NEC Corporation  
Express5800/R110i-1 (Intel Xeon E3-1220 v6)  

<table>
<thead>
<tr>
<th>Spec Benchmark</th>
<th>SPECrate2017_int_base</th>
<th>SPECrate2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_r</td>
<td>21.8</td>
<td>20.6</td>
</tr>
<tr>
<td>gcc_r</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mcf_r</td>
<td>20.3</td>
<td>24.0</td>
</tr>
<tr>
<td>omnetpp_r</td>
<td>12.8</td>
<td>24.0</td>
</tr>
<tr>
<td>xalancbmk_r</td>
<td></td>
<td>24.1</td>
</tr>
<tr>
<td>x264_r</td>
<td>18.3</td>
<td>43.4</td>
</tr>
<tr>
<td>deepsjeng_r</td>
<td>14.9</td>
<td>46.1</td>
</tr>
<tr>
<td>leela_r</td>
<td>14.9</td>
<td></td>
</tr>
<tr>
<td>exchange2_r</td>
<td>12.6</td>
<td></td>
</tr>
<tr>
<td>xz_r</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Hardware**  
- CPU Name: Intel Xeon E3-1220 v6  
- Max MHz.: 3500  
- Nominal: 3000  
- 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 PC4-2400T-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: No  
- Firmware: Version 5.0.3006 02/28/2018 released Apr-2018  
- 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
SPEC CPU2017 Integer Rate Result

NEC Corporation
Express5800/R110i-1 (Intel Xeon E3-1220 v6)

SPECrate2017_int_base = 20.6
SPECrate2017_int_peak = 21.8

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>500.perlbench_r</td>
<td>4</td>
<td>366</td>
<td>17.4</td>
<td>362</td>
<td>17.6</td>
<td>363</td>
<td>17.6</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>4</td>
<td>285</td>
<td>19.9</td>
<td>285</td>
<td>19.9</td>
<td>285</td>
<td>19.9</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>4</td>
<td>271</td>
<td>23.9</td>
<td>270</td>
<td>24.0</td>
<td>269</td>
<td>24.0</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>4</td>
<td>410</td>
<td>12.8</td>
<td>410</td>
<td>12.8</td>
<td>409</td>
<td>12.8</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>4</td>
<td>209</td>
<td>20.2</td>
<td>208</td>
<td>20.3</td>
<td>208</td>
<td>20.3</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>4</td>
<td>161</td>
<td>43.4</td>
<td>161</td>
<td>43.4</td>
<td>161</td>
<td>43.5</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>4</td>
<td>250</td>
<td>18.3</td>
<td>250</td>
<td>18.3</td>
<td>250</td>
<td>18.3</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>4</td>
<td>445</td>
<td>14.9</td>
<td>446</td>
<td>14.9</td>
<td>446</td>
<td>14.9</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>4</td>
<td>246</td>
<td>42.7</td>
<td>249</td>
<td>42.1</td>
<td>247</td>
<td>42.4</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>4</td>
<td>344</td>
<td>12.6</td>
<td>344</td>
<td>12.6</td>
<td>344</td>
<td>12.6</td>
</tr>
</tbody>
</table>

SPECrate2017_int_base = 20.6
SPECrate2017_int_peak = 21.8

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"

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.
spec

SPEC CPU2017 Integer Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

NEC Corporation

Express5800/R110i-1 (Intel Xeon E3-1220 v6) SPECrate2017_int_base = 20.6
SPECrate2017_int_peak = 21.8

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

General Notes (Continued)

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:
Power Management Policy: Custom
Energy Performance: Performance
DCU Streamer Prefetcher: Disabled
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on r110i1 Wed Oct 24 16:50:17 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 E3-1220 v6 @ 3.00GHz
 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 E3-1220 v6 @ 3.00GHz
Stepping: 9
CPU MHz: 3334.570
CPU max MHz: 3500.000

(Continued on next page)
SPEC CPU2017 Integer Rate Result
Copyright 2017-2018 Standard Performance Evaluation Corporation

NEC Corporation
Express5800/R110i-1 (Intel Xeon E3-1220 v6)

SPECrate2017_int_base = 20.6
SPECrate2017_int_peak = 21.8

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

| Test Date: | Oct-2018 |
| Hardware Availability: | Apr-2017 |
| Software Availability: | Mar-2018 |

Platform Notes (Continued)

- CPU min MHz: 800.0000
- BogoMIPS: 6000.00
- 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 dtsc 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 xtpm pcid sse2 sse3 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 vpid fsgsbase tsc_adjust bm1 hle avx2
  - smep bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt xsaveopt xsavec xgetbv1
  - dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp

/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: 65474 MB
  - node 0 free: 63622 MB
  - node distances:
    - node 0
      - 0: 10

From /proc/meminfo
- MemTotal: 65915844 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)

(Continued on next page)
## NEC Corporation

**Platform Notes (Continued)**

- **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 r110i1 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:**

- 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 Oct 24 16:44**

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

<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>87G</td>
<td>776G</td>
<td>11%</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. 5.0.3006 02/28/2018
- **Memory**: 4x Micron 18ASF2G72AZ-2G3B1 16 GB 2 rank 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)
==============================================================================
ccc (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)
==============================================================================
ccc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
```

(Continued on next page)
**NEC Corporation**

**Express5800/R110i-1 (Intel Xeon E3-1220 v6)**

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>20.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>21.8</td>
</tr>
</tbody>
</table>

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

---

### 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
```
SPEC CPU2017 Integer Rate Result

NEC Corporation
Express5800/R110i-1 (Intel Xeon E3-1220 v6)

Copyright 2017-2018 Standard Performance Evaluation Corporation

SPECrate2017_int_base = 20.6
SPECrate2017_int_peak = 21.8

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

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

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

Fortran benchmarks:
ifort -m64

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

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

ifort -m64
### SPEC CPU2017 Integer Rate Result

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

**NEC Corporation**

**Express5800/R110i-1 (Intel Xeon E3-1220 v6)**

<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>SPECrate2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>20.6</td>
<td>21.8</td>
</tr>
</tbody>
</table>

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

**Test Date:** Oct-2018  
**Hardware Availability:** Apr-2017  
**Software Availability:** Mar-2018

#### Peak Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlb</td>
<td>-D SPEC_LP64 -D SPEC_LINUX_X64</td>
</tr>
<tr>
<td>502.gcc</td>
<td>-D_FILE_OFFSET_BITS=64</td>
</tr>
<tr>
<td>505.mcf</td>
<td>-D SPEC_LP64</td>
</tr>
<tr>
<td>520.omnetpp</td>
<td>-D SPEC_LP64</td>
</tr>
<tr>
<td>523.xalancbmk</td>
<td>-D_FILE_OFFSET_BITS=64 -D SPEC_LINUX</td>
</tr>
<tr>
<td>525.x264</td>
<td>-D SPEC_LP64</td>
</tr>
<tr>
<td>531.deepsjeng</td>
<td>-D SPEC_LP64</td>
</tr>
<tr>
<td>541.leela</td>
<td></td>
</tr>
<tr>
<td>548.exchange2</td>
<td></td>
</tr>
<tr>
<td>557.xz</td>
<td>-D SPEC_LP64</td>
</tr>
</tbody>
</table>

#### Peak Optimization Flags

**C benchmarks:**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlb</td>
<td>-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</td>
</tr>
<tr>
<td>502.gcc</td>
<td>-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</td>
</tr>
<tr>
<td>505.mcf</td>
<td>-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</td>
</tr>
<tr>
<td>525.x264</td>
<td>-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</td>
</tr>
<tr>
<td>557.xz</td>
<td>basepeak = yes</td>
</tr>
</tbody>
</table>

**C++ benchmarks:**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>520.omnetpp</td>
<td>basepeak = yes</td>
</tr>
<tr>
<td>523.xalancbmk</td>
<td>-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</td>
</tr>
<tr>
<td>531.deepsjeng</td>
<td>basepeak = yes</td>
</tr>
</tbody>
</table>

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

### NEC Corporation

**Express5800/R110i-1 (Intel Xeon E3-1220 v6)**

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9006</th>
<th>Test Date:</th>
<th>Oct-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>NEC Corporation</td>
<td>Hardware Availability:</td>
<td>Apr-2017</td>
</tr>
<tr>
<td>Tested by:</td>
<td>NEC Corporation</td>
<td>Software Availability:</td>
<td>Mar-2018</td>
</tr>
</tbody>
</table>

### 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:


---

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

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 2018-10-24 03:50:16-0400.