

**MAGISTER ADVISORS**  
**BITCOIN & BLOCKCHAIN IN 2016**  
**A SURVEY OF GLOBAL LEADERS**

**DECEMBER 2015**

Private and Confidential



MAGISTER  
ADVISORS

# BITCOIN & BLOCKCHAIN IN 2016

## A SURVEY OF GLOBAL LEADERS

### Executive Summary

- Bitcoin and Blockchain markets have fundamentally diverged over the past 12 months
- Bitcoin governance (as a 'standard'), compliance and regulation is maturing quickly. Lack of clear 'Bitcoin native' use cases in developed markets giving way to consumer finance apps with 'Bitcoin inside' combined with a surge of developing economy applications
- We estimate over \$1bn will be spent by large financial institutions on Blockchain over the next 24 months



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- Partner at Magister Advisors (London, UK)
- Mentor at Barclays/TechStars FinTech Accelerator
- Angel Investor: Origin, Ravelin, EngageSciences
- Previously
  - Goldman Sachs—Advised on >\$25B of transactions
  - Oracle—Senior roles building Oracle's Java business from 1998–2005



#### Etienne Brunet - [ebrunet@magisteradvisors.com](mailto:ebrunet@magisteradvisors.com)

- Analyst at Magister Advisors (London, UK)
- MSc Stockholm School of Economics (SE) & Saint Gallen (CH)

### Companies Surveyed

#### Bitcoin



#### Blockchain



- **\$474m** of venture funding covered
- Equivalent to **51%** of global funding in Bitcoin/Blockchain
- **33** companies ( **21** EU, **10** US and **2** from RoW)
  - **12** Blockchain companies
  - **21** Bitcoin companies including **6** Exchanges, **2** Miners, **4** Wallets, **5** Payments and **4** Others
- Large Financial Institutions, Hedge Funds and Investment Banks were also part of the survey



# ALMOST \$1BN OF TOTAL INVESTMENT OVER THE PAST 36 MONTHS



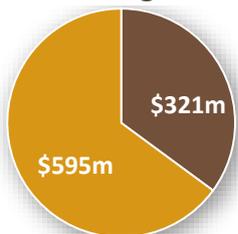
		2013				2014				2015		
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
North America	# Investments	3	4	7	12	11	16	11	22	13	10	6
	≥\$10m	-	-	-	1	2	2	1	2	2	4	1
Europe	# Investments	0	0	1	1	3	2	7	2	6	4	6
	≥\$10m	-	-	-	1	-	1	1	2	1	1	1
RoW	# Investments	0	1	2	4	11	4	6	6	5	2	3
	≥\$10m	-	-	-	-	1	1	-	-	-	-	1

**2015 has marked a transition to investors backing leaders rather than experiments, with the top 10 companies raising more than 80% of the total funding this year**

# FINANCIAL INSTITUTIONS HIGHLY ACTIVE INVESTORS

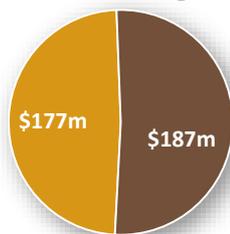
## Fls are even more represented in large rounds

All financing rounds



■ No Financial Institution Participation

\$25m+ financing rounds



■ Financial Institution Participation

### Apr 2015: GS invested in Circle's \$50m financing round

#### Goldman Joins Bitcoin Startup Circle's \$50 Million Fundraising

Goldman Sachs Group Inc. invested in a \$50 million fundraising round in bitcoin startup Circle Internet Financial Ltd., another sign of the growing interest in digital currency technology by established financial institutions.

IDG Capital Partners co-led the round, which also included existing Circle investors such as Breyer Capital, General Catalyst Partners, Accel Partners and Oak Investment Partners, Circle said in a statement late Wednesday. The company offers a variety of services for storing and using bitcoins.

The round brings Circle's total funding to \$76 million, and "is a material step-up in valuation from our past financing," Jeremy Allaire, chief executive officer of the Boston-based venture, said in a telephone interview. He declined to disclose the specific value.

### May 2015: CME invested in Ripple's \$28m Series A round

#### Ripple Labs Raises \$28 Million in Series A Round

Digital currency startup Ripple Labs announced today that it has closed a new \$28m Series A funding round.

The company drew support from a mixture of new and existing investors, including the venture arms of US futures and options exchange CME Group and data storage firm Seagate Technology.

### Jul 2014: Fortress invested in Xapo's \$40m financing round

#### Xapo Sets \$40 Million Fundraising Record for Bitcoin Industry

Online wallet provider Xapo has raised its funding total to \$40m, leapfrogging BitPay to become the best-funded bitcoin startup to date.

Announced today, the startup's second Series A-1 funding round took \$20m in total. Spearheaded by Index Ventures and Greyllock Partners, the round also included Emergence Capital Partners, venture capitalist Yuri Milner, PayPal co-founder Max Levchin and former Yahoo! CEO Jerry Yang.

### Jan 2015: NYSE & BBVA invested in Coinbase's \$75m financing round

#### MARKETS Coinbase Raises \$75 Million in Funding Round

Investors in Bitcoin-Related Startup Include Traditional Financial Institutions and NYSE

Coinbase said it raised \$75 million in the single largest venture-capital fundraising by a bitcoin-related startup.

Investors included banks and the New York Stock Exchange, apparently the first time any traditional financial institutions have taken direct stakes in a bitcoin enterprise.

Coinbase, based in San Francisco, offers a number of financial services for individuals and businesses, such as processing transactions for merchants that accept bitcoin.

Bitcoin, a digital currency created six years ago that allows for peer-to-peer transactions outside the traditional banking system, has been beset by bad news, most prominently a brutal selloff in the currency. After falling 67% in 2014, it careened down 44% in January before stabilizing.

### Sep 2015: Visa, Nasdaq & Citi invested in Chain's \$30m round

#### Fintech Bitcoin Blockchain startup Chain raises \$30m Series B from Visa, Nasdaq, Citi and others

Fintech Bitcoin blockchain startup Chain, Inc. has raised \$30 million Series B in a round that included financial heavyweights Visa, Nasdaq, Citi Ventures and Capital One, along with Fiserv, Orange, RRE Ventures, Khosla Ventures, Thrive Capital, SV Angel and individual investors including former Bank of America Chief Executive Officer David Coulter, X Prize Foundation Chief Executive Officer Peter Diamandis and MongoDB Co-founder Kevin Ryan.

Although not officially disclosed, Forbes puts the valuation on the round at \$150 million.

Founded in 2014, Chain utilizes the Blockchain, the underlying digital ledger that powers Bitcoin, to assist banks and other institutions in developing ways to trade and transfer financial assets.

The company claims that their solutions enable institutions to design, deploy and operate Blockchain networks that can power any type of asset in any market.

Being based on the Bitcoin Blockchain, Chain says that its platform delivers interoperability across systems and networks while also offering APIs and SDKs that enable partners to test ideas faster in a private environment.

### Sep 2015: AmEx invested in Abra's \$12m financing round

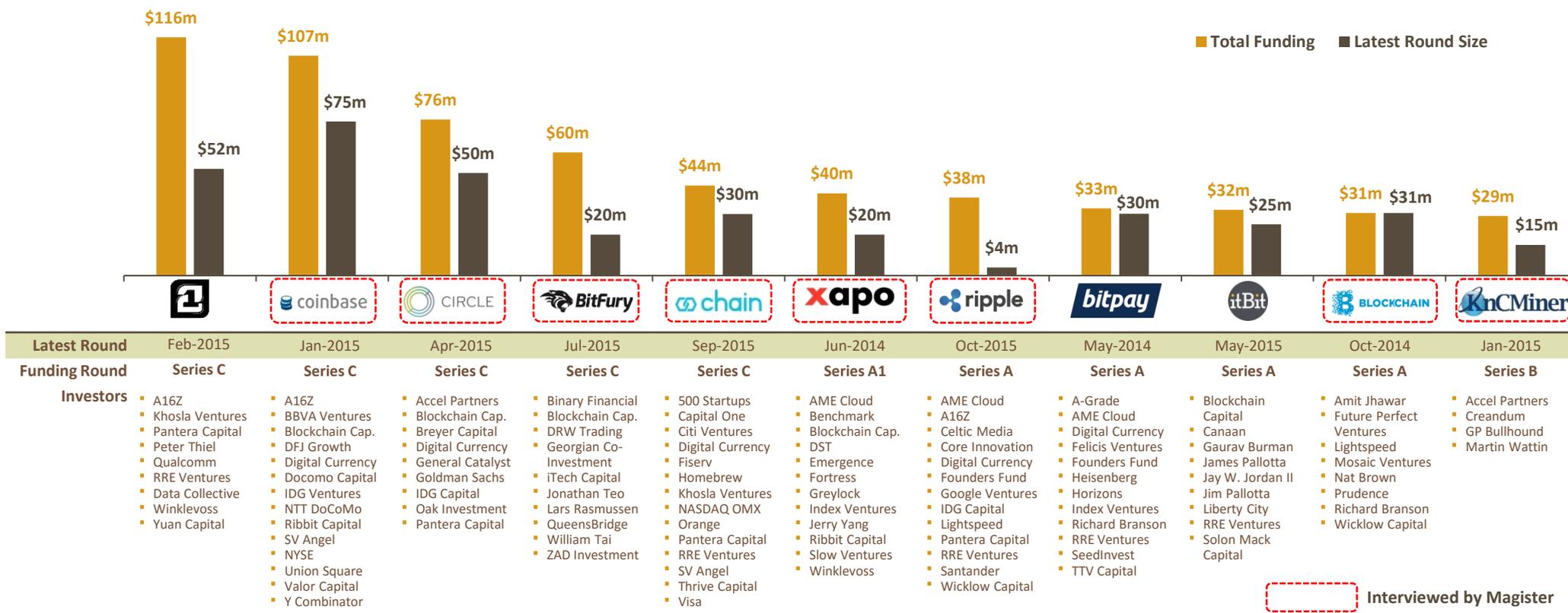
#### Bitcoin-based mobile app Abra raises \$12 million

A bitcoin-based challenger to Western Union just raised \$12 million as it gears up to launch a low-cost, global cash-transfer network.

The new mobile app, called Abra, will begin transmitting money this fall between more than 80 countries for fees of less than 2 percent — less than half the fee of traditional services.

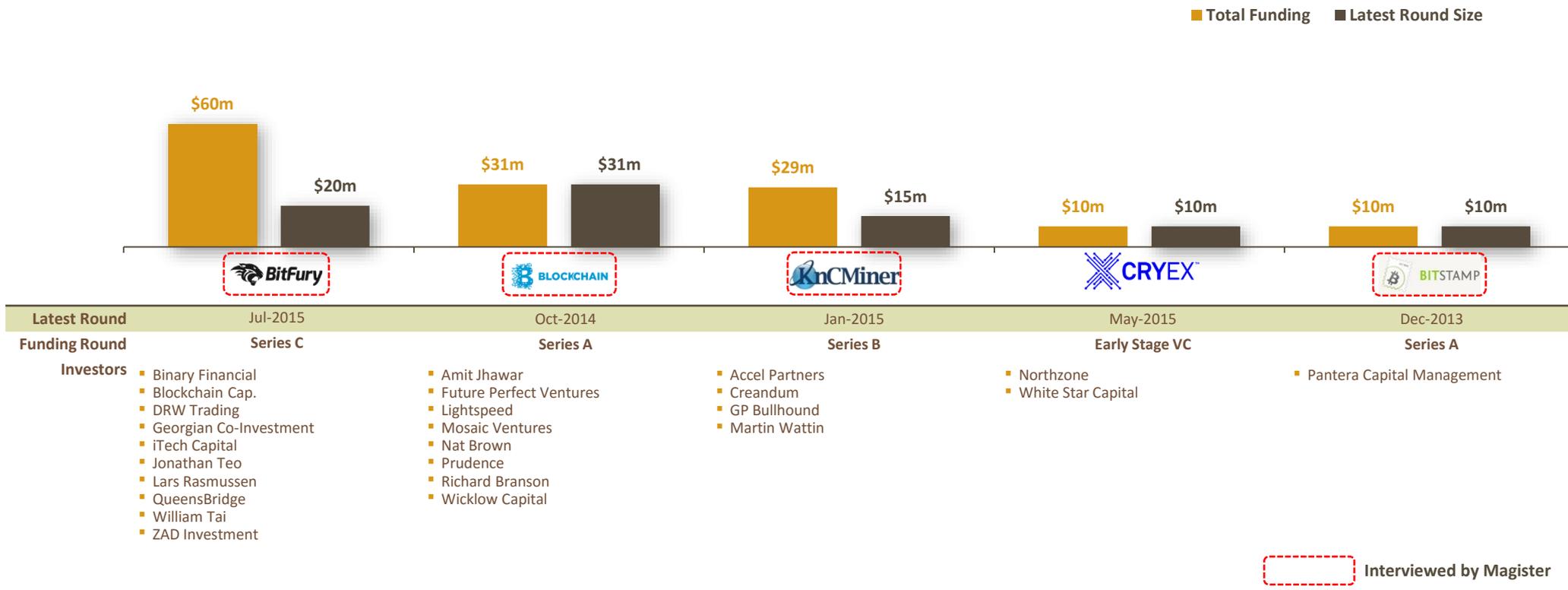
Fls have participated in \$321m worth of financing rounds in 18 Bitcoin/Blockchain companies and have invested in more than half of all \$25m+ financing rounds

# LARGEST VC-BACKED COMPANIES BITCOIN/BLOCKCHAIN



2/3rds of total Bitcoin/Blockchain investment has been raised by the top 11 companies

# EU BITCOIN/BLOCKCHAIN COMPANIES WITH \$10M+ OF FUNDING



Only 5 Bitcoin/Blockchain companies in Europe have raised at least \$10m

# BITCOIN AND BLOCKCHAIN HAVE DIVERGED OVER THE PAST 12-18 MONTHS



## *Bitcoin*

- The leading digital currency
- Numerous consumer/SME and financial service payment applications, particularly in developing economies
- A favourite for speculators given its volatility and liquidity, with high-frequency trading and hedge fund participation



## *Blockchain*

- Distributed ledger with cryptographic integrity
- Potential replacement for middleware networks and clearing houses in financial transactions where 3<sup>rd</sup> party verification is required
- Applications extend to other networks where veracity is critical to performance

**While Bitcoin is established as the leading digital currency, banks are more focused on applications of the underlying Blockchain technology**



# WHAT IS DRIVING BITCOIN EVOLUTION AND WHAT IS NEXT?

1

Rapidly maturing governance, regulation and compliance

2

Improving 'on/off ramps' between Bitcoin and local banking networks (a potentially 'hidden' value of regional exchanges)

3

Next-Gen Consumer finance apps leveraging Bitcoin as an alternative payment rail, but not branded Bitcoin

4

Bitcoin wallet leaders are well-funded, and some have started to become 'Bitcoin banks', raising barriers to entry

5

Accelerating adoption in developing economies, particularly those with frequent cross-currency payment requirements and weak financial institutions

6

Institutional-like usage as instrument for speculation, given backdrop of low yields and volatility

- Failures and consolidation where economies of scale and network effects drive economics, notably exchanges and mining
- In established Bitcoin markets, the full service model has gained significant traction and scale
- In the developing economies, local market considerations are significant
- Consumer services with 'Bitcoin inside', but the crypto-currency aspects to be largely invisible
- Continued growth both as a store value and transactions



# WHAT IS DRIVING BLOCKCHAIN EVOLUTION AND WHAT IS NEXT?

**1** Broad recognition of potential transformational impact for financial institutions, with benefits estimated in the tens of billions annually in infrastructure savings alone

**2** Large financial institutions typically already have identified portfolios of 10-20 potential Blockchain projects to evaluate

**3** Blockchain technology providers have adopted a collaborative approach to working with financial institutions, who in turn are frequently major investors

**4** The market has already split between broad platform or 'fabric' vendors and domain-specific application providers

**5** The largest technology providers we spoke with tended to have 20-30 client projects underway, often involving multiple counter-parties collaborating on projects

**6** The market is largely at the POC phase, proving that Blockchain-based implementations can replicate or complement existing infrastructure

- 2016 marks a 'race to production' as innovators seek to push beyond the prototype stage. This is particularly important for the vendors looking to establish market position
- We estimate that over \$1bn will be spent by large financial institutions on Blockchain projects over the next 24 months
- Even within the collaborative approach, we see a certain degree of 'co-opetition' between the vendors and financial institutions vying for technology leadership



# I. BITCOIN LANDSCAPE

# BITCOIN TECHNOLOGY OVERVIEW

## Key Concepts

Created by Satoshi Nakamoto in 2008, Bitcoin is a decentralised cryptocurrency based on Blockchain technology. Bitcoin provides lower transaction costs, cryptographic security and cross-currency portability



**Transaction:** Transactions in Bitcoin are made by sending an encrypted message signed by a key which is private to the user. This transaction can be verified by others in the network by using a public key



**Blockchain:** The public ledger refers to a long list of blocks known as Blockchain. Whenever a new block of transactions is created, it is added to the Blockchain, creating an increasingly lengthy list of all the transactions that ever took place on the Bitcoin network



**Mining:** Bitcoin mining is a decentralized computational process where miners use their computing power to calculate cryptographic hash functions in order to verify and record payments into a public ledger



**Proof of Work:** Miners can create a hash to update the Blockchain after each transaction. Creating a hash, however, requires solving a cryptographic function. This process is called proof of work

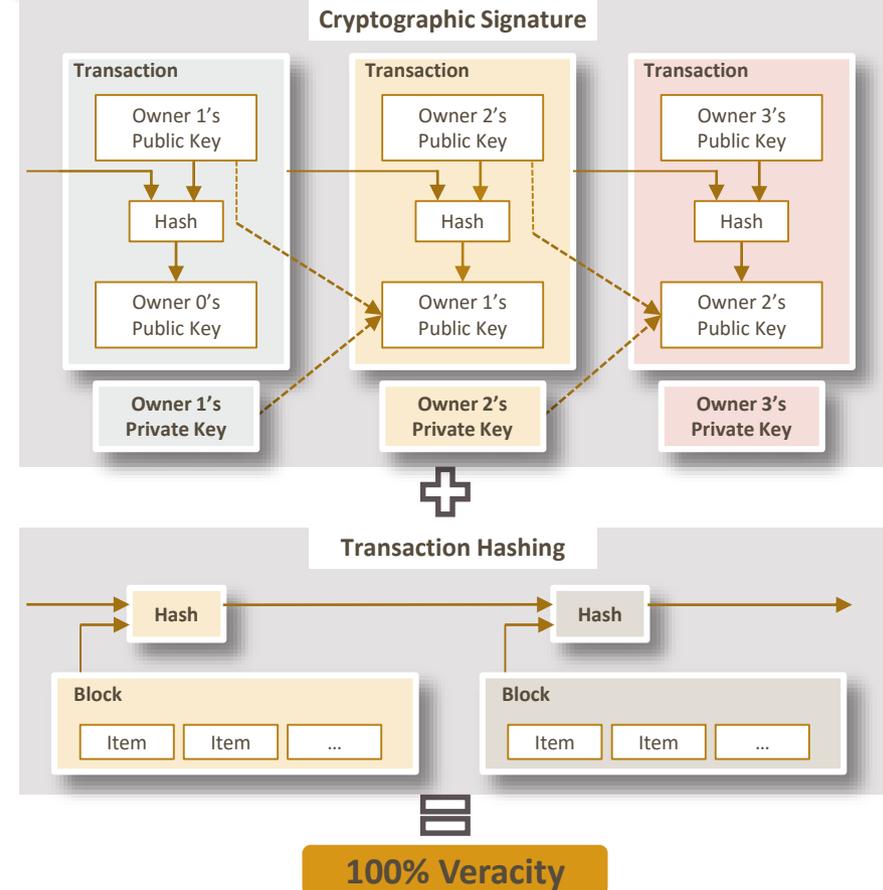


**Reward:** Proof of work requires significant computational power. To provide incentives to the miners, they are rewarded with Bitcoin every time they create a hash to update the Blockchain. Today, miners receive 25 Bitcoins per hash and transactions fees



**Security:** Blockchain serves to confirm to the rest of the network what transactions have already taken place. Bitcoin nodes use the Blockchain to distinguish legitimate Bitcoin transactions from attempts to re-spend coins that have already been spent elsewhere

## Cryptographic Integrity



No wonder Bitcoin has captured the imagination. It combines a number of complex theoretical constructs from computer science and economics, into a globally distributed system that has already scaled to millions of transactions a day globally, operating in near real-time



# BITCOIN: A HISTORY OF VOLATILITY THOUGH RELATIVELY STABLE IN '15 TILL LATE

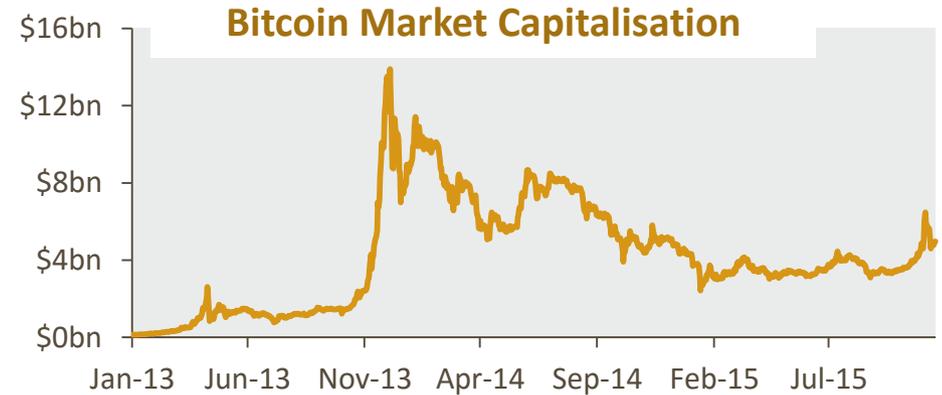


**Significant Bitcoin price volatility in 2013 and 2014 hindered general Bitcoin adoption; However, the price stability since the beginning of 2015 is now helping to support adoption**



# BITCOIN: 6<sup>TH</sup> LARGEST RESERVE CURRENCY BY 2030?

#	Currency	Total FX Reserves \$B (COFER)	% Reserves
1	\$	4,250	65.8%
2	€	1,367	21.2%
3	£	313	4.8%
4	¥	255	4.0%
T-5	C\$	128	2.0%
T-5	A\$	128	2.0%
6	SFr	20	0.3%
-		5	n.m.



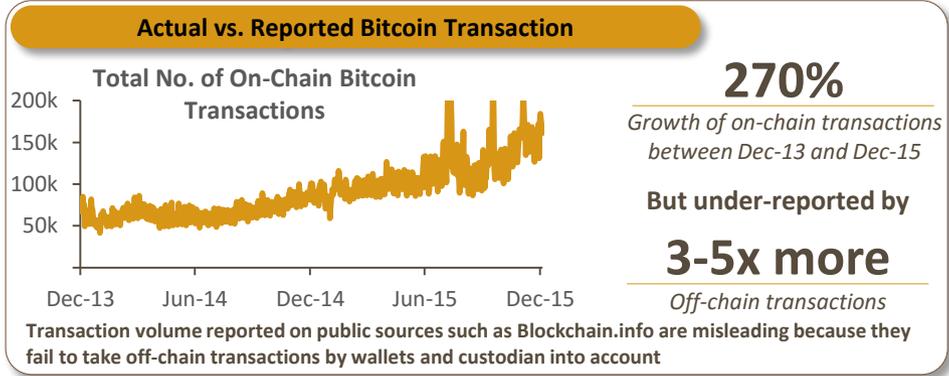
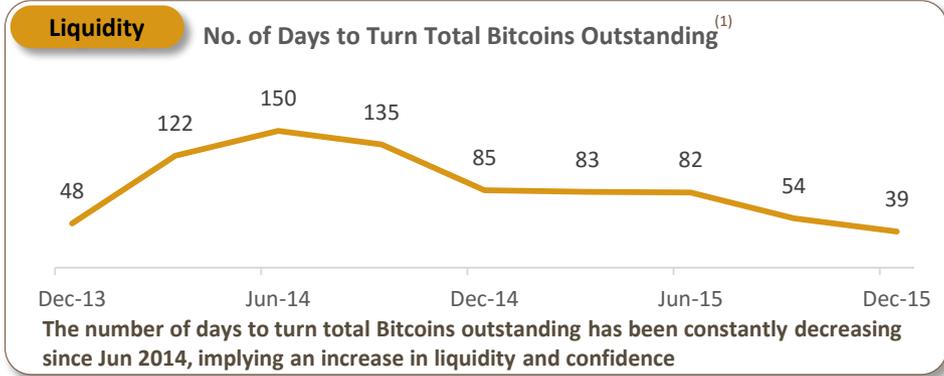
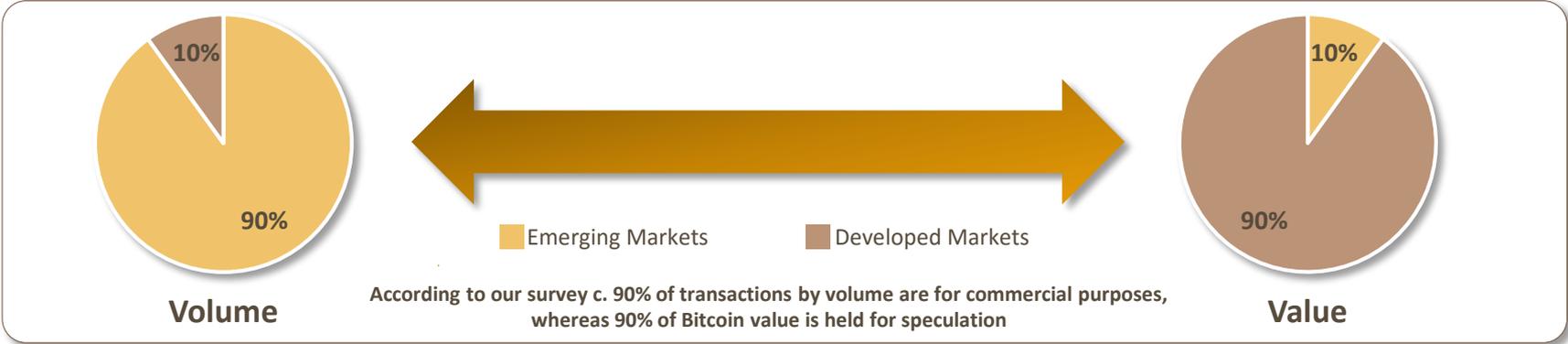
*'Adding Bitcoin to the reserve portfolio of the central bank would not significantly increase volatility, but could provide opportunities to offset exchange rate depreciations against major currencies such as the Pound and the Euro. In addition, the appreciation in the value of the Bitcoin portfolio (in US dollars) would have also generated a significant return for the Bank.'*

– Central Bank of Barbados Working Paper, Nov 2015

Becoming the 6th largest currency globally is well in sight, given the sharp drop-off outside the top 5

# BEYOND PRICE A FEW STATISTICS

## Volume vs. Value



According to our survey, ~90% of total Bitcoin transactions by volume are used for commercial purposes (frequently in developing and emerging markets) while 90% of Bitcoin value is retained for speculation, often by HNW and 'near-institutional' purposes

Source: Blockchain.info, Press Release  
 (1): 30 Day Moving Average, Data as of 1 Dec 2015  
 The Volume, Value data and Off Blockchain transaction data are obtained from Magister Advisors survey

# SECURITY & TRUST HAVE CREATED ANXIETIES THAT LEADERS ARE ADDRESSING

## Proceeds of Crime

### Meet The 'Bitcoin Millionaire' Arrested For Allegedly Helping Silk Road Launder \$1 Million

The Bitcoin community faces a major publicity crisis this week with the arrest of BitInstant CEO Charlie Shrem on charges of money laundering for users of the digital black market known as Silk Road.

Shrem, though only 24, is considered an important figure in the Bitcoin community.

In less than three years, he went from being a college senior investing in a silly bubble, to one of the publicly known "Bitcoin millionaires" – a face for a concept just hitting the



BitInstant CEO Charlie Shrem

## Deposit Security

### Bitstamp Claims \$5 Million Lost in Hot Wallet Hack

Bitstamp has released a new statement regarding the security of its website, admitting that it has lost "less than 19,000 BTC", about \$5.1m at press time.

The revelation follows the disclosure that Bitstamp's **wallet system was compromised**, prompting it to halt deposits and later shut down its platform entirely.

According to the statement, an undisclosed number of wallets were compromised and upon learning of the breach, the Bitstamp team issued warnings about deposits and moved to suspend operations. Bitstamp CEO Nejc Kodrič said that all other funds held by the bitcoin exchange are secure in cold storage, stating:



## Bitcoin Governance

### What is the Bitcoin Block Size Debate and Why Does it Matter?

Bitcoin is divided. Some are calling it the currency's "constitutional crisis", a debate that has split its community right down the middle.

The crux of the issue comes down to a single technical detail: the size of bitcoin's blocks.

The question of scale in bitcoin is not a new one. But as transaction volumes are expected to increase in the years ahead, questions about the cryptocurrency's future composition must, in the eyes of those who favor change, be answered sooner rather than later: who does it serve? How should it look? What makes it unique?

As the block size debate rages on, here's a primer on its broad strokes and why it matters.

### The Bitcoin Big Bang – Elliptic's Remarkable Breakthrough in AML

#### New bitcoin technology can tell banks where coins come from with incredible accuracy

UK-based Bitcoin analytics and security firm **Elliptic** today announced the launch of **The Bitcoin Big Bang** – an interactive visualization that marks the emergence and interconnectivity of key Bitcoin names since the cryptocurrency was first heard in 2009.

The Bitcoin Big Bang is a landmark achievement in itself. The interactive visualization tool debunks the anonymity myth of the blockchain technology and tracks the flow of Bitcoin from one entity to another.

# xapo

## WE'VE BUILT A FORTRESS

Secure bitcoin storage is what we do best. We've developed a new standard in bitcoin security that insures your assets by using man, machine and even a mountain to keep your money safe.

### WHAT IF HACKERS ATTACK? INSURANCE

Xapo reduces risks and provides you with the peace of mind that comes from knowing that your bitcoins are safe. Bitcoins stored in the Xapo Vault are insured by third party insurance companies with an A.M. Best rating of A.

### Bitcoin Scalability Workshops

In recent months the Bitcoin development community has faced difficult discussions of how to safely improve the scalability and decentralized nature of the Bitcoin network. To aid the technical consensus building process we are organizing a pair of workshops to collect technical criteria, present proposals and evaluate technical materials and data with academic discipline and analysis that fully considers the complex tradeoffs between decentralization, utility, security and operational realities. This may be considered as similar in intent and process to the NIST-SHA3 design process where performance and security were in a tradeoff for a security critical application.

Since Bitcoin is a P2P currency with many stakeholders, it is important to collect requirements as broadly as possible, and through the process enhance everyone's understanding of the technical properties of Bitcoin to help foster an inclusive, transparent, and informed process.

Bitcoin has held a negative reputation particularly in regards to crime and fraud, but over the past 12-24 months leaders have moved quickly to address concerns.

# BITCOIN REGULATION IS DEVELOPING RAPIDLY



Mar-2015

## Anti-money laundering rules to apply to digital currency exchanges in the UK

Operators of digital currency trading platforms will be required to carry out anti-money laundering (AML) checks in future under new plans outlined by the UK government. | 19 Mar 2015

The Treasury said it would consult on the plans "early in the next parliament" in an effort to ensure people cannot use digital currency exchanges to conceal criminal behaviour.

"The government intends to apply anti-money laundering regulation to digital currency exchanges in the UK, to support innovation and prevent criminal use," the Treasury said. "The government will formally consult on the proposed regulatory approach early in the next parliament."

Last year, [Singapore](#) announced it would regulate digital currency intermediaries to address AML risks, whilst an AML regime for digital currencies was implemented in [Canada](#).



NEW YORK STATE  
DEPARTMENT of  
FINANCIAL SERVICES

Jun-2015

## New York Releases Final BitLicense

The New York State Department of Financial Services (NYDFS) released the final version of its long-awaited regulatory framework for digital currency companies today.

The final release of the [BitLicense](#) follows nearly two years of [fact-finding](#) and [debate](#). The NYDFS began crafting the rules after it determined the technology should not be regulated under existing state law.

The bill will not become law until its publication in the New York state register, a weekly government-issued guide to proposed rulemakings.

In remarks issued by NYDFS at the [BITS Emerging Payments Forum](#) in Washington, DC today, superintendent Benjamin Lawsky clarified that the final regulation meant firms will no longer need the agency's approval for each new software update or round of venture capital funding.



Oct-2015

## European Court of Justice: Bitcoin is a currency and exchanges are VAT-exempt

The European Court of Justice (ECJ) has ruled that bitcoin exchange transactions should be exempt from VAT. The ECJ ruling stated that bitcoin transactions "are exempt from VAT under the provision concerning transactions relating to currency, bank notes and coins used as legal tender."

The ECJ's top legal advisors had already recommended the exemption, but the judges do not always agree with them. Had the decision gone the other way, it would have caused a huge headache for European bitcoin exchanges.

The case involved a request regarding the tax status on exchange commissions and margins which came from a Swede called David Hedqvist who was looking to set up a one-man bitcoin exchange. He had approached Swedish tax authorities for an advanced decision on whether or not the exchange of bitcoin into Swedish Krona and vice versa should be considered as a VAT taxable or VAT exempt activity.

The tax authorities said Bitcoin trading should be subject to VAT, but Hedqvist thought the answer should be no, and he took it to court and eventually it reached the appeal court in Sweden. Since all VAT law flows from Europe, the appeal court passed the case on to the ECJ to decide.

There have been some limited decisions in the US involving criminal cases where bitcoin was viewed as money, for the purposes of money laundering offence. Meanwhile, the US Commodity Futures Trading Commission (CFTC) last month deemed bitcoin to be a commodity and closed down trading platform Coinflip in the process.

The most surprising aspect to note is the speed and pragmatism with which regulators are taking action towards Bitcoin

# BITCOIN ECOSYSTEM COVERED IN THIS SURVEY



## Mining

- Mining – i.e. compute farm which maintain the cryptographic integrity of the network - is evolving into a ‘natural monopoly’ due to economies of scale and increasing capital intensity with the top five players collectively commanding c. 78% of market share



## Exchanges

- There are many regional players but only a few market leaders crossing only a few currencies
- Unlike elsewhere in the Bitcoin ecosystem, exchanges have seen an early wave of M&A activity



## Wallets

- Wallets are evolving into banks, crossing their own currency pairs and making off-chain transactions
- Development of full-service models including forex, custody, payments and brokerage
- Offer SaaS platforms/SDKs providing APIs for others to build consumer applications



## Payment & Remittance

- Few clear commercial use cases are visible in the developed world beyond speculation
- The last mile is the key challenge in developing and emerging markets
- Next-gen consumer services are leveraging ‘Bitcoin inside’ as a payment rail



## Financial Products

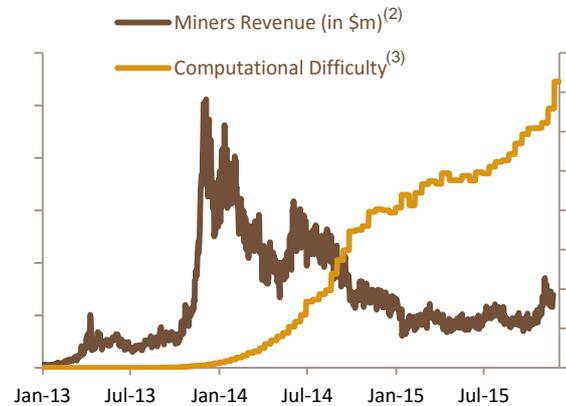
- Financial products have emerged in the Bitcoin ecosystem ranging from ETFs and saving accounts to derivatives
- With a lack of mass public adoption, Bitcoin-related financial products are still in their infancy





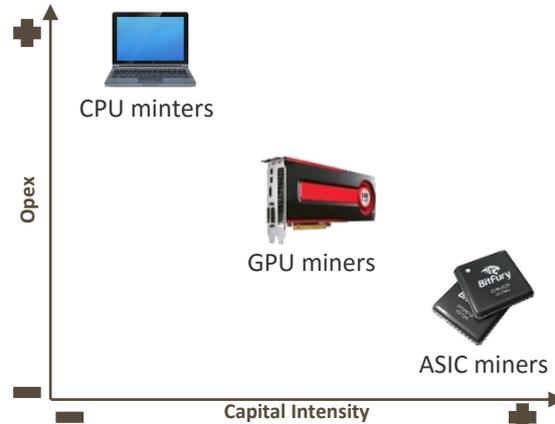
# ECONOMIES OF SCALE & CAPITAL INTENSITY LEAD TO NATURAL MONOPOLY

Increase in computational difficulty  
and reduction in rewards...



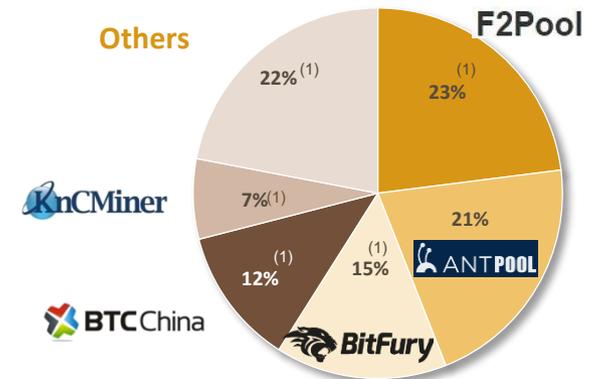
Mining capacity has increased, driving up computational difficulty while rewards are falling

...require increasing capital costs /  
complexity and lowering Opex



To maintain margin, the leading miners have evolved from simple computer to custom ASIC systems

...creating barriers to entry and  
market concentration



The leading five miners are generating 78% of the revenue

Started as a hobby for tech enthusiasts, Bitcoin mining has moved to enterprise-grade data centres with specialized ASICs and \$100m+ facilities; today the market is fragmented with only a handful of leaders including 2 European companies (KnCMiner and BitFury)

Note: 1: Source Blockchain.info as of November 3, 2015  
2: Miner's revenue is the revenue earned for mining a block (in USD)  
3: Computational Difficulty refers to difficulty in mining a block





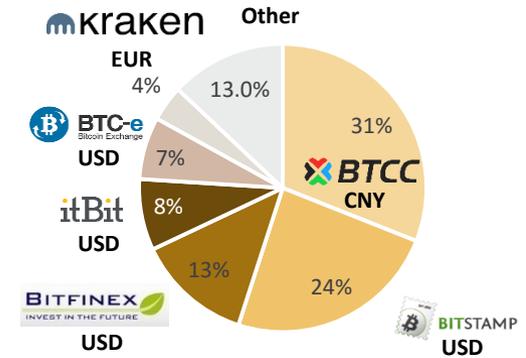
# BITCOIN EXCHANGES HAVE BECOME AN OLIGOPOLISTIC MARKET

## Many Regional Players...



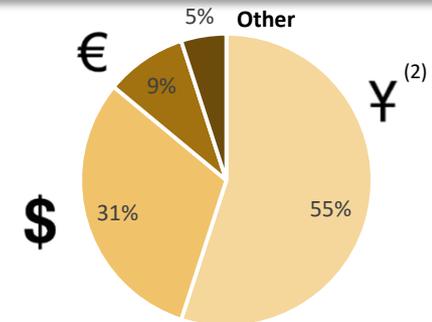
## ... But Few Winners At Scale...

Segmented By Bitcoin Exchange Firms<sup>(1)</sup>



## ... Crossing Only a Few Currencies

Segmented By Bitcoin Exchange Currency<sup>(1)</sup>



Depth of liquidity rewards scale but local bank partnership critical; M&A consolidation a natural consequence

Source: Bitcoin's website, Press release, Company, Magister analysis  
Note: (1) Bitcoincharts, (2) Chinese Yuan Currency





# EARLY EXCHANGE CONSOLIDATION ALREADY OCCURRING

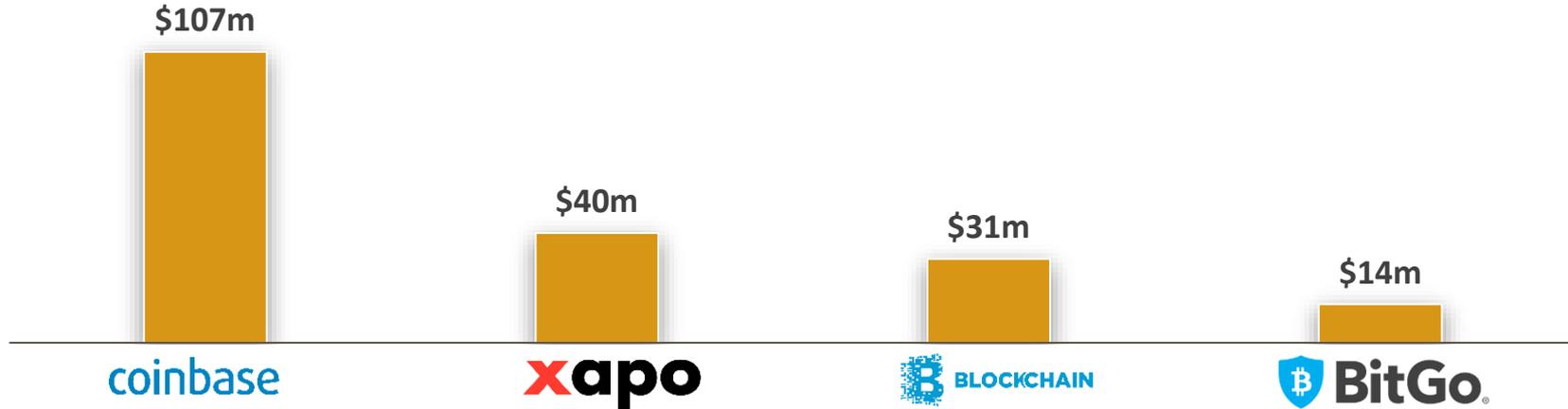
Announced	Acquirer	Country	Target	Country
Sep-15				
Aug-15				
Jun-15				
Apr-15				
Apr-15				
Jan-15				
Jul-14				
Mar-14				
Dec-13				

Given the potential economies of scale we expect consolidation to continue or even accelerate in 2016





# WALLET LEADERS HEAVILY FUNDED CREATING HIGH BARRIERS TO ENTRY



Latest Round	Jan-2015	Jun-2014	Oct-2014	Sep-2014
Funding Round	Series C	Series A1	Series A	Series A
<b>Investors</b>	<ul style="list-style-type: none"> <li>A16Z</li> <li>BBVA Ventures</li> <li>Blockchain Capital</li> <li>DFJ Growth</li> <li>Digital Currency Group</li> <li>Docomo Capital</li> <li>IDG Ventures</li> <li>NTT DoCoMo</li> <li>Ribbit Capital</li> <li>SV Angel</li> <li>NYSE</li> <li>Union Square</li> <li>Valor Capital</li> <li>Y Combinator</li> </ul>	<ul style="list-style-type: none"> <li>AME Cloud</li> <li>Benchmark</li> <li>Blockchain Capital</li> <li>BitFury Group</li> <li>DST</li> <li>Emergence Capital</li> <li>Fortress</li> <li>Greylock</li> <li>Index Ventures</li> <li>Jerry Yang</li> <li>Ribbit Capital</li> <li>Slow Ventures</li> <li>Winklevoss Capital</li> </ul>	<ul style="list-style-type: none"> <li>Amit Jhavar</li> <li>Future Perfect Ventures</li> <li>Lightspeed</li> <li>BitFury Group</li> <li>Mosaic Ventures</li> <li>Nat Brown</li> <li>Prudence</li> <li>Richard Branson</li> <li>Wicklow Capital</li> </ul>	<ul style="list-style-type: none"> <li>Redpoint Ventures</li> <li>Bridgescale Partners</li> <li>BitFury Group</li> <li>A-Grade Investments</li> <li>Blockchain Capital</li> <li>Founders Fund</li> <li>Inventures Group</li> <li>Liberty City Ventures</li> <li>Radar Partners</li> </ul>

21% of total VC funding is invested in the top 4 Bitcoin wallets

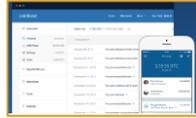
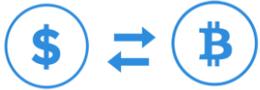


Source PitchBook as of December 02, 2015



# WALLETS ARE EVOLVING INTO BANKS...

## COINBASE DEVELOPMENT SINCE 2012



**Jan 2012:** Coinbase launches Bitcoin wallet

**May 2013:** Coinbase launches subscription payments

**Aug 2014:** Coinbase announces that it holds insurance against theft or loss of its Bitcoins

**Jan 2015:** Coinbase launches the first regulated Bitcoin exchange in the US

**Jun 2015:** Coinbase launches Instant Exchange, a feature that allows users to send or receive Bitcoin payments while eliminating exposure to Bitcoin exchange rate fluctuations

**Jul 2015:** Coinbase launches market orders on Coinbase Exchange

**Nov 2015:** Coinbase launches first US-issued Bitcoin debit card, the Shift Card

**Dec 2012:** Launch of Coinbase payment button to accept Bitcoin on any website by copying and pasting a few lines of code

**Jan 2013:** Coinbase launches a new version of its API enabling users to buy, send, and accept Bitcoin

**Jul 2014:** Coinbase Vault goes live to all customers

**Jun 2014:** Coinbase launches new mobile site

2012

2013

2014

2015

coinbase

Since its inception in 2012, Coinbase has expanded its offering from a Bitcoin wallet to a full-featured Bitcoin bank. This exemplifies the trend of wallet providers evolving to gain additional market share





# ... AND SAAS PLATFORMS BLOCKCHAIN IS A PRIME EXAMPLE

## Our Mission

## BLOCKCHAIN

At Blockchain, we build innovative software that makes using Bitcoin safe, easy, and secure for all consumers and businesses anywhere in the world. We have raised over 30M in capital from top tier investors including Lightspeed Venture Partners, Wicklow Capital, and Sir Richard Branson.

Blockchain is currently the provider of the world's most popular Bitcoin wallet, the most widely used Bitcoin APIs, the most popular block explorer and search engine, and has what is widely recognized as the strongest, most trusted brand in Bitcoin. Experiencing a rapid expansion during the course of two years, Blockchain exploded from 100,000 users to over 3,500,000 users.

*'Our API solution may be our most valuable piece of technology. Developers can build on the top of it and have access to all of our data including wallet information, data on transactions & blocks, and market information.'*

**– Nicolas Cary, Co-Founder of Blockchain**

Payment Processing



Blockchain Wallet API



Bitcoin-Qt Compatible  
JSON RPC



Web services

Create Wallets



Blockchain Data API



Simple

Query API



WebSocket



Exchange  
Rates



Charts and  
Statistics



 **BLOCKCHAIN API**



















**Snapshot of API Users**

**In contrast, Blockchain has been pursuing a strategy of providing software and data to the ecosystem**



# PAYMENT USE CASES VARY SIGNIFICANTLY BY GEOGRAPHY AND APPLICATION

## Emerging Markets

### Remittance

#### How BitPesa Plans to Reduce Friction in the Remittances Market

Bitcoin remittance service Rebit rolls out zero transaction fees, KYC policy



- The remittance market could benefit substantially from Bitcoin given the high fees on international money transfers and the oligopoly of incumbents with limited competition and accessibility (due to the limited number of locations and opening hours of branches)

### Cross-Currency Payment

#### Starting Bitwage, An International Payroll Company That Uses Bitcoin

Align Commerce Raises \$12.5 Million To Simplify Cross Border Payments For Business Using Blockchain



- Tight capital control policies are a hurdle for traditional cross-border payments
- Bitcoin technology can replace correspondent banks in the cross-border process by providing cheaper transactions for merchant clients

## Developed Markets

### Consumer Products

Bitcoin goes mainstream: Circle's payments make cryptocurrencies easy

**COINBASE JUST DEBUTED THE FIRST BITCOIN DEBIT CARD IN THE US**



- Circle uses Bitcoin technology to offer digital money transfers to consumers, thereby competing against Venmo, Google Wallet, and Apple; users do not know they are exchanging through Bitcoin, but nonetheless enjoy Bitcoin benefits

### Micropayments

#### Faradam: Bitcoin Micropayments for Freelancers

Streamium Allows You To Earn Bitcoin Per Minute



- Traditional cards were not designed to support online micropayments. Bitcoin offers a flexible solution without borders
- Ability to charge for services rather than content would be broadly useful

**The Bitcoin payment landscape is rapidly evolving and is use case dependent**



# FINANCIAL PRODUCTS ARE STARTING TO EMERGE

## Bitcoin Hedge Funds

Sep-2014

### Hedge Fund GABI Makes First Bitcoin Purchase via DigitalBTC

The Global Advisors Bitcoin Investment Fund (GABI) has completed its first initial offer period and made its first purchase of bitcoin, according to the company.

While the amount of cryptocurrency purchased has not been announced, it is clear that the fund delayed the move to make the most of the [current decrease](#) in the bitcoin price.

GABI is incorporated in the island of Jersey and is possibly the world's [first regulated bitcoin investment fund](#).

#### Transparency and compliance

GABI made the decision to execute its first bitcoin purchase via [digitalBTC](#), Australia's [first publicly listed bitcoin company](#).

Daniel Masters, director of GABI and co-founder of Global Advisors Jersey Limited (GAJL), which set up the fund, explains:

## Bitcoin ETFs

May-2015

### Bitcoin Tracker One ETN Starts Trading on Nasdaq Stockholm

Two weeks ago [XBT Provider AB](#) announced the [authorization](#) of Bitcoin Tracker One, the first Bitcoin-based security available on a regulated exchange. Today, Bitcoin Tracker One started [trading](#) on Nasdaq Stockholm.

"NASDAQ OMX Stockholm decides to officially list 1 Exchange Traded Note issued by XBT Provider AB with effect from 2015-05-18," [announced](#) XBT Provider AB on Friday. "We are proud to offer the world's first "Bitcoin tracker" to be traded on a regulated exchange," [states](#) the XBT Provider website. "By enabling this easy and secure way to invest in Bitcoin we hope to have eliminated the boundaries that earlier prevented individuals and companies from being able to actively invest in what we believe to be the future of money."

## Bitcoin Savings Accounts

Jun-2015

### BTC.sx Rebrands as Magnr in Bitcoin Savings Account Launch

Magnr, formerly [BTC.sx](#) – a bitcoin derivatives trading platform – has rebranded and is now offering bitcoin saving accounts with an interest rate fixed at 2.18% for a promotional period of six months.

Following this, the interest rate will be variable, dependent on trading fees generated by users on the platform. Magnr declined to reveal its trading volume but said that it had surpassed 60,000 total trades earlier this year.

## Bitcoin Derivatives

Sep-2015

### Alt-Options Launches Bitcoin Derivative Market

A group of students from Boston University has set out to build a commodity derivative exchange for digital currencies, allowing those who hold large amounts of bitcoin to hedge against market volatility.

Alt-Options, co-founded in June 2014 by Joe Zhou, Kevin Foo and Marco Cuesta, aims to act as the Chicago Mercantile Exchange for bitcoin, allowing digital currency derivatives to be publicly bought and sold instantly on its platform. The new platform launches in this month with a competition in collaboration with the [College Cryptocurrency Network](#).

Bitcoin financial products have started to emerge, but the sector is still in its infancy

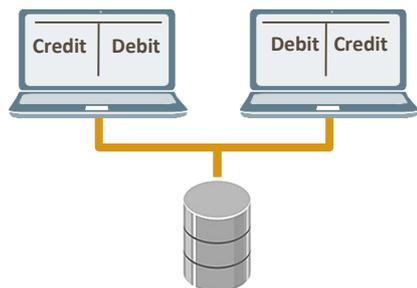
## II. BLOCKCHAIN LANDSCAPE



# BLOCKCHAIN FOR FINANCIAL INSTITUTIONS

## DIFFERENCES VS. EXISTING ARCHITECTURES

### Internal Transaction Systems



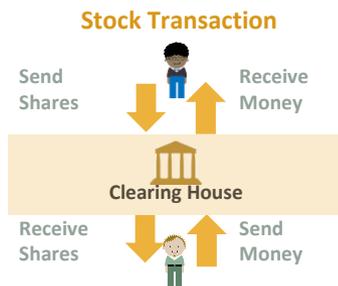
- **Architecture:** Centralized internal database (e.g. IBM, Oracle)
- **Settlement Process:** Internal
- **Speed:** Real-time
- **Transaction Cost:** Internal IT
- **Benefits:** Speed, cost and (relative) simplicity
- **Limitations:** Committing transactions with third parties/across network

### Middleware/Messaging



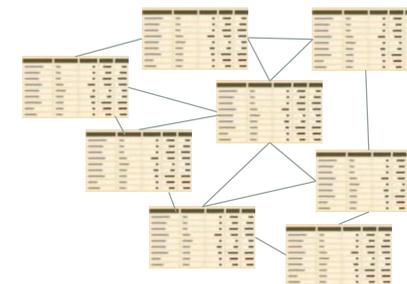
- **Architecture:** Secure inter-party messaging/queue-based middleware
- **Settlement Process:** Independent (but enabled by messaging)
- **Speed:** Up to 3–5 days
- **Transaction Cost:** External provider + settlement costs
- **Benefits:** Secure transaction between external parties, standardized data formats
- **Limitations:** Data errors slow transactions, flexibility

### Clearing Houses



- **Architecture:** Third party agent-in-possession
- **Settlement Process:** Via clearing house
- **Speed:** Days (transaction dependent)
- **Transaction Cost:** Third-party service
- **Benefits:** Reduced settlement risk/DVP
- **Limitations:** Complex and cumbersome, expensive

### Blockchain



- **Architecture:** Distributed ledger with cryptographic integrity
- **Settlement Process:** Consensus
- **Speed:** Near real-time to minutes
- **Transaction Cost:** Similar to internal databases
- **Benefits:** Enables third-party transaction to be as simple and efficient as internal transactions
- **Issues:** Tech maturity, integration with existing systems/workflows

Blockchain/distributed ledgers provide the potential efficiency of a central database and the robustness of a third-party clearing house for complex/distributed transactions without costly middleware

# BLOCKCHAIN 'FLAVOURS'

## Bitcoin Blockchain

- ✓ Mining-based Proof-of-Work consensus model enables a global, permissionless currency network
- ✓ Extensibility through e.g. side chains
- ✓ Can be layered, e.g. Lightning payment contracts
- ? Speed and weight for financial institutions
- ? Permissioning where trust is already established between counterparties

Proof-of-work consensus and permissionless model enables Bitcoin to function without established trust relationships between counterparties. However, this overhead is not required for most applications between financial institutions where trust levels are well understood

## Domain-Specific

- ✓ Focus on specific applications
- ✓ Integration into existing systems / processes key priority
- ✓ Significant domain-specific logic and workflow
- ? Interoperability and cross-chain integration will require additional protocols

Domain-specific approaches, focusing on specific business processes such as forex or settlement, benefit from focus and delivery of complete solutions that can be readily adopted

## Private Platform

- ✓ General purpose Blockchain platforms, akin to e.g. relational databases for building enterprise applications
- ? Vendor-specific implementations will vary
- ? Interoperability and cross-chain integration will require additional protocols

General purpose platforms provide flexibility and allow institutions to tailor their applications to their individual requirements, unrestricted from assumptions on business processes

## Open Source (Non-Bitcoin)

- ✓ Significant groundswell support/enthusiasm for e.g. Ethereum
- ✓ Open source is a proven model, e.g. Linux, Hadoop
- ✓ Ambitious projects to date
- ? Funding and ability to deliver enterprise-class solutions
- ? Potential for conflicts, scope creep in projects

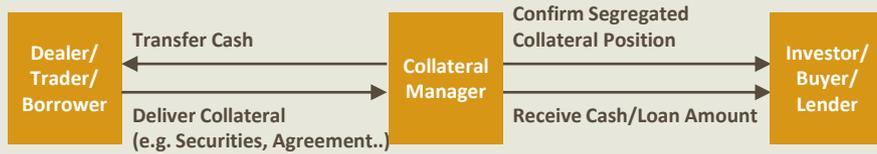
The Ethereum smart contract platform in particular has garnered interest from both IT vendors, such as Microsoft, and financial institutions. However, the project is hugely ambitious and funding has been in question

Currently, financial institutions are experimenting with all flavours of Blockchain. Winners can come from any category, and winning will rely on successful deployment and ROI over the next 12–24 months



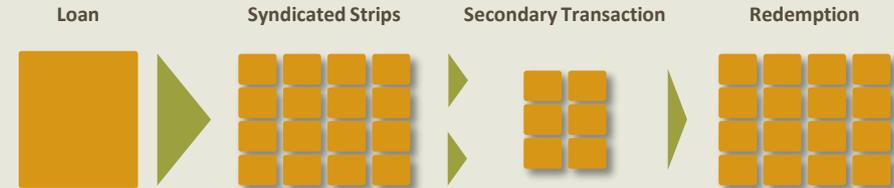
# BLOCKCHAIN APPLICATIONS ALREADY IN DEVELOPMENT WITH FIs

## Repurchase Agreement



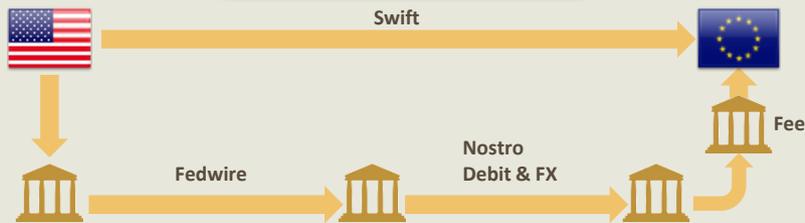
- Within a trusted network of counterparties, replace the collateral manager with a distributed ledger, thereby removing the bottleneck and simplifying the transaction

## Debt Distribution



- Ownership can be tracked, retained, and monitored by the Blockchain
- Significant reduction in loan administration and improved accuracy

## International Payment



- Remove middleware network and replace with a distributed ledger application

## Insurance Processing

1	Claim Verification/Assessment
2	Auto/Manual Claim Adjudication
3	Follow-ups/Chasers For Missing Information/Documents
4	Case Management/Assignments
5	Reserve Calculation
6	Claim Payment Processing
7	Recurring Payment Processing

- Leverage Blockchain to ensure process compliance, reduce fraud, and streamline document management

Successful Blockchain initiatives depend on the business process and application as much as, if not more than, the underlying technology. These involve multi-party exchanges of value where currently a third-party agent or system is required to ensure transaction robustness

# POTENTIAL IMPACT OF MOVING TRANSACTIONS TO THE BLOCKCHAIN

*'In lots of areas, it looks like the Blockchain will work and it is easy to see how it could revolutionise finance [...] The speed of execution is so much faster for securities settlement. [And] you can see how it could reduce the capital, that banks have to hold, against each trade.'*

– Rhomaios Ram  
 Head of Product Management  
 Deutsche Bank Global Transaction Banking  
 Financial Times, Nov-2015



*'[Blockchain has] the potential to facilitate the fast, efficient, and secure transfer of ownership of assets – including bonds, shares, and other instruments – [and to help] maintain records securely and efficiently. In other words, it's all about making processes simpler and life easier.'*

– Harriett Baldwin  
 Economic Secretary to HM Treasury  
 Oct-15



*'This technology has the potential to open the door to revolutionary possibilities. Any financial asset that currently requires a trusted third party to provide verification could, theoretically, be disrupted.'*

– Understanding the Evolving  
 Cryptocurrency Market  
 PwC, Aug-15



*'Our analysis suggests that distributed ledger technology could reduce banks' infrastructure costs attributable to cross-border payments, securities trading, and regulatory compliance by between \$15-20 billion per annum by 2022.'*



– The Fintech 2.0 Paper: Rebooting Financial Services

# 2016 BEGINS THE RACE TO PRODUCTION



Oct-2015

## UBS Working with Blockchain Prototypes

Oliver Bussmann, CIO at Swiss bank UBS AG, is connecting the company to startups, entrepreneurs and others that can help the bank as digital technologies such as the Internet and blockchain transform financial services.

Mr. Bussmann in April created an innovation lab in London where the bank is looking at blockchain, the technology that underpins bitcoin digital currency. About six weeks ago, he also launched **The UBS Future of Finance Challenge**, an open competition for entrepreneurs and technology startups around the world. The new UBS lab is part of Level39, a large technology accelerator that includes about 170 startups in the financial technology area.

These efforts underpin the culture of open innovation occurring not only at UBS but at a number of financial institutions as they open their research and development programs to outside partners to spark innovation in everything from security technologies to new payment platforms.

In Sep 2015, UBS became one of the first banks to join the R3 consortium; at the same time, UBS is experimenting with using Blockchain for various applications, such as issuing bonds and settling trades



Sep-2015

## Barclays wants to help blockchain startups understand investment banking requirements

There's plenty of hype about blockchain technology these days, but only a handful of people who actually understand the challenge of engineering a distributed ledger system for say, an investment bank.

Dr Lee Braine of the Investment Bank CTO Office at Barclays is one such person. He said the current startup ecosystem and its fount of ideas is inspiring and banks are actively engaged in exploring the right opportunities.



For their part, startups should take a step back and consider the core kinds of non-functional requirements that products must meet if they pass through an architecture review.

Braine said developers should ask themselves, "If you are going to have an enterprise-scale solution, what type of things would you need to adjust?"

"And if we are looking at rollback, recovery, scalability, timeliness of transaction processing and so on - then there's a whole host of things that normally get baked in from the bottom up.

Barclays has been one of the most active financial institutions in the Bitcoin/Blockchain ecosystem supporting Fintech startups via its incubator, joining the R3 consortium, and experimenting with various Blockchain projects



Oct-2015

## Santander plans to become 'Ripple evangelist'

Spanish banking giant Santander said its recent investment in Ripple is a strategy it promises will continue with a number of roll outs and pilots. Santander InnoVentures pumped \$4m into Ripple earlier this month, bringing the technology provider's Series A funding round to \$32m.

Mariano Belinky, managing partner of Santander InnoVentures, told **iBTimes UK** there are a number of ways the bank will participate with Ripple going forward: "Actively let's say we can act as a facilitator for them to meet other financial institutions and discuss their capabilities with them. We are evangelists if you will.

"We are soon to join their board as well. I think that will be announced in the coming days. They have created a sort of senior advisory board with a number of financial institutions and we are part of that advisory board."

He said Santander had stuck close to technology-driven use cases most relevant to its clients - the most sensible being international payments. In this respect Ripple was the obvious partner.

To this end Belinky sang Ripple's praises: "They have been around for quite a while, and they have already gone through some regulatory scrutiny, which we see as positive. I think they have established a number of very credible relationships with regulators. They are part of the faster payments initiative in the US; they are only non-financial institution participating at the Fed level, which gives us a lot of comfort. They are very serious and credible guys with a large development team and knowledge and really good banking relationships."

Santander is one of the most active institutions within the Bitcoin/Blockchain ecosystem, investing in Ripple and creating a Bitcoin/Blockchain lab working on 20-25 projects



Nov-2015

## 30 top banks and Mike Hearn have now joined R3 Global Consortium

The New York-based financial innovation startup, R3 CEV, continues to add to its impressive list of partner banks. The company announced today that five more banks have joined its global consortium, bringing the total to 30. The firm also revealed the team that would design the system.

Led by Wall Street veteran, David Rutter, R3 is self-described as "a financial markets crypto, exchanges and venture practice." The company is working on a framework for using blockchain technology in financial markets.

In September, the company launched the initiative with nine banks, attracting the attention of the financial industry. However, nine banks were just a start and the company soon added 13 more, in the same month.

The latest round of five banks to join R3 are BNP Paribas, Canadian Imperial Bank of Commerce, ING Bank, Macquarie Bank, and Wells Fargo & Co. This follows last month's additions of Japan's Mizuho Bank, Italy's UniCredit and Stockholm-based Nordea.

According to the latest list of the top banks in the world from Acuity's Bankers Almanac, BNP Paribas is the world's fourth largest bank by asset. An independent list of the world's biggest bank by *Forbes'* lists Wells Fargo as the second largest bank by market capitalization (US\$278.3 billion). However, top banks lists often vary based on the date of data gathering and exchange rates.

In Nov 2015, 5 additional investment banks signed up with the R3 consortium. The total number of participants has now increased to 30 banks

According to our survey, large financial institutions have typically already identified 10 – 20 (or more) potential Blockchain applications and are in prototype stages with multiples projects

# REACHING \$1BN IN BLOCKCHAIN SPEND BY '17 IS NOT A STRETCH FOR LARGE FIs

100 Top Global Financial Institutions



Average of 10 Projects Per Financial Institution



Average of \$1m of Investment Per Project



c. \$1B of Total Investment in Blockchain Project By FIs

Barclays has two blockchain 'labs' in London and is planning 45 experiments with the technology



UBS to Open Blockchain Research Lab in London



Citi builds blockchains

Citi has been exploring distributed ledger technology for years, building three blockchains and creating its own crypto-currency, dubbed Citicoin, the banking giant has told International Business Times.



BBVA selected 10 bitcoin and blockchain start-ups for Open Talent finals



Goldman Sachs Seeking Crypto Trade Settlement Patent



Blockchain has evolved from zero to the cusp of being a multi billion dollar market in less than 24 months



# EARLY LEADERS HAVE SIGNIFICANT MOMENTUM



Provider of software used by businesses to design, deploy and operate private Blockchain networks

- **Sep 10, 2015:** Chain raises \$30m from Visa, Nasdaq, Citi, Capital One, Fiserv and Orange
- **Jun 24, 2015:** Nasdaq selects Chain to run pilot in private market arm
- **Jun 19, 2015:** Gyft partners with Chain for Blockchain-powered gift cards

- **Founded:** 2013
- **FTE:** c. 15
- **Total Funding:** \$44m (Series C, \$30m, Sep 2015)
- **Investors:** Capital One, Citi, DCG, Fiserv, Khosla, NASDAQ, Pantera, RRE, Visa
- **Clients/Partners:**



Developer of decentralized applications and end-user tools for blockchain ecosystems on Ethereum

- **Nov 9-13, 2015:** Help to set up 5 days event about the Ethereum Foundation in London
- **Oct 28, 2015:** Microsoft partners with ConsenSys to offer blockchain technology to financial institutions
- **Oct 13, 2015:** ConsenSys announces that it has been in long term talk with Deloitte and Microsoft

- **Launched:** 2014
- **FTE:** 60
- **Total Funding:** Internal funding
- **Investors:** n/a
- **Clients/Partners:**



Developer of Blockchain/distributed ledger applications for the financial services industry

- **Nov 23, 2015:** ING bank joins R3
- **Nov 19, 2015:** Five more banks join R3
- **Oct 28, 2015:** Three banks join R3 Blockchain consortium taking total to 25
- **Sep 29, 2015:** An additional 13 banks joined R3 consortium including Citi and RBC
- **Sep 15, 2015:** 9 banks, including Goldman Sachs and Barclays have joined forces R3

- **Launched:** September 2015
- **FTE:** c. 20
- **Total Funding:** n/a
- **Investors:** n/a
- **Clients/Partners:** 30+ banks including:



Provider of a cross-currency payment and settlement services using a distributed financial technology called consensus

- **Oct 21, 2015:** Santander to become 'Ripple evangelist'
- **Oct 6, 2015:** Ripple receives \$4m from Santander arm and inks partnership with Accenture
- **Aug 5, 2015:** Ripple is named a 2015 World Economic Forum Technology Pioneer
- **May 19, 2015:** Ripple closes \$28m in funding

- **Founded:** 2012
- **FTE:** c. 120
- **Total Funding:** \$38m (Series A, May/Oct 2015)
- **Investors:** Core Innovation, Lightspeed, Pantera, RRE, Santander and DCG
- **Clients/Partners:**



At this stage of market development, there is scope for multiple winners. The early leaders have momentum and emerging clear value propositions

# FEW EU BLOCKCHAIN COMPANIES BEGINNING TO GAIN MOMENTUM WITH FIs



Oct-2015

## Blockchain Platform Setl Exceeds 1 Billion Transaction 'Milestone'

Blockchain platform Setl claims it is now capable of processing 1 billion transactions per day, a figure it terms a "milestone" for scaling the technology.



The firm, which is building a private network of distributed ledgers that can settle cash and assets in real time, says its testnet can now match the volume of non-cash electronic payments made globally.

When announced in July, Setl's network was handling 5,000 transactions per second, which amounts to 432 million a day.

While blockchain technology is gaining traction as a cheaper, leaner alternative to legacy financial systems – settlement, for example, currently costs firms \$65–\$80bn annually – bankers remain skeptical about the speed and reputation of open systems such as bitcoin.

Developer of a multi-asset, multi-currency institutional payment and settlement infrastructure based on Blockchain technology



Sep-2015

## Credits testing KYC blockchain on the Isle of Man

Blockchain specialist Credits is following a tradition of testing new technologies on the Isle of Man with a federated know your customer (KYC) application which leverages the jurisdiction's financial services pedigree.

Nick Williamson, co-founder of Credits told IBTimes: "We are still evolving exactly how it's going to play out but it would initially be for people living or present on the Isle of Man.

"We wanted to set it out on that small scale and build up the technology before looking to expand it wider.

Williamson agreed that rolling out this sort of KYC technology beyond the Isle of Man was by no means a straightforward undertaking.

He pointed out that KYC is 'such a huge pain point for every company that touches it. There's a lot of institutional will to try new approaches that are promising both in reducing cost and fraud in a systemic way.

Developer of a hybrid Blockchain platform that provides interoperability between private and public chains



Nov-2015

## Sending money overseas: could the blockchain hold the answer?

Here at Visa Europe Collab, we recognise the potential of blockchain technology to improve existing processes and protocols, particularly in areas that traditional payment rails have been less suitable for.

One such area is international remittances. Transferring money overseas is vital for millions of families across the world, but it can be expensive, cumbersome and slow.

We believe there's a real opportunity to develop an improved remittance service for both the sender and receiver of payments in terms of fees, speed and ease of use. That's why we have partnered with Epiphyte, a startup specialising in distributed ledger solutions for the mainstream financial market, to see if blockchain technology holds the key. We're working with them on a proof of concept to run a series of simulations within a test environment and explore an alternative to conventional remittance processing.

Provider of Blockchain-powered SaaS that delivers instant settlement and delivery versus payment for financial trades



Sep-2015

## Bitcoin 2.0: Eris is talking to banks first and worrying about revenues later

Eris Industries, the smart contracts blockchain platform, says it's currently inundated with tier one banks, but is still exploring where its actual business model might lie.

Brian Fabian Crain, head of business development, Eris told IBTimes: "So we haven't got a proven business model that we know like, this is where we are going to go.



"We do have some early revenue. Let's put it like this - this is all very new so it is unclear where it is going and it is unclear where blockchains will have the most utility and the most impact.

"So we are fairly open to and are exploring our customers - I think everybody is kind of exploring."

Eris emerged as fork of Ethereum and as such its core competency is the code based execution of smart contracts, the sort of thing that fills the world's registries in the form of centralised databases or on paper.

Provider of a free software platform that allows anyone to build their own data infrastructure using Blockchain and smart contract technology

Although the European Blockchain ecosystem is still nascent relative to the US, a few companies are gaining momentum

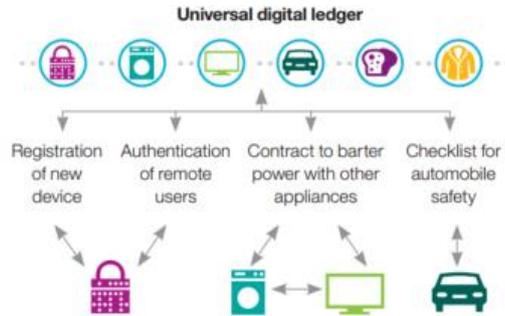
# BROAD APPLICATIONS WHERE VERACITY IS IMPORTANT



## Why blockchains work for the IoT

A technology breakthrough that has fundamentally changed our notions of centralized authority, the blockchain is a universal digital ledger that functions at the heart of decentralized financial systems such as Bitcoin, and increasingly, many other decentralized systems.

*The blockchain functions as a universal digital ledger facilitating various types of IoT transactions between devices*



IBM has developed a proof-of-concept that uses Blockchain technology to build a decentralized IoT



## Ericsson and Guardtime create secure cloud and big data

- Ericsson and Guardtime partner to enable all businesses and governments to monetize their data assets with confidence and knowledge of data history with immutable proof
- Real time governance of cloud operations and data assets at scale is possible for the first time leveraging Guardtime's Keyless Signature Infrastructure (KSI) in Ericsson's offerings
- Ericsson offerings have built in forensics capabilities at point of receipt and offer real time protection from Advanced Persistent Threats (APTs), malicious insiders and corrupt practices. Evidence of data history is portable and independently verifiable



## Lockheed Martin and Guardtime Technology Target Data Manipulation Cyber Threats

SUFFOLK, Va., Oct. 7, 2015 – Using a specialized mission support system, Lockheed Martin (NYSE: LMT) and Guardtime demonstrated a pre-packaged technology that mitigates data manipulation attempts by internal and external threats to a networked mission centric environment.

Guardtime's Blockchain-based data integrity solutions can be applied to the telco, defense, digital advertising, and public sectors



Honduras



## Honduras to build land title registry using bitcoin technology

Honduras, one of the poorest countries in the Americas, has agreed to use a Texas-based company to build a permanent and secure land title record system using the underlying technology behind bitcoin, a company official said late Thursday.

Factom, a U.S. blockchain technology company based in Austin, Texas, will provide the service to the government of Honduras, the firm's president, Peter Kirby, said. The company is doing the project with Epigraph, a title software company that uses blockchain technology, also based in Austin.

Factom would not reveal the cost of the project. Honduras would become only the second government to use blockchain, which increases transparency in a transaction, to manage government data, after reports that the Isle of Man would test a government-run blockchain project.

"In the past, Honduras has struggled with land title fraud," said Kirby. "The country's database was basically hacked. So bureaucrats could get in there and they could get themselves beachfront properties."

Ebal Jair Diaz Lupian, the Honduran government's chief of staff, did not respond to several attempts from Reuters to contact him via email and telephone.

Honduras is using Blockchain technology to build a land title registry, which will help to reduce land title fraud

Blockchain technology has many applications outside the financial industry, though these use cases are less publicized



# III. COMPANIES SURVEYED

# BITCOIN COMPANIES SURVEYED

## SHORT PROFILES (1/2)

Company	Description	Company	Description
 <b>ABRA</b> US	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of a P2P money transfer platform; globally accessible through the Bitcoin Blockchain network enabling fast and secure transactions with no transfer fees</li> <li><b>Total Funding:</b> \$14m (Amex VC, First Round, RRE VC)</li> <li><b>Founded:</b> 2014 / <b>Headquarters:</b> SF, US / <b>FTE:</b> c. 20</li> </ul>	 <b>BITSTAMP</b> LU	<ul style="list-style-type: none"> <li><b>Description:</b> Online Bitcoin marketplace for selling and buying Bitcoins</li> <li><b>Total Funding:</b> \$10m (Pantera Capital)</li> <li><b>Founded:</b> 2011 / <b>Headquarters:</b> Luxembourg / <b>FTE:</b> c. 27</li> </ul>
 <b>Bitcurex</b> Bitcoin Exchange PO	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of an exchange platform for buying and selling Bitcoins and Dashcoins</li> <li><b>Total Funding:</b> No external funding</li> <li><b>Founded:</b> 2012 / <b>Headquarters:</b> Łódź, Poland / <b>FTE:</b> c. 20</li> </ul>	 <b>BLOCKCHAIN</b> UK / US	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of Bitcoin wallets, block explorers, and APIs</li> <li><b>Total Funding:</b> \$30m (Lightspeed VC, Wicklow, Mosaic)</li> <li><b>Founded:</b> 2011 / <b>Headquarters:</b> LDN, UK/NYC, US / <b>FTE:</b> c.40</li> </ul>
 <b>Bitex.la</b> AR / NL	<ul style="list-style-type: none"> <li><b>Description:</b> Largest Latin American Bitcoin exchange with 25%+ market share</li> <li><b>Total Funding:</b> No external funding</li> <li><b>Founded:</b> 2013 / <b>Headquarters:</b> Argentina / NL / <b>FTE:</b> c. 5</li> </ul>	 <b>CEX IO</b> UK	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of Bitcoin cloud mining services and a Bitcoin exchange platform</li> <li><b>Founded:</b> 2013 / <b>Headquarters:</b> London, UK / <b>FTE:</b> 20</li> </ul>
 <b>BitFury</b> US / NL	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of ASICs to consumers for Bitcoin mining (i.e. performing cryptographic hashes to process transactions on the Bitcoin Blockchain network)</li> <li><b>Total Funding:</b> \$60m (Georgian Co-Inv. Fund, Blockchain, Binary Fin., iTech Capital, DRW Trading, QueensBridge)</li> <li><b>Founded:</b> 2012 / <b>Headquarters:</b> US / NL / <b>FTE:</b> 70+</li> </ul>	 <b>Chainalysis</b> US	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of a compliance solution for the Blockchain, enabling monitoring of connections between entities and identification of malicious actors / activity</li> <li><b>Founded:</b> 2014 / <b>Headquarters:</b> New York, US / <b>FTE:</b> 8</li> </ul>
 <b>bitonic</b> NL	<ul style="list-style-type: none"> <li><b>Description:</b> Largest Bitcoin trading platform in the Netherlands and Belgium, representing more than half of the market or equivalent to \$30m+ of transactions annually</li> <li><b>Founded:</b> 2012 / <b>Headquarters:</b> Utrecht, NL / <b>FTE:</b> c. 11</li> </ul>	 <b>CIRCLE</b> US	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of an app for sending and receiving money free of charge, with Bitcoin acting as an intermediate currency</li> <li><b>Total Funding:</b> \$76m (Accel, General Catalyst, Goldman Sachs, IDG Capital Partners, Oak Investment, Pantera)</li> <li><b>Founded:</b> 2013 / <b>Headquarters:</b> Boston, US / <b>FTE:</b> c. 80</li> </ul>
 <b>bitSIM*</b> HK & AU	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of an enabling platform that uses mobile virtual SIM cards to secure mobile money, Bitcoin, and Blockchain asset transactions</li> <li><b>Founded:</b> 2014 / <b>Headquarters:</b> HK &amp; Australia / <b>FTE:</b> c. 12</li> </ul>	 <b>coinbase</b> US	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of a Bitcoin transaction platform, comprising an exchange, wallet, and API for developers</li> <li><b>Total Funding:</b> \$106m (A16Z,, BBVA, DFJ Growth, IDG, NYSE, Ribbit Capital, Union Square Ventures, USAA)</li> <li><b>Founded:</b> 2012 / <b>Headquarters:</b> SF, CA / <b>FTE:</b> 100</li> </ul>

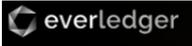
# BITCOIN COMPANIES SURVEYED

## SHORT PROFILES (2/2)

Company	Description	Company	Description
 UK	<ul style="list-style-type: none"> <li><b>Description:</b> UK-focused Bitcoin marketplace enabling users to buy and trade Bitcoins with GBP, EUR, PLN, and USD</li> <li><b>Total Funding:</b> \$0.25m (Angel Investors)</li> <li><b>Founded:</b> 2013 / <b>Headquarters:</b> London, UK / <b>FTE:</b> c. 7</li> </ul>	 SE	<ul style="list-style-type: none"> <li><b>Description:</b> Operator of a Bitcoin trading portal that enables users to buy, sell, and store Bitcoins; also enables users to make donations and send money in Bitcoins</li> <li><b>Total Funding:</b> \$1.0m (DCG, Barclays, and Techstars)</li> <li><b>Founded:</b> 2013 / <b>Headquarters:</b> Stockholm, SE / <b>FTE:</b> c. 11</li> </ul>
 UK	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of a Bitcoin wallet and payments platform that enables users to buy, sell, and store Bitcoins</li> <li><b>Investor:</b> Coinsilium</li> <li><b>Founded:</b> 2013 / <b>Headquarters:</b> London, UK / <b>FTE:</b> c. 7</li> </ul>	 AT	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of B2B solution enabling online casino payment processing functionality through Bitcoin</li> <li><b>Founded:</b> 2008 / <b>Headquarters:</b> Pöttelsdorf, Austria</li> <li><b>FTE:</b> 40+ including 15+ developers</li> </ul>
 UK	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of an AML solution for Blockchain as well as a Bitcoin vault and Bitcoin wallet hosting services</li> <li><b>Total Funding:</b> \$2m (Octopus Investments and Seedcamp)</li> <li><b>Founded:</b> 2013 / <b>Headquarters:</b> London, UK / <b>FTE:</b> 10</li> </ul>	 US	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of a Bitcoin storage platform for businesses and financial institutions, and provider of Bitcoin wallets and debit cards to retail customers</li> <li><b>Total Funding:</b> \$40m (Benchmark, DCG, Fortress Investment Group, Greylock, Index, Pantera, Ribbit)</li> <li><b>Founded:</b> 2014 / <b>Headquarters:</b> Palo Alto, US / <b>FTE:</b> 60+</li> </ul>
 SE	<ul style="list-style-type: none"> <li><b>Description:</b> One of the largest Bitcoin miners in the world with c. 10% of the global Bitcoin mining market share</li> <li><b>Total Funding:</b> \$29m (Accel Partners, Creandum)</li> <li><b>Founded:</b> 2013 / <b>Headquarters:</b> Stockholm, SE / <b>FTE:</b> c. 40</li> </ul>		
 UK	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of an online Bitcoin trading platform that allows users to open both long and short positions</li> <li><b>Total Funding:</b> \$0.5m / <b>Investor:</b> Coinsilium</li> <li><b>Founded:</b> 2013 / <b>Headquarters:</b> London, UK / <b>FTE:</b> c. 6</li> </ul>		
 US	<ul style="list-style-type: none"> <li><b>Description:</b> Developer of tools that enable app developers to easily leverage advanced hardware security on phones, tablets, and PCs</li> <li><b>Total Funding:</b> \$1.2m (Coinsilium)</li> <li><b>Founded:</b> 2014 / <b>Headquarters:</b> San Mateo, US / <b>FTE:</b> c. 8</li> </ul>		

# BLOCKCHAIN COMPANIES SURVEYED

## SHORT PROFILES

Company	Description	Company	Description
 DE	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of registry, licensing and visibility services for using Blockchain technology</li> <li><b>Funding to date:</b> \$2m (Earlybird, Freelands Ventures, DCG)</li> <li><b>Founded:</b> 2014 / <b>Headquarters:</b> Berlin, Germany / <b>FTE:</b> c. 15</li> </ul>	 US	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of a data layer solution described as a giant database in which anyone can insert any type of data directly on the Blockchain</li> <li><b>Funding to date:</b> \$1.3m (Coinsilium &amp; Kuala Innovations)</li> <li><b>Founded:</b> 2014 / <b>Headquarters:</b> Texas, US / <b>Employees:</b> c. 17</li> </ul>
 US	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of software used by businesses to design, deploy and operate private Blockchain networks (hosted or on-premise)</li> <li><b>Funding to date:</b> \$44m (Citi, DCG, Khosla, Nasdaq, Pantera)</li> <li><b>Founded:</b> 2013 / <b>Headquarters:</b> SF, US / <b>FTE:</b> c. 15</li> </ul>	 EE	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of a subscription-based database of early-stage startups that allows angel investors and entrepreneurs to discover, benchmark, and analyse startups</li> <li><b>Funding to date:</b> \$2.2m (3TS Capital Partners, Rockspring)</li> <li><b>Founded:</b> 2013 / <b>Headquarters:</b> Tallinn, Estonia / <b>FTE:</b> c. 16</li> </ul>
 US	<ul style="list-style-type: none"> <li><b>Description:</b> Developer of decentralized applications and end-user tools for blockchain ecosystems on Ethereum</li> <li><b>Founded:</b> 2014 / <b>Headquarters:</b> New York, US / <b>FTE:</b> 60</li> </ul>	 NL	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of a platform that ensures the integrity of systems, networks, and data at industrial scale using Blockchain technology</li> <li><b>Founded:</b> 2007 / <b>Headquarters:</b> Amsterdam, NL</li> <li><b>FTE:</b> c. 100</li> </ul>
 UK	<ul style="list-style-type: none"> <li><b>Description:</b> Developer of a hybrid Blockchain platform that provides interoperability between private and public chains</li> <li><b>Founded:</b> 2014</li> <li><b>Headquarters:</b> London &amp; Isle of Man, UK / <b>FTE:</b> c. 12</li> </ul>	 US	<ul style="list-style-type: none"> <li><b>Description:</b> Developer of blockchain/distributed ledger applications for the financial services industry</li> <li>Works in conjunction with a consortium of 30+ banks</li> <li><b>Launched:</b> Sep-2015 / <b>Headquarters:</b> NYC, US / <b>FTE:</b> c.20</li> </ul>
 UK	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of an open-source software platform stack to build smart contract applications and permissioned Blockchains</li> <li><b>Funding to date:</b> n/a (Anthemis Group)</li> <li><b>Founded:</b> 2014 / <b>Headquarters:</b> London, UK / <b>FTE:</b> 9</li> </ul>	 US	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of a cross-currency payment and settlement services using a distributed financial technology called consensus</li> <li><b>Funding to date:</b> \$38.4m (GV, A16Z, Santander, CME Group, Seagate Technology, IDG Capital Partners)</li> <li><b>Founded:</b> 2012 / <b>Headquarters:</b> SF, US / <b>Employees:</b> c.120+</li> </ul>
 UK	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of certification and verification services for diamonds and other luxury goods using smart contracts (Blockchain technology)</li> <li><b>Funding to date:</b> Seed round (Barclays, Techstars)</li> <li><b>Founded:</b> 2015 / <b>Headquarters:</b> London, UK</li> </ul>	 UK	<ul style="list-style-type: none"> <li><b>Description:</b> Provider of a private Blockchain-based payments and settlements system for financial institutions</li> <li><b>Founded:</b> 2015 / <b>Headquarters:</b> London, UK / <b>FTE:</b> c. 5</li> </ul>



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