



# The Ultimate Guide to *bitcoin*<sup>TM</sup>

# The Ultimate Guide to Bitcoin™

MICHAEL MILLER

**que®**

800 East 96th Street,  
Indianapolis, Indiana 46240 USA

# The Ultimate Guide to Bitcoin™

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## About the Author

**Michael Miller** has written more than 150 non-fiction how-to books over the past two decades, as well as a variety of web articles. His best-selling books include Que's *Absolute Beginner's Guide to Computer Basics*, *The Ultimate Digital Music Guide*, and *Is It Safe? Protecting Your Computer, Your Business, and Yourself Online*. Collectively, his books have sold more than 1 million copies worldwide.

Miller has established a reputation for clearly explaining technical topics to non-technical readers, and for offering useful real-world advice about complicated topics. More information can be found at the author's website, located at [www.molehillgroup.com](http://www.molehillgroup.com).

## Dedication

*To grandkids Collin, Alethia, Hayley, Judah, and Lael, and whatever currency you'll be using when you grow up.*

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We welcome your comments. You can email or write to let us know what you did or didn't like about this book—as well as what we can do to make our books better.

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# Introduction

Bitcoin is like nothing you've ever dealt with before. It's a form of money, but it doesn't physically exist as a coin or paper currency. You can spend it (at some merchants) or save it, or even buy and trade it as a type of speculative commodity. Some people have gotten rich trading in Bitcoin; others have been burned by fraud and hacks and just plain incompetence. And everybody's talking about it, even though few really understand what it's all about.

Some people think that Bitcoin is the currency of the future, destined to replace dollars and euros and other traditional currency. Other people think Bitcoin is a get-rich-quick scheme, this week's bubble that's bound to burst. Others think Bitcoin is a complete and total scam.

The reality is that Bitcoin is potentially all of these things, and none of them. It's what we call a cryptocurrency (because it's based on cryptography technology) or virtual currency (because it doesn't exist in physical form). It's still in its infancy, used by few but monitored by many. And it might be a big part of your personal financial future.

What is Bitcoin good for? Who uses it? How do you get some—and how do you spend any you've gotten? What's it worth? And just how safe is it, anyway?

These are all rational questions for which there are rational answers. Which is why I wrote this book.

*The Ultimate Guide to Bitcoin* is meant to be...well, the ultimate guide to Bitcoin. It explains what Bitcoin is, why it exists, how it works, who uses it, and more. On the surface, anyway, Bitcoin is easier to understand than you might think. Yes, there's a lot of detail under the surface (and we cover that too), but I try to present the basics of Bitcoin in a way that even the most inexperienced novice will understand. It's not rocket science—just some beginning-level finance and technology.

I assume that you're reading this book to learn about Bitcoin, perhaps with the expectation to start trading, accumulating, or spending Bitcoin. Before you invest your first dollar into this new virtual currency, you want to know what you're getting into. Fair enough; I'll tell you what you need to know to get started.

By the way, I am neither a Bitcoin cheerleader nor a naysayer. You can find plenty of both on the Internet, so you don't need any more biased opinions here. Instead, I try to present the facts as we know them, balanced by realistic descriptions of the risks and rewards of working with Bitcoin. I don't have a horse in this race, but just want to help you make better decisions. I hope you'll find my words useful.

## What You Need to Know to Use This Book

How much prior experience with Bitcoin do you need before starting this book? None. In fact, I expect that you have never traded a Bitcoin in your life, and know little about Bitcoin and other cryptocurrencies. That's why you're reading this book, after all. In the world of Bitcoin, we're all novices.

In other words, you don't have to be an experienced Bitcoin trader to dive into this book. The information on these pages is actually best consumed *before* you get involved with Bitcoin—it's the information that beginners need in order to be a little more savvy about the whole Bitcoin thing.

## Learn More...

Bitcoin as a topic, a technology, and a currency is in constant flux. It's not just the pricing that's volatile; not a day goes by without some seemingly major development or announcement concerning Bitcoin or other cryptocurrencies.

That means that some of the information in this book will be outdated by the time you read these words. That's simply to be expected—and especially true in regard to any discussion of Bitcoin pricing. If I write something about a \$500 price and, when you read the book, the current price is \$700 (or \$300), accept that things have changed and make the necessary conversions. There's really no way of predicting these things, so we just have to deal with them.

As to keeping abreast of Bitcoin-related developments, a handful of websites report daily Bitcoin-related news and deliver the latest exchange rates and other statistics. If you're serious about Bitcoin, bookmark these sites and make them a component of your daily reading regimen:

- Bitcoin Magazine ([www.bitcoinmagazine.com](http://www.bitcoinmagazine.com))
- Blockchain ([www.blockchain.info](http://www.blockchain.info))
- CoinDesk ([www.coindesk.com](http://www.coindesk.com))
- CoinReport ([www.coinreport.net](http://www.coinreport.net))
- CryptoCoinsNews ([www.cryptocoinsnews.com](http://www.cryptocoinsnews.com))

In addition, I recommend you subscribe to the Bitcoin News' Twitter feed, @bitcoinnews, and to the r/Bitcoin subreddit on Reddit ([www.reddit.com/r/Bitcoin/](http://www.reddit.com/r/Bitcoin/)). Both are good sources of up-to-the-minute news, rumors, and discussions.

Finally, there are two Bitcoin-related discussion forums worth your participation. Both of these Bitcoin forums, [www.bitcointalk.org](http://www.bitcointalk.org) and [www.bitcoinforum.org](http://www.bitcoinforum.org), are filled with real and imagined experts on everything Bitcoin, and they will help you get involved with the greater Bitcoin community. Take a look and join in as you like.

# Bitcoin: The Future of Currency?

*Bitcoin. Some people call it the currency of the Internet. Some call it the currency of the future. Others call it fool's gold, not worth the bits and bytes it's built on.*

*What exactly is Bitcoin—and why should you care? The answers are not simple; there's a lot going on in the world of Bitcoin, and not all of it is honey and roses. Indeed, the world of Bitcoin is a tumultuous one, as you no doubt know if you've been following the news.*

## Bitcoin in the News

Even if you don't know anything about Bitcoin (and most people don't), you've probably heard something about it on your nightly news report. That's because there's a lot of interest in Bitcoin, and a lot is happening in the world of Bitcoin. Newsworthy, it is.

Let's start with some of the bigger items to hit the news—you know, the ones that spell doom and gloom for Bitcoin and anyone using it. (Bad news always gets the headlines.)

Most folks probably first heard about Bitcoin back in October of 2013, when the FBI shut down the Silk Road website. Silk Road was essentially an online black market, known by many as the “eBay of illegal drugs,” and closing it was a major coup for the Feds. Because Silk Road used Bitcoin to receive payments from its customers, the FBI was able to seize 170,000 or so Bitcoins, worth more than \$30 million at the time. Of course, the association with such a black market site didn't do much to enhance Bitcoin's reputation, but it did make people aware that this thing called Bitcoin was out there.

The next big Bitcoin news came from China, which in December of 2013 cracked down big time on its burgeoning Bitcoin market. China decreed that merchants could not accept Bitcoin payments and prohibited banks and payment processors from converting Bitcoin into yuan, the native currency. Although that wasn't good news for Bitcoin traders, several Chinese Bitcoin businesses subsequently announced that they were shifting to offshore operation, to effectively sidestep the government's new regulations.

A much bigger Bitcoin-related story broke in February of 2014, when the Japan-based Bitcoin exchange Mt. Gox filed for bankruptcy protection. Reports indicated that around 850,000 Bitcoins had been stolen or had gone missing from the exchange, a loss valued at around \$473 million. This was a very big deal, and many observers predicted that it signaled the end of the line for Bitcoin overall. More observant observers noted that the existence of bad business practices at one exchange does not mean that the entire concept of virtual currency is flawed. The debate continues to rage, and surely it influenced our next bit of news.

In May 2014, the United States Securities and Exchange Commission (SEC) issued a lengthy warning to investors about the risks it sees in Bitcoin and virtual currencies. The advisory cited the collapse of Mt. Gox three months earlier and warned, “As a recent invention, Bitcoin does not have an established track record of credibility and trust.” The warning went on to advise that the SEC and law enforcement might have trouble investigating Bitcoin-related cases because there is no central authority in place to obtain information on Bitcoin users. It's risky, in other words.

But the news isn't all bad—even from the U.S. government. While the right hand was tsk-tsking about that evil Bitcoin, the left hand was saying, go ahead, give us some. The left hand being the Federal Election Commission (FEC), which, the same week as the SEC report, okayed the use of Bitcoin for political contributions. The FEC ruled that candidates can accept up to \$100 in Bitcoin per contributor each election cycle. So there.

And, proving just how influential the SEC is these days (not), Cameron and Tyler Winklevoss, the guys who claimed that Mark Zuckerberg ripped off one of their ideas for Facebook, disclosed that they plan to offer their Bitcoin exchange-traded fund on the NASDAQ stock exchange. The imaginatively named Winklevoss Bitcoin Trust filed in May 2014, to issue a \$20 million IPO—although they're still awaiting approval from those nervous Nellies in the SEC. They also launched a financial index, dubbed Winkdex, to track the price of Bitcoin on a daily basis.

The same week that the Winklevoss twins made their latest move, Coin Capital Management launched a new Bitcoin-focused hedge fund. This fund will buy and hold Bitcoins in an institutional-grade environment, perfect for investors. "We are pretty excited about Bitcoin...it is an exciting payment technology," said Samuel Cahn, managing partner at the New York-based firm. "We are fully dedicated to holding Bitcoin, and we are the first ones to do so in an institutional-grade hedge fund using the same types of checks and balances that investors have come to expect."

And the news doesn't stop there. Just open your daily newspaper (or associated website) and turn to the financial section. Chances are that you'll find something there about Bitcoin, at least once a week. A lot of big players are getting interested, and those that aren't are getting scared. The result is a kind of political Ping-Pong game played out in the press, with each side volleying about how great Bitcoin is, or how safe it isn't. The opinions expressed are kind of predictable, after you realize who has what to gain or lose if Bitcoin becomes more mainstream. (For example, big-league Wall Street guys don't like it. Libertarians and technical folks do.) Just don't be surprised if you see lots and lots of news stories about Bitcoin in the weeks and months to come—it's a very newsworthy topic.

## What Is Bitcoin?

So everybody's talking about Bitcoin, but it's still possible that you don't know what they're talking about. That's because Bitcoin is different things to different people.

For some individuals, Bitcoin is simply a digital currency—something you can use to pay for things online (and, increasingly, at physical retailers). In this worldview, Bitcoin is a viable alternative to dollars or euros or yuan or whatever; you can get



paid for your services in Bitcoin, and then use Bitcoin to pay for other services and merchandise you purchase online.

To other people—financial speculators, we’ll call them—Bitcoin is an “investment.” That is, you obtain a certain number of Bitcoins and then wait around for their value to increase. At that point you can sell them and collect your profits (kind of like investing in securities or precious metals or trading cards). If the price goes up, you score. If the price goes down, you lose.

Then there are those techie types who like Bitcoin because...well, because it’s very high-tech. The currency itself is nothing but a bunch of encrypted 1s and 0s, it’s all open source, and Microsoft doesn’t make any money off of it. That makes dealing in Bitcoin somewhat cool. (And cool is good.)

Privacy hounds view Bitcoin as a way to hide their financial activities from prying government eyes (and regulations). As noted, it’s an encrypted currency, so it’s virtually untraceable. When everything else in our lives is being tracked, there’s an appeal to that.

That untraceability also appeals to individuals and organizations engaging in, shall we say, “shady” activities. You know, criminals—guys selling illegal drugs and fake IDs and stolen credit card numbers and the like. In fact, Bitcoin is the currency of choice for those in the digital underworld. That shouldn’t be a surprise.

To some limited-government types—let’s call them libertarians, for want of a better word—Bitcoin is viewed as a way to totally sidestep the established central banking structure. These folks don’t trust the federal government to manage the money supply, and they pin their hopes on Bitcoin as a way to destroy the Fed and end the era of centralized banking.

The limited-government types also like the fact that there’s really no way for Bitcoins to be seized or frozen or confiscated by any public or private entity. That means there’s no threat of bank seizures or government liens or anything similar playing out against Bitcoin owners. If you’re at all paranoid about that sort of thing, consider it a plus.

## LIBERTARIAN BITCOINERS

According to an online survey by a University College of London researcher, 44% of Bitcoin users identify themselves as libertarian or anarcho-capitalist. This compares to the 2% of the general public that identifies itself as libertarian. So to say that there’s a libertarian bent to Bitcoin is not overstating things.

To pro-government types—specifically, the Internal Revenue Service—Bitcoin is definitely not a currency. Instead, the IRS classifies Bitcoin as property, at least for tax purposes. That means it applies existing rules for stocks and barter transactions to any and all reported Bitcoin transactions.

This also means that using Bitcoin to pay for items either online or in the real world just got trickier. For example, when you purchase an item online for \$10 using Bitcoins that you acquired for \$5, that transaction triggers \$5 in capital gains for you and \$10 in gross income for the online retailer. (And if you think this might somewhat discourage the use of Bitcoin for online payments, you're probably right.)

Finally, many businesspeople who are heavily vested in our current financial system—bankers, moneymen, and the like—view Bitcoin as a threat to their livelihood. Whereas some progressive thinkers recognize a business potential in processing Bitcoin payments, others fear that Bitcoin (and other digital currencies) enables consumers to bypass the banking system altogether. If all goes a certain way, Bitcoin could create a new online economy, completely independent of the existing financial system and its rules and regulations. Of course bankers are afraid of that.

## No, Really, What *Is* Bitcoin?

Enough of these different views from different people. What is Bitcoin, really?

Put simply, Bitcoin is a virtual or digital currency. By virtual, I mean that there are no physical “bitcoins,” in either paper or coin format—nothing you can put in your pocket and carry around with you. A Bitcoin is nothing more than a computer file, albeit one that is highly encrypted for security reasons. Bitcoin is based on open-source code (which means nobody owns or controls it) and is distributed via peer-to-peer file-trading networks, similar to the way some digital music is shared.

What makes Bitcoin and other digital currency unique is the lack of any centralized issuing authority. The management of Bitcoin-related transactions is carried out collectively by the network; no one entity is in charge.

In fact, Bitcoins can be created (“mined”) by anyone with the technological know-how and appropriate computer hardware. If you're not into Bitcoin mining (and few people are), you can purchase Bitcoins through Bitcoin exchanges, which let you trade cash for Bitcoins. These exchanges also let you trade in your Bitcoins for cash.

You store any Bitcoins you own in a “digital wallet” that exists either locally (on your computer) or in the cloud. Your digital wallet is protected via encryption technology but is not insured by the FDIC or any other official entity.

The lack of any regulatory authority means that there are no middlemen (banks) to facilitate transactions and charge fees. In this way, Bitcoins create a one-to-one virtual economy that bypasses the traditional financial system. For many, that is part of the appeal.

Today, more and more merchants—both online and off—are accepting payment via Bitcoin. Bitcoin is also good for fast international payments with minimal (if any) associated fees. And, while many individuals use Bitcoin to pay for things, others collect them as an investment, hoping that they will go up in value—which they have done, over time.

## What Famous People Are Saying About Bitcoin

Not that it really matters, but some very important people are big fans of Bitcoin. In fact, former U.S. Vice President Al Gore said, literally, “I’m a big fan of Bitcoin.” In another interview Gore noted, “Regulation of money supply needs to be depoliticized...especially as it applies to virtual currencies.” Yay, Bitcoin.

Microsoft founder Bill Gates also sees a big future for Bitcoin and other digital currencies, especially in third-world countries. “Digital money has low transaction costs,” he noted in a 2014 Reddit interview, “which is great for the poor because they need to do financial transactions with small amounts of money. Over the next five years I think digital money will catch on in India and parts of Africa and help the poorest a lot.”

Eric Schmidt, former CEO of Google, had this to say about it: “Bitcoin is a remarkable cryptographic achievement, and the ability to create something that is not duplicable in the digital world has enormous value.” (After his years at Google, Schmidt should know something about enormous value.)

And Rick Falkvinge, founder of the Swedish pirate party (not exactly a household name in the U.S., but still), says that “Bitcoin will do to banks what email did to the postal industry.” Take that, banks.

But not every bigwig out there is hip on the Bitcoin thing. Take financial genius and über billionaire Warren Buffett, for example. He’s skeptical of the whole thing, saying, “I wouldn’t be surprised if it’s not around in ten or twenty years. It does not meet the test of a currency.”

And that's tame compared to the comments from Jamie Dimon, newsworthy CEO of JPMorgan Chase. "It's a terrible store of value," he said in a recent interview. "It doesn't have the standing of a government. And honestly, a lot of it...is being used for illicit purposes." (Of course, Dimon kind of has a vested interest in our current traditional currency system, so that might color his opinion. At least a little.)

Want more? Check out this quote from Yishan Wong, the CEO of Reddit: "Without being too inflammatory, the user base for Bitcoin is basically crazy libertarians who are increasingly poorly informed about currency systems and macroeconomics...I think that the obsession in the Bitcoin community with bringing down central banks, fiat currencies, and governments is misguided and generally misses the point of Bitcoin."

He's obviously not a fan. Or, at least, not a fan of some of Bitcoin's fans.

## Does Bitcoin Really Matter to You?

Forget what all those famous people say, pro or con. How important is Bitcoin to you?

Well, if you're thinking of using Bitcoin to pay for things online, it's becoming more and more feasible—especially when dealing with tech-savvy retailers and service providers. For example, Overstock.com accepts payments in Bitcoin, as TigerDirect, Digital River, and Expedia. You probably can't yet use Bitcoins to pay for stuff at your local shops, however, although that's slowly changing.

Bitcoin is probably more popular today as an investment tool. Many, many, many people are speculating in Bitcoins, which results in the price of Bitcoin varying wildly from day to day. It'll probably settle down in time, but right now some people are making big bucks by buying and selling Bitcoins. (Some are also losing big bucks, but that's the way speculation goes.)

Will Bitcoin replace dollars and euros and other traditional currencies? Not anytime soon. But it is possible that Bitcoin will become much more acceptable for everyday transactions, especially online ones. Until then, tread cautiously—remember, there are no regulations or protections available. People have lost big through Bitcoin fraud or theft, without any recourse. That could be devastating.

So, after all that, are you still interested in the whole Bitcoin thing? Well, there's a lot more to learn—so keep reading to get smarter about it.

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# Understanding Virtual Currency

*Bitcoin is what experts call a virtual currency. It's also a digital currency, and a cryptocurrency. But above all, it's a currency of some sort—just like the dollar bills in your wallet, only different.*

*So what exactly are virtual, digital, and cryptocurrencies, and how do they work? Understanding all of this is essential to understanding and using Bitcoin, so read on to learn more.*

## What Is Currency?

Okay, folks, it's time for Finance 101, and the topic of the day is *currency*.

Currency, as defined by the Oxford Dictionary, is “a system of money in general use in a particular country.” That seems simple enough; currency is money.

But what, then, is money? Well, money—and, by association, currency—is a medium of exchange. Money or currency enables people to store value in a symbolic fashion without having to carry around physical items of actual value.

That is, currency represents value in a convenient format. The medium of currency—the paper of the dollar bill or the metal of the quarter coin—has no intrinsic value in and of itself, other than the slight cost of paper and ink. The paper or metal money gains value only when linked to a set value in a country's currency system.

So we know, for example, that the little green piece of paper with George Washington's face on the front is worth one dollar. We know that because the United States government says that it is so.

Now, we could just carry around and trade actual items of value, rather than the currency that has symbolic value, but that would be a little awkward. For example, we know that gold has a certain value, but carrying around bars of gold would be a trifle bit inconvenient. Same thing with using jewels or rare metals to pay for lunch at McDonald's. We could do it, but we wouldn't want to.

Instead, governments invented the concept of currency to represent that value for us, so we don't have to hoard gold or silver in our basement and carry it all around when we go shopping. Currency, in the form of paper money and coins, is a lot smaller and lighter than gold and silver and even diamonds.

(In addition, you can't easily “break” a jewel or gold bar when you need to make change. Those physical items of value are simply impractical as a day-to-day medium of exchange.)

So we use paper money and coins to transfer value from one entity to another. Someone says a sandwich is worth five dollars, so you give the kid behind the counter a paper bill that represents a five-dollar value—no need to hand over a gold bar or precious stone for payment.

## THE GOLD STANDARD

There was a time when major currencies were backed by precious metals, most often gold. Under the gold standard, the value of a dollar (or pound or lira or whatever) was based on a fixed quantity of gold, and the issuing governments held their own gold reserves to back the currency they issued.

One advantage to the gold standard is that a government could guarantee a fixed exchange rate between its currency and the currency of another government, based on the underlying value of each currency in gold. (In the U.S., the exchange rate was officially set at \$20.67 per Troy ounce of gold.) It was the price of gold that connected everything.

The gold standard is a thing of the past, however. Even though most countries still hold substantial gold reserves (in the U.S., at Fort Knox in Kentucky), there are no countries today that still use the gold standard. The United States first moved away from the gold standard in 1933, during the bank rushes of the Great Depression, to deter people from cashing in their deposits and depleting the country's gold supply. Because the Fed could now print more money than it had gold reserves, this allowed the government to pump extra money into the failing economy and lower interest rates.

(By the way, currencies based on physical commodities are called *commodity currencies*. Those not based on commodities are called *fiat currencies*. This makes virtually every official currency in today's post-gold standard world a fiat currency.)

The final ties to the gold standard were severed in 1971, when the government cancelled the direct convertibility of the dollar to gold. This was done ostensibly to stop dollar-flush foreigners of the time from sapping U.S. gold reserves. (This also answers the unasked question: What do presidents Roosevelt and Nixon have in common?)

There continue to be calls, particularly from the libertarian community and some Tea Party conservatives, to return the U.S. to the gold standard. They believe that the government has become too cavalier about borrowing and printing money, leading to increasing deficits and debt. By returning to the gold standard, these folks say, the government would be forced to better live within its means. So far, this argument has not received serious consideration in official circles.

## What Is Virtual Currency?

So currency is essentially money—a means of representing value in a convenient, easy-to-carry format. What, then, is *virtual currency*?



The concept of virtual currency is a relatively new one. The phrase itself was coined in 2011, coincident with the rise of social gaming and the digital currencies used in many of those games.

As defined by the European Central Bank, virtual currency is “a type of unregulated, digital money, which is issued and usually controlled by its developers, and used and accepted among the members of a specific virtual community.” The U.S. Department of Treasury defines virtual currency as “a medium of exchange that operates like a currency in some environments, but does not have all the attributes of real currency.”

In addition, it goes without saying that virtual currency is not physical currency. You don’t get any paper bills or minted coins to store or carry around; virtual currency is stored and transferred electronically, not physically.

Some virtual currencies are *closed*, in that they have no connection to the real-world economy. For example, the currencies used in many online games are closed currencies, usable only within that game environment, with no tie to real dollars or euros.

In contrast, *open* virtual currencies—also called *convertible* currencies—can be tied to real-world currencies. That is, one can use a physical currency to purchase an open virtual currency, and vice versa.

Convertible virtual currencies can be either centralized or decentralized. A *centralized* virtual currency is one that is issued by a single organization that is in charge of recording transactions for that currency. In this instance, the issuing organization serves as a centralized repository for that currency. Centralized virtual currencies can be purchased or traded for traditional currencies at a fixed price specified by the virtual currency operator. For example, the virtual currency used within an online game such as World of Warcraft is a centralized currency. (It’s also a closed currency, if you’re keeping score.)

Then we have *decentralized* virtual currencies, of which Bitcoin is a prime example. A decentralized virtual currency does not have a centralized repository nor does it rely on a single operator. Instead, multiple operators can buy and sell the virtual currency, and the price of the currency fluctuates according to market forces. The continued existence and success of a decentralized virtual currency depends, then, on a distributed system of trust across the entire network of users.

Because virtual currencies are not tied to or regulated by any country’s central banking system, they typically do not have the protections that come with official currencies. That makes collecting and trading in virtual currencies more risky than using official currencies. For example, if the single organization controlling a centralized virtual currency is shut down, customers of that exchange might lose their deposits. The same thing could happen (and has happened) with decentralized