Full Node Friends - Understanding and Running A Fully Validating Wallet

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Overview

In previous tutorials, we've discussed the basic differences between a full node wallet and an SPV or Simplified Payment Verification wallet. Now let's take a further look into why full nodes are important to cryptocurrency networks, and how you can get started running one!

Why Full Nodes?

Full nodes, along with mining nodes form the backbone of cryptocurrency and smart contract networks like Bitcoin and Ethereum. These wallets have several important characteristics that help secure these networks and ensure they remain decentralized. This is not to detract from the importance of SPV wallets for adoption and convenient day-to-day use! Simplified wallets allow users to quickly and efficiently onboard to the world of crypto, but those aren't the focus of this discussion.

So what makes full nodes so special and important for Bitcoin and other decentralized forms of money? The first critical characteristic of full nodes is that *these wallets store the entire blockchain*. Unlike SPV wallets which only store data relevant to the wallet user's addresses, full node wallets download and process the *whole* blockchain database. There are some special methods the software uses to prune out unnecessary data, but at a high level we can say that these wallets store every transaction ever recorded in the history of Bitcoin, Litecoin, etc.

Now why is this data-intensive act of storing the whole blockchain necessary and valuable? It's important because *full nodes validate every single transaction in the blockchain.* And in doing so, *they ensure everyone is following the rules!* By processing all the transactions up to and including the current block, wallets ensure that transactions are cryptographically sound, and therefore no one is trying to falsify ownership of any currency. If a single transaction in the history is off, the cryptography won't be correct and the node will not recognize this fake version of the blockchain.

By rejecting bad blocks, full nodes help tell other parties on the network that something is up...and other nodes in turn will not allow shenanigans to occur. Bitcoin and other digital currencies are decentralized because *anyone* on the network can run a fully validating node and help make sure everyone is following the rules. If someone tries to fake a transaction (give themselves more money, re-spend money they've already spent, etc.), nodes on the network will refuse to accept this false version of history. And if nodes reject the malicious transaction, the bad actor effectively can't spend that money!

Full nodes are just like cashiers who are trained to recognize counterfeit $100 bills. The know what a fake bill looks like, and they won't let you spend it. But taking the analogy a bit further, a

full node is a cashier that won't take your fake money and also *tells everyone else around them* that your money is no good.

How to Run A Full Node

General Setup

Fortunately, running a full node is extremely easy. All you need is a computer with a decent internet connection, plenty of hard drive space, and the right software.

Almost all cryptocurrencies list their full node implementations as top recommended wallets. For example, bitcoin.org recommends running the Bitcoin Core client for Bitcoin (BTC).

Once you download and install the full node, you'll need to wait for the initial download of the blockchain to complete. This does require some patience, as the most popular cryptocurrency blockchains exceed 100 GB in size at the time of this writing. On a 250Mbps connection, my node was able to sync the Bitcoin Cash blockchain overnight.

Once this initial sync is complete, your node will continually download and broadcast blockchain data and validate that all of the consensus rules of the currency are being followed!

Bitcoin Cash Nodes

For Bitcoin Cash (BCH), I'm trying out the Bitcoin ABC implementation. I installed this via the Ubuntu package manager aptitutde:

```
sudo add-apt-repository ppa:bitcoin-abc/ppa
sudo apt-get update
sudo apt-get install bitcoind bitcoin-qt
```

Once installed, simply open up the Bitcoin ABC software and follow some initial setup prompts. None are technical or complicated. Again, the blockchain will take some time to sync but your full node is up and doing its thing!

Ethereum Full Nodes

For the smart contract network Ethereum, geth is the client of choice. geth is just as simple to install, but is a bit less user friendly in terms of interface. The quickest way to start it is to run via the command line. To install:

```
sudo apt-get install software-properties-common
sudo add-apt-repository -y ppa:ethereum/ethereum
sudo add-apt-repository -y ppa:ethereum/ethereum-dev
sudo apt-get update
sudo apt-get install ethereum
```

And to start the client:

```
geth account new
```

```
geth
```

Be a Full Node Friend

Fully validating nodes are an important part of cryptocurrency networks. They help keep these digital currencies secure and decentralized by ensuring that all transactions on the network follow the rules. No one can falsify transactions with thousands of full nodes watching, and because anyone can help ensure the rules are being followed, there is no need for central authorities to maintain trust.

And thankfully, running a full node is pretty easy to do. If you have the resources and desire, consider being a "full node friend" on the currency network of your choice - you'll be keeping digital money secure for everyone!