NEC Corporation

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

NEC Corporation

Express5800/R110j-1 (Intel Xeon E-2134)

SPECspeed2017_fp_base = 24.7
SPECspeed2017_fp_peak = 26.0

CPU Name: Intel Xeon E-2134
Max MHz.: 4500
Nominal: 3500
Enabled: 4 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 256 KB I+D on chip per core
L3: 8 MB I+D on chip per core
Other: None
Memory: 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)
Storage: 1 x 600 GB SAS, 15000 RPM, RAID 0
Other: None

OS: Red Hat Enterprise Linux Server release 7.5 (Maipo)
Kernel 3.10.0-862.11.6.el7.x86_64
Compiler: C/C++: Version 18.0.2.199 of Intel C/C++
Compiler for Linux:
Fortran: Version 18.0.2.199 of Intel Fortran
Compiler for Linux
Parallel: Yes
Firmware: NEC BIOS Version U43 10/02/2018 released Dec-2018
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
SPEC CPU2017 Floating Point Speed Result

NEC Corporation

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CPU2017 License: 9006
Test Date: Nov-2018
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Hardware Availability: Jan-2019
Tested by: NEC Corporation
Software Availability: Aug-2018

Results Table

<table>
<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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<tbody>
<tr>
<td>603.bwaves_s</td>
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<td>79.7</td>
<td>741</td>
<td>79.6</td>
<td>740</td>
<td>79.7</td>
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<tr>
<td>607.cactubssn_s</td>
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<td>403</td>
<td>41.4</td>
<td>406</td>
<td>41.0</td>
<td>402</td>
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<tr>
<td>619.lbm_s</td>
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<td>7.26</td>
<td>722</td>
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<td>7.27</td>
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<tr>
<td>621.wrf_s</td>
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<td>420</td>
<td>31.5</td>
<td>422</td>
<td>31.3</td>
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<tr>
<td>627.cam4_s</td>
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<td>18.2</td>
<td>488</td>
<td>18.2</td>
<td>489</td>
<td>18.1</td>
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<tr>
<td>628.pop2_s</td>
<td>4</td>
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<td>30.3</td>
<td>392</td>
<td>30.4</td>
<td>391</td>
<td>30.4</td>
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<tr>
<td>638.imagick_s</td>
<td>4</td>
<td>731</td>
<td>19.7</td>
<td>729</td>
<td>19.8</td>
<td>725</td>
<td>19.9</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>4</td>
<td>472</td>
<td>37.0</td>
<td>467</td>
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<td>467</td>
<td>37.4</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>4</td>
<td>509</td>
<td>17.9</td>
<td>509</td>
<td>17.9</td>
<td>510</td>
<td>17.9</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>4</td>
<td>1019</td>
<td>15.4</td>
<td>1019</td>
<td>15.4</td>
<td>1020</td>
<td>15.4</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"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact,1,0"
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32;/home/cpu2017/lib/intel64;/home/cpu2017/je5.0.1-32;/home/cpu2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-6700K 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

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.

jemalloc, a general purpose malloc implementation
built with the Redhat Enterprise 7.5, and the system compiler gcc 4.8.5
SPEC CPU2017 Floating Point Speed Result

NEC Corporation

Express5800/R110j-1 (Intel Xeon E-2134)

SPECspeed2017_fp_base = 24.7
SPECspeed2017_fp_peak = 26.0

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

Test Date: Nov-2018
Hardware Availability: Jan-2019
Software Availability: Aug-2018

Platform Notes

BIOS Settings:
  Thermal Configuration: Maximum Cooling
  Workload Profile: Custom
  Intel Virtualization Technology (Intel VT): Disabled
  Energy Efficient Turbo: Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on r110j1 Wed Nov 21 20:05:37 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) E-2134 CPU @ 3.50GHz
    1 "physical id"s (chips)
    8 "processors"
    cores, siblings (Caution: counting these is hw and system dependent. Use with caution.)
      cpu cores: 4
      siblings: 8
      physical 0: cores 0 1 2 3

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): 1
  Vendor ID: GenuineIntel
  CPU family: 6
  Model: 158
  Model name: Intel(R) Xeon(R) E-2134 CPU @ 3.50GHz
  Stepping: 10
  CPU MHz: 4411.315
  CPU max MHz: 4500.0000
  CPU min MHz: 800.0000
  BogoMIPS: 7008.00
  Virtualization: VT-x
  L1d cache: 32K
  L1i cache: 32K
  L2 cache: 256K
  L3 cache: 8192K

(Continued on next page)
**Platform Notes (Continued)**

NUMA node0 CPU(s):  0-7
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 rdtsscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtrr pdcm pclid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch epb intel_pt ssbd ibrs ibpb stibp
tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
erm invpcid rtm mpx rdseed adx smap clflushopt xsaveopt xsavec xgetbv1 dtherm ida
arat pln pts hwp hwp_notify hwp_act_window hwp_epp spec_ctrl intel_stibp flush_l1d

/cache data
  cache size : 8192 KB

From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
physical chip.
  available: 1 nodes (0)
  node 0 cpus: 0 1 2 3 4 5 6 7
  node 0 size: 65386 MB
  node 0 free: 63482 MB
  node distances:
    node 0
      0:  10

From /proc/meminfo
  MemTotal:  65821576 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB

From /etc/*release*/version*
  os-release:
    NAME="Red Hat Enterprise Linux Server"
    VERSION="7.5 (Maipo)"
    ID="rhel"
    ID_LIKE="fedora"
    VARIANT="Server"
    VARIANT_ID="server"
    VERSION_ID="7.5"
    PRETTY_NAME="Red Hat Enterprise Linux Server 7.5 (Maipo)"
  redhat-release: Red Hat Enterprise Linux Server release 7.5 (Maipo)
  system-release: Red Hat Enterprise Linux Server release 7.5 (Maipo)
  system-release-cpe: cpe:/o:redhat:enterprise_linux:7.5:ga:server

uname -a:
  Linux r110j1 3.10.0-862.11.6.e17.x86_64 #1 SMP Fri Aug 10 16:55:11 UTC 2018 x86_64
  x86_64 x86_64 GNU/Linux

(Continued on next page)
SPEC CPU2017 Floating Point Speed Result
Copyright 2017-2018 Standard Performance Evaluation Corporation

NEC Corporation
Express5800/R110j-1 (Intel Xeon E-2134)

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SPECspeed2017_fp_peak = 26.0

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Tested by: NEC Corporation

Test Date: Nov-2018
Hardware Availability: Jan-2019
Software Availability: Aug-2018

Platform Notes (Continued)

Kernel self-reported vulnerability status:
CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: Load fences, __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS (kernel)

run-level 3 Nov 21 19:59
SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 ext4 542G 91G 424G 18% /

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 U43 10/02/2018
Memory:
2x HPE 879527-091 16 GB 2 rank 2666, configured at 2667
2x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666, configured at 2667

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base, peak) 644.nab_s(base, peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
CC   619.lbm_s(peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
FC  607.cactuBSSN_s(base, peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

(Continued on next page)
### NEC Corporation

**Express5800/R110j-1 (Intel Xeon E-2134)**  

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**CPU2017 License:** 9006  
**Test Date:** Nov-2018  
**Hardware Availability:** Jan-2019  
**Test Sponsor:** NEC Corporation  
**Software Availability:** Aug-2018  
**Tested by:** NEC Corporation

### Compiler Version Notes (Continued)

```plaintext
ifort (IFORT) 18.0.2 20180210  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```plaintext
== FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base, peak) ==
```

```plaintext
ifort (IFORT) 18.0.2 20180210  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```plaintext
== FC  603.bwaves_s(peak) 649.fotonik3d_s(peak) ==
```

```plaintext
ifort (IFORT) 18.0.2 20180210  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```plaintext
== CC  621.wrf_s(base) 627.cam4_s(base, peak) 628.pop2_s(base) ==
```

```plaintext
ifort (IFORT) 18.0.2 20180210  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```plaintext
== CC  621.wrf_s(peak) 628.pop2_s(peak) ==
```

```plaintext
ifort (IFORT) 18.0.2 20180210  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

### Base Compiler Invocation

**C benchmarks:**  
```plaintext
icc -m64 -std=c11
```

**Fortran benchmarks:**  
```plaintext
ifort -m64
```

**Benchmarks using both Fortran and C:**  
```plaintext
ifort -m64  icc -m64 -std=c11
```

*(Continued on next page)*
## SPEC CPU2017 Floating Point Speed Result

**NEC Corporation**  
Express5800/R110j-1 (Intel Xeon E-2134)

<table>
<thead>
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- **Software Availability:** Aug-2018

### Base Compiler Invocation (Continued)

Benchmarks using Fortran, C, and C++:
```plaintext
icpc -m64 icc -m64 -std=c11 ifort -m64
```

### Base Portability Flags

- `603.bwaves_s`: `-DSPEC_LP64`  
- `607.cactuBSSN_s`: `-DSPEC_LP64`  
- `619.lbm_s`: `-DSPEC_LP64`  
- `621.wrf_s`: `-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian`  
- `624.cam4_s`: `-DSPEC_LP64 -DSPEC_CASE_FLAG`  
- `628.pop2_s`: `-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian -assume byterecl`  
- `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:**
- `-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch`  
- `-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP`  
- `-L/usr/local/je5.0.1-64/lib -ljemalloc`

**Fortran benchmarks:**
- `-W1,-z,muldefs -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc`

**Benchmarks using both Fortran and C:**
- `-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch`  
- `-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc`

**Benchmarks using Fortran, C, and C++:**
- `-W1,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch`  
- `-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP -nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc`
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Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

Fortran benchmarks:
ifort -m64

Benchmarks using both Fortran and C:
ifort -m64 icc -m64 -std=c11

Benchmarks using Fortran, C, and C++:
icpc -m64 icc -m64 -std=c11 ifort -m64

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: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OpenMP

Fortran benchmarks:
603.bwaves_s: -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP
-DSPEC_OpenMP -O2 -xCORE-AVX2 -qopt-prefetch -ipo -O3
-ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3
-qopenmp -nostandard-realloc-lhs

649.fotonik3d_s: Same as 603.bwaves_s

654.roms_s: -DSPEC_OpenMP -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3
-qopenmp -nostandard-realloc-lhs

(Continued on next page)
Peak Optimization Flags (Continued)

Benchmarks using both Fortran and C:

621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2
-qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div
-qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

627.cam4_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs

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-ic18.0-official-linux64.2017-12-21.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.