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Bitcoin — a New Currency?

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Bitcoin is basically a payment system. It provides the ability to transfer some type of value from a payer to a payee. (There are no physical coins, only entries in a software ledger.) If you have been monitoring the news with your tablet or laptop, or you have been reading the daily papers, you probably already know a lot about Bitcoin. (Mostly negatives lately, I suspect.) But the interest here is mostly on the technology. Bitcoin uses fairly complex peer-to-peer software technology and operates with no central authority (or banks). (It reminds me of the operation of the Bit Torrent file sharing networks, only “value” files are being transferred instead of “entertainment” files.) I must say, up front, that I am not a proponent of this type of software currency. With the current levels of computer security, I feel that there is too much opportunity for problems, like hacking, spoofing and down-right dishonesty. However, progress will probably move this technology forward. I must also admit that I missed some major changes like MySpace, and Twitter, so my opinion of Bitcoin should probably be taken with a grain of salt. The idea of a digital currency, convenient and untraceable, and far from the oversight of governments and banks, has been an interesting software technology topic since the beginning of the Internet.

Bitcoin is a network of computers running Bitcoin software. The Bitcoin network manages the transactions and the issuing of bitcoins. All this is carried out collectively by the network participants. Bitcoin is open-source. Nobody owns or controls Bitcoin, yet anyone with the proper software can take part in its operation. Proponents say that “through many of its unique properties, Bitcoin can enable uses that could not be accomplished by any previous payment system,” but I’m not sure what that really means. Bitcoin is not the only peer-to-peer based digital currency, but it is certainly the most notable. Peercoin and Primecoin are also mentioned in the literature, and in fact a research team at Johns Hopkins computer lab is developing a similar digital currency called Zerocoin. Maybe this type of currency will really be in our future.

Bitcoin, as a new currency, was created in 2009 by an unknown person using the name Satoshi Nakamoto. Satoshi Nakamoto, it is said, is almost certainly a pseudonym for the actual individual, or individuals. Transactions are made with no middle men, meaning no banks. There are no transaction fees and no need to give your real name. Some internet merchants have begun to accept Bitcoins. Supposedly, you can use bitcoins to buy things on the internet like web hosting services. There are even indications that you can buy everyday items like pizza using bitcoins. Because bitcoins are used to transfer wealth, people can send bitcoins to each other using their computers, or mobile phone, or tablet apps. It is supposed to be similar to sending cash digitally. Bitcoins can be used to buy merchandise anonymously, a characteristic that has certainly caught the

interest of the government. In addition, international payments are easy and cheap because bitcoins are not tied to any country, country's currency, or subject to any regulation. (But the lack of regulation may actually encourage volatility and add risk to the value of a Bitcoin in the future, so this may not be as good as it sounds.) Small businesses may like bitcoins because there are no, or very low, fees. Some people have even been buying bitcoins to have as an investment, hoping their value will appreciate. But bitcoins have been extremely volatile, not really like an investment, but more like a speculation similar to a roulette bet at a casino.

Bitcoin employs the use of very complex peer-to-peer software technology, along with software cryptography. Bitcoin is called a cryptocurrency, because it uses cryptography to control the creation and the transfer of bitcoins among the users. Bitcoin uses public-key cryptography in which pairs of cryptographic keys, one public and one private, are generated. (A cryptographic key is a piece of information that specifies a particular transformation of plaintext into ciphertext, and vice-versa.) A collection of keys is called a "wallet". A Bitcoin transaction transfers bitcoin ownership to a new individual. A coded alphanumeric string is created from the use of the individual's public key. The corresponding private key is then used to decode the transaction. Only the correct private key will complete the transaction. Additionally a digital signature is checked for validity. (A digital signature is a mathematical scheme for demonstrating the authenticity of a digital message or document.) Private key protection is critical for Bitcoin security, because anyone with the correct private key can spend all of the bitcoins sent to that individual. Security is of paramount importance for the success of Bitcoin. Theft of bitcoins has occurred on numerous occasions and the practical day-to-day security of bitcoins remains an on-going concern.

Bitcoins are stored in a "digital wallet," which exists either in the cloud or on a user's computer. The wallet is a kind of virtual bank account that allows users to send or receive bitcoins, pay for goods, or save their money. Bitcoin wallet software has been implemented in several programming languages for personal computers, mobile devices, and as web applications. At the most basic, a wallet program generates and stores private keys and communicates with peers on the Bitcoin network. Unlike bank accounts, bitcoin wallets are not insured by the FDIC. Although each bitcoin transaction is recorded in a public log, the names of buyers and sellers are never revealed, only their wallet IDs are recorded. This lets users buy or sell items without anyone having the ability to trace the transaction back to them. This is why it has become the currency of choice for online illicit activities.

Bitcoins can be obtained in exchange for products, services, or other currencies, or by a process called "mining." Bitcoins are actually created by the mining process. People compete to "mine" bitcoins using computers to solve complex math problems. In other words, Bitcoin's mining operation consists of the network of its users' computers solving complex mathematical problems. I'm not sure how this really works, but as a result of the effort to solve the problems, at preset intervals, an algorithm releases new bitcoins into the network. The interval is said to be 25 bitcoins every 10 minutes, with the pace of bitcoin generation halving in increments until around the year 2140. This automated

pace is meant to ensure regular growth of the monetary supply without interference by third parties, like a central bank, (of which it is thought might lead to hyperinflation).

Bitcoins can be bought and traded on an “Exchange” website, however the most prominent exchange site “Mt. Gox,” has just recently “gone dark,” and is not to be found online. Another exchange, “SecondMarket,” was about to go online, but the apparent collapse of Mt. Gox may delay, or even eliminate the possibility of any new exchanges.

Because the bitcoin transactions are anonymous, there can be a dark side to this technology. Bitcoin has been the subject of government investigation due to its ties with illicit activities. In 2013 the FBI shut down the website, Silk Road, which came on line in 2011, as the first, or one of the first, websites to use Bitcoin for anonymous purchase of all sorts of illegal products and services. The acceptance of only the digital currency, Bitcoin was meant to add an additional layer of anonymity to buyers and sellers. As of September, 2012, the Silk Road site had over 10,000 listings for drugs including heroin, cocaine and LSD. Silk Road was shut down by law enforcement officials last year. This February Federal officials announced a grand jury indictment of the man accused of creating the online drug marketplace. He is in law enforcement custody, and could be behind bars for the rest of his life. He is charged with engaging in a continuing criminal enterprise, computer hacking, money laundering, and operating a narcotics conspiracy. (Sounds a lot like hacking, spoofing and down-right dishonesty, to me.)

Bitcoin as a form of payment for products and services has seen growth, because merchants have an incentive to accept the currency because transaction costs are lower than the 2 to 3% typically charged by credit card companies. Commercial use of Bitcoin, illicit or otherwise, is currently small compared to its use by speculators, which has been the cause of bitcoin’s price volatility. No one knows what will become of bitcoin. It is mostly unregulated, but that could change. Governments are concerned about taxation and their lack of control over the currency. Maybe the government will take a more active role in the development of a digital currency, but I think the government is happy with its own dollar based currency. It’s not clear if Bitcoin will be in our future, but it does look like we will have some form of digital payment technology when we get there.