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HOUSE OF REPRESENTATIVES
STATE GOVERNMENT COMMITTEE
SUBCOMMITTEE ON GOVERNMENT OPERATIONS
and
SENATE
COMMUNICATIONS AND TECHNOLOGY COMMITTEE

NORTH OFFICE BUILDING
HEARING ROOM 1
HARRISBURG, PENNSYLVANIA

PUBLIC HEARING ON BLOCKCHAIN TECHNOLOGY AND ITS IMPACT ON GOVERNMENT OPERATIONS

WEDNESDAY, JUNE 8, 2022
9:00 A.M.

SENATE COMMITTEE MEMBERS PRESENT:

HONORABLE KRISTIN PHILLIPS-HILL, MAJORITY CHAIRWOMAN
HONORABLE JOHN KANE, MINORITY CHAIRMAN

HOUSE SUBCOMMITTEE MEMBERS PRESENT:
HONORABLE JASON ORTITAY, MAJORITY CHAIRMAN
HONORABLE CLINT OWLETT
HONORABLE ISABELLA FITZGERALD

NON-SUBCOMMITTEE HOUSE MEMBERS PRESENT:
HONORABLE SETH GROVE
HONORABLE SCOTT CONKLIN (VIRTUAL)
HONORABLE BRETT MILLER
HONORABLE FRANK RYAN
HONORABLE KRISTINE HOWARD (VIRTUAL)
HONORABLE BENJAMIN SANCHEZ (VIRTUAL)
HONORABLE JOE WEBSTER (VIRTUAL)

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SUBMITTED WRITTEN TESTIMONY

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(See submitted written testimony and handouts online.)

P R O C E E D I N G S

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: Good morning. I call this public hearing of the Senate Communications and Technology Committee and the House State Government Committee, Subcommittee on Government Operations, to order. Today's hearing is to receive testimony on what blockchain technology is and how it impacts state government operations.

The world of technology is changing rapidly. And state government must keep up in order to effectively create policy that reflects the changing times. This is a topic that is new to many of us. And, hopefully, it will create a larger conversation on the inclusion of new technologies within our state government.

I'd like to welcome all members of both committees and would like to start with a few housekeeping items.

We do have a few members who are participating virtually. For those participating virtually, if you could make sure that your microphone's on mute and your

phone is silent so we don't hear any background noise, we'd really appreciate it.

Additionally, if you have a question, please use the hand raising feature on Zoom, and we will recognize you to speak.

I'd like to start with member introductions, beginning with the gentleman from Lebanon County.

REPRESENTATIVE RYAN: I'm Representative Frank Ryan. And apparently I must be operating remotely since I'm that much distant from the rest of the committee.

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: Good morning. State Senator Kristin Phillips-Hill, 28th District, York County.

HOUSE MAJORITY CHAIRMAN ORTITAY: Representative Jason Ortitay, 46th District, Allegheny and Washington counties.

REPRESENTATIVE MILLER: Brett Miller, state representative, 41st District, Lancaster County.

REPRESENTATIVE GROVE: State Representative Seth Grove, Senator Kristin Phillips-Hill's driver and also to pick up her

dry cleaning, York County, 196 District. Thanks for having me.

REPRESENTATIVE OWLETT: It's going to be that kind of hearing, I can tell.

Representative Clint Owlett, Tioga, Bradford, and Potter County. Thank you.

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: Oh, if only that were true.

So, I would now --

(Whereupon, a brief discussion was held off the record.)

REPRESENTATIVE SANCHEZ: Good morning, everybody. Representative Ben Sanchez, from Montgomery County.

REPRESENTATIVE HOWARD: And hi. It's Kristine Howard, from Chester County.

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: Thank you, Representative Howard.

I would now like to turn it over to our testifier for this morning, Mr. William Price, attorney at Clark Hill.

And, Mr. Price, you can proceed whenever you are ready.

MR. PRICE: Good morning. William Price. I do work at Clark Hill, PLC, a law firm --

international law firm, with offices both in Pittsburgh and Philadelphia within the Commonwealth. I work out of the Pittsburgh office.

I also -- and much more of my testimony today will be related to my role at the University of Pittsburgh School of Law. I've been an adjunct professor for ten years now -- just recently re-upped for another four-year stretch -- teaching the course Secure Transactions, which centers on the Uniform Commercial Code.

My testimony today is purely my personal observations. It's not to be reflected by my law firm or the law school. But I'm very appreciative of being able to present today and answer any questions that I'm capable of answering.

It's -- it's pretty wonderful to ask for a meeting with your local representative, get that meeting for, you know, fifteen, twenty minutes, talk about a topic that is not greatly understood yet by most politicians, and then it turned into a hearing relatively quickly. So, I really appreciate your time.

And I think it's an important issue that could take months or even years to become a reality for the Commonwealth to utilize the technology. But

it starts with something like this, with a hearing.

So, I provided a written statement in advance. I'm happy to read it into the record if that is helpful. Or I'm happy to just reference it during my discussion.

With that statement, I provided a variety of links that I think are very helpful for preliminary review of blockchain technology. I provided a nuts-and-bolts link that really explains what it is we're talking about. And I provided some Law Review articles specifically on the system that I can speak to, which is the Uniform Commercial Code filing system, as to why and how it would actually be a better system utilizing the blockchain technology in the smart contracts that are now utilized on blockchain technology.

I am not an expert on blockchain technology. I've been reviewing it for about a year. I've -- I find it interesting specifically for the UCC filing system. It's my personal belief that this should be a conversion for all fifty states to go to blockchain technology, to use the smart contracts that I discussed in my statement.

The reason being is that it's a very basic system. It's a database that has, you know, a

limited number of fields that are necessary to file the documents. And it should be quickly, easily scanned. It should be easy to search. And it should be also easy for parties to renew their filings, which are required under the code between the window of six months at the tail end of their five-year period, which all could be automated.

While I say in my statement that I'm not going to discuss cryptocurrency specifically all that much, unless you really want to talk about it, there are tokens that can be created that are utilized for credits, a credit system. So, somebody could pre-load their filing and automatically renew within five years to have an extended period of time. And most lending facilities anymore have a relationship longer than five years.

So, it's just those basic things that could be done much more easily on the blockchain technology. And because it's so public and transparent and easily reviewable, it's not a very complicated system to be able to keep up to speed on where things stand.

So, for example, if you are PNC Bank, they can easily scan on a blockchain much more quickly an output that says, Here are all your filings. Here's

when they're due. Here's when they lapse. Here's how you renew them.

And with blockchain technology, you can put pivots in those contracts and just say, Well, at four years, six months, and a day, we want to automatically renew.

The most notable pitfall was in the General Motors Bankruptcy, where there was a billion-dollar miss on a renewal. So, a bank lost a billion-dollar position, their secured status, in the General Motors bankruptcy. So, there are practical issues that arise by virtue of the nature of having to take an overt act to renew these contracts, when the contracts between the parties was expected to be an automatic renewal when it comes through.

So, those are some of the things I'd like to talk about. I'm open to any questions. And if there's any specific questions in the statement or things that you've done in your own investigation, I'm happy to address them.

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: Thank you very much, Mr. Price.

I'd like to recognize that we are now joined with Senate Communications and Technology Committee minority chair, Senator Kane.

And I would like to turn it over to Chairman Ortitay for some questions.

MR. PRICE: Thank you.

HOUSE MAJORITY CHAIRMAN ORTITAY: Thank you, Madam Chair. Appreciate it.

Thank you, Mr. Price, for being here. It's good to see you outside of the district.

MR. PRICE: Thank you.

HOUSE MAJORITY CHAIRMAN ORTITAY: For the benefit of everyone here and everyone watching at home live, mainly probably just my mom, could you just go over what -- basically what blockchain technology is at its basic level.

MR. PRICE: Sure.

So, a blockchain technology is -- there are -- they are referred to as platforms or chains. There are different parties that have created them. In my summary, I mention specifically Algorand. And the only reason I mention that one is because I've become personally familiar with it.

A blockchain is -- a block is a sequence of information that is memorialized permanently on the chain. So, it's akin to a database that could be centralized, a mainframe technology, for example, like Oracle, those types of systems, where you create

these databases that you put information to. A blockchain has a continuous register of information that gets validated, and that there are -- there are different ways of creating it. But, typically, you would have -- somebody creates this block that they want to add to the chain, and then there's a process whereby that block becomes permanent.

And there are different types of systems that are centralized or decentralized. Centralized means that there's a third party with monitoring that controls the system. Decentralized means that there are numerous parties that basically just validate the process and ensure that the block becomes permanent in a record.

So, why does it matter? Who cares? Well, that permanent blockchain, as it becomes permanent and adds layers and layers and layers to it, the information is available permanently. You can see it; you can scan it.

And there are programming languages -- so with Algorand, they use Python and some other languages -- that go ahead and search the database and give outputs, outputs that are very inexpensive for anybody to download the mechanism to search the blockchain and have a full scan of the blockchain

very, very quickly, very efficiently.

And so, when you have a blockchain, you have two different types of items on the blockchain. You have fungible ones, that look and act and feel, but there are many of them issued. So, you have cryptocurrency, for example. So, people are very familiar with the Bitcoin and Ethereum. And Algorand has their own native token called ALGO. So, that looks and acts and feels the same again and again and again. It just sits on the blockchain and the blockchain shows which account is associated with which number of those tokens.

A non-fungible token, an NFT, which a lot of people associate it with images or pictures, that's, in my view, the least important aspect of an NFT. An NFT is a non-fungible, meaning that there's one of it permanently.

And so, it provides you with a roster of data that's scannable on a public blockchain, that is searchable by anybody, shows who owns it, which account it's associated with, and provides permanent information that cannot be modified generally, that shows okay, this NFT has these following qualities, has this information associated with it. So, for example, it could be a mortgage document, it could be

a UCC filing. It could be any number of informations that could have a digital image. It could have a song associated with it, a number of things, qualities.

So, when you have this blockchain, it creates this massive database quickly that everybody in the world has access to and can see.

Now, there's also private blockchains that can be designed and implemented for a private organization. So, if the state or Commonwealth has concerns about security or how does anybody have access to the information in the blockchain, it doesn't have to be publicized. It can be a blockchain that's privately driven.

But it's really just a very simple format of a database that is easily reviewable and has, you know, the ones and zeros again and again and again and again, that shows a permanent register of a piece of information.

HOUSE MAJORITY CHAIRMAN ORTITAY: Thank you for that.

If you could -- I'll just ask one more question and then turn it back over you to.

You mentioned the UCC filing system in your written testimony. Could you just walk through an

example of what that would look like with the blockchain technology.

MR. PRICE: Sure. Absolutely.

So, the UCC system is a very basic system. It is statutorily, it provides a lender with the right to provide public notice that they have a lending relationship with a borrower. So, it says the name of the debtor, the name of the lender. It has -- you have to indicate the type of collateral. You can say all assets. You can describe, you know, equipment, inventory, et cetera. All those fields get populated. There's a mandatory form that the state requires in order to send it off to the secretary of state, who's the designated register of the information.

And so, right now, every UCC system in the country is run through a centralized mainframe database that says, okay, what's the name of debtor, what's the name of the lender, what's the address of the debtor, what's the address of the lender, all that information gets put into a system that gets maintained on technology that runs -- that was invented fifty years-plus ago. And it's -- it works, the project works. It's effective in doing what it needs to do. Nobody has filed lawsuits saying that

the UCC system is ineffective or not registering, the information not available.

Every state in the union has a different process whereby you can search the database. There's different search logic. There's different, you know, what output matters as to whether or not you've given proper notice to the world.

And so, the power of the UCC filing is that you are given a perfected status in certain types of collateral against other -- against other lenders that have a relationship with the debtor. With a blockchain, it would provide more uniformity to a uniform system. It would provide a very direct manner where every state in the union -- this is my dream -- is that every state in the union uses the same technology, the same search logic, the same way to output information, that everyone in the world can see, that provides the inquiry notice that is contemplated by the UCC system.

And so, every secretary of state could utilize the same type of blockchain technology that says, if you want to know if there's been a filing in Pennsylvania, Wyoming, Delaware, wherever, you can search here. And it's just another field in the blockchain that shows where was the filing, what

was -- was it with the appropriate body or not, what's the name of the debtor, all of that would be on an individual block. Each filing would create an individual block on the chain that shows that a UCC has been filed.

And so, to me, any state can go first. Why not us? It hasn't happened yet. And to me, it seems like it's a very inexpensive investigation and implementation for one of the more simple systems that is administered by this Commonwealth. That's why I like the UCC as an example, and I happen to know something about how that system functions.

HOUSE MAJORITY CHAIRMAN ORTITAY: I appreciate the answer, and I appreciate your time here.

Thank you, Madam Chair.

MR. PRICE: Thank you.

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: Thank you, Chairman Ortitay.

Like to welcome Representative Fitzgerald and House State Government Committee Minority Chair, Representative Conklin, to the hearing this morning.

Turn it over to Representative Ryan for questions.

REPRESENTATIVE RYAN: Thank you so much for

being here.

I have a couple of questions, if you don't mind. The -- in any type of -- I'm an expert in bankruptcy, prior to becoming a representative. I'm a CPA.

And your applications and comments of the UCC are particularly appropriate. But one of the questions I have is, with blockchain and my limited experience, is that sometimes we're behind the power curve. And as an example, if blockchain -- and it is an innovative database technology, and it's not the last technology.

And so the question I would have for you is, what are some of the vulnerabilities to a blockchain technology? How can a governmental entity that would structure legislation not -- inadvertently create an incentive for somebody to abandon this technology and develop a different type of technology and that type of thing?

And then, finally, what type of implications are there to a -- an electromagnetic pulse attack -- I'm a retired Marine as well -- an EMP type of attack that might possibly potentially interfere with items stored electronically?

MR. PRICE: I will answer them in order.

The first -- your first question, what are some of the things that you should be thinking about, is the way I took your question.

REPRESENTATIVE RYAN: Yes.

MR. PRICE: And so, if I were in your shoes, if I were on the other side of this -- this hearing, the things that I would be concerned about are, you know, the "don't fix what isn't broken issue." So, our systems work, so why do it? And so -- it also raises questions about security, you know, who has control of the data? Is it -- is it going to get compromised? Is it going to be modified? Can people -- you know, who has the ability to modify the chain?

One of the reason why so many parties are moving to this type of technology -- and I reference just a handful of the ones I'm familiar with -- I think the Italian Olive Oil one's a very interesting one, because there's a lot of import/export, a lot of different producers. And from an auditing standpoint, they have found that the blockchain technology, because it's so finalized and so permanent and so searchable and quickly searchable, that it's much easier to track what's going on. So, you know, are the taxes being collected properly, for

example.

So, the security's an issue. I think it's critical for any governmental body that implements any of this technology to do their due diligence on how the actual blockchain functions that gets selected through what would typically be an RFP process or something like that. Who is the provider? How is it designed? How is it secure? Why did El Salvador select Algorand to be the platform for Bitcoin, for example? You know, their entire economy is -- now accepts a legal tender that's run on a blockchain technology by Algorand.

So, what if there's an attack, a cyber attack? What if there's a breakdown in the system? How do you have continuous, ongoing operations at all times. And those are all fair questions and all things that should be thoroughly investigated and why I mention in my statement that I'm not here to suggest an implementation protocol. It's just a first step to start asking these questions. What could hold us back if we do this conversion?

You know, a lifetime ago, I was a systems analyst at a steel company. And at least at that time, any system that you would implement -- we were converting to web-based technology at that time. Any

system had to be run in parallel. You know, the steel mill's still got to make the steel. It has to have the data on site in a localized manner, and then you want to be able to ship things to third parties, and they want to be able to see it. Well, there's an old system through General Electric that it's point-to-point how to get the information. Well, we should go to the web. That's the next step. Everybody has access to it. It's very inexpensive. You don't pay a fee to a third party to just have the point-to-point discussions.

And so, we ran the system in parallel for months, flyspeck it. Check, you know, did this one work? What's the same outcome? Is it identical? You know, you have to figure out your batches.

So, to me, it's going to require investigation on the platform that's selected. How is it secure? How does it have continuous operations? How do you have control of the data? Who can -- who has access to modify that data? And then, when you select a system, pick one that is easy to compare in parallel to see how it gets rolled out.

And then, from there, at some point, you can flip a switch and go to the one that is -- I would suspect that through investigation, you'll find is

less expensive, is carbon negative, are the things that matter from a technology standpoint, which is how do you save money from it, how do you improve and enhance the operations of the Commonwealth. And I think this technology, based on what others in the marketplace are doing, are finding that it is the solution in some regard to enhance your systems, make them faster, make them more secure, make them more transparent, and make them more efficient.

REPRESENTATIVE RYAN: Thank you.

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: Thank you, Representative Ryan.

Representative Miller.

REPRESENTATIVE MILLER: Thank you, Mr. Price. I appreciate your testimony.

I -- you've said in your testimony that the technology, more or less, was created fifty years ago that is used today and all the various systems. And you are highlighting the blockchain as an option to move forward.

So, I would like to hear from you, since the current system basically works, it's been vetted through many years, what are the advantages, the specific advantages of moving to a blockchain methodology?

MR. PRICE: Well, from what I've reviewed and seen, the use case is largely on efficiency, cost -- it's less expensive to administer, it's less expensive to manage and maintain, and it is more transparent and easier to search and get data output. So, it's -- I can't put a number to it as to what exactly it would save the Commonwealth in funds or how the carbon neutrality or negative nature is compared to the existing systems.

And I think that's what I am asking for, is an investigation to look at certain systems. What does it cost the Commonwealth to maintain it? How does it run?

And based on other use cases that are happening every day, there's -- something else comes out using some different form of the blockchain technology, they've announced that the reason they're doing it are the things like transparency, speed, efficiency, carbon neutrality or less.

So, I just -- I think that any party, including the Commonwealth and private parties, should be reviewing their systems to see is this something that can save us money, be more efficient, be more transparent for whatever our purposes are. And so I think -- a government entity, not

surprisingly, manages massive systems, no different than private enterprise.

So, to me, those are the basic pluses of investigating it.

I've yet to find too many negatives with it. It does seem to hold up. And this is not new. Blockchain technology is, call it seven, eight years old as far as being heavily used by private industry. And we're starting to see sovereign nations do things with it, which would -- spurred my interest in saying, Well, why not the state level, why not look at what the state could do with it, whether it be for, you know -- I referenced three different ones where there's -- you know, for cryptocurrency.

El Salvador is using it for a backbone to administer legal tender. For Italy, they're using it for ensuring that there's proper tracking on all of their olive oil transactions. And for Nigeria, very much akin to a UCC system, there's now a partnership that they've launched that's going to be on blockchain for all intellectual property files, all registrations that are done.

And so, we are talking about nations that have significant financial constrains and issues, and they're finding that they can save money from it and

have more robust systems. And it is an evolution of the technology. It's -- there's sea changes in every industry. And technology is starting to recognize that blockchain is a sea change. Some people refer to it as Web 3. There's different things that you'll see buzz words out there, but it really is a seismic shift on how people are managing their data.

And I just think that it's something that this Commonwealth should investigate as to whether that's something that they should use as well.

REPRESENTATIVE MILLER: I have another question.

We had a hearing just yesterday, and one of the issues, without going into detail, was -- we talked was how our policymakers often lags technology. And it's difficult, because of how the public process works, for us to move forward in the same pace.

So, one of the questions I have related to the previous question about security. This area of blockchain is so highly complex. And the question I have is how -- how do we, as government officials, look to secure that, in light of the fact there's very, very few individuals that fully understand it? And if some individual out there has written a code

that some individual knows the individual parts and how to access it and so forth, how do we, as a government body that is constantly changing, secure that?

MR. PRICE: So, you're touching on the concept that many, many in the digital asset arena have tried to solve what is referred to as the tri-level. How do you create a platform that involves data that is secure, can scale, can -- as big, as many transactions as you need, and be fast, have finality? So, people focus a tremendous amount on the currency aspect of it because you want to be able to transfer funds just as quickly as you could on the Visa network, which has finality within seconds and is secure. It is tried and true. It works.

So, how do you do that with this new technology? And it -- it depends on the schematic. It depends on how that network that maintains that blockchain is run, and you have to -- that's part of the investigation, is understanding how are they solving the tri-level, how are they doing things that ensure that it is secure and it can handle our scale, and it is efficient, it has quick finality?

And so, there's different ways of doing it.

There's dozens of blockchain platforms out there. They refer to themselves as layer ones. It's by which all the information flows. And then layer two are applications on top of it and other networks that function with it.

So, when you're looking at these layer one technologies that have these blockchains, the questions are not only fair, they're mandatory. How's it secure? Who controls the data? How do I know that bad actors can't manipulate it? How do I know that you -- at all times it can't go down? Why can't it go down? Explain that to me. How does that work? How do I have total comfort that you can deal with the amount of data that we're going to produce, that you're going to be able to do it 24/7/365? It's never going to go down. And how do I know that it's secure? Who has the keys to the kingdom? Who has the keys to that data?

And I leave it to, you know, a further and deeper investigation. I'd be happy to help to investigate, how do we ensure that it gets done, that saves us money, that it is secure, that won't go down. And those are all fair questions.

REPRESENTATIVE MILLER: Final question here, for now, anyway.

We, during the -- some of our previous hearings discussed election security and that sort of thing. So, the question I have has to do with two concepts. One, open source. So that everyone can look in on it and kind of be the gate keepers; everyone's checking everyone else and what's happening. And then a closed source.

So, in terms of blockchain, is -- is what you're describing here open source or closed source for security purposes?

MR. PRICE: At your option, as I understand it. So, typically, parties select to use the public blockchain that's out there, but you can certainly have one designed for yourself that's closed. So, those are the sorts of things for implementation, that, you know, companies and governments should look at. Should all this data be out there for governmental entities? I think a lot of people say, Well, it should. It's a governmental entity. It should be completely transparent.

But the question is who has -- (inaudible). And if you look at the way certain blockchains are designed, there's validators on blocks. And those valitators are the ones that say that this should be added to the chain.

So, how does that work? Is it automated? Who can manipulate that? Who can be involved in that process of manipulating the block? And -- but I actually -- when I met with Representative Ortitay directly, I said, I'm going to really try to avoid, you know, politicized issues, like voting systems, for example. But it is fair to raise the question of, well, if voting was on the blockchain and scannable, the auditor general should love it. I mean, it's a tremendous amount of information that's easily scanned, and it gives data output that shows what happened, and including, you know, how the block got validated and how -- and who approved it.

And so, all those sorts of things, you just -- you have to understand how that chain works and if it's the right fit for your organization, whether it's a governmental entity or it's a private entity. So, who can see it, who can touch it, who can scan it, who can change it.

And every entity's going to have to make those choices as to whether they want it transparent, whether they want it to be just visible to certain authorities. All those sorts of things are pivots for every different system that you have.

REPRESENTATIVE MILLER: Thank you.

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: Thank you, Representative Miller.

Chairman Grove.

REPRESENTATIVE GROVE: Thank you.

You know, we have our -- we have our issues with implementing new technology in this Commonwealth. I remember wonderful breaking stories about our wonderful merged management system, unemployment compensation system, which still -- I'm not sure it's fully operational, after we're putting hundreds of millions of dollars of taxpayers' money in that.

So, it's -- I question whether state agencies can actually implement big change. So, I don't foresee us shifting to blockchain right away, but I think it's important to start discussing it.

I care deeply about stopping fraud, waste, and abuse. I have a destain for improper payments. And this Commonwealth makes billions of dollars of improper payments. You know, nationally, I think it's 163 billion dollars of welfare fraud, which started with the federal government, removing all integrity provisions within the UC system, and it -- (inaudible) -- down to states like ours. And we continue to see it.

You know, my -- a lot of -- actually, all of our district offices were treated as the intake center by Labor and Industry during the pandemic, of which I had -- I had couples, one applied for unemployment, wasn't getting it. The spouse got unemployment, never applied for it. It was a constant frustration.

So, I'm glad you brought up the UC system as maybe a forum to work through it.

So, if we were to take the UC system --

MR. PRICE: Representative, sorry to interrupt. Are you referring to the unemployment compensation system?

REPRESENTATIVE GROVE: Yes. Unemployment comp.

MR. PRICE: Okay. That's fine.

REPRESENTATIVE GROVE: Sorry. Government terms.

MR. PRICE: It's -- because my -- I spoke quite a bit about the Uniform Commercial Code system, so I just want to make sure we're talking about two different systems. That's fine.

REPRESENTATIVE GROVE: So, if the state would implement this -- and let's just use unemployment compensation for an example because we

know how much fraud, waste, and abuse and how many improper payments occurred through that system -- would each individual filer have their own chain? Or would the entire system be a chain?

MR. PRICE: It's a single system that -- so, for example, there's layer one system that exists. We can take -- I've spoken about Algorand. Algorand exists. That blockchain is used for various different registers of information. And so, as I mentioned, it's being utilized to run the Bitcoin system in El Salvador. It's also now going to be used to run the Nigerian intellectual properties system, filing, registration system.

The Pennsylvania unemployment system could be yet another one that that chain, you can use the information. And within there, there's -- it's sprinkled all over the place, but the way the system works, you can -- you can query it, and it will output that information and show you, for this specific system, this is the relevant information and data.

So, if I'm going to audit that information, and, say, who got payments, it's very similar to traditional database management, but its on a broader public chain. So, it's transparent. It's easily

searchable.

So, you can do a private subset of that, developed by a vendor like Algorand, that says, We're going to create the Pennsylvania governmental chain, as I -- for what I understand. And, again, I'm not an expert on this stuff, but I just keep seeing partnerships announced, private industry announcing that, We're doing a private chain. We're going to be utilizing this technology.

So, I'm not sure how that you procurement works if you wanted to make it just purely the only data on it was Pennsylvania specific. Typically, you're seeing that it's just being utilized on the broader chain.

REPRESENTATIVE GROVE: Right. For citizens going into the UC system, you know, I go online, I want to file. None of that changes; correct?

MR. PRICE: It wouldn't have to.

REPRESENTATIVE GROVE: Right. So, you're basically talking about the data management aspects of it, that you're using less server space and your data -- all your data is not sitting on one server, it's spread out across a chain.

MR. PRICE: Correct.

REPRESENTATIVE GROVE: So, if I'm going to

penetrate the system, I need the key card, correct, or the password or whatever, the -- to access it. That is the important aspect of a blockchain, where, on a server system, there might be several points to penetrate that server and get into the database.

MR. PRICE: Fair. Yeah.

REPRESENTATIVE GROVE: Yeah?

MR. PRICE: Yeah. That's fair.

REPRESENTATIVE GROVE: So, conceivably, it will stop, to an extent, maybe a little more of individuals trying to hack into governmental systems. It will make it harder to do that, as long as you protect your, kind of, passwords; correct?

MR. PRICE: Well, one of the things that I've seen in commentary about the cryptocurrency space, the blockchain space, is that -- and a fear that's raised by -- more on the federal level because there's discussions about digital assets right now, is the amount of fraud that goes on in the digital asset space. You know, faceless individuals are, you know, doing various things to take, you know, off your ledger onto mine, put it into my wallet.

So, I can't say that there -- it shuts down concepts of fraud or abuse or waste or things like that by individual actors that try to game the

system, but the data integrity, the security, and the scalability is something that I do believe is a technological advancement that should be explored.

I don't believe that it would change necessarily somebody saying, I'm entitled to unemployment benefits, but they really are not. They can still file, but now, on a blockchain, you can see that they did file and they did get benefits. You still have to have the intervention to say, Well, were they actually entitled to them?

REPRESENTATIVE GROVE: Gotcha. Okay. Thank you.

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: Thank you, Chairman Grove.

Chairman Kane.

SENATE MINORITY CHAIRMAN KANE: Thank you, Chairwoman.

And thank you for your testimony this morning.

Just going to let you know, I am in deep, deep water here, so I'm going to try to navigate through this.

MR. PRICE: I felt better when somebody said they knew about bankruptcy, because that's what I do --

SENATE MINORITY CHAIRMAN KANE: I'm a plumber by trade, so we're a little bit out of my league here.

But you've already touched on, you know, cybersecurity, which is extremely important, and it's something that I've seen hit an organization that I was affiliated with, and they were held hostage. So, I do know that's probably on the top of my list here, but you've already addressed that.

You already addressed the unemployment compensation, which was going to be my next one. And now I'm into what are the disadvantages of blockchain?

MR. PRICE: So, the disadvantages as I see them is the unknown. You know, being a first mover in anything means that you're everybody else's tackling dummy. You know, you're going to have to go through the process and get it right to make sure that it gets it right.

My position on that is that there's already been a lot of implementation on large-scale systems, sovereign nations, et cetera. So, that is -- that concern is reducing daily, from my perspective.

The other disadvantage is it requires a shift-over on how data is managed by the

Commonwealth, and there's going to be a learning curve for, you know, the general services to understand how to manage that. And in all likelihood, there'll be a shift in the vendors that they have to use to implement it appropriately.

So, anything that involves change, there's -- the downside is the transitional period and the cost associated with it and the use case and cost benefit analysis that it's actually going to work. So, all of that right now, I can't sit here today and say that other states have done this and it was all okay. They haven't done it.

So, it's -- that's my -- that's the negative that I can identify is the unknown, you know, will it work? But there's a lot -- there's a lot of anecdotal evidence that is proving out that's this technology can be functional for large-scale systems.

SENATE MINORITY CHAIRMAN KANE: It's fascinating technology. So, thank you for being here today.

MR. PRICE: Well, thank you.

SENATE MINORITY CHAIRMAN KANE: No further questions.

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: Thank you, Chairman Kane.

And if I could follow up on that question. We had an issue with our unemployment compensation system where somehow rogue actors were able to enter into people's unemployment compensation accounts online and change the bank routing numbers, and those bank routing numbers were then changed to these rogue actor's bank account numbers, and people's unemployment compensation benefits were then directed into this other person's account. Right?

And I know that in your testimony you provided to us here today you said you're not here to talk about cryptocurrency. However, when people trade in cryptocurrency, they also often have a blockchain wallet to keep all of their assets safe. And they have a cryptographic key in order to access that blockchain wallet.

So, help me to understand. I have a person who is now unemployed. They're going to get unemployment compensation for the first time. So, we have a blockchain system in place. What type of credentials would they need in order to access their blockchain unemployment compensation account? Would they need have some sort of a cryptographic key?

MR. PRICE: So, Senator, the goal of all these systems, from my perspective, is that the user

interface doesn't have to change at all. So, the end user, the citizens that are applying for unemployment compensation and the citizens that -- or the parties that need to file UCC filings, the interface can be identical as to what it is today. It's to how you put the information in that gets loaded to the blockchain as opposed to the servers that you maintain.

And so, John Smith is entitled to unemployment compensation benefits. If that's now permissible on the web -- so, if they can just go online and file with their name, their information, their prior employer, and all the information that gets uploaded to the unemployment compensation system. What I believe is -- would be the shift would be instead of going into a server that's maintained -- whether it's an Oracle type database or whatever the Commonwealth uses, or SAP or something like that -- that information would go into the blockchain that then the Commonwealth or anybody else could search to see that John Smith applied for unemployment compensation benefits, and they are available at certain rates, because they'll be -- the system still has to exist to show, okay, they're in this quadrant for these types of benefits for this

long. And there would be a block created to memorialize that those benefits exist.

Now, to move into the concepts of tokenization, currencies, et cetera, you could -- that block gets created. You could also mint a token that says, Here is your -- your personal right to get that benefit, John Smith. It's issued by the state, and it's an NFT. And it has his name. It has the number. All those things can be done here, now, and today.

The tricky part is actually administering the payments through some form of currency. We don't currently have a U.S. digital asset. There's no USD token backed by the fed. So, you can't, right now, give them a wallet that holds and gets U.S. dollars in it, for example. That's not -- that has not happened yet.

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: So, you're saying that the blockchain technology is being used on the back end to assure that John Smith is, in fact, John Smith, that John Smith's bank account is, in fact, John Smith's bank account. You're not talking about it being on the front end of how that money is dispensed --

MR. PRICE: Correct.

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: -- into that person's bank account.

MR. PRICE: Money's the tricky part right now.

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: Okay. So --

MR. PRICE: But I also -- sorry to interrupt, but I also --

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: No, no. Go ahead.

MR. PRICE: One thing I wanted to add to that, though, is that I think it's important to know that the permanence of those records, that goes to the security questions. The validation that John Smith actually filed that. The concept of third-party hackers, you have to investigate whether or not the blockchain has the ability to ensure that those blocks can't be modified, that you can't change that John Smith's mailing address went from this to this to effectuate a fraud.

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: But at some point John Smith may move from Maple Street to Main Street. And so, what would a process look like for John Smith to make any potential changes to his information to assure that John Smith

has, in fact, moved from Maple Street to Main Street.

MR. PRICE: However the unemployment compensation system functions for change of address or change of name -- somebody gets married or gets divorced and changes their name back -- all those sorts of things, as they exist today, could still be maintained, and they create an additional block. Another block gets made. So, now John Smith -- and you can correlate it, just like there's a filing number for the unemployment compensation the first time, you know, you're -- John Smith, the first one who ever filed for unemployment comp, he's number one. Well, number one now correlates to block number fifteen, which is just a mailing address change for John Smith from the block one.

You have now two blocks that exist, and because it's very inexpensive to administer, you can make billions of blocks. And they -- and so, it matters about the point-to-point correlation between those blocks, that they relate to the same Social Security number, in all likelihood, or, you know, federal EIN for a corporation. Those blocks, that permanence, is why it becomes more secure, that third parties can't come in and modify and say, Well, John Smith's really now over here and it's not really John

Smith.

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: And they wouldn't need any type of cryptographic key that could potentially be lost in order to access their benefits; they could just use their password? Because we have people who lose their passwords, who need to change their passwords.

We hear, in the cryptocurrency world, where you lose your cryptographic key, you lose all of your assets. That would be potentially problematic for everyday Pennsylvanians.

MR. PRICE: So, my statement said, you know, I'm skirting the crypocurrency aspect because I personally want the Commonwealth to focus on what they can digest right now.

The Commonwealth switching to some kind of cryptocurrency or issuing a token that is recognized by the state to do X, Y, or Z is a much more challenging endeavor. But I'm happy to talk about what cryptocurrency is.

The issues you're discussing are real. They are a real issue in cryptocurrency, and the reasons they are real is that it comes down to the security that they're trying to give end users.

So, generally, this is how it works. So,

let's say you and I have a discussion afterwards, you say, Hey, I want to get a wallet. I want to -- I want to hold some cryptocurrency. You can do that on one of two ways. You can hold it on a centralized exchange. The most common one that people are aware of is called Coinbase.

So, you could -- you and I could create an online web interface, fill out your information, has to know your customer information requirements, referred to as KYC. So, they -- you actually have to take a picture of yourself, picture of your driver's license, so they know who you are. And it's centralized. That's on a database that Coinbase maintains. They know who are you. They report to the federal government that you did X, Y, and Z. And they give you tax reports, you know, what did you make, what did you lose.

That is a user name, a password, and if you're really smart, you get dual authentification. You know, you have a Google authenticator or something, so somebody can't get into it. And you can hold Bitcoin in that. You can hold Ethereum in that. You can hold Algorand in that. You can hold Dogecoin in that. You can have tokens that are fungible tokens. Again, there's so many of them

issued, and they're treated as currency, an exchange of value. I'll give you ten of these; you'll give me this back, cash, U.S. dollars, et cetera. There's an exchange that's centralized.

The keys that you're hearing about is when people say, I don't want to hold through a custodian. I don't want to hold my currency through a third-party intermediary, like Coinbase or Crypto.com. I want to hold my tokens in my shoe box in my house. I don't -- I want them in my digital shoe box under my bed. That's the wallets that people are talking about. It's a wallet that gets created on chain that shows all the information. So, we could download a wallet. A wallet is an application that has to be developed to interface with a blockchain. So, that wallet gets created. And they give you twenty-four or twenty-five words that only you should know.

And if you get concerned that your phone's been compromised or that you -- you know, that you took a picture of it and saved it in your phone, and somebody, you know, with some kind of malware, went in and found that picture, they now have the keys to your wallet. And they can be on any number of different platforms, and say, Move these tokens that

are in this wallet with this key, move them over here now. And -- and -- and sometimes they're successful. The FBI can sometimes get the money back, the cryptocurrency back. And oftentimes they're not.

That is a very different issue and why I said it creates a bit of a Pandora's box of discussion, but it's a very different issue about what I'm talking about with blockchain technology to be used for these types of systems, where you're just -- instead of having this database that you pay for and you maintain, you have the blockchain that does that for you. And then you have these applications that you have to build, like the application that has the wallet that stuffs the information into it, that says this blockchain authenticates that it's associated with this account, in this wallet, held out of a centralized exchange, in my hand, in my wallet, in my phone, but really just memorialized on the blockchain permanently.

I can re-key anytime I want to. I can pull my phone out right now and say, You know what, I'm getting concerned that, while I was doing this testimony, I became publicly known as figure. I talked about Algorand. He probably has a bunch of ALGO or some other thing that's on that chain. I'm

going to go download and try to get into his phone and find out what his keys are.

So, when I leave here, if I get concerned that, you know, now people are maliciously attacking me for my digital assets, I can go to my phone and re-key it, and only I know it.

So, that is an entire realm of how end users, you know, protect their own data. That's their own inquiry of how am I secure, just like you should be about the Commonwealth's data. How's my data secure versus how your data's secure.

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: And I appreciate that point. It's very, very salient to all the members who are sitting up here today. That is our ultimate concern, of course, and making sure that, especially with unemployment compensation, that the money is actually getting to the right person.

MR. PRICE: Right.

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: So, really appreciate you delineating that.

You acknowledge that this blockchain technology, it is ever-evolving. So, in your opinion, what are the challenges for ever-evolving technologies on a government level?

MR. PRICE: So, the technology is evolving rapidly, and there are -- as I mentioned, there are different chains available. And so, as a government, I think it's critical in the selection of the chain, the chain that -- if you were to go in this direction, which chain you use.

And one of the reasons why I became most interested in Algorand over other chains as a solution is I listened to a variety of podcasts by different thought leaders on this technology. And there's -- Ethereum is very well known. There's -- you know, Algorand was highlighted by a podcaster by the name of Lex Fridman. Lex Fridman interviewed the inventor of Algorand, Silvio Micali, for hours and talked in detail about how he and why he created the Algorand blockchain. And he's not a nobody. He's a professor at MIT. He's -- he's considered a thought leader on the backbone of blockchain technology. And I'm summarizing at a very high level as to what he said. And I could never really digest everything that he put into those three hours of discussion.

But in essence, what he said was, some people did some interesting stuff. They created these blockchains and they work. But they have flaws. They're not perfect. So, I could try to

evolve what already existed and take what was created and improve it and enhance it and make it better. Or I could start from scratch, knowing what I've known from these prior ones, and create something as -- he uses the term "elegant" -- it's more elegant and it works more appropriately.

And I think it's now to a point where there's chains like Algorand that are ISO compliant, that have been tire kicked by, you know, certain standards of organizations, that, if you look at it, there's now -- the evolution has happened long enough that organizations like this, bodies like this, should look at it, because a lot of the flaws of the prior systems, that there's constant patchwork.

The whole existence of layer two, for example, is that there are flaws and issues with the Ethereum network, as an example. What are those flaws? They refer to them as gas fees. A gas fee is every transaction costs something. You have to pay something for the transaction to go through. Oftentimes the transaction fee exceeds the value of the item that's being transferred. That's completely illogical. So, layer two technologies, because of those flaws, are created to try to deal with those transactional costs.

You look at the newer technologies that have come out since, and with the newer technologies, the transaction fees are less than a penny. They've solved those issues. So, I -- this is not something that came out yesterday. Over the course of years, there's been analysis and scrutiny of the existing ones that were done early, and there's even been an evolution on that with brand-new, stand-alone technologies that have improved and enhanced and dealt with the cost aspect, the carbon negative aspect, the transactional fee aspect.

The -- and the carbon issue is a real one, where, you know, people criticize Bitcoin and things like that with mining because the energy digestion is significant.

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: Thank you very much.

So, for me, if there was one thing you would want us to know once you leave here today about blockchain technology and it's impact on government operations, what would it be and why?

MR. PRICE: I would -- I hope the takeaway is that this is something that can greatly benefit the Commonwealth from a cost standpoint, transparency standpoint, security standpoint, and that appropriate

diligence is necessary to do it right. But it's something that can be done and should be done in the long term for some or all of the systems that the Commonwealth administers.

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: I think that pretty much wraps it all up.

MR. PRICE: Okay.

SENATE MAJORITY CHAIRWOMAN PHILLIPS-HILL: Mr. Price, I want to thank you so much for being here today.

I want to thank all of the members who have joined us for what I think was a very informative and very enlightening conversation. And as much as we learned, we know that there's even more that we need to learn and delve into.

And really, again, appreciate your testimony here today.

And with that, I would like to recess this hearing until the call of the chair.

Thank you very much.

(Whereupon, the hearing concluded at 9:54 a.m.)

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I HEREBY CERTIFY that the foregoing is a true and accurate transcript, to the best of my ability, produced from audio on the said proceedings.

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