NEC Corporation

**Express5800/R120i-2M (Intel Xeon Gold 6346)**

<table>
<thead>
<tr>
<th>SPECspeed²017_int_base</th>
<th>SPECspeed²017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.1</td>
<td>12.3</td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Gold 6346
- **Max MHz:** 3600
- **Nominal:** 3100
- **Enabled:** 32 cores, 2 chips, 2 threads/core
- **Orderable:** 1.2 chips
- **Cache L1:** 32 KB I + 48 KB D on chip per core
- **L2:** 1.25 MB I+D on chip per core
- **L3:** 36 MB I+D on chip per chip
- **Other:** None
- **Memory:** 2 TB (32 x 64 GB 2Rx4 PC4-3200AA-R)
- **Storage:** 1 x 800 GB SAS SSD, RAID 0
- **Other:** None

**Software**

- **OS:** Red Hat Enterprise Linux release 8.3 (Ootpa) 4.18.0-240.el8.x86_64
- **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
- **Parallel:** Yes
- **Firmware:** NEC BIOS Version U46 v1.40 04/28/2021 released Jul-2021
- **File System:** ext4
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** jemalloc memory allocator V5.0.1
- **Power Management:** BIOS set to balance power and performance.
**SPEC CPU®2017 Integer Speed Result**

**NEC Corporation**

Express5800/R120i-2M (Intel Xeon Gold 6346)

---

**SPECspeed®2017_int_base = 12.1**

**SPECspeed®2017_int_peak = 12.3**

---

**Results Table**

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<th>Seconds</th>
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<td>64</td>
<td>260</td>
<td>23.8</td>
<td>260</td>
<td>23.8</td>
</tr>
</tbody>
</table>

---

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:

- KMP_AFFINITY = "granularity=fine,scatter"
- LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
- MALLOC_CONF = "retain:true"
- OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Redhat Enterprise Linux 8.0

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.

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

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

NEC Corporation

Express5800/R120i-2M (Intel Xeon Gold 6346)

SPECspeed®2017_int_base = 12.1
SPECspeed®2017_int_peak = 12.3

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

General Notes ( Continued )

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
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 Peak Frequency 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
LLC Prefetch: Enabled
Enhanced Processor Performance: Enabled
Workload Profile: Custom
Minimum Processor Idle Power Package C-State: No Package State
Energy/Performance Bias: Balanced Power
Adjacent Sector Prefetch: Disabled
DCU Stream Prefetcher: Disabled
Numa Group Size Optimization: Flat

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca6f64d
running on r12012m Fri Aug 27 16:05:04 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 6346 CPU @ 3.10GHz
2 "physical id"s (chips)
### SPEC CPU®2017 Integer Speed Result

**NEC Corporation**

Express5800/R120i-2M (Intel Xeon Gold 6346)

---

**SPECspeed®2017_int_base = 12.1**

**SPECspeed®2017_int_peak = 12.3**

---

**CPU2017 License:** 9006

**Test Sponsor:** NEC Corporation

**Test Date:** Aug-2021

**CPU2017 License:** 9006

**Tested by:** NEC Corporation

**Hardware Availability:** Jul-2021

**Software Availability:** Dec-2020

---

### Platform Notes (Continued)

64 "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 : 16
  - siblings : 32
  - physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
  - physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

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): 64
- On-line CPU(s) list: 0-63
- Thread(s) per core: 2
- Core(s) per socket: 16
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 106
- Model name: Intel(R) Xeon(R) Gold 6346 CPU @ 3.10GHz
- Stepping: 6
- CPU MHz: 2774.886
- BogoMIPS: 6200.00
- Virtualization: VT-x
- L1d cache: 48K
- L1i cache: 32K
- L2 cache: 1280K
- L3 cache: 36864K
- NUMA node0 CPU(s): 0-15,32-47
- NUMA node1 CPU(s): 16-31,48-63
- Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov

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

NEC Corporation

Express5800/R120i-2M (Intel Xeon Gold 6346)

SPECspeed®2017_int_base = 12.1
SPECspeed®2017_int_peak = 12.3

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

Platform Notes (Continued)

cache size : 36864 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 3 4 5 6 7 8 9 10 11 12 13 14 15 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
  node 0 size: 981737 MB
  node 0 free: 1030923 MB
  node 1 cpus:  16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
  node 1 size: 974321 MB
  node 1 free: 1031358 MB
  node distances:
    node 0 1
    0: 10 20
    1: 20 10

From /proc/meminfo
  MemTotal:       2113487520 kB
  HugePages_Total:       0
  Hugepagesize:       2048 kB

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

From /etc/*release* /etc/*version*
  os-release:
    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 r120i2m 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020 x86_64 x86_64
  x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected

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

**NEC Corporation**  
Express5800/R120i-2M (Intel Xeon Gold 6346)  

<table>
<thead>
<tr>
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<td>Tested by:</td>
<td>NEC Corporation</td>
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**SPECspeed®2017_int_base = 12.1**  
**SPECspeed®2017_int_peak = 12.3**

<table>
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<tr>
<th>Test Date:</th>
<th>Aug-2021</th>
</tr>
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<tbody>
<tr>
<td>Hardware Availability:</td>
<td>Jul-2021</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2020</td>
</tr>
</tbody>
</table>

#### Platform Notes (Continued)

- **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/swaps barriers and __user pointer sanitization
- **CVE-2017-5753** (Spectre variant 1): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
- **CVE-2017-5715** (Spectre variant 2): Not affected
- **CVE-2020-0543** (Special Register Buffer Data Sampling): Not affected
- **CVE-2019-11135** (TSX Asynchronous Abort): Not affected

**run-level 3 Aug 27 16:02**

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

**Filesystem**  
<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
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<tr>
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<td>724G</td>
<td>109G</td>
<td>578G</td>
<td>16%</td>
<td>/</td>
</tr>
</tbody>
</table>

**From /sys/devices/virtual/dmi/id**

**Vendor:** NEC  
**Product:** Express5800/R120i-2M  
**Product Family:** Express5800  
**Serial:** CN705114NH

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 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 HMAA8GR7AJR4N-XN 64 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        | 600.perlbench_s(peak) |
```

(Continued on next page)
NEC Corporation
Express5800/R120i-2M (Intel Xeon Gold 6346)

SPEC CPU®2017 Integer Speed Result

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

SPECspeed®2017_int_base = 12.1
SPECspeed®2017_int_peak = 12.3

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

Compiler Version Notes (Continued)

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       | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
       | 625.x264_s(base, peak) 657.xz_s(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       | 600.perlbench_s(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       | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
       | 625.x264_s(base, peak) 657.xz_s(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++     | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak)
       | 631.deepsjeng_s(base, peak) 641.leela_s(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.

==============================================================================
Fortran | 648.exchange2_s(base, peak)
Intel(R) Fortran 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.

(Continued on next page)
NEC Corporation

Express5800/R120i-2M (Intel Xeon Gold 6346)

**SPEC CPU®2017 Integer Speed Result**

<table>
<thead>
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<th>Metric</th>
<th>Value</th>
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<tr>
<td>SPECspeed®2017_int_base</td>
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<tr>
<td>SPECspeed®2017_int_peak</td>
<td>12.3</td>
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</table>

**CPU2017 License:** 9006

**Test Sponsor:** NEC Corporation

**Tested by:** NEC Corporation

**Test Date:** Aug-2021

**Hardware Availability:** Jul-2021

**Software Availability:** Dec-2020

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**Compiler Version Notes (Continued)**

**Base Compiler Invocation**

- C benchmarks: `icx`
- C++ benchmarks: `icpx`
- Fortran benchmarks: `ifort`

**Base Portability Flags**

- `600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64`
- `602.gcc_s: -DSPEC_LP64`
- `605.mcf_s: -DSPEC_LP64`
- `620.omnetpp_s: -DSPEC_LP64`
- `623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX`
- `625.x264_s: -DSPEC_LP64`
- `631.deepsjeng_s: -DSPEC_LP64`
- `641.leela_s: -DSPEC_LP64`
- `648.exchange2_s: -DSPEC_LP64`
- `657.xz_s: -DSPEC_LP64`

**Base Optimization Flags**

- C benchmarks:
  - `-DSPEC_OPENMP -std=c11 -m64 -fiopenmp -Wl,-z,muldefs -xCORE-AVX512`
  - `-O3 -ffast-math -flto -mfpmath=sse -funroll-loops`
  - `-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries`
  - `-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

- C++ benchmarks:
  - `-DSPEC_OPENMP -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/`
  - `-lqkmallocc`

(Continued on next page)
SPEC CPU®2017 Integer Speed Result
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NEC Corporation
Express5800/R120i-2M (Intel Xeon Gold 6346)

| SPECspeed®2017_int_base = 12.1 |
| SPECspeed®2017_int_peak = 12.3 |

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

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

Base Optimization Flags (Continued)

Fortran benchmarks:
- m64 -xCORE-AVX512 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
- nostandard-realloc-lhs -align array32byte -auto
- mbranches-within-32B-boundaries

Peak Compiler Invocation

C benchmarks (except as noted below):
icx
600.perlbench_s: icc

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
600.perlbench_s: -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/usr/local/jemalloc64-5.0.1/lib -ljemalloc

602.gcc_s: -m64 -std=c11 -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/jemalloc64-5.0.1/lib -ljemalloc

605.mcf_s: basepeak = yes

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

NEC Corporation
Express5800/R120i-2M (Intel Xeon Gold 6346)

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SPECspeed®2017_int_base = 12.1
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CPU2017 License: 9006
Test Sponsor: NEC Corporation
Test Date: Aug-2021
Tested by: NEC Corporation
Hardware Availability: Jul-2021
Software Availability: Dec-2020

Peak Optimization Flags (Continued)

625.x264_s: -DSPEC_OPENMP -fiopenmp -std=c11 -m64 -Wl,-z,muldefs
-xCORE-AVX512 -flto -o3 -ffast-math
-qopt-mem-layout-trans=4 -fno-alias
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

657.xz_s: basepeak = yes

C++ benchmarks:
620.omnetpp_s: basepeak = yes
623.xalancbmk_s: basepeak = yes
631.deepsjeng_s: basepeak = yes
641.leela_s: basepeak = yes

Fortran benchmarks:
648.exchange2_s: 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.

Tested with SPEC CPU®2017 v1.1.8 on 2021-08-27 03:05:03-0400.
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