Episode 1,064: The Debate Within Bitcoin: Jameson Lopp vs. Roger Ver on Bitcoin and Bitcoin Cash

Guest: Roger Ver and Jameson Lopp

WOODS: All right, we've got today not a debate about cryptocurrency, but a kind of debate within Bitcoin that has been going on for a little while and has generated quite a bit of heat and interest. And I think it's safe to say that probably Bitcoin has never attracted more attention and commentary than it is attracting right now, so this seemed like an opportune moment to have this particular conversation. And in particular — so in other words, if you're interested in what is Bitcoin and how does it work and what's the infrastructure of it, I have other episodes on that that'll be linked on the show notes page for today, which is TomWoods.com/1064. This gets a bit more into the weeds, but I have so many people demanding this that I thought, you know, what am I here for if not to do the people's will?

So in particular, I have two people with us today who are going to talk about Bitcoin Cash, abbreviated BCH, and Bitcoin, abbreviated BTC, and talk about the different visions of Bitcoin that both represent and where both are going and the relative merits of each one. So our two discussants today are Roger Ver, who is CEO of Bitcoin.com, and Jameson Lopp, who is infrastructure team lead at Bitco. So I'm going to let each of them — I'm going to be a little less formal than we normally are in these debates. We don't even have an official resolution. We're just going to have a conversation. But at the beginning of this conversation, I'm going to let each one of them speak for fivish minutes about this issue, and then I'm going to moderate a series of questions that they ask each other, and we expect this to generate quite a bit of light. So let's start with, since he's never been on the show before, Jameson let's start with you. I'll give you the floor for about five minutes.

LOPP: All right, sure; thanks, Tom. So I think what we're really here to talk about is differing visions for how to scale Bitcoin and how to get it to the level that the technology is really capable of supporting mainstream adoption. And for the past several years, that's really come down to what everyone has called the block size debate, because it is one of the main parameters that affects how many transactions can go into a block, which is created approximately every ten minutes.

And so what we've seen happen over the past few years is this schism between groups of people who want to increase the block size in order to alleviate a lot of the load and the stress on the network right now, because the demand for block space is exceeding what is available with one megabyte every ten minutes. On the other hand,

we have people who want to take a more efficient and yet more complex and more effort-required approach of scaling, which is to create off-chain scaling solutions.

Now, I'm in an interesting position here because I've been on both sides of the debate. In fact, I was a big Bitcoin XT proponent several years ago. And then I actually started working at Bitco full time and started spending a lot of my time and resources managing nodes, building infrastructure around nodes, and I began to realize how incredibly inefficient these blockchain databases are.

And so I'm looking at this from a very, very long-term, multigenerational standpoint of how much data do we really want to put into these blockchains if we're trying to create a system that will outlast us all and hopeful eventually become a mainstream global commerce system and store of value? So I think that, over the long term, Bitcoin will need larger blocks, but those of us who are more conservative want to try as many other available options to increase the capacity and use the block space that we have more efficiently before we simply allow our nodes to accept a greater node with larger blocks.

The interesting thing about Bitcoin's transaction capacity is that, at the moment, it's only running at about half of its potential capacity. If you look at the stats, only about 10% of transactions are currently spending segregated witness outputs, and if the rest of the ecosystem would catch up with Bitco and a few other providers and adopt this new technology, then capacity would actually double and fees would drop, at least for the short term, which would be some nice alleviation. Now, that is not a panacea. Really what that's doing is that's getting us to the next step to eventually be able to support lightning networks, second layer networks, which are going to afford us much greater, more efficient scalability.

This off-chain scaling plan is being pursued by a plethora of engineering teams in the space. In fact, it's a tried and true method for building efficient permissionless networks. It is in fact analogous to how the Internet itself is designed, because, you see, if you look at the seven layers that compose the Internet itself, the lowest layer is called Ethernet, which is this broadcast-to-all data transmission layer. If that was the only layer that composed the Internet, then we wouldn't be able to do what we're doing right now, which is streaming audio across the world, because if we only had Ethernet, every other participant on the Internet would have to receive and relay all of the data from everybody else, which just doesn't scale at all. The only reason why we can make use of these high-bandwidth applications is due to something called TCP/IP, which are routing layers that allow you to send data through the fewest intermediaries necessary in order to get it to the intended recipient on the other side of the world.

Now, I know that Roger and a lot of Bitcoin Cash supporters are more focused on the economic aspects of the network. They're willing to make some tradeoffs of higher cost of full-node operation in order to achieve lower transaction fees, which is a big problem on the network right now and it's frustrating a lot of people. On the other hand, many of us like myself are not willing to make this tradeoff for Bitcoin because we believe that targeting low on-chain transaction fees can easily become a slippery slope to centralization of full nodes and other aspects of the network. And if a permissionless network of nodes gets to the point that only large enterprises can

afford to run them, then it's interesting because it essentially creates an opportunity for those entities to govern the protocol.

And this means that such a network could eventually find itself in the position where there's insufficient revenue from transaction fees to sustain the hash rate, and the enterprises that are governing the protocol may then decide that inflation of the monetary supply is required in order to sustain the system. And they could even do this without telling the users, because if the users can't afford to validate the rules to which they agree, then they're blindly following what the nodes on the network are telling them is correct. And some of these rules, such as total supply, cannot be validated by lightweight clients using SPV proofs.

So my main point is that the Bitcoin protocol is analogous to Ethernet. It's this global broadcast system of data propagation. And second layer networks, such as lightning, are analogous to TCP/IP, and they allow parties to communicate much more efficiently by only routing the data through a few network participants rather than everybody. So Bitcoin Cash proponents, in my opinion, are welcome to try to naively scale a flood-fill network, but my money is on a more efficient albeit more complex engineering solution. And these second layer networks will be much faster than the on-chain networks and will eventually end up actually having lower fees because they won't be in this situation of having high competition over scarce resources and scarce block space. So I'm very interested to see what happens with the Bitcoin Cash project; I'm just not really willing to support that vision myself.

WOODS: All right, well, thank you, Jameson. Roger, the floor is yours.

VER: Yeah, thank you, Jameson. So I took a couple of notes during your little talk there, and one of the things that I heard you mention is that you want to take the conservative approach, which is not scaling the Bitcoin blockchain. And I'd like to point out that the approach that Bitcoin Core is taking is the most reckless, dangerous approach it possibly could. Bitcoin is the first and only cryptocurrency ever in the entire history of cryptocurrencies to have full blocks and to have high fees, so we're taking this Bitcoin experiment that's the number one cryptocurrency used by more businesses and more people around the world than any other cryptocurrency, and we're going to try something brand new with it.

And we have this empirical evidence of Bitcoin for the first seven or eight years of its existence. The blocks were never full. The fees were low. The transactions were always included in the very next block, and that provided for a fantastic user experience that allowed Bitcoin to grow from being this little, tiny mish thing to this worldwide phenomenon that it is today. So if we wanted to follow the conservative path, we would just allow Bitcoin to scale in the exact same way it scaled from its beginning up until very recently.

Another thing I'd like to point out is that you were basically advocating for central planning. You were saying that a bunch of developers get to decide what the correct amount of block space to be produced is. At the end of the day, I don't think that you or I or anybody else knows what the correct amount of block space to produce is. I think the amount of block space being produced should be decided by the people that produce the block space, which are the miners, and the people that want to include

their transactions in the space, which are the Bitcoin users. So if the Bitcoin users are willing to pay an amount of money that the miners are willing to include that transaction in a block, that should be what determines the correct amount of block space to be produced, not a bunch of central-planning guys without any business background or econ background at all, which is exactly what's going on. And even if they did have a business and econ background, they still wouldn't want to be centrally planning the amount of block space to be produced.

In regard to layer two solutions, Bitcoin Cash will be able to support all of those even more reliably and even better than Bitcoin Core will be able to, because when you have full blocks, that makes the on-chain transactions that are required to settle up the layer two stuff — it makes those transactions unreliable and it makes it possible for all sorts of bad things to happen. So layer two is going to work even better on Bitcoin Cash than it will on Bitcoin Core.

The part that I think most people don't realize or don't seem to care or pay enough attention to is that Bitcoin's market share, it used to basically by 100%. It used to have 99.something percent of the cryptocoin market share, and it wasn't until the blocks became full and the fees became high, and that caused the transactions to be unreliable. So then you had Bitcoin Core essentially becoming slow, expensive to use, and unreliable, and 1,001 other alt coins are still fast, cheap, and reliable. Well, guess what. When you have two options — or in economics it's called substitute goods theory. When you have one good that's fast, cheap, and reliable and another one that's slow, expensive, and unreliable, people are going to start using the fast, cheap, and reliable one.

And that's exactly what's been happening to Bitcoin Core, and that's why we've seen its market share drop from basically 100% to less than 50% today. And my prediction is that in the next year in 2018, Bitcoin Core will no longer be the top cryptocurrency in the world. The average free is more than $30 for a single transaction. That means for Bitcoin Core to even be competitive with credit cards, it's only competitive for transactions that are more than about $2,000 each, so Bitcoin Core can't even compete with credit cards at this point. Whereas Bitcoin Cash, the transactions are less than a penny. They're always confirmed in the next block. Bitcoin Cash very, very clearly is the original version of Bitcoin that was described in the Bitcoin white paper and behaves the same way Bitcoin did until the Bitcoin Core team managed to completely veer Bitcoin Core off of the original roadmap that was laid out by Bitcoin.org and the original Bitcoin white paper written by Satoshi Nakamoto.

So I guess one last point I'll touch on is you're worried about the centralization of nodes if the blocks become too big and it requires a more expensive piece of hardware. Well, it's not the full nodes that include your transactions in a block; it's the miners. Only the people who are doing Bitcoin mining actually include transactions in a block. And these mining machines cost over $1,000 each, and these miners are buying thousands or even tens of thousands of these machines at a time. So they're spending millions or tens of millions of dollars at a time buying this mining equipment. Even for the price of one of these mining machines, one S9 from Bitmain, you can already buy a computer that can easily run and validate the hundred megabyte blocks right now for the cost of just one of these mining machines that Bitmain is selling, so I don't think it's a realistic worry.

So I guess to close up, I feel that the Bitcoin Core team are worried about all sorts of things that might maybe possibly somehow someway maybe become a problem far into the future, and they're optimizing against those things that might possibly become a problem way into the future, and in doing so, causing the current Bitcoin network to basically be unusable for any business or individual who wants to use it in commerce. And that's why we've seen all these businesses that used to be strictly Bitcoin-only busy innovating all sorts of alt coins, like Bitcoin Cash. We've seen that happen with Coinbase. We've seen that happen with BitPay. We've seen that happen with Blockchain.info. And we've seen that happen with Bitcoin.com. All of those businesses used to be strictly Bitcoin-only until the Core team sufficiently deviated Bitcoin Core from the original roadmap and basically turned it on its head. They took a network that used to be fast, cheap, and reliable and have essentially made it slow, expensive to use, and unreliable. And you don't have to be a rocket scientist to figure out which of those two versions of Bitcoin is going to be the more successful one in the world.

WOODS: All right, I think I'd like to give each of you an opportunity to take a couple of minutes to respond to each other, so, Jameson, if you want to respond to that, go right ahead. I'll give Roger the same opportunity. And then we want to jump into questions. In fact, I actually did develop a question that I think I want to ask before you guys ask any. But anyway, you have the floor, Jameson.

LOPP: Yeah, no, Roger brings up a lot of good points, especially regarding the frustration and unreliability for commerce transactions, especially retail-level stuff. So from the standpoint, though, of who controls the block space or is there centralized planning happening or is Bitcoin Core in control of the Bitcoin protocol, I think that's a result of a lot of frustration of people wanting to have somebody to blame. But in fact, there are over half a dozen Bitcoin protocol implementations; it just so happens that Bitcoin Core happens to be the one with the largest group of people who are contributing to it.

And it's very interesting to see how angry people get about Bitcoin Core in specific because this is an open, group-collaboration project, so anyone who has the expertise and wants to contribute their time is welcome to join Bitcoin Core, start making reviews and pull requests and participate in the process. And people who don't like Bitcoin Core and their process are free to create their own software and put it out there on the market, and there have been a number of different teams who have done that, as well.

But at the question of who controls the protocol and the rules and the size of the blocks, this is another one of the big disconnects between the different sides of the scalability debate. So you have one side who believes it's very important for full-node operators to be able to run a fully validating node at a low cost. And then on the other side, you have people who believe it's very important that transaction fees for on-chain transactions are very low cost in order to continue to drive adoption for these retail-level transactions. And these are tradeoffs that can't really — you have to choose one or the other, because low transaction fees are going to continue driving more demand and raising the cost to actually run a full node.

So it's interesting to talk about the unreliability of the Bitcoin network at the moment. It is in many senses unreliable because it is so successful. It's almost an issue of, "We

don't go there anymore; it's too crowded," type of situation. But it is true that high fees are at I think all-time high fees right now for transactions on the Bitcoin network. This is because there's a ton of demand and people are willing to pay a premium for it. Some people aren't, but apparently a lot of people are because that's why they're so high.

And in fact, transaction fees are on track to make Bitcoin's computational security actually sustainable. Because Bitcoin is deflationary, the subsidy that is provided by each block to miners is going to continue to dwindle until there's none left to pay them. And at that point, miners will either have to work for free or there will need to be sufficient transaction fees for them to collect.

So last I checked, Bitcoin is already about 40 to 50% of the way to being sustainable in this regard, and there are thousands of cryptocurrencies out there that have extremely low fees, not just Bitcoin Cash. This is because almost nobody uses them and there's no demand for them, and it's unclear at this moment if these cryptocurrencies will withstand the test of time. I expect that many of them are actually going to fade into obscurity.

And it's worth noting that fees are related to a user's time preference. So users with low-priority transactions who are willing to wait for a period of low demand are actually able to get by by paying lower fees. And the estimates that we provide at Bitco will go all the way out to a one-week confirmation target. So while some people say that lightning network may "steal fees from miners," I actually expect that these second layer networks are going to enable new-use cases that add more utility and value to Bitcoin, which will result in even more demand for block space because they need to open and close these payment channels.

And if you consider that a payment channel will enable a user to perform many transactions off chain, those fee savings are going to be reflected by users that are willing to pay even higher on-chain fees because they're netting in overall fee savings. So users who are opening payment channels, they're also going to have pretty a low time preference for their confirmation because they don't need to pay those high fees to get very fast block confirmations.

So I know that Roger's been in Bitcoin for a very long time. He often reminisces about what the good old days used to be like, when fees were optional and old UTXOs got prioritized by miners regardless of the fees they paid, but the terrible truth from my perspective is that all blockchains are terrible at scaling. They're highly inefficient databases, and the only public permissionless networks you're going to see that have low fees are going to have that because they have low usage, low security, and thus lower utility and value. Almost nobody other than the miners themselves like having high transaction fees, but allowing a fee market to form when demand for block space surges incentivizes users to be more efficient about their use of block space. So as a result, the higher value use cases get prioritized, and unfortunately, the low value use cases may suffer, and this is what Roger and a lot of the Bitcoin Cash supporters are upset about.

And I've been monitoring the Bitcoin transactions versus the Bitcoin Cash transactions, and over the past week, the average Bitcoin Cash transaction has been over three

kilobytes in size, which is more than five times larger than the average Bitcoin transaction. It was very interesting for me to observe. I expect that this trend may continue if the adoption of Bitcoin Cash continues to increase, because users are going to have very little incentive to be good stewards of this shared resource. And I fear that it may fall victim to a tragedy of the commons-type situation, but I'm incredibly fascinated to see how it all plays out.

WOODS: All right, Roger, the floor is yours once again.

VER: Yeah, so I guess one of the — again, I took a couple of notes there, so one of the comments that Jameson made is that the Bitcoin Core team is this open community that anybody can participate in. I'd like to point out what happened to Gavin, what happened to Jeff Garzik there. So Gavin Andresen, for those that don't know, was the person that Satoshi Nakamoto, a big creator of Bitcoin, essentially turned over the reins of the project to. Gavin was gracious enough to share access to a number of repositories with other people. And then when Gavin came out and said that he thought that Craig Wright was Satoshi, people under the guise of claiming that they thought his account had been hacked revoked his access from these repositories and then never gave it back to him when it turned out his account hadn't been hacked.

And then they also removed Jeff Garzik's access as well at the same time without giving any excuse at all, whereas in reality the reason that their access was revoked was because simply they had different opinions from the current Core development teams. They had their access revoked. That's certainly not a free and open thing for anybody to participate in.

And then we should also point out about the incredibly amount of censorship that's been going on on the main discussion platforms for Bitcoin, so both on BitcoinTalk.org and r/Bitcoin. r/Bitcoin is probably the number one discussion platform for Bitcoin worldwide up until maybe a week ago when the mainstream media started going really crazy reporting on Bitcoin. But at any one moment, you have more than 10,000 users reading about Bitcoin over there, and you're literally not allowed to post anything that's in opposition to Bitcoin Core's roadmap or your post will literally be deleted.

I implore anybody out there to go and Google "Bitcoin censorship," and there's a number of fantastic articles there by a guy going by the name of John Block laying out the censorship that's been going on. And it's just jaw dropping if you take the time to read it. Not only are they deleting posts, but they're modifying posts and deleting things selectively to make it look like people have the exact opposite opinion of what they actually do have. So that's not in line with a free and open community.

And I understand that not all Bitcoin Core developers are engaged in that, but for the most part, a lot of them have been openly supportive of it, and the ones that have spoken out against it basically say something along the lines of, *Yeah, I kind of wish they wouldn't do that*. And then lots of other ones claim that they don't see any evidence of this censorship at all, which is just absolute madness.

And Jameson is right: I do like to reminisce about the old days of Bitcoin when it worked really, really well. Transactions oftentimes were free. It worked incredibly well for commerce. And you had this thing that was called zero confirmation

transactions, where basically most transactions, even before they'd been included in a block, were good enough for merchants to accept them without them having been included in a block yet. And I understand and I think everybody understands that a transaction that's included in a block is more reliable than one that hasn't, but the current Bitcoin Core development team, they've openly made zero confirmation transactions less reliable and less useful to the point where people can't really use them in commerce at this point anymore. It's a real, real big shame.

And for anybody that's actually trying to use Bitcoin in commerce, you realize that the Bitcoin Core dev team aren't interested. They're openly hostile to people using Bitcoin in commerce. And if you look at it, the entire reason Bitcoin is where it is today is because people started to use it in commerce, and it was only because people were using it in commerce that it even became usable as this store of value or so-called digital gold that lots of people on the Core team think that it can be.

So I guess I'd like to point out that, for anything to be usable as a store of value, it has to have some secondary use case, so it either has to be usable in commerce or, in the case of a house, you can live in it, or in the case of gold, it has all sorts of industrial uses or dental uses or all sorts of other things. If Bitcoin is morphed into something that doesn't have any use case other than a store of value, it won't be usable as a store of value, and I think that's a real big disconnect on both sides of this debate. And once again, the proof is in the pudding. As soon as Bitcoin's blocks became full and it started having a bad user experience, its market share went from nearly 100% to less than 50% today.

And maybe someday lightning network and layer two stuff will solve all over these problems, but by that point it's going to be way too late. Imagine if a version of Facebook came out today that had way better features and everything was fantastic but everybody was still on Facebook. It would be almost impossible to get people to switch. And that's happening to Bitcoin right now. We're watching people switching away from Bitcoin Core right now, and they're busy switching to Ethereum and Bitcoin Cash and Ripple and Dash and all sorts of other things out there because of the bad user experience that Bitcoin is providing to users. If something is slow, expensive, and unreliable and an alternative is offering them something that's fast, cheap, and reliable, people are going to switch to that thing that offers a better user experience. And that's exactly what happens.

And as the very first person in the entire world to start investing in cryptocurrency startups, I'm calling it. Bitcoin Core is not going to be the top cryptocurrency in the world by the end of next year. That's a plain and simple truth because of the bad user experience that, not by accident but has intentionally been created by the Bitcoin Core development team. They openly say they want Bitcoin to have full blocks, and by having full blocks, it creates high fees and unreliable transactions. When things are expensive to use, slow, and unreliable, people are going to use something else, and that's why myself and my friends and all the businesses I do business with are busy switching to Bitcoin Cash.

WOODS: All right, let me ask Jameson a question, and then I'm going to ask one to Roger, and then I'll let you two go at it. Roger just repeated something I've heard him say before, which is that the Bitcoin Core people in some cases have been implicitly or

explicitly hostile to the idea of Bitcoin becoming accepted as a widespread medium of exchange, but rather thinking of it more now in terms of being a store of value. Now, is that really true and is that your personal vision for Bitcoin?

LOPP: Well, I mean, okay, this is really difficult whenever you're saying like "the Bitcoin Core people," because, first of all, Bitcoin Core is one of several implementations, and even within Bitcoin Core, there are so many different supporters who have so many different views, it's very, very tricky to just categorize any large group of people as being one specific thing or another.

WOODS: Okay, all right, so let me try and clarify then. Because let's just say, if I were to have read an article about Bitcoin five years ago, I would have encountered a lot of young enthusiasts whose view was, *This thing's going to take over the world. It's going to take on the central banks. It's going to bring the state down. And it's not going to do that by being a store of value. It's going to do that by being a medium of exchange*. Is there a deliberate attempt to play down that aspect? That's my question.

LOPP: I mean, I think there definitely is with regard to doing on-chain transactions for it, but if you start digging into all of the technical progress that is happening, there are, last I checked, like four or five different teams that are working on second layer technologies that want to make Bitcoin as a medium of exchange be an even better experience than, say, your Visa or MasterCard-type networks. It's just they've been working on this for several years now and we're finally at the point where the technology is going to be ready sometime next year. I mean, people are already doing transactions on the main network; it's just in a beta phase at the moment.

WOODS: Roger, let me ask you something. I've heard — I think I've heard you but I've certainly heard some friends argue that, as time has gone on over the past seven or eight years, people have gotten into Bitcoin who don't necessarily have libertarian ideology undergirding them, that a lot of times when you're learning about Bitcoin in the beginning, it was libertarians, everybody admits, were early adopters. They were early enthusiasts. But that wasn't necessarily going to stay the case, and I think there's been a kind of implication that, as people have gotten into Bitcoin who have not had a libertarian commitment, that this was bound to push Bitcoin down directions you haven't wanted to go. But at the same time, Jameson here seems as good a libertarian as anybody. So can you sort out what the role of ideology in all this is?

VER: Well, there's I guess lots of different types of libertarians. So I came to be a libertarian from studying economics, and I certainly was not born a libertarian. My parents were not libertarians, but I was fortunate enough just by chance to come across a Ludwig von Mises book when I was in junior high called *Socialism*, and I thought it was a pro-socialism book when I picked it up. But by the time I was done reading it, I realized that socialism, not only does it not work in practice, it's impossible for it to even work in theory as well. So I became a libertarian from studying the economics, and I got interested in Bitcoin because of the economic ramifications.

And I was that first person that started trying to spread Bitcoin to the world, and I focused on libertarians, and I focused on libertarians that were part of the Free State

Project in particular. So I reached out to everybody I could that was part of the Free State Project and tried to give them all Bitcoins and tried to get them all involved.

And I don't know exactly what Jameson's libertarian leanings are or political leanings are, but I kind of actually felt like he avoided the question in regard to the censorship issue and people being complacent and whether or not Bitcoin should be a medium of exchange or a store of value, and maybe we could ask Jameson directly what is his own opinion. It's fine it he doesn't want to speak for others, but I'd like to ask Jameson: do you think Bitcoin should be a store of value or a medium of exchange, and what do you think about all of the censorship that's been going on in the Bitcoin ecosystem?

LOPP: Sure. So I believe that we should prioritize the store of value at the moment due to the technological limitations, but ultimately, I think that everybody on both sides of the scalability debate has the same ultimate goal, which is get Bitcoin used by everybody across the world, make it a mainstream technology that is easy and basically empowers people. That is really like — my fundamental goal, even higher level than Bitcoin, is to use my skills as a technologist to help empower individuals.

And like with regard to the censorship stuff, I think it's interesting, like these moderation actions on various can be pretty annoying. I've gotten hit with them myself over the years, and I wrote a long article about this I think earlier in the year. I don't believe that this is actual censorship that is stifling speech, because there are plenty of alternative forums that you can use for discussion. In fact, I generally hate Reddit. Whatever subreddit you're talking about, I hate it. I think it has a lot of issues. And I myself am a big fan of Twitter because I get to choose what content I see and there are rarely any interventions by Twitter administrators.

It's kind of odd to me that Roger keeps complaining about the censorship when he's competing on the free market. He's offering "uncensored forums." He has a quarter million Twitter followers, 120,00 subscribers on the BTC subreddit. Bitcoin.com is ranked something like number 2200 in the whole world in terms of traffic volume. So he's out there and his views are getting heard. Like, I don't think that there are that many people in this space who don't know about both sides of the debate because of censorship. I mean, information wants to be free and pretty much everybody who spends time getting into this level of the debate is well aware of the points on both sides.

VER: So basically a summary of your position is that the censorship that's going on or the manipulation of the opinions of people being posted online, the manipulation and censorship is okay because there's other places that people can go to discuss it in addition to the places where the censorship is happening? Is that an accurate summary of your position?

LOPP: Yeah, so there are multiple different forums that have their own styles of moderation. People get to choose which ones they interact on. It's pretty obvious what the different moderation styles of these different forums are. I believe this is free market in action. And believe me, from like all of the vitriol and all of the shilling that happens on both sides — there are definitely people who are doing dirty stuff on both

sides — I don't condone any of that stuff. I generally try to mute and block as much of it as possible. But this is kind of the chaos that you get from a free market.

WOODS: All right, we've got a lively conversation going on here. We're going to continue it after we thank our sponsor.

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All right, I actually want to give Jameson an opportunity to ask Roger a question just because I have to kind of be in charge here to make sure there's equal time, so, Jameson, ask Roger anything you like.

LOPP: Sure. So I think one of the main differences between our viewpoints on the scaling debate is kind of like short-term versus long-term viewpoints. So I'm just interested to know how many users do you really think that you can get supporting on-chain daily transactions? Like, is there a block size that you believe is too large or a cost of node operation that is too high? Or how are you going to deal with the adversarial situations? I think this is one of — when I say that Bitcoin developers are conservative, I'm really saying that they're extremely adversarial thinkers and they're trying to be careful so that edge cases don't get into the system that can cause it to have problems. So like how are you going to deal with being able to target extremely low on-chain transaction fees but then not have some adversary come in and just fill up all of your block space for basically free?

VER: So again, it's the miners that should decide what size blocks they want to produce. It's not for me to decide. It's for the market to decide. I don't think that that parameter should be centrally planned. So the people that are paying for transactions in a block space can decide how much they want to pay, and the people producing the block space can decide how much they want to produce for the amount of money that people are willing to pay. So I don't know what the answer is there, and I don't think anybody knows what the answer for that is, just as nobody knows what the correct price for a cup of coffee is. It depends on the location; it depends on all sorts of different things.

And there's a fantastic essay that I read when I was a young man called "I, Pencil," I believe, by Leonard Read, and he makes the claim that there's not a single person alive in the entire world that knows how to make a pencil. And when you first hear that claim, you think, *What a bunch of nonsense. A pencil's so simple. Of course I know how to make it.* But then he goes into all the details of what's actually required to make a pencil and the graphite that's mined out of the ground somewhere and trees that are cut down somewhere and the machinery that's used to process the trees and then how you make the paint and the piece of rubber on the end for an eraser. And by the time you get done reading the essay, you realize he's right. There's not a single human being alive on the planet that knows how to make a simple pencil that you can go and buy at the store.

So I think it's the same way with block space. We don't know what the right amount of block space to produce is. We don't know what the right things to be included in that block space is. At the end of the day, it's the people producing that block space and the people paying to have their stuff put into the block space that need to decide

what the correct amount is and what the correct price for that block space is. So I don't know what it is, but I can tell you by the fact that we can see Bitcoin losing market share and losing market share quickly that the $30 per transaction that Bitcoin costs right now for 250 bytes of data, that's way, way, way too high, and that's why we're seeing people go to other things.

LOPP: Okay, so I think that makes sense. That's pretty much in line with a lot of the perspective that I hear, which is that these things should be decided by the miners because they're basically operating the market and really in control of the supply of block space. So I'm wondering, can you then abstract that a little bit more? And would you say that at the end of the day, who really gets to define the rules of the Bitcoin protocol — is that still the miners again versus the rest of the regular users?

VER: So I guess there isn't a real clear answer to that question and that's why this fight has been going on for a couple of years. And that's one of Bitcoin's strengths and I guess one of its weaknesses, is there isn't one final arbiter of what should be decided and how things should be done. It's not only the developers. It's not only the miners. It's not only the merchants. It's all of these things and none of these things. So I guess I don't have a clear answer for you other than we're seeing the ecosystem migrating away from Bitcoin Core and migrating mainly to Bitcoin Cash and other alt coins.

Because up until very recently, the amount of block space produced was decided by the market. There was this one-megabyte cap, but the amount of block space that people were willing to pay for was much, much less than one megabyte. The blocks were never, ever a full megabyte. And during that time in which the market was deciding how much block pace to be produced, Bitcoin grew from nothing into the worldwide phenomenon that it is today. And then once the amount of block space being produced was no longer being determined by the market, we're seeing Bitcoin lose market share to all these other alt coins.

And all these other alt coins still had the amount of block space that they're producing being determined by the market. There's not another alt coin in the entire world that has full blocks. It's only Bitcoin. And that's an incredibly dangerous and reckless thing to do with Bitcoin, and we're seeing the results of that by Bitcoin losing its first mover advantage and near 100% market share down to less than 50%. So I guess congratulations to the small blockers in the Bitcoin Core development team. You guys have successfully destroyed Bitcoin's first mover advantage.

WOODS: Let me ask you guys a question that would come from the average person reading the newspaper and, well, reading things online about Bitcoin in the news, because you get a lot of commentators saying Bitcoin is in a bubble. And one of the arguments they make — I find a lot of these people are not very informed about Bitcoin, but one of the arguments they make is what's going to happen is people are going to get buyer's remorse. They're going to acquire some Bitcoin; they're going to realize it's not very usable precisely because of some of the complaints that Roger has had. It doesn't give a very good user experience, so they're going to think then, *What the heck am I doing this? I'm buying it because I think it's just going to go up and up and up? Forget it*. And they're going to dump it for that reason. What is your response — whether that's right or wrong, how do you respond to that kind of argument? We'll start with Jameson.

LOPP: Well, the usability argument. So what's really changing as a result of the higher fees and greater demand on Bitcoin is that the lower value use cases are getting priced out of it, and that's causing a lot of friction and frustration. So if you have to pay $10 or $20 for a transaction, it no longer makes sense to do these retail payments of $10, $20, even possibly $100. So from what I'm observing right now is that the nature of the use cases of Bitcoin are changing at the moment to being more of an institutional and high-net-worth level of people that are getting into it, because they are willing to pay those higher fees.

Now, one of the differences I think between my perspective and a Bitcoin Cash kind of roadmap is that I believe that these second layer technologies are going to alleviate a lot of that problem; it's just going to be a patience game. Whereas the folks who are in more of a rush to try to fix this fee situation, they just want to raise the block size and get Bitcoin back to operating the way that it was before.

VER: If could reply to that a little bit —

WOODS: Yeah, please do.

VER: So I think Jameson actually kind of summarized the position pretty darn well, and in regard to these layer two things, the Bitcoin Core team, they're really confident in these layer two technologies that they've claimed are going to be coming in about 18 months from now. They've been claiming that for years. And from my point of view, they've intentionally broken the version of Bitcoin that we know and have years and years, almost a decade of empirical evidence showing that it worked and worked incredibly well. And they've intentionally broken and damaged that in the hopes of creating these layer two technologies that don't exist yet, haven't been proven in commerce. There's not a single place online where you can buy anything with a layer two technology payment system built on top of Bitcoin, or anything else for that matter, as far as I'm aware.

So I think the conservative approach would be, if you have something that's working and working incredibly well, don't break it. That's the exact approach that Core has taken. They've broken something that was working incredibly well in the hopes of creating layer two technologies that I hope work really well as well — and I hope that flying cars come and replace my Tesla, but I'm not going to go and destroy my Tesla today because I think that flying cars are going to come next year. I'll wait till the flying cars are already here and working well and working safely before I get rid of my Tesla, and unfortunately, Bitcoin Core has taken the exact opposite approach. They've destroyed the thing that was working well because they hope that this other thing is going to come in the future and replace it, and that is just incredibly frustrating and reckless for me.

And I guess one other point too that's worth pointing out: that not only transactions of tens of dollars, also hundreds of dollars and even thousands-of-dollar-size transactions have been priced out of the Bitcoin network. Just the other week, I sent $20,000 worth of Bitcoin from my wallet to a Bitcoin exchange to buy more Bitcoin Cash. So I sent Bitcoin Core to an exchange to buy Bitcoin Cash. To send the $20,000 worth of Bitcoin Core, it cost me $1,000 in fees. It cost literally 5% of the transaction. That's way more than credit cards. That's way more than a bank. Why the heck would I ever

want to use that sort of thing? And the $20,000 were all funds that I received for people to pay for advertising on Bitcoin.com. Well, guess what. Now we're only accepting Bitcoin Cash for advertising payments, and if I receive the same $20,000 from a bunch of different advertisers for advertising and if I want to move it to an exchange to exchange for something else, it will cost me pennies rather than $1,000 to do so. And so even big institutions are going to be switching to Bitcoin Cash because it provides a better experience for both small-value payments and large-value payments.

WOODS: All right, I'm going to give each of you an opportunity to ask each other one final question, and then you can each sum up your positions. So Jameson, I'm going to turn to you to ask Roger a final question.

LOPP: Sure. So in terms of like — and this kind of goes back to one of the other questions. With regard to like what is the definition of Bitcoin, are you in favor or against the idea of people being able to run fully validating nodes? Because that does seem to be one of the main differences here, and deciding whether or not these users need to have the individual sovereignty and trustlessness, these security aspects of Bitcoin, or whether or not it's good enough for them just to use the lightweight verification and use SPV proofs to check that their transaction was included in a block. So are you less concerned with I guess the rest of the rules of the network and for the average person to be able to participate in that? Are you just more concerned in the average person being able to move money around?

VER: So my number one goal and interest in Bitcoin is to undermine the ability of every single government on the planet to be able to control the money supply and control what people do with their own money. And so the way I see the best strategy to achieve that goal is to get as many people around the world to use Bitcoin as quickly as we possibly can.

And if you look at the way that's happened, it's been through companies like Coinbase and Blockchain.info. Those are probably the top two Bitcoin wallets in the entire world. None of the users of Blockchain.info or Coinbase are validating their own transactions. They're all relying on Coinbase and Blockchain.info to do that for them, and I think that's just fine. If you read the original post by Satoshi Nakamoto, the idea was that only full nodes, meaning mining nodes, would be the ones that would be required to run all these transactions.

And if we get Bitcoin being used by people all over the world in commerce for everything from shampoo to cat food to absolutely everything you can think of, if politicians go to try and ban it, it will be too late. Everybody will say, *No, wait a minute. Bitcoin, it's not bad. I use it to buy my puppy food. How come the politicians want to make it harder for me to buy my puppy food?* So I think it's just fine if we rely on companies like BitPay, for example, as well, and Coinbase and Blockchain and Bitcoin.com to run full nodes, I think as long as you have enough full nodes around the world so that it's impossible for governments to shut them down, that's enough. We don't have to have everybody running a full node.

And anybody that's interested enough for $2,000 today can buy what was definitely a super computer just a few years ago. So I don't think we're anywhere near being at the

price point where people are going to be priced out of being able to run a full node where we're already at the point where people are being priced out of even being able to transact in Bitcoin. So if we're forced to choose between people being able to afford to run a full node and people being able to afford to use Bitcoin, I would choose the path where people are still able to afford to use Bitcoin and not be able to afford to run a full node rather than the path where people can still afford to run a full node but they can't afford to use Bitcoin. And that's the decision I hear you're presenting me with, and I choose the one in which everybody can afford to use Bitcoin.

WOODS: All right, Roger, your turn to ask a final question.

VER: Okay, well, I guess first actually I want to thank Jameson. I've met you in person. You're definitely on the other side of this scaling debate from me, but you've always been very civil and a gentleman and an all-around civil guy, and I think this debate needs more of that sort of thing and more people like you, so thank you for being such a civil guy.

And I suppose my final question for you is: the title of the Bitcoin white paper is "Bitcoin: A Peer-to-Peer Electronic Cash System." At the moment, Bitcoin is no longer usable as cash. How big of a problem do you see the fact that Bitcoin is no longer usable as cash and the Bitcoin Core team are for the most part openly hostile to even being able to use it as cash?

LOPP: Yeah. So it's my pleasure. There's so much vitriol in this space, and Roger is even a much bigger public figure than I am, but I've had to deal with my fair share of vitriol and people just attacking me all the time, so I definitely understand this can be a tough space to operate in as a public figure.

But yeah, in regard to Bitcoin as a cash system, there is no way that I can argue that there's no problems right now. There's obviously a lot of problems, a lot of frustration. We are not able to onboard users as quickly as we would like to. If anything, I would say that Bitcoin has become popular and mainstream faster than the technology is really ready for it right now. I actually would really like to see a kind of cooling off period so that the industry in general can regroup and continue innovating, because right now a lot of us in the industry are just trying to keep the servers from catching on fire every day.

But with regard to the earlier point of this tradeoff of being able to transact versus being able to run a full node, I think I have an interesting perspective because I'm in charge of running all the full nodes at Bitco, and we had this issue this year with the New York Agreement and a lot of companies saying the enterprises are deciding to go in this one specific direction. And I was actually pretty upset about that. Like, that is not the vision that I've been wanting to see. And because I was on the inside of one of the prominent companies that was supporting that, it created a lot of conflicts for me and it's a situation that I never expected to be in before.

But the whole ecosystem is so fascinating, and while it can be very challenging to be an outspoken participant in it, I think that these types of debates are very important just for us to allow the free market to work. And so while there are a lot of times I'll come out and I'll say things that I think are concerning to me about Bitcoin Cash or

other scalability stuff, I am not predicting that Bitcoin Cash is going to crash and burn. I actually suspect that it will do all right, at least in the short term. I just have a really, really long-term view on the engineering of these networks.

And so at the moment, there's obviously a lot of demand for lower value use cases to get onto these networks. Lightning network is not production ready yet. Thus, many users are going to choose a cheaper alt coin to transact on right now. And they may choose Bitcoin Cash or Bitcoin Gold or Bitcoin Silver or Litecoin or — maybe not Ethereum anymore because it's having issues, but there's a million options out there and the free market is working, and there's always going to be a demand for users to externalize their cost of transacting onto the other entities that are running the network infrastructure. So there's a lot of different tradeoffs going on, and it's going to be fascinating to see how much these folks are going to be willing to pay to keep the Bitcoin Cash network nodes operating if it really gets to the level of adoption that they're trying to hit. So I'm very interested —

VER: So can I clarify my question a tiny bit, Jameson?

LOPP: Sure.

VER: So I guess a more clear version of my question is: do you think that the version of Bitcoin described in the Bitcoin white paper, is that Bitcoin Core or is that Bitcoin Cash? Which one most closely resembles the Bitcoin described in the white paper?

LOPP: So yeah, that's a tricky question because people are interpreting the Bitcoin white paper in different ways. And Bitcoin has been changing over the years. I have this article I wrote about why nobody understands Bitcoin, and I put a lot of examples in there of things that Satoshi actually realized he got wrong and had to fix. So is Bitcoin Cash like a better version of what is described in the Bitcoin white paper? From one perspective, that is absolutely true. It's just interesting for me to see a lot of people referring back to the white paper as some sort of like founding document that we have to go by. I'm taking this from a more engineering, the-system-is-going-to-change-and-going-to-evolve type of view and saying we have to keep our minds open and be willing to try things that weren't even mentioned in the white paper.

VER: So your position is, if you strictly go by what was mentioned in the white paper, Bitcoin Cash more closely resembles what's in the white paper than Bitcoin Core today?

LOPP: I can certainly see that from some interpretations, yes.

VER: Okay. Thanks, Jameson.

WOODS: All right, now I'm going to actually be democratic here and ask if the two of you feel — maybe you feel completely satisfied with everything, but if you'd like to have each of you two minutes to sum up where you stand, you're free to do that. So Jameson, would you like to take a couple of minutes?

LOPP: Yeah. So I try not to get too dogmatic like a lot of people do in this debate and get really upset about what is happening in the ecosystem. I think that Bitcoin is

undergoing natural growing pains and it is "failing to scale." But there is a great talk actually from Andreas Antonopoulos where he shows that there's a lot of parallels between what's happening in Bitcoin and what happened to the Internet itself and that the Internet failed to scale for several decades and it kept running into problems. Engineers looked at those problems, they came up with solutions, and then the Internet became more scalable until it hit yet another point at which it failed to scale. And I see Bitcoin as a new type of Internet. It's this new economic network for people are, instead of just transferring information, they're transferring monetary value or data that represents monetary value.

So I'm sure that Bitcoin is going to continue to surprise us and evolve in ways that we haven't imagined yet. We're continuing to really understand what it is this system is that is built. I would argue that even the smartest self-professed Bitcoin experts cannot possibly understand every aspect of the system and foresee every potential direction that it may go in. So regardless of what happens, I think it's going to continue to be an extremely exciting space, and I am very happy to continue spending my time and resources trying to make it better.

WOODS: All right, Roger, you have the final word.

VER: Great, thank you, Tom and Jameson both, for participating in this. I feel it was a real productive discussion. People got to hear both sides and both visions. I want Bitcoin to be usable for every single person on the planet, and I think that's more important than every single person being able to afford to run a full node. There's no point in running a full node if you can't even afford to use Bitcoin. So you can stop and think for yourself. There's two versions of Bitcoin. There's Bitcoin Core and Bitcoin Cash. Bitcoin Cash is fast, cheap, and reliable. Bitcoin Core is slow, expensive, and unreliable. Maybe someday in the future that will change with Bitcoin Core thanks to the lightning network, but lightning network will work right on top of Bitcoin Cash as well.

And like any good investor, don't put all your eggs in one basket. You don't have to be 100% committed to Bitcoin Cash, and you don't have to be 100% committed to Bitcoin Core, but I would invite anybody to go and get — the Bitcoin.com wallet supports both versions of Bitcoin. Go and get some of each and then send it back and forth with your spouse or your child or whoever and figure out for you which one is more useful in your life and use the one that you find most useful in your life. That's the beauty of the free market, is everybody gets to have the solution that they want and there's not a one-size-fits-all solution for everybody. So try them all out, see which ones you like, and use it to make the world a better place. So thank you guys both.

WOODS: All right, well, that is going to do it for today. So my thanks to Jameson and Roger. As I said, I will have their information and links up at TomWoods.com/1064. Also, if there's anything you guys would like linked in terms of things you've written, whatever you'd like up there will be up there for people to read and decide for themselves. So TomWoods.com/1064 will be the smorgasbord of information on this subject. And again, my thanks to you two folks, because I think we did have a fruitful conversation here and no names were called and we all walk away better for it. So thanks so much again.

LOPP: Thank you.

VER: Thanks, Tom.