

You can't hold a bitcoin, but the web currency's value has skyrocketed. Why?

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Unlike gold or dollar bills, the digital currency known as bitcoin does not

physically exist. There is no there there.

Even so, there is excitement - and speculation. And a wild rollercoaster ride.

The price of bitcoin has more than tripled in the past six months. At one point in May, the value of a single bitcoin spiked above \$3,000, only to yo-yo back down to around \$2,245, before nearly hitting \$3,000 again on Tuesday. Daily price fluctuations have been as high as \$200 or \$300.

Once only a curiosity with strong appeal to libertarians and technologists, bitcoin's supporters now include hedge fund managers, titans of industry and a former Treasury secretary. Some say the currency - and its unique underlying technology - have crossed a threshold of respectability, even as new problems loom.

"I love this stuff," the chief executive of Fidelity Investments, Abigail P. Johnson, said in New York City May 23 at a conference on digital currencies and the decentralized, tamper-resistant so-called blockchain technology that supports them. She noted that the cafeteria at Boston-based Fidelity now accepts payment in bitcoin. Employees can approach a payment terminal and scan a machine-readable code on their smartphones.

She suggested that bitcoin's underlying technology may be part of a revolution.

"What if this technology could do for the transfer of value what the internet did for the transfer of information?" Johnson asked.

Some mystery surrounds the emergence of bitcoin in January 2009. It was the brainchild of Satoshi Nakamoto, who invented the electronic cash system and the seamless underlying database that makes each linked

computer a continuously synchronizing repository of all current and past transactions. Nakamoto is likely a pseudonym. No one knows if Nakamoto is a he or she, or a group of people. After introducing bitcoin, Nakamoto vanished.

What remains is a universal currency, independent of government or bank. Transactions are verified and recorded through a database shared on at least 10,000 computers spread around the world. No one owns the bitcoin system but anyone can participate. Experts say its genius is its simplicity. No middlemen extract fees.

The first known transaction occurred on May 22, 2010. A programmer on a Bitcoin Talk forum paid another user 10,000 bitcoin to buy two Papa John's pizzas. Bitcoins were worth pennies then. If he still had those 10,000 bitcoin, the programmer, Laszlo Hanyecz, would have more than \$22.4 million today.

Bitcoins are digital rather than physical, although a handful of companies have manufactured physical coins, sometimes made of gold or silver, as conversation pieces or collectors' items.

Along the way, bitcoin has had its share of problems. Criminals embraced it as a way to pay for narcotics online. And the largest bitcoin exchange, Mt.Gox, collapsed in 2014. Earlier this year, hackers who encrypted hard drives of more than 200,000 computers around the world demanded a ransom in bitcoin to unlock the computers.

The [digital currency](#)'s first price spike came in late 2013, when it topped out at over \$1,000, only to fall as low as the \$200 range until starting a new spike in mid-2016.

Slowly bitcoin gained adherents - the number of people using bitcoin now "rivals the population of small countries," Garrick Hileman, an

economic historian and research fellow at the Cambridge Centre for Alternative Finance, wrote in a preface to a report on digital currency released in April.

In a subsequent telephone interview, Hileman said 5-10 million people have used bitcoin or a handful of other digital currencies, and the electronic system has proved extraordinarily resilient.

"It hasn't been down for a single nanosecond in its 8 { years, and it is the largest computer network in history," Hileman said, adding that without any central control over the network, there is no possible single point of failure. "How many complicated IT systems, large IT systems had zero downtime over an 8 {-year period?"

Among those who have added their voice to bitcoin is Larry Summers, the former Treasury secretary and Harvard president who is an adviser to Xapo, a Silicon Valley bitcoin company now based in Zurich, Switzerland, that offers consumers Visa debit cards

As it became apparent that bitcoin wouldn't go away, speculation has set in.

Last week, an analyst for Saxo Bank, Kay Van-Petersen, set a breathtaking target price of \$100,000 for a single unit of bitcoin within 10 years, saying bitcoin and other digital currencies will occupy a growing place in global currency trades.

The sky-high projections and whipsawing price fluctuations worry some experts.

"When you see these gyrations in the value, I worry that it is due to some sort of manipulation," said Jonathan Katz, a computer scientist who leads a cybersecurity center at the University of Maryland.

"There are some real risks right now," added Vinny Lingham, a South African internet entrepreneur who is a board member of the Bitcoin Foundation, an advocacy group.

Over the long haul, bitcoin "will survive and will thrive," Lingham said. But he added: "I track it daily, and I can tell you now some of the price gyrations concern me. ... You're heading into bubble territory."

The rise comes in spite of headwinds. U.S. regulators have sent confusing signals about their views on bitcoin. The Internal Revenue Service sees bitcoin as a form of property, while the Financial Crimes Enforcement Network at the Treasury Department views it as a virtual currency that is a gift to money launderers. Adding to the confusion, the U.S. Commodity Futures Trading Commission has ruled that bitcoins and other digital currencies are commodities.

The Securities and Exchange Commission rejected two different exchange traded funds based on bitcoin in March, asserting that bitcoin markets are largely unregulated and thus subject to fraud and manipulation.

Bitcoin's move into the mainstream has been quicker in other countries. Japan on April 1 began accepting bitcoin as a legal form of payment, sparking a buying frenzy there. Signs advertising bitcoin acceptance hang in two branches of Tokyo's Bic Camera store, where consumers can summon their bitcoin "wallets," or accounts, on their smartphones, generate a barcode and make purchases for bitcoins or fractions. Peach, a Japanese airline, accepts payment in bitcoin, and thousands of retailers may do so in coming months.

Elsewhere in Asia, bitcoin has been a way to get around China's tightened capital controls.

"A lot of Chinese are moving their wealth out of the country using bitcoin," said Dave Huseby, director of security at Hyperledger, an umbrella project run by the Linux Foundation to advance use of the underlying bitcoin technology for other industries.

Even as it makes strides overseas, bitcoin proponents face an unusually contentious debate over how to address technical issues related to its growing popularity.

"One side wants the underlying technology to be changed, the other side doesn't," said Marco Streng, chief executive of Gemini Mining, a Hong Kong-headquartered company in the bitcoin sector.

"This matters because bitcoin could potentially be split in two and the effects could be devastating if not done in a cordially and coordinated manner," Streng said in an email.

The dispute is over a bottleneck in the speed of transactions, which has largely reached a capacity of seven transactions per second, due to existing technical limitations.

"With that limit reached, there simply isn't enough room to process transactions in a timely fashion," Hileman said. "You hear stories of people waiting for days for their transactions to clear and settle."

Some long-time advocates are loath to change bitcoin's existing architecture.

"The community is very conservative with changes to that core protocol," said Peter Van Valkenburgh, research director of the Coin Center, a nonprofit research center in Washington that focuses on public policy toward digital currencies.

As stakeholders battle over technology to speed transactions, debate has grown heated.

"It's been, I think, very tense, and people have had fears for their personal safety," Hileman said.

Industry experts do not discard the possibility of a schism that would cleave bitcoin into two separate currencies, one with a faster transaction rate.

If that happens, it could favor rival digital currency platforms using blockchain that have risen in more recent years, including Ethereum, Ripple and Litecoin. Ethereum recently blasted above \$20 billion in market capitalization, more than half of bitcoin's \$36 billion.

Ethereum has received backing from corporate giants like Microsoft, Intel, JPMorgan Chase and UBS, while bitcoin's grassroots origins are still apparent. Ethereum is a public platform that uses a digital currency called ether.

"People talk about the early days of Betamax versus VHS," Van Valkenburgh said, referring to the 1980s battle over video recording, in which Sony's better technology lost the videotape format war due to its poor marketing execution.

Lingham said he is confident that bitcoin will prevail.

"For what we have today," Lingham said, "bitcoin is the only real game in town."

BITCOIN Q & A

What is bitcoin?

It's a type of digital currency created in 2009. They aren't printed, like dollars, and exist only electronically. The system has no centralized control, and is an open network managed by its users.

Are bitcoins safe?

Security researchers say bitcoins are impossible to counterfeit. Bitcoin transactions are encrypted. The decentralized platform is continuously updated by thousands of computers. Experts say the system would fail only if the global internet went dark since the database is held simultaneously on computers all over the world. Yet the use of bitcoin is still seen as a big economic experiment.

Why is the value of bitcoin soaring?

Bitcoin is still an emerging technology, and trades on the open market subject to supply and demand. Demand has risen sharply in the past six months, driving the price of a single bitcoin well over \$2,000. Some see market speculation at work.

How do you spend bitcoins?

One needs a mobile app or a computer to send bitcoin, much as you do when sending cash digitally. You keep bitcoin in digital "wallets," which are like virtual accounts. But bitcoins doesn't actually move around the internet. Rather, the bitcoin system maintains a continuously updated ledger maintained on thousands of host computers around the world.

What is the blockchain?

The platform upon which bitcoin rests is a sprawling ingenious database

that keeps track of every transaction ever made. Each transaction is timestamped and is linked, or chained, to earlier transactions. A blockchain, then, is a list of all past transactions. One could follow the chain all the way back to a bitcoin's origin.

Why is blockchain technology promising?

The tamper-resistant technology under [bitcoin](#) is considered disruptive to many sectors of the global economy. To use the technology, parties must collaborate and mutually verify transactions. Experts say it could take away the need for trusted third parties, or middlemen, in a variety of industries, including finance, real estate and entertainment. Moreover, the technology could streamline manufacturing and logistical supply chain processes by adding transparency to the way goods and services are created and move through the economy.

- Tim Johnson

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