



Student Privacy Protection in Online Classrooms

Semester Project - SPRING Lab
Supervised by Wouter Lueks

Pierre Thévenet
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Online Classrooms and Data Collection

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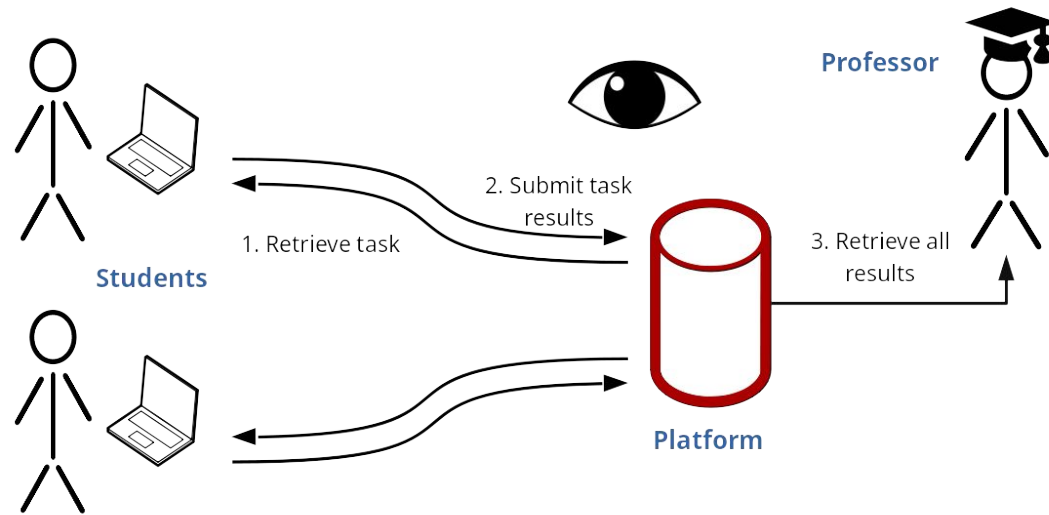
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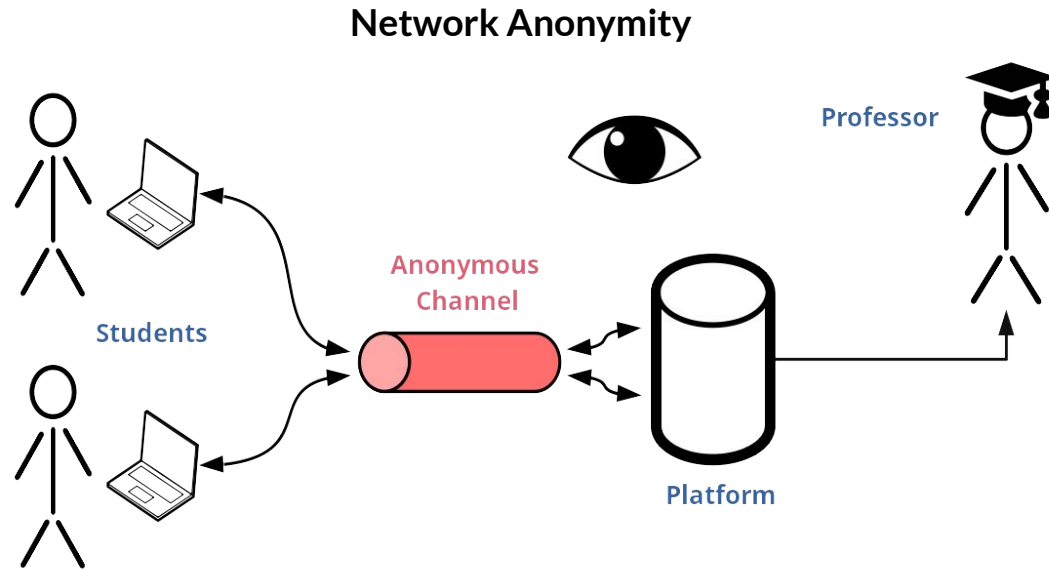
Online Classrooms Platforms collect data

What about privacy?

Scenario



Goal



Tor + Lightnion



Tor Browser

- + anonymous web browsing
- requires installation

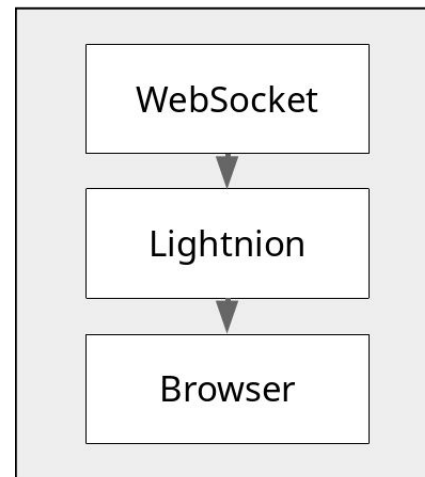
Lightnion.js (SPRING)

- + anonymity on usual web browsers
- requires proxy

WebSocket support in Lightnion

- Cannot use standard browser WebSockets
- Implemented the WebSocket protocol in browser JavaScript

```
let ws = new WebSocket(url, protocols = []);  
  
let ws = new LWS(url, protocols = [],  
    lightningHost = "127.0.0.1", lightningPort = 4990);
```



WebSocket
encapsulation

Evaluation

Convenience

Anonymity

	Standard WebSocket	WebSocket proxied through Tor	TCP via Lightnion	WebSocket via Lightnion
RTT (ms)	0.248	0.227	23.7	25.0
Connection Establishment (ms)	6.11	6.44	334	480
Download Throughput (MB/s)	32.9	28.2	1.48	0.564

Using a local Tor network

Demo



Summary



- Extended Lightnion with WebSockets

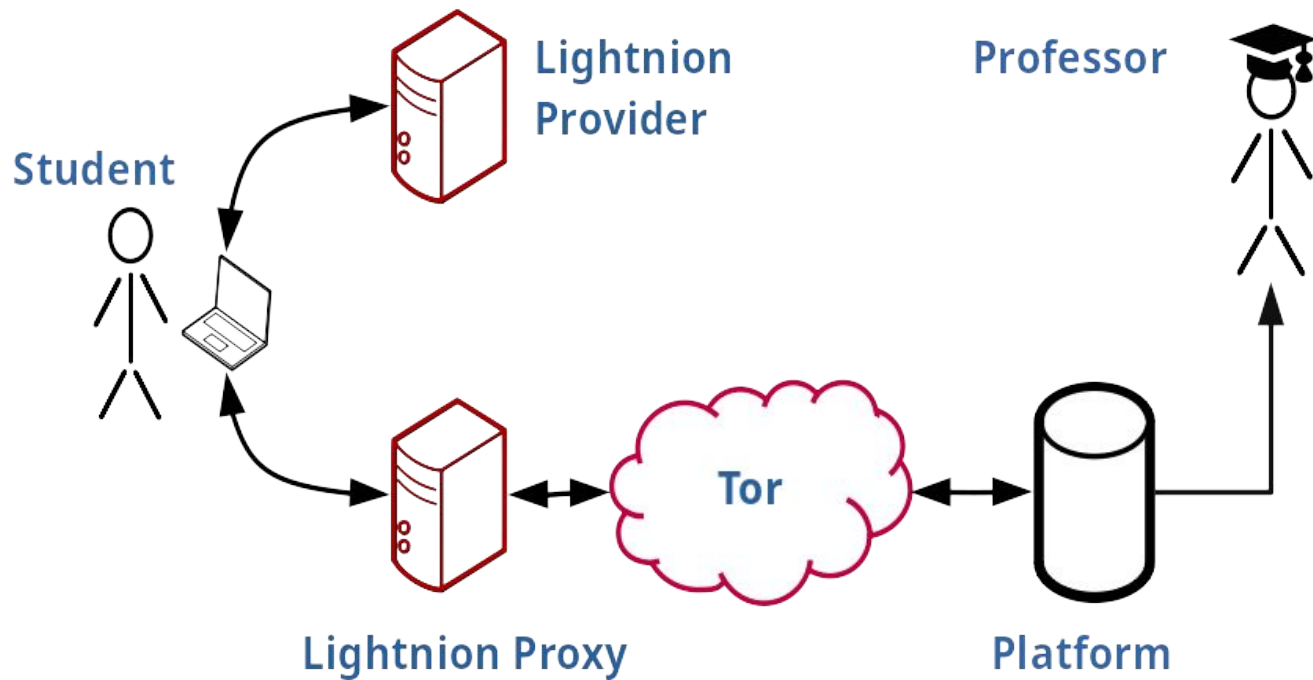
Anonymous WebSocket

- Extended FROG

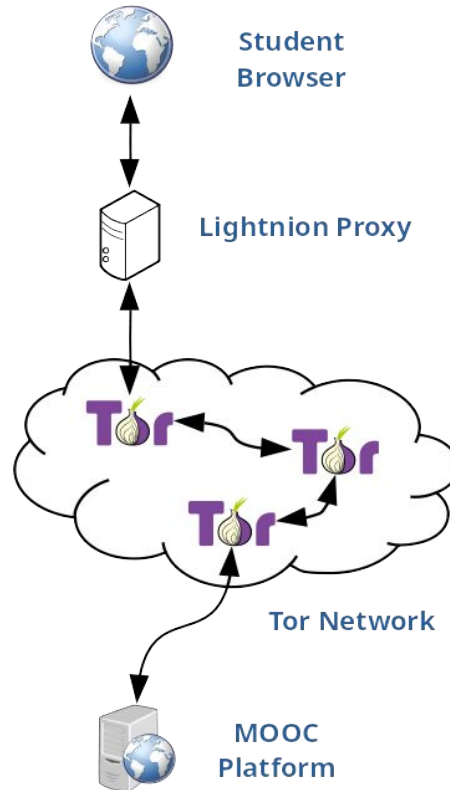
Painless integration, except meteor's WebSocket...

Source and Documentation available soon.

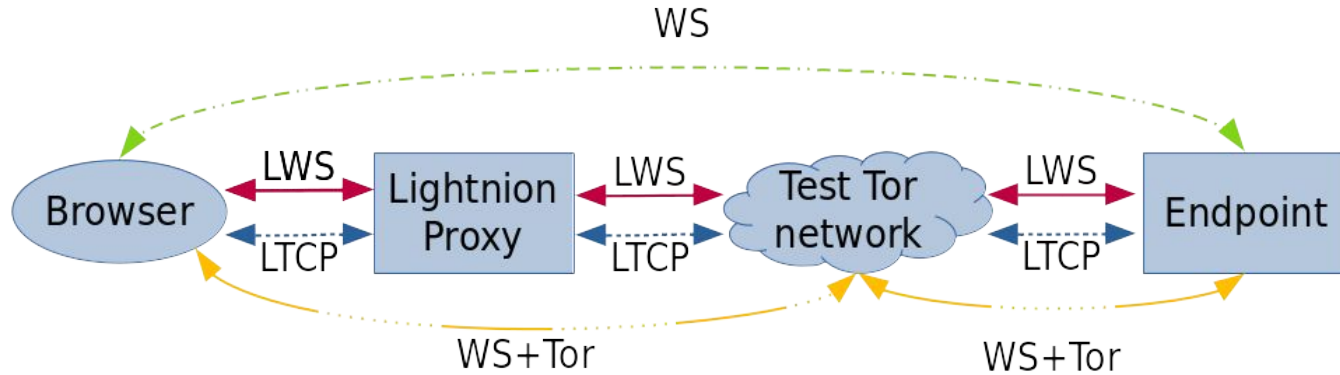
Integration



Lightnion+Tor



Evaluation Setup



Future Work



- Secure WebSockets, need Lightnion Proxy support
- Missing features in WebSocket implementations: subprotocols (easy, necessary)
- Finish FROG integration
- Use Anonymous Credentials... (Application-level anonymity)