NEC Corporation

Express5800/R120h-1M (Intel Xeon Gold 5122)

SPECrate2017_int_base = 28.6
SPECrate2017_int_peak = 30.2

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

Hardware
CPU Name: Intel Xeon Gold 5122
Max MHz.: 3700
Nominal: 3600
Enabled: 4 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: 16.5 MB I+D on chip per chip
Other: None
Memory: 96 GB (12 x 8 GB 2Rx8 PC4-2666V-R)
Storage: 1 x 1 TB SATA, 7200 RPM, RAID 0
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: NEC BIOS Version U32 02/14/2018 released Mar-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

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500.perlbench_r 8
502.gcc_r 8
505.mcf_r 8
520.omnetpp_r 8
523.xalancbmk_r 8
525.x264_r 8
531.deepsjeng_r 8
541.leela_r 8
548.exchange2_r 8
557.xz_r 8

SPECratenum_int_base (28.6)
SPECratenum_int_peak (30.2)
## Results Table

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<thead>
<tr>
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</table>

**SPECrate2017_int_base = 28.6**

**SPECrate2017_int_peak = 30.2**

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;

(Continued on next page)
NEC Corporation
Express5800/R120h-1M (Intel Xeon Gold 5122)

SPECrate2017_int_base = 28.6
SPECrate2017_int_peak = 30.2

General Notes (Continued)

Yes: 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.

Platform Notes

BIOS Settings:
Workload Profile: General Throughput Compute
Thermal Configuration: Maximum Cooling
LLC Prefetch: Enabled
LLC Dead Line Allocation: Disabled
Memory Patrol Scrubbing: Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on r120h1m Sat May 12 18:30:42 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 5122 CPU @ 3.60GHz
 1 "physical id"s (chips)
 8 "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 : 4
siblings : 8
physical 0: cores 2 3 4 10

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 8
On-line CPU(s) list: 0-7
Thread(s) per core: 2
Core(s) per socket: 4
Socket(s): 1
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6

(Continued on next page)
SPEC CPU2017 Integer Rate Result

NEC Corporation

Express5800/R120h-1M (Intel Xeon Gold 5122)

| SPECrate2017_int_base | 28.6 |
| SPECrate2017_int_peak | 30.2 |

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

Platform Notes (Continued)

| Model: | 85 |
| Model name: | Intel(R) Xeon(R) Gold 5122 CPU @ 3.60GHz |
| Stepping: | 4 |
| CPU MHz: | 3600.000 |
| BogoMIPS: | 7200.00 |
| Virtualization: | VT-x |
| L1d cache: | 32K |
| L1i cache: | 32K |
| L2 cache: | 1024K |
| L3 cache: | 16896K |
| NUMA node0 CPU(s): | 0,1,4,5 |
| NUMA node1 CPU(s): | 2,3,6,7 |
| 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 rdtscp |
| | lm constant_tsc arch_perfmon pbs bts rep_good nopl xtopology nonstop_tsc |
| | aperfmperf eagerfpu nni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 fma |
| | cx16 xtpr pdcm pcid 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 vmmi flexpriority ept vpid fsgsbase |
| | tsc_adjust bmi1 hle avx2 smep bmi2 erna invpcid rtm cqm mpx rdt_a avx512f avx512dq |
| | rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsave xgetbv1 |
| | xsaveopt xgetbv1 cqm_llc cqm_occupa_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln pts |

/cache data

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 4 5 |
| node 0 size: 48812 MB |
| node 0 free: 47435 MB |
| node 1 cpus: 2 3 6 7 |
| node 1 size: 49151 MB |
| node 1 free: 47884 MB |

From /proc/meminfo

| MemTotal: | 98661604 kB |
| HugePages_Total: | 0 |
| Hugepagesize: | 2048 kB |

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

os-release:

(Continued on next page)
### SPEC CPU2017 Integer Rate Result

#### NEC Corporation

**Express5800/R120h-1M (Intel Xeon Gold 5122)**

<table>
<thead>
<tr>
<th><strong>CPU2017 License:</strong></th>
<th>9006</th>
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<tbody>
<tr>
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<td><strong>Tested by:</strong></td>
<td>NEC Corporation</td>
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<td><strong>Test Date:</strong></td>
<td>May-2018</td>
</tr>
<tr>
<td><strong>Hardware Availability:</strong></td>
<td>Jun-2018</td>
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<tr>
<td><strong>Software Availability:</strong></td>
<td>Mar-2018</td>
</tr>
</tbody>
</table>

**SPECrate2017_int_base =** 28.6  
**SPECrate2017_int_peak =** 30.2

#### Platform Notes (Continued)

```bash
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
```

```bash
uname -a:
    Linux r120h1m 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 May 12 18:25
```

**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 NEC U32 02/14/2018
- Memory:
  - 12x HPE 876319-081 8 GB 2 rank 2666
  - 12x UNKNOWN NOT AVAILABLE

`(End of data from sysinfo program)`

### Compiler Version Notes

```bash
CC  500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
    525.x264_r(base, peak) 557.xz_r(base, peak)
```

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

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

`(Continued on next page)`
NEC Corporation

Express5800/R120h-1M (Intel Xeon Gold 5122)

SPECrate2017_int_base = 28.6
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CPU2017 License: 9006
Test Sponsor: NEC Corporation
Tested by: NEC Corporation

Test Date: May-2018
Hardware Availability: Jun-2018
Software Availability: Mar-2018

Compiler Version Notes (Continued)

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
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64

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SPEC CPU2017 Integer Rate Result

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NEC Corporation
Express5800/R120h-1M (Intel Xeon Gold 5122)

SPECratenextint_base = 28.6
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CPU2017 License: 9006
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Tested by: NEC Corporation
Hardware Availability: Jun-2018
Software Availability: Mar-2018

Base Portability Flags (Continued)

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

(Continued on next page)
### Peak Compiler Invocation (Continued)

- C++ benchmarks:
  - icpc

- Fortran benchmarks:
  - ifort

### Peak Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
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<tr>
<td>perlbench_r</td>
<td>-DSPEC_LP64 -DSPEC_LINUX_X64</td>
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<tr>
<td>gcc_r</td>
<td>-D_FILE_OFFSET_BITS=64</td>
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<tr>
<td>mcf_r</td>
<td>-DSPEC_LP64</td>
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<td>omnetpp_r</td>
<td>-DSPEC_LP64</td>
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<td>xalancbmk_r</td>
<td>-D_FILE_OFFSET_BITS=64 -DSPEC_LINUX</td>
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<td>-DSPEC_LP64</td>
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<td>deepsjeng_r</td>
<td>-DSPEC_LP64</td>
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<td>leela_r</td>
<td>-DSPEC_LP64</td>
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<td>exchange2_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>xz_r</td>
<td>-DSPEC_LP64</td>
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</tbody>
</table>

### Peak Optimization Flags

- C benchmarks:

  - 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

  - gcc_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/je5.0.1-32/lib -ljemalloc

  - mcf_r: basepeak = yes

  - x264_r:
    -Wl,-z,muldefs -xCORE-AVX512 -ipo -03 -no-prec-div
    -qopt-mem-layout-trans=3 -fno-alias
    -L/usr/local/je5.0.1-64/lib -ljemalloc

  - xz_r: basepeak = yes

(Continued on next page)
SPEC CPU2017 Integer Rate Result

NEC Corporation

Express5800/R120h-1M (Intel Xeon Gold 5122)

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Peak Optimization Flags (Continued)

C++ benchmarks:
520.omnetpp_r: basepeak = yes


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

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-RevB.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-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 CPU2017 v1.0.2 on 2018-05-12 05:30:41-0400.
Report generated on 2018-10-31 17:30:28 by CPU2017 PDF formatter v6067.