# SPEC® CPU2017 Integer Rate Result

## NEC Corporation

Express5800/T110j (Intel Xeon E-2124G)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>SPECrate2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>24.8</td>
<td>26.3</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9006

**Test Sponsor:** NEC Corporation

**Test Date:** Apr-2019

**Hardware Availability:** Dec-2018

**Tested by:** NEC Corporation

**Software Availability:** Aug-2018

### Hardware

- **CPU Name:** Intel Xeon E-2124G
- **Max MHz.:** 4500
- **Nominal:** 3400
- **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)
- **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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## Benchmark Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate2017_int_base</th>
<th>SPECrate2017_int_peak</th>
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<tbody>
<tr>
<td>perlbench_r</td>
<td>4</td>
<td>21.6</td>
<td>25.5</td>
</tr>
<tr>
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<td>4</td>
<td>23.7</td>
<td>28.2</td>
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<td>mcf_r</td>
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<td>24.2</td>
<td>28.7</td>
</tr>
<tr>
<td>omnetpp_r</td>
<td>4</td>
<td>14.2</td>
<td>24.7</td>
</tr>
<tr>
<td>xalancbmk_r</td>
<td>4</td>
<td>24.7</td>
<td>30.8</td>
</tr>
<tr>
<td>x264_r</td>
<td>4</td>
<td>22.3</td>
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<td>deepsjeng_r</td>
<td>4</td>
<td>18.5</td>
<td>38.5</td>
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<tr>
<td>leela_r</td>
<td>4</td>
<td>18.5</td>
<td></td>
</tr>
<tr>
<td>exchange2_r</td>
<td>4</td>
<td>14.4</td>
<td></td>
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<tr>
<td>xz_r</td>
<td>4</td>
<td>14.4</td>
<td></td>
</tr>
</tbody>
</table>

---

**Notes:**

- SPECrate2017_int_base:

  - 24.8

- SPECrate2017_int_peak:

  - 26.3

---

**Legend:**

- **SPECrate2017_int_base**
- **SPECrate2017_int_peak**
### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
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<tbody>
<tr>
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<td>505.mcf_r</td>
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<td><strong>14.2</strong></td>
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<td>541.leela_r</td>
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<td>548.exchange2_r</td>
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</tbody>
</table>

**SPECrate2017_int_base** = 24.8  
**SPECrate2017_int_peak** = 26.3

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) is mitigated in the system as tested and documented.

(Continued on next page)
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
  Energy Efficient P-state: Disabled
  Energy Efficient Turbo: Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on t110j Mon Apr 15 12:11:08 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) Xeon(R) E-2124G CPU @ 3.40GHz
    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) E-2124G CPU @ 3.40GHz
  Stepping: 10
  CPU MHz: 4373.889

(Continued on next page)
NEC Corporation
Express5800/T110j (Intel Xeon E-2124G)

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SPECrate2017_int_peak = 26.3

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

Platform Notes (Continued)

CPU max MHz: 4500.0000
CPU min MHz: 800.0000
BogoMIPS: 6816.00
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 rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xptr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx fl64c rdrand lahf_lm abm 3dnowprefetch intel_pt ssbd ibbp stibp
tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
ems invpcid rtm rdx seed adx smap clflushopt xsaveopt xsavec xgetbv1 dtherm ida
arat pin pts hwp hwp_notify hwp_act_window hwp_epp spec_ctrl intel_stibp flush_l1d

/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: 65455 MB
node 0 free: 63588 MB
node distances:
node  0
   0:  10

From /proc/meminfo
MemTotal: 65895300 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)"

(Continued on next page)
SPEC CPU2017 Integer Rate Result

NEC Corporation

Express5800/T110j (Intel Xeon E-2124G)

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Platform Notes (Continued)

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 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 Apr 15 12:05
SPEC is set to: /home/cpu2017

Filesystem     Type  Size  Used Avail Use% Mounted on
/dev/sda3      ext4  3.6T   98G  3.3T   3% /

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

(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
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

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Express5800/T110j (Intel Xeon E-2124G)

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</table>

Compiler Version Notes (Continued)

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

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

 reliability 548.exchange2_r(base)
ífort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

 reliability 548.exchange2_r(peak)
ífort (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
SPEC CPU2017 Integer Rate Result

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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
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
SPEC CPU2017 Integer Rate Result
Copyright 2017-2019 Standard Performance Evaluation Corporation

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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

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

(Continued on next page)
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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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