SOA paper crunch

Comparative Analysis of Performance Using Server-Client Protocols

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Advanced Operating Systems

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SOA paper crunch

First half (recap)

The "Test Generator"

Comparison of ws and WebSocket-Node

Updated Architecture Proposal

Conclusions and Future Work

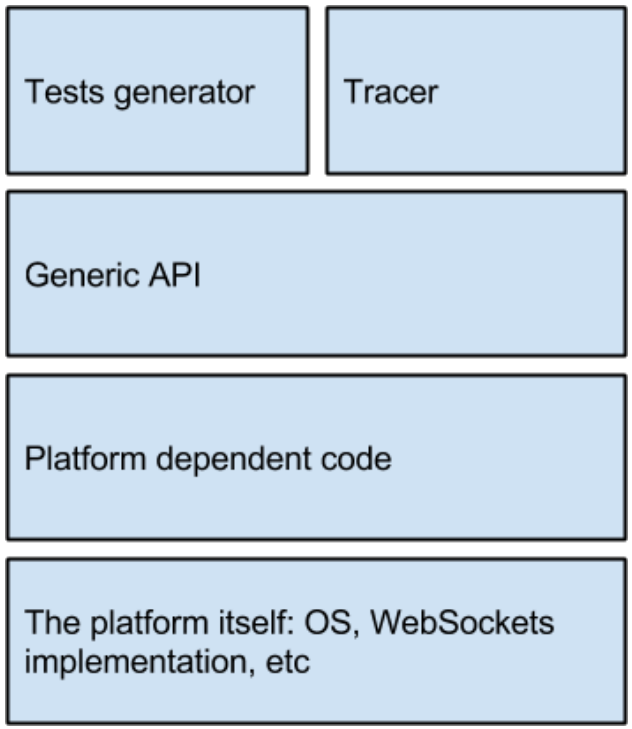
Questions

Outline

Initial Research: Related Work

- WebSocket-based clients require:
  - constant memory (AJAX-based: increasing rates!) [3]
  - 50% less network bandwith [3]
- for 2B of data per frame exchanged by WebSockets, AJAX enchanges up to 8KB of HTTP headers [4]

Initial Performance Evaluation Framework



- Advantages:
  - profiling flexibility
  - platform independent

Outline

The "Test Generator"

- Architectural goals:
  - several WebSocket clients
  - all kinds of stress testing scenarios
  - assess CPU, RAM and network throughput
- Final implementation:
  - **ws** and **WebSocket-Node** as clients (from Node.js)
  - obtain CPU and Memory Consumption using the **Look** profiler for Node.js apps [5]

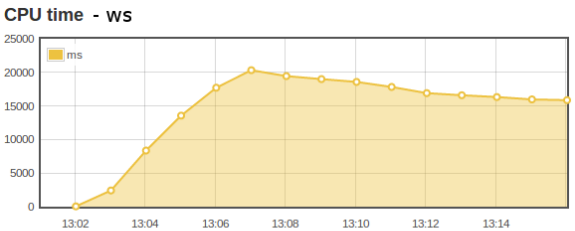
The "Test Generator"

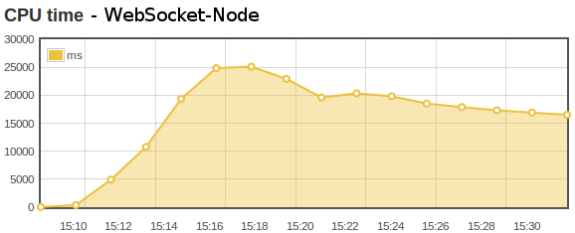
- Testing scenarios included:
  - 4 new clients/second, minimal data
  - 600 new clients/120 seconds, minimal data
  - 100 clients, exchanging data starting at 2KB, up to 1MB (+2KB/s)
  - 400 clients, minimal data, close connection, add 200 clients. repeat

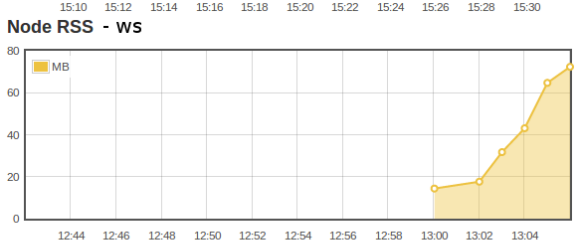
Outline

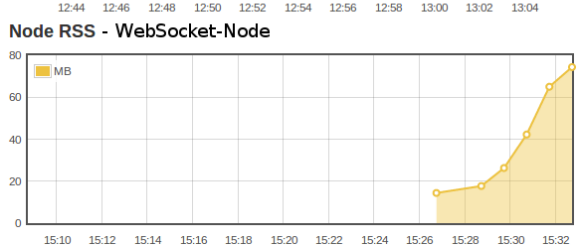
"Test Generator" results

Testing Scenario 1

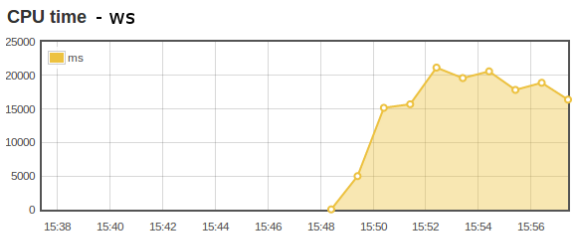


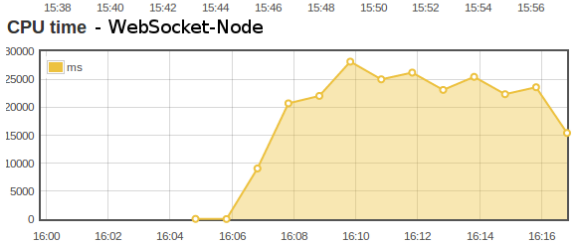


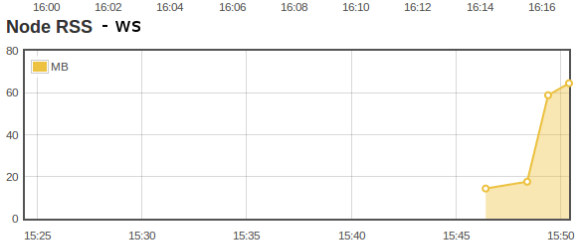


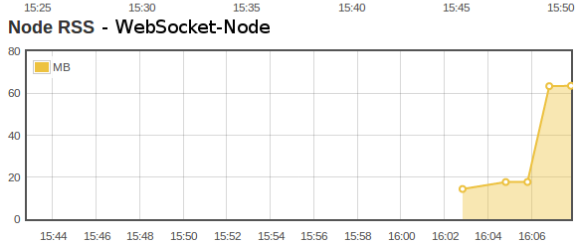


Testing Scenario 2

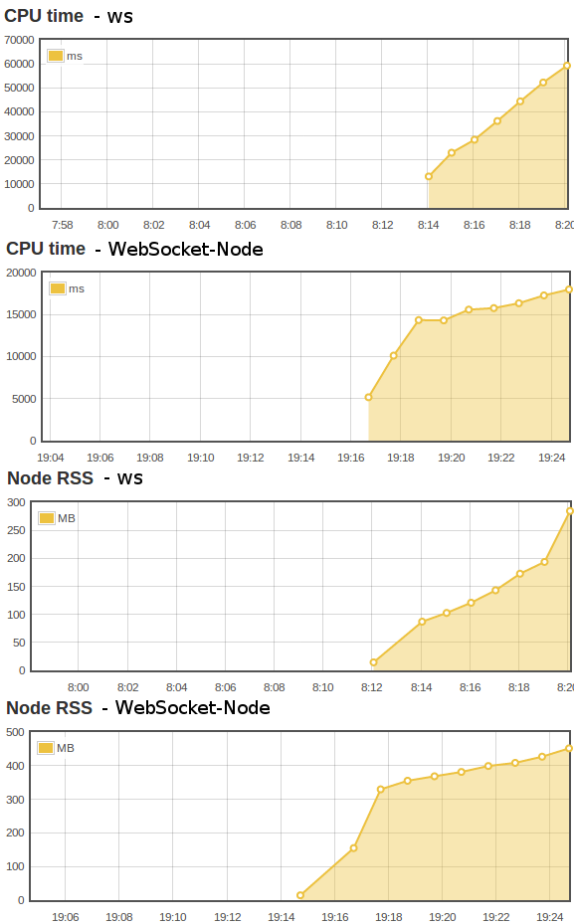




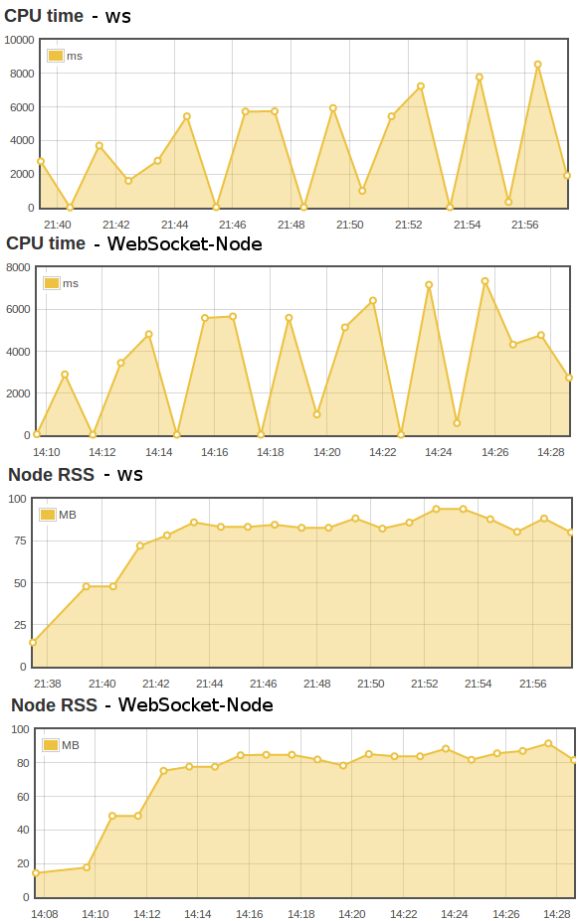




Testing Scenario 3



Testing Scenario 4



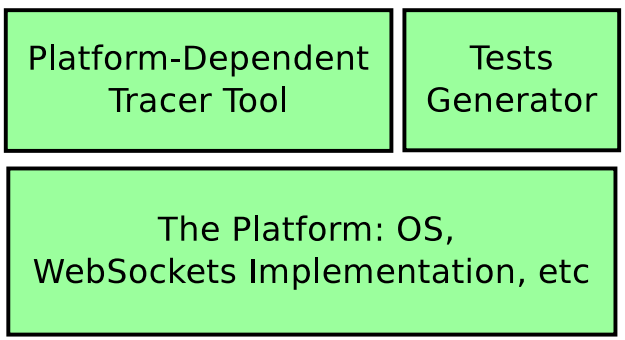
Testing Conclusions

- relatively equal performance with fewer connections and small data frames (slighty better results for **ws**)
- **WebSocket-Node** scales much better both with number of connections and frame size

Outline

The Alternate Design

- Core ideas:
  - learning and also using a new API can be painful
  - users would preffer a "black-box" evaluation framework
- An alternate design:



Outline

Conclusions and Future Work

- two architectural proposals
  - one is more flexible, but comes in the form of a library
  - the other is a fully independent app which offers quick results
- very likely to become a popular choice in this field

Other resources

1. Anthony T. Holdener, III. Ajax: The Definitive Guide
2. A. Melnikov I. Fette. The websocket protocol, 2011
3. D.G. Puranik, D.C. Feiock, and J.H. Hill. Real-time monitoring using ajax and websockets.
4. Ian Hickson. http://www.ietf.org/mail-archive/web/hybi/current/msg00784.html
5. S. Agarwal. Real-time web application roadblock: Performance penalty of html sockets.

Outline