

Scarcity in the Digital Realm







Digital Gold Institute: Vision

R&D center of excellence focused on teaching, training, consulting, and advising about scarcity in digital domain (bitcoin and crypto-assets) and the underlying blockchain technology

Bitcoin: Digital Gold

The most successful attempt at creating *scarcity in the digital realm* without a trusted third party. *Bitcoin is the digital equivalent of gold, disruptive for our current digital civilization and the future of money and finance*. More a cryptocommodity than a crypto-currency, Bitcoin aims to be world reserve asset.

Blockchain: Hype or Reality?

Blockchain requires an intrinsic native digital asset to provide the economic incentives for the blockchain maintainers to be honest. Without the seigniorage revenues associated to its native asset, a blockchain system would need to select and appoint its maintainers, ultimately resorting to central governance.

Beyond Bitcoin: Timestamping



A timestamp demonstrates that a document existed in a specific status prior to a given point in time. Digital data can be securely timestamped though the attestation of its hash value in a blockchain transaction. *What jewellery is for gold, timestamping could be for bitcoin: not essential but effective at leveraging its beauty*.

Financial Services for Crypto



The most promising field, instead of technological applications of blockchain, is the development of financial services for crypto assets: those tools, practices, and facilities needed by institutional investors and high-networth individuals. *Finance might not need blockchain, but the blockchain economy needs new financial services.*

Digital Gold Institute: Activities

R&D center of excellence focused on teaching, training, consulting, and advising about scarcity in digital domain (bitcoin and crypto-assets) and the underlying blockchain technology



Consulting

Becoming one of our <u>partners</u> means empowering your business with a proper understanding of Bitcoin, crypto assets, and blockchain technology. It is a strategic choice that will allow you to leverage unique opportunities while avoiding the irrational hype that pollutes these topics.

Training



We offer training and education about Bitcoin, crypto assets, blockchain, distributed ledger, smart contracts, and cryptography: the program is based on the <u>Bitcoin and Blockchain</u> <u>Technology</u> course taught at Milano-Bicocca and other universities.

Research

Our research activity includes



quarterly <u>reports</u> on the bitcoin and blockchain ecosystem and the thesis works of our <u>students</u>. Anyway, the bulk of the activity is happening at the <u>Crypto Asset Lab</u> (CAL), a joint research initiative with the University of Milano-Bicocca.

Development



We <u>write code</u> and love to get our hands dirty in programming and technology.

Check out our <u>OpenTimestamps calendar</u> free facility and <u>btclib</u>, an open-source Python library intended for teaching/learning/using bitcoin, its blockchain, and the associated elliptic curve cryptography.

Advisory and Training for Institutions, Consultancies, and Private Firms

Selected current and past collaborations

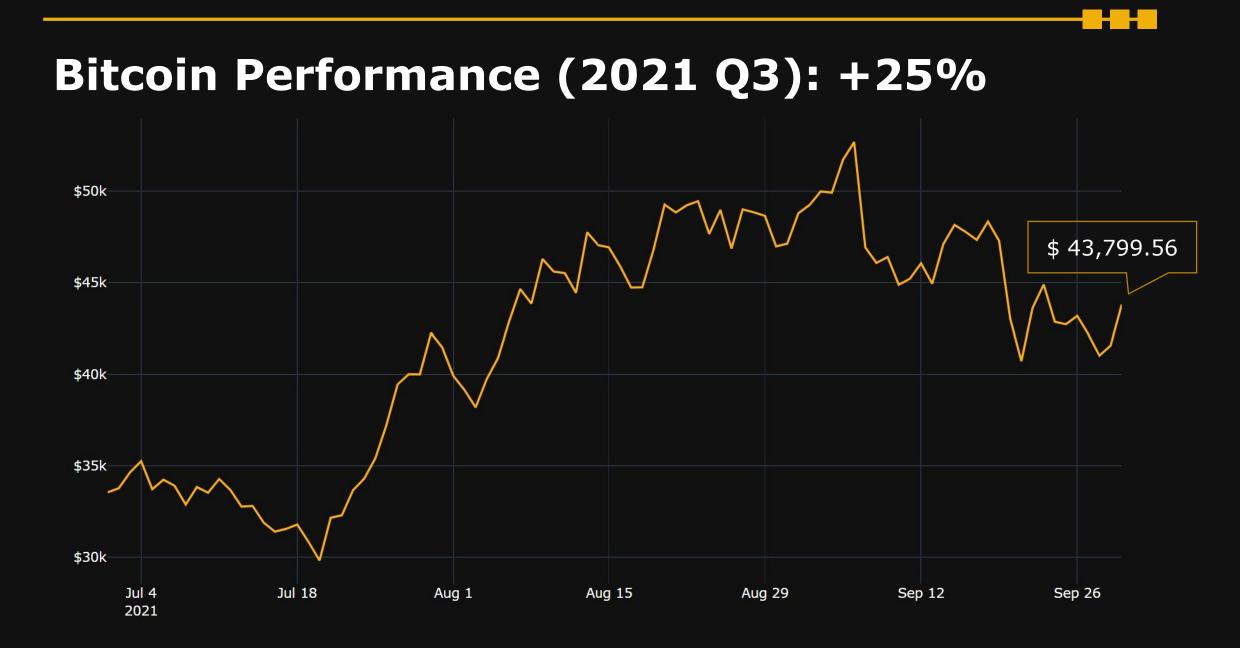
Ania **BNP PARIBAS** ASSAGENTI **BTO**_® CERİF Borsa Italiana CRYPTOVALUES Harvard **Deloitte.** Fintech District The European House ondon **prometeia** INTESA m SANPAOLO Exchange Ambrosetti

Agenda

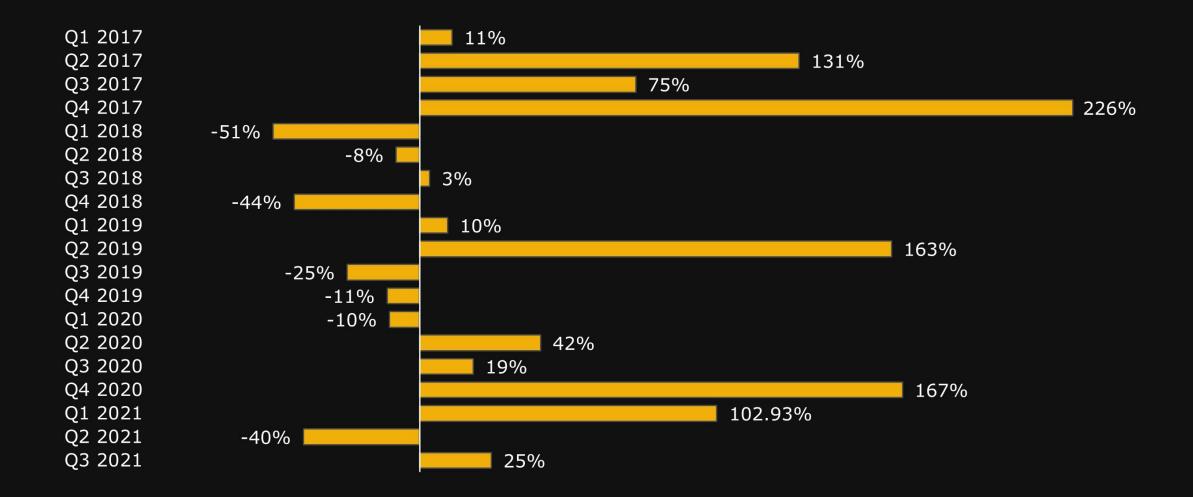
- 1. Market
- 2. Ecosystem
- **3. Regulation**
- 4. Technology
- **5.** The Institute







Bitcoin Quarter Performances



Bitcoin Yearly Performance

Date	Price	Yearly Performance
31-Dec-2011	5.00 \$	1,566.67 %
31-Dec-2012	13.59 \$	171.80 %
31-Dec-2013	754.01 \$	5,448.27 %
31-Dec-2014	320.19 \$	-58.49 %
31-Dec-2015	430.57 \$	37.02 %
31-Dec-2016	963.74 \$	121.89 %
31-Dec-2017	14,156.40 \$	1,318.01 %
31-Dec-2018	3,742.70 \$	-72.60 %
31-Dec-2019	7,193.60 \$	87.16 %
31-Dec-2020	28,968.31 \$	302.33 %
30-Sep-2021	43,799.56 \$	51.20 %



Bitcoin Performance

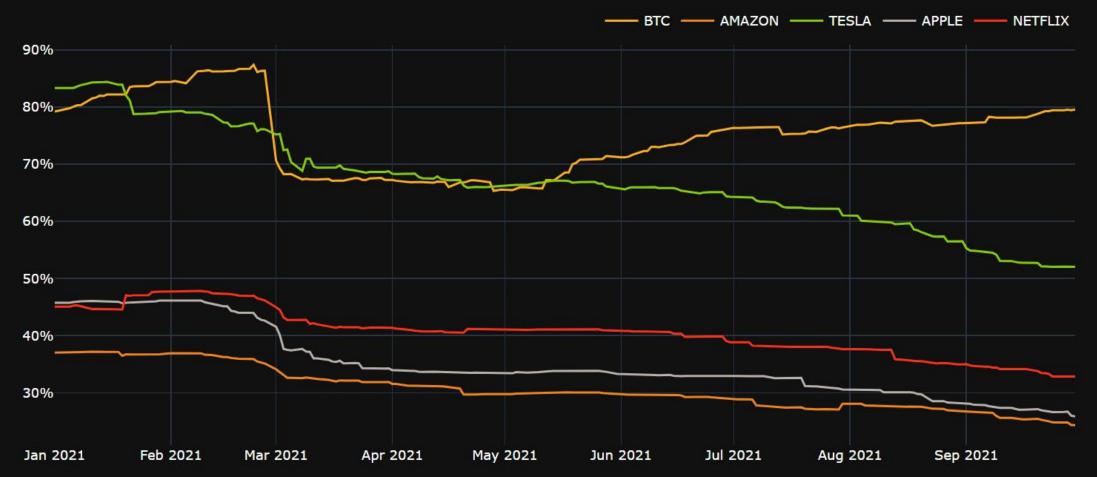
Price dynamic is the discovery process of value: volatility is physiologic when it comes to assess the fair value of something so controversial as the digital equivalent of gold



Bitcoin Minimum Prices

Volatility of Best Performing Assets

252 Days Rolling Window





Asset Class Correlation With Bitcoin

1Y Rolling Window



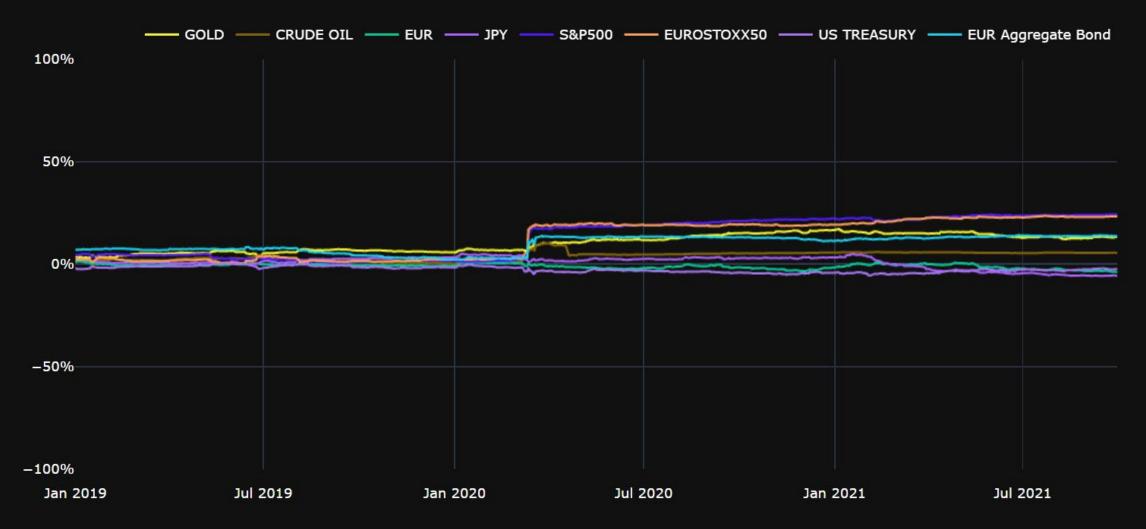
Asset Class Correlation Matrix

1Y															
BTC	100.00%														
GOLD	-1.76%	100.00%													
COPPER	19.99%	24.70%	100.00%												
CRUDE OIL	-0.96%	-6.42%	21.79%	100.00%											
CORN	10.32%	9.25%	17.73%	18.45%	100.00%										
EUR	1.35%	6.88%	11.09%	3.35%	-4.35%	100.00%									
GBP	2.22%	-2.77%	8.02%	8.65%	-5.46%	62.17%	100.00%								
JPY	-10.61%	4.84%	6.07%	-4.79%	-10.99%	50.78%	36.90%	100.00%		_					
CHF	2.31%	9.26%	8.47%	-4.72%	-6.79%	81.54%	46.34%	56.46%	100.00%						
NASDAQ	24.38%	18.99%	18.59%	13.98%	5.05%	-6.83%	-6.40%	-3.53%	-0.98%	100.00%		_			
S&P500	21.37%	13.60%	26.02%	27.56%	5.74%	-4.58%	-5.88%	-6.46%	-0.91%	87.64%	100.00%				
EUROSTOXX50	20.23%	-5.61%	14.37%	34.10%	2.55%	-0.67%	0.56%	-4.41%	1.06%	37.04%	54.38%	100.00%			
VIX	-24.41%	-9.84%	-25.46%	-20.72%	-4.43%	7.05%	9.45%	6.71%	4.08%	-70.09%	-79.06%	-47.67%	100.00%		
US TREASURY	4.72%	20.92%	-19.04%	-20.87%	-11.41%	-8.28%	-11.85%	0.87%	-8.82%	14.56%	-5.21%	-23.29%	1.71%	100.00%	
PANEUR	13.37%	22.79%	-7.20%	-15.81%	-3.33%	-5.31%	-12.02%	3.18%	1.13%	18.61%	6.30%	-6.55%	-4.67%	54.95%	100.00%
	BTC	GOLD	COPPER	CRUDE OIL	CORN	EUR	GBP	JPY	CHF	NASDAQ	S&P500	JROSTOXX!	VIX	S TREASUR	PAN EUR
	Crypto		Comm	nodity			Curre	ency			Equity		Volatility	Во	nd



Asset Class Correlation With Bitcoin

3Y Rolling Window



Asset Class Correlation Matrix

3Y															
BTC	100.00%														
GOLD	13.27%	100.00%													
COPPER	13.24%	14.21%	100.00%												
CRUDE OIL	5.62%	2.13%	11.64%	100.00%											
CORN	8.04%	6.13%	13.85%	11.42%	100.00%										
EUR	-3.97%	5.68%	5.05%	-0.75%	-1.02%	100.00%									
GBP	-8.15%	0.49%	1.29%	-1.03%	-2.04%	56.13%	100.00%								
JPY	-5.69%	7.23%	2.57%	-2.61%	-5.90%	44.49%	26.14%	100.00%		_					
CHF	-3.27%	8.85%	4.80%	-2.37%	-3.43%	80.12%	43.30%	57.52%	100.00%						
NASDAQ	25.47%	12.16%	29.10%	12.76%	8.76%	3.61%	-3.89%	1.69%	-0.53%	100.00%		_			
S&P500	24.31%	10.13%	31.04%	15.00%	9.57%	5.74%	-2.05%	1.98%	-0.22%	94.78%	100.00%				
EUROSTOXX50	23.36%	4.82%	31.97%	10.47%	9.01%	-4.91%	-2.49%	-18.31%	-8.84%	56.62%	64.92%	100.00%		_	
VIX	-17.52%	-0.41%	-29.65%	-12.06%	-8.66%	3.82%	3.38%	4.23%	5.83%	-72.16%	-71.12%	-49.25%	100.00%		
US TREASURY	-2.42%	26.07%	-18.81%	-8.20%	-9.94%	-0.84%	-1.87%	6.79%	2.78%	-28.44%	-36.42%	-31.39%	25.58%	100.00%	
PANEUR	13.78%	25.59%	-0.13%	5.38%	5.68%	4.35%	-6.20%	4.61%	2.25%	20.13%	18.54%	15.64%	-8.18%	41.40%	100.00%
	BTC	GOLD	COPPER	CRUDE OIL	CORN	EUR	GBP	JPY	CHF	NASDAQ	S&P500	JROSTOXX!	VIX	S TREASUR	PAN EUR
	Crypto		Comm	nodity			Curre	ency			Equity		Volatility	Во	nd

Asset Class Correlation With Bitcoin

1Q Rolling Window



Altcoins vs Bitcoin (2021 Q3)





Altcoins vs Bitcoin (1Y)





Altcoins vs Bitcoin (3Y)

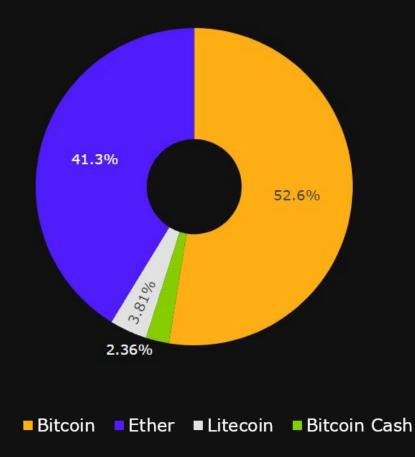


DGI Crypto Index Weights (Q2 2021)

- Weighted by trading volume, Bitcoin accounts for about the 70.3% of the index composition
- Exchanges considered:



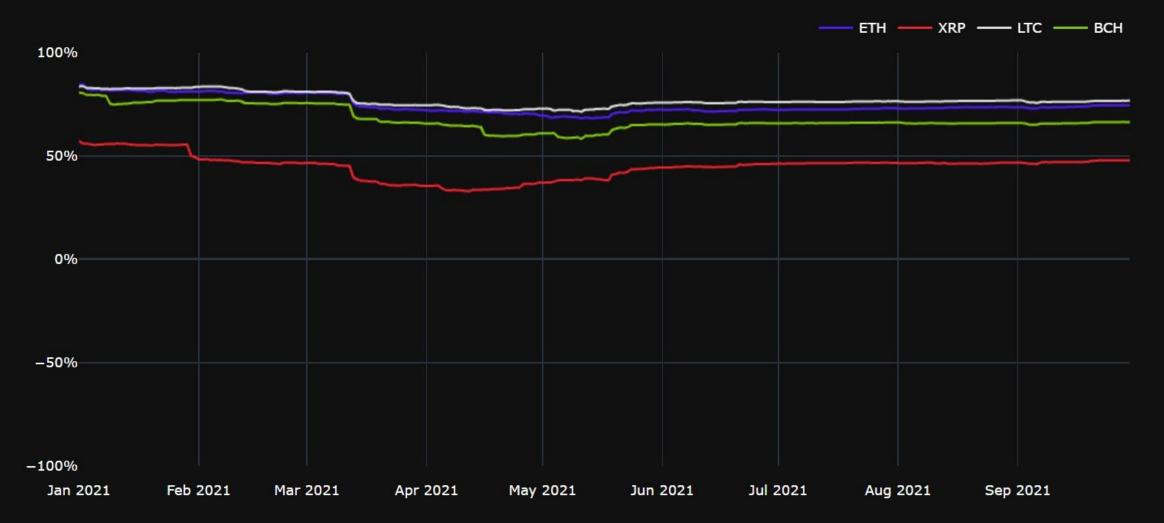
Index weight





Altcoin Correlation With Bitcoin

1Y Rolling Window

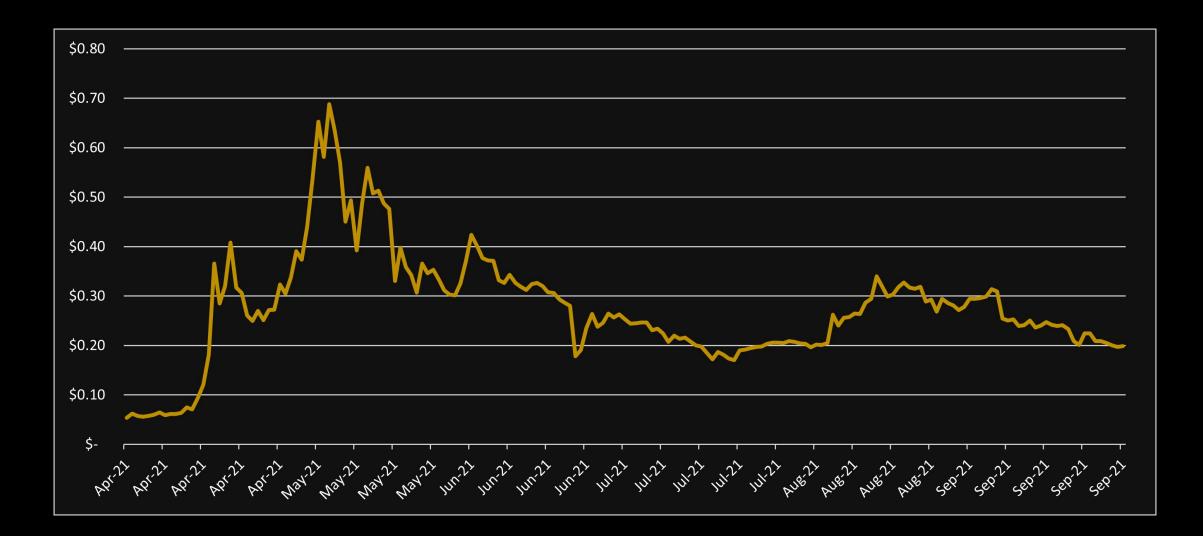


Altcoin Correlation Matrix

1Y				
BTC	100.00%			
ETH	71.65%	100.00%		
LTC	79.37%	78.12%	100.00%	
XRP	39.59%	44.08%	51.95%	100.00%
	BTC	ETH	LTC	XRP

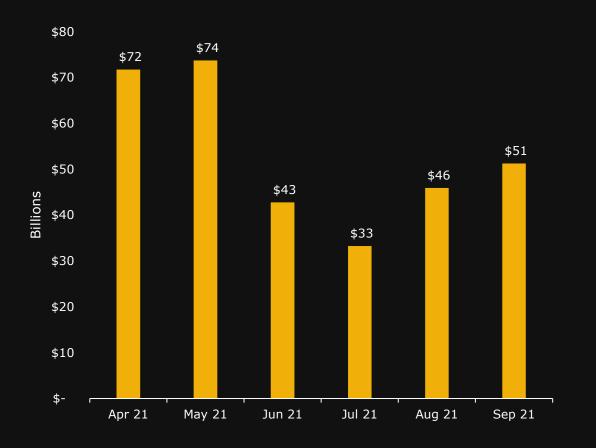
	BTC	ETH	LTC	XRP
XRP	51.66%	58.38%	60.18%	100.00%
LTC	79.52%	81.38%	100.00%	
ETH	79.20%	100.00%		
BTC	100.00%			
3Y				

Dogecoin: The End of the Bubble?

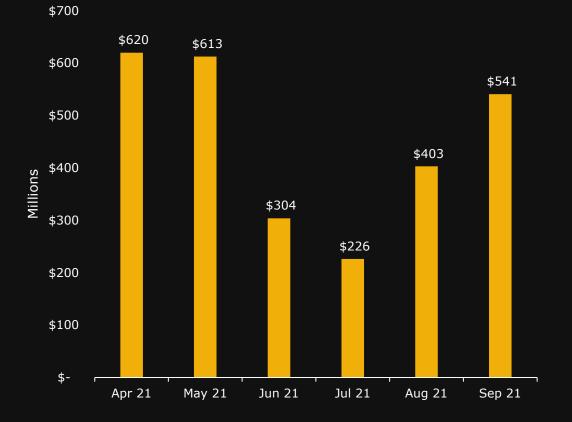


Bitcoin Listed Derivatives

CME Futures Volume



CME Options Volume





Bitcoin has Legal Tender in El Salvador 1/2

- El Salvador became the first country to officially adopt Bitcoin as a legal tender (September 7)
- As the price declined from around \$51,000 down to \$43,000, Nayib Bukele bought the dip
- El Salvador national fund has about 700 bitcoins





Bitcoin has Legal Tender in El Salvador 2/2



- El Salvador government wallet: Chivo
- The wallet was also beset with technical problems that meant new users were forbidden from registering, and the issues took few days to fix
- User receive \$30 in Bitcoin as registration bonus, to encourage crypto usage
- After three weeks, over 2 million Salvadorans are using Chivo Wallet: more users than all banks in El Salvador combined
- Chivo allows Salvadorans free cross-border payment; Salvadorans could save about \$400 million per year in remittance fees
- Chivo Wallet uses Lightning Network, a Bitcoin second layer solution that allows instant and free transactions



Bitcoin Legal Tender: the Others



Uruguay Proposes Bill to Allow Crypto to be Used for Payments



Panama Introducing Legislation to Make Bitcoin Legal



Brazil Cryptocurrency Transactions to Be Regulated



Ukraine to legalize bitcoin as the cryptocurrency slowly goes global

China Ban Crypto

- After many bans issued in the past, this time it is for real
- Mining stopped first
- All crypto-activities has been declared illegal
- All activities will shut down by the end of the year

Binance Leaking Compliance Regulation 1/2

- Consob Publishes a Warning on Binance
- Hong Kong Watchdog Says Binance Not Licensed to Sell Stock Tokens in City
- SC Takes Enforcement Actions on Binance for Illegally Operating in Malaysia
- The Binance stand-off:
 - Temporary Stops Payments From EU's SEPA Platform
 - Binance Will No Longer Offer Trading of Stock Tokens
 - Unavailability of Futures and Derivatives Products in Germany, Italy, and the Netherlands



Binance Leaking Compliance Regulation 2/2

Binance CEO Changpeng Zhao reflects on our progress over the last four years, the current regulatory:

- Protect users' interests first
- Clear regulations are critical for continued growth
- Making crypto safe and sustainable for all



"I and everyone at Binance are ready and look forward to being a partner in developing and following guidelines that will help the industry grow in a sustainable manner. And together, we will help to increase freedom in the society in a sustainable and responsible way."



Crypto Job Market 1/2

As a response to the regulatory problems, Binance has been hiring experts from the traditional finance world:



Former Controller of Office of the Comptroller of the Currency (OCC) Brian Brooks as CEO of BinanceUS (resigned for differences over strategic direction after only 4 months)



BINANCE



Former US Federal Law Enforcement Investigator Greg Monahan as Global Money Laundering Reporting Officer



Former Ant Financial, Uber Executive Brian Shroder as President of BinanceUS



Crypto Job Market 2/2

- Multinationals getting into the crypto system:
- **amazonjobs** *Digital Currency and Blockchain Product Lead* Wanted at Amazon
- Walmart Seeks Crypto Expert to Oversee Digital Currency Push and to Develop Cryptocurrency Products
 - Institutions seeking for Crypto Experts:



New York State Department of Financial Services (DFS) seeking a Deputy Superintendent in the Research and Innovation Division with a special focus on virtual currencies, digital currencies, blockchain, distributed ledger technology

Ransomwares and Cybersecurity

- US President Biden meets with Apple, Google and Microsoft
- Recent high-profile attacks on critical infrastructure around the world, including the ransomware attacks on the Colonial Pipeline and JBS Foods in the United States, demonstrate that significant cyber vulnerabilities exist across U.S. critical infrastructure, which is largely owned and operated by the private sector



Poly Network Hack

- \$600 Million Stolen From Poly Network is the Largest DeFi Hack Ever
- Crypto platform Poly Network rewards hacker with \$500,000 'bug bounty'
- Poly Network hacker gave back more than \$600 million in stolen crypto
- Poly Network Offers Chief Security Officer Role to Hacker That Stole \$600M



PolyNetwork



Non-fungible Tokens (NFT)

- Visa buys a CryptoPunk as it takes first steps into 'NFT commerce'
- Binance NFT Launches Premium NFT Collection by The State Hermitage Museum: Featuring Tokenized Artworks of Leonardo da Vinci & More
- Collector buys fake Banksy NFT for £244,000: Scammers and Hackers See New Frontier in NFT Art

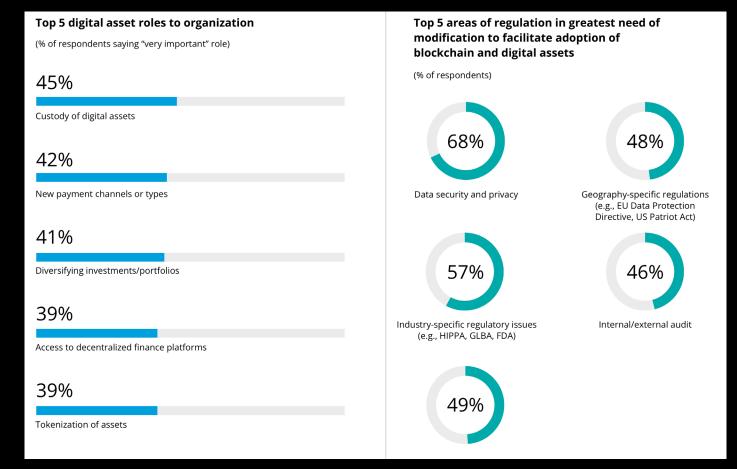
- CryptoPunks blasts past \$1 billion in lifetime sales as NFT speculation surges
- OpenSea Hits \$3B in Monthly NFT Volume



Deloitte 2021 Global Blockchain Survey

- Deloitte's 2021 Global Blockchain Survey affirms that banks should embrace their inevitable digital future
- In a seismic shift, financial leaders increasingly see digital assets as the future
- Majority of Executives Think Digital Assets Will Soon Be Alternative to Fiat

https://www2.deloitte.com/us/en/insights/topics/u nderstanding-blockchain-potential/globalblockchain-survey.html







Digital Euro 1/2

European Central Bank Launches 24-Month Investigation into Digital Euro



Christine Lagarde ECB President "Our work aims to ensure that in the digital age citizens and firms continue to have access to the safest form of money, central bank money."



"If the central bank gets involved in digital payments, privacy is going to be better protected . . . because we are not like private companies, we have no commercial interest in storing, managing or monetizing the data of users."

Fabio Panetta ECB Executive Board



Digital Euro 2/2



A Digital Euro aims to:

- lead to "a fundamental change in the way in which payments, the financial system and society at large will function"
- protect consumer privacy
 - combat the spread of digital coins created by other nations and companies
- maintain the autonomy of domestic payment systems and the international use of a currency in a digital world
 - competing cryptocurrencies that could undermine the bloc's monetary sovereignty
 - prevent illicit activities and avoid any "undesirable impact on financial stability and monetary policy"

Central Bank Digital Currency (CBDC)













- The Banque de France successfully carried out an experiment on the use of CBDC
- The experiment involved the simulation on a private blockchain of the issuance and settlement of unlisted securities and of the settlement of listed securities
 - The experiment required the development and deployment of smart contracts
- Operations were conducted by a consortium of players gathered at the initiative of LiquidShare, among which Axa Investment Managers, BNP Paribas Securities Services, CACEIS Bank, CIC Market Solutions, Crédit Agricole Titres, Euroclear, Euronext, Kriptown, La Banque Postale, Caisse des Dépôts, ODDO BHF, ODDO BHF AM, OFI AM and Société Générale Securities Services.

US Infrastructure Bill & Crypto Regulation

- It's official: Cryptocurrency is infrastructure
- The \$1 trillion infrastructure bill H. R. 3684, which includes provisions for crypto regulation, passed the US Senate
- The developing US cryptocurrency regulation will address:
 - Topping cryptocurrency crime and tax evasion
 - Stablecoins regulation
 - Legislation investment vehicles, e.g., cryptocurrency ETFs.
- Elizabeth Warren urged Treasury Secretary Janet Yellen to identify and remedy risks posed by cryptocurrencies and to craft a "comprehensive and coordinated" framework through which federal agencies can continually regulate virtual coins



"As the demand for cryptocurrencies continues to grow and these assets become more embedded in our financial system, consumers, the environment, and our financial system are under growing threats"

Elizabeth Warren Senior United States Senator from Massachusetts

SEC Seeking Authority for Crypto Regulation

- Elizabeth Warren wrote asked the SEC what congressional authorization it needs to handle crypto.
- Gary Gensler, Chair the U.S. Securities and Exchange, asked Sen. Warren for more SEC authority to regulate crypto exchanges for investors protection.



Gary Gensler Chair the U.S. Securities and Exchange "Right now, we just don't have enough investor protection in crypto. Frankly, at this time, it's more like the Wild West."

SEC Oversights the Crypto Ecosystem

- Areas of focus for SEC's regulation purposes are:
 - Platforms for crypto trading and lending they provide direct access to millions of investors with no intermediate broker andabsent clear investor protection obligation on these platforms. Therefore, the investing public is vulnerable.

- Stablecoins

the use of stablecoins on trading platforms may facilitate those seeking to sidestep public policy suck as anti-money laundering, sanctions, and more."

 Decentralized Finance (DeFi) even though they are decentralized, DeFi projects that reward participants with incentives or digital tokens could enter territory that is subject to SEC regulation

AND EXC.



Coinbase Threatened by the SEC

- The Securities and Exchange Commission has threatened Coinbase with a lawsuit for wild cryptocurrency trading swings
- After months of open dialogue, Coinbase CEO Armstrong claims the SEC shut talks down over crypto lending program Lend: federal markets regulator said that the product is a type of security that should be registered with the government.
- Brian Armstong on Twitter: "How can lending be a security?"
- However, Coinbase's revenue rose more than 1,000 per cent year on year in the second quarter of 2021



1/ Some really sketchy behavior coming out of the SEC recently. Story time...

...





Bitcoin 22.0 Released

- 22nd major release of Bitcoin's original software client launched by Satoshi Nakamoto almost 13 years ago
- Is the first Bitcoin Core release to drop the leading 0 from its version number: it's Bitcoin Core 22.0 — not Bitcoin Core 0.22.0
- First software with Taproot support
- This means that Bitcoin Core 22.0 fully validate the new Taproot rules.



Ethereum London Hard Fork – EIP 1559

Search

London Mainnet Announcement

Posted by Tim Beiko on July 15, 2021

Research & Development

ethereum

bloa

foundation



 05/08/2021 12:34 UTC (block 12,965,000): London Hard Fork activated

- Try to solve the high fee rate problem and the scalability of the network. Impact on the way fee are calculated, on the miners reward and on the monetary policy:
 - new fee market that change how transactions are prioritized and add predictability to transaction fees
 - miners will receive reduced transaction fees and become more reliant on block rewards, transaction tips and potentially "maximal extractable value" (MEV) for rewards
 - greater block size variance, meaning block sizes can fluctuate up to two times the current maximum limit during times of high network congestion

Protocol Development: Bitcoin vs Ethereum

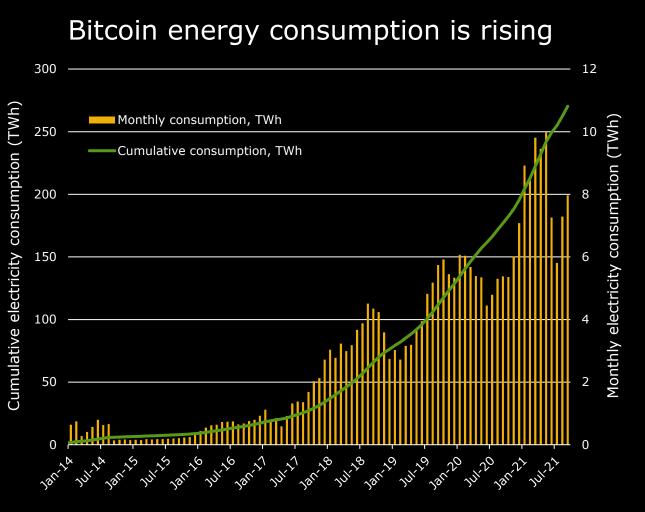


- **12 protocol** update
- Hard-fork: non backward compatible
- Defined roadmap driven by Vitalik Buterin and the Ethereum fundation
- Migration to Proof of Stake (PoS) and Ethereum 2.0 in progress since forever



- 2 protocol update
- Soft-fork: backward compatible
- Incremental updates, must be accepted by all actors of the ecosystem: developers, miners, users, investors, industries

Mining: environment sustainability



- Actually, Bitcoin energy consumption is comparable to Netherlands
- If Bitcoin hits \$500,000, mining it will spew more CO2 than Mexico or Brazil
- In this scenario, Bitcoin capitalization will be more than 10 Trillion, Mexico and Brazil GDP is less than 2 Trillion



Proof of Reserves

Bitmex proof-of-liabilities has revamped the **BitMEX** debate about proof-of-reserves and proof-of liabilities



coinfloor Coinfloor has been the only exchange so far to produce both proofs

CheckSig CheckSig is the only custodian to provide proofof-reserves (https://checksiq.io/por/)





Presa Diretta: a Documentary on Bitcoin



Media Appearances

We Wealth	
dgi.io/2021/08/12/we-wealth	WEALTH
Il Sole 24 Ore	501e 24 ORE
dgi.io/2021/08/10/il-sole-24-ore	
Rai 1	Det 1
dgi.io/2021/07/17/codice-rai1	Rai 1
Agenda Digitale	Agenda
dgi.io/2021/08/06/agenda-digitale	Digitale
dgi.io/2021/09/21/agenda-digitale	
dgi.io/2021/09/29/agenda-digitale	

Media Appearances

DigiTech.news

dgi.io/2021/07/16/digitech

DigiTech.news

dgi.io/2021/09/29/cybersecurity360

Studio Paolo Gaeta podcast

dgi.io/2021/09/28/studio-paolo-gaeta









Next Training Sessions

- Entry-level and Advanced Training
- Focus: Bitcoin, crypto-asset, blockchain, distributed ledger, smart contract, and cryptography
- Next session:
 - 14-15 december 2021
- www.dgi.io/workshop



CryptoWeek: Every Friday at 6PM

- The most relevant news about bitcoin, crypto-assets and blockchain commented weekly by Ferdinando M. Ametrano
- Live streaming:
 - YouTube
 - Facebook
 - Linkedin
- Also available as podcast
- www.dgi.io/cryptoweek



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CAL2021: Save The Date



https://cryptoassetlab.diseade.unimib.it/calconf/

INVITED SPEAKER

Guest Speakers



Paola Agnese Bongini

Full Professor of Banking and Finance Department of Business and Law **University of Milano-Bicocca**



Marco Petracco Giudici Senior Economist Finance and Economy Unit Joint Research Centre European Commission

Digital Gold Institute

Scarcity in the Digital Realm

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