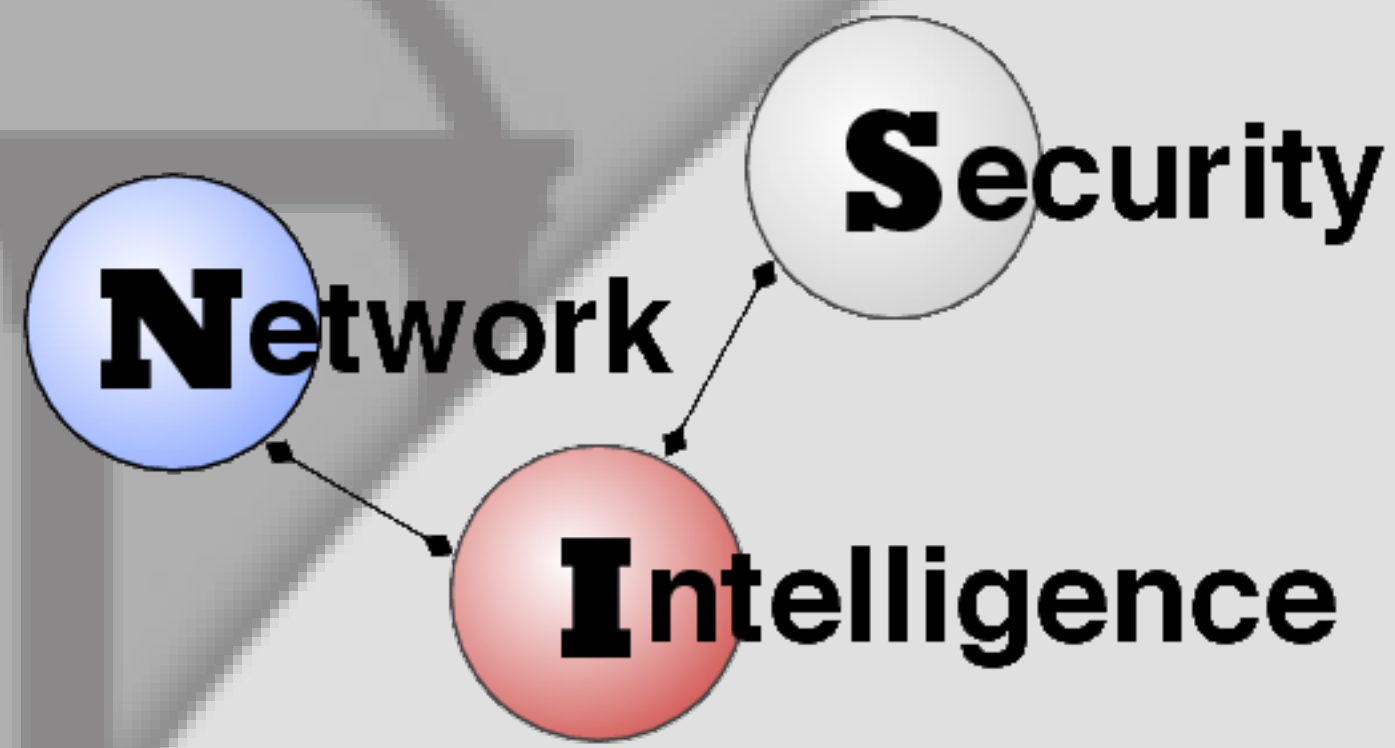


# WebCapsule: Platform-Agnostic Record & Replay for Web Applications

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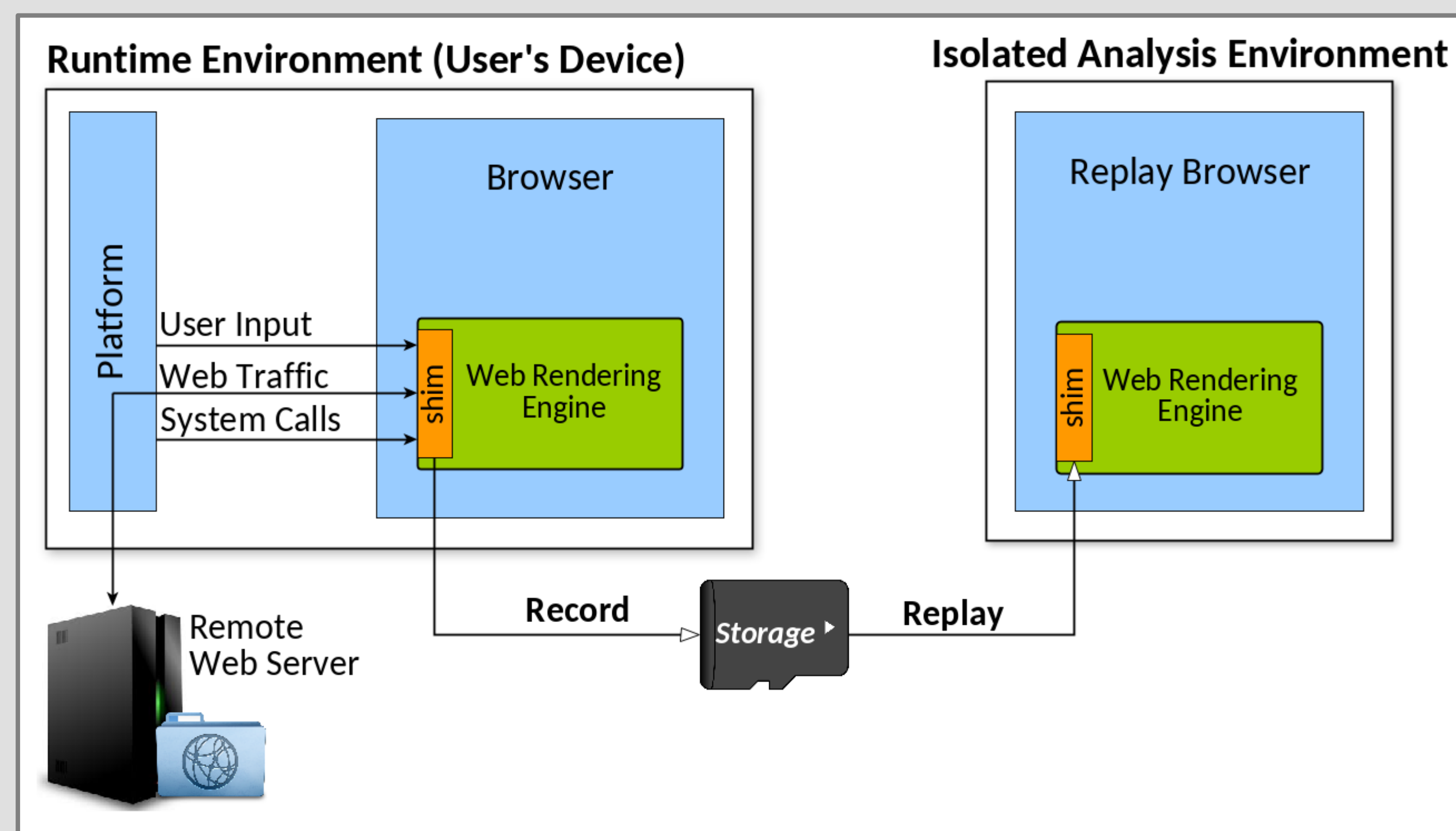
## Introduction

The ability to fully record and faithfully replay the execution of an application is desirable in many software research and engineering tasks. To this end, we present WebCapsule, a record and replay system for web applications. WebCapsule aims to record all non-deterministic inputs to the Blink web rendering engine and V8 Javascript Engine. WebCapsule provides the ability to fully replay past web browsing sessions in a controlled isolated environment.

## Contributions

- A novel record and replay system for web applications rendered within different kinds of software.
- Always-on, portable, and transparent system
- Evaluation against several of the most popular websites.

## System Overview



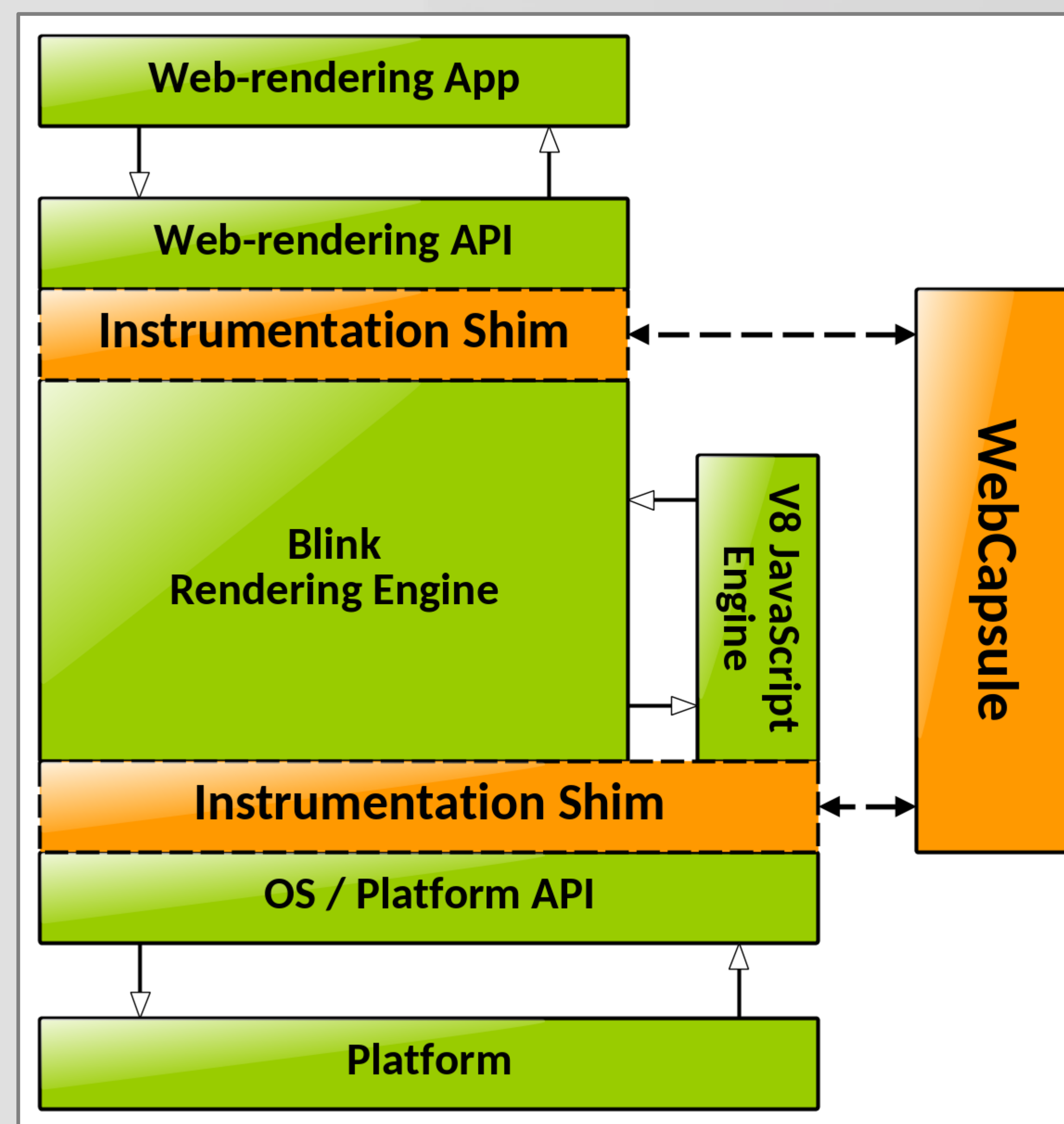
## Approach

- Recording: Intercept and record non-deterministic Web and Platform API calls/events
- Replay: Inject recorded non-deterministic events back into Blink/V8.

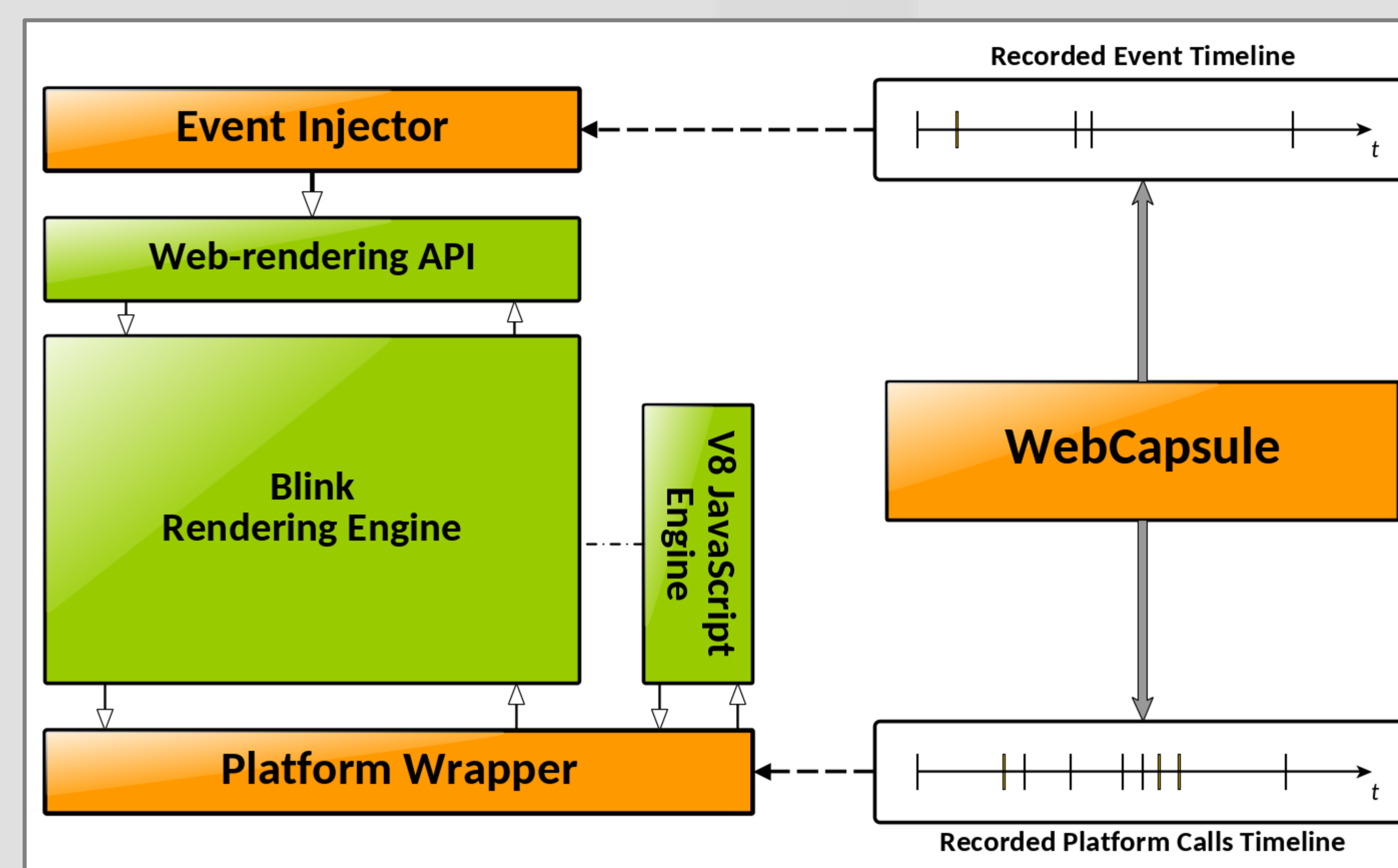
## Acknowledgements

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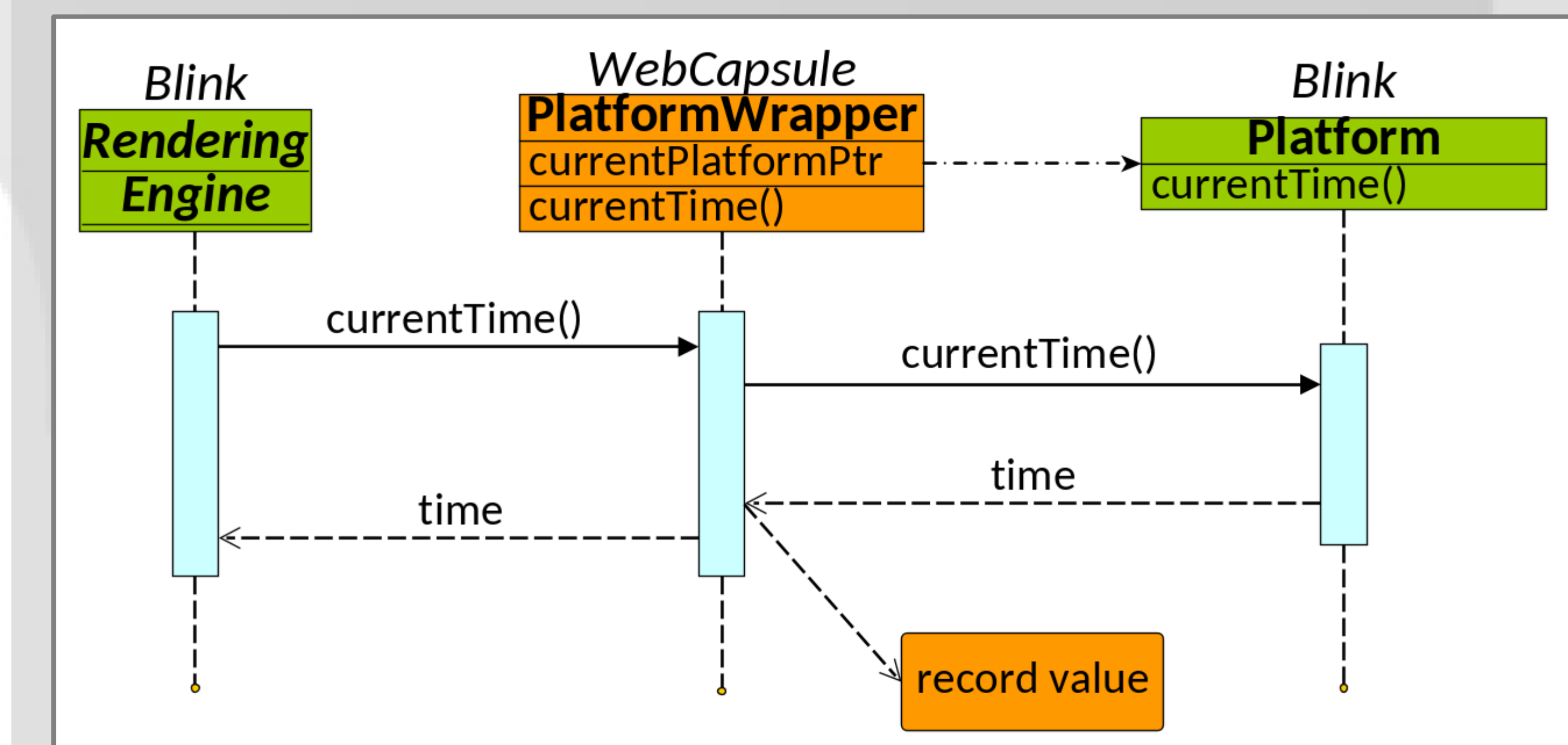
## Simplified Recording Strategy



## Simplified Replay Strategy



## Platform API Call Recording



## Website Replay Results

Site	Record	Replay	Comment
Google	✓	✓	Google Instant disabled
Facebook	✓	✓	
Youtube	✓	✗	Replay page rendering bug
Amazon	✓	✓	
Yahoo	✓	✓	
Wikipedia	✓	✓	
Ebay	✓	✓	
Reddit	✓	✓	

## Performance Results

Website	WebAPI overhead %	Platform overhead %	Network overhead %
Google	16.08	0.12	3.76
Facebook	5.30	1.58	0.54
Youtube	5.04	0.67	2.57
Amazon	16.78	0.72	0.32
Yahoo	8.99	0.20	0.89
Wikipedia	15.51	0.22	0.33
Ebay	7.63	0.34	0.31
Reddit	13.16	0.14	1.39