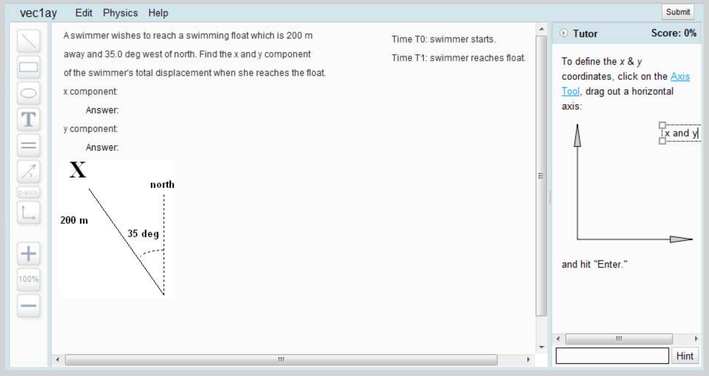
EXTENDING THE FUNCTIONALITY OF THE ANDES PHYSICS TUTOR WITH AN ONLINE WHITEBOARD

Team Members: Jadiel de Armas, Joseph Milazzo, Minh Nguyen, Mark Scheppe, Matthew Smith, and Addison Waldow
Sponsor: Brett Van de Sande

Introduction

Andes is an intelligent tutor homework system for introductory physics. It replaces the pencil and paper that students would ordinarily use to solve physics homework problems. Students draw diagrams, enter equations, and define variables with the same freedom that they have when using paper. Yet, unlike a piece of paper, Andes tells students whether their entry is correct by turning it red or green, and Andes will give principle-based hints when asked.

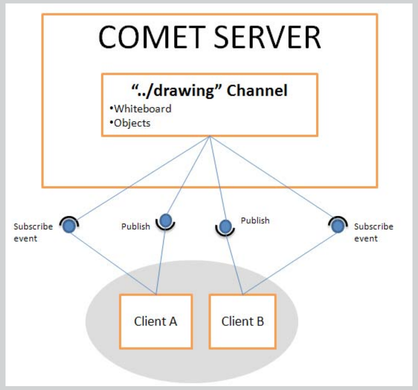


Motivation for the Project

- Allow two or more people who are physically separated to work simultaneously on a problem
- Collaborate (via a web server) by drawing in a canvas that is updated in real time and by chatting within the user interface

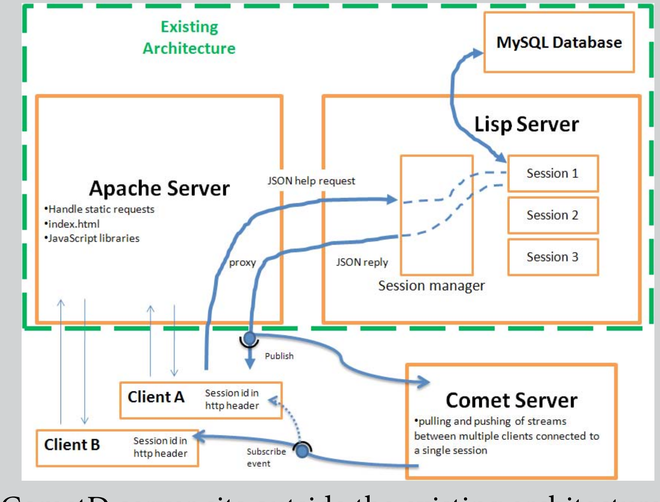
The Comet Paradigm

Comet is a web application model which allows full bidirectional, asynchronous communication between a browser and a server.



Multiple users/clients are allowed to subscribe to the same server channel, which is the logical representation of a whiteboard and the objects it contains. Each time a subscribed client publishes a message to the channel, all other clients subscribed to the channel receive the message that was published.

Methodology



The CometD server sits outside the existing architecture so as to introduce as little disruption as possible. It implements the Comet paradigm, allowing the implementation of the publish/subscribe model.

Results

The team was able to successfully implement the following features:

- Chat
- Collaborative drawing
- Conflict resolution during drawing
- Session logging
- Session restoration

The team gained substantial experience in the following areas:

- Linux system administration
- JavaScript programming
- Working within a robust, existing system

dōjō

Future Work

- Conflict resolution can be optimized and locking mechanisms made more intuitive
- "Human Tutor" functionality needs to be tuned to work for all users in the session

ASU Ira A. Fulton Schools of Engineering
ARIZONA STATE UNIVERSITY