## SPEC CPU®2017 Integer Rate Result

### NEC Corporation

**Express5800/R120h-1M (Intel Xeon Bronze 3204)**

**SPECraten®2017_int_base** = 39.3  
**SPECraten®2017_int_peak** = 40.1  

### Hardware

- **CPU Name:** Intel Xeon Bronze 3204  
- **Max MHz:** 1900  
- **Nominal:** 1900  
- **Enabled:** 12 cores, 2 chips  
- **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:** 8.25 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R, running at 2133)  
- **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 v2.32 03/09/2020 released Jun-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.

---

### Test Information

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

### Performance Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
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<td>perlbench_r</td>
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<td>gcc_r</td>
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<td>mcf_r</td>
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<td>omnetpp_r</td>
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<td>xalancbmk_r</td>
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<td>leela_r</td>
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<tr>
<td>exchange2_r</td>
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**SPECrate®2017_int_base = 39.3**  
**SPECrate®2017_int_peak = 40.1**

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

### 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"

### 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
```

runcpu command invoked through numactl i.e.:

(Continued on next page)
General Notes (Continued)

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.


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 295195f888a3d7edbe6e646a485a0011
running on r120h1m Tue Sep 15 18:17:50 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) Bronze 3204 CPU @ 1.90GHz
  2 "physical id"s (chips)
  12 "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 : 6
  siblings : 6
  physical 0: cores 0 1 2 3 4 5
  physical 1: cores 0 1 2 3 4 5

From lscpu:
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**Test Date:** Sep-2020  
**Hardware Availability:** Dec-2019  
**Software Availability:** Sep-2019

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**Platform Notes (Continued)***

Architecture: x86_64  
CPU op-mode(s): 32-bit, 64-bit  
Byte Order: Little Endian  
CPU(s): 12  
On-line CPU(s) list: 0-11  
Thread(s) per core: 1  
Core(s) per socket: 6  
Socket(s): 2  
NUMA node(s): 2  
Vendor ID: GenuineIntel  
CPU family: 6  
Model: 85  
Model name: Intel(R) Xeon(R) Bronze 3204 CPU @ 1.90GHz  
Stepping: 6  
CPU MHz: 1900.000  
BogoMIPS: 3800.00  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 8448K  
NUMA node0 CPU(s): 0-2,6-8  
NUMA node1 CPU(s): 3-5,9-11  

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 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 xtpr pdcm pclid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch eb pcat_l3 cd_pcl3 invpcid_single intel_pmm intel_pt ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsaves vgetbv1 cqm_llc cqm_occu _llc cqm_mbb_total cqm_mbb_local dtherm arat pln pts pku ospke avx512_vnni md_clear spec_ctrl intel_stibp flush_l1d arch_capabilities

/proc/cpuinfo cache data  
cache size : 8448 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.  
available: 2 nodes (0-1)  
node 0 cpus: 0 1 2 6 7 8  
node 0 size: 196265 MB  
node 0 free: 191707 MB  
node 1 cpus: 3 4 5 9 10 11  
node 1 size: 196607 MB

(Continued on next page)
Platform Notes (Continued)

node 1 free: 192109 MB
node distances:
node  0  1
  0: 10 21
  1: 21 10

From /proc/meminfo
MemTotal:       395928236 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
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/swaps barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Full retpoline, IBPB

run-level 3 Sep 15 18:12

SPEC is set to: /home/cpu2017
    Filesystem Type Size Used Avail Use% Mounted on
    /dev/sda3    ext4  908G 186G  677G  22% /

From /sys/devices/virtual/dmi/id

(Continued on next page)
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- **Test Sponsor**: NEC Corporation
- **Tested by**: NEC Corporation
- **Test Date**: Sep-2020
- **Hardware Availability**: Dec-2019
- **Software Availability**: Sep-2019

### Platform Notes (Continued)

- **BIOS**: NEC U32 03/09/2020
- **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 frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

- **Memory**: 24x HPE P03050-091 16 GB 2 rank 2933

(End of data from sysinfo program)

Regarding the sysinfo display about the memory speed, the correct configured memory speed is 2133 MT/s. The dmidecode description should be as follows:

24x HPE P03050-091 16 GB 2 rank 2933, configured at 2133

### 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, Version 19.0.4.227 Build 20190416
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Compiler Version Notes (Continued)

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<td>Version 19.0.4.227 Build 20190416</td>
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<td>Copyright (C) 1985-2019 Intel Corporation. All rights reserved.</td>
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<p>| C++  | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak) |
|-----------------------------------------------|
| Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,                  |
| Version 19.0.4.227 Build 20190416                                                       |</p>
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<p>| 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                                                      |</p>
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Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

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

(Continued on next page)
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Base Portability Flags (Continued)
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
- L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
- lqkmalloc

C++ benchmarks:
- 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

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

Peak Compiler Invocation

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

502.gcc_r.icc -m32 -std=c11 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/ia32_lin

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64
PEC CPU®2017 Integer Rate Result

Copyright 2017-2020 Standard Performance Evaluation Corporation

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Software Availability: Sep-2019

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: -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

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: basepeak = yes
- 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

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

NEC Corporation

Express5800/R120h-1M (Intel Xeon Bronze 3204)

SPECRate®2017_int_base = 39.3
SPECRate®2017_int_peak = 40.1

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

Test Date: Sep-2020
Hardware Availability: Dec-2019
Software Availability: Sep-2019

Peak Optimization Flags (Continued)

523.xalancbmk_r: basepeak = yes

531.deepsjeng_r: Same as 520.omnetpp_r

541.leela_r: Same as 520.omnetpp_r

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

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

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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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