### SPEC CPU®2017 Floating Point Speed Result

#### ASUSTeK Computer Inc.

ASUS RS720-E11-RS12U(Z13PP-D32) Server System (2.00 GHz, Intel Xeon Platinum 8480+)

- **CPU2017 License:** 9016
- **Test Sponsor:** ASUSTeK Computer Inc.
- **Tested by:** ASUSTeK Computer Inc.

#### Table: Benchmark Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>112</td>
<td>371</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>112</td>
<td>294</td>
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<tr>
<td>619.lbm_s</td>
<td>112</td>
<td>212</td>
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<tr>
<td>621.wrf_s</td>
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<td>215</td>
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<tr>
<td>627.cam4_s</td>
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<td>99.1</td>
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<td>628.pop2_s</td>
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<tr>
<td>638.imagick_s</td>
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<td>644.nab_s</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>112</td>
<td>189</td>
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<tr>
<td>654.roms_s</td>
<td>112</td>
<td>571</td>
<td>571</td>
</tr>
</tbody>
</table>

#### Hardware

- **CPU Name:** Intel Xeon Platinum 8480+
- **Max MHz:** 3800
- **Nominal:** 2000
- **Enabled:** 112 cores, 2 chips
- **Orderable:** 1, 2 chip(s)
- **Cache L1:** 32 KB I + 48 KB D on chip per core
- **Cache L2:** 2 MB I+D on chip per core
- **Cache L3:** 105 MB I+D on chip per chip
- **Memory:** 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)
- **Storage:** 1 x 1.6 TB PCIE NVME SSD
- **Other:** None

#### Software

- **OS:** SUSE Linux Enterprise Server 15 SP4 (x86_64)
  - Kernel 5.14.21-150400.22-default
- **Compiler:** C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux;
  - Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;
- **Parallel:** Yes
- **Firmware:** Version 0501 released Dec-2022
- **File System:** xfs
- **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 and OS set to prefer performance at the cost of additional power usage.
ASUSTeK Computer Inc.

ASUS RS720-E11-2S12U(Z13PP-D32) Server System
(2.00 GHz, Intel Xeon Platinum 8480+)

CPU2017 License: 9016
Test Date: Jan-2023
Test Sponsor: ASUSTeK Computer Inc.
Hardware Availability: Jan-2023
Tested by: ASUSTeK Computer Inc.
Software Availability: Jun-2022

Results Table

<table>
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<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Ratio</th>
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<td>28.5</td>
<td>553</td>
<td>27.6</td>
<td>571</td>
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</tbody>
</table>

SPECspeed®2017_fp_base = 371
SPECspeed®2017_fp_peak = 371

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

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
OS set to performance mode via cpupower frequency-set -g performance

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/spec2017/lib/intel64:/spec2017/je5.0.1-64"
MALLOC_CONF = "retain:true"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using Redhat Enterprise Linux 8.0
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
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.
jemalloc, a general purpose malloc implementation built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

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(2.00 GHz, Intel Xeon Platinum 8480+)

SPECspeed®2017_fp_base = 371
SPECspeed®2017_fp_peak = 371

BIOS Configuration:
VT-d = Disabled
Patrol Scrub = Disabled
Hyper-Threading = Disable
Engine Boost = Aggressive
SR-IOV Support = Disabled
BMC Configuration:
Fan mode = Full speed mode

Sysinfo program /spec2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost Tue Jan 3 12:12:04 2023

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 8480+
  2 "physical id"s (chips)
  112 "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 : 56
siblings : 56
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 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
  53 54 55
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 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
  53 54 55

From lscpu from util-linux 2.37.2:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Address sizes: 46 bits physical, 57 bits virtual
Byte Order: Little Endian
CPU(s): 112
On-line CPU(s) list: 0-111
Vendor ID: GenuineIntel
Model name: Intel(R) Xeon(R) Platinum 8480+
CPU family: 6

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ASUSTeK Computer Inc.

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CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

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<tbody>
<tr>
<td>Specspeed®2017_fp_peak</td>
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</tbody>
</table>

CPU2017 License: 9016
Test Date: Jan-2023
Hardware Availability: Jan-2023
Software Availability: Jun-2022

CPU max MHz: 3800.0000
CPU min MHz: 800.0000
BogoMIPS: 4000.00

Model: 143
Thread(s) per core: 1
Core(s) per socket: 56
Socket(s): 2
Stepping: 8

<table>
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<tr>
<th>Platform Notes (Continued)</th>
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<tr>
<td>CPU min MHz: 800.0000</td>
</tr>
<tr>
<td>BogoMIPS: 4000.00</td>
</tr>
<tr>
<td>Flags:</td>
</tr>
<tr>
<td>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 xtopology nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor ds cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid 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 cat_l2 cdp_l3 invpcid_single intel_pcn cdq l2s mda ibrs ibpb stibp ibrs_enhanced tpr_shadow vmxni flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cmp cmq rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsxsave xxsaves cmq_llc cmq_occup_llc cmq_mbb_total cmq_mbb_local split_lock_detect avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req avx512vbmi uimp kpu ospke waitpkg avx512vbmi2 gfin vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid bus_lock_detect cldemote movdiri movdir64b enqcmd fasm md_clear serialize txmlintrk pconfig arch_lbr avx512_fp16 amx_tile flush_l1d arch_capabilities</td>
</tr>
<tr>
<td>Virtualization: VT-x</td>
</tr>
<tr>
<td>L1d cache: 5.3 MiB (112 instances)</td>
</tr>
<tr>
<td>L1i cache: 3.5 MiB (112 instances)</td>
</tr>
<tr>
<td>L2 cache: 224 MiB (112 instances)</td>
</tr>
<tr>
<td>L3 cache: 210 MiB (2 instances)</td>
</tr>
<tr>
<td>NUMA node(s): 2</td>
</tr>
<tr>
<td>NUMA node0 CPU(s): 0-55</td>
</tr>
<tr>
<td>NUMA node1 CPU(s): 56-111</td>
</tr>
<tr>
<td>Vulnerability Itlb multihit: Not affected</td>
</tr>
<tr>
<td>Vulnerability L1tf: Not affected</td>
</tr>
<tr>
<td>Vulnerability Mds: Not affected</td>
</tr>
<tr>
<td>Vulnerability Meltdown: Not affected</td>
</tr>
<tr>
<td>Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp</td>
</tr>
<tr>
<td>Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitation</td>
</tr>
<tr>
<td>Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling</td>
</tr>
<tr>
<td>Vulnerability Srbd6s: Not affected</td>
</tr>
<tr>
<td>Vulnerability Ttx async abort: Not affected</td>
</tr>
</tbody>
</table>

From lscpu --cache:
NAME ONE-SIZE ALL-SIZE WAYS TYPE LEVEL SETS PHY-LINE COHERENCY-SIZE

(Continued on next page)
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Hardware Availability: Jan-2023
Software Availability: Jun-2022

Platform Notes (Continued)

<table>
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<th></th>
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<th>12 Data</th>
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<td>3.5M</td>
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<td>224M</td>
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<td>3</td>
<td>114688</td>
<td>1</td>
<td>64</td>
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</tr>
</tbody>
</table>

/proc/cpuinfo cache data

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 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
node 0 size: 515688 MB
node 0 free: 514268 MB
node 1 cpus: 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
  81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106
node 1 size: 516052 MB
node 1 free: 513788 MB
node distances:
node 0 1
 0: 10 21
 1: 21 10

From /proc/meminfo
MemTotal: 1056502804 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance

From /etc/*release* /etc/*version*
os-release:
  NAME="SLES"
  VERSION="15-SP4"
  VERSION_ID="15.4"
  PRETTY_NAME="SUSE Linux Enterprise Server 15 SP4"
  ID="sles"
  ID_LIKE="suse"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:15:sp4"

uname -a:
  Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18
  UTC 2022 (49db222) x86_64 x86_64 x86_64 GNU/Linux

(Continued on next page)
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SPECspeed®2017_fp_base = 371
SPECspeed®2017_fp_peak = 371

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): 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 Jan 3 10:35

SPEC is set to: /spec2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/nvme0n1p8 xfs 1.3T 13G 1.3T 2% /

From /sys/devices/virtual/dmi/id
Vendor: ASUSTeK COMPUTER INC.
Product: RS720-E11-RS12U
Product Family: Server

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:
16x Samsung M321R8GA0BB0-CQKVG 64 GB 2 rank 4800

BIOS:
BIOS Vendor: American Megatrends Inc.
BIOS Version: 0501
BIOS Date: 12/29/2022
BIOS Revision: 5.1

(End of data from sysinfo program)
ASUSTeK Computer Inc.
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Compiler Version Notes

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<tr>
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<td></td>
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<tr>
<td>Version 2022.1.0 Build 20220316</td>
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<tr>
<td>Copyright (C) 1985-2022 Intel Corporation. All rights reserved.</td>
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<td>C++, C, Fortran</td>
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<td>Copyright (C) 1985-2022 Intel Corporation. All rights reserved.</td>
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ASUSTeK Computer Inc.  
ASUS RS720-E11-RS12U(Z13PP-D32) Server System  
(2.00 GHz, Intel Xeon Platinum 8480+)

SPEC CPU®2017 Floating Point Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

SPECspeed®2017_fp_base = 371
SPECspeed®2017_fp_peak = 371

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Test Date: Jan-2023
Tested by: ASUSTeK Computer Inc.
Hardware Availability: Jan-2023
Software Availability: Jun-2022

Base Compiler Invocation

C benchmarks:
icx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifx

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
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 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:
-m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using both Fortran and C:
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp

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

**ASUSTeK Computer Inc.**
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**SPECspeed®2017_fp_base = 371**
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<td>Software Availability: Jun-2022</td>
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</tbody>
</table>

### Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
-m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -gopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

### Peak Compiler Invocation

C benchmarks:
icx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifx

### 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: basepeak = yes

Fortran benchmarks:

(Continued on next page)
ASUSTeK Computer Inc.
ASUS RS720-E11-RS12U(Z13PP-D32) Server System
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SPECspeed®2017_fp_base = 371
SPECspeed®2017_fp_peak = 371

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Jan-2023
Hardware Availability: Jan-2023
Software Availability: Jun-2022

Peak Optimization Flags (Continued)

603.bwaves_s: basepeak = yes
649.fotonik3d_s: basepeak = yes
654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:
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
http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-z13-V1.0.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-z13-V1.0.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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