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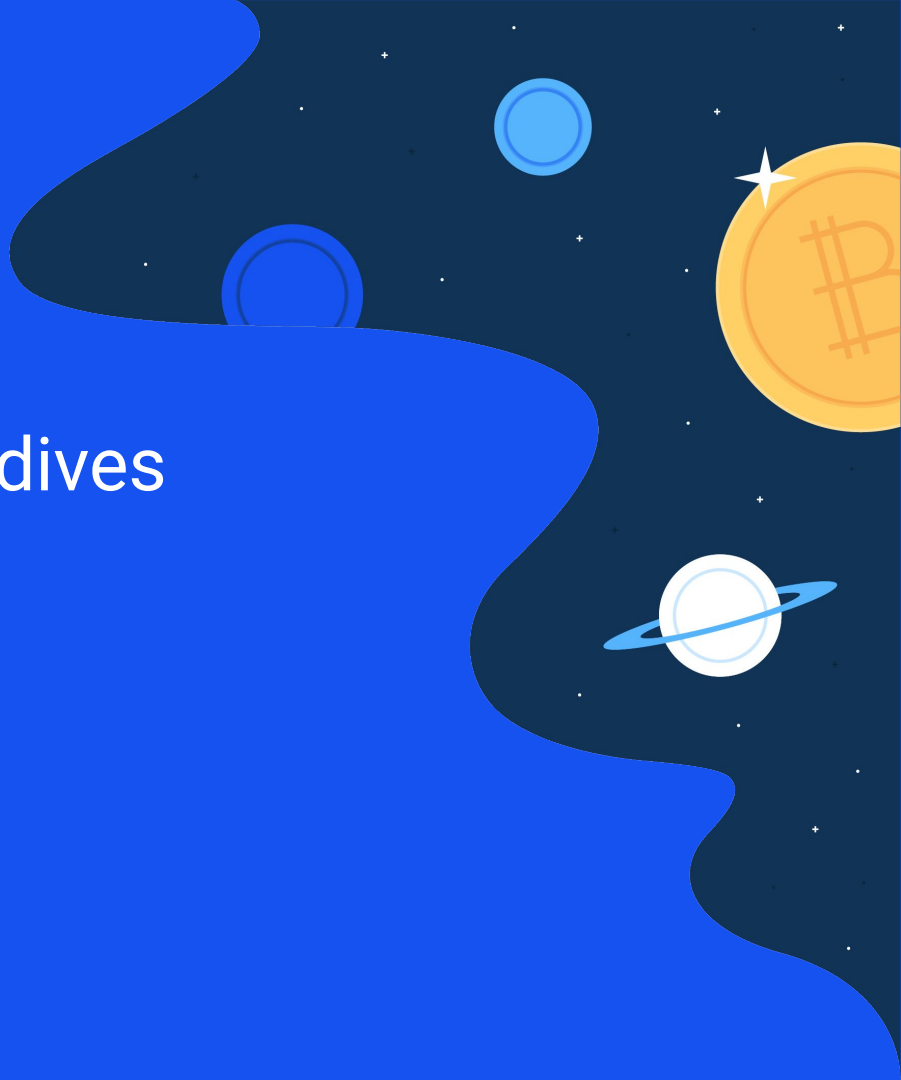
Why Crypto? Use case deep-dives



Overview of materials

Crypto and blockchain technology have tremendous potential to improve transparency, security, and privacy across countless industries and services.

This document lays out some of these use cases, including:

Financial use cases

Area of greatest maturity

Societal use cases

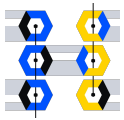
Several mature; others still emerging

Crypto as a technology | Why is it unique?

Crypto is global, decentralized, and open. These three core features are transforming a variety of key services and industries through increased access, efficiency, and transparency.

Global

Crypto is a digital technology available to anyone with internet access. Just as you can email or video chat with family and friends around the world, you can now seamlessly send them value in the form of crypto. Crypto offers 24/7 access and instant settlement.



Decentralized

Crypto relies on code—not people, institutions, or government. This feature makes it "trustless and permissionless," with each and every crypto transaction immutable and publicly verifiable on the blockchain. Crypto and blockchain are also powering the next generation of apps, with the potential to transform countless industries and services.

Open

Crypto technology is open-source and auditable, making crypto fully transparent, as well as:

- **Interoperable:** as the technology develops, blockchains will be able to openly communicate and interact with each other, driving the creation of compelling new products and services.
- **Composable:** blockchains can share infrastructure and effectively "clone" previous iterations, leading to rapid innovation cycles.

Sample Crypto Use Cases

Financial

- **Store of value**: Used as an inflation hedge, or where financial institutions cannot be trusted to guard assets
- **Payments / remittances**: Reducing the cost of payments and of sending remittances
- **Decentralized finance (DeFi)**: Bringing financial products like lending on-chain, broadening access at scale; removing intermediaries to reduce settlement times and decrease costs
- **Humanitarian Relief**: Instantly & securely raise funds for those in need; Ukraine raised over $180M in crypto donations; women in Afghanistan received emergency aid in crypto after the gov't limited cash withdrawals

Societal

- **Climate**: Blockchain and fractionalized ownership facilitate carbon markets and track / incentivize recycling
- **Healthcare**: Blockchain security protects health data; smart contracts help secure vaccine distribution
- **Identity**: "Decentralized ID" can transform everything from KYC verification to preventing child trafficking
- **Disinformation**: News organizations can validate sources and identify deep fakes by creating an "audit trail for digital content" (WEF, NYT)
- **Supply chain**: NFTs can provide unique and verifiable identifiers for supply chain data
- **Science**: Research ecosystems use native tokens to reward users for publishing, reviewing, and collaborating on open research, and rely on DAOs to allocate funding for specialized causes
- **Social**: Startups leverage crypto tokens to incentivize participation, reward users for posting or commenting

Financial use cases

Crypto as a Store of Value

The problem - Lack of trust. Monetary systems today require individuals to trust centralized institutions to both manage their money safely, and ensure that the value of that money does not diminish over time. This has led to a system where hyperinflation runs rampant in many countries, and in certain scenarios, governments seize funds that rightly belong to individuals.

The solution - Crypto as the trustless system. Crypto provides an alternative, allowing individuals to custody their own funds without relying on an intermediary, either with an asset pegged to existing fiat with less deflationary risk (e.g., USDC), or to an asset completely distinct from fiat currencies (e.g., Bitcoin).

The outcome - Economic freedom for those that need it most. Not being able to trust an intermediary to provide a fair store of value or maintain a currency's value disproportionately impacts the poorest populations in the world. These populations are increasingly turning to crypto to solve this problem.

"Even though cryptocurrencies have lost value, many Argentines see them as a less risky choice than their own currency, whose worth has plunged as inflation has soared." (NYTimes)

Crypto and the Transfer of Value: Remittances

The problem - Costs and delays. The traditional process of sending money to friends and family abroad is complex and costly. Payment networks are slow, complicated, and dominated by large banks and money transfer operators. The World Bank in 2023 found that the costs of sending money cross-border continued to be too high, averaging 6.2 percent for a $200 transfer.

The solution - Cheaper, faster, more secure. Crypto can be transferred around the world seamlessly peer-to-peer, without the need for inter-bank accounts or overnight payment processing. Fees are minimal or nonexistent. And assets stored in crypto wallets, such as dollar-denominated stablecoins, preserve value against local currency inflation and let recipients participate in staking or other yield-producing services.

The outcome - More money to recipients. A Coinbase Institute analysis estimates that sending remittances using crypto can save between 2-8 percent in fees. For a $200 payment, that means friends and family receive up to $16 more to save, stake, or spend on necessities. (Source: Crypto and Remittances, June 2022).

"Imagine, with each intermediary taking their fee in the transaction, if suddenly you can reduce the number and directly transact, you don't have to wait. It reduces the cost." – Jean Pesme, World Bank Global Director of Finance, Competitiveness & Innovation (World Bank podcast, Dec. 2021).

Crypto and Tokenized Assets

The problem - An outdated system. Traditional investment opportunities have high barriers to entry and are limited both geographically and to those who can afford an entire asset. Further, transactions and settlement often take days and require costly fees.

The solution - Tokenization converts ownership rights in an asset into a digital token on a blockchain. Almost any asset can be tokenized, from financial instruments like equities and bonds to tangible assets such as real estate and precious metals. And the use of smart contracts helps automate transactions, saving time and money. These efforts face regulatory hurdles, however, as a number of key jurisdictions lack clear legal frameworks for tokenization.

Real world examples

- **Greater access to markets.** Fund managers are partnering with token providers like Securitize to tokenize billion-dollar funds, giving individuals access to private equity assets that are typically limited to institutional investors.
- **Customized portfolios.** Investors can customize portfolios around their specific interests, such as “tokenized royalty streams from their favorite musical artists.” (Source: Coindesk)

Tokenizing assets can “unlock potential innovations in areas including custody, collateral management, cash and liquidity, fund administration, accounting and payments.” – BNY Mellon report, 2021

Crypto and Humanitarian Support

The problem - The traditional financial system makes it too slow and difficult to transfer value.

The solution - Crypto offers "innovative solutions to meet increasingly complex humanitarian emergencies," from natural disasters to armed conflict. Crypto operates 24/7, with near-instant settlement globally, and donations have already provided key support to those in need in Venezuela, Kenya, Ecuador, and elsewhere. (Source: CARE Crypto Fund for Humanitarian Aid)

Real world examples

- **Support for Ukraine.** Ukraine legalized digital assets in March 2022, allowing it to raise over $180M in crypto donations. These included funds from crypto-native decentralized autonomous organizations (DAOs) and NFT sales; UkraineDAO auctioned an NFT of the Ukrainian flag for $6.5M in ETH, with proceeds donated to a foundation that supports the Ukraine armed forces. (CNBC, 2022).
- **Building blocks.** The UN World Food Program has developed a blockchain-based app that "enables the tracking and delivery of multiple types of assistance," from cash to medicine. This network lets users around the world collaborate, transact, and share information, securely and in real time.

"In a situation like this where the national bank is not really operating, crypto is helping to perform fast transfers, to make it very quick and get results almost immediately."
– Ukrainian Deputy Minister Alex Bornyakov (Source: Decrypt, March 2022).

Societal use cases

Crypto and Healthcare

The problem - Healthcare data is often held in centralized, siloed locations, making it difficult to share and vulnerable to hacking. In 2021, the Health and Human Services Department launched an initiative to digitize data and give patients control over *how, with whom, and for what purposes* their electronic health data is shared.

The solution - Crypto technology can encrypt data and allow accurate, up-to-date sharing.

Real world examples

- **Blockchain innovation.** Cryptographic encryption protects the privacy of health data and lets patients easily share it with providers. Patientory allows users to store medical records securely on the blockchain and share them as needed. WholeCare uses blockchain tech to provide data to caregivers, ensuring they have current and accurate information on medication protocols and doctor's appointments, all while protecting patient privacy.
- **Public health onchain.** Smart contracts, which execute automatically when certain conditions are met, can make vaccine distribution more secure by monitoring it in real time, creating a tamper-proof supply chain. The UK government recently used a public blockchain to track and manage COVID-19 vaccine cold storage.

"Blockchain technology has the potential to transform health care, placing the patient at the center of the health care ecosystem and increasing the security, privacy, and interoperability of health data." (Deloitte)

Crypto and Identification

The problem - The current system of paper documents and digital IDs managed by big tech compromises privacy and is complex and confusing. Websites store duplicative personal data and require endless username-password combinations for access.

The solution - Decentralized ID gives people control over their personal data, solving the security, privacy, and consent issues of traditional IDs. DiD relies on trusted third parties to issue identifying credentials, which are stored on a blockchain and accessed via a digital wallet. Users can selectively share data as needed, and revoke access at any time.

Real world examples

- **Simplifying compliance.** DiD can improve financial compliance by ensuring customer data is up-to-date and instantly available. Institutions can issue a customer's "know your customer" evaluation as a token on the blockchain, preventing duplicative reviews and ensuring information is updated in a timely manner.
- **Humanitarian uses.** Digital credentials can help prevent the trafficking of vulnerable children by eliminating the forgeability of Power of Attorney and identity documents that typically enable illegal border crossings. (Source: DIDs for Self-Sovereignty)

Decentralized ID creates a "lifetime portable identity for any person, organization or thing that does not depend on any centralized authority and can never be taken away." – IBM Blockchain Blog

Crypto and the Climate

The problem - Projects like carbon markets and recycling initiatives face challenges related to transparency and validation. It also can be difficult for small participants to enter markets.

The solution - Blockchain provides increased transparency, and tokens offer incentives and opportunities for fractionalized ownership.

Real world examples

- **Tracking carbon credits.** Outsyde, Inc., acquires and manages at-risk lands, fractionalizes their ownership, and distributes ownership interests as NFTs on the blockchain. Using the Algorand network's microequity exchange, Outsyde can mint up to 1 million shares for each piece of property. It now oversees more than $45 million in land assets across the United States.
- **Incentivizing recycling.** Startups like Recereum help consumers receive rewards in crypto simply by scanning a QR code when recycling. The receiving organization uses the code and related blockchain data to confirm receipt and issue rewards. Crypto can be used as a credit on energy bills or spent on everyday expenses. While rewards-driven recycling is not new, the ability to relay both waste and financial information on the same rail is unique.

"Cryptocurrencies and the technology that powers them (blockchain) can play an important role in sustainable development, and [in] actually improving our stewardship of the environment."
– UN News, June 2021

Crypto and Energy

The problem - Large numbers of intermediaries limit the availability of renewable energy and consumers' freedom to choose their preferred energy source, and present tracking and data management challenges.

The solution - Blockchain technology can effectuate peer-to-peer exchanges of crypto for energy from specific providers, giving consumers greater choice over their sources of energy and further unlocking renewable energy markets.

Real world examples

- **Facilitating renewable energy use.** Suncontract is a blockchain-based peer-to-peer renewable energy trading platform with over 5,000 customers in Slovenia. The platform uses SNC token, an Ethereum-based payment method, to facilitate direct transactions between buyers and sellers on its marketplace.
- **P2P transactions.** The National Renewable Energy Laboratory piloted a program using blockchain to automatically match energy generation and demand between two homes, showing that homeowners could successfully sell excess solar power to each other.

"Keeping track of renewable-energy certificates is one of dozens of potential applications of blockchain technology that could solve data management challenges in the electricity sector without disrupting business as usual." – MIT Technology Review

Crypto and Combatting Disinformation

The problem - Federal law enforcement and national security experts have identified the spread of disinformation as a critical threat to U.S. election integrity and therefore our democracy. Foreign adversaries have spent millions of dollars to spread disinformation, and the U.S. government expects this trend to continue. (Source: Dir. of Nat'l Intelligence brochure)

The solution - Combat deep fakes and other disinformation attacks by using the blockchain to track digital content and verify its legitimacy.

Real world examples

- **Verifying information.** Studies have shown that news organizations can validate sources and identify deep fakes by storing image and video data on an immutable ledger, or by recording an article's source data in an NFT. This creates an "audit trail for digital content," making later alterations clearly evident. (Sources: NYT, 2020; WEF, 2021; Cointelegraph, 2020).
- **Building reputation.** Blockchain offers a decentralized approach to tracking a specific source's identity and reputation for accuracy, apart from the organizations for which they work. A recent study outlined how distributed ledger technology could could guarantee authenticity, "essentially eliminating the need for a trusted, centralized institution." (Sources: Harvard Business Review, 2021; *Fake News, Disinformation, and Deep Fakes*, Fraga-Lamas et al, 2019).

"[A] blockchain-based approach could potentially address many of the risks and root causes of digital disinformation." – Harvard Business Review, July 2021

Crypto and Supply Chain Management

The problem - Supply chains struggle to accurately track parts and meet demands in complex global supplier networks, leading to increased inefficiencies and counterfeiting.

The solution - NFTs can provide unique and verifiable identifiers for supply chain data like purchase orders, inventory units, and bills of lading, enhancing capacity planning. Further, each participant in the chain can use their own unique ID to "sign" tokens as they move through the chain, creating a built-in, tamper-proof audit trail of each stage of the supply and manufacturing process.

Real world examples

- **Ethical sourcing.** The U.N. has launched an open-source, Ethereum blockchain initiative to trace cotton supply chains in Latin America, helping meet customer demand for sustainable, high-quality fibers. Brilliant Earth, a retailer of ethically-sourced diamonds, confirms the provenance of its diamonds by tracking them from mine operator through manufacturing on the blockchain. (UN Econ Commission for Europe, 2021; Everledger Case Study).
- **Trusted data.** A pilot project in Taiwan built a trusted vehicle data source on the Ethereum blockchain, confirming the accuracy of used car data and vehicle safety by tracking replacement parts and vehicle repairs, mileage, and ownership over time. (Source: You-Ting Jiang et al, Blockchain-Based Vehicle Condition Recording System, 2021).

"Blockchain technology has powerful potential to grant better control over and visibility into the supply chain than ever before." – Forbes, 2021

Crypto and the Arts

The problem - Plagiarism is a real risk in the digital age, and accurately attributing creative ownership may require input from multiple intermediaries.

The solution - Non-fungible tokens (NFTs) can prove exclusive ownership of digital and real-world assets on the blockchain, creating a “digital certificate of authenticity” that also facilitates exchange.

Real world examples

- **Profits to creators.** NFTs allow artists to profit more directly from their creations by removing the middlemen that historically have dominated the art world. They also provide opportunities for fan engagement and support.
- **Intellectual property rights via crypto.** Mediachain.io, built on the Ethereum blockchain, allows musicians to centrally store their music, claim rights to property, and distribute their music across a number of different platforms, including Spotify. Manifold is a Web3 platform that lets artists create custom smart contracts and music NFTs that they personally own. This allows artists the flexibility and autonomy to operate independent of any particular music label or streaming platform.

“From verification tools for provenance and authenticity to new approaches to art collecting and even new art forms, blockchain’s impact on the artworld is already undeniable” -Art Basel Art Fair

Crypto and Decentralized Science

The problem - The legacy system of scientific research is hindered by a lack of data transparency, centralized funding allocation, and strict barriers to publishing.

The solution - DeSci introduces novel methods of coordination, incentivization, and verification.

Real world examples

- **Tokenization.** Over 80 DeSci projects are in operation today. Ecosystems like ResearchHub use native tokens to reward users for "publishing, reviewing, criticizing, and collaborating" on open research. Protocols like OpSci allow researchers to authenticate their identity, credentials, and projects as NFTs, facilitating research and reputation tracking over time.
- **Community.** DeSci leverages community decisionmaking to allocate funding, often through decentralized autonomous organizations (DAOs). Some DAOs focus on specific areas of research, such as rare diseases, while others fund projects more broadly.

"I believe that any patient with a life altering disease, no matter how rare, deserves to be a part of a community and have the power to pursue a cure." – Alok Tayi, founder of Vibe Bio, a DAO dedicated to funding research on rare diseases

Crypto and Decentralized Social Media

The problem - Traditional social media apps have been criticized for their content moderation policies, deplatforming, use of algorithms, and economic model of monetizing user data.

The solution - "DeSoc" empowers users to take control of their social media experiences. Operating on the blockchain or a network of independent servers, DeSoc platforms let users communicate directly peer to peer, easily port their identities and content to other sites, and collectively determine content guidelines without fear of deplatforming.

Real world examples

- **Tokenization.** DeSoc leverages crypto tokens to incentivize participation and reward users for posting or commenting. This ensures that users—rather than big tech—own and profit from the content they create. One blockchain, STEEM, distributes tokens to reward upvoted articles, and has paid creators well over $30 million to date.
- **Transparent algorithms.** While some platforms have abandoned algorithms altogether, others embrace a middle ground by offering users more visibility into, and control over, the content they see. Greater transparency could alleviate problems caused by extremism, echo chambers, and the spread of misinformation.

"A decentralized social network allows users more control. Benefits include censorship resistance, ownership over personal data, and improved control over user-generated content." – Tulane University

Crypto and the Metaverse

What is the metaverse? It has been described as “a persistent and interconnected network of 3D virtual worlds that will eventually serve as the gateway to most online experiences, and also underpin much of the physical world." (Matthew Ball, The Metaverse, 2022)

- **Crypto as currency.** Blockchain technology underpins the metaverse, and crypto is its native currency. Crypto tokens facilitate the exchange of virtual goods, can be earned as rewards and incentives, and can be spent on in-world assets.
- **Virtual factories.** Manufacturers like Boeing and BMW are creating virtual factories using “digital twins” that allow simulations and real-time data from production and process monitoring to enhance product quality, efficiency, and worker safety. (Sources: VentureBeat, Reuters, WEF)
- **Training and service.** INTERPOL has built virtual headquarters and classrooms that deliver trainings on travel document verification and passenger screening, and allow students to apply skills at a virtual border point. (Source: Interpol)

“The metaverse may profoundly change how businesses and consumers interact with products, services and each other.” – PricewaterhouseCoopers

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