Browser Based Distributed Computing
TJHSST Senior Research Project Proposal
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1 Purpose and Scope

The purpose of this project is to create a framework that allows researchers to harness the tremendous number of nodes available over the Internet for volunteer computing. A web interface for project management will allow for a manager-worker task distribution model to be set up with relatively little knowledge of web technologies on any operating system. If the framework comes to fruition and is satisfactorily accessible, fault tolerant, secure, and efficient, a sample problem to demonstrate the use of the framework will be implemented. If possible, that data will then be sent to one of the various volunteer computing projects in existence today.

2 Background

Several research projects have been done in the field of volunteer computing. A project based out of MIT seeks to provide a similar framework to developers using Java instead of Javascript, which they hope to increase speed, but severely limits the number of nodes they can access. With the current increase in the speed of Javascript in modern browsers due to the advent of web based applications, Javascript will the fastest, most accessible language available on the Internet. Other projects have looked into various aspects of volunteer computing including fault tolerance and sabotage resistance, and the results of those studies will be built upon.

3 Computer Language and Software

The server will be running Apache to serve webpages to clients, with PHP as server side programming language and HTML to display the interface. The clients will be modern day browsers like Firefox, Safari, or Internet Explorer and will display the HTML served by the server and Javascript to perform calculations on the data received. Messages will be sent from the server to the clients and vice versa using AJAX (Asynchronous JavaScript And XML) using a framework called Prototype.

4 Procedure

To begin, a cursory working model of the manager worker interactions between the server and the browser will be established to assess the validity of the idea. Once a rough model is established, the storage scheme will be implemented to keep track of results, statistics and the data that needs to be calculated. From there a focus will be placed on making the code as general as possible to convert it from a model to a framework that can be used for any number of applications. A focus will be placed on a way for those implementing the framework to easily adapt it to their needs, fault-tolerance, security, scalability, and interface. From there, the framework will be released and the project will be working towards a implementing a useful distributed computing project that will display the features and test the validity of the framework.

5 Algorithms and Testing

Using AJAX to pass messages, a client-worker style parallel arrangement will be established with a data pool. Various algorithms will be used to calculate the data on the browser side, based on the function of the system, and this will be easily changed using the admin interface. The results will be tested based on their validity, the speed in which they are calculated compared single worker calculations, and the ease with which the results data can be viewed and accessed.