NEC Corporation

Express5800/R120i-1M (Intel Xeon Platinum 8358)

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

CPU Name: Intel Xeon Platinum 8358
Max MHz: 3400
Nominal: 2600
Enabled: 64 cores, 2 chips
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: 48 MB I+D on chip per chip
Other: None
Memory: 1 TB (32 x 32 GB 2Rx4 PC4-3200AA-R)
Storage: 1 x 800 GB SAS SSD, RAID 0
Other: None

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 Floating Point Speed Result**

**NEC Corporation**

Express5800/R120i-1M (Intel Xeon Platinum 8358)

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
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<tr>
<td>603.bwaves_s</td>
<td>64</td>
<td>80.6</td>
<td>732</td>
<td><strong>81.2</strong></td>
<td><strong>727</strong></td>
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<td>726</td>
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<tr>
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<td>64</td>
<td>60.6</td>
<td>275</td>
<td><strong>61.2</strong></td>
<td><strong>272</strong></td>
<td>61.4</td>
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<td>60.0</td>
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<td><strong>221</strong></td>
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<td>627.cam4_s</td>
<td>64</td>
<td>52.0</td>
<td>170</td>
<td>52.0</td>
<td>170</td>
<td><strong>52.0</strong></td>
<td><strong>170</strong></td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>64</td>
<td>137</td>
<td>86.8</td>
<td><strong>134</strong></td>
<td><strong>88.4</strong></td>
<td>134</td>
<td>88.4</td>
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<td>64</td>
<td>65.7</td>
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<td><strong>65.6</strong></td>
<td><strong>220</strong></td>
<td>65.6</td>
<td>220</td>
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<td>644.nab_s</td>
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<td><strong>442</strong></td>
<td>39.4</td>
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<td>649.fotonik3d_s</td>
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<td>654.roms_s</td>
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<td>56.1</td>
<td>281</td>
<td><strong>55.6</strong></td>
<td><strong>283</strong></td>
<td>55.6</td>
<td>283</td>
</tr>
</tbody>
</table>

**Results 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,compact"
  - 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.

(Continued on next page)
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
Intel Hyper-Threading: Disabled
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 982a61ec0915b55891ef0e16aca64d4d
running on r1201m Sat Sep  4 13:17:11 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) Platinum 8358 CPU @ 2.60GHz

(Continued on next page)
NEC Corporation

Express5800/R120i-1M (Intel Xeon Platinum 8358)

SPEC CPU®2017 Floating Point Speed Result

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SPECspeed®2017_fp_base = 222
SPECspeed®2017_fp_peak = 225

NEC Corporation

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

Platform Notes (Continued)

2 "physical id"s (chips)
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 : 32
siblings : 32
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 24 25 26 27 28 29 30 31
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 24 25 26 27 28 29 30 31

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: 1
Core(s) per socket: 32
Socket: 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Platinum 8358 CPU @ 2.60GHz
Stepping: 6
CPU MHz: 2925.411
BogoMIPS: 5200.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 49152K
NUMA node0 CPU(s): 0-31
NUMA node1 CPU(s): 32-63
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 cpuid aperffilter pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtrr pdcm pclid 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 vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid cmp rdtp a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsavesopt xsaveopt xsave xgetbv1 xsaveas cmp_llc cmp_occu_llc cmp_mbm_total cmp_mbm_local split_lock_detect wbnoinvd dtherm ida arat pln pts avx512vbmi umip pkp ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bital g tme

(Continued on next page)
### NEC Corporation

**NEC Corporation**

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

---

### SPEC CPU 2017 Floating Point Speed Result

**SPECspeed**

- **SPECspeed®2017_fp_base = 222**
- **SPECspeed®2017_fp_peak = 225**

---

#### Platform Notes (Continued)

```
avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities
```

```
/proc/cpuinfo cache data
  cache size : 49152 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 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
  node 0 size: 486149 MB
  node 0 free: 508965 MB
  node 1 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
  node 1 size: 486940 MB
  node 1 free: 514470 MB
  node distances:
      node   0   1
    0:  10  20
    1:  20  10

From /proc/meminfo
    MemTotal:       1056524032 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 r120i1m 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
```

(Continued on next page)
**SPEC CPU®2017 Floating Point Speed Result**

**NEC Corporation**

Express5800/R120i-1M (Intel Xeon Platinum 8358)

**SPECspeed®2017_fp_base = 222**

**SPECspeed®2017_fp_peak = 225**

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<tr>
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<td>Dec-2020</td>
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</tbody>
</table>

**Platform Notes (Continued)**

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

run-level 3 Sep 4 09:17

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

```
Filesystem  Type  Size  Used  Avail  Use% Mounted on
/dev/sda3  ext4  724G  171G  516G   25%   /
```

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 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)
NEC Corporation

Express5800/R120i-1M (Intel Xeon Platinum 8358)

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SPEC CPU®2017 Floating Point Speed Result

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NEC Corporation

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

Compiler Version Notes

==============================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
| 644.nab_s(base)
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               | 644.nab_s(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               | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
| 644.nab_s(base)
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C               | 644.nab_s(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++, C, Fortran | 607.cactuBSSN_s(base, 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.
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
64, Version 2021.1 Build 20201112_000000
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Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
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NEC Corporation
Express5800/R120i-1M (Intel Xeon Platinum 8358)

SPECspeed®2017_fp_base = 222
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CPU2017 License: 9006
Test Sponsor: NEC Corporation
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Compiler Version Notes (Continued)

==============================================================================
<table>
<thead>
<tr>
<th>Fortran</th>
<th>603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak)</th>
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==============================================================================

Base Compiler Invocation

C benchmarks:
icc

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG

(Continued on next page)
### NEC Corporation

**Express5800/R120i-1M (Intel Xeon Platinum 8358)**

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### Base Portability Flags (Continued)

- 628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
- -assume byterecl
- 638.imagick_s: -DSPEC_LP64
- 644.nab_s: -DSPEC_LP64
- 649.fotonik3d_s: -DSPEC_LP64
- 654.roms_s: -DSPEC_LP64

### Base Optimization Flags

**C benchmarks:**

- -m64 -std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
- -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
- -mbranches-within-32B-boundaries

**Fortran benchmarks:**

- -m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3
- -no-prec-div -qopt-prefetch -ffinite-math-only
- -qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs
- -mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib
- -ljemalloc

**Benchmarks using both Fortran and C:**

- -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
- -DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs
- -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

**Benchmarks using Fortran, C, and C++:**

- -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
- -DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs
- -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

### Peak Compiler Invocation

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

- icc
- 644.nab_s: icx

**Fortran benchmarks:**

- ifort

(Continued on next page)
SPEC CPU®2017 Floating Point Speed Result
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NEC Corporation
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SPECspeed®2017_fp_base = 222
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</table>

Peak Compiler Invocation (Continued)

Benchmarks using both Fortran and C:
ifort icc
Benchmarks using Fortran, C, and C++:
icpc icc ifort

Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
619.lbm_s: basepeak = yes
638.imagick_s: basepeak = yes
644.nab_s: -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -fipopt
-DSPEC_OPENMP -qopt-mem-layout-trans=4
-fimf-accuracy-bits=14:sqrt
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:
603.bwaves_s: -m64 -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-DSPEC_SUPPRESS_OPENMP -DSPEC_OPENMP -ipo -xCORE-AVX512
-03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=4 -qopenmp -nostream-realloc-lhs
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
649.fotonik3d_s: Same as 603.bwaves_s
654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:

(Continued on next page)
**SPEC CPU®2017 Floating Point Speed Result**

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<th>Test Date: Sep-2021</th>
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<td>Hardware Availability: Jul-2021</td>
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<td>Tested by: NEC Corporation</td>
<td>Software Availability: Dec-2020</td>
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**Peak Optimization Flags (Continued)**

621.wrf_s: basepeak = yes
627.cam4_s: basepeak = yes
628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:
607.cactuBSSN_s: 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:
- 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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