Governance 13-14

13. **How is the governance of the Ethereum Network similar to and different from the governance of the Bitcoin network?**

**Fundamental vs. Surface-Level Upgrades**

Broadly speaking, Bitcoiners prefer minimal upgrades or changes to the Bitcoin protocol, though they do face some significant scalability challenges. It was designed to be peer-to-peer digital cash, and it has performed that function – or been capable of performing it – from the genesis block. Ethereum, on the other hand, has not been – and still is not – the “world computer” it aspires to. It is too slow, and hardly capable of handling the relatively minimal transaction throughput it currently faces. Upgrades and changes, though often wrought with conflict over specifics, are much needed and anticipated in the Ethereum community. Whereas any potential upgrades to Bitcoin are generally optimizing in nature and (arguably) rarely change any fundamental aspects of the codebase, the Ethereum community members anticipate and are working toward major, fundamental changes: Ethereum is slated to replace its virtual machine (Ethereum Virtual Machine to Ethereum flavored Web Assembly), its mechanism for creating new blocks (from proof-of-work to proof-of-stake), and the chain’s architecture (a linear chain to a sharded network of chains). The Ethereum community hopes that within the next few years, if all goes according to plan, that Ethereum will be an essentially different blockchain. A new proof-of-stake blockchain will be created that is rooted in the Ethereum proof-of-work chain, and it will eventually become a sharded blockchain. In time, even the existing proof-of-work chain is expected to become a proof-of-stake chain.

**Client Coordination**

This shift will require massive protocol changes which will require extensive coordination between software companies and independent developers, which brings up another significant difference between Bitcoin and Ethereum: the vast majority of the Bitcoin network is comprised of computers running software made by the same company, while Ethereum is comprised largely of computers running software made by two different companies – though both networks also include small numbers computers running software created by various other software companies. This software is often referred to as a “client.” Clients are the software that allows blocks to be created and validated on the blockchain, and which store the blockchain on people’s computers. When protocol changes are decided, it is the clients that must code the changes. When there are a diversity of software companies making clients for a particular blockchain, they must coordinate to ensure that they all make the same changes. If they fail to coordinate and one client implements changes to its code, but the other clients do not, then instead of working together to create and validate blocks in a chain, the chain splits in half – one chain that is following the encoded rules of one software, and the other chain which follows the other set of un-upgraded encoded rules.

Because the vast majority (roughly 96 percent) of Bitcoin clients are all made by the same software company (Bitcoin Core), minimal coordination is required to implement changes. If Bitcoin Core developers decide to change the software, they can do so. All they must do is then convince all of the people running the software to also upgrade (though this may be a significant coordination game).

**Decentralized Coordination Across Multiple Channels**

In the Ethereum network, all development must be coordinated between clients such that all clients fit the same agreed-upon specifications. This coordination takes place in a very public and decentralized fashion, with some defacto leaders but no official or enforced hierarchy. Specifications are open source and posted on GitHub, and the leading developers of these specifications meet every couple of weeks to discuss and debate proposed developments in public calls. These protocol changes are discussed across a number of forums, including Gitter, GitHub, Reddit, and encrypted messaging apps. Eventually, decisions are made by rough consensus.

**Ethereum’s EIP Process**

A central part of Ethereum governance is its EIP, or Ethereum Improvement Proposal, process. The EIP process allows anyone to submit a proposal for a new specification or standard that would affect all Ethereum network participants. The EIP process allows anyone to suggest a new standard, and then specifies a process by which these proposals will be refined, denied, or accepted. Many client-level upgrades are initially suggested through the EIP process, but not all. For example, the proof-of-stake and sharding specification is not being completed through an EIP process, since it is an enormous and hugely complicated feat of development requiring significant cross-client and network participation to define from the start. In comparison, smaller changes, such as a proposal to increase or decrease the cost for some specific transaction type, could just be proposed by an individual, and then debated and refined by the community after.

Still, while not every change is determined through the EIP process, it does cover an immensely diverse set of decisions – from base level protocol changes, to second layer scaling solutions, to token standards. Because Ethereum is not just a base level protocol with a single currency, but rather a network host to wide-ranging applications all with their own tokens, there is significant coordination necessary to ensure some level of interoperability between contracts and wallets. For example, developers of a gaming application must make sure that the token their application uses is compatible with user wallets, or else no one will be able to store, spend, or buy the application’s token. To ensure compatibility, everyone in the community agrees to certain standards for token specification.

**14. In light of Ether’s origins as an outgrowth from the Ethereum Classic blockchain, are there potential** **issues that could make Ether’s underlying blockchain vulnerable to future hard forks or splintering?**

Not everyone would agree with the premise that Ether is an “outgrowth from the Ethereum Classic blockchain,” but as this subtlety is not essential to the question being asked, I won’t go into that. Ethereum Classic has nothing, or very little, to do with Ethereum’s potential to hard fork or “splinter” in the future. Further, hard forks do not necessarily lead to a chain split. So first, let me clarify what a hard fork is. To do so, I’ll start by explaining what a soft fork is.

A soft fork is backwards compatible software upgrade to the clients storing and building the blockchain. After a soft fork, clients pre and post upgrade can still communicate and there is one blockchain.

A hard fork is a non-backwards compatible software upgrade to clients storing and building the blockchain. Hard forks happen periodically to the Ethereum blockchain and other blockchains when significant protocol changes are made. There is one currently scheduled for the end of February called Constantinople, and there will be another in probably 8-18 months called Istanbul. At the time of a hard fork, all of the computers in the network must upgrade the software to maintain a single chain.

A chain split happens when not all of the people upgrade their software, or choose a different version of software upgrades, and then both groups of people continue to mine new blocks with incompatible software.

All public blockchains can split at any time (though Ethereum is probably extremely unlikely to); the ability to fork in this way is a central value promise to blockchains. If there are two widely differing, essential and unresolvable disagreements about the direction of software development, or the methods of governance, or any other thing relating to a blockchain, the participants running the nodes can simply choose to fork the chain and create a blockchain that reflects their needs and values, whilst allowing for the continuation of the other chain if it is desirable to another group. This is democracy and freedom in action; public blockchains allow for the free collaboration between free individuals, not opaque and distant systems or services outside of the control of the people using them. Admittedly, this creates potential market instability, which may make regulation difficult.

At this time, there is unlikely to be any chain splitting fork on the Ethereum blockchain. There are very few people proposing such a radical move. There has been some discussion over whether a certain EIP would cause such a split, but this is generally considered unlikely. The EIP in question would change the consensus algorithm to disempower certain types of specialized mining hardware in an effort to democratize the mining pool, though some people think this is an anti-competitive and fruitless endeavor.