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Introduction

Substratum is creating an open-source foundation for a decentralized web which will provide unrestricted access to content and sharing of information for users across the globe. Our mission is to bring forth the free and fair internet of the future by combining proven technological building blocks with emergent technologies in an innovative and holistic way to help solve many of the problems that plague the modern internet.

Substratum will gain mass adoption by revolutionizing the hosting industry with per-request billing via micro-transactions and incentivizing users to run nodes to create the network by paying node hosts in Substrate. This is all being managed by blockchain technology and machine learning.

Section 1

THE DECENTRALIZED WEB

Current Internet and Issues at Play

The current version of the web, how we currently experience the internet has become increasingly centralized, censored and faced many controls. Data must travel through designated hardware access points (usually servers and hubs). This causes access points to become hacking targets to anyone seeking user's personal data. Aside from cybersecurity issues, there is also the issue of net neutrality. Net neutrality is the idea that Internet Service Providers (ISPs) should not be allowed to slow service to specific sites, or be able to block content and applications that flow through that network.

“Just a few large platforms drive most traffic to online news sources in the U.S., and thus have enormous influence over what sources of information the public consumes on a daily basis. The existence of these consolidated points of control is troubling for many reasons. A small number of stakeholders end up having outsized influence over the content the public can create and consume. This leads to problems ranging from censorship at the behest of national governments to more subtle, perhaps even unintentional, bias in the curation of content users see based on opaque, unaudited curation algorithms. The platforms that host our networked public sphere and inform us about the world are unelected, unaccountable, and often impossible to audit or oversee.”

The Decentralized Web

The decentralized web (or Web 3.0) is a web controlled by independent and privately owned computers that allow for a web experience that is both secure and open. This means that everyone can access all information and services on the internet without informational gatekeepers, ISP interference as well as being resistant to corporate or governmental surveillance and restrictions.

A decentralized web will create a free and open web for everyone in the world by making sure that anyone in the world can access content with no interference from corporations or governmental agencies. When net neutrality, data breaches and cybersecurity are growing concerns to the general public, the call for a community-oriented web experience is now stronger than ever.

Section 2

THE SUBSTRATUM NETWORK

The Substratum Network combines innovative technologies from the cryptocurrency, and community hosting realms to not only usher in a free, peer-to-peer internet, but to revolutionize the hosting industry. The Substratum Network is made up of nodes—networks of peer-to-peer computers—who then can deliver secure content anywhere using industry-leading cryptography, effectively ending the need for VPNs and Tor. It changes web hosting by incentivizing network users with its own cryptocurrency token to essentially rent out their unused computing resources as a hosting platform for websites. Hosting costs are billed through per-request micro-transactions, inhibiting the payment of unutilized resources.

One of the biggest frustrations of the decentralized web and its users is that it isn't always easy for those who aren't technically inclined. Part of the beauty of the Substratum Network is that you don't need any additional software or a special browser to run it. The network integrates into existing internet frameworks, meaning the end user won't have to change the ways in which they interact with the web.

Substratum provides a method for serving decentralized content through a Mac, Windows, and Linux application service that is easy to install and run (requires no technical expertise) and serves up decentralized content using the toolkit that we have developed.

By allowing millions of Substratum Network users to serve content the biggest concern becomes privacy and security. Substratum solves these issues through advanced cryptography algorithms rooted in Artificial Intelligence that ensures all data remains

secure. Following the lead of BitCoin, this is the strength of cryptocurrency and the crypto movement.

Substratum will become a fully open-sourced project upon launching version 2 in the beginning of 2018. This means that the source code will be available to anyone for redistribution or modification. The reason we are waiting, is to ensure our compression and cryptographic algorithms are solid before we take the project open-source.

The Substratum Network will provide an API and SDK for developing tools and applications directly on the Substratum Platform. Adding this feature allows for a strong developer presence and an extensive support network while simultaneously accelerating the growth of the decentralized web on the Substratum Network.

Section 3

SUBSTRATUM HOST

The SubstratumHost component of the networkSubstratum will completely change the ways that we approach web hosting. Currently, web hosting consists of paying a company to store a website’s files on a server connected to the internet. Pricing is typically structured around first buying a domain name (for example: <http://www.substratum.net> is a domain name). Then, a monthly price is set based on how much bandwidth and computing resources you need to run the site. For small, personal websites shared hosting—sharing space on a server with other sites— will usually suffice. For businesses and larger enterprises with a complex site and a lot of traffic must use either VPS (Virtual Private Servers) or cloud hosting. VPS hosting involves paying a hosting company for dedicated use to their servers whereas cloud hosting such as AWS (Amazon Web Services) involves only renting the space you need on a “virtual” server instead of a paying to use physical one.

The primary issue with web hosting in its current form is that is incredibly expensive! It can cost upwards thousands of dollars per month solely to host the site files—this doesn’t include any maintenance costs or additional security. This makes it incredibly difficult for small or medium sized businesses to have a strong web presence without incurring significant costs.

Other less prevalent issues include a lack of transparency regarding uptime (the time a hosting company can guarantee a site to be online), the need for additional software, lack of reliable security, slow load times based on server location as well as privacy and resource limitations (CPU, RAM, etc.).

Substratum aims to resolve these common issues in the following ways:

1. Drastically reducing hosting costs through peer-to-peer hosting that is billed per request through micro-transactions. This means that you will only be billed when people go to your site as opposed to per minute or hour like AWS and other cloud hosting platforms.
 - As each request comes through the amount of CPU power, Network Bandwidth and the amount of data are calculated and once a threshold of 1 ATOM is reached a micro-transaction will take place between the HOST and the NODE and Substrate will be transferred. The result of all of this is that since you only pay for what you use the cost is reduced.
 - Calculations are being worked to get an exact fee matrix but we will without a doubt be less expensive than current industry standard hosting.
2. In order to serve millions of sites, databases and applications, the Substratum Network uses advanced compression algorithms, geolocation and machine learning to direct the right combination of Substratum Network nodes to serve content to the intended user based on location. This will ensure the fastest load times with the lowest amount of latency/strain on the Substratum Network, the serving machine and the receiving machine.
3. Due to Substratum's peer-to-peer network, websites will never experience downtime.
4. We serve Substratum Requests directly to the default browser (Safari, Firefox, Chrome, Internet Explorer) without any special software installed on the average consuming users computer.
5. Substratum uses cryptography, compression algorithms and the peer-to-peer network itself to send data in small, encrypted pieces so your data and content is always safe.
6. Substratum allows site owners to keep their domain names without using a subdomain name (example: <http://www.yourwebsite.hostingcompany.com>)
7. Substratum hosts sites that can be accessed by both the centralized and decentralized web.

8. SubstratumHost will have an easy to use Control Panel similar to CPanel or PHPMyAdmin that will allow you to manage your content as a web host.

Upon launch, Substratum will support the following languages and libraries:

- HTML/CSS
- JavaScript (jQuery, Bootstrap)
- PHP/MySQL (Wordpress, Magento, Joomla)
- ASP.NET
- Python (Django)

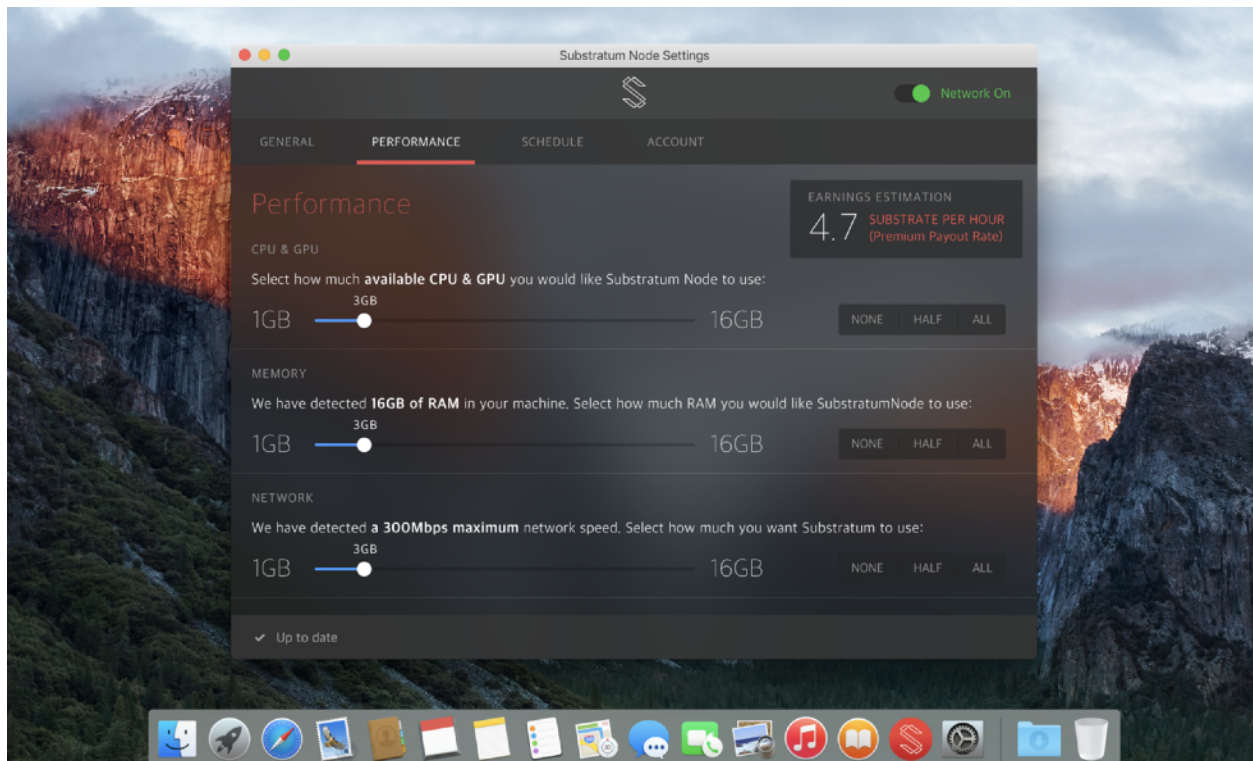
More will be added in future versions such as Ruby/Ruby on Rails.

Section 4

SUBSTRATUM NODE

SubstratumNode is the actual network of computers that link all of Substratum's interactions. It will allow anyone to become a web host and earn Substratum's own cryptocurrency while the user is hosting. Users do not need any Substrate Tokens to run a SubstratumNode. They only need a valid Substrate Wallet Address (supported through Ethereum) to send your Substrate at your designated payout periods.

Through an easy-to-use, UI interface the user can easily control how much CPU, GPU and RAM they want to let Substratum use. The user can control what times and days of the week they want to allow hosting. This allows your node makes the most money possible for you when you aren't working but doesn't disturb you when you are working.



Network Members that run our broadcast software will receive SUB coins by serving requests. This increases global participation and will bring value to Substrate.

In order to run SubstratumNode on your computer, users only need to have ports 80 (HTTP) and 443 (HTTPS) open to run a node. These ports will automatically be opened in the setup process. The Substratum host will be simple to setup and run.

SubstratumDNS

DNS (Domain Name System): DNS or the Domain Name System is the naming system that currently tells your browser where to go when you type in a domain name. For instance when someone types <http://www.substratum.net> into the address bar, a DNS lookup is performed to check where to send the request. Then the DNS system returns a unique IP address where the request can be routed. The first version of SubstratumDNS will be a complex, AI enabled DNS server that will receive DNS requests along with the geolocation of the requestor and find the closest available SubstratumNode able to fulfill the request.

SubstratumDNS runs on both the distributed and decentralized web through a system bridge. It uses the existing DNS framework of the internet to deliver content to default browsers and allows the user to keep their domain name; however, that is where the similarities with a traditional DNS server end. The most substantial difference lies in its process of receiving requests from the user and returning the requested page back to the user.

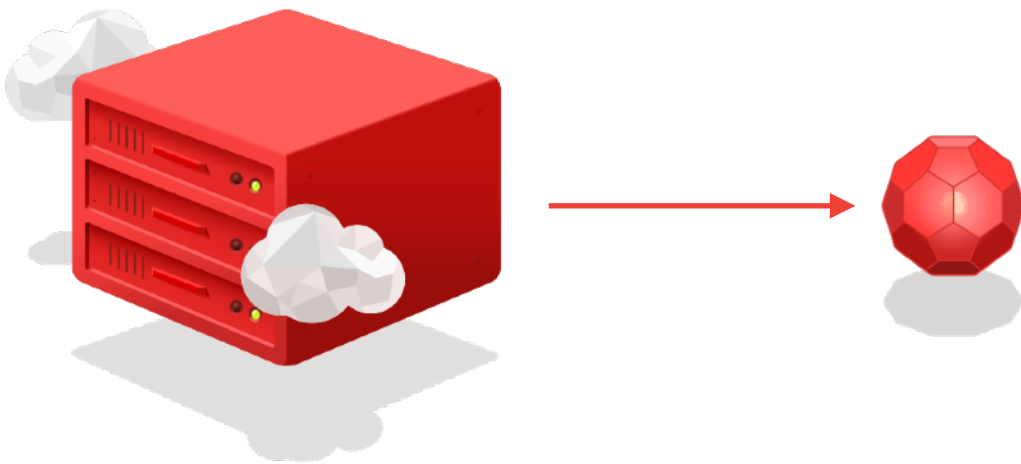
1. SubstratumDNS prioritizes the user's geolocation to identify the closest nodes. This allows for the user to receive the fastest request response possible.
2. Within that bank of nodes, the system locates the node(s) with the most accurate information that needs to be returned. This is a complex process involving machine learning and advanced algorithms.

Note: *Not all nodes hold the same information. In fact, the nodes themselves rotate content and information to guarantee and maintain their anonymity.*

3. Once the system locates the best primary node it sends the request to the node to return to the user.

4. If the node requires additional content from another node, the two nodes will work in tandem to return the required content.

This will ensure that we can reach the entire world with the Substratum network without the average everyday user having to install any special software.



Section 5

SUBSTRATUM COINS AND CRYPTO PAY

Substrate Token

“Cryptocurrency” and “blockchains” are terms that have been tossed around the past few years without a lot of information on what they actually are and how they work.

Put simply, cryptocurrencies are e-monies that are not backed by any centralized financial institute or financial server. Instead it is backed and produced from within the cryptocurrency community itself. This means that every single peer in a cryptocurrency’s network has a list of all transactions made by all other peers. This database of the networks data and transactions is called the blockchain. In order to complete a transaction, the entire network has to collectively agree that the transaction is valid and that there are available funds to move. A transaction is simply a file that tells the network what you want to do, signed with your personal, encrypted key. This file is broadcasted to the entire network through nodes (a network of peer-to-peer computers). Once the transaction is confirmed as legitimate, the record of the transaction is added as a new block to the blockchain. This record cannot be changed, reversed or altered in any way.

Blockchain technology is being used for more than digital money. Due to its genuine peer-to-peer network, it can be used for identity confirmation, smart contracts, auditing, data and record management. The applications that are using blockchain technology are growing and changing every day.

Substratum Network will be running a combination of blockchains, developed specifically for the decentralized web. Substrate, the coin that is the fuel that runs the Substratum Network is a ERC20 compliant token based on the Ethereum Blockchain.

Substratum runs on Substrate and Atoms, a rough linguistic equivalent to dollars and cents. The fiat currency model uses numbers rounded to the second decimal place, and so does SUB. The numbers before the decimal point are Substrate and the numbers after are the Atoms. So for example, 354.98 SUB equals 354 Substrate and 98 Atoms.

In order to incentivize users to run the Substratum Network client on their machine, Substrate will be used as payment for serving the network. The coin is issued to the serving machine through a micro-transaction from the hosting site to the serving computer. By breaking fees down to a micro-transactional level it greatly reduces the overall cost to companies and entities that want to host sites and applications on the internet as they pay only for what is being used.

Creating and Maintaining Substrate's Value in the Global Market

Substrate acts as the fuel that powers the Substratum Network*. The process works something like this:

1. When a business or entity wants to host their site(s) on the decentralized web, they will purchase Substrate using other cryptocurrencies or fiat.
2. When a Substratum Network member runs their node and renders requests they are paid using Substrate from the host.
3. When a shopper checks out using CryptoPay, the payment method they use is converted to the payment method the vendor desires by using Substrate as the conversion currency.

- Should the market ever reach 90% saturation, the network will create 10% additional tokens and separate them into an account that is only used to fuel the network. These will not hit the exchanges and will only be available for transactions within the network.
- To ensure the development fund is not subject to big market fluctuations, we're hedging it four ways. By doing this we ensure we have the capital needed to finish each phase of the project budgeted for in the Initial Coin Offering (ICO).

Ethereum (25%)

BitCoin (25%)

USDT (25%)

USD Fiat (25%)

- Founders & Advisors Shares

Below are the shares dedicated to the founders and advisors for their efforts and investments to get Substratum up and running:

Main Founder: 10MIL Substrate

Team Leads: 1 MIL Substrate each (5 Team Leads)

Advisors: 25% of total investment

- Lockout Period

Founders receive NO SHARES until the first version of Substratum is released in 2018. This will ensure that members who join during the pre-ICO or ICO phases are protected and a quality product is delivered.

We believe in operational transparency so we've provided a breakdown of how we plan to use the development fund. This is to ensure short-and long-term goals are met and that we raise sufficient market awareness:

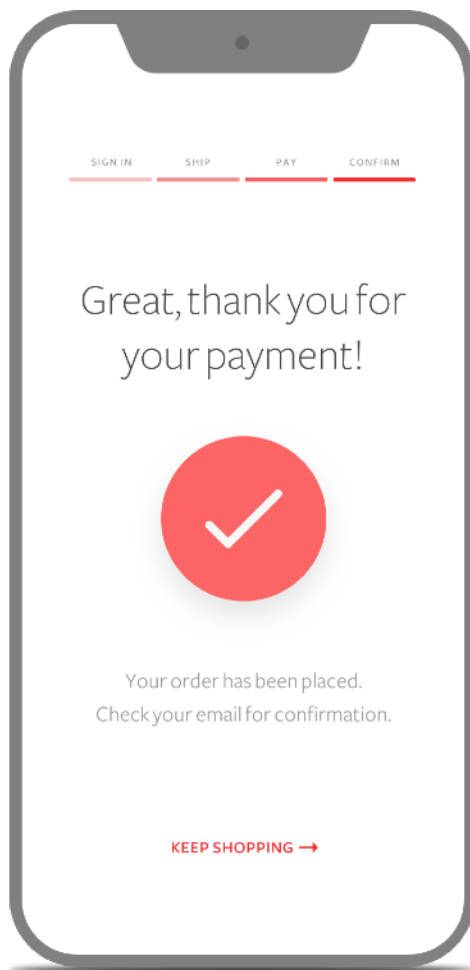
Product Development: 60%

Product Awareness: 30%

Network Infrastructure: 10%

CryptoPay

CryptoPay is an online wallet that allows storage, transfer and spending capabilities for GBP, USD, EUR, BTC. We will be bringing in CryptoPay to support Substrate (SUB). This will allow all sites and applications that run on the Substratum Network to process cryptocurrency transactions using any publicly traded coin.



Getting CryptoPay on a website is similar to other payment gateways. CryptoPay will have simple tools to easily add cryptocurrency checkout to a website. Similar to adding Paypal or Stripe, CryptoPay has a quick registration process completed by the site owner. Once registration is complete, the site owner will receive an integration guide to add CryptoPay to their website. (Figure 2)

Each vendor sets which currency they desire to be paid in. In order to change the currency that the user pays in to the desired payment currency CryptoPay uses Substrate as conversion currency.

Section 6

web users

Development Tools for the Decentralized Web: the Substratum Network will provide an API and SDK for developing tools on the Substratum Platform. This will bring in strong developer support and will accelerate the growth of the decentralized web on the Substratum Network.

With the Substratum Network ALL web-sites and applications will have EQUAL ability to be broadcast in an equal and fair manner. International Digital Barriers: currently countries like China have strict regulations on what their 1.379 billion citizens are able to interact with on the internet. Substratum will break down these barriers through a network of decentralized computers running the Substratum Network Software. Where other solutions that are currently used by residents in these countries require special software to be installed, like TOR, Substratum will take a reverse approach and require no special software for the average user.

The benefits of the decentralized web are clear and the proponents are of the highest caliber in the technological community but not without its issues. Substratum aims to solve global issues of censorship, international content barriers, full net neutrality and a user-governed ethics system.

On the Substratum Network, ALL websites and applications will have equal ability to broadcast content, but with the added self-governing element means that users will have a system of self-governance so illegal content like child pornography and terrorism sites can eventually be removed from the network while keeping the integrity and openness of the network free and fair for all.

Section 7

substratum ico

ICO Goals

Substratum solves a global problem that all experts agree is the next step in the evolution of the internet. In version 2, we integrate all Cryptocurrencies that are publicly traded into a Payment Gateway that brings all cryptocurrencies to the web and uses Substratum Coin as an exchange currency which brings tremendous value. In order to achieve these goals we need to raise working capital for further development to take us through version 2 and marketing capital to raise awareness about our product. Substratum builds upon principles of the crypto community and takes decentralization to the next logical step in the progression that BitCoin started. Because Substratum is in the same sphere of influence cryptocurrency investors should find this project appealing and the overall reach of this project goes even beyond that of BitCoin and Cryptocurrencies in general. In 10 years Substratum should touch every computer on the planet.

ICO Parameters

ICO Start Date: August 14 2017 00:00 EST

ICO End Date: September 14 2017 00:00 EST

SUB Tokens Issued: ~226,000,000

Total Sale Goal: 150 000 ETH

Minimum Sale Goal: 1 000 ETH (met during pre-ICO 3.5 times over)

\$13.8 million raised

17,778.25 ETH Raised
154.6736 BTC Raised
232,105.45 XRP Raised
602.1433 BCH Raised
865.9953 LTC Raised

\$5 million direct investment (Render Payment Systems)

ICO Budget Allocation

Product Awareness: 30% of Total Budget

Regardless of how great the project is no one will use it if they don't know about it. Because of that we will be spending a considerable amount of resources on raising awareness of the product. This will involve traditional methods of advertising as well as taking part in cryptocurrency/blockchain-based conferences worldwide as speakers and booth vendors.

Product Development: 60% of Total Budget

The core of the budget is the development of the product, so naturally the majority of the budget is allocated to development. Through the use of our core team and by bringing in additional resources we will achieve the product timeline set in place.

Network Infrastructure: 10% of Total Budget

To kick-start the network we will need to establish data centers around the world to provide the core supernodes.

Section 8

US PARTICIPATION

The Securities and Exchange Commission recently made a filing that most coins need to be registered as a commodity to run an ICO for US citizens. The exception to that rule is if the token/ coin has a purpose as part of a platform or system. If it is used as the FUEL that runs the system. Since Substrate is the fuel that runs the Substratum Network, we are cleared to run for US Citizens.

Section 9

THE FUTURE OF SUBSTRATUM

Beta

A public beta will be released during December of 2017.

Version 1

SubstratumNode — Mac, Windows, Linux Software for Substratum Network Users to run their Web, Database, and App Broadcast Nodes and receive Substratum Coin on a per request basis.

Developer Toolkit — for Developers to write applications to run on the Substratum Network which includes our fully encrypted SubstratumDB (Database Management System), SubstratumWeb (Web Application Server), and SubstratumApp (App Development System and Broadcast Server).

SubstratumStore — Decentralized app store for developers to submit their applications to that will serve as the application store for the decentralized web.

SubstratumDNS — This is a DNS (Domain Name Management) system bridge that will allow standard browsers on any system (Mac, Windows, Linux) to use their default browser (Safari, Firefox, Chrome, Internet Explorer) to serve up sites from the Substratum Network. This will ensure that we can reach the entire world with the Substratum network without the average everyday user having to install any special software.

Version 2 (Early to Mid 2018)

Payment Gateway (SubstratumPay) to the Substratum Network. This will enable not only Credit Card transactions but CryptoCurrency transactions for all websites and applications on the Substratum Network.

SubstratumBridge will provide the crux of the SubstratumPay network by using SubstratumCoin as a bridge coin for all transactions that happen on our Payment Gateway network. For example if a user wants to pay with LiteCoin we will execute a micro-transaction that will convert BitCoin into SubstratumCoin which will then pay the vendor in Fiat. This conversion will happen seamlessly in the background and will further provide value to the SubstratumCoin.

Section 10

WHO WE ARE

The team behind Substratum is a US based software development firm who for well over a decade has architected, developed and deployed software solutions for Fortune 100 companies such as Apple, Facebook, Disney, HP and many more.

Project Leads

Justin Tabb

Solutions Architect

[EMAIL](#) • [LINKED IN](#)

Over the last 10 years Justin has lead development teams on projects such as training.apple.com, consultants.apple.com, Event Software for Facebook, Event Software for OpenStack, Theme Park Software for Disney, Election Software for 2008 Presidential Campaign and many more.

Abram Cookson

CIO and Co-founder at Substratum

[EMAIL](#) • [LINKED IN](#)

Serial Entrepreneur, Idea Man, Consultant. Over 18 years of experience in software development. Has provided software development and leadership for both small business and fortune 500 companies.

B.J. Allmon

Senior Software Engineer

[EMAIL](#) • [LINKED IN](#)

Seasoned leader in product engineering with over 20 years experience, lean practitioner, author, and speaker who specializes in leadership, program management, enabling team autonomy, mastery, and purpose.

Steve Swing

Chief Technical Officer

[EMAIL](#) • [LINKED IN](#)

Nearly 30 years of experience in the software industry with 14 of those as an independent consultant. Still makes time to learn recent technologies like Lagom, Scala, Akka, Play! Bootcamp Master craftsman Trainer.

Dan Wiebe

Technical Lead

[EMAIL](#) • [LINKED IN](#)

Head of Design with 10+ years of design experience of eye catching campaigns with high conversion rates and software design for systems that maximize ergonomics and ease of use.

Christian Pope

Chief Marketing Officer

[EMAIL](#) • [LINKED IN](#)

With 25 years in the field, Christian has served as VP of Marketing, CMO, & Consultant with a key emphasis on B2B Fortune 1,000 & B2C Startups.

Michael Stockwell

Advisor

[EMAIL](#) • [LINKED IN](#)

Michael is the owner of FizzPow Games, the creator of Bitcoin Billionaire, an accomplished developer and an experienced cryptocurrency investor and is serving as an advisor for Substratum.

Luke Bixler

Advisor

Whitepaper & ICO Consultant to numerous top ICOs and clients.