Check out IBM's proposal for an internet of things architecture using Bitcoin's block chain tech

by Stacey Higginbotham

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SUMMARY: *Combine Bitcoin's block chain technology, BitTorrent and a secure messaging protocol called telehash and you get a distributed infrastructure that some IBM researchers think would be ideal for the internet of things.*

In tech circles block chain technology — the transaction processing engine behind the Bitcoin crypto-currency — has become the technological equivalent of quinoa. Not everyone is sure of what it is, but everyone is raving about it as an answer to any number of tough problems. The latest is IBM's research team, who are looking at building out a distribution platform for the internet of things that uses block chain.

Paul Brody, the head of mobile and internet with IBM, is proposing a system called Adept, which will use three distinct technologies to solve what he sees as both technical and economic issues for the internet of things. The Adept platform is not an official IBM product, but was created by researchers at IBM's Institute for Business Value (IBV). Adept will be released on Github as open-source software. The platform consists of three parts:

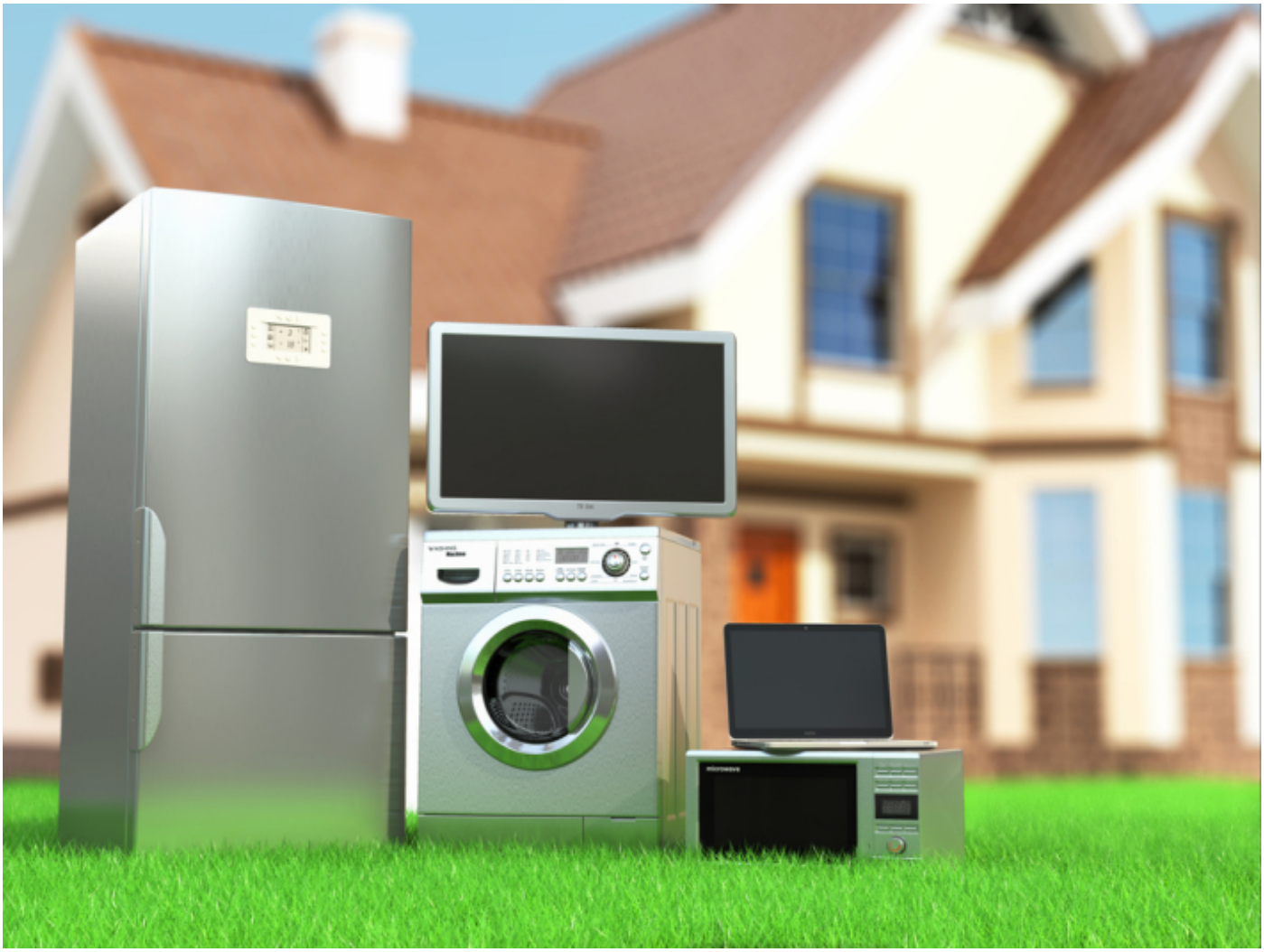
- **Block chain**: As mentioned above, block chain is the distributed transaction processing engine that keeps track of Bitcoin and other crypto-currencies. The beauty of block chain is that it can be used for many purposes. Basically it's a technology that allows data to be stored in a variety of different places while tracking the relationship between different parties to that data. So when it comes to the internet of things, Brody envisions it as a way for devices to understand what other devices do and the instructions and permissions different users have around these devices.In practice this can mean tracking relationships between

devices, between a user and a device and even between two devices with the consent of a user. This means your smartphone could securely communicate with your door lock or that you could approve someone else to communicate with the door lock. Those relationships would be stored on the locks, your phones and come together as needed to ensure the right people had access to your home without having to go back to the cloud.

- **Telehash**: It's one thing for devices to use block chain to understand contracts and capabilities, but they also need to communicate it, which is why Adept is using Telehash, a private messaging protocol that was built using JSON to share distributed information. It's creator Jeremie Miller says at its simplest telehash is a "very simple and secure end-to-end encryption library that any application can build on, with the whole point being that an "end" can be a device, browser, or mobile app." He added, "Perhaps, you can think of it as a combination of SSL+PGP that is designed for devices and apps to connect with each other and create a secure private mesh?" A new version of the software is expected soon.

- **BitTorrent**: And finally, to move all this data around, especially because not everything has a robust connection to each other — especially if they are using a low data rate connection like Bluetooth or Zigbee, Adept uses file sharing protocol BitTorrent to move data around keeping with the decentralized ethos of Adept.

The end perspective is one of many chunks of data flying between devices where it can then be assembled according to the rules laid out by the block chain software. Of course, this sort of architecture won't work with machines running 8-bit processors, which means it won't appear on low-end devices any time soon. However, Brody is convinced we won't be dealing with embedded processors for much longer as connectivity takes over our every appliance and electronic device.



Brody, explains this in depth on a podcast he did with me this week, but there are two reasons he's eyeing the new architecture. The first is economic. For him the internet of things as a plethora of devices talking to the cloud doesn't make much fundamental sense. There's way too much overhead in operating a cloud platform, especially for devices that are designed to live in people's homes for a decade or longer.

Building a cloud back end to support your dishwasher when not that many devices will realistically want to talk to your dishwasher seems impractical. He's also skeptical that the model of selling people's data as a revenue model will support these services for several years, thus he's trying to build a platform that keeps the intelligence at the device level (and maybe in a hub on the premise) and can operate even without a manufacturer's constant attention and survival.

The second reason is that Brody has some ideas about how this architecture could change the business models for the internet of things. He's not convinced that the sales of data will ever amount to much, especially since sensors will be so cheap. If a company decides it wants data, it's not terribly difficult to put a sensor on the market and build a program so consumers will use it to share their data.

But with this architecture and the use of block chain, one could actually create new business models around sharing more than just data. Devices could share computer power, or bandwidth or even electricity via the block chain's instructions. And while Bitcoins are built to be difficult to

mine via computation, there's no need for the Adept platform to rely on scarcity, meaning that the hash tables could track any number of variables. For more on this, listen to the podcast or come see Paul Brody answer my questions (and yours) at Structure Connect Oct. 21 and 22 in San Francisco.

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foobar
Tuesday, September 9, 2014

So IBM decided to steal Ethereum's idea?

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aaronreeves88 > foobar
Wednesday, September 10, 2014

I don't think this is the same thing. While they may accomplish similar things, I believe Ethereum's is still based around commerce. I haven't heard them talking about using it as a sort of "data-backbone" for the home. (I could be wrong though)

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Realtalk > foobar
Wednesday, September 10, 2014

You mean Satoshi's Idea. Ethereum is far from an innovator in this space. Bitcoin is already doing what Ethereum suckers are buying into. Just because they have a hyped up IPO doesn't mean anything for the platform.. When will people learn that IPOs (price fixing) does not work in a free and open market.

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Rikard Strid
Wednesday, September 10, 2014

This is of highest importance! Thanks for writing such a great article about one of the most questions for IoT.

We have just launched the worlds first distributed IoT infrastructure using XMPP to secure the ownership of our data and access to things. Distributing the APIs (data models) to the thing and enabling a place with its only purpose to put the owner of things in control is what thingk.me is about. The API and the provisioning is all done by a open standard within XFS.

In regards to Bitcoin or crypto currency will it go hand in hand with IoT. Every thing will have its own wallet and make its own transaction with however they need a service from (e.g. Pay the utility). IoT and Bitcoin is both real time data exchange with highest level of security.

We cannot live in a world where APIs is control by major companies and centralized to their part of the Internet. Internet must be open and free as it core intentions once was!

Rikard

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PurpleAlien
Wednesday, September 10, 2014

This is so very close to the paper I submitter for the Cisco IoT Grand Challenge that it isn't even funny…

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Alex GuangTou > PurpleAlien
Tuesday, September 16, 2014

when is it due?

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PurpleAlien > Alex GuangTou
Thursday, September 18, 2014

My paper is submitted since June. Winners will be announced at the Cisco IoT World Forum in October. I hope there will be a record of submissions though whether mine gets selected or not. That way it can't be claimed I copied the idea…

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Arthur Schopenhauer
Thursday, September 11, 2014

EVERY aspect of this "idea" was stolen from ethereum:

ethereum:
1. Block Chain
2. Swarm (analogous to BitTorrent)
3. Whisper (secure messaging)

IBM adept:
1. Block Chain
2. BitTorrent
3. Telehash (secure messaging)

Here's where ethereum differentiates itself…ethereum is not just an average blockchain, rather, it's a completely programmable blockchain that's compatable with 4 different programming languages – javascript, Python, C++, and GO.

Smart contracts, apps, and decentralized organizations can be created to decentralize almost anything that is currently on web 2.0 as well as disrupt the current legal, financial, and settlement industries!

…and…I think it's safe to say that ethereum's developers, researchers, and programmers probably have more talent, creativity, and block-chain experience on their team than these IBM clowns…I'm pretty sure IBM doesn't have Neal Koblitz and Ralph Merkle on their team :)

IBM's interest in the blockchain proves that the current centralized industries are about to get massively disrupted!

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The Bitcoin Rat
Tuesday, September 16, 2014

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The @BitcoinRat can foresee that IBM will offer the backbone (using spare capacity on their worldwide network of Mainframe Servers – most technically “owned” by other parties) to allow the Big Banks and existing Financial Institutions to offer a “distributed decentralised ledger” concept to compete with bitcoin. This will seem attractive to the general public, who wont realise that it is still actually ‘controlled’ by a central authority (Bank/IBM partnership)
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just saying …..
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Chris
Sunday, September 21, 2014

This is insanity btw

” This means your smartphone could securely communicate with your door lock “

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Ace > Chris
Tuesday, September 23, 2014

This is actually amazing, if they could really talk securely without fear of man in the middle attacks.

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