /

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.
  BIOS GIGABYTE F21 02/22/2018
  Memory:
    10x NO DIMM NO DIMM
    6x Samsung M393A4K40BB2-CTD 32 GB 2 rank 2666

(End of data from sysinfo program)

Compiler Version Notes
==============================================================================
  CC  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
      525.x264_r(base, peak) 557.xz_r(base, peak)
==============================================================================
  icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================

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Compiler Version Notes (Continued)

CC  500.perlbench_r(peak) 502.gcc_r(peak)

icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(base)

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

CXXC 520.omnetpp_r(peak) 523.xalancbmk_r(peak) 531.deepsjeng_r(peak) 541.leela_r(peak)

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

FC  548.exchange2_r(base, peak)

ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Base Portability Flags

500.perlbench_r: −DSPEC_LP64 −DSPEC_LINUX_X64

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Base Portability Flags (Continued)

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:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -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=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc

Base Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

Peak Compiler Invocation

C benchmarks:
icc

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## SPEC CPU2017 Integer Rate Result

**NEC Corporation**

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### Peak Compiler Invocation (Continued)

C++ benchmarks:
- icpc

Fortran benchmarks:
- ifort

### Peak Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
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<tr>
<td>500.perlbench_r:</td>
<td>-DSPEC_LP64 -DSPEC_LINUX_X64</td>
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<tr>
<td>502.gcc_r:</td>
<td>-D_FILE_OFFSET_BITS=64</td>
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<tr>
<td>505.mcf_r:</td>
<td>-DSPEC_LP64</td>
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<td>520.omnetpp_r:</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>523.xalanchmk_r:</td>
<td>-D_FILE_OFFSET_BITS=64 -DSPEC_LINUX</td>
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<td>525.x264_r:</td>
<td>-DSPEC_LP64</td>
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<td>557.xz_r:</td>
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### Peak Optimization Flags

C benchmarks:

- `500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3 -fno-strict-overflow -L/usr/local/je5.0.1-64/lib -ljemalloc`
- `505.mcf_r: basepeak = yes`
- `525.x264_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=3 -fno-alias -L/usr/local/je5.0.1-64/lib -ljemalloc`
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#### Peak Optimization Flags (Continued)

```plaintext
557.xz_r: basepeak = yes

C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: -L/opt/intel/compilers_and_libraries_2018/linux/lib/ia32  
-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-L/usr/local/je5.0.1-32/lib -ljemalloc

531.deepsjeng_r: basepeak = yes

541.leela_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo  
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=3  
-L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte  
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

#### Peak Other Flags

**C benchmarks (except as noted below):**

-m64 -std=c11

502.gcc_r: -m32 -std=c11

**C++ benchmarks (except as noted below):**

-m64

523.xalancbmk_r: -m32

**Fortran benchmarks:**

-m64

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The flags files that were used to format this result can be browsed at:

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You can also download the XML flags sources by saving the following links:

- [Intel ic18.0 official Linux64 2017-10-19.xml](http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-10-19.xml)
- [NEC Platform Settings V1.2-D120h-RevA.xml](http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-V1.2-D120h-RevA.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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