<table>
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<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate®2017 int_base</th>
<th>SPECrate®2017 int_peak</th>
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<tr>
<td>perlbench_r</td>
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<td>64.7</td>
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<td>x264_r</td>
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<td>112</td>
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<tr>
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<tr>
<td>exchange2_r</td>
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<tr>
<td>xz_r</td>
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<td>40.6</td>
<td>45.0</td>
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</table>

**Hardware**

- **CPU Name:** Intel Xeon E-2388G
- **Max MHz:** 5100
- **Nominal:** 3200
- **Enabled:** 8 cores, 1 chip, 2 threads/core
- **Orderable:** 1 chip
- **Cache L1:** 32 KB I + 48 KB D on chip per core
- **L2:** 512 KB I+D on chip per core
- **L3:** 16 MB I+D on chip per chip
- **Other:** None
- **Memory:** 64 GB (2 x 32 GB 2Rx8 PC4-3200AA-E)
- **Storage:** 1 x 960 GB SATA SSD
- **Other:** None

**Software**

- **OS:** Red Hat Enterprise Linux release 8.4 (Ootpa)
- **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;
- **Parallel:** No
- **Firmware:** Version 0401 released Oct-2021
- **File System:** xfs
- **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 and OS set to prefer performance at the cost of additional power usage.
**Results Table**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<tr>
<td>531.deepsjeng_r</td>
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<td>557.xz_r</td>
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<td>40.6</td>
<td>426</td>
<td>40.6</td>
</tr>
</tbody>
</table>

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

**Submit Notes**

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset 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"
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:
LD_LIBRARY_PATH = 
"/home/cpu118/lib/intel64:/home/cpu118/lib/ia32:/home/cpu118/je5.0.1-32"
MALLOCONF = "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
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

(Continued on next page)
spec

SPEC CPU®2017 Integer Rate Result

Copyright 2017-2021 Standard Performance Evaluation Corporation

ASUSTeK Computer Inc.
ASUS RS300-E11(P12R-M) Server System
(3.20 GHz, Intel Xeon E-2388G)

SPECrate®2017_int_base = 74.1
SPECrate®2017_int_peak = 77.6

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>9016</th>
<th>Test Date:</th>
<th>Oct-2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>ASUSTeK Computer Inc.</td>
<td>Hardware Availability:</td>
<td>Oct-2021</td>
</tr>
<tr>
<td>Tested by:</td>
<td>ASUSTeK Computer Inc.</td>
<td>Software Availability:</td>
<td>Sep-2021</td>
</tr>
</tbody>
</table>

General Notes (Continued)

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 Configuration:
VT-d = Disabled
AES = Disabled
Intel Speed Shift Technology = Native Mode
Engine Boost = Level3(Max)
Race to Halt (RTH) = Disabled

Sysinfo program /home/cpu118/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca64d
running on localhost.localdomain Thu Oct 28 11:48:42 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) E-2388G CPU @ 3.20GHz
  1 "physical id"s (chips)
  16 "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 : 8
siblings : 16
physical 0: cores 0 1 2 3 4 5 6 7

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):             16
On-line CPU(s) list: 0-15
Thread(s) per core: 2
Core(s) per socket: 8
Socket(s):          1

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

**ASUSTeK Computer Inc.**

ASUS RS300-E11(P12R-M) Server System
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**SPECrate®2017_int_base = 74.1**

**SPECrate®2017_int_peak = 77.6**

---

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

---

**Platform Notes (Continued)**

- **NUMA node(s):** 1  
- **Vendor ID:** GenuineIntel  
- **BIOS Vendor ID:** Intel(R) Corporation  
- **CPU family:** 6  
- **Model:** 167  
- **Model name:** Intel(R) Xeon(R) E-2388G CPU @ 3.20GHz  
- **BIOS Model name:** Intel(R) Xeon(R) E-2388G CPU @ 3.20GHz  
- **Stepping:** 1  
- **CPU MHz:** 4958.991  
- **CPU max MHz:** 5100.0000  
- **CPU min MHz:** 800.0000  
- **BogoMIPS:** 6384.00  
- **Virtualization:** VT-x  
- **L1d cache:** 48K  
- **L1i cache:** 32K  
- **L2 cache:** 512K  
- **L3 cache:** 16384K  
- **NUMA node0 CPU(s):** 0-15  
- **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 apic id l dedic mce lms cmov Crus tsc_adjust mrent fp fixed mmx popcnt init dty_mmu thread fpu ida arat pmlnm perf_tsc dts intel ipcd pdcms cpld sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invpcid_single ssbd ibrs ibpb stibp ibrs_enhanced tpr_shadow vmmx flexpriority ept vpid ept_ad fsgsbase tsc_adjust bm11 avx2 smep bmi2 2 rso es riocd mpn kg dreg m xsaveopt xsaveopt xgetbv xsavepd tpm dtherm ida arat ltds hwp hwp_present hwp_act_window hwp_epp hwp_pkg_req avx512f_opt avx512vbody umip pkud ospke avx512_vbmi2 gfni vpcmulqdq avx512_vnni avx512_bitalg avx512_vppcntdq rdpid fsrm md_clear flush_lld arch_capabilities

From /proc/cpuinfo cache data

- **cache size:** 16384 KB

From numactl --hardware

**WARNING:** a numactl 'node' might or might not correspond to a physical chip.

- **available:** 1 nodes (0)
- **node 0 cpus:** 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
- **node 0 size:** 64129 MB
- **node 0 free:** 63263 MB
- **node distances:**
  - node 0
    - 0: 10

From /proc/meminfo

- **MemTotal:** 65668864 kB
- **HugePages_Total:** 0

(Continued on next page)
ASUSTeK Computer Inc.
ASUS RS300-E11(P12R-M) Server System
(3.20 GHz, Intel Xeon E-2388G)

SPECrates®2017_int_base = 74.1
SPECrates®2017_int_peak = 77.6

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Test Date: Oct-2021
Tested by: ASUSTeK Computer Inc.
Hardware Availability: Oct-2021
Software Availability: Sep-2021

Platform Notes (Continued)

Hugepagesize: 2048 kB
/sbin/tuned-adm active
   Current active profile: throughput-performance
/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance
From /etc/*release* /etc/*version*
   os-release:
      NAME="Red Hat Enterprise Linux"
      VERSION="8.4 (Ootpa)"
      ID="rhel"
      ID_LIKE="fedora"
      VERSION_ID="8.4"
      PLATFORM_ID="platform:el8"
      PRETTY_NAME="Red Hat Enterprise Linux 8.4 (Ootpa)"
      ANSI_COLOR="0;31"
   redhat-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
   system-release: Red Hat Enterprise Linux release 8.4 (Ootpa)
   system-release-cpe: cpe:/o:redhat:enterprise_linux:8.4:ga
uname -a:
   Linux localhost.localdomain 4.18.0-305.19.1.el8_4.x86_64 #1 SMP Tue Sep 7 07:07:31 EDT 2021 x86_64 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): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swaps barriers and _user pointer sanitation
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 Oct 28 11:48
SPEC is set to: /home/cpu118
Filesystem      Type  Size  Used Avail Use% Mounted on

(Continued on next page)
SPEC CPU®2017 Integer Rate Result
Copyright 2017-2021 Standard Performance Evaluation Corporation

ASUSTeK Computer Inc.
ASUS RS300-E11(P12R-M) Server System
(3.20 GHz, Intel Xeon E-2388G)

SPECrade®2017_int_base = 74.1
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CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Oct-2021
Hardware Availability: Oct-2021
Software Availability: Sep-2021

Platform Notes (Continued)
/dev/mapper/rhel-home xfs  807G  11G  797G  2% /home

From /sys/devices/virtual/dmi/id
Vendor: ASUSTeK COMPUTER INC.
Product: P12R-M Series
Product Family: Server
Serial: System Serial Number

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:
  2x Apacer Technology D33.27306S.003 32 GB 2 rank 3200

BIOS:
  BIOS Vendor: American Megatrends Inc.
  BIOS Version: 0401
  BIOS Date: 10/26/2021
  BIOS Revision: 4.1

(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,

(Continued on next page)
Compiler Version Notes (Continued)

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)
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
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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)

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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
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Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

--------------------------------------------------------------------------------
C | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak)

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

ASUSTeK Computer Inc.
ASUS RS300-E11(P12R-M) Server System
(3.20 GHz, Intel Xeon E-2388G)

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

SPECrater®2017_int_base = 74.1
SPECrater®2017_int_peak = 77.6

Test Date:  Oct-2021
Hardware Availability:  Oct-2021
Software Availability:  Sep-2021

Compiler Version Notes (Continued)

| 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++ 520.omnetpp_r(base, peak) 523.xalancbmk_r(base, peak)
31.deepsjeng_r(base, peak) 541.leela_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.

Fortran 548.exchange2_r(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.

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.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64

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

ASUSTeK Computer Inc.
ASUS RS300-E11(P12R-M) Server System
(3.20 GHz, Intel Xeon E-2388G)

| SPECrate®2017_int_base = 74.1 | SPECrate®2017_int_peak = 77.6 |

| CPU2017 License: 9016 | Test Date: Oct-2021 |
| Test Sponsor: ASUSTeK Computer Inc. | Hardware Availability: Oct-2021 |
| Tested by: ASUSTeK Computer Inc. | Software Availability: Sep-2021 |

### 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:**
- `-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`
ASUSTeK Computer Inc.

ASUS RS300-E11(P12R-M) Server System
(3.20 GHz, Intel Xeon E-2388G)

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Test Date: Oct-2021
Tested by: ASUSTeK Computer Inc.
Hardware Availability: Oct-2021
Software Availability: Sep-2021

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)
-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

520.omnetpp_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

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

ASUSTeK Computer Inc.
ASUS RS300-E11(P12R-M) Server System
(3.20 GHz, Intel Xeon E-2388G)

SPECrater®2017_int_base = 74.1
SPECrater®2017_int_peak = 77.6

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

Test Date: Oct-2021
Hardware Availability: Oct-2021
Software Availability: Sep-2021

Peak Optimization Flags (Continued)

523.xalancbmk_r:basepeak = yes
531.deepsjeng_r:basepeak = yes
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

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-p12-V1.0.xml
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.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 2021-10-28 11:48:42-0400.
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