NEC Corporation
Express5800/T110i (Intel Xeon E3-1230 v6)

**SPECspeed2017_fp_base** = 22.4
**SPECspeed2017_fp_peak** = 22.6

### Hardware
- **CPU Name:** Intel Xeon E3-1230 v6
- **Max MHz.:** 3900
- **Nominal:** 3500
- **Enabled:** 4 cores, 1 chip
- **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 chip
- **Memory:** 64 GB (4 x 16 GB 2Rx8 PC4-2400T-E)
- **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 18.0.2.199 of Intel C/C++ Compiler for Linux
  - Fortran: Version 18.0.2.199 of Intel Fortran Compiler for Linux
- **Parallel:** Yes
- **Firmware:** Version 5.0.4008 06/07/2018 released Aug-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
## 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>
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<td>607.cactuBSSN_s</td>
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<td>16.3</td>
</tr>
<tr>
<td>628.pop2_s</td>
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<td>14.0</td>
<td>1122</td>
<td>14.0</td>
</tr>
</tbody>
</table>

### 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"
- 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.

SPEC CPU2017 Floating Point Speed Result

NEC Corporation

Express5800/T110i (Intel Xeon E3-1230 v6)

SPECspeed2017_fp_base = 22.4
SPECspeed2017_fp_peak = 22.6

CPU2017 License: 9006
Test Sponsor: NEC Corporation
Tested by: NEC Corporation
Test Date: Nov-2018
Hardware Availability: Apr-2017
Software Availability: Mar-2018

Platform Notes

BIOS Settings:
Power Management Policy: Custom
Energy Performance: Performance
Hyper-Threading: Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on t110i Thu Nov 29 15:31:14 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) CPU E3-1230 v6 @ 3.50GHz
  1 "physical id"s (chips)
  4 "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: 4
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): 4
On-line CPU(s) list: 0-3
Thread(s) per core: 1
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) CPU E3-1230 v6 @ 3.50GHz
Stepping: 9
CPU MHz: 3691.269
CPU max MHz: 3900.0000
CPU min MHz: 800.0000
BogoMIPS: 7008.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 8192K
NUMA node0 CPU(s): 0-3

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

NEC Corporation

Express5800/T110i (Intel Xeon E3-1230 v6)

SPECspeed2017_fp_base = 22.4
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CPU2017 License: 9006
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Test Date: Nov-2018
Hardware Availability: Apr-2017
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Platform Notes (Continued)

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 art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 fma
cx16 xptr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abm 3dnowprefetch epb invpcid_single intel_pt spec_ctrl
ibpb_support tpr_shadow vnmi flexpriority ept fsgsbase tsc_adjust bmi1 hle avx2
smep bmi2 erms invpcid rtm mpx rside adx smap clflushopt xsaveopt xsavec xgetbv1
dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp

From /proc/cpuinfo 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
  node 0 size: 65479 MB
  node 0 free: 63624 MB
  node distances:
    node 0
      0: 10

From /proc/meminfo
  MemTotal: 65920372 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

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 t110i 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

Kernel self-reported vulnerability status:

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

**NEC Corporation**

**Express5800/T110i (Intel Xeon E3-1230 v6)**

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
<th>22.4</th>
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</thead>
<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
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</tbody>
</table>

**CPU2017 License:** 9006  
**Test Sponsor:** NEC Corporation  
**Test Date:** Nov-2018  
**Tested by:** NEC Corporation  
**Hardware Availability:** Apr-2017  
**Software Availability:** Mar-2018

---

**Platform Notes (Continued)**

CVE-2017-5754 (Meltdown): Mitigation: PTI  
CVE-2017-5753 (Spectre variant 1): Mitigation: Load fences  
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS (kernel)

**run-level 3 Nov 29 15:25**

**SPEC is set to:** /home/cpu2017  
**Filesystem**  
```
<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda3</td>
<td>ext4</td>
<td>909G</td>
<td>124G</td>
<td>739G</td>
<td>15%</td>
<td>/</td>
</tr>
</tbody>
</table>
```

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 American Megatrends Inc. 5.0.4008 06/07/2018**  
**Memory:**  
4x Micron 18ASF2G72AZ-2G3B1 16 GB 2 rank 2400

(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.
------------------------------------------------------------------------------
==============================================================================
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.
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
(Continued on next page)
```
**NEC Corporation**

**Expression5800/T110i (Intel Xeon E3-1230 v6)**

<table>
<thead>
<tr>
<th>SPECspeed2017_fp_base</th>
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<tbody>
<tr>
<td>SPECspeed2017_fp_peak</td>
<td>22.6</td>
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</table>

**CPU2017 License:** 9006  
**Test Sponsor:** NEC Corporation  
**Test Date:** Nov-2018  
**Tested by:** NEC Corporation  
**Hardware Availability:** Apr-2017  
**Software Availability:** Mar-2018

---

**Compiler Version Notes (Continued)**

```
FC  603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base, peak)
   ifort (IFORT) 18.0.2 20180210
   Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

```
FC  603.bwaves_s(peak) 649.fotonik3d_s(peak)
   ifort (IFORT) 18.0.2 20180210
   Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

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

```
CC  621.wrf_s(peak) 628.pop2_s(peak)
   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:**

```
icc -m64 -std=c11
```

**Fortran benchmarks:**

```
ifort -m64
```

**Benchmarks using both Fortran and C:**

```
ifort -m64 icc -m64 -std=c11
```

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

NEC Corporation
Express5800/T110i (Intel Xeon E3-1230 v6)

| SPECspeed2017_fp_base = 22.4 |
| SPECspeed2017_fp_peak = 22.6 |

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

Base Compiler Invocation (Continued)

Benchmarks using Fortran, C, and C++:
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
627.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
PEC CPU2017 Floating Point Speed Result

NEC Corporation

Express5800/T110i (Intel Xeon E3-1230 v6)

<table>
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</table>

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

Test Date: Nov-2018
Hardware Availability: Apr-2017
Software Availability: Mar-2018

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: basepeak = yes

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

Benchmarks using both Fortran and C:

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

NEC Corporation

Express5800/T110i (Intel Xeon E3-1230 v6)

SPECspeed2017_fp_peak = 22.6
SPECspeed2017_fp_base = 22.4

CPU2017 License: 9006
Test Sponsor: NEC Corporation
Tested by: NEC Corporation
Test Date: Nov-2018
Hardware Availability: Apr-2017
Software Availability: Mar-2018

Peak Optimization Flags (Continued)

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: Same as 621.wrf_s

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.

Tested with SPEC CPU2017 v1.0.5 on 2018-11-29 01:31:13-0500.
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