

HOMA Project

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Problem

We would like to evaluate the effectiveness of the recently proposed transport protocol HOMA and compare its performance in the intended settings to TCP. We would also like to present the comparison information (as well as information about HOMA itself) in an easy-to-use user-friendly website.

Student Contributions

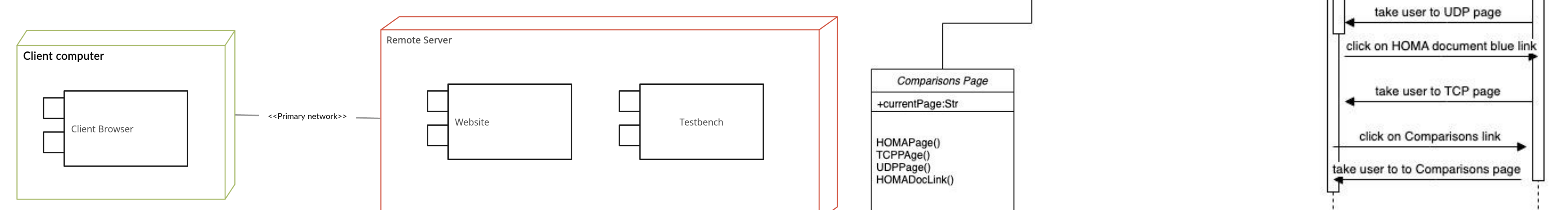
My contributions to the project centered mainly in the areas of protocol research and website design.

HOMA is a novel transport protocol (It was recently presented in a paper by Montazeri et al detailing the project led by MIT's John Osterhout). Because of this, the paper deals in some fairly advanced networking concepts, and I worked on decoding this ideas in order to later implement them.

I then worked the design and content of the user-friendly website. This included wireframing, mockups, and writing all of the website's content (as well as obtaining or designing suitable graphics).

Current System

Our current system consists of a HOMA and a TCP testbench which evaluates the message latency of the protocols with varying message, and a website which presents this information in a user-friendly manner.



Design Examples

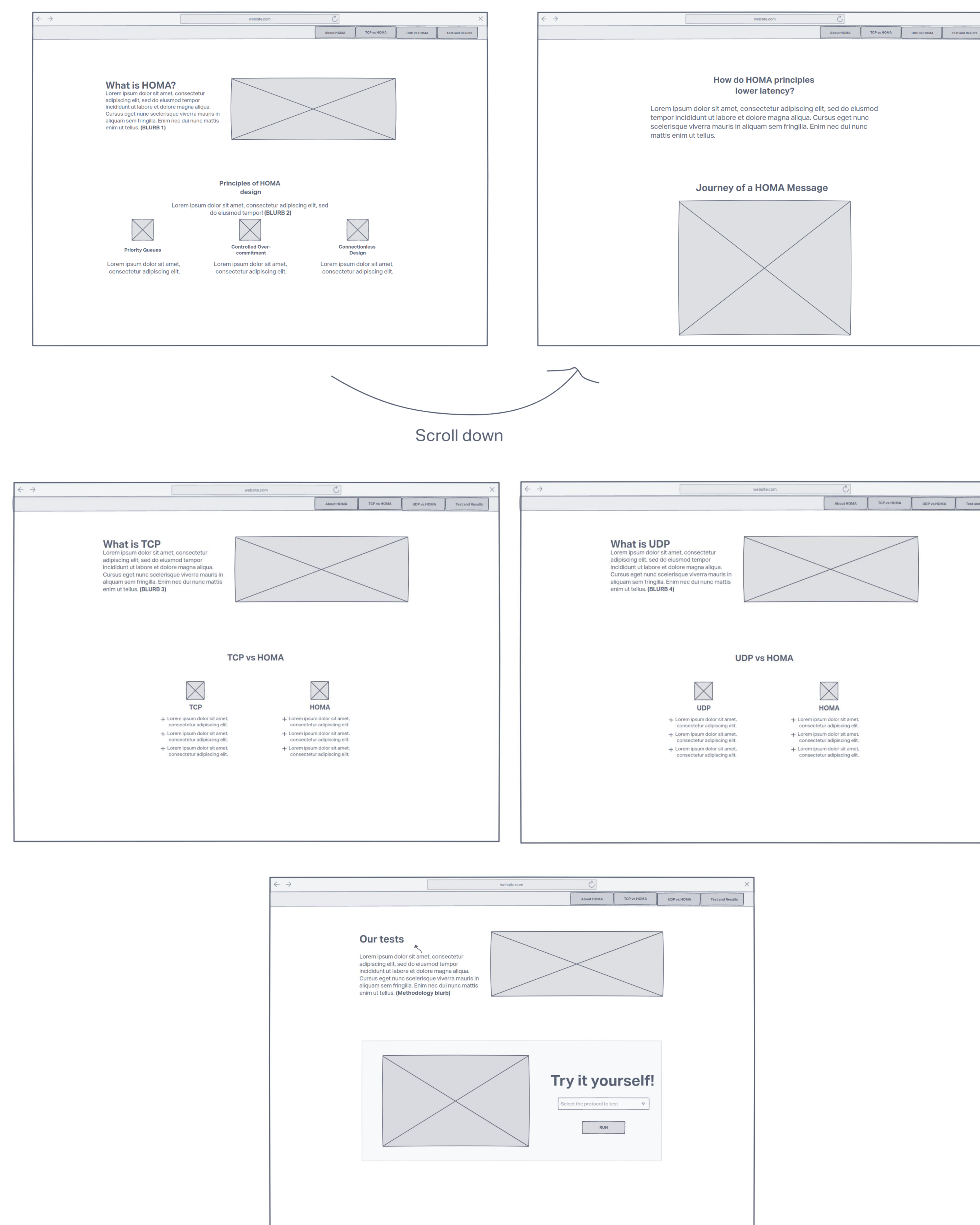


Figure 1: Early wireframes for user-friendly website

System Design and Diagrams

How HOMA works

HOMA is designed to improve the latency of messages in a datacenter situation. Specifically, it improves latency in situations where there is a large amount of small messages. It does this by employing two novel strategies:

- Dynamic (in-network) assignment of priorities to messages using switch priority queues
- Controlled overcommitment to provide reliable (mostly) transport without needing to establish a connection.

Thanks to these strategies (among others) HOMA achieves a near 100x speedup as compared to TCP in the relevant situations.

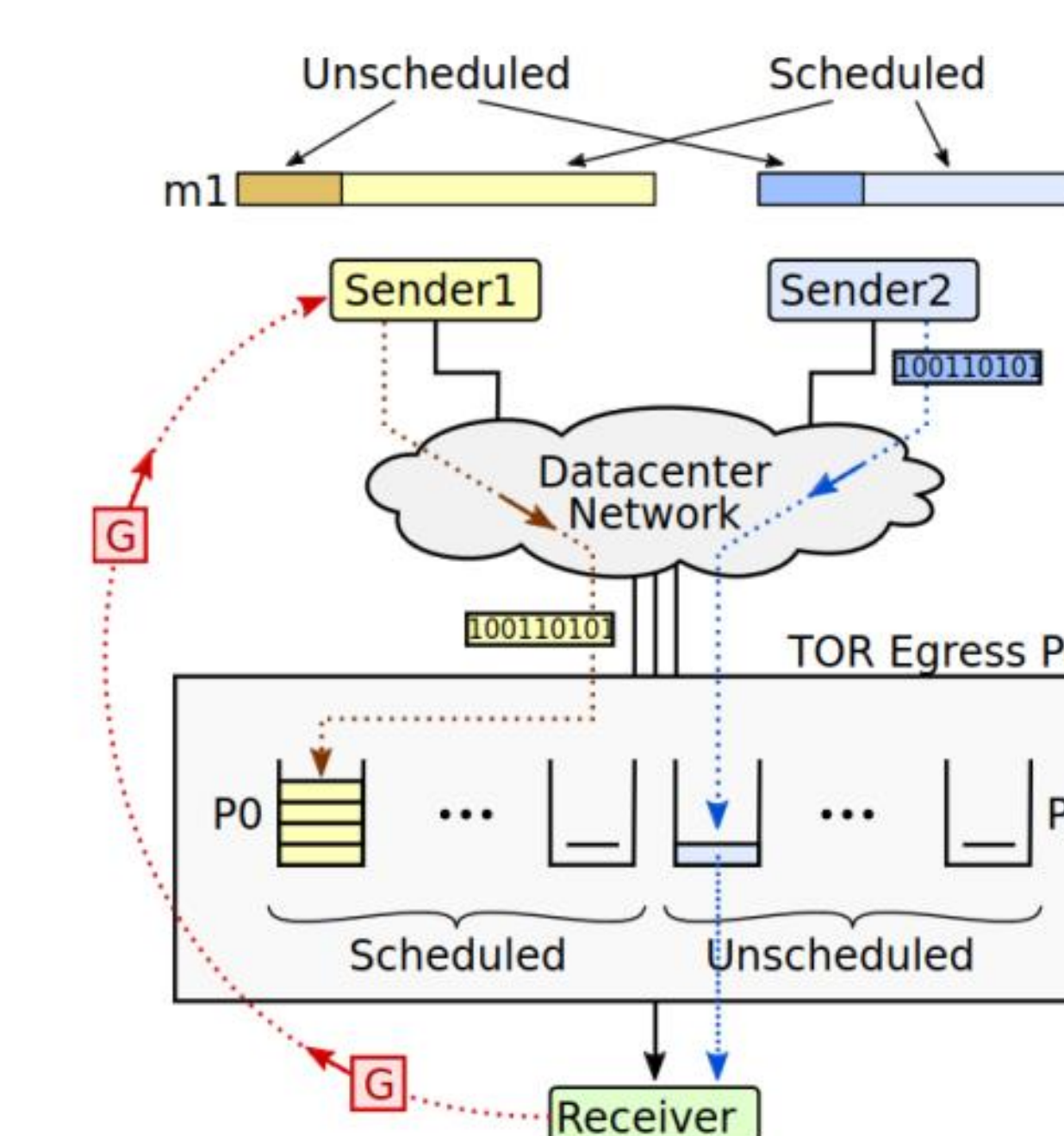


Figure 2: Graphical depiction of how the HOMA protocol operates (Sourced from HOMA paper)

Summary

Through our experiments, we were able to confirm the HOMA paper's reported speedups in the small-message-high-volume case over TCP and we presented our findings via the website.

Acknowledgements

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