



## Podcast Transcript

# Blockchain University: What is Blockchain and Why Should I Care?

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**Kattman:** Blockchain technology is widely anticipated to disrupt major industries and business operations over the next several years, but with all of the hype in the blockchain market, at times it can be difficult to separate fact from fiction and identify the real value in this new technology. To help bring things into focus, we've created a five-part series to introduce blockchain from a technological, market and legal perspective. Our first episode provides an introduction to what blockchain is, how it works and the key blockchain networks that everyone should know about. I'm Amy Kattman, and you're listening to BakerHosts. Our guest today is Rob Musiala, a counsel in BakerHostetler's Digital Assets and Data Management group, and the co-leader of the Blockchain Technologies and Digital Currency team. Welcome to the show, Rob.

**Musiala:** Thanks, Amy. Nice to be here.

**Kattman:** So Rob, over the last few years blockchain has been associated with everything from criminals, anarchists and volatile investments to new startup companies and brand name businesses across a variety of industries, such as banking, data management, manufacturing, pharmaceuticals and more. For those of us who aren't technology gurus it can be quite confusing. Why should I care about blockchain, and what's all the fuss about?

**Musiala:** There are two ways that I like to answer that question. The first way is to look at the data. There are a lot of reports that have been published, and studies published, on what blockchain is being used for and its measure of success in different industries. There are two reports in particular that I find interesting that I

like to point out to people. The first is a report from McKinsey Consulting, where they surveyed the different industries that are experimenting with blockchain, and let me just read off some of those industries to you: agriculture, arts, automotive, financial services, healthcare, insurance, manufacturing, mining, property, public sector, retail, technology and media, transport and logistics, utilities. And so you can see by that list that this technology is being looked at and used by industries all across the board, so that's one reason why I think it's important.

Another survey that I like to point people to is the Deloitte Global Executive Survey on Blockchain. The latest one was published in May of 2020, and let me just give you a couple data points from that survey. 88% of CEOs surveyed believe that blockchain will achieve mainstream adoption, 86% see a compelling use case for blockchain, 85% had suppliers, customers or competitors that were discussing or working on blockchain solutions, 88% believe blockchain will enable new business processes and new revenue streams, and 83% perceive a competitive disadvantage if they do not adopt blockchain. I call that last one Blockchain FOMO. But you can see, and those are just five stats from a much larger survey that talks about a lot of different industries, and so you can see, just solely by the data, that this technology is being looked at very closely by a lot of executives across a lot of different industries. So, that is the first way that I like to answer that question of, why should I care about blockchain.

Kattman: Well, you mention that there are two ways. What is the second way you describe blockchain technology?

Musiala: The second way is just my own perception from watching this market over the last eight years or so, and that is that you should care about blockchain because blockchain is a new method of data management that is going to allow us to manage data in ways that we were not able to do before. In particular, blockchain in certain situations is going to enable enhanced transparency over data, speed over transferring data updates, security over that data and other efficiencies over that data management. It's not going to provide those things in every scenario. Blockchain is particularly effective in scenarios where you have multiple independent parties that are all relying on and updating the same data set, and in those situations, I believe blockchain is going to be quite transformative in a lot of different areas, and the key point to that transformation will be the ability to remove data intermediaries, and I'll talk a little bit more about that in the podcast today.

Kattman: So, you've explained why I should care about blockchain. What is it, and how does it work?

Musiala: That's a great question, and it's an interesting one because to this day there is no standard definition of blockchain. People describe how it works in different ways, and so I certainly encourage folks listening to listen to how other people explain what it is and how it works, because you hear it from multiple perspectives, and it helps. My way of describing what it is, so I put together my own short technical definition, and it's this. A blockchain is a cryptographically secured transaction network and ledger that is shared among and verified by all computer nodes

participating in a distributed system. And when I finish saying that I usually see people's eyes glaze over.

So, what the heck does that mean? Well, in plain English, blockchain is a new type of database, and it's a new type of database that has four key characteristics that prior database systems did not all use in the same way that blockchain does, and all four of these characteristics that I'll talk about have all existed and continue to exist prior to blockchain coming on to the scene. Blockchain is the first time that a database took all four of these and fit them together in a unique and novel way, and that is sort of what makes blockchain interesting and novel.

So, what are those four key characteristics? The first one: distributed networks. So, blockchains by their very nature rely not on a single centralized data repository, but instead rely on multiple independent computer nodes, where each of those independent computer nodes each independently support the network, and each independently verify updates to the database, and so, this concept of a distributed network gives blockchains an enhanced degree of network security over the more centralized systems that are more common today.

So that's number one, distributed networks. The second key characteristic is advanced public private key cryptography. We're not going to get into the nuts and bolts of cryptography today, but suffice it to say that through using advanced cryptography, blockchain is able to provide enhanced security over information that is sent from one user of a blockchain to another user of that blockchain.

The third key characteristic: data immutability, or unalterability of data. And this is where I can get a little bit into where we came up with the word blockchain. So, on a blockchain, data is grouped together in blocks of data, and each new block of data is linked, or chained, to the previous block of data through a technical process called hashing, and we won't get into the details of how hashing works, but suffice it to say that through hashing, once data is added to a blockchain data set, it is, from a practical standpoint, nearly impossible to alter, delete or otherwise disrupt or change that data. And so this concept of data immutability and using hashing to link each block of data to the prior block of data through a blockchain gives data on a blockchain an enhanced degree of data integrity, and it allows us to trust the accuracy of that data much more so than we are able to trust databases that are managed by, and controlled by, a third party who may or may not be trustworthy.

And so, we've got these three characteristics: distributed networks, cryptography, data immutability through hashing. You put all three of those together and you come up with the fourth key characteristic, which is disintermediation. Disintermediation is a fancy word for cutting out the middleman. And so, what blockchain allows us to do, for arguably the first time ever, is to have two users on a network transfer information directly peer-to-peer without a third party managing or facilitating that transaction.

Kattman: So, you've shared with us key characteristics. Can you give us an example?

Musiala: Yes, I will give you two examples. So, one by analogy, which I find helpful, and then another one, I'll get into a little bit more of the technical details. The example that I found helpful by analogy is the example of sending an attachment over email. So if I login to my Gmail account, and I attach a PowerPoint file, and I put your email address in the Send line, and I hit Send, once I hit that Send button, now you have the PowerPoint file.

But I still have the PowerPoint file. I have it on my hard drive. I can go recover it from my Sent box. And actually, now there's a third party that has that PowerPoint file: it's Google. Google, by managing that Gmail transaction, they are the data intermediary of that transaction, and so now they have a copy of that file. And that's essentially how data transfer works in the way that we're all familiar with now. Well, imagine a situation where, when I attach that PowerPoint file and I hit Send, imagine if as soon as I hit Send, you have the file and I do not have it anymore. I can't access it anywhere. And imagine if, also, there is no third party like Google that has access to that file. You're the only one that has it. That is kind of how blockchain works. In blockchain, when you are sending data from one party to another on that blockchain, you're actually sending the original copy of that data, the original, not a copy, and in a blockchain network, data can only exist in one particular place with one particular user of that blockchain at any given point in time. And so, that is one of the key characteristics that I like to highlight about blockchain that makes it different from centrally managed databases that we're more familiar with.

Kattman: So, you've given us a simple example. I think we're ready to hear a more technical example.

Musiala: Okay, let me try to describe how this works using some of those four key characteristics that I talked about a moment ago. So, if I'm a user on a blockchain, and I want to send a piece of data to you, Amy, the first thing I will do is I will broadcast my intent to make that transaction on the blockchain. Once I broadcast that transaction, all of the network nodes, the distributed network of computer nodes that are all co-hosting that blockchain, they will each independently seek to verify the authenticity of that transaction, and they'll do that through advanced cryptographic techniques, through advanced public private key cryptography.

Once a certain threshold of those independent nodes have all verified the transaction and verified the validity and accuracy of the transaction, at that point the transaction will clear and get posted to the blockchain. And I want to note here that the percentage of independent nodes that it takes to verify the transaction can be different on different blockchains. Sometimes it can be once 51% verify the transaction, sometimes it can be 60% or more. So, there'll be a certain threshold programmed into the blockchain, where once that percentage of nodes has verified the transaction, then it is validated and it clears, and it gets posted to the data set.

Once it's posted to the data set, it is chained to all the previous data on that data set in a way that makes the data impossible to alter, or immutable. And then, at

that point, once the data has been posted, each independent network node that is co-hosting that blockchain will each update its own copy of the blockchain data set with that new information such that, let's say there are ten nodes, they all have their own copy, if nine get destroyed in a cyber-attack, that tenth node will still have the full copy of the data set.

And then, finally, like I mentioned, once that data is posted to the blockchain in a way that is immutable, there is no third party that will be able to ever reverse the transaction, alter the transaction, or otherwise disrupt it. And so that's a little quick description of the transaction life cycle on blockchain.

Kattman: Thank you. What's the difference between Bitcoin and blockchain, and as a follow-up, besides the Bitcoin network, what other blockchain networks do I need to know about?

Musiala: It's a great question. So, Bitcoin and blockchain are two separate and distinct things. Bitcoin is not blockchain, blockchain is not Bitcoin. It's very important to know that. Blockchain is the technology that powers the Bitcoin network. The Bitcoin network is the world's first implementation of blockchain. We'll talk more about the Bitcoin network in later podcasts. There are several different types of blockchain. The Bitcoin network is just one of those. There are actually dozens that are in operation today. I'll talk about four just briefly that I think are important for people to know about.

So, we talked about the Bitcoin network. That is the largest and most popular public blockchain network. The other large, public blockchain network that folks ought to know about is the Ethereum network. Ethereum was based off of the Bitcoin network in several respects. It is a favorite network of startups and blockchain developers. It's being used for financial transactions as well as other types of data management solutions.

Another blockchain network that folks should know about is the Hyperledger blockchain. Hyperledger is the blockchain network that is most used by more established businesses, and it's mostly used as a private blockchain, not a public blockchain like Bitcoin or Ethereum, and it's mostly used for data management systems, and there are several different types of Hyperledger blockchains.

Another blockchain network is the Corda blockchain. The Corda blockchain is another private blockchain. It was created by a large group of financial services firms, and it is being used mostly for backend clearing and settlement solutions for financial transactions.

And then, a fifth that I want to point out is the Quorum blockchain, the Quorum network. It's a private blockchain that was developed in-house by JPMorgan, and it was actually based off of the public Ethereum blockchain, and JPMorgan recently sold the Quorum blockchain to a blockchain development company called ConsenSys.

So, those are just a couple of the other blockchain networks that are out there, but there are many more, and we will get deeper into some of the different functionalities of those in a later podcast.

Kattman: Great, I look forward to that. So switching gears just a little bit, how is blockchain being used today, and what are some examples?

Musiala: It's being used in a variety of contexts. So, we've talked about payments and clearing and settlement, it's being used a lot there. It's also being used to track and manage food along the food supply chain, which I find fascinating. So, to track who has food products at what point in time, and to prevent things like food spoilage, and to assist in situations where you have product recalls, like E. coli and stuff like that. So, it's a fascinating use case for it.

It's also being used to help track and manage those huge shipping containers that you see on those large barges that are moving products all over the globe. A couple years ago, there was a major hack of one of the providers of the systems that manage those shipping containers, and in part, potentially as a result of that, a blockchain solution has been implemented to help track and manage those.

It's being used in the pharma industry to track and manage the provenance, location and supply chain of pharmaceutical products, and to prevent things like counterfeiting. It's being used in the commodities supply chain, especially with commodities that are at risk for conflicts related to substandard labor conditions and potential human trafficking and other types of human violations, so things like diamonds and cobalt in particular have been industries where they're using blockchain to help verify that those products are being used and moved in a sustainable manner.

It's being used in property registry pilots. It's being used in voting system pilots. It's being used to help store and manage corporate records and academic records. Blockchain is being used to help manage and track advertising data over the internet. And then, a last use case that I want to mention is, it's being used in an emerging field called digital identity, or self-sovereign identity, and that is all focused around putting the user of their internet identity more in control of their own personal data, so that your data is really only being shared with the people that absolutely need to have it for any particular internet transaction, and the way that those systems are being developed leverages blockchain behind the scenes. And so, those are just a couple examples, and like I said, we will talk more about those in a later podcast.

Kattman: So, it really sounds like blockchain is in more places than you believe it to be. It seems to be everywhere. As we close out today's episode, I have one final question for you, Rob, and that is, what is the key takeaway for our listeners today regarding blockchain?

Musiala: If I could give one key takeaway, I think it's, there is no doubt that this can be a confusing market. Sometimes I like to say that 90% of the blockchain market is hype. But if you can cut through that 90% and identify that 10% that is really

valuable, you'll find a lot of value there, so I encourage people to sort of focus on that, and we have resources that we can provide to help you kind of hone in on the areas that are really important.

And the other thing I would leave you with is that this technology, whether you know it or not, is going to be, and already has become, transformative in terms of the way that we manage data in a variety of different industries, and sometimes it's gonna be more prevalent that blockchain is involved in some type of data management. Other times it's going to be, and in fact I would say when it's being used best, it's gonna be happening behind the scenes, where no one is going to have to necessarily know or care that blockchain is being involved, but behind the scenes it will be there, making our lives easier and better in the way that any good technology does.

Kattman: Thank you, Rob.

Musiala: Thanks, Amy. Great to be here.

Kattman: If you have any questions for Rob, his contact information is in the show notes. Please check out our weekly Blockchain Monitor blog, where Rob is the editor and a frequent contributor. In our next episode we will discuss Bitcoin, the world's first cryptocurrency, and implementation of blockchain. As always, thanks for listening to BakerHosts.

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