



# SPEC CPU®2026 Integer Rate Result

Copyright 2026 Standard Performance Evaluation Corporation

## Apple

(Test Sponsor: SPEC CPU Supporting Contributor jhenning)

SPECrate®2026\_int\_base = 7.64

### MacBook Pro (16-inch, M5 Pro) 1-copy SPECrate

SPECrate®2026\_int\_peak = Not Run

CPU2026 License: 7

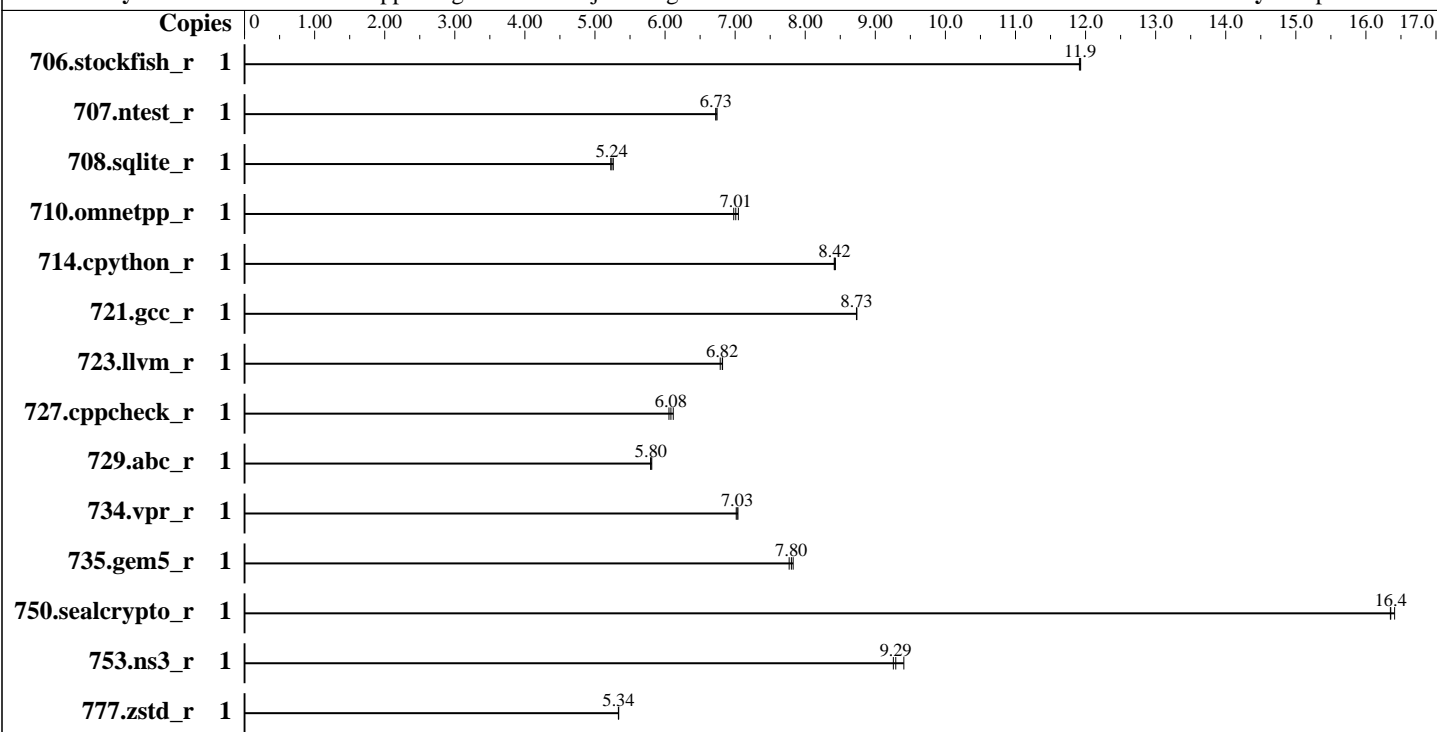
Test Sponsor: SPEC CPU Supporting Contributor jhenning

Tested by: SPEC CPU Supporting Contributor jhenning

Test Date: Apr-2026

Hardware Availability: Mar-2026

Software Availability: Apr-2026



### Hardware

CPU Name: Apple M5 Pro  
 Max MHz: 4600 (approximate; see notes)  
 Nominal: 4600 (approximate; see notes)  
 Enabled: 18 (6 Super and 12 Performance) cores, 1 chip  
 Orderable: 1 chip  
 Cache L1: 192 KB I + 128 KB D on chip per core (Super);  
 128 KB I + 64 KB D on chip per core (Performance)  
 L2: 32 MB I+D on chip per chip,  
 (16 MB per 6 Super cores, 8 MB per 6  
 Performance cores)  
 L3: None disclosed  
 Other: None disclosed  
 Memory: 64.0 GB  
 Storage: 4 TB APPLE SSD AP4096Z  
 Cooling: Air  
 Other: None

### Software

OS: macOS 26.4.1 (25E253)  
 Compiler: C/C++: Version 22.1.4 of LLVM  
 Compiler Category: Community  
 Firmware: Version 18000.101.7 released Apr-2026  
 File System: apfs  
 System State: Default  
 Base Pointers: 64-bit  
 Peak Pointers: Not Applicable  
 Other: Xcode 26.4.1.0.1775747724  
 Power Management: Default



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## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
706.stockfish_r	1	106	11.9	<b>106</b>	<b>11.9</b>	106	11.9							
707.ntest_r	1	87.8	6.74	<b>88.0</b>	<b>6.73</b>	88.1	6.72							
708.sqlite_r	1	101	5.23	100	5.26	<b>101</b>	<b>5.24</b>							
710.omnetpp_r	1	69.6	6.98	69.0	7.05	<b>69.3</b>	<b>7.01</b>							
714.cpython_r	1	56.9	8.41	56.8	8.43	<b>56.9</b>	<b>8.42</b>							
721.gcc_r	1	78.5	8.74	<b>78.5</b>	<b>8.73</b>	78.6	8.73							
723.llvm_r	1	<b>74.4</b>	<b>6.82</b>	74.7	6.79	74.3	6.82							
727.cppcheck_r	1	<b>59.0</b>	<b>6.08</b>	59.3	6.06	58.7	6.12							
729.abc_r	1	<b>79.1</b>	<b>5.80</b>	79.0	5.81	79.2	5.79							
734.vpr_r	1	65.5	7.04	<b>65.6</b>	<b>7.03</b>	65.7	7.02							
735.gem5_r	1	<b>62.4</b>	<b>7.80</b>	62.7	7.77	62.2	7.83							
750.sealcrypto_r	1	<b>32.8</b>	<b>16.4</b>	32.8	16.3	32.7	16.4							
753.ns3_r	1	66.2	9.26	65.2	9.41	<b>66.0</b>	<b>9.29</b>							
777.zstd_r	1	121	5.34	121	5.33	<b>121</b>	<b>5.34</b>							

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

## Compiler Notes

NOTE - MODERATE COMPILER TUNING

The results on this page intentionally use only moderate compiler tuning. This page differs from many other SPEC CPU results which are published to demonstrate the best performance that can be achieved by a system. Such tests often use compilers that are optimized for specific chip vendors and use advanced tuning options.

Moderate optimization may be of interest to users who prefer a simple build process, or who do not know whether their application works correctly with advanced tuning options. Specifically, these tests:

- Use an open source, community-supported compiler, rather than a vendor-specific compiler.
- Specify only one optimization option, namely -O3.
- Avoid options that disregard strict standards compliance, such as -Ofast, -ffinite-math-only, or -funsafe-math-optimizations.
- Avoid options such as -march=native or -mcpu=native. Without those, the code generator cannot assume that the program will run only on systems that use the same chip as the current system.

There are many other kinds of testing can be done with SPEC CPU, such as:

- Performance modeling prior to CPU chip development.
- Hardware validation.
- Compiler regression testing (both correctness and performance).
- Academic and industrial research into new optimizations for CPUs, memory systems, and compilers.



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## Environment Variables Notes

Environment variables set by runcpu before the start of the run:

LD\_LIBRARY\_PATH =

```
"/usr/local/LLVM-22.1.4-macos-ARM64//lib64/:/usr/local/LLVM-22.1.4-macos-ARM64//lib/:/lib64"
```

SDKROOT =

```
"/Applications/Xcode.app/Contents/Developer/Platforms/MacOSX.platform/Developer/SDKs/MacOSX.sdk"
```

## General Notes

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.  
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-2017-5754 (Meltdown) is mitigated in the system as tested and documented.  
The above 3 statements are based on <https://support.apple.com/en-us/101886>

## Platform Notes

Sysinfo program /Volumes/ScratchVolume/spec/cpu2026/1.0.0/bin/sysinfo  
Rev: 779ab21020787073335a329f3a45e2cd  
running on i4gots-MacBook-Pro Tue Apr 21 21:54:08 2026

SUT (System Under Test) info as seen by some common utilities.

uname -srvm

```
Darwin 25.4.0 Darwin Kernel Version 25.4.0: Thu Mar 19 19:33:50 PDT 2026;  
root:xnu-12377.101.15~1/RELEASE_ARM64_T6050 arm64
```

w

```
21:54 up 2:44, 3 users, load averages: 11.44 19.04 20.78
```

```
USER      TTY      FROM      LOGIN@    IDLE WHAT  
i4got    console  -         19:10     2:43 -  
i4got    s000    -         19:12     2:33 -bash  
i4got    s001    -         19:20     1:11 -bash
```

Username

```
From environment variable $USER: i4got
```

ulimit -a

```
core file size          (blocks, -c) 0
```

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### Platform Notes (Continued)

```

data seg size      (kbytes, -d) unlimited
file size          (blocks, -f) unlimited
max locked memory (kbytes, -l) unlimited
max memory size   (kbytes, -m) unlimited
open files        (-n) 256
pipe size         (512 bytes, -p) 1
stack size        (kbytes, -s) 65000
cpu time          (seconds, -t) unlimited
max user processes (-u) 10666
virtual memory    (kbytes, -v) unlimited

```

sysinfo process ancestry

```

/sbin/launchd
/System/Applications/Utilities/Terminal.app/Contents/MacOS/Terminal
login -pf i4got
-bash
/bin/bash ./run.4.sh
runcpu -c clang4 -n 3 --reportable --nobuild --copies=1 intrate
runcpu --configfile clang4 --iterations 3 --reportable --nobuild --copies 1 --nopower --runmode rate --tune
  base --size refrate intrate --nopreenv --note-preenv --logfile
  $GOTmp/CPU2026.124/templogs/preenv.intrate.124.0.log --lognum 124.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /Volumes/ScratchVolume/spec/cpu2026/1.0.0
$GO    = /Volumes/ScratchVolume/spec/cpu2026/out/1.0.0/

```

Hardware:

Hardware Overview:

```

Model Name: MacBook Pro
Model Identifier: Mac17,8
Model Number: Z1N0001A3LL/A
Chip: Apple M5 Pro
Total Number of Cores: 18 (6 Super and 12 Performance)
Memory: 64 GB
System Firmware Version: 18000.101.7
OS Loader Version: 18000.101.7

```

Software:

System Software Overview:

```

System Version: macOS 26.4.1 (25E253)
Kernel Version: Darwin 25.4.0
Boot Volume: Macintosh HD
Boot Mode: Normal
Computer Name: i4got's MacBook Pro

```

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## Platform Notes (Continued)

User Name: i4got (i4got)  
Secure Virtual Memory: Enabled  
System Integrity Protection: Enabled  
Time since boot: 2 hours, 44 minutes

### Memory:

Memory: 64 GB  
Type: LPDDR5  
Manufacturer: Micron

### Developer:

#### Developer Tools:

Version: 26.4.1 (17E202)  
Location: /Applications/Xcode.app  
Applications:  
Xcode: 26.4.1 (24909.0.3)  
Instruments: 26.4.1 (64575.156)

#### SDKs:

DriverKit:  
25.4:  
iOS:  
26.4: (23E252)  
iOS Simulator:  
26.4: (23E252)  
macOS:  
26.4: (25E251)  
tvOS:  
26.4: (23L236)  
tvOS Simulator:  
26.4: (23L236)  
visionOS:  
26.4: (23O248)  
visionOS Simulator:  
26.4: (23O248)  
watchOS:  
26.4: (23T238)  
watchOS Simulator:  
26.4: (23T238)

### From sysctl:

machdep.cpu.core\_count: 18  
machdep.cpu.thread\_count: 18  
machdep.cpu.brand\_string: Apple M5 Pro

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## Platform Notes (Continued)

```

hw.memsize: 68719476736
hw.activecpu: 18
hw.perflevel0.llicachesize: 196608
hw.perflevel0.l1dcachesize: 131072
hw.perflevel0.l2cachesize: 16777216
hw.perflevel1.llicachesize: 131072
hw.perflevel1.l1dcachesize: 65536
hw.perflevel1.l2cachesize: 8388608
hw.physicalcpu: 18
hw.physicalcpu_max: 18
hw.logicalcpu: 18
hw.logicalcpu_max: 18
hw.cacheconfig: 18 1 6 0 0 0 0 0 0 0
hw.cachesize: 2995912704 65536 8388608 0 0 0 0 0 0 0
hw.pagesize: 16384
hw.pagesize32: 16384
hw.cachelinesize: 128
hw.llicachesize: 131072
hw.l1dcachesize: 65536
hw.l2cachesize: 8388608
hw.memsize_usable: 67420422144

```

SPEC is set to: /Volumes/ScratchVolume/spec/cpu2026/1.0.0

Filesystem	Size	Used	Avail	Capacity	iused	ifree	%iused	Mounted on
/dev/disk3s1	1998G	562G	1436G	29%	1.3M	14G	0%	/Volumes/ScratchVolume

(End of data from sysinfo program)

### ADDITIONAL INFORMATION FROM SYSCTL

```

$ sysctl hw | grep perflevel0
hw.perflevel0.physicalcpu: 6
hw.perflevel0.physicalcpu_max: 6
hw.perflevel0.logicalcpu: 6
hw.perflevel0.logicalcpu_max: 6
hw.perflevel0.llicachesize: 196608
hw.perflevel0.l1dcachesize: 131072
hw.perflevel0.l2cachesize: 16777216
hw.perflevel0.cpusperl2: 6
hw.perflevel0.name: Super
$ sysctl hw | grep perflevel1
hw.perflevel1.physicalcpu: 12
hw.perflevel1.physicalcpu_max: 12
hw.perflevel1.logicalcpu: 12
hw.perflevel1.logicalcpu_max: 12
hw.perflevel1.llicachesize: 131072

```

(Continued on next page)



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### Platform Notes (Continued)

```
hw.perflevel1.l1dcachesize: 65536
hw.perflevel1.l2cachesize: 8388608
hw.perflevel1.cpusperl2: 6
hw.perflevel1.name: Performance
$
```

The above shows cache sizes for both core types, and "cpusperl2" indicates sharing among cores. See [https://developer.apple.com/documentation/kernel/1387446-sysctlbyname/determining\\_system\\_capabilities](https://developer.apple.com/documentation/kernel/1387446-sysctlbyname/determining_system_capabilities)  
Note: it is possible that the sysctl cache information may be incomplete. There might be other cache types or other cache characteristics that are not disclosed by the above 'sysctl' command.

#### ADDITIONAL INFORMATION FROM POWERMETRICS

Regarding the CPU MHz fields above, note that:

- The vendor does not state CPU frequencies in their marketing materials.
- Frequency levels are printed by the vendor-provided 'powermetrics' utility; these might or might not correspond to traditional "nominal" or "maximum" MHz. Therefore, the values on this page for Nominal and Maximum MHz must be considered approximate.
- The table below lists all of the MHz values mentioned in the dvfm\_states section of powermetrics.
- On the tested system, the maximum frequencies mentioned are 4608 for the S-cluster and 4380 for the P-Clusters

-----  
CPU Dynamic Frequencies From 'powermetrics --format=plist'  
-----

```
processor
clusters    dvfm_states
name        freq
-----
```

Cluster	1344	1644	1992	2304	2652	2964	3240	3504	3696	3876	4044	4176	4284	4308	4380					
P0-Cluster	1344	1644	1992	2304	2652	2964	3240	3504	3696	3876	4044	4176	4284	4308	4380					
P1-Cluster	1344	1644	1992	2304	2652	2964	3240	3504	3696	3876	4044	4176	4284	4308	4380					
S-Cluster	1308	1620	1980	2292	2580	2880	3180	3432	3648	3828	3984	4104	4188	4236	4284	4308	4332	4428	4512	4608

The table above was extracted from powermetrics via Perl code:

```
open P, "powermetrics --sample-count=0 --show-initial-usage --samplers=cpu_power --format=plist|"
  or die "cannot run powermetrics";
while (<P>) {
  if (m{<key>name</key><string>(\S+Cluster)</string>}) {
    printf "%-10s  ", $1;
    $printing = 1;
    @freqs    = ();
  }
  next if ! $printing;
  if (m{^</array>}) {
    print join(" ", @freqs), "\n";
  }
}
```

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### Platform Notes (Continued)

```

    $printing = 0;
  }
  if (m{<key>freq</key><integer>(\d+)</integer>}) {
    push @freqs, $1;
  }
}

```

### Compiler Version Notes

```

=====
C      | 708.sqlite_r(base) 714.cpython_r(base) 777.zstd_r(base)
=====

```

```

clang version 22.1.4 (https://github.com/llvm/llvm-project
35990504507d79e0b9deb809c8ee5e1b34ceef20)

```

Target: arm64-apple-darwin25.4.0

Thread model: posix

InstalledDir: /usr/local/LLVM-22.1.4-macOS-ARM64/bin

```

=====
C++   | 706.stockfish_r(base) 707.ntest_r(base) 727.cppcheck_r(base)
      | 753.ns3_r(base)
=====

```

```

clang version 22.1.4 (https://github.com/llvm/llvm-project
35990504507d79e0b9deb809c8ee5e1b34ceef20)

```

Target: arm64-apple-darwin25.4.0

Thread model: posix

InstalledDir: /usr/local/LLVM-22.1.4-macOS-ARM64/bin

```

=====
C++, C | 710.omnetpp_r(base) 721.gcc_r(base) 723.llvm_r(base) 729.abc_r(base)
      | 734.vpr_r(base) 735.gem5_r(base) 750.sealcrypto_r(base)
=====

```

```

clang version 22.1.4 (https://github.com/llvm/llvm-project
35990504507d79e0b9deb809c8ee5e1b34ceef20)

```

Target: arm64-apple-darwin25.4.0

Thread model: posix

InstalledDir: /usr/local/LLVM-22.1.4-macOS-ARM64/bin



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## Base Compiler Invocation

C benchmarks:  
clang

C++ benchmarks:  
clang++

Benchmarks using both C and C++:  
clang++ clang

## Base Portability Flags

714.python\_r: -UHAVE\_PTHREAD\_STUBS

## Base Optimization Flags

C benchmarks:  
-std=c18 -g -O3 -Wno-implicit-function-declaration

C++ benchmarks:  
-std=c++17 -g -O3 -Wno-implicit-function-declaration

Benchmarks using both C and C++:  
-std=c++17 -std=c18 -g -O3 -Wno-implicit-function-declaration

The flags file that was used to format this result can be browsed at  
<http://www.spec.org/cpu2026/results/flags/llvm-rev-A3.html>

You can also download the XML flags source by saving the following link:  
<http://www.spec.org/cpu2026/results/flags/llvm-rev-A3.xml>

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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