THE INTERNET OF AGREEMENTS

PRESENTED AT BLOCKCHAIN EXPO, LONDON 2017

BY VINAY GUPTA

internetofagreements.com

THE INTERNET OF AGREEMENTS

This transcript is taken from a talk given by Vinay Gupta at Blockchain Expo London 2017.

This is largely going to be a talk about regulation and the fact that inside of most of our computer systems regulation is completely invisible. I can't think of a single piece of software that attempts to build a comprehensive map of the regulatory structure of the world. There is no API for access to the English law, there is certainly no artificially intelligent representation of that law that will help me decide whether a given act is legal or illegal. The absence of any kind of framework for thinking about regulation in the context of something like a blockchain means that it's relatively easy to deliberately or accidentally give an illegal instruction to a blockchain system. Because the blockchain has no understanding of regulation, because there is no API to send a deal for a regulatory check; if you're doing something for the first time, you're going to need to put a human being in the loop to take a look at it and figure out whether it's legal or not.

This is clearly completely excessive for the vast majority of things that you might want to do. If your objective is to do something like ship cheese to France, then fairly clearly this is going to have to go through some kind of check for food quality. If that was going across a border between an EU and a non-EU state, there would be a clear set of establishments and credentials that you would have to have, and even a very simple system could check whether or not you have those credentials before it would allow you to go forward and make your transaction. Right now we just don't have machine representations of the law even in areas where it would be extremely simple. My assertion is that it is necessary for us to build this, because the limit on what we could automate is going to be strictly defined by our ability to figure out exactly what it is that we're doing with the regulation of these kind of spaces. If we can't figure out what is legal then we cannot proceed to automate, and if we can't automate then the long-term impact of the blockchain is greatly reduced.

The second thing is that the vast majority of the people who are early actors in the blockchain space are fairly substantially dematerialised. They're what are often referred to as rootless global nomads; you see these folks drifting in and out of conferences, they have a single backpack and that's basically everything they own in the world, apart from a quarter of a million dollars' worth of Bitcoin that lives on a USB keychain around their throat. That template is very, very common in this space. You can make some assertions about this being tied to autism, but it might also just be that these people live in a kind of hyper, postmodern future.

One way or another, when you get to the sheer, gritty, nasty reality of regulation, when you have to deal with the heavyweight, deep structures of the world, it's very, very hard for people to fully get their heads around that as a physical, tangible artefact. Very few of people that work in the blockchain space have ever worked at a container port, very few of them have ever had to handle logistics, so they don't have any immediate intuition for the paperwork and for the heaviness of the project that they're engaged in when they start talking about doing things like applying the blockchain to a supply chain. It's an enormous shift in consciousness from a very, very light, almost dematerialised culture, through to this very, very heavy, deep bedrock of civilisation.

In the real world logistics is everything. Every single thing that we can see in this room was brought in on the back of a truck sometime in the last couple of days. The walls came on a truck, the chairs came on a truck, the stage that I'm standing on and the screen that you're looking at, the podium, all of this stuff got in and out of this building because of a logistical network that moved it around. That logistical framework is more or less the target of almost all real finance. When you finally resolve complicated futures deals or even high-frequency trading, at some point all of that stuff will eventually collapse back down into the real world. There will be a point where although somebody is buying and selling and trading gold stocks, it will eventually turn into a company that digs a hole in the ground that extracts physical gold. Same thing if you're thinking about buying and selling shares at a stock market; eventually these companies almost all either produce physical stuff or they sell things to

people that produce physical stuff.

The media industry: you think of media as being this dematerialised situation, but it's not dematerialised. The media is enormously dependent on things like stage sets, these vast, vast constructions, hundreds of acres on a site that are essential parts of building out the rest of the structure that allows you to tell the stories you want to tell. In that kind of setting, if you imagine that this entire digital world dissolves and revolves around real physical artefacts, it gives you a much better feeling for what the blockchain is fundamentally for. The blockchain is a way of controlling the movement of physical stuff through many, many tiers and layers of abstraction until you hit this kind of bedrock, hard reality at the bottom of the pile.

There's an enormous amount of thinking about blockchains and supply chains, this is a really common thread, and the basic conceptual model or the abstract is that information flows one way and goods flow the other way. The information is in the form of payment, it's in the form of an order, and the goods that are moving in the other direction it's the physical stuff; it might be insurance, it might be credentials attached to the physical stuff like safety certificates. There are boxes manufactured in China, it gets a bunch of safety certifications, it's transferred to a ship, it's moved along the ship with bills of lading and so on, gets to a place like Singapore, and essentially robotic port will take the containers off, reallocate them onto different ships, somebody will process the paperwork, reload the boats and move it along. That process repeats at every point where you change jurisdiction or where you change custody of the goods, until you've worked your way all the way across to some loading dock in America, you take the stuff off, you unload it, and it goes through a similar but different system to handle the box logistics and tell individual computers or individual shops.

That structure is well-understood and everybody knows the blockchain is going to be huge in that area, because the existing systems are very archaic, they're very inefficient and they're more or less the only remaining manual paperwork in the global system. The design, the execution, the ordering, the payments, all of that stuff is happening electronically, and then you get to this very, very stubborn last little part

which is the logistics system that is still running on paper. We know that this stuff closes eventually, but once again we have this regulatory void. If we're going to automate all of this stuff, there is an element of human intelligence in handling the paperwork, where somebody who's been in the business for 35 years says, "You can't ship bananas to Brazil – they don't let anything into the country that looks like fruit!" or whatever the local regulation has to be. "These are imperial nuts and you're sending them to Germany – there's no way this shipment is correct."

That problem of embedded human intelligence all the way along the supply chain makes it very, very hard to see and grasp and fully understand the complexity of the global logistics network that we're operating inside of at an abstract level; this is tacit, implicit knowledge of the kind that knowledge managers would typically think of as being nightmarishly hard to go in there and extract. But this is the knowledge that frameworks of regulation, the basic structure of what is and isn't feasible to do that has to be extracted before you can do fully automated trade logistics, because what you'll want is the ability for two people to make an agreement on the Internet, send payment across the Internet and then receive goods in the physical world, without it dropping from this pure digital environment all the way down into this mess of paperwork and remembered opinions about things we do and we don't do based on some loose, kind of workman's understanding of the law. That drop is going to be an enormous block to us building this kind of global automated robologistics network.

So, this is basically about completing the necessary bridge between the physical and the digital. We start right now in a world where digital mapping of physical space has been an enormous empowerment: it's made the delivery of goods possible, it's changed the way we travel and it has generated things like Uber; all of that stuff is completely dependent on having essentially perfect digital maps. Similarly, we've got excellent representations of things like stocks and bonds, the flows of value and transactions and cash and all the rest of that; all of that maps very neatly into computer systems, blockchain or non-blockchain. These are solved problems.

In the middle there is this enormous slab which we could term "regulatory space", and where we are

right now is we have no good maps of regulatory space, certainly not that are publicly accessible across APIs, certainly not that are in the form of software and you could download if you wanted to. The entire regulatory space area is completely black, it's terra incognita, so as we start attempting to build automated systems that interact with the real world, they're automatically going to hit this regulatory space void, at which point you basically have to narrow down the transactions you're doing to a tiny subset of all possible transactions that have been hand-designed by your lawyers. You take this enormous automated trade network, you make this enormous automated contracting and payment network, and you narrow it down to the %5 of the deals that your lawyers have approved; everything else you don't know whether it's legal or illegal, legitimate or illegitimate, because your legal team hasn't looked at it and therefore you know nothing about it. That enormous black hole where you just have no idea of what happened and you don't know what to do is the vast majority of the stuff that we actually want to execute using this kind of blockchain plus robologistics network.

A good example of this would be how you did route-finding before the age of Internet maps on your phone: you would sit down in front of a computer, you would figure out a route using a map, you would then write the route down or print out the instructions and then you would follow them exactly, and you left the track you were lost. This is how it is navigating through regulatory space using current abstractions and current technologies. It's extremely hard to come to a conclusion about whether something is okay because we just have no maps, and with no maps you can't build automated systems to help you navigate; in the sea of regulation we are lost at sea. We can't realise the full value of things like self-driving cars and robologistics until we get the rest of the way up that regulatory curve, to the point where you really can understand what the regulations say inside the context of a blockchain system. What I'm essentially suggesting is that we need a regulatory oracle, in which you could take a business, take a transaction within that business, show it to the regulatory oracle, and receive some kind of proof that this is considered to be legal by your advisors; you could think of it as being due diligence but automated. Without that, how are we going to build the interfaces between the blockchain and the real world in a comprehensive, 360

way? Not possible.

Imagine that we take this the rest of the way, the full extent with which one could close this loop. Two human beings in a room together are having a discussion about doing a deal, over the course of that they agree to a set of terms and then they make it verbal, saying, "We're going to do this." If this isn't an area where they're already doing a lot of deals in this format, it may be a standard set of contract terms they're agreeing to, as would be for example an ISDA, which is a very common financial instrument which is heavily standardised. The deal could then be extracted from their conversation by an AI, recorded in the form of a smart contract, validated and verified by humans if necessary, somebody that then sends a payment to that smart contract, which starts a cascade of interactions through a robologistics network, resulting in the delivery of a physical box. Every step of that logistical trade is recorded on the same blockchain as the original contract was agreed on, and what we have is a completely seamless loop between human speech and a change in the physical world in the form of delivery of goods and services.

This is obviously the future that people want, and it sounds like science fiction. If you start to think about this for a minute, every step in that sounds distinctly kind of sci-fi, apart from the fact that it is not; I do this all the time at home. "Alexa, buy me more printer paper," and Amazon has a pre-existing set of contracts with me, it's got some mechanisms for catching problems if the AI makes a mistake, it has its own robologistics grid in the form of its warehouses – at the edge of the robologistics grid it's still using human delivery drivers, I'm sure they'll replace them as fast as they could get to them – and at that point what I'm really talking about is simply taking the existing infrastructure which must exist inside of Amazon that allows it to do things like not ship alcohol to places where alcohol is forbidden, not ship pocked knives to four-year-olds, whatever it is that their system of regulation prevents people from doing country by country. That's essentially their map of regulatory space, the robologistics grid I've just described, it's their ability to use robots to move their packages, and the ability to put an AI front end on that that understands human intention is Alexa.

All of this stuff is already here, but in the blockchain world we've been so busy and so focused on the

exact details of the initial phases, where we're taking things like statutory registers and loading all of that information onto the blockchain, we're taking things like smart contracts for instance and we're loading all that onto the blockchain; we haven't really gotten our heads above the parapet and taken a broader look around all of the places where the blockchain technologies could be interacting with other systems. Blockchain and AI is largely unexplored, blockchain and robologistics is largely unexplored. People are beginning to look at this stuff, but where the cutting edge is, in areas where we are not so focused on the blockchain, has moved a good deal ahead in the past few years. When Bitcoin was invented Alexa was still a pipe dream, and over the course of time that it's taken Bitcoin to get as well-established as it has, that it's taken the blockchain to get as well established as it has, artificial intelligence has gone through a total phase transition. We need to basically catch up and bring the blockchain back into the conversation with AI, bring the conversation between blockchain and robotics back up to speed, and we really need to look at this stuff again, because actually the world has become much more sophisticated, much more complicated and much more exciting than it was the last time that we really took a moment, looked around us and saw where everything interconnects.

One last bit about the economics and then I'll talk a little about the future. Right now it's fairly easy to imagine a situation in which China simply does all of the world's manufacturing and Amazon does all of the world's logistics and delivery, and you wind up with a single global robologistics network that has incredibly low margins to the point where nothing can slide underneath it, and is operated more or less like an electricity utility would have been 50 years previously. The idea that you could see a kind of global trading platform across which everything flows and why would you build anything else, it basically becomes kind of goods as a service: just plug in your order and stuff comes out, in the same way that you plugged in your toaster and electricity came out, and the idea that you needed to build a competitive market for electricity was a faraway vision.

It's possible that we're heading into a direction where for all intents and purposes the supply of physical goods will be a natural monopoly, and more or less everything in the world will be made in China and

delivered by Amazon. That vision of the future may or may not come to pass. I think if it does come to pass, it will enormously slow up both cultural and technological progress, because innovation happens at the edges, and anything that becomes monopoly-shaped will eventually ossify and become useless. This is particularly true where government regulators get involved, and you start with a set of common practices in businesses which could change when people change their minds, and then these things become regulations and you wind up moving at the pace of government rather than the pace of commerce.

So I think it's quite important that we don't passively accept the creation of a single logistics monopoly and a single manufacturing monopoly. I think it would be much more sensible for us to think about what happens if we decentralise and relocalise manufacturing, and if we operate logistics as a commercial market with lots of automation to enable deal creating and deal finding, rather than accepting that this stuff will be done by natural monopolies. It might require some effort, particularly from legislators, to ensure that the kind of logistics AI transformation that we're midway through becomes a marketplace and becomes a series of interlocking marketplaces, rather than being run by monopolies.

But anti-monopoly regulation is a core function of the state; it's well-understood that market capitalism does not operate smoothly without some mechanism for breaking up monopolies, and I don't think it's too much of an ask to the state to take effective action on making sure that we don't wind up with a logistics monopoly in the age of self-driving cars. In that case, we're going to need a good alternative to a logistics monopoly, which means that we have to take the intelligence that monopolies have about what is or is not legal inside of the space, and we have to make that intelligence available on blockchains as oracles and in other systems as kind of API-based AI calls where you could go and check something with somebody else. If you don't build those systems, then what will happen is that the software which handles compliance with regulation will become the core intellectual property asset of the natural monopolies and it will be very hard for other people to match that, and as a result we will wind up with a kind of regulatory monopoly partnership of the kind of that was common in telecoms all the way through the dark

years of telecoms, in which there was no innovation because Bell didn't have to innovate, because they owned everything and were essentially an arm of the state.

I should say a word about Hexayurt Capital. Hexayurt Capital is my current project, we're investing in the intersections between lots of different technologies, to see what happens where these technology beams cross. We're just at the early stages of putting together a fund and it's all looking very exciting. The basic case is that things get weird even before we get strong AI. Is everybody familiar with the concept of the singularity? You've heard the basic idea. The singularity is the idea that if eventually we will be able to design an artificial intelligence program which is smart enough to design an artificial intelligence program which is better than it is, and that the second program which is better than the first program will design a third program, and you'll get a thing that they call runaway superintelligence. This is something that people like Elon Musk are enormously worried by, the Silicon Valley long-range thinkers are all very panicked by this as an outcome.

Even before we get to that point, even before we get to that discussion, things are getting weird, they're getting really strange. If you haven't bought an Amazon Alexa, they're 50 bucks, you could buy it on Amazon Prime and they'll deliver it to you in two hours, plug it into your computer, into your home network and just have a play with it: it will blow your mind. Plug it into your speakers, put Spotify on it, you'll be surprised and delighted. That shift into technologies that we really don't understand all that well is happening very, very quickly, and where those technologies cross things get weirder and better even faster. The ability to do a two-hour delivery loop, where you place an order by voice and the stuff shows up at your doorstep two hours later feels properly like magic because it is properly like magic.

These kind of magical hybrids, AI plus robots equals self-driving cars, AI plus natural language processing plus robologistics is instant delivery… AI plus virtual reality will be what? We don't know. But I guarantee that it will be fascinating, surprising and amazing when it arrives, and these systems often feel completely magical. The first time you interact with a system made of two technologies, both of which are at a breakthrough point and neither of which you understand very well, it is like magic. The thing operates outside of your space of your sense of the real, and it hits you with the immediacy of something which is just sorcery. "Wow – where did that come from?!" I think that that emotional response to the world is going to be an increasingly large part of our relationship with technology. Technology is going to seem more and more and more like weird interconnected magic, and less and less like boxes that sit under desks and hum and burn electricity.

That's it, 20 minutes – thank you!