

XFolio —

A Decentralized Cryptocurrency Portfolio Manager

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Abstract

Modern internet applications rely on centralized servers to store data and exchange information with other users. Due to this centralization of data, these servers are a prime target for digital thieves, and there is no juicier target than money. Many times a year, we learn of high-profile data leaks that release millions of credit cards, passwords, and social security numbers into the wild, and we lose more and more faith in the safety of our personal digital information.

We introduce XFolio, a decentralized cryptocurrency portfolio application. The app solves two problems. Firstly, it is a proof-of-concept decentralized web application—it allows users to choose where their information is stored rather than being forced to trust in a central authority. Secondly, it satisfies the need for a cryptocurrency management app that embodies these decentralized properties and allows users to monitor market trends and keep track of their varied cryptocurrency holdings.

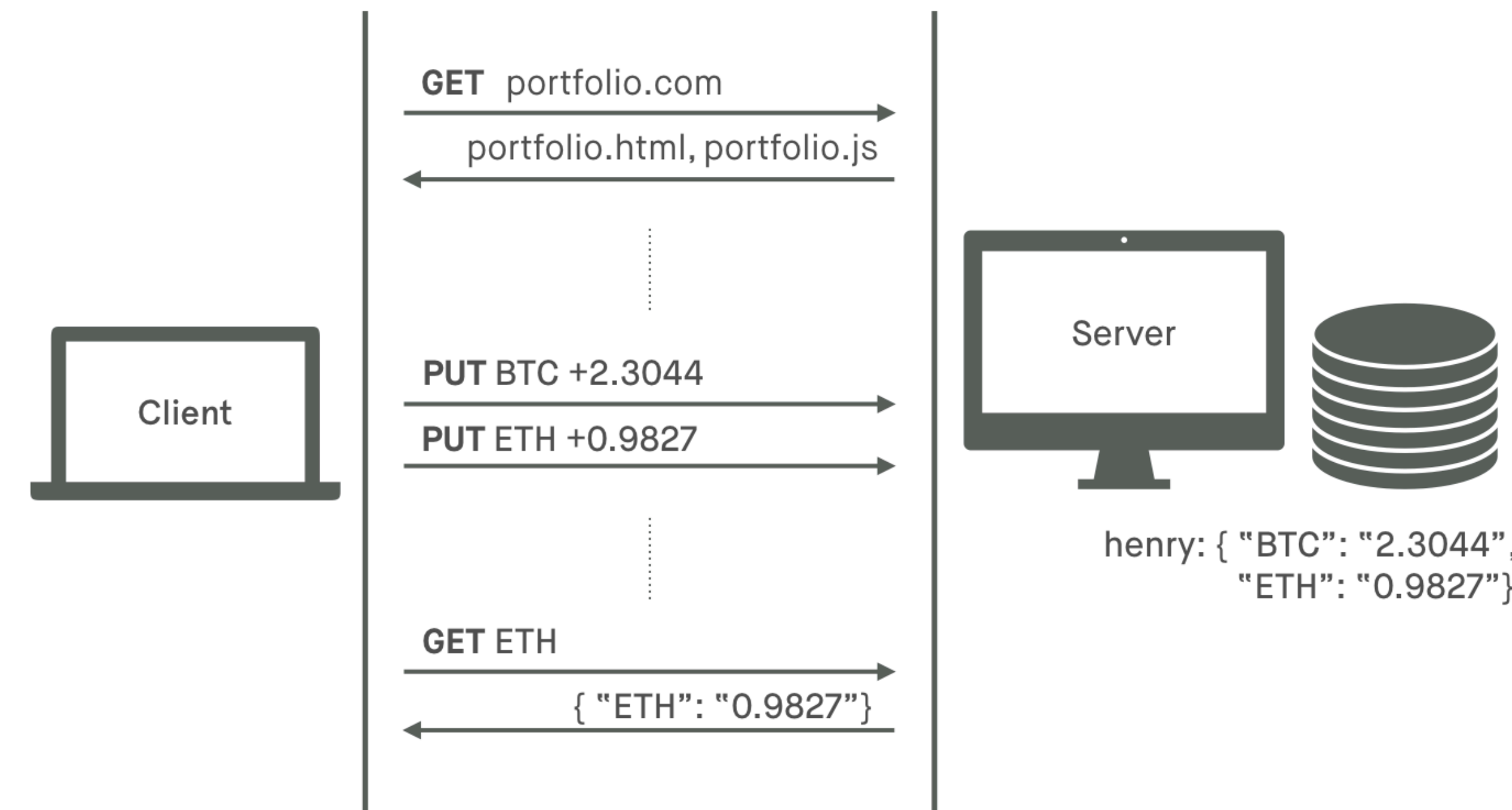
Introduction

- The internet is on a trend of heavy centralization
 - Traffic: 25%+ shared by Google and Facebook
 - Motivates hackers to attack centralized data stores, resulting in breaches (for instance, Equifax)
- Clear incentives to create a more decentralized internet
- Cryptocurrencies, which thrive through a system of decentralized trust, are growing massively in popularity
- *Users of cryptocurrencies need a means of tracking their asset portfolio and viewing market trends*

Idea

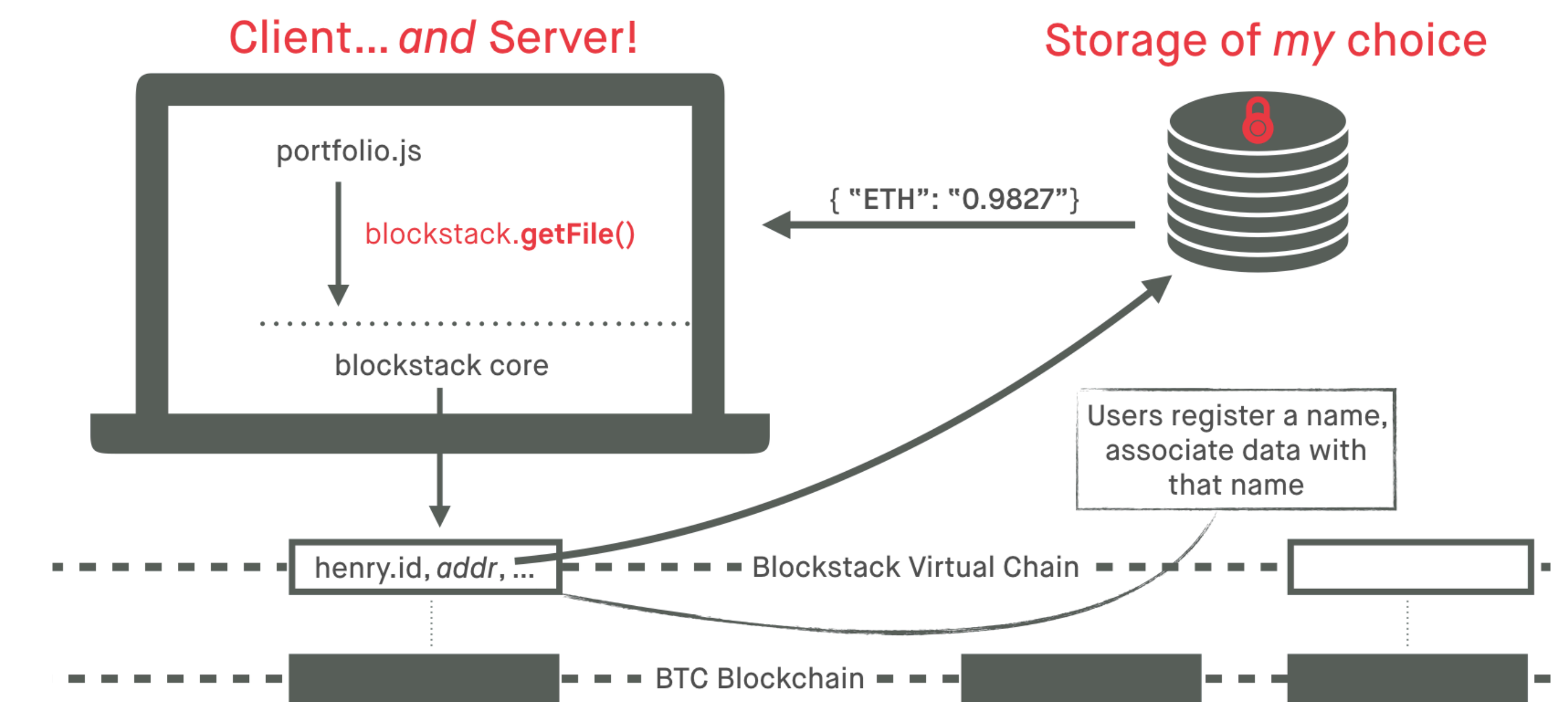
- **XFolio**, a portfolio application as decentralized as the cryptocurrency it manages
 - Give users the ability to choose where and what is stored
 - Record asset balances, track market trends with rich graphs
- Use **Blockstack**, a new app framework that allows developers to build decentralized applications using the blockchain.
 - Utilizes a 'virtual chain'—a layer of information that lies above the (Bitcoin) blockchain
- Users can register a name and associate data with that name
- Confers the same decentralized properties that blockchains provide

Implementation



Conventional Implementation

- Client and server run on separate machines
- User data is stored in a centralized database controlled by a trusted party (for instance, Facebook)
- Possible vulnerabilities, lack of user control



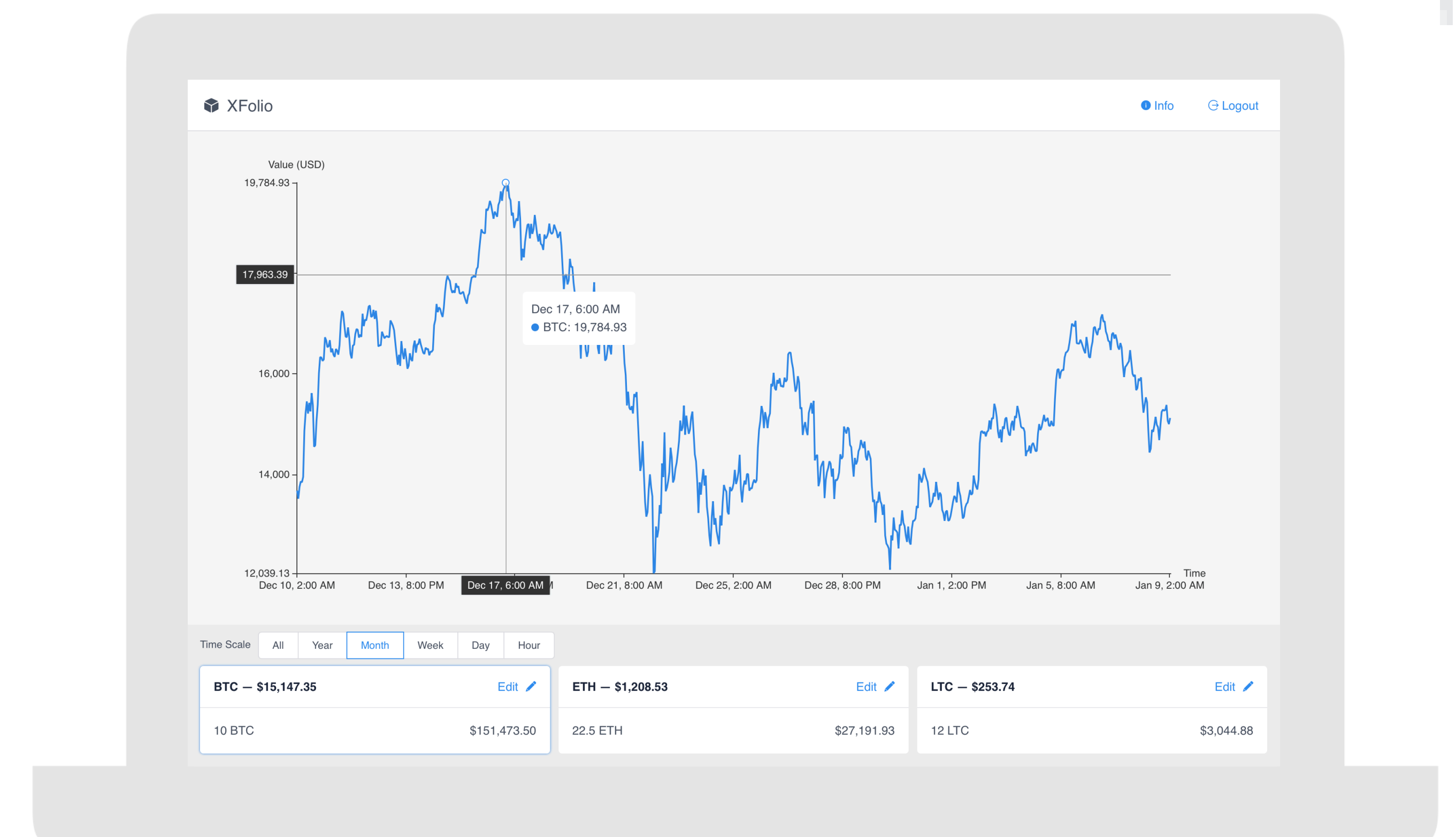
Blockstack Implementation

- Client (XFolio) and server (Blockstack) run on the same machine
- User controls location of data; gets to choose who to trust
- XFolio is built with: **Blockstack** (decentralized identity, storage), **Vue.js** (JS framework), **iVue** (UI components), **ECharts** (graphs), **Node/NPM** (packages), **WebSocket** and **Axios** (requests)

Results

- **Features** (met all proposed targets, exceeded graph target)
 - Store and edit personal balance for various coin assets (BTC, ETH, LTC) in location of choice, linked to Blockstack ID
 - Blockstack currently supports only Gaia, in the future Dropbox, Google Drive, user-hosted storage
 - **Ongoing issue**: occasional data write failures
 - View graph of historical data for various coins (BTC, ETH, LTC)
 - Time scale ranges from hourly to all time
- **Performance** (sample latency/duration, using Princeton network)
 - Blockstack-linked storage
 - Read¹: 900ms/0.3ms
 - Write²: **2s**/0.3ms
 - Graph data:
 - BTC, All³: 200ms/100ms
 - BTC, Hourly⁴: 100ms/0.7ms

Name	Domain	Type	Method	Latency	Duration	20.00s
localhost	localhost	Document	GET	2.929ms	0.644ms	
app.js	localhost	Script	GET	38.05ms	25.67ms	
files	localhost	Fetch	GET	992.0ms	0.315ms	
histoday	min-api.cryptoco...	XHR	GET	208.0ms	99.17ms	
webpack.hmr	localhost	Other	GET	112.1ms		
icons.24712f6.ttf	localhost	Font	GET	107.2ms	2.660ms	
vs-feed.gdax.com	vs-feed.gdax.com	Socket	GET	59.02ms	0ms	
nodes	localhost	Fetch	GET	565.2ms	0.378ms	
files	localhost	Fetch	PUT	2.28s	0.320ms	
histomminute	min-api.cryptoco...	XHR	GET	97.28ms	0.738ms	



XFolio Interface, showing graph, time scale, coin info
code available at <https://github.com/hstolz/xfolio>