## NEC Corporation

### Express5800/R120h-2M (Intel Xeon Gold 6234)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>126</td>
<td>130</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 9006  
**Test Sponsor:** NEC Corporation  
**Tested by:** NEC Corporation  
**Test Date:** Oct-2019  
**Hardware Availability:** May-2019  
**Software Availability:** May-2019

### SPEC CPU2017 Integer Rate Result

#### Copies

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>32</td>
</tr>
<tr>
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<tr>
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</tr>
<tr>
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<td>32</td>
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<td>531.deepsjeng_r</td>
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</tr>
<tr>
<td>548.exchange2_r</td>
<td>32</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>32</td>
</tr>
</tbody>
</table>

![Graph](image.png)

#### Hardware

**CPU Name:** Intel Xeon Gold 6234  
**Max MHz:** 4000  
**Nominal:** 3300  
**Enabled:** 16 cores, 2 chips, 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:** 24.75 MB I+D on chip per chip  
**Other:** None  
**Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)  
**Storage:** 1 x 480 GB SATA SSD, RAID 0  
**Other:** None

#### Software

**OS:** Red Hat Enterprise Linux Server release 7.6 (Maipo)  
**Kernel:** 3.10.0-957.5.1.el7.x86_64  
**Compiler:** C/C++: Version 19.0.4.227 of Intel C/C++ Compiler for Linux; Fortran: Version 19.0.4.227 of Intel Fortran Compiler for Linux  
**Parallel:** No  
**Firmware:** NEC BIOS Version U30 v2.10 05/21/2019 released Jul-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  
**Power Management:** --
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<td>434</td>
<td>79.7</td>
<td>434</td>
<td>79.6</td>
</tr>
</tbody>
</table>

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl 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/intel64:/home/cpu2017/lib/ia32:/home/cpu2017/je5.0.1-32"

Binaries compiled on a system with 1x Intel Core i9-799X 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
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

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.
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:
    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
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on r120h2m Tue Oct 8 11:08:18 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) Gold 6234 CPU @ 3.30GHz
    2 "physical id"s (chips)
    32 "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 1 2 16 18 19 20 25 27
    physical 1: cores 1 2 4 8 11 17 18 27

From lscpu:
    Architecture: x86_64
    CPU op-mode(s): 32-bit, 64-bit
    Byte Order: Little Endian
    CPU(s): 32
    On-line CPU(s) list: 0-31
    Thread(s) per core: 2
    Core(s) per socket: 8
    Socket(s): 2
    NUMA node(s): 4

(Continued on next page)
### NEC Corporation

**Express5800/R120h-2M (Intel Xeon Gold 6234)**

<table>
<thead>
<tr>
<th>SPEC CPU®2017 Integ-Rate Result</th>
<th>SPEC®2017_int_base = 126</th>
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<tbody>
<tr>
<td>CPU2017 License:</td>
<td>9006</td>
</tr>
<tr>
<td>Test Sponsor:</td>
<td>NEC Corporation</td>
</tr>
<tr>
<td>Tested by:</td>
<td>NEC Corporation</td>
</tr>
<tr>
<td>Test Date:</td>
<td>Oct-2019</td>
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<td>Hardware Availability:</td>
<td>May-2019</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>May-2019</td>
</tr>
</tbody>
</table>

**Platform Notes (Continued)**

- **Vendor ID:** GenuineIntel
- **CPU family:** 6
- **Model:** 85
- **Model name:** Intel(R) Xeon(R) Gold 6234 CPU @ 3.30GHz
- **Stepping:** 7
- **CPU MHz:** 3300.00
- **BogoMIPS:** 6600.00
- **Virtualization:** VT-x
- **L1d cache:** 32K
- **L1i cache:** 32K
- **L2 cache:** 1024K
- **L3 cache:** 25344K
- **NUMA node0 CPU(s):** 0-3,16-19
- **NUMA node1 CPU(s):** 4-7,20-23
- **NUMA node2 CPU(s):** 8-11,24-27
- **NUMA node3 CPU(s):** 12-15,28-31
- **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 apic cpuid 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 apic cpuid cmov

From `numactl --hardware` WARNING: a numactl 'node' might or might not correspond to a physical chip.

```
    numactl --hardware
    WARNING: a numactl 'node' might or might not correspond to a physical chip.
```

 available: 4 nodes (0-3)
    node 0 cpus: 0 1 2 3 16 17 18 19
    node 0 size: 196256 MB
    node 0 free: 191738 MB
    node 1 cpus: 4 5 6 7 20 21 22 23
    node 1 size: 196608 MB
    node 1 free: 192198 MB
    node 2 cpus: 8 9 10 11 24 25 26 27
    node 2 size: 196608 MB
    node 2 free: 192264 MB
    node 3 cpus: 12 13 14 15 28 29 30 31
    node 3 size: 196607 MB
    node 3 free: 192268 MB
    node distances:
NEC Corporation

Express5800/R120h-2M (Intel Xeon Gold 6234)

SPEC CPU®2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

SPECrate®2017_int_base = 126
SPECrate®2017_int_peak = 130

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

Test Date: Oct-2019
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Platform Notes (Continued)

node 0 1 2 3
0: 10 21 31 31
1: 21 10 31 31
2: 31 31 10 21
3: 31 31 21 10

From /proc/meminfo
MemTotal: 792277340 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

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

NAME="Red Hat Enterprise Linux Server"
VERSION="7.6 (Maipo)"
ID="rhel"
ID_LIKE="fedora"
VARIANT="Server"
VARIANT_ID="server"
VERSION_ID="7.6"
PRETTY_NAME="Red Hat Enterprise Linux Server 7.6 (Maipo)"
redhat-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)
system-release: Red Hat Enterprise Linux Server release 7.6 (Maipo)

uname -a:
Linux r120h2m 3.10.0-957.5.1.el7.x86_64 #1 SMP Wed Dec 19 10:46:58 EST 2018 x86_64
x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2017-5754 (Meltdown): Not affected
CVE-2017-5753 (Spectre variant 1): Mitigation: Load fences, __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS

run-level 3 Oct 8 11:02

SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 ext4 432G 53G 357G 13% /

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 NEC U30 05/21/2019
Memory:
NEC Corporation
Express5800/R120h-2M (Intel Xeon Gold 6234)

SPECrater®2017_int_base = 126
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Test Date: Oct-2019
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Platform Notes (Continued)

24x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

=====================================================================================================
C       | 502.gcc_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.

=====================================================================================================
C       | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
        | 525.x264_r(base, peak) 557.xz_r(base, peak)
---------|----------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
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        | 525.x264_r(base, peak) 557.xz_r(base, peak)
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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.

=====================================================================================================
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.

(Continued on next page)
NEC Corporation  
Express5800/R120h-2M (Intel Xeon Gold 6234)  

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**SPEC CPU®2017 Integer Rate Result**

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**NEC Corporation**

Express5800/R120h-2M (Intel Xeon Gold 6234)

---

**SPECrater®2017_int_base = 126**

**SPECrater®2017_int_peak = 130**

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**CPU2017 License:** 9006

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**Hardware Availability:** May-2019

**Software Availability:** May-2019

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**Compiler Version Notes (Continued)**

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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.

---

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.

---

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.

---

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.

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**Base Compiler Invocation**

C benchmarks:  
icc -m64 -std=c11

C++ benchmarks:  
icpc -m64

Fortran benchmarks:  
ifort -m64

---
NEC Corporation
Express5800/R120h-2M (Intel Xeon Gold 6234)

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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-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-1/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqmalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-1/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqmalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-1/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqmalloc

Peak Compiler Invocation

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


C++ benchmarks (except as noted below):
icp -m64
SPEC CPU®2017 Integer Rate Result

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Peak Compiler Invocation (Continued)

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

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

505.mcf_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

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

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

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### Peak Optimization Flags (Continued)

557.xz_r: Same as 505.mcf_r

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.xalancbmk_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:

-Wl,-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

The flags files that were used to format this result can be browsed at:

http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-V1.2-R120h-RevE.html

You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-V1.2-R120h-RevE.xml