

## Web3: The Next Generation of the Internet

<https://mindmatters.ai/podcast/ep198>

Robert J. Marks:

Welcome to Mind Matters News. I'm your non-fungible host, Robert J. Marks. We'll find out why I'm non-fungible later in the podcast.

Robert J. Marks:

Today we're going to talk about Web3 and the future of the internet and how it may disrupt the internet as we know it. There's a lot of services I get today from companies like Google. Besides their search engine, we have Google Maps that helps me not get as lost as I used to get, and Google Translate that translates up to 100 different languages. Other services include free Gmail, seamless software for the office like spreadsheets and word processors, and Google Earth, Google Flights. And as a teacher, I've used Google Forms to give tests.

Robert J. Marks:

Google Scholar steers me to papers to help me in my research. And I have to confess I haven't been in a library in over two decades. Google Scholar also lets me know who is referencing my papers, so it's always good for scholars to know that you're writing papers and somebody is actually reading them.

Robert J. Marks:

Now, is Google just being nice in giving me all these services? Are they just a bunch of really rich, altruistic guys thinking of all the ways they can make my life better? No. Google is a business and the purpose of business is to make money, and a prime source of income is mining information from your web use. This info is then sold to help others sell you stuff.

Robert J. Marks:

But Google services are so incredible, I've long ago surrendered my personal information to them. I block it when I can, but I have surrendered to their all too convenient services. They're just too good to pass up. But here's the question, is this sustainable? Can Google and other companies continue to profit from our data?

Robert J. Marks:

A few decades ago, the top companies in the world included companies like Sears and Roebuck and General Motors and US Steel. They're kind of gone. Today, the top companies include Google's parent company, Alphabet, Amazon.com, and Facebook. So here's the probing question, what will be the top companies in the world a few decades from now? Good question.

Robert J. Marks:

In his book, Life After Google, futurist George Gilder forecasts that decentralization of the web is going to be the future of the internet. This includes blockchain and something called edge computing, where a

lot of the computing is done on your local device as opposed to in some big company's cloud. Data will become more personalized and companies like Google will have to figure out some way to adjust.

Robert J. Marks:

We're starting to see this happen. The new generation of internet incorporating decentralization and such things as called Web3. To talk about this today is our guest Adam Goad. He's a PhD candidate in electrical and computer engineering at Baylor University. We're also happy to invite Dr. Austin Egbert, who you recognize as the editor and director of the Mind Matters News podcast. Dr. Egbert is also with Baylor University.

Robert J. Marks:

Adam, welcome. How you doing?

Adam Goad:

I'm doing good. Thanks for having me, Dr. Marks.

Robert J. Marks:

Okay, well, let's talk about Web3. Before we talk about Web3, today we have 5G, we have 4G, 3G, 2G, and supposedly our cell phones are getting better and better. You're going to talk about Web3. So there was a Web3, which is the newest wave. There's also going to be Web2, Web1. What are these previous generations of the web correspond to?

Adam Goad:

Web 1.0 is generally considered to have started sometime in the early 90s, and that is when the internet was a place for people to consume information, so that the whole internet was basically a giant Wikipedia. You would go to a page, you would read it, it could link you to another page, but that is about all you would do. You would not log in. You would not really interact with it. It was just something to read and be consumed.

Adam Goad:

And then around 2004, Web 2.0 began. That is when we got things like Facebook, YouTube, this whole vise of all the companies we know today as big tech, that is where they started providing you goods and services that you could interact with. In exchange though, like you mentioned in the introduction, you became the product. They were doing all of this to get your information so that they could do targeted advertising on you. This represented a large change and, as we saw, there was a whole shift in how the internet worked and what people used it for.

Adam Goad:

Now, though, people are becoming more and more concerned about the centralization of the internet. Like you mentioned, Google does everything. What if something happens to Google? Then there's nothing you can do.

Robert J. Marks:

Yep. You got it.

Adam Goad:

We've seen several times in the past years when Amazon has an outage, the AWS Web Service, it goes down, there are so many different websites and services that rely on that that the internet is basically shut down until they are able to recover.

Robert J. Marks:

What does AWS stand for?

Adam Goad:

Amazon Web Services. So yes, Amazon Web Services is something that Amazon began... I'm not exactly sure when they began it actually, but in addition to providing you with whatever you want to buy, any physical good, you want to buy, Amazon will also provide you with any amount of computing power you want to buy, pretty much. You can go onto the website, you can buy a machine that could host just about anything you want. For instance, Twitter is run through AWS, so that is how powerful of a machine you could get.

Adam Goad:

You could also get something as small as being less than the laptop you're using, but you can get about just any size of computer you want and you can spin it up for any kind of service you need. They also provide all sorts of different pre-made services you can purchase from them. And I believe that this has become a significant portion of Amazon's business, actually.

Robert J. Marks:

Interestingly, there was a competitor to Twitter, which was called Parler and it was run on AWS. And I don't know if it was because AWS also hosted Twitter, but AWS all of a sudden decided that it wasn't going to post Parler anymore. So there were websites and there were lawsuits going back and forth. Parler, again, was supposed to be another manifestation of Twitter, where there wasn't the censorship that Twitter was going through. So you're right, AWS is a pretty powerful organization and a pretty big presence on the web.

Robert J. Marks:

Let me ask you, the future of the web, which is Web3, is what?

Adam Goad:

Web3 is focused on decentralization and distributed systems. So we just talked about AWS is a centralization of all of this power and they have the ability to turn it on and off for whoever they choose. But if you have a decentralized system, then it is pretty much impossible for any one entity to control it or regulate it.

Robert J. Marks:

The critics of W3, which is this decentralization, include the former head of Twitter, Jack Dorsey. He dismissed Web3 as, let's see, I have a quote here, a "Venture capitalist plaything," whatever that means. And Elon Musk is not impressed. But it does seem to me that if you'd get this information away from central servers and onto your private cell phone or computer, and you have control over it, that's going to be really disruptive to places like Google and Amazon. Do you think?

Adam Goad:

Yes, certainly. So, one big thing that you can get out of using Web3 is you can have much more privacy. It is much easier to be anonymous using Web3 than it is with Web2 currently. So companies like Amazon, Twitter, Google, that are currently invested in getting as much personal information out of you as possible would, of course, be resistant to such technologies.

Robert J. Marks:

Yes. Hence the resistance of people like Jack Dorsey. One of the criticisms of doing this decentralization is that it's going to be more difficult to prevent online harassment, hate speech, and the dissemination of, I don't know, say kiddie porn and things of that sort. Yet, on the other hand, the Libertarian part of me says, this is something I do not like in today's Twitter and YouTube, where offhand they discriminate and they censor certain content out of nowhere. Unfortunately, I think that's something that comes along with the freedom of the internet, is the potential disuse of it. So I think that's going to be a consequence of it.

Robert J. Marks:

The question is, how do you regulate it? But then if you regulate it, you get away from this idea of privacy and people trying to impose their politics and their ideology on you. It's frustrating.

Robert J. Marks:

One of the things about decentralization and distributed systems is something called blockchain. Now, we've talked about blockchain before, but I think we should revisit it. And I'd like you to talk about blockchain, because that seems to be a big part of this decentralization and the way to protect your data. So, what is blockchain? What's going on there?

Adam Goad:

Blockchain, at least as applies to Web3, is a decentralized ledger basically. So if you have, for instance, Bitcoin, the most famous blockchain, so what all Bitcoin is, is it is a very large ledger of every transaction that's ever happened.

Robert J. Marks:

That's a lot of transactions.

Adam Goad:

It is. This ledger is then stored by anyone who wants to take a copy of it. You can go on to your computer right now and download a copy of the entire Bitcoin blockchain.

Robert J. Marks:

I just looked, Adam, and it turns out the current Bitcoin blockchain is over 400 gigabytes, and I don't have 400 gigabytes on my computer anyway. One of the criticisms is that this is going to be something which is going to limit the people that store the blockchain. It's going to limit the number of people that are able to do it.

Adam Goad:

The Ethereum blockchain I know is about around 600 gigabytes right now.

Robert J. Marks:

Really? So, it's bigger than Bitcoin. Because Ethereum has more than cryptocurrency. Ethereum is a blockchain company, basically, right?

Adam Goad:

Ethereum introduced a technology known as smart contracts, which allow people to place code onto the blockchain itself. And this revolutionized things. So with Bitcoin, all you can do on Bitcoin is send and receive Bitcoin. With Ethereum, you can publish a smart contract and there's many things you can do with this smart contract. You could start your own cryptocurrency. That is how most of the ones that you hear of now that are smaller, that is what they are. They are a layer two token onto the Ethereum blockchain. You could sell an NFT using a smart contract. You could make an escrow deal using a smart contract. The only limits of what you are able to code.

Robert J. Marks:

Well, let's get down to a specific example of this, the code contract in the... What did you call them? Smart contracts that we do with blockchain. I'm selling you my house, and usually if I sell you my house, they have to do a title search and they have to just make sure that that everything is on the up and up before I sell you my house. And I think that what you're saying is that there's certain situations, like title searches and things that could be placed on blockchain and we could have a contract and it would be a lot simpler than the way things are done now. Do you think I have an idea here?

Adam Goad:

Yes. So there are many places now that have started selling land in what they call the metaverse.

Robert J. Marks:

Wait, wait, wait, wait. We know the metaverse. Let's talk about the metaverse. This is a Mark Zuckerberg thing, right? That's what he wants to do. So define the metaverse and tell me what land in the metaverse is about.

Adam Goad:

The metaverse is something that is still seeking definition, perhaps. There's a lot of people trying to define what it is, and it's still trying to settle down, I think.

Adam Goad:

Yes, Mark Zuckerberg has renamed the parent company of Facebook to Meta and believes that the future of the internet is in the metaverse. So the concept of the metaverse is that it is a place, a virtual place, where you can go and you can buy land. You could build a house, you could decorate this house. You can have friends, you could virtually meet them at the local virtual cafe, you could buy virtual drinks at the virtual cafe, and you can go and buy virtual clothes to wear on your virtual avatar. It is this whole virtual universe that people can go and explore.

Robert J. Marks:

That's really spooky stuff. I can see that clothes and different styles could be made available in the metaverse, but I don't get enough exercise now. I think if I sat in a easy chair and just lived in the metaverse and bought all my stuff and did everything in the metaverse, oh my gosh, I would balloon and

probably not get a lot of exercise, and just spend all of my time doing stuff. What was that movie? WALL-E, I think it was, where he went to the future and all of these people were just driving around in little cars because robots were doing everything for them. The metaverse, it seems to me, would even be worse, because you wouldn't even need these little cars.

Adam Goad:

A more accurate comparison would be Ready Player One.

Robert J. Marks:

Tell me about Ready Player One. I'm not familiar with that.

Adam Goad:

The concept of Ready Player One is it's in the near future and a full immersive metaverse technology has been released called The Oasis that people are able to plug into and fully experience. Well, actually, fully experience comes later in the series I believe, but it starts off with just a VR experience, but then you can buy a haptic feedback glove so then you can try to touch things and stuff like that. And basically the biggest company in the world is the one providing the service, and most people live in absolute squalor, but they spend all their time in The Oasis and are all right with it.

Robert J. Marks:

So, these are people in the real world that they literally live in squalor, they don't care about their reality of their surroundings, and they just live in this metaverse. That's troubling.

Adam Goad:

It's a theme common in several modern sci-fis, I believe.

Robert J. Marks:

Okay. Do you have examples of sci-fis where they do that? I guess would The Matrix? That's the one I'm familiar with. That would be living in metaverse, right?

Adam Goad:

Yes, The Matrix, a forced immersion into a virtual world, yes.

Robert J. Marks:

I wonder if people have done any work into the psychological and social implications of this metaverse. It seems to me that people that want to spend their time there are people that want to escape reality. And if you want to escape reality, I guess the traditional way of doing things is getting drunk or taking drugs. So this is escaping reality. I don't know. To me it's very frightening, but I guess we'll see what happens and what Mark Zuckerberg does.

Adam Goad:

I am no expert in psychology, but I believe it would be similar to, and perhaps more extreme than, the current problems and addictions we see with things like social media, people spending all day just scrolling through Facebook or Twitter. This would be a fully immersive version where they have far more shiny buttons to click on.

Robert J. Marks:

Yes. I just read an article by Andrew McDiarmid who has hosted Mind Matters for us and writes for Mind Matters News, and he just wrote an article about one of the stars of a sitcom called Fresh Off the Boat, who went through a period where she tried to commit suicide because of social media, and she recognized it was because of social media that she had these psychological problems, and she has sworn off of it and come out and is doing a crusade against some of the things on social media.

Robert J. Marks:

She was a star, she was a celebrity, so she was getting dissed, she was getting put down, maybe even doxed, and she just didn't take it. It was not a pretty sight. The social media has a really incredible impact upon the youth of today, and it's something that needs to be mitigated hopefully by parents and ourselves, we have to exercise self discipline against it.

Robert J. Marks:

Blockchain, was it originally generated by Bitcoin? Do you know if that's the origin of it?

Adam Goad:

I'm not certain if that is the origin, but that is certainly the first big public use of it.

Robert J. Marks:

Let's talk about blockchain a little bit. I don't know if we got into it, but my understanding it's a chain of little pieces of software that are linked together. I don't know. Could you elaborate on that a little bit? Why is it so important, especially for privacy?

Adam Goad:

Yes, so blockchain is a chain of blocks. Each of these blocks for Bitcoin contains the ledger of the most recent transactions, and once there's blocks added to the chain, the transactions become official. In order to ensure privacy, and in order to ensure that these transactions are valid, there is a large amount of cryptographic security that goes into this. And that is what takes place through mining. What the miners are doing is solving cryptographic problems, fighting for the rights to add the next block to the chain. When they add that block to the chain, they get a flat reward in Bitcoin just for adding it. I believe right now it's about 6.25 Bitcoin that you receive for adding a block.

Robert J. Marks:

How much is that worth, by the way? I know the Bitcoin goes up and down, but what is that worth?

Adam Goad:

Today, bitcoin is worth just about \$21,000.

Robert J. Marks:

So, if you are successful in this mining, you get six times 21, or 120 som thousand dollars. Is that right?

Adam Goad:

Yes. And that is why so many people are getting involved in this. Entire companies are being built around Bitcoin mining.

Austin Egbert:

One thing to note is that with Bitcoin mining specifically, and Adam may come to this in a moment, but there's this idea of difficulty scaling, in cryptocurrency mining, and it's because they do these payouts, they have to continue to ramp up how hard it is to generate a block in order to keep this artificial difficulty level in it to keep anyone from being able to take over the network.

Austin Egbert:

The people who are mining these blocks, it's progressed to the point where you can't just mine Bitcoin on your computer at home like you used to be able to a decade ago, it's progressed to the point where people are having to custom order dedicated chips specifically designed to compute the algorithm used in mining Bitcoin. And that's an investment that requires significant capital to purchase this specialty hardware and burn through immense amounts of electricity.

Austin Egbert:

So you get \$120,000 if you successfully mine one, but there's a lot of money that goes into even having a chance at that in the first place.

Robert J. Marks:

By the way, you've heard his name, but he's here, I told him to chime in if he can, because he knows a lot about this Web3 and decentralization and blockchain. That was Austin Egbert.

Robert J. Marks:

I've heard about companies that are mining Bitcoin and, as you mentioned, their consuming of electricity is just enormous. And some of them in order to have heat sinks in order to get rid of the heat which is generated by their computers, have, I have heard, I read it on the web, so it must be true, they have moved up close to the Arctic circle where things are cold. Have you ever heard of companies doing that sort of thing?

Adam Goad:

Yes, I have heard that there are a few companies that are moving up to the Northern regions, trying to, like you said, get a cheap heat sink by just having it be very cold outside already.

Robert J. Marks:

Wow. Isn't that interesting?

Adam Goad:

But yes, here in Texas, I know I have some friends who work with power distributors and they tell me that we have lots of companies trying to move here and open Bitcoin farms.

Robert J. Marks:

That's a new term for me. Bitcoin farms. What's a Bitcoin... Just a bunch of computers?

Adam Goad:

Right. So basically you buy a giant warehouse, you fill it with these specialized computers Dr. Egbert was talking about, and you just plug in a ton of power and you cool it down and it mines Bitcoin all day.

Robert J. Marks:

Wow. But it's getting more and more difficult. It's a situation where the more mining you get, you get diminished returns. Clearly some of these companies are just going to get to the point where they say, well, it isn't worth it anymore, it's just too hard to mine the new level of difficulty. Do you see that coming or is the investment in these Bitcoin farms still on the rise?

Adam Goad:

With Bitcoin, there is only a set amount of Bitcoin, so there will come a time in the next few years when Bitcoin is over, basically. The awards for mining will basically go away and there will be very little incentive for people to continue mining it.

Austin Egbert:

That being said, I believe that miners get money from two sources, essentially. There is the actual mining reward of new Bitcoin entering the system, but I believe there's also some transaction fees that the miners charge that gets tacked on to whoever's making a transaction. So if I want to send money to you, Adam, I have to pay a small fee. I associate a small fee with that that then goes to whoever successfully mines the block, is that correct?

Adam Goad:

Yes. Those fees are known as gas fees and, depending on which blockchain you're using, some of that could go to the chain itself and be burned or destroyed to create a little deflation, and a part of it would also go to the miners themselves, yes.

Austin Egbert:

Yeah, so, I think longterm, those gas fees are what end up providing the incentive to keep the network running.

Adam Goad:

Yes, they very well could. And that would also mean, though, that they would probably rise significantly when this time comes.

Robert J. Marks:

Is gas an acronym?

Adam Goad:

It is not, it is just similar to gasoline makes your car run, gas makes the blockchain run.

Robert J. Marks:

I see. So this reminds me of actors in sitcoms, like Seinfeld, they used to get paid their salaries for their weekly shows, but now they still get residuals in all of the reruns. And that's basically what the gas fees is, isn't it? It's getting residuals from the reruns, from the reuse of Bitcoin.

Adam Goad:

Yes. You only receive it when you mint a block onto the chain. You do not get it continuing, but yes.

Austin Egbert:

Now, one thing to note is I believe if I'm wanting to send money to Adam, I can choose how much gas I want to spend on that transaction, and it will incentivize people to choose my transaction to focus on putting on the blockchain.

Adam Goad:

Yes. And that can be a very competitive thing, particularly with NFTs. When there is a new, exciting NFT coming onto the market, it will enter the market through what is known as a mint, and to mint this NFT, that is an on chain transaction. So, whoever is willing to pay the most gas fees will get it first, and if there's only a limited amount and lots of people want it, people are willing to pay thousands or tens of thousands of dollars in these fees to ensure they get them.

Robert J. Marks:

Well, we're going to talk about non-fungible tokens, which I tell you, I don't get, in the next podcast. They're just a little bit beyond my comprehension. I do understand Bitcoin though, and one of the ways that I was explained is that Bitcoin establishes trust. We have a dollar bill that we use. I give you a dollar bill, and why do you think that dollar bill is worth a dollar? It's because of trust in the United States government, right? You have a trust that that dollar bill, that piece of paper, is going to be worth \$1.

Robert J. Marks:

Why do we trust that Bitcoin is a Bitcoin and that somebody hasn't screwed around and fudged it or something like that? And it's the establishment of trust. And that trust is established by depositing these Bitcoin records in numerous different places. So, a number of different places have a recording of these Bitcoin transactions, which, if I read right that the current Bitcoin blockchain is over 400 gigabytes, so there's a whole bunch of people that have these 400 gigabytes stored on their computers, and if anybody makes any change in this, tries to hack it, tries to fudge something, on the Bitcoin, everybody that has a copy of that knows. So with that there's been a trust which has been established.

Robert J. Marks:

Last topic. Bitcoin was the first cryptocurrency. I think that Ethereum is another big one. Cryptocurrencies are just biting the dust today. I've read that a lot of the companies are declaring bankruptcy, that they just didn't catch on. And right now, as we record this, we're in a pre-recession economic state in the United States, and I'm wondering what your thoughts are. Is this a characteristic of cryptocurrencies? Are we just doing a Darwinian thing where we get rid of the weakest links in the chain? Or is this just a sign of the current economic times? Do you have any thoughts?

Robert J. Marks:

I don't even know if that's answerable by an economics major, but I was just wondering any thoughts that you might have.

Adam Goad:

I am no expert in economics, but my opinion on what we've been seeing is the decline in Bitcoin, like you mentioned, it came with the decline of pretty much everything else as well. It tracked down with the fall of the stock markets and all other commodities. So we are seeing that several smaller projects are not succeeding, but people just aren't investing money right now.

Adam Goad:

I think that the larger projects, Bitcoin, Ethereum, and such, they will make it through and they will rise once again, most likely. A lot of them, actually, if you look at the value of them, are still higher than where they were a year, a year and a half ago. It is just that they were so high about six months ago that we've seen this fall down by 60-70% in some cases, and that just feels like it's come down so much, but really it is still very high.

Robert J. Marks:

Could that be just characteristic of a bubble? That everybody got interested in it, and then the bubble popped? Do you think that is a contributing factor?

Adam Goad:

I think it is. Particularly, we'll get into it more here, but NFTs, I think we've definitely seen a bubble and that the bubble has popped, but I think that the technology is still there and that there is very much a chance for a comeback.

Robert J. Marks:

This is great. Thank you, Adam. Thank you, Austin. We've been talking to my A team, Adam and Austin, if you will, both starting with an A. We've been talking to them about Web3 and we got a little bit into blockchain. Next time we talk about the mysterious market, which I'm still trying to grasp, of non-fungible tokens. So until then, be of good cheer.

Announcer:

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