Vitalik Buterin's Impact on Software Engineering

Intro

Russian born programmer Vitalik Buterin is one of the best-known figures in the cryptocurrency space. He is most commonly known as the creator and co-founder of Ethereum, a global and open-source platform for decentralised applications. Currently still working on the incremental upgrades to the Ethereum networks code.

Early Life

Born in Moscow, Vitalik lived there until that age of six when his family emigrated to Canada looking for better employment opportunities.

This move proved to be of great benefit to Buterin as he attended the prestigious private school, The Abelard School in Toronto. Early in his education there Vitalik was identified as gifted and was placed in a program for gifted children. This program lead to more learning opportunities and Vitalik quickly became aware he was drawn to maths, programming and economics. These core concepts served as the foundation for Ethereum.

University and Early Career

Vitalik was first introduced to cryptocurrency through his father, who had told him about Bitcoin at the age of 17. Initially Buterin was very sceptical and was of the opinion that a currency with no intrinsic value was doomed to fail. This led Vitalik to browse several Bitcoin related forums and over time his opinion begun to change as he researched the technology behind the currency.

Spending more time researching the technology Vitalik eventually found another user that was willing to pay him five bitcoin for each article that he wrote for the user's blog. At the time a bitcoin was worth about $0.80, but to Vitalik $1.50 per hour seemed like a solid wage for a college student. In total, he wrote four articles netting him 20 bitcoin which he then used half of to buy a t-shirt, a moment which he says made him realise that this ecosystem was a real-world tested, viable idea.

Vitalik's articles caught the eye of another forum user Mihie Alisie, another bitcoin enthusiast and together they founded the Bitcoin Magazine in 2011. At this time, Vitalik had a lot on his plate, working as head writer for the magazine, attending University of Waterloo where he was taking five advanced courses, as well as being research assistant to Ian Goldberg, a well-known cypherpunk, famous for breaking Netscape's implementation of SSL. He soon dropped out of university to pursue crypto projects that were already taking up "30 hours per week" of his time.

Blockchain

Unlike other distributed systems such as BitTorrent, a distributed file sharing network, some distributed applications require a form of system-wide memory. Bitcoin is an example where without the systems so called memory or ledger, users could spend freely without adequate funds as the wider system would have no idea what quantity of funds the user had access to and hadn't spent.

This was the core technology of bitcoin that was so revolutionary, the blockchain. However, Buterin felt this specific application of the technology was too restricting and proposed a general scripting language which would allow for application development on the network. He had argued that Bitcoin needed a scripting language for application development but after his idea failed to reach consensus, he proposed the development of an entirely new platform. He identified that the underlying technology of Bitcoin, the blockchain was the real innovation and wrote the white paper for Ethereum, sharing it with a few close friends and colleagues before publishing it in late 2013.

In the Ethereum whitepaper he described a new platform for decentralised applications with a more general, purpose-built scripting language, much like how JavaScript is the scripting language of the internet. The Ethereum project started development in early 2014, while Vitalik was the main face of Ethereum, he wasn't alone in its development. There were five originally credited as co-founders of Ethereum; Vitalik Buterin, Anthony Di Iorio, Charles Hoskinson, Mihai Alisie and Amir Chetrit. Another three were subsequently added in January 2014 when Joseph Lubin, Gavin Wood and Jeffrey Wilke were added before development began.

A public crowd sale went on from July to August 2014, where participants would trade Bitcoin for the new coin which powered the Ethereum platform, Ether. This sale generated at the time $18 million, allowing the team to establish a non-profit organisation in Switzerland, the Ethereum Foundation. The foundations current role is primarily as a resource allocator. While the foundation reports to own about 0.6% of the Ethereum in circulation (as of May 2019), this is intended to decrease over time, as they invest in critical work across the ecosystem. They feel it is their responsibility that every dollar is spent effectively. Other than resource allocation they act as advocates for the Ethereum ecosystem. Often when a company or government has questions about Ethereum the foundation assists them in understanding the decentralised system.

Ethereum

Blockchain put simply is a distributed digital ledger recording all of the transactions on the network. Instead of all this information being stored centrally, at one point of failure, the blockchains ledger is distributed among all its participants. This saves the participants from intermediaries, bypassing them and allowing them to interact directly with each other. Another positive feature of this unique architecture is that multiple nodes in the system can go offline without the greater network feeling the effects.

The system verifies each transaction using cryptography. When a transaction is made its detail is added to a block. Blocks eventually consist of a bunch of unconfirmed transactions that need verification. This is where so called "miners" come in. Using their computers computational power, the miners verify each block by confirming the transactions contained

against their own ledgers. They are then rewarded for their work with newly minted bitcoin. Once the miners are finished confirming a block it is added to the end of the last block, creating a "chain" of blocks.

While Vitalik did not develop the idea of the blockchain, he noticed its greater potential. Bitcoin is just one application of blockchain technology whereas Ethereum is a decentralised computing platform. With Ethereum users can create and deploy applications to the blockchain by way of smart contracts. This is massively innovative as it appears to disrupt many of the internet giants like amazon and google whose servers and cloud platforms are where the majority of our data is stored today.

While Ethereum intends to essentially be a new decentralised internet, capable of running decentralised apps, it cannot do so cost-free. Ether, the Ethereum networks native coin acts a fuel or gas for dapps on the network where each transaction comes at a cost, which is determined by how much computing power it costs to make. A smart contract is the term used for these apps as it is essentially just a program stored on the Ethereum blockchain. These contracts wait for certain input conditions and then execute the code. Smart contracts effectively act as digital contracts as once created and launched to the blockchain it cannot be changed. This makes the blockchain immutable and entirely removes the necessity for a third party to be present enforcing the contract.

Another important feature of the Ethereum blockchain is its native scripting language solidity. Solidity itself is Turing complete, meaning it can run any algorithm or computation. As any application is essentially just a series of computations, Ethereum can imitate the function of a computer albeit a very slow one compared to ours today. This computational engine, running all these decentralised programs or smart contracts is called the Ethereum Virtual Machine. Within the EVM, all the nodes the network has at its disposal are used to compile and execute the smart contract. It does this by converting solidity into bytecode, an assembly type language. However, this mass compilation and execution of smart contracts on every single node in the network has massive effects on the speed of the EVM, it is much slower and far more resource-intensive than any normal computer, but it's incredible robustness is hard to argue with. It provides a degree of safety, with zero downtime and completely transparent data.

Conclusion

In my opinion Vitalik Buterin's contributions to technology and software engineering as a whole has been monumental. Its impact may not yet be fully realised, but smart contracts are the backbone for the programs that run on the Ethereum blockchain and they may prove to be the tool that used by the futures next technological leaders.