This lecture is going to be one detailed insight into use cases of blockchain technology for you. So without any further a due, lets dive in to learn about its many uses

Now blockchain has been hailed as the fundamental technology under the hood of cryptocurrencies like Bitcoin, and though it’s not the only one, it is certainly getting a lot of attention from pretty much every industry, as they’re all looking to integrate it into their systems.

Blockchain has been such a strong buzzword lately, that it feels like any startup can easily get heaps of funding from VCs or crowdfunding just by stating that they’re doing a blockchain for something.

The vast majority of major companies, banks, and even governments are researching Blockchain and figuring out how to implement it to help secure their infrastructures. In this lecture we’ll try and cover why that is, what Blockchain is good for, what it’s not good for, and where bitcoin itself fits into this picture.

To really figure out what it can and can not do, let's start by restating what we’ve already covered; Blockchains are databases that trade off efficiency for security, and are inherently tamper-evident. This means a peer in a network that’s observing a blockchain database can notice when any change has been made to it. When implemented with what’s called “Proof-of-Work” baked in, it can also be hardened and therefore become practically tamper-proof.

Arguably, since blockchains are inherently inefficient, keeping copies of the database with every participant of the network, it’s only reasonable use cases are data sets that really require a high level of security.

Naturally, the first companies to really get excited over blockchain were banks and financial institutions. They’re the most sensitive to intruders tampering with their databases. When just a few numbers being changed around could cost them millions of dollars, the need for a more secure way to hold your database becomes pretty obvious.

For example, R3 is a distributed database technology company. It leads a consortium of more than 70 of the world's biggest financial institutions, all developing blockchain based products that are going to be used in banks all across the world.

Beyond that, people are working on a blockchain version of pretty much every other major tech service imaginable. We’re talking blockchain competitors to: Facebook, Ebay, Internet of Things, Stock Markets, Shipment tracking, cloud services, gambling sites, Domain registrars, Ad networks and even Tinder! Anywhere where people have sensitive data or transactions that they want to back up and secure, Blockchain is being researched. And that’s without even getting to many different blockchain based networks that compete and complement bitcoin as a monetary system.

Pretty much every tech based company you can think of has some kind of blockchain based competitor in the works.

Will they all work? Not a chance.

Some of these industries arguably have more to gain from using a blockchain then others, as the inherent tradeoffs involved with using a blockchain will complement some use-cases and will be a burden to others. We’ll quickly go through a couple of examples to try and analyze what can blockchain do for them and what it can’t.

One of the first industries to come onboard the bitcoin revolution is the gambling industry, because it suffers from a lot of restrictions in many jurisdictions around the world.

On top of that, there is also a major issue with the integrity of the software that runs a gambling site. How can you know you're getting the odds you should be getting, and the house isn’t cheating to get more money out of you?

And then there’s a bunch of security related issues that every business dealing with the transmission of monetary value needs to handle. Blockchain tech addresses each one of these issues. It’s highly compatible with peer-to-peer technology that has broken down borders for years, like torrent software does, and just like bitcoin does.

An open source code and client side software or Blockchain it allows independent people to go through it and make sure the odds they are promised are actually the odds they are getting.

Furthermore, having a system that’s highly secure for value transmission allows for a reduction in costs operating a gambling operation. As most common games in casinos are not time sensitive, the relative inefficiency of blockchain networks shouldn’t be much of an issue. Sure, you wouldn’t want to run an online football game on a blockchain because any time delays are a big deal, but a few seconds on a roulette wheel might well be worth all of the benefits.

All of these can contribute to lowering rates and being a highly competitive actor within the gambling industry.

However, having the software of such a casino as an open source does bring up a lot of difficulty monetizing it, just like any other open source software. Imagine you try and hardcode even a miniscule portion, for example a %0.1 rake to go to the developers of this site, with open source software, an identical version that does not pay out these dividends is likely to pop up within days of it launching.

Let’s also have a look at the very first fork of bitcoin, which is an almost identical duplication of it with some slight modification, it’s called Namecoin.

Namecoin’s main use is as the database that manages the top level domains that ends with .bit , unlike traditional DNS registrars, which require you to rely on companies and corporations to get from the domain to the IP address you’re trying to reach, Namecoin stores that information in a blockchain database, which allows you to trust no one and be certain that everyone have the correct database.

This is a classic use case for blockchains: it doesn’t have to be efficient, the amounts of data it’s keeping is not that big so can easily be duplicated over many computers all around the world.

While Namecoin serves its DNS purpose well, for a long part of it’s existence it’s failed to gain real monetary value, which in turn caused a low hashrate because it didn’t draw a lot of miners, and some services that originally used the Namecoin blockchain have moved to the bitcoin blockchain because they were worried it wasn’t secure enough, which illustrate another problem with blockchains, they require a lot of computing power dedicated to their Proof-of-Work to actually be secure and tamper-proof.

But these real-world examples may only scratch the surface of what blockchain can do for our society. Think of all of the various situations in which information needs to be either securely stored, immutable, or validated in it’s authenticity.

For example, you may have read in the news about the WannaCry attack that affected 300,000 computers worldwide and crippled organizations everywhere from FedEx to the National Health Service of the United Kingdom. Ironically, the only way that Blockchain was used in this scenario was to demand a bitcoin ransom for unlocking the affected computers. But what if that information had instead been stored not on individual computers or servers, but rather in a form of Blockchain? Affected computers, such as those at the hospital reception desks, could simply be wiped clean and restore the latest blockchain from unaffected machines, without having to worry about old or outdated backups. Furthermore, they wouldn’t have to worry about whether or not the attackers were able to access the data on the machines, because it would be encrypted using private keys.

Or how about all of the debate about voter fraud in the United States? What if every single vote was somehow recorded in a publicly-available ledger, and verified by encrypted private keys. If governments around the world were able to harness blockchain technology successfully to identify voters, the resulting voting system would not only be more convenient, but also significantly more secure and transparent.

Obviously not all of these applications are going to be a success, and some of them are going to evolve in ways that we can’t predict, but one thing is for sure: Blockchain technology is not going to play an increasing role in security our digital world.

I look forward to seeing you in the next lecture where we will be going over smart contracts!