Blockchain Revolution

A white paper by Ge Jin, Robert Byers, Thom Harrington, & Jason Lee

Introduction

Blockchain is the most revolutionary technology since Marc Andreessen introduced us to the World Wide Web with Mosaic, the first internet browser (Marc Andreessen). It will challenge conventions in nearly every industry and disrupt business as usual in orders of magnitude not seen before. It will transform business on the internet and world wide web. There are risks, and these will be mitigated in the same fashion that organizations address other risks in technology and other aspects of business.

What is blockchain, what makes it so potentially power and transformative? Where did it come from? What are the current corporate directives? What's in it for college grads? What are the employment opportunities? Why are all your friends and family talking about it?

According to CNBC.com, "Blockchain is one of the biggest buzzwords in technology right now. But what is it? To most of us, blockchain is a mysterious technology associated with cryptocurrency such as bitcoin. And in fact,the first blockchain was conceptualized and implemented was Bitcon, implemented in 2008. However, the first paper on cryptographically secured chain of blocks dates back to 1991. ("Blockchain." Wikipedia)

With our current understanding, blockchain seems mysterious, but with two words we can make blockchain easily understood and remove the mystery. In short, blockchains are simply **transaction ledgers** linked together on the internet. (Iinuma, Arthur)

Where did Blockchain Originate?

Let's start with the first implementation. The first major application of blockchain technology was bitcoin which was released in 2009. Bitcoin is a cryptocurrency and the blockchain is the technology that underpins it. A cryptocurrency refers to a digital coin that runs on a blockchain.
Understanding how the blockchain works with bitcoin will allow us to see how the technology can be transferred to many other real-world use cases" (Kharpal, Arjun).

Satoshi Nakamoto mined the first bitcoins in January 2009, and with that, the cryptocurrency era was born. But while its origin is shadowy, the technology that made it possible, which we now call blockchain, did not arise out the blue. Nakamoto combined established cryptography tools with methods derived from decades of computer science research to enable a public network of participants who don't necessarily trust each other to agree, over and over, that a shared accounting ledger reflects the truth.

This makes it virtually impossible for someone to spend the same bitcoin twice, solving a problem that had hindered previous attempts to create digital cash. And, crucially, it eliminates the need for a central authority to mediate electronic exchange of the currency.

Soon, technologists realized that blockchains could be used to track other things besides money. In 2013, 19-year-old Vitalik Buterin proposed Ethereum, which would record not only currency transactions but also the status of computer programs called smart contracts. Launched in 2015, Ethereum—and now a host of competitors and imitators—promises to make possible a new generation of applications that look and feel like today's web apps but are powered by decentralized cryptocurrency networks instead of a company's servers (MIT Technology Review Editors).

Turning Industry Upside Down - The Revolution

The world is changing rapidly. The impact of technology is seen all around us. The Internet was first implemented in the 1970's. Andreessen brought the internet to life with the first web browser introducing us to the World Wide Web in 1994 (Marc Andreessen). Today we have technology at our fingertips with everything from shopping to music. Blockchain is about to take us on the next phase of innovation. Hang on!

From the brief history and explanation of what blockchain is, we can all start having our own visions. Some are obvious like instantaneous credit card approvals, and other banking transactions. Others are more complex, like speedy real estate transactions. Many will start making Star Trek future the status quo and others are perhaps beyond our wildest imagination.

Virtually every industry is exploring blockchain, and many are actively trying to integrate it to benefit their business. Let's take a look at a couple of use cases where change is on the way.

Docusign a "System of Agreement"

Docusign is already the industry leader of electronic document signage. Their next step is revolutionizing the entire agreement process.

Docusign will become a "system of agreement", says company CEO Dan Springer. Customers want us to move upstream so the documents are originated live in Docusign and can facilitate process. They want post signing help with managing the agreements. Docusign is in gear providing this service with a public blockchain. (Dan Springer.)

Docusign has already demonstrated blockchain integration with Ethereum Project, an open-source blockchain based computing platform and operating system. They are working with Salesforce to improve their "quote-to-cash" process at every stage, and adding artificial intelligence search and insights that will go beyond keywords and seek to understand agreement clauses. (System of Agreement.)

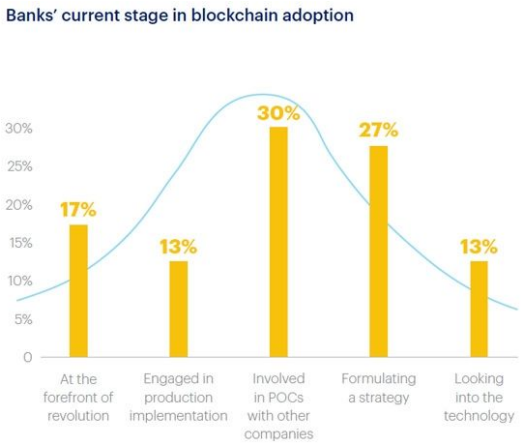
Real Estate Transactions Reimagined

Consider the potential for complex lengthy transactions like real estate business. Today, real estate transactions typically take a minimum of 30 days to complete. Blockchain could pull together existing information on a transaction, the property, the seller, the buyer, bank, and location county. Once the buyer and seller have reached agreement on terms and pricing (DocuSign opportunity?), they both electronically sign. They buyer is prompted to enter their credentials to gain access to the property (of course equipped with digital locks), the seller is notified of the deposit, the deed is recorded with the county, and so forth. Certainly there is a process, and steps along the way that must be taken into consideration (Weiss, Matt.), but DocuSign seems to be on the way to manage this part, as others are as well.

There are companies already working on blockchain for real estate! Propy has already "roadmapped a global property store with a decentralized title registry to disrupt the #340 billion cross-border real estate business." (Scott, Michael.)

Banking - Already an Adopter

Banking products are on the cutting edge of delivering. Consider JP Morgan Chase, the nation's largest of the big four banking institutions. Like Docusign, they are using Ethereum. They are using Blockchain technology to improve the payment process and for regulatory required KYC (Know Your Customer) processes. (Berman, Anma.) The bank has even filed for a blockchain related patent to keep track of payments sent between financial institutions. (Marinova, Polina.) JP Morgan is not alone. 30% of banks are involved in proof of concepts and 40% are exploring the possibilities (Matteson, Amelia.)

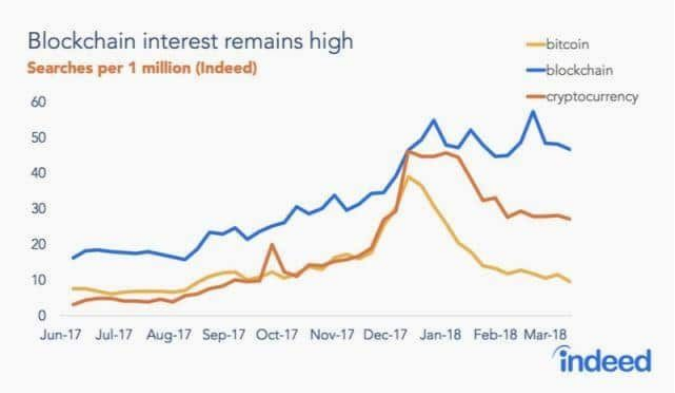


These are only three examples, but spend some time doing some web searches, and you will begin see the future for yourself. Pick an industry, product, or other concept and search blockchain <your topic>.

Opportunities for College Grads & other Job Seekers

Blockchain's Job Market

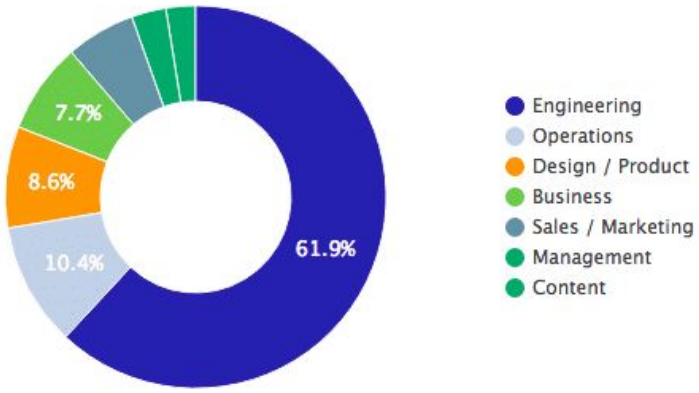
As a pretty new technology, one big point people care about is the job market. How is blockchain's job market, what can people do in this field and does it deserve to learn and apply as a job? Let's take a look at them.



From the graph, we can see people's interests are rising to peak in 2017 and that's the highest point for blockchain. The rise of blockchain leads

to the rise of blockchain jobs. The numbers don't lie and some numbers are truly staggering. According to Indeed's statistics, jobs on blockchain has increased 206% in 2016. It makes cryptocurrency jobs hot as well. Many big industries are desperately looking for high-quality talent which is extremely limited in this field. In 2018, we can see the overall market cap for bitcoins and other cryptocurrency. But blockchain is still in its high demand(Block Geeks).

It's easy to find jobs about blockchain online. But what career options do people have in this field? We can see from the image that technical engineering positions are always leading, but there are also many for design, operation, business, management and so on. There are multiple reasons to choose blockchain for the career. Compared with other technique jobs, blockchain jobs offer a 10%-20% higher rate as it's a new field and not many people have its knowledge. Working remotely is also easier to accept from the company and it's faster to accumulate knowledge in this field which provides a better start in career path(Rebecca Koenig). To be a developer or engineer, you need to know about Ethereum or other smart contract platform, Solidity programing language and other blockchain core knowledge. To be a non-tech person like operation, management or business, basically you need to know about the blockchain technology. A lot of big companies are hiring blockchain positions like IBM, Microsoft and VISA. And there are also some new bitcoin startups which are also good options. For those who want to learn and try something new, this is a good opportunity.



Risks to Mitigate

Blockchain is still an emerging technology and that comes with some problems that have yet to be solved. From the technical with high energy demand, transaction speeds, and data management. To security, preventing hacking and distributed denial of service attacks known to the cryptocurrency community.

One of the notable incidents involving blockchains is the Mt. Gox hack. Mt. Gox was the leading bitcoin exchange handling 70% of the world's bitcoin trades. In 2011, a key pass for the blockchain used by Mt. Gox was duplicated and bitcoins were stolen. Over 750,000 bitcoins owned by customers and 100,000 owned by Mt. Gox were stolen. It wasn't until February 17, 2014 when the theft was noticed and the company declared bankruptcy. Together they were valued at $480 million at the time the theft was noticed. Today they would be worth $55.6 billion. Most blockchains are made to be immutable and the stolen bitcoins can not be recovered. About a month later on March 20, 2014 the company managed to find 200,000 bitcoins in an unrelated old digital wallet. (Dougherty, Carter & Grace Huang.)

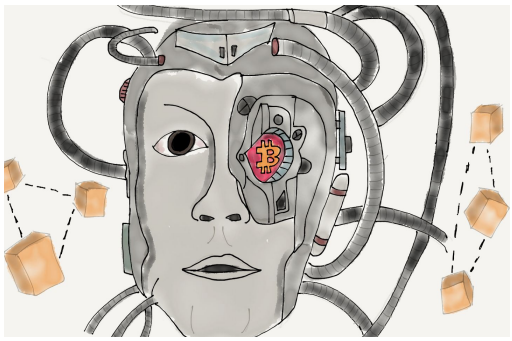
To this day the Mt. Gox is still undergoing the bankruptcy proceedings. 200,000 bitcoins that were found in March 2014 have been placed under a trust for creditors for when the courts decide how to distribute them. The owner of Mt. Gox, Mark Karpeles was arrested and charged with fraud and embezzlement unrelated to the stolen bitcoins. He was in prison for about a year and then released on bail with his trial still ongoing. The US government believes a Russian hacker, Alexander Vinnik, to

have played a key role laundering the stolen bitcoins. He was arrested in Greece July 2017. The US, France, and Russia have sent requests for his extradition (Stubbs, Jack, and Karolina Tagaris, Anna Irrera).

Energy consumption is another concern about how blockchain technology is currently implemented. This summer, public utilities that serve Eastern Washington counties, Chelan, Douglas, and Grant, have changed how they operate due to cryptocurrency mining speculators moving into the area (Cary, Annette, Cary, Annette). The dams along the Columbia River generate a surplus of electricity that exceeds the requirements for the nearby counties. Locals pay one of the lowest rates for electricity in the United States and the excess electricity is normally sold at a higher price to cities such as Seattle and Los Angeles (Roberts, Paul).

With low cost energy and the high energy demands needed to use cryptocurrency blockchains, Eastern Washington is a perfect environment for cryptocurrency miners to try to make easy money. In 2014, the public utilities district in Chelan realized they had a problem when prospective miners requested a total of 220 megawatts. The county with a population around 70,000 at that time used 200 megawatts. Early server mining sites used at most 5 megawatts or even less. Today many of the bigger server farm sites use close to 40 megawatts and plans are being made with outside investors to create sites requiring even larger megawatts. While renewable hydroelectric power is used in Washington, the form of electricity generated for blockchains presently is from cheap coal power plants (Roberts, Paul).

T. D. Smith, a research scientist at Adventium Labs calls blockchain “redundancy taken to the extreme.” (Smith, T.D.) There is also concern that blockchain transactions can’t be unwound to fix errors or return fraudulently acquired gains.



There is also talk of blockchain being a step towards becoming the Borg of Star Trek fame (web search: blockchain borg). The internet already pulls together millions of devices across the world, and blockchain adds “intelligence” to the network. As we become more interconnected, a new Borg may be in the future. Blockchain is not the only threat, and resistance is futile.

Some of these are age old issues that will be resolved through good business practices. A well appointed accounting system doesn’t let transactions be changed or deleted, but requires and separate correction entry. Hacking will be mitigated through diligent code review and open source code. T. D. Smith calls out three areas of scrutiny in considering blockchain based products: dependability, security, and trust (Smith, T.D.).

So what is new? The concerns that are being highlighted are areas that must be addressed, but must be addressed for blockchain as well as any technology or process.

In the short run, blockchain is here. It's not a mystery, and it's not just about shifty cryptocurrency moves on the darkweb. In the long run, blockchain will change our world significantly, linking us closer, and speeding mundane transactions to reduce times from days, weeks, months to microseconds. While risks and threats abound, this is business as usual. We will overcome and benefit immensely from the opportunities to improve our existence provided by blockchain.

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Questions to ponder:

1. If you have enough money to start a new company doing blockchain, what kind of company do you like?
2. How do people associate blockchain with the Borg? What are the implications for AI?

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