**SPEC CPU® 2017 Integer Rate Result**

**NEC Corporation**

**Express5800/R120i-1M (Intel Xeon Gold 6342)**

<table>
<thead>
<tr>
<th>SPECrate® 2017_int_base = 383</th>
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<tbody>
<tr>
<td>SPECrate® 2017_int_peak = 397</td>
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**Test Sponsor:** NEC Corporation  
**Test Date:** Aug-2021  
**Tested by:** NEC Corporation  
**Software Availability:** Dec-2020

<table>
<thead>
<tr>
<th>Software</th>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS: Red Hat Enterprise Linux release 8.3 (Ootpa) 4.18.0-240.el8.x86_64</td>
<td>CPU Name: Intel Xeon Gold 6342</td>
</tr>
<tr>
<td>Compiler: C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux; Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux; C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux</td>
<td>Max MHz: 3500</td>
</tr>
<tr>
<td>File System: ext4</td>
<td>Enabled: 48 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>System State: Run level 3 (multi-user)</td>
<td>Orderable: 1.2 chips</td>
</tr>
<tr>
<td>Base Pointers: 64-bit</td>
<td>Cache L1: 32 KB I + 48 KB D on chip per core</td>
</tr>
<tr>
<td>Peak Pointers: 32/64-bit</td>
<td>L2: 1.25 MB I+D on chip per core</td>
</tr>
<tr>
<td>Other: None</td>
<td>L3: 36 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Power Management: BIOS set to prefer performance at the cost of additional power usage.</td>
<td>Other: None</td>
</tr>
</tbody>
</table>

**Hardware**

**Software**

**Copies**

- 500.perlbench_r 96
- 502.gcc_r 96
- 505.mcf_r 96
- 520.omnetpp_r 96
- 523.xalancbmk_r 96
- 525.x264_r 96
- 531.deepsjeng_r 96
- 541.leela_r 96
- 548.exchange2_r 96
- 557.xz_r 96

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**Test Date:** Aug-2021  
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**NEC Corporation**

**Express5800/R120i-1M (Intel Xeon Gold 6342)**

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### Results Table

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<td>211</td>
<td>492</td>
<td>211</td>
<td></td>
<td></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"

**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"
MALLOC_CONF = "retain:true"
```

**General Notes**

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Red Hat Enterprise Linux 8.1

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)

(Continued on next page)
General Notes (Continued)

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.

This benchmark result is intended to provide perspective on past performance using the historical software and/or firmware described on this result page.

The system as described on this result page was formerly generally available. At the time of this publication, it may not be shipping, and/or may not be supported, and/or may fail to meet other tests of General Availability described in the SPEC OSG Policy document, http://www.spec.org/osg/policy.html

This measured result may not be representative of the result that would be measured were this benchmark run with software and firmware available as of the publication date.

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>
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
Advanced Memory Protection: Advanced ECC Support
Memory Patrol Scrubbing: Disabled
Minimum Processor Idle Power Core C-State: C6 State
LLC Dead Line Allocation: Disabled
Enhanced Processor Performance: Enabled
XPT Prefetcher: Enabled
Intel UPI Link Enablement: Single Link Operation
Intel UPI Link Frequency: Min UPI Speed
Direct To UPI (D2K): Disabled
Workload Profile: Custom
Adjacent Sector Prefetch: Disabled
DCU Stream Prefetcher: Disabled
Intel UPI Link Power Management: Enabled
Energy Efficient Turbo: Enabled

(Continued on next page)
SPEC CPU®2017 Integer Rate Result
Copyright 2017-2023 Standard Performance Evaluation Corporation

NEC Corporation

Express5800/R120i-1M (Intel Xeon Gold 6342)

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

SPECrater®2017_int_base = 383
SPECrater®2017_int_peak = 397

Test Date: Aug-2021
Hardware Availability: Jul-2021
Software Availability: Dec-2020

Platform Notes (Continued)

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acaf64d
running on r120i1m Tue Aug 24 10:43:57 2021

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 6342 CPU @ 2.80GHz
2 "physical id"s (chips)
96 "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 : 24
siblings : 48
physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

From lscpu from util-linux 2.32.1:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 96
On-line CPU(s) list: 0-95
Thread(s) per core: 2
Core(s) per socket: 24
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 6342 CPU @ 2.80GHz
Stepping: 6
CPU MHz: 3346.760
BogoMIPS: 5600.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 36864K
NUMA node0 CPU(s): 0-11,48-59
NUMA node1 CPU(s): 12-23,60-71
NUMA node2 CPU(s): 24-35,72-83
NUMA node3 CPU(s): 36-47,84-95
Flags: fpu vme de pse tsc msr pae mce cx8 apa sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp

(Continued on next page)
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Platform Notes (Continued)

```
lm_constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtpm pdc md cpcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 invpcid_single ssbd
mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmni flexpriority ept vpid ept_ad
fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cmp rdt_a avx512f avx512dq
rdsed adx smap avx512ifma cfliushopt clwb intel_pt avx512cd sha ni avx512bw
avx512vl xsavesoxt xsaveopt xsaves xcetbs xsavec xsaveopt xsavec xgetbv1 xsaveopt
avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities
```

/proc/cpuinfo cache data
  cache size : 36864 KB

From 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 4 5 6 7 8 9 10 11 48 49 50 51 52 53 54 55 56 57 58 59
    node 0 size: 251649 MB
    node 0 free: 257194 MB
    node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23 60 61 62 63 64 65 66 67 68 69 70 71
    node 1 size: 252236 MB
    node 1 free: 257475 MB
    node 2 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 72 73 74 75 76 77 78 79 80 81 82 83
    node 2 size: 252520 MB
    node 2 free: 257658 MB
    node 3 cpus: 36 37 38 39 40 41 42 43 44 45 46 47 84 85 86 87 88 89 90 91 92 93 94 95
    node 3 size: 252319 MB
    node 3 free: 257666 MB
    node distances:
      node 0 1 2 3
      0: 10 20 30 30
      1: 20 10 30 30
      2: 30 30 10 20
      3: 30 30 20 10

From /proc/meminfo
  MemTotal: 1056516436 KB
  HugePages_Total: 0
  Hugepagesize: 2048 KB

/sbin/tuned-adm active
  Current active profile: throughput-performance

From /etc/*release* /etc/*version*
os-release:
Platform Notes (Continued)

NAME="Red Hat Enterprise Linux"
VERSION="8.3 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.3"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:
  Linux r120i1m 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5753 (Spectre variant 1): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2017-5715 (Spectre variant 2):
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Aug 24 10:42

SPEC is set to: /home/cpu2017

From /sys/devices/virtual/dmi/id
  Vendor: NEC
  Product: Express5800/R120i-1M
  Product Family: Express5800
  Serial: CN70450X8H

Additional information from dmidecode 3.2 follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to
Platform Notes (Continued)

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:

32x Hynix HMA84GR7CJR4N-XN 32 GB 2 rank 3200

BIOS:

BIOS Vendor:       NEC
BIOS Version:      U46
BIOS Date:         04/28/2021
BIOS Revision:     1.40
Firmware Revision: 2.44

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C       | 500.perlbench_r(peak)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C       | 502.gcc_r(peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version
2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)
| 525.x264_r(base, peak) 557.xz_r(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------

==============================================================================
C       | 500.perlbench_r(peak)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
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(Continued on next page)
## NEC Corporation

**Express5800/R120i-1M (Intel Xeon Gold 6342)**

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<td>C</td>
<td>500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak) 557.xz_r(base, peak)</td>
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<tr>
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<td>520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak)</td>
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NEC Corporation

Express5800/R120i-1M (Intel Xeon Gold 6342)

SPECrète®2017_int_base = 383
SPECrète®2017_int_peak = 397

| Test Date: | Aug-2021 |
| Test Sponsor: | NEC Corporation |
| Tested by: | NEC Corporation |
| CPU2017 License: | 9006 |
| Hardware Availability: | Jul-2021 |
| Software Availability: | Dec-2020 |

Compiler Version Notes (Continued)

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<th>531.deepsjeng_r(base, peak)</th>
<th>541.leela_r(base, peak)</th>
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</table>

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
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Base Compiler Invocation

C benchmarks:
- icx

C++ benchmarks:
- icpx

Fortran benchmarks:
- ifort

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.xalanchmk_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
SPEC CPU®2017 Integer Rate Result

NEC Corporation

Express5800/R120i-1M (Intel Xeon Gold 6342)

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Test Sponsor: NEC Corporation
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Test Date: Aug-2021
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Base Optimization Flags

C benchmarks:
- w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
- flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
- mbranches-within-32B-boundaries
- L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
- lqkmalloc

C++ benchmarks:
- w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
- mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
- mbranches-within-32B-boundaries
- L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
- lqkmalloc

Fortran benchmarks:
- w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div
- qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
- auto -mbranches-within-32B-boundaries
- L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
- lqkmalloc

Peak Compiler Invocation

C benchmarks (except as noted below):
icx
500.perlbench_r: icc

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

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

(Continued on next page)
SPEC CPU®2017 Integer Rate Result
Copyright 2017-2023 Standard Performance Evaluation Corporation

NEC Corporation
Express5800/R120i-1M (Intel Xeon Gold 6342)

**SPECrate®2017_int_base = 383**
**SPECrate®2017_int_peak = 397**

**CPU2017 License:** 9006  
**Test Sponsor:** NEC Corporation  
**Tested by:** NEC Corporation  
**Test Date:** Aug-2021  
**Hardware Availability:** Jul-2021  
**Software Availability:** Dec-2020

### Peak Portability Flags (Continued)

- 525.x264_r: -DSPEC_LP64
- 531.deepsjeng_r: -DSPEC_LP64
- 541.leet_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)
- -xCORE-AVX512 -ipo -O3 -no-prec-div
- -qopt-mem-layout-trans=4 -fno-strict-overflow
- -mbranches-within-32B-boundaries
- -L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
- -lqkmalloc

- 502.gcc_r: -m32
- -L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/ia32_lin
- -std=gnu89 -Wl,-z,muldefs -fprofile-generate(pass 1)
- -fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto
- -Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4
- -mbranches-within-32B-boundaries
- -L/usr/local/jemalloc32-5.0.1/lib -ljemalloc

- 505.mcf_r: basepeak = yes

- 525.x264_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
- -O3 -ffast-math -qopt-mem-layout-trans=4 -fno-alias
- -mbranches-within-32B-boundaries
- -L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
- -lqkmalloc

- 557.xz_r: basepeak = yes

#### C++ benchmarks:

- 520.omnetpp_r: basepeak = yes
- 523.xalancbmk_r: basepeak = yes
- 531.deepsjeng_r: basepeak = yes

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

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Peak Optimization Flags (Continued)

541.leela_r: basepeak = yes

Fortran benchmarks:

548.exchange2_r: basepeak = yes

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-R120i-RevE.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/NEC-Platform-Settings-V1.2-R120i-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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