NEC Corporation
Express5800/T110j (Intel Core i3-8300)

**SPEC® CPU2017 Integer Rate Result**

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

<table>
<thead>
<tr>
<th>Copies</th>
<th>Specrate2017_int_base (22.5)</th>
<th>Specrate2017_int_peak (24.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r 4</td>
<td>19.6</td>
<td>23.2</td>
</tr>
<tr>
<td>502.gcc_r 4</td>
<td>21.7</td>
<td>23.7</td>
</tr>
<tr>
<td>505.mcf_r 4</td>
<td>25.8</td>
<td>25.9</td>
</tr>
<tr>
<td>520.omnetpp_r 4</td>
<td>13.2</td>
<td>13.7</td>
</tr>
<tr>
<td>523.xalancbmk_r 4</td>
<td>22.4</td>
<td>27.8</td>
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<tr>
<td>525.x264_r 4</td>
<td>48.6</td>
<td>51.7</td>
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<tr>
<td>531.deepsjeng_r 4</td>
<td>20.3</td>
<td>23.2</td>
</tr>
<tr>
<td>541.leela_r 4</td>
<td>16.6</td>
<td>16.7</td>
</tr>
<tr>
<td>548.exchange2_r 4</td>
<td>47.5</td>
<td></td>
</tr>
<tr>
<td>557.xz_r 4</td>
<td>13.3</td>
<td></td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Core i3-8300  
- **Max MHz.** 3700  
- **Nominal:** 3700  
- **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  
- **Other:** None  
- **Memory:** 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E, running at 2400)  
- **Storage:** 1 x 4 TB SATA, 7200 RPM  
- **Other:** None

**Software**

- **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:** No  
- **Firmware:** NEC BIOS Version F09 12/04/2018 released Feb-2019  
- **File System:** ext4  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** 32/64-bit  
- **Other:** jemalloc memory allocator V5.0.1
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SPEC CPU2017 Integer Rate Result

SPECrate2017_int_base = 22.5
SPECrate2017_int_peak = 24.0

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base</th>
<th>Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Seconds</td>
</tr>
<tr>
<td>500.perlbench_r</td>
<td>4</td>
<td>325</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>4</td>
<td>261</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>4</td>
<td>249</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>4</td>
<td>398</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>4</td>
<td>189</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>4</td>
<td>144</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>4</td>
<td>226</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>4</td>
<td>398</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>4</td>
<td>220</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>4</td>
<td>325</td>
</tr>
</tbody>
</table>

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

Submit Notes

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset 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"
IRQ balance service was stopped using "systemctl stop irqbalance.service"

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 i7-6700K 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)

(Continued on next page)
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General Notes (Continued)

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

Platform Notes

BIOS Settings:
VT-x: Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on t110j Mon Mar 25 10:00:41 2019

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) Core(TM) i3-8300 CPU @ 3.70GHz
  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) Core(TM) i3-8300 CPU @ 3.70GHz
Stepping:              11
CPU MHz:               3697.741
CPU max MHz:           3700.000
CPU min MHz:           800.0000

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| SPECrate2017_int_base | 22.5 |
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Platform Notes (Continued)

BogoMIPS: 7392.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 8192K
NUMA node0 CPU(s): 0-3
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 rdtsc

From /proc/cpuinfo

/cach data

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: 65455 MB
node 0 free: 63581 MB
node distances:
node 0
0: 10

From /proc/meminfo

MemTotal: 65895380 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*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)

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

```bash
euname -a:
    Linux t110j 3.10.0-862.11.6.el7.x86_64 #1 SMP Fri Aug 10 16:55:11 UTC 2018 x86_64
    x86_64 x86_64 GNU/Linux
```

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 Mar 25 09:54**

**SPEC is set to:** /home/cpu2017

```
Filesystem  Type Size  Used Avail Use% Mounted on
/dev/sda3    ext4 3.6T  29G 3.4T  1% /
```

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. F09 12/04/2018
- Memory:
  - 4x Samsung M391A2K43BB1-CTD 16 GB 2 rank 2667, configured at 2400

(End of data from `sysinfo` program)

### Compiler Version Notes

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

---

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

---

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

---

```
# icc (ICC) 18.0.2 20180210
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```

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**Compiler Version Notes (Continued)**

```  
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(base)  
icpc (ICC) 18.0.2 20180210  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
```

---

```  
CXXC 520.omnetpp_r(peak) 523.xalancbmk_r(peak) 531.deepsjeng_r(peak) 541.leela_r(peak)  
icpc (ICC) 18.0.2 20180210  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
```

---

```  
FC 548.exchange2_r(base)  
ifort (IFORT) 18.0.2 20180210  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
```

---

```  
FC 548.exchange2_r(peak)  
ifort (IFORT) 18.0.2 20180210  
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.  
```

---

**Base Compiler Invocation**

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

- **C++ benchmarks:**  
  - icpc -m64

- **Fortran benchmarks:**  
  - ifort -m64
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Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
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 -DSPEC_LINUX
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-AVX2 -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-AVX2 -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-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs
-L/usr/local/je5.0.1-64/lib -ljemalloc

Peak Compiler Invocation

C benchmarks (except as noted below):
icc -m64 -std=c11

502.gcc_r.icc -m32 -std=c11 -L/home/prasadj/specdev/IC18u2_Internal/lin_18_0_20180210/compiler/lib/ia32_lin

C++ benchmarks (except as noted below):
icpc -m64

523.xalancbmk_r.icpc -m32 -L/home/prasadj/specdev/IC18u2_Internal/lin_18_0_20180210/compiler/lib/ia32_lin

Fortran benchmarks:
ifort -m64
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### Peak Portability Flags

- `500.perlbench_r`: `-DSPEC_LP64 -DSPEC_LINUX_X64`
- `502.gcc_r`: `-D_FILE_OFFSET_BITS=64`
- `505.mcf_r`: `-DSPEC_LP64`
- `520.omnetpp_r`: `-DSPEC_LP64`
- `523.xalancbmk_r`: `-D_FILE_OFFSET_BITS=64 -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`

(Continued on next page)

### Peak Optimization Flags

**C benchmarks:**

- `500.perlbench_r`: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3 -fno-strict-overflow -L/usr/local/je5.0.1-64/lib -ljemalloc`
- `502.gcc_r`: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-32/lib -ljemalloc`
- `505.mcf_r`: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc`
- `525.x264_r`: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3 -fno-alias -L/usr/local/je5.0.1-64/lib -ljemalloc`
- `557.xz_r`: `basepeak = yes`

**C++ benchmarks:**

- `520.omnetpp_r`: `basepeak = yes`
- `523.xalancbmk_r`: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-32/lib -ljemalloc`
- `531.deepsjeng_r`: `basepeak = yes`

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Peak Optimization Flags (Continued)

541.leela_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=3 -L/usr/local/je5.0.1-64/lib -ljemalloc

Fortran benchmarks:

548.exchange2_r: 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.

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