



# SPEC CPU®2026 Integer Rate Result

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## Apple

(Test Sponsor: SPEC CPU Supporting Contributor jhenning)

SPECrate®2026\_int\_base = 82.7

SPECrate®2026\_int\_peak = Not Run

### MacBook Pro (16-inch, M5 Pro) 18-copy SPECrate

CPU2026 License: 7

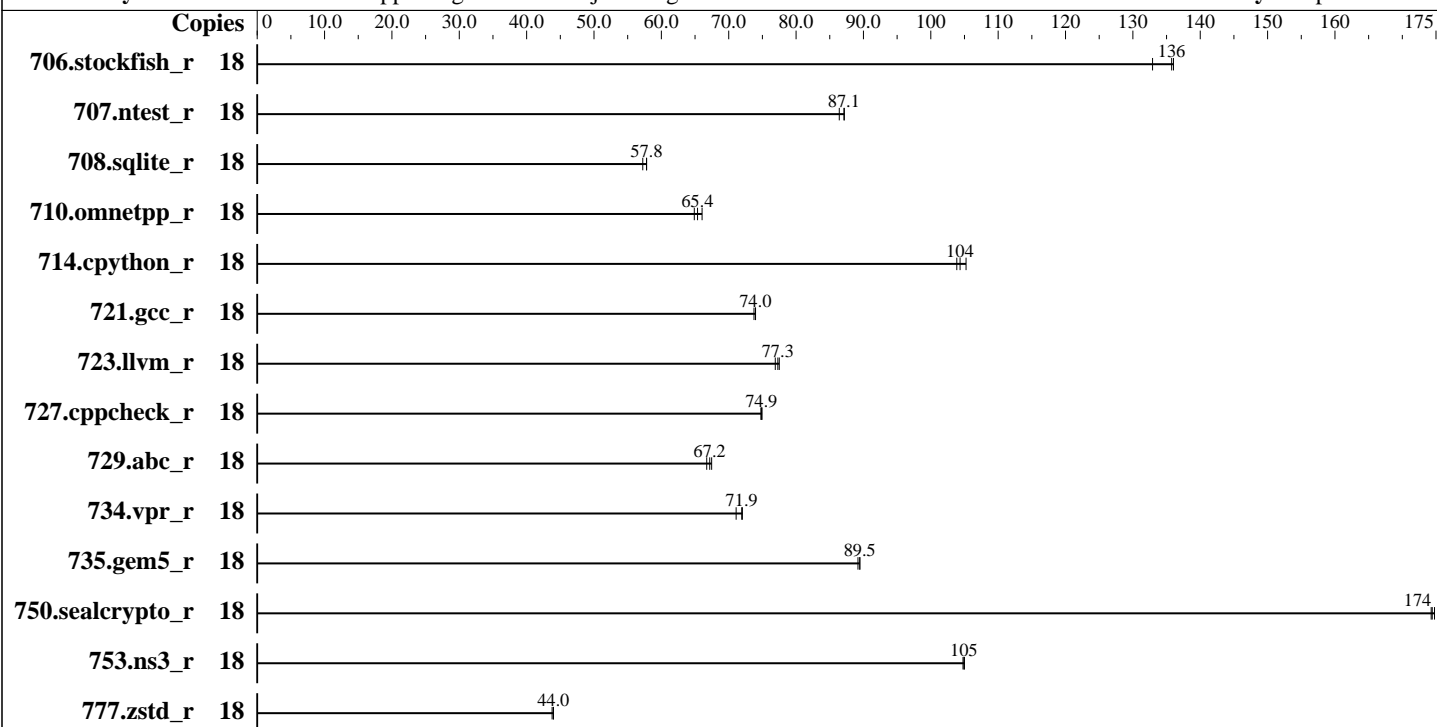
Test Sponsor: SPEC CPU Supporting Contributor jhenning

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	18	171	133	<b>167</b>	<b>136</b>	167	136							
707.ntest_r	18	123	86.4	122	87.2	<b>122</b>	<b>87.1</b>							
708.sqlite_r	18	166	57.2	<b>164</b>	<b>57.8</b>	164	57.8							
710.omnetpp_r	18	<b>134</b>	<b>65.4</b>	132	66.0	135	64.9							
714.cpython_r	18	83.0	104	81.9	105	<b>82.6</b>	<b>104</b>							
721.gcc_r	18	167	73.8	<b>167</b>	<b>74.0</b>	167	74.0							
723.llvm_r	18	119	76.9	118	77.5	<b>118</b>	<b>77.3</b>							
727.cppcheck_r	18	86.4	74.8	<b>86.3</b>	<b>74.9</b>	86.2	74.9							
729.abc_r	18	124	66.7	<b>123</b>	<b>67.2</b>	122	67.5							
734.vpr_r	18	117	71.1	115	72.0	<b>115</b>	<b>71.9</b>							
735.gem5_r	18	<b>98.0</b>	<b>89.5</b>	98.0	89.5	98.3	89.2							
750.sealcrypto_r	18	55.2	175	<b>55.3</b>	<b>174</b>	55.4	174							
753.ns3_r	18	105	105	<b>105</b>	<b>105</b>	105	105							
777.zstd_r	18	265	43.8	264	44.0	<b>264</b>	<b>44.0</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 20:20:19 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

```
20:20 up 1:10, 3 users, load averages: 2.26 2.16 2.16  
USER      TTY      FROM      LOGIN@    IDLE WHAT  
i4got    console  -          19:10     1:09 -  
i4got    s000    -          19:12     59 -bash  
i4got    s001    -          19:20     58 -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=18 intrate
runcpu --configfile clang4 --iterations 3 --reportable --nobuild --copies 18 --nopower --runmode rate --tune
  base --size refrate intrate --nopreenv --note-preenv --logfile
  $GOTmp/CPU2026.123/templogs/preenv.intrate.123.0.log --lognum 123.0 --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: 1 hour, 10 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.lldcachesize: 131072
hw.perflevel0.l2cachesize: 16777216
hw.perflevel1.llicachesize: 131072
hw.perflevel1.lldcachesize: 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.lldcachesize: 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	558G	1440G	28%	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.lldcachesize: 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

```

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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
-----
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

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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.cpython\_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).

Tested with SPEC CPU®2026 v1.0.0 on 2026-04-21 20:20:18-0400.

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