## NEC Corporation

**Express5800/R120h-1M (Intel Xeon Silver 4208)**

<table>
<thead>
<tr>
<th>CPU2017 License: 9006</th>
<th>Test Date: Mar-2020</th>
</tr>
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<tbody>
<tr>
<td>Test Sponsor: NEC Corporation</td>
<td>Hardware Availability: Dec-2019</td>
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<tr>
<td>Tested by: NEC Corporation</td>
<td>Software Availability: Sep-2019</td>
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### SPECrate®2017_int_base = 41.5
### SPECrate®2017_int_peak = 42.7

<table>
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<tr>
<th>Benchmark</th>
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<tr>
<td>557.xz_r</td>
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</table>

### Hardware

- **CPU Name:** Intel Xeon Silver 4208
- **Max MHz:** 3200
- **Nominal:** 2100
- **Enabled:** 8 cores, 1 chip, 2 threads/core
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 1 MB I+D on chip per core
- **L3:** 11 MB I+D on chip per chip
- **Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R, running at 2400)
- **Storage:** 1 x 1 TB SATA, 7200 RPM, RAID 0
- **Other:** None

### Software

- **OS:** Red Hat Enterprise Linux Server release 7.7 (Maipo)
  Kernel 3.10.0-1062.1.1.el7.x86_64
- **Compiler:** C/C++: Version 19.0.4.227 of Intel C/C++ Compiler Build 20190416 for Linux;
  Fortran: Version 19.0.4.227 of Intel Fortran Compiler Build 20190416 for Linux
- **Parallel:** No
- **Firmware:** NEC BIOS Version U32 v2.22 11/13/2019 released Mar-2020
- **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
- **Power Management:** BIOS set to prefer performance at the cost of additional power usage.
NEC Corporation

Express5800/R120h-1M (Intel Xeon Silver 4208)

SPECrate®2017_int_base = 41.5
SPECrate®2017_int_peak = 42.7

Results Table

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<td>635</td>
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</table>

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"

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
"/home/cpu2017/lib/intel64:/home/cpu2017/lib/ia32:/home/cpu2017/je5.0.1-32"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7900X 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
NEC Corporation

Express5800/R120h-1M (Intel Xeon Silver 4208)

SPECrate®2017_int_base = 41.5
SPECrate®2017_int_peak = 42.7

General Notes (Continued)

NA: 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.


Platform Notes

BIOS Settings:
Thermal Configuration: Maximum Cooling
Workload Profile: General Throughput Compute
Memory Patrol Scrubbing: Disabled
LLC Dead Line Allocation: Disabled
LLC Prefetch: Enabled
Enhanced Processor Performance: Enabled
Workload Profile: Custom
Advanced Memory Protection: Advanced ECC Support
Sub-NUMA Clustering: Disabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed1be6e46a485a0011
running on r120h1m Mon Mar 30 07:28:15 2020

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) Silver 4208 CPU @ 2.10GHz
  1 "physical id"s (chips)
  16 "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 : 8
  siblings : 16
  physical 0: cores 0 1 2 3 4 5 6 7

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian

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

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<tr>
<th>Item</th>
<th>Value</th>
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<td>On-line CPU(s) list:</td>
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<tr>
<td>Thread(s) per core:</td>
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<td>Core(s) per socket:</td>
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<tr>
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<td>NUMA node0 CPU(s):</td>
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<td>Flags:</td>
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</tr>
</tbody>
</table>

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 8 9 10 11 12 13 14 15
node 0 size: 196265 MB
node 0 free: 191442 MB
node distances:
node 0
0: 10

From /proc/meminfo
MemTotal: 197747132 KB

(Continued on next page)
# SPEC CPU®2017 Integer Rate Result

**NEC Corporation**

Express5800/R120h-1M (Intel Xeon Silver 4208)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
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<tr>
<td>Software Availability:</td>
<td>Sep-2019</td>
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</tbody>
</table>

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## Platform Notes (Continued)

- **HugePages_Total:** 0
- **Hugepagesize:** 2048 kB

From /etc/*release* /etc/*version*

```
From /etc/*release* /etc/*version*

os-release:  
NAME="Red Hat Enterprise Linux Server"
VERSION="7.7 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VARIANT="Server"
VARIANT_ID="server"
VERSION_ID="7.7"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.7 (Maipo)"
redhat-release: Red Hat Enterprise Linux Server release 7.7 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.7 (Maipo)
system-release-cpe: cpe:/o:redhat:enterprise_linux:7.7:ga:server
```

```
uname -a:  
Linux r120h1m 3.10.0-1062.1.1.el7.x86_64 #1 SMP Tue Aug 13 18:39:59 UTC 2019 x86_64  
x86_64 x86_64 GNU/Linux
```

### Kernel self-reported vulnerability status:

- **CVE-2018-3620 (L1 Terminal Fault):** Not affected
- **Microarchitectural Data Sampling:** Not affected
- **CVE-2017-5754 (Meltdown):** Not affected
- **CVE-2018-3639 (Speculative Store Bypass):** Mitigation: Speculative Store Bypass disabled via prctl and seccomp
- **CVE-2017-5753 (Spectre variant 1):** Mitigation: Load fences, usercopy/swappgs barriers and __user pointer sanitization
- **CVE-2017-5715 (Spectre variant 2):** Mitigation: Full retpoline, IBPB

### run-level 3 Mar 30 07:22

```
run-level 3 Mar 30 07:22
```

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

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

### Filesystem

```
Filesystem   Type  Size  Used Avail Use% Mounted on  
/dev/sda3    ext4  908G  77G  786G  9%  /
```

### From /sys/devices/virtual/dmi/id

```
From /sys/devices/virtual/dmi/id
```

```
BIOS: NEC U32 11/13/2019
Vendor: NEC
Product: Express5800/R120h-1M
Serial: JPN0084094
```

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
SPEC CPU®2017 Integer Rate Result

NEC Corporation

Express5800/R120h-1M (Intel Xeon Silver 4208)

SPECrater®2017_int_base = 41.5
SPECrater®2017_int_peak = 42.7

CPU2017 License: 9006
Test Sponsor: NEC Corporation
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Software Availability: Sep-2019

Platform Notes (Continued)

frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
Memory:
  12x HPE P03050-091 16 GB 2 rank 2933
  12x UNKNOWN NOT AVAILABLE

(End of data from sysinfo program)
Regarding the sysinfo display about the memory speed, the correct configured memory speed is 2400 MT/s. The dmidecode description should be as follows:
12x HPE P03050-091 16 GB 2 rank 2933, configured at 2400

Compiler Version Notes

==============================================================================
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<th>C</th>
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<td>Intel(R) C Intel(R) 64 Compiler for applications running on IA-32, Version</td>
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Express5800/R120h-1M (Intel Xeon Silver 4208)

**SPEC CPU®2017 Integer Rate Result**

**CPU2017 License:** 9006  
**Test Sponsor:** NEC Corporation  
**Tested by:** NEC Corporation  
**Test Date:** Mar-2020  
**Hardware Availability:** Dec-2019  
**Software Availability:** Sep-2019

---

**SPECrater2017_int_base = 41.5**  
**SPECrater2017_int_peak = 42.7**

---

**Compiler Version Notes (Continued)**

```plaintext
C++     | 523.xalancbmk_r(peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
```

```plaintext
C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)  
        | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
```

```plaintext
C++     | 523.xalancbmk_r(peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
```

```plaintext
C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)  
        | 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
```

```plaintext
Fortran | 548.exchange2_r(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
```

---

**Base Compiler Invocation**

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

(Continued on next page)
**SPECCPU®2017 Integer Rate Result**

**NEC Corporation**

Express5800/R120h-1M (Intel Xeon Silver 4208)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 41.5</th>
</tr>
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<tr>
<td>SPECrate®2017_int_peak = 42.7</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9006  
**Test Sponsor:** NEC Corporation  
**Tested by:** NEC Corporation  
**Test Date:** Mar-2020  
**Hardware Availability:** Dec-2019  
**Software Availability:** Sep-2019

**Base Compiler Invocation (Continued)**

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

**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:
-W1, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64  
-lqkmalloc

C++ benchmarks:
-W1, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64  
-lqkmalloc

Fortran benchmarks:
-W1, -z, muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div  
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte  
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64  
-lqkmalloc
**SPEC CPU®2017 Integer Rate Result**

**NEC Corporation**

Express5800/R120h-1M (Intel Xeon Silver 4208)

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**Copyright 2017-2020 Standard Performance Evaluation Corporation**

**CPU2017 License:** 9006  
**Test Sponsor:** NEC Corporation  
**Tested by:** NEC Corporation  
**Test Date:** Mar-2020  
**Hardware Availability:** Dec-2019  
**Software Availability:** Sep-2019

---

### Peak Compiler Invocation

**C benchmarks (except as noted below):**

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

```plaintext
```

**C++ benchmarks (except as noted below):**

```plaintext
icpc -m64
```

```plaintext
523.xalancbmk_r: icpc -m32 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/ia32_lin
```

**Fortran benchmarks:**

```plaintext
ifort -m64
```

### 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:**

```plaintext
500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
-fno-strict-overflow
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc
```

```plaintext
502.gcc_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
-L/usr/local/je5.0.1-32/lib -ljemalloc
```

```plaintext
505.mcf_r: basepeak = yes
```

(Continued on next page)
# SPEC CPU®2017 Integer Rate Result

**NEC Corporation**

**Express5800/R120h-1M (Intel Xeon Silver 4208)**

**SPECrate®2017_int_base = 41.5**

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</table>

## Peak Optimization Flags (Continued)

- **525.x264_r**
  - `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`  
  - `-qopt-mem-layout-trans=4 -fno-alias`  
  - `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64`  
  - `-lqkmalloc`

- **557.xz_r**
  - `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`  
  - `-qopt-mem-layout-trans=4`  
  - `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64`  
  - `-lqkmalloc`

### C++ benchmarks:

- **520.omnetpp_r**
  - `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`  
  - `-qopt-mem-layout-trans=4`  
  - `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64`  
  - `-lqkmalloc`

- **523.xalancmk_r**
  - `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo`  
  - `-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4`  
  - `-L/usr/local/je5.0.1-32/lib`  
  - `-ljemalloc`

- **531.deepsjeng_r**
  - Same as 520.omnetpp_r

- **541.leela_r**
  - Same as 520.omnetpp_r

### 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:


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

Tested with SPEC CPU®2017 v1.1.0 on 2020-03-29 18:28:14-0400.
Report generated on 2020-04-14 14:08:54 by CPU2017 PDF formatter v6255.
Originally published on 2020-04-14.