# Trollip's Degen Almanack

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# Welcome

This Almanack represents an attempt to document cryptocurrency and Web3 knowledge without the conflicts of interest that plague our industry. Just as Henry Varnum Poor created his Manual of Railroads to bring transparency to America's railroad boom, this Almanack aims to bring clarity to the cryptocurrency revolution.

## Why This Almanack Exists

The cryptocurrency industry suffers from a unique problem: those with the deepest knowledge often have the strongest financial incentives to mislead others. Protocol developers promote their own chains, influencers pump their own holdings, and "researchers" serve those who pay them. Meanwhile, crucial information remains locked behind paywalls and exclusive groups.

This Almanack breaks that pattern by providing:

- Comprehensive knowledge from basic concepts to advanced strategies
- Independent analysis free from token-holder influence
- Technical depth that doesn't sacrifice accessibility
- Practical guidance for both users and developers

## How to Use This Almanack

Whether you're seeking financial sovereignty or building the future, this Almanack offers multiple paths:

**For Those Seeking Independence**
Start with "Regular Person's Path to Independence" to understand how to safely participate in the cryptocurrency ecosystem without falling prey to scams or losing your funds.

**For Technical Minds**
The "Technical" section provides deep dives into cryptography, blockchain architecture, and protocol design patterns. Consider starting with "Web3 Essentials" to establish a common vocabulary.

**For Market Participants**
The "Financial" section offers frameworks for analyzing digital assets, understanding market structures, and evaluating protocols.

## Living Document

This Almanack is version controlled through Git and continuously updated by community contributions. Every technical claim is justified, every strategy explained, and every risk clearly stated. You're reading an early draft, dated December 2024.

## Contributing

Knowledge critical to digital independence should be freely accessible. This work is licensed under Creative Commons Attribution-ShareAlike 4.0, ensuring it remains open while preventing commercial exploitation. Learn more in our "Contributing" section.

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Begin your journey with the topics listed in the navigation menu, or proceed systematically through each section. Welcome to your guide to digital independence.

# Part I

# Introduction

# Copyright Notice

## Motivation

Knowledge critical to achieving financial sovereignty should never be locked behind paywalls or restrictions. The crypto industry already suffers from enough artificial barriers - gated Discord servers, exclusive research groups, and insider knowledge networks that perpetuate inequality.

This Almanack exists to break down these barriers. Just as Bitcoin enables permissionless financial transactions, this work aims to enable permissionless learning. However, we must also prevent others from creating new barriers around this knowledge.

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1. Anyone can freely access, share, and build upon this work
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4. Attribution protects the community's contributions
5. The viral nature of ShareAlike prevents future enclosure

Think of it like a smart contract for knowledge: immutable rules that protect freedom while enabling innovation.

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## Version Control

This work is version controlled through Git. Each version represents a distinct iteration of the Almanack, identified by commit hashes and release tags. While the content may evolve, this license remains constant across all versions.

You can find the complete version history and contribute to future versions at: [Repository URL]

## Attribution Example

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## Contact

For questions about usage or licensing, contact: jtrollip@protonmail.com

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The above represents the formal terms under which this Almanack is shared. In the spirit of transparency and accessibility that cryptocurrency enables, we've chosen these terms to ensure this knowledge remains as free as the protocols it describes.

# Dedication

For my two skebangas. Huxley & Morrissey

# Epigraph

*"Arise, you have nothing to lose but your barbed wire fences!"*
— Timothy C. May (1988)

# Preface

## Why I must write

So that I can continue to use crypto without dishonor, I have decided to put together a sufficient body of free research so that I will be able to get along without any knowledge that is not free and accessible by anyone.

## Why many others want to help

I have found that many within crypto are unhappy with the exploitation of digital currencies. The influx of grifters, charlatans and scammers. It may enable them to make more money, but it requires them to feel in conflict with humanity rather than feel as comrades.

The fundamental act of friendship among degens is the sharing of knowledge. Knowledge in crypto, due to it's technical complexity has attracted a special type of exploitation. High pay walls for access to data goes against the very ethos of Web3.

## How you can contribute

Currently you can contribute by submitting knowledge in the form of a Pull Request to the Github repo.

I'm considering opening up this Almanack onto Mirror so people can donate financially and anonymously through there. I still need to do more research on Open Source financial models to ensure this Almanack can operate sustainably as a going concern.

Stay Tuned!

# 1 Introduction

The genesis of this book was reading a technical argument on Twitter that was steeped in ideology. I agreed with both parties on certain points, yet the two combatants resorted to ad hominem attacks, both lacking a standardized framework in which to couch their arguments. This led me to rekindle an idea I'd had years before, to create a blockchain taxonomy. Something that would be easily accessible and would be able to be used to quickly dispel bad faith arguments.

After building out the initial taxonomy, the breadth of the task started to dawn on me. The potential of it could be expanded to provide value not just to the technical community but to all parties interested in blockchain technology. I kept recalling the numerous conversations with family and friends asking for crypto investment advice. This wonderful patchwork of humanity I've had the fortune of spending my life with and how I could never give them an answer that spanned the breadth of this fascinating industry I love. Even sadder, I had no way of giving them advice concise enough for them to follow, that matched their investment goals.

What then if there was a book, an Almanack for lack of a better word, that I could give to these people. A book that would educate, illuminate and help them make well informed investing decisions. While still straddling a fine line of being technically honest on how to safely navigate these waters.

Taking a cue from history, following in the footsteps of Henry Vanrum Poor when he recognized the need for reliable information about the booming railroad companies. This takes inspiration from that venture with a modern twist. In line with the cypherpunk manifesto(Hughes 1993) and the open source communities (Raymond 1999) which I admire so much, this Almanack will be open source and community contributed. As a core tenet of the Cypherpunk manifesto, contributors identity will be less important than their reputation. The knowledge will be curated and go through an approval process via Github Pull Requests. The other innovation is that as the Alamack evolves over time it will integrate with real time data sources in order to provide a dynamic document that plugs into the market as it evolves.

A brief note on the naming of the book. Initially I wanted to call it blockchain taxonomy, reflecting it's early design goals. However as I worked more and more and it evolved into something much broader than a Taxonomy, Almanack made a lot more sense. Initially I liked Trollip's Web3 Almanack. But all the broader terms for this industry have severe limitations. I consider myself a degen. And while it's a loaded term, it's being a degen that has armed me with the knowledge to attempt this ambitious venture. Hence Trollip's Degen Almanack.

## 1.1 Core mission

This Almanack aims to solve the Agency problem in Web3. In simple terms, most of the information currently being published to users are from people with huge conflicts of interests. For all of TradFi's many faults, we do have regulatory frameworks and structures that help manage conflicts of interests. Even though they largely fail, in crypto these guardrails don't really exist. Even educational content in crypto generally comes from platforms that are funded by exchanges or protocols. These educational pieces promote certain technology because the authors are financially invested in their adoption.

This creates several problems I hope the Almanack can solve:

1. Information Asymmetry - we can reduce the knowledge gap between insiders and regular users
2. Principal Agent Misalignment - The Almanack's success isn't tied to promoting particular assets or protocols and if I ever took any money, it would be disclosed
3. Moral Hazard - By being open source, community reviewed resource, we create accountability through transparency
4. Selection Bias

## 1.2 Intended Audience

Our audience is primarily aimed at:

- People wanting to escape the reliance on centralized post industrial systems
- Technologists

# Part II

# Foundations

# 2 Digital Independence

The story of digital independence begins not with blockchains or cryptocurrencies, but with a profound recognition: the tools that brought unprecedented convenience to our lives have also created unprecedented control over them.

Consider your daily financial life. Your morning coffee purchase creates a data point. Your salary arrives through systems you don't control. Your savings exist primarily as numbers in someone else's database. This convenience comes with hidden costs - your transactions can be blocked, your accounts frozen, your privacy compromised. Each small sacrifice of control seemed reasonable in isolation, but together they've created golden handcuffs of financial dependence.

This isn't accidental. The post-industrial financial system runs on centralization because it's efficient. Banks can process thousands of transactions per second. Credit cards work seamlessly across borders. Mobile payments happen with a fingerprint. But this efficiency masks a fundamental truth - you're asking permission to use your own money.

The early cypherpunks understood this tradeoff. In 1993, Eric Hughes wrote in the Cypherpunk Manifesto:

"Privacy is necessary for an open society in the electronic age. Privacy is not secrecy. A private matter is something one doesn't want the whole world to know, but a secret matter is something one doesn't want anybody to know. Privacy is the power to selectively reveal oneself to the world."

They saw that digital privacy would become inseparable from freedom. Without privacy in our transactions and communications, true independence would be impossible. But they also understood that simply criticizing the system wasn't enough - they needed to build alternatives.

This brings us to public key cryptography, the foundation of digital independence. Imagine having a special lock that anyone can use to send you messages or money, but only you can open. No permission needed, no middlemen required, no central authority to approve or deny. This isn't just technical theory - it's a practical tool for independence.

Bitcoin emerged from this foundation, but it would be a mistake to see it as just digital money. It proved that we could create systems where trust comes from mathematics and consensus rather than institutions. Where rules are enforced by code rather than policy. Where participation is permissionless rather than granted.

The path to digital independence isn't about rejecting modern convenience - it's about reclaiming control while preserving it. We'll learn to:

- Hold assets that can't be frozen or seized
- Communicate without surveillance
- Trade without gatekeepers
- Build systems that resist control

But this power comes with responsibility. In traditional systems, mistakes can often be reversed. Passwords can be reset. Transactions can be disputed. In truly independent systems, you alone are responsible for your security. Your privacy. Your choices.

This Almanack exists because that responsibility requires knowledge. Not just technical knowledge, though that's important, but practical wisdom. Understanding not just how these systems work, but why they matter. Learning not just to use tools, but to think independently about digital freedom.

The journey of digital independence is both personal and collective. Each person who takes control of their digital life strengthens the network for everyone. Each developer who builds privacy-preserving tools expands what's possible. We're not just users of a new system - we're participants in its evolution.

In the coming chapters, we'll explore both the philosophical foundations and practical tools of digital independence. Whether you're a developer looking to build these systems or someone seeking to use them, understanding these foundations is essential. Because digital independence isn't given - it's learned, practiced, and ultimately, earned.

- Start with the philosophical and historical context - from cypherpunks to present
- Explain why both regular people and technologists seek alternatives to centralized systems
- Cover the core principles: self-sovereignty, censorship resistance, trustless systems
- This section unifies both audiences with common ground before diverging into specialized paths

# Part III

# Path to Independence

**3**

# Part IV

# Technologist's Path

# 4

- Deep technical fundamentals (cryptography, consensus, networking)
- Protocol design patterns and tradeoffs
- Development frameworks and tools
- Security considerations for builders
- Advanced privacy techniques

# Part V

# Web3 Essentials

# 5 Terms

This Chapter will be updated most frequently. Terms are constantly changing, definitions being debated in the public square and evolving at a quicksilver pace.

Please treat it as a living document. The Almanack uses version control, so it will be possible to see how terms change over time by going back to previous versions.

## 5.1 Core Concepts

### 5.1.1 Web3

While our industry is built on the back bone of cryptography, it encompasses not only a branch of mathematics, but economic, social, technological and political aspects. Web3 more closely aligns with the breadth of our industry.

Below you can see how the web has evolved into Web3.
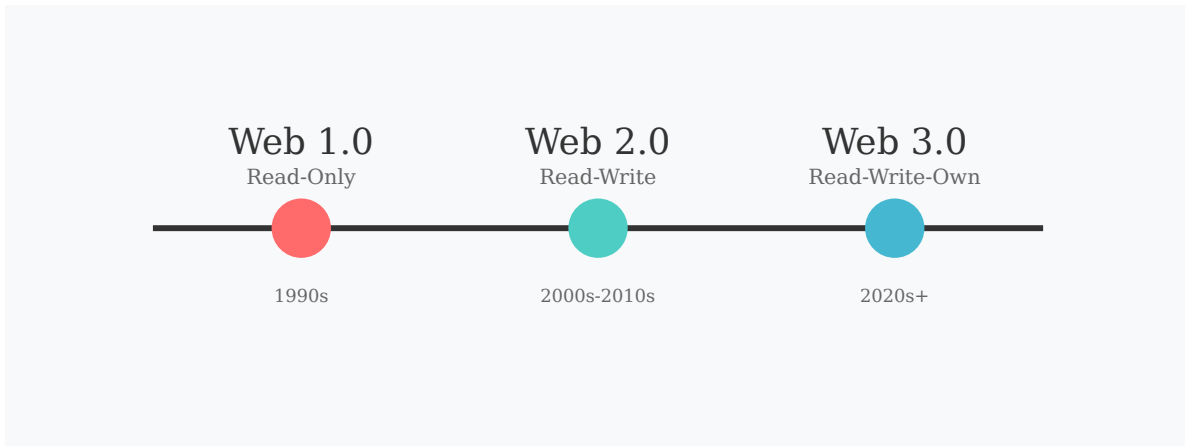


Figure 5.1: Evolution of the Web

- Web1 (1990s): static websites, read-only content
- Web2 (2000s - 2010s): Interactive social platforms, user-generated content
- Web3 (2020s+): Decentralized networks, blockchain, user-owned data and assets

### 5.1.2 Decentralization
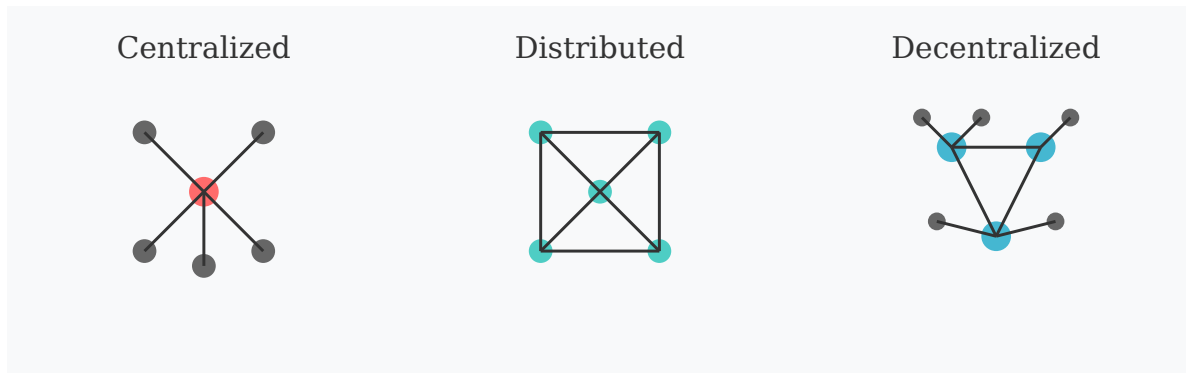


Figure 5.2: Network Topologies

### 5.1.3 Blockchains

#### 5.1.3.1 Layer 1

Currently there is no formally and universally accepted definition of what comprises a L1 Network.

We have taken these sources in order to come up with our definition:

- (Nakamoto 2008) for Bitcoin
- (Buterin 2013) for Ethereum
- (Buterin 2021) for the rollups guide
- (Charbonneau 2023) for John's excellent guide to rollups

Nakamoto's Bitcoin whitepaper, while not explicitly using the term "Layer 1," established the core principles of what we now recognize as Layer 1 characteristics: a base protocol that handles consensus, security, and data availability without relying on any other blockchain system. This introduced the concept of a `self-contained, sovereign blockchain network`.

The Ethereum whitepaper expanded this foundation by introducing programmability and demonstrating that a Layer 1 could be more than just a payment system. It showed that a Layer 1 blockchain serves as a foundation for broader computational capabilities while maintaining the core properties of decentralization and security.

Buterin's rollup guide helps define Layer 1 by contrast - it clarifies what makes a base layer distinct from scaling solutions built on top of it. This work emphasizes that a Layer 1 blockchain must handle three critical functions: data availability, consensus, and execution, all while maintaining decentralization.

Charbonneau's report further refines our understanding by examining how Layer 1 blockchains interact with scaling solutions, highlighting their role as the security and settlement layer of the blockchain ecosystem.

Synthesizing these sources, we can define a Layer 1 blockchain as:

A sovereign blockchain network that provides three fundamental guarantees without relying on any other blockchain system:

1. consensus - the ability to agree on the state of the network
2. data availability - ensuring all transaction data is publicly accessible and verifiable
3. execution - the processing of transactions and state changes. It must do this while maintaining decentralization in its security model and serving as the ultimate settlement layer where the final state of all transactions is recorded.

### 5.1.3.1.1 Settlement Layer

This is kinda a meme at this point and no formal definition exists. Although lots of opinions, as is generally the case in crypto.

> **ℹ Note**

> **ℹ Note**

### 5.1.3.2 Layer 2

There is no canonical definition of L2's.

We use:

- zkRollup vs Optimistic Rollup (Gluchowski 2019)
- Plasma (Poon and Buterin 2017)
- The Bitcoin Lightning Network (Poon and Dryja 2016)
- Incomplete Guide to Rollups (Buterin 2021)
- The Complete Guide to Rollups (Charbonneau 2023)

To come up with the following Framework

1. Data Availability

- On-chain (Rollups)
- Off-chain (Validiums, Plasma, Sidechains)

2. Security Model

- Inherited from L1 (Rollups, Validiums)
- Independent (Sidechains)
- Hybrid (Plasma)

3. State Validation

- Fraud Proofs (Optimistic Rollups)
- Validity Proofs (ZK Rollups, Validiums)
- Independent (Sidechains)
- Merkle Roots (Plasma)

4. Settlement Mechanism

- Direct (Rollups)
- Challenge Period (Optimistic Rollups)
- Exit Games (Plasma)
- Bridge/Peg (Sidechains)

## 5.2 Trading

### 5.2.1 Wash trading

Wash trading is the practice of manipulating the trading volume of an exchange. It's when trading occurs between related parties used to inflate the real volume occuring. An example, would be a CEX holds two accounts and constantly trade between themselves.

## 5.3 Accounts

While technically different blockchains will have their own nuances and their own technically correct terms for the concept of an "account", we will refer to them all as accounts for ease of reference. We define an Account as a user owned blockchain public-private key pair. The account can be a simple account that can only send Coins or execute smart contracts, or the Account can be a smart account, whereby it's behaviour and attributes can be controlled by code.

**Please note** a user can be either a human, bot, or AI agent.

### 5.3.1 Seed phrases

In order to create an Account on a blockchain, it needs to be secured by a public-private key pair. The most common way to do is via a Seed phrase generated by the wallet.

Since your private key is the singular point of security for your interaction on that blockchain, it needs to be incredibly secure. This means that your private key is a very large random number. Due to the difficulty of working with these large random numbers, Seed phrases were created to improve the user experience. Historically humans have used "code words" to obfuscate and hide meaning. Seed phrases are just a way to generate a private key in a more human relatable way.

### 5.3.2 Simple Account

In the early days of blockchain, while only Proof of Work blockchains existed, an account was simply a public-private key pair that could transfer Coins or execute a very simple script.

With the advent of Ethereum, Accounts and Blockchains became more powerful. In Ethereum's Yellow Paper (Wood 2014) Gavin Wood introduced the concept of an Externally Owned Account, or EOA for short.

There it is defined as:

- Having a nonce (counter for transactions sent)
- Having a balance (in the native currency)
- No associated contract code
- No data storage

Now that we have the rise of different Application models we need to further refine what a Simple Account is:

- Direct control through a public-private key pair
- No additional programmable logic at the account level
- Transactions must be directly signed by the controlling private key

## 5.4 DeFi - Dentralized Finance

### 5.4.1 Slippage

Slippage is the price difference between the advertised price and what you actually pay. Let's say you want to purchase ETH at \$3,500, I then confirm the transaction, but in between the time I got the quote and the time I confirmed my transaction, the price has changed to \$3,550. One of two things can happen:

1. The transaction fails due to me not setting my slippage high enough
2. The transaction succeeds as it's within the bounds of my slippage setting

In that example above, for my transaction to have succeeded, I would had to have my slippage set at above 1.42%.



Figure 5.3: Uniswap UI

There are few reasons to manually increase the slippage:

- Trading shit coins with low liquidity
- Trading large amounts. Although it probably makes more sense to break these trades up over a few days rather
- Networks with slower block times
- Times of high market volatility

## 5.5 Colloquialisms

### 5.5.1 Degens

"Degen" (short for "degenerate") in crypto/Web3 culture refers to aggressive or risk-seeking participants in cryptocurrency markets and DeFi (decentralized finance) protocols. The term originated from gambling culture but has been embraced by the crypto community as a semi-ironic badge of honor.

- Trading Behavior: Degens are known for taking high-risk positions, often using significant leverage, and engaging in yield farming, liquidity mining, and other complex DeFi strategies.
- Cultural Identity: Unlike traditional finance's negative connotation of "degenerate gambling," the crypto community has reclaimed "degen" as a positive or playful identifier. It represents a willingness to experiment with new protocols and take calculated risks.
- Technical Sophistication: Despite the seeming recklessness implied by the term, many "degens" are highly knowledgeable about blockchain technology, smart contracts, and DeFi mechanics. They're often early adopters of new protocols and technologies.
- Community Role: Degens play an important role in crypto ecosystems by providing early liquidity to new protocols, testing experimental features, and contributing to the rapid evolution of DeFi products.

## 5.6 General Terms

- Smol Brain
- Big Brain
- Gigabrain
- FUD (Fear, Uncertainty, Doubt): While not strictly a meme, it's become memefied in crypto culture. Any negative news or criticism is often dismissed as "FUD" by cryptocurrency enthusiasts, sometimes ironically.
- "When Lambo?": This phrase emerged during the 2017 bull run, representing the dream of getting rich enough from crypto to buy a Lamborghini. It's both used seriously by newcomers and ironically by veterans.

- Diamond Hands / Paper Hands: Popularized during the GameStop saga but heavily adopted in crypto. "Diamond hands" refers to holders who don't sell despite market pressure, while "paper hands" sell at the first sign of trouble.
- "This is good for Bitcoin": Originally used seriously, it became ironic as people would claim any news, even negative, was somehow positive for Bitcoin's adoption or price.
- Bogdanoff Twins ("Dump It"): These memes feature the late Bogdanoff twins supposedly controlling the crypto markets, ordering price dumps right after someone buys or pumps after they sell.
- "Funds are SAFU": From a Binance CEO video where he mispronounced "safe," this became a way to reassure (often ironically) about exchange security.

### 5.6.1 Common Characters
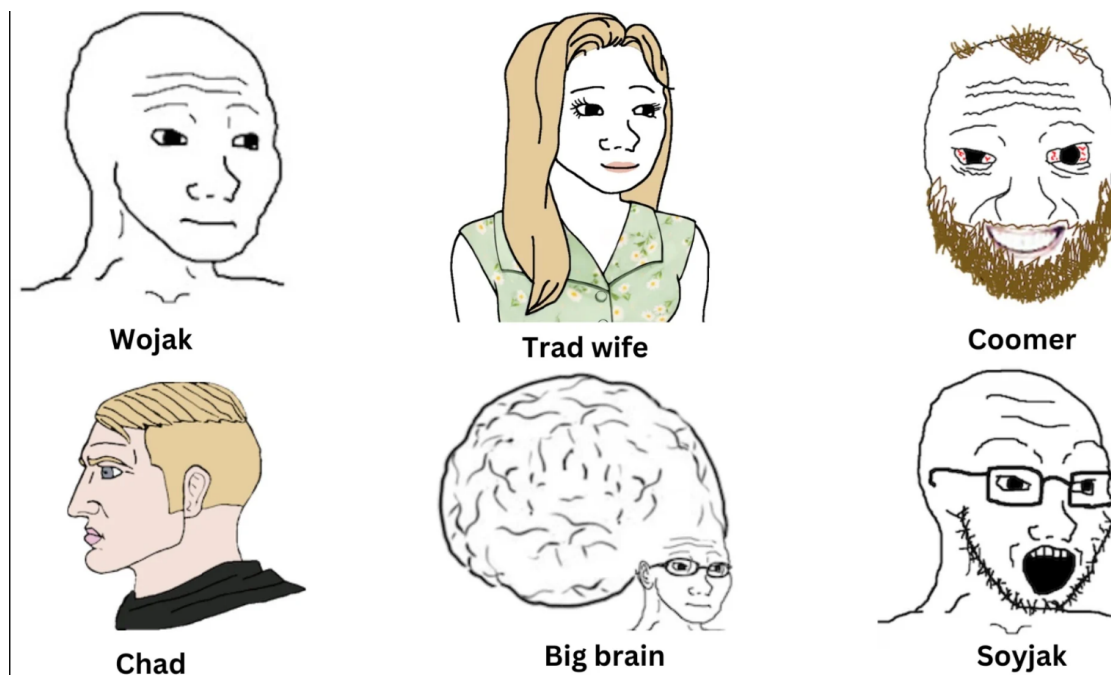


Figure 5.4: Crypto characters

- Wojak/NPC: Originally from 4chan, this simple face drawing represents the average retail trader who buys high and sells low. It's often paired with the "feels guy" emotion variations, particularly during market crashes.
- Soyjak: a derogatory variation of Wojak used to mock people perceived as overly enthusiastic, naive, or conformist. The term combines "soy" (from the controversial and scientifically unsupported claim that soy consumption reduces masculinity) with "Wojak."

- Coomer: a derogatory variation of Wojak used to mock people perceived as overly enthusiastic, naive, or conformist. The term combines "soy" (from the controversial and scientifically unsupported claim that soy consumption reduces masculinity) with "Wojak."

## 5.7 Acronyms

IBRL - Increase Bandwidth, Reduce Latency

# 6 Tools

## 6.1 CEX's

Centralized Exchanges are a necessary evil in Web3. They can be used for trading and purchasing Digital Assets and generally offer better rates and lower fee's than their decentralized counterparts. However they're generally not to be trusted as seen by some notable CEX failures in the not too distant past:

- Mt Gox (2014) - 850k BTC. $450 million in 2014 prices
- Bitfinex (2016) - 120k BTC. $72 million in 2016 prices
- Quadriga (2019) - $190 million in 2019 prices
- FTX (2022) - $8-10 billion in 2022 prices
- Celsius Network (2022) - $4.7 billion in 2022 prices
- BlockFi (2022) - $1-10 billion in 2022 prices
- Voyager Digital (2022) - $1.3 billion in 2022 prices

Notice how in 2022, contagion became pretty prevalent. This is why the not your keys, not your coins meme is so popular.

You can view and evaluate CEX's on CoinGecko. Take careful note of the Trust Score. A lot of CEX's engage in wash trading and that's why it's important to have someone independently verify their stated trading volumes.

## 6.2 Wallets

A wallet is the primary way you interact with a Blockchain.

Wallets have the following major attributes:

- Type - Hardware or Software wallets
- Private
- Platform - Mobile, Browser, Desktop or Hybrid
- Application Model - Type of blockchains it supports. Can support multiple models.

Table 6.1: Wallets

| Wallet Name | Type | Platform | Application Models Supported |
| --- | --- | --- | --- |
| Ledger | Hardware | Desktop, Mobile | Account (EVM), UTXO, Specialized Account, Resource, Actor |
| Trezor | Hardware | Desktop, Browser | Account (EVM), UTXO, Specialized Account |
| MetaMask | Software | Browser Extension, Mobile | Account (EVM) |
| Phantom | Software | Browser Extension, Mobile | Capability (Solana), Account (EVM), UTXO (Bitcoin) |
| Safe | Software | Browser (Web App) | Account (EVM) |
| TrustWallet | Software | Mobile | Account (EVM), UTXO, Specialized Account |
| Rainbow | Software | Mobile | Account (EVM) |

## 6.3 Analysis Tools

There are numerous ways to analyze blockchains.

- On chain analysis
- Data Professional Tools

    - Dashboards and Charting
    - SQL Playgrounds
    - API

On chain analysis tools allow you to analyze data on chain through a User Interface

### 6.3.1 On Chain Analysis

#### 6.3.1.1 Portfolio Trackers

We break down Portfolio Trackers into manual versus automated. Manual is whereby the user has to manually input their Tokens and how many they bought for how much USD.

Manual are recommended for newcomers, but they quickly fall down. They only handle Coins and Tokens and not your DeFi positions, such as Liquidity Pools, Money Market positions etc.

They have a place and are valuable but Automated Portfolio Trackers are far superior and only getting better.

For Manual there are:

- CoinGecko
- CoinMarketCap

For Automated, we need to break it down into single vs multiple Application Model support.

Table 6.2: Portfolio-Tracker

| Portfolio Tracker | Supported Models | Key Features | Main Chains | Notable Aspects |
|---|---|---|---|---|
| DeBank | Account (EVM) | - DeFi protocol tracking- Wallet analytics- Cross-chain support | Ethereum, BSC, Polygon, Avalanche | Strong focus on DeFi positions and yields |
| Pulsar Finance | Account (EVM), UTXO, Capability Model, Cosmos | Support for the most chains. But values can be wrong | Ethereum, Base, Cosmos, Solana, Bitcoin, Sui, Aptos, Near, Cardano | Widest coverage in the market |
| Zapper | Account (EVM) | - NFT tracking- DeFi dashboard- Portfolio history | Ethereum, Optimism, Arbitrum, Polygon | Excellent UI/UX and bridging features |
| Nansen Portfolio | Account (EVM) | - Yield farming focus- TVL tracking- ROI calculator | All major EVM chains | Specializes in yield optimization |
| DappRadar | Multiple Models | - NFT tracking- DApp analytics- Cross-chain support | Most major blockchains | Comprehensive ecosystem analytics |

| Portfolio Tracker | Supported Models | Key Features | Main Chains | Notable Aspects |
|---|---|---|---|---|
| Step Finance | Capability Model | - Solana ecosystem- Yield tracking- NFT support | Solana | Native Solana portfolio manager |

I recommend newcomers to use Pulsar. As you learn about DeFi, you'll be chasing yield on numerous chains and will need something with the comprehensive coverage that only Pulsar provides. If you're only on EVM, then I recommend using Debank.

### 6.3.1.2 Explorers

Explorers allow you to explore transactions and on chain activity.

I'll revise the table to be more focused and clear, removing the alternative explorers column.

Table 6.3: Explorers

| Blockchain | Primary Explorer | URL |
|---|---|---|
| Bitcoin | Mempool Space | https://mempool.space/ |
| Ethereum | Etherscan | https://etherscan.io |
| ApeCoin | ApeScan | https://apescan.org |
| Arbitrum One | Arbiscan | https://arbiscan.io |
| Arbitrum Nova | Nova Explorer | https://nova.arbiscan.io |
| Base | BaseScan | https://basescan.org |
| Blast Chain | BlastScan | https://blastscan.io |
| BNB Chain | BscScan | https://bscscan.com |
| BTTC | BttcScan | https://bttcscan.com |
| Celo | CeloScan | https://celoscan.io |
| Cronos | CronoScan | https://cronoscan.com |
| Frax | FraxScan | https://fraxscan.io |
| Fantom | FTMScan | https://ftmscan.com |
| Gnosis | GnosisScan | https://gnosisscan.io |
| Linea | LineaScan | https://lineascan.build |
| Mantle | MantleScan | https://mantlescan.io |
| Moonbeam | Moonscan | https://moonbeam.moonscan.i |
| Moonriver | Moonscan | https://moonriver.moonscan.i |
| opBNB | opBNB Explorer | https://opbnbscan.com |
| Optimism | Optimistic Etherscan | https://optimistic.etherscan.io |
| Polygon zkEVM | Polygon zkEVM Explorer | https://zkevm.polygonscan.co |
| Polygon | PolygonScan | https://polygonscan.com |

| Blockchain | Primary Explorer | URL |
| --- | --- | --- |
| Scroll | ScrollScan | https://scrollscan.com |
| Avalanche | SnowTrace | https://snowtrace.io |
| Sophon | SophScan | https://sophonscan.com |
| Taiko | TakioScan | https://taikoscan.com |
| Wemix | WemixScan | https://wemixscan.com |
| Worldcoin | WorldScan | https://worldcoin.org/explorer |
| Xai | XaiScan | https://xaiscan.com |
| XDC | XdcScan | https://xdcscan.io |
| zkSync | zkSync Explorer | https://explorer.zksync.io |
| XRP | XRP Ledger Explorer | https://livenet.xrpl.org |
| Solana | Solana Explorer | https://explorer.solana.com |
| Dogecoin | DogeChain | https://dogechain.info |
| Cardano | Cardanoscan | https://cardanoscan.io |
| Tron | Tronscan | https://tronscan.org |
| TON | TON Explorer | https://tonscan.org |
| Polkadot | Polkascan | https://polkascan.io |
| Chainlink | Chainlink Explorer | https://explorer.chain.link |
| Stellar | Stellar Expert | https://stellar.expert |
| Bitcoin Cash | Blockchair | https://blockchair.com/bitcoin-cash |
| Sui | Sui Explorer | https://suiexplorer.com |
| NEAR | NEAR Explorer | https://explorer.near.org |
| Aptos | Aptos Explorer | https://explorer.aptoslabs.com |
| Hedera | HashScan | https://hashscan.io |
| Litecoin | Litecoin Explorer | https://litecoinblockexplorer.n |
| Internet Computer | IC Scan | https://icscan.io |
| VeChain | VeChain Stats | https://vechainstats.com |
| Filecoin | Filfox | https://filfox.info |
| Stacks | Stacks Explorer | https://explorer.stacks.co |
| Hyperliquid | Hyperliquid Explorer | https://hyperliquid.xyz/info |
| Kaspa | Kaspa Explorer | https://explorer.kaspa.org |
| Algorand | AlgoExplorer | https://algoexplorer.io |
| Cosmos | Mintscan | https://www.mintscan.io |
| Mantra | Mantra Scan | https://mantrascan.org |

### 6.3.1.2.1 Pure EVM

Etherscan is the most widely used Explorer and has versions on all the major EVM Chains. We'll only focus on their Explorers for EVM chains in perpetuity or until something better comes along.

I recommend using Blockscan which is from the same company and consolidates all their supported chains into a consolidated UI. It makes sense to use Blockscan for surface level analysis. But as soon as you want to delve into the code, you'll need to use one of their Explorers specializing on that particular chain.

#### 6.3.1.2.1.1 Exploring Solidity

We'll use Etherscan to explore the EVM

We'll delve into how to use Etherscan to analyze:

- Addresses
- Contract

For Addresses we'll explore Vitalik's Account

> **i** Note

Then for the Contract we'll explore Tether's USDT

The first thing you need to know is that Solidity is a compiled language and as such for us to view the code in the Explorer, we need the developer to upload their code and have it verified against the bytecode. Don't sweat too much about the details, what you really want is to ensure that in the Etherscan explorer is the contract is verified.

- Viewing the Solidity version
- Viewing the "standard" libraries the code inherits

### 6.3.1.3 Defillama

Defillama will become one of the most important tools you'll use in your degen journey. Give the team some love.

## 6.3.2 Data Professional Tools

### 6.3.2.1 API

We'll start off by using Ortege. For full transparency I own and founded Ortege. This Almanack can and will use data from any trusted source. But in the early days while we require data specifically tailored to our requirements, we will be using Ortege. Anyone contributing however can integrate with any other reputable data sources.

We break down API's into the following categories:

- RPC Nodes. These are the API's provided by the Blockchain clients. Each Application Model will have a different API structure. The most famous example being the Bitcon RPC standard and the EVM RPC standard
- SQL based. These API's allow you to write SQL against their Datasets. Examples include Dune and Flipside. Much like the RPC based API's, these will all have a different API structure.
- Semantic Layer. Ortege is the first, that I'm aware of, API that aims to abstract away the blockchains implementation away from the developer and provide a uniform API that is consistent across blockchains.

### 6.3.2.1.1 Ortege

Coming Soon.

## 6.4 Security Tools

### 6.4.1 OpenZeppelin

## 6.5 Privacy Tools

### 6.5.1 VPN

The most commercially popular VPN's are ExpressVPN, NordVPN and CyberGhost. I'm not an expert here, but I use Mullvad VPN as it accepts BTC as payment and seems most resitant to state attacks.

### 6.5.2 TOR

# 7 Memes

There will be a lot of references to meme's in your journey to become a Gigabrain Degen. It's important to understand them. Culture is a massive part of Web3 and will help you immensely in your journey.

## 7.1 Not your keys, not your Coins



Figure 7.1: Not your keys

"Not your keys, not your coins" is one of the most fundamental principles in cryptocurrency, emerging from the early days of Bitcoin and becoming even more relevant after several high-profile exchange failures. This phrase encapsulates a core tenet of cryptocurrency's original vision: true financial self-custody.

The principle is simple but profound: if you don't control the private keys to your cryptocurrency wallet, you don't truly own your cryptocurrency. When you keep your crypto on an exchange or any centralized platform, you're essentially trusting that entity with your assets. The exchange provides you with an IOU - a promise that they're holding your coins safely - rather than giving you direct control over them. This arrangement mirrors traditional banking, where your money is actually a liability on the bank's balance sheet rather than physical cash in your possession.

The significance of this principle has been repeatedly demonstrated through catastrophic exchange failures like Mt. Gox, FTX, and others, where users lost billions because they trusted centralized entities with their crypto assets. Each of these events reinforced the wisdom of the original crypto ethos: the only way to truly own your cryptocurrency is to hold your private keys in a wallet you control. This might mean using a hardware wallet, a properly secured software wallet, or even a paper wallet, but the key factor is that you - and only you - have access to the private keys that control the funds.

This phrase has evolved from a simple security recommendation into a battle cry for cryptocurrency self-sovereignty, encouraging users to take direct responsibility for their assets rather than defaulting to the familiar but potentially risky comfort of centralized custody. It represents not just a practical security measure, but a philosophical alignment with the decentralized, trustless principles that cryptocurrency was built upon.

## 7.2  HODL

HODL originated as a misspelling of "hold" in a 2013 Bitcoin forum post titled "I AM HODLING." The post's author, frustrated by their poor trading performance during a Bitcoin price crash, declared they would simply hold onto their Bitcoin rather than try to time the market. The typographical error caught on as both a meme and an investment philosophy in the cryptocurrency community.

The term has evolved beyond its humorous origins to represent a long-term investment strategy often summarized as "Hold On for Dear Life." This reflects the mindset of cryptocurrency investors who maintain their positions despite extreme market volatility, believing in the long-term value proposition of their assets rather than attempting to profit from short-term price movements.

HODL also represents a rejection of traditional trading wisdom. While conventional financial markets emphasize technical analysis and market timing, HODLing suggests that, particularly in the volatile cryptocurrency space, a simple buy-and-hold strategy might outperform active trading for many investors. This approach acknowledges the difficulty of timing a highly volatile, 24/7 global market.

The term has become so influential that it helps identify different types of market participants. "HODLers" are often contrasted with "traders" or "speculators," with HODLers viewed as

providing market stability through their long-term commitment to holding assets. During market downturns, the community often encourages "HODL" as a way to maintain conviction and avoid panic selling.

The concept of HODLing has also influenced how blockchain projects design their token economics. Many projects now include staking mechanisms, vesting schedules, and other features that encourage long-term holding, showing how a simple misspelling has evolved into a fundamental aspect of cryptocurrency culture and economics.

## 7.3 Midwit (Bell Curve) Meme

The meme uses a bell curve (IQ distribution curve) with three characters:

- Left side (low IQ): A simple, happy figure who does something basic but effective. Often called Smol brain
- Middle of the curve (average IQ): A pseudo-intellectual character with overcomplicated strategies/thoughts, often wearing glasses and trying to sound smart
- Right side (high IQ): Returns to the simple approach but with deep understanding of why it works
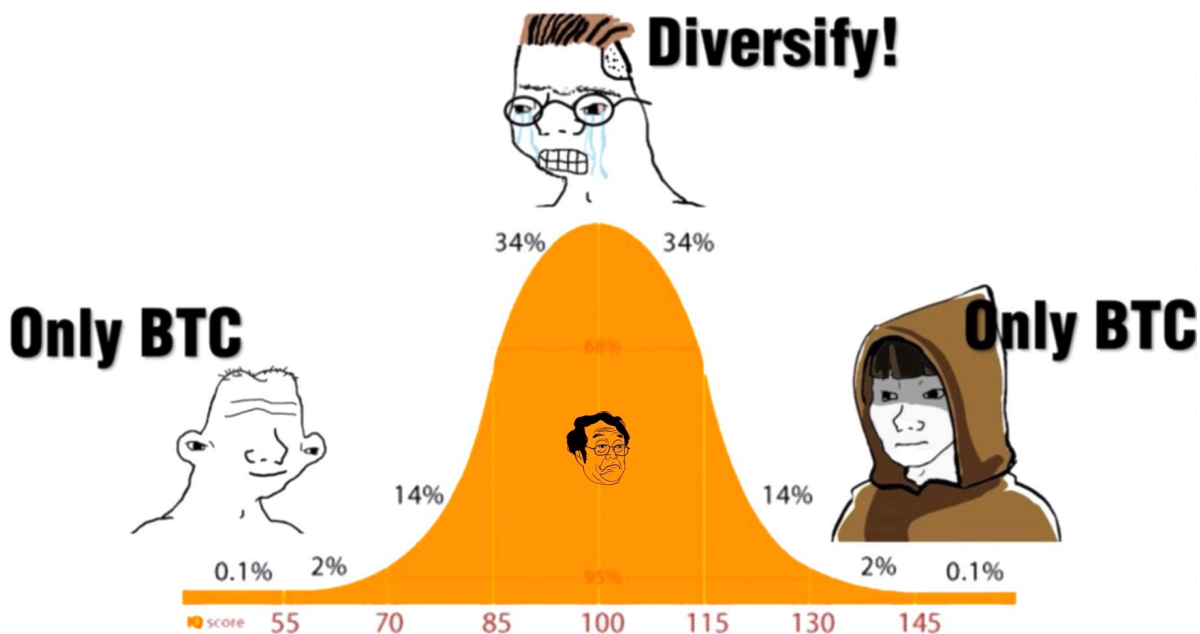


Figure 7.2: BTC Bell Curve meme

## 7.4  General

- "Sir, this is a Wendy's": Used when crypto discussions become overly technical or philosophical, reminding people not to take themselves too seriously.

> ℹ **Note**

# 8 Icons

## 8.1 Satoshi Nakamoto



Figure 8.1: Satoshi artwork in Lugano, Switzerland

Satoshi is the most publicly known creator of our industry. He was preceded by the Cypherpunks but has engulfed the public's imagination due to the fact no-one categorically knows who he/she/they were.

## 8.2 Vitalik Buterin

Vitalik Buterin stands as one of the most influential figures in cryptocurrency history, having conceived and co-founded Ethereum at just 19 years old. His journey began as a curious teenager writing for Bitcoin Magazine, where he first explored the limitations of Bitcoin's scripting language. This exploration led him to envision a more programmable blockchain platform that could serve as a global computer.

In 2013, Buterin published the Ethereum whitepaper, introducing the revolutionary concept of a blockchain platform that could execute arbitrary code through "smart contracts." This innovation transformed blockchain technology from a purely financial tool into a general-purpose computing platform, enabling everything from decentralized applications (dApps) to non-fungible tokens (NFTs).

Known for his profound technical insights and philosophical writings, Buterin continues to shape Ethereum's development through research into scaling solutions like sharding and rollups. His advocacy for "crypto for social good" has influenced numerous humanitarian blockchain projects, while his vocal support for proof-of-stake helped drive Ethereum's successful transition from proof-of-work in The Merge.

Despite his prominence, Buterin maintains a reputation for intellectual humility and openness to criticism. He regularly publishes detailed technical analyses on his blog, addressing everything from blockchain scalability to social coordination problems. His commitment to open discourse and technical excellence has earned him respect even from competing blockchain communities.

## 8.3 Hal Finney

Hal Finney was a pioneering cryptographer and one of Bitcoin's earliest adopters. He was the first person to receive a Bitcoin transaction from Satoshi Nakamoto and helped refine the Bitcoin software in its early days. His work on reusable proof of work systems (RPoW) laid crucial groundwork for Bitcoin's consensus mechanism. Tragically, Finney passed away in 2014 after battling ALS, but his contributions to cryptocurrency remain foundational to the industry.

## 8.4 Anatoly Yakovenko

Anatoly Yakovenko is the co-founder of Solana, a high-performance blockchain platform known for its remarkable transaction speed and low costs. His background at Qualcomm and Dropbox influenced Solana's innovative proof-of-history consensus mechanism, which timestamps transactions to improve network efficiency. Under his leadership, Solana has become one of the fastest-growing blockchain ecosystems.

## 8.5 Gavin Wood

Dr. Gavin Wood served as Ethereum's first Chief Technology Officer and authored the Ethereum Yellow Paper, which provided the first formal specification of any blockchain protocol. He later founded Polkadot, a protocol that enables cross-blockchain transfers of any data type, not just tokens. Wood also created the Web3 Foundation to facilitate a decentralized internet and coined the term "Web3."

## 8.6 Charles Hoskinson

Charles Hoskinson was one of Ethereum's original co-founders before departing to create Cardano. His approach to blockchain development emphasizes academic rigor and peer-reviewed research. Through IOHK (Input Output Hong Kong), he's led the development of Cardano, implementing a proof-of-stake protocol that aims to be more energy-efficient and scalable than earlier blockchain systems.

## 8.7 Justin Sun

Justin Sun founded TRON, a blockchain platform focused on content sharing and entertainment. Known for his marketing prowess and controversial public persona, Sun has expanded TRON's ecosystem significantly through various acquisitions, including BitTorrent. His aggressive growth strategies have made TRON one of the most actively used blockchains.

## 8.8 Emin Gün Sirer

Dr. Emin Gün Sirer is the founder of Avalanche, a blockchain platform known for its unique consensus mechanism that combines the benefits of classical and Nakamoto consensus. As a professor at Cornell University, he has contributed significantly to blockchain research and

identified potential vulnerabilities in early cryptocurrency systems. His academic background brings technical depth to Avalanche's innovative approach.

## 8.9 Pavel Durov

Pavel Durov, often called the "Russian Mark Zuckerberg," is the founder of Telegram and the TON blockchain. After creating VKontakte (Russia's Facebook equivalent), he developed Telegram into one of the world's most popular messaging apps. Although TON was initially developed by Telegram, it has since evolved into an independent blockchain platform focused on scalability and user accessibility.

## 8.10 Sergey Nazarov

Sergey Nazarov is the co-founder of Chainlink, a decentralized oracle network that enables smart contracts to securely access off-chain data feeds and traditional bank payments. His work on the "oracle problem" has been crucial for expanding blockchain applications beyond cryptocurrency transactions. Through Chainlink, he's created the standard for bringing real-world data onto blockchain networks.

## 8.11 People who protect us

Coffeezilla

# Part VI

# Become a Degen

# 9 Don't lose your money

I'll be the first to admit that Web3 is full of sharks looking at newcomers like the chum you are. Before you even begin to tip your toes into this industry you need to be aware of the common pitfalls. Even after years of being in the industry, experienced degens can lose money to scams. If you want to make money and keep it, you need to be ever vigilant.

We break down the ways people can lose their money into the following categories:

- Private Key Management
- Technical User Errors
- Social Engineering and Scams
- Smart Contract Vulnerabilities and Hacks
- Rug Pulls and Exit Scams
- Market Manipulation
- Exchange and Platform Risks

## 9.1 Private Key Management

A large part of the early vision of crypto was to create a currency with the absence of a central authority (read Government). Indeed the first Bitcoin block, mined by Satoshi contained a message admonishing the banks.

> The Times 03/Jan/2009 Chancellor on brink of second bailout for banks

In order to have a currency not controlled by a central authority, you need to be able to exchange value with others while not relying on the authority of governments. If I give you 10 digital dollars, what's to prevent you from saying you never received it? Who proves the exchange occured? This is where Cryptography comes into it. We won't go into the technical details here, it's just important to note some general overview.

Your account/wallet on a blockchain is secured by a public-private key pair. You can think of the public key as akin to an email address and the private key as your password. Whenever you create a wallet and a seed phrase is generated, what's essentially happening is a public-private key is being generated.

Now whenever you interact with a blockchain, for example by sending someone some digital coins, you need to sign that transaction. What you're doing is essentially using your private key to sign that you do want to perform that transaction.

This is why keeping your private key safe is the most important thing you can do in Web3. Since we have no trusted authority, we can only rely on ourselves in this decentralized environment. If someone got access to your private key, they would be able to do anything with the assets that are owned by your account.

The below are the ways you can store your private key or seed phrases:

- Cold Storage
- Paper and Metal Storage
- Multiple Physical Locations
- Multisignature Wallets
- Glacier Protocol

For newcomers, we recommend cold storage via using a Hardware wallet. However this is impractical for a few reasons:

- Costs can be prohibitive
- UX when interacting on chain is cumbersome

For this reason we recommend using Passkeys however this is only beginning to see adoption in Web3 and is not quite ready for mass adoption at this stage. Please see creating your first crypto wallet for the latest recommendation.

## 9.2 Technical Errors

- Network selection error. If you send money to someone on a different network there is no guarantee the address will be the same
- Gas Fee misunderstandings
- Token Approval Dangers - never set max limits. Would be good to break down these risks by Application Model.
- Smart Contract Interaction Errors - Some UI's may not be linked to the actual smart contract you're looking for
- Impermanent Loss
- Wallet Address Verification
- Slippage and Frontrunning
- Sniping - new token launchs

### 9.2.1 Gas Fee misunderstandings

To be truly proficient with Gas you should understand deeply how Fee Markets work.

Else this could be you...

> **i** Note

> **i** Note

### 9.2.2 Impermanent Loss

**Spoiler alert** It's probably permanent
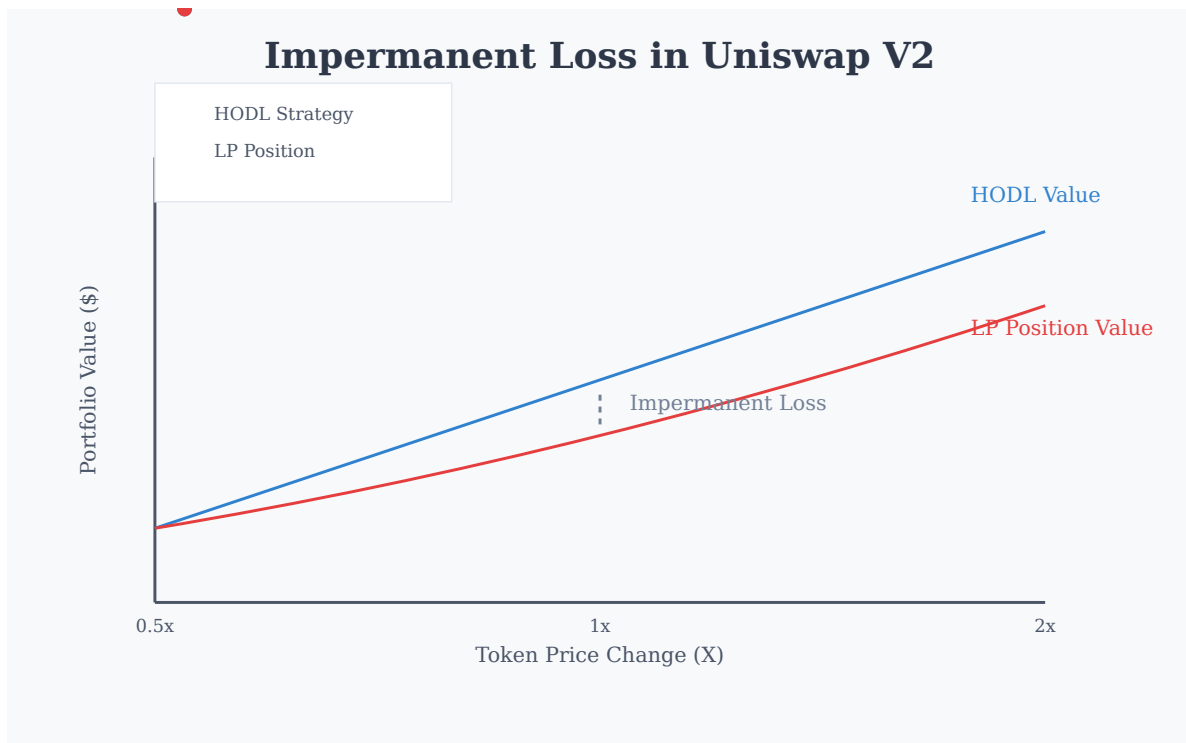


Figure 9.1: Chart showing Impermanent Loss

> **ⓘ** Note

### 9.2.3 Wallet Address Verification

This is one of the reasons Name Services have gained popularity. Although they do remove a further layer of anonymity if you're not careful.

## 9.3 Social Engineering Scams

- OneCoin. Ruja Ignatova (the "CryptoQueen") got away with $4 billion.

Common threads of social engineering scams

- Authority Exploitation
- Emotional Manipulation
- Technical Obscurity
- Community Building
- Urgency Creation

**Authority Exploitation** While no mean authoritive, these are some of the biggest dodgy celebrities:

- Kim Kardashian
- Floyd Mayweather
- DJ Khaled
- Ben Phillips
- Lindsay Lohan
- Steven Seagal
- Paul Pierce
- Logan and Jake Paul

### 9.3.1 Network addresses

Scammers put in fake networks. Use Chainlist

## 9.4 Smart Contract Vulnerabilities and Hacks

Smart contract vulnerabilities represent one of the most critical risks in Web3, having led to billions in losses. This analysis examines major exploit categories based on historical hacks, their prevalence across different application models, and effective mitigation strategies.

- Access Control Flaws
- Logic and Arithmetic Errors
- Oracle Manipulation
- Reentrancy attacks
- Flash Loan Vulnerabilities
- Reentrancy attacks

# 10 Make some money

## 10.1 Purchasing your first Crypto

I'd like to respect and adhere to the ethos of the early Cypherpunks. This means that I'd like everyone that follows along to maintain privacy. However the current solutions are overly technical for newcomers. Tornado Cash and Railgun have a high barrier to entry and Payy Network doesn't support moving funds onto other wallets yet.

So please be aware that all your transactions that you perform following along will be non private and easy for someone to trace. If you're an advanced user, then please see how to convert fiat to crypto anonymously.

Important things to note:

- You'll need about 10 US Dollars
- We'll be using a CEX to purchase crypto
- We'll use a Mobile wallet, Phantom

First thing anyone entering Web3 needs to do is to convert Fiat into a Digital Asset

We will use Coinbase as the CEX for this section. You're more than welcome to use your local CEX.

The reason I went with $10 is so that this will work for as many people as possible. See these heart breaking facts:

- The poorest 10% of the world live on less than $2 a day
- About 50% live on less than $7 a day

We'll purchase $10 worth of BTC.

## 10.2 Creating your first Crypto wallet

We'll follow the mantra of "Not your keys, not your Coins" and as such we need to get our assets off a CEX as soon as is practical. Bitcoin fee's are a bit expensive, so we'll keep them on a CEX until we have enough built up to justify the transaction fee to get them into our own wallet.

Please download or install Phantom. Once you open the wallet it will walk you through creating the wallet and will ask you to store your Seed phrase. For first time users, we recommend storing this on a piece of paper that you laminate and keep somewhere safe. At a later stage, we'll expand this section with a much more comprehensive handling of the pros and cons of various methods to store your seed phrase.

There are countless ways to store your seed phrase...

https://youtu.be/kWp6hZ-5ndc?si=yk6_iFfjv3lw0UQ5&t=70

## 10.3 Financial Independence

This Almanack is opinionated, because I'm opinionated. It will be wrong on occasion, but it also won't be cowed by crowds into taking safe calls. Where a position is required, we'll take one.

The North Star of this Almanack is financial independence. All strategies will be tailored to help you achieve this.

I'm a firm believer in Compound Interest. While as we progress up the degeneracy scale we'll be trading shit coins like a drunken Goth invading Italy, for now we want to learn some fundamentals, which we can then ignore later at our peril.

> "Compound Interest is the eighth wonder of the world. He who understands it, earns it; he who doesn't, pays it" - Often misattributed, but Author unknown

This isn't a TardFi textbook, so I'm not going too deeply into Compound Interest. I much prefer the Future Value of Money.

> "If you don't know where you are going, you'll end up someplace else." - Yogi Berra

So where are we going? Financial Independence from a Central Authority. That's what I want, and I'm pretty sure if you're reading this, you want it too.

So this book will be tailored to the people living in the third world. So if you live in the first world, just add an extra zero to all the figures and follow along. But for someone living in the third world where they need to live on $7 a day to survive, in order to get financial freedom from a central authority, they'd need to earn enough interest on their money yearly to afford

their daily survival. So that's approximately $2,555 US dollars they'd need to earn in interest yearly. This would need to be a relatively stable yield without crazy degen high risks. So something like a US Bond. We'll get into that later.

But let's say we can get 4% yearly. That means we need a principal of $63,875 in order to escape reliance on any authority.

So now we know where we're going.

How do we get there?

In this example, we're going to ignore things like inflation for the time being. Even though inflation is one of the major driving forces behind crypto adoption.

The formula for future value with periodic payments is: $FV = PV \times (1 + r)^n + PMT \times [((1 + r)^n - 1) / r]$ Where:

- FV = Future Value
- PV = Present Value (initial investment)
- PMT = Payment (the regular contribution amount)
- r = Interest rate (as a decimal)
- n = Number of time periods

**Interactive Financial Independence Calculator**

Use the calculator below to experiment with different scenarios and see how they affect your path to financial independence. The chart shows your projected growth over time, with the red dashed line indicating your target amount.

```
// Create input elements with improved formatting
viewof target = Inputs.range(
  [1000, 10000000],
  {value: 63875, step: 100, label: "Target Amount ($)"}
)

viewof initial = Inputs.range(
  [0, 10000],
  {value: 10, step: 1, label: "Initial Investment ($)"}
)

viewof monthly = Inputs.range(
  [0, 1000],
  {value: 10, step: 1, label: "Monthly Contribution ($)"}
)

viewof rate = Inputs.range(
```

```
    [0, 1000],
    {value: 77, step: 0.1, label: "Annual Return Rate (%)"}
)

// Enhanced number formatting function
function formatCurrency(value) {
  return new Intl.NumberFormat('en-US', {
    style: 'currency',
    currency: 'USD',
    minimumFractionDigits: 0,
    maximumFractionDigits: 0
  }).format(value);
}

// Display current input values with proper formatting
currentValues = md`
Current Values:
- Target Amount: ${formatCurrency(target)}
- Initial Investment: ${formatCurrency(initial)}
- Monthly Contribution: ${formatCurrency(monthly)}
- Annual Return Rate: ${rate.toFixed(1)}%
`

// Calculation function
function calculateGrowth(initial, monthly, rate, target) {
  const monthlyRate = rate / 100 / 12;
  let amount = initial;
  let data = [{month: 0, amount: amount}];
  let month = 0;

  while (amount < target && month < 1200) {
    amount = amount * (1 + monthlyRate) + monthly;
    month++;
    data.push({month, amount});
  }

  return {
    months: month,
    finalAmount: amount,
    years: Math.floor(month / 12),
    remainingMonths: month % 12,
    isAchievable: month < 1200,
```

```
    growthData: data
  };
}


// Calculate results based on inputs
results = calculateGrowth(initial, monthly, rate, target)


// Display formatted results
md`### Results
Time to reach goal: ${results.years} years and ${results.remainingMonths} months


Final amount: ${formatCurrency(results.finalAmount)}


${results.isAchievable ? '' : ' Goal may not be achievable with current parameters'}`


// Create the growth visualization
{
  const svg = d3.create("svg")
    .attr("viewBox", [0, 0, 800, 400])
    .attr("style", "max-width: 100%; height: auto;");

  const x = d3.scaleLinear()
    .domain([0, results.months])
    .range([50, 750]);

  const y = d3.scaleLinear()
    .domain([0, Math.max(target, results.finalAmount)])
    .range([350, 50]);

  // Improved axis formatting for large numbers
  const formatAmount = (value) => {
    if (value >= 1e6) return `$${(value/1e6).toFixed(1)}M`;
    if (value >= 1e3) return `$${(value/1e3).toFixed(1)}K`;
    return `$${value}`;
  };

  svg.append("g")
    .attr("transform", `translate(0,350)`)
    .call(d3.axisBottom(x)
      .ticks(10)
      .tickFormat(d => d + " months"));
```

```
svg.append("g")
  .attr("transform", "translate(50,0)")
  .call(d3.axisLeft(y)
    .ticks(10)
    .tickFormat(formatAmount));

// Grid lines
svg.append("g")
  .attr("class", "grid")
  .attr("transform", `translate(0,350)`)
  .call(d3.axisBottom(x)
    .ticks(10)
    .tickSize(-300)
    .tickFormat(""))
  .style("stroke-opacity", 0.1);

const line = d3.line()
  .x(d => x(d.month))
  .y(d => y(d.amount));

svg.append("path")
  .datum(results.growthData)
  .attr("fill", "none")
  .attr("stroke", "steelblue")
  .attr("stroke-width", 2)
  .attr("d", line);

svg.append("line")
  .attr("x1", 50)
  .attr("x2", 750)
  .attr("y1", y(target))
  .attr("y2", y(target))
  .attr("stroke", "red")
  .attr("stroke-dasharray", "5,5");

svg.append("text")
  .attr("x", 400)
  .attr("y", 390)
  .attr("text-anchor", "middle")
  .text("Time (months)");

svg.append("text")
```

```
    .attr("transform", "rotate(-90)")
    .attr("x", -200)
    .attr("y", 15)
    .attr("text-anchor", "middle")
    .text("Amount ($)");

  return svg.node();
}
```

Important to note that holding BTC for 8 years:

- Starting 2013 (to 2021): ~4,000% return
- Starting 2014 (to 2022): ~2,900% return
- Starting 2015 (to 2023): ~8,500% return
- Starting 2016 (to 2024): ~17,500% return

This clearly means holding BTC is the only logical thing you should do. Everything else is bullshit unless you're mid brain.

The Future Value of Money though assumes that the periodical payments are in a fixed currency like the US Dollar. This is not true though for our approach. We'll revise this in future to take into account the different costs of purchasing BTC throughout the 8 years to make the figures more realistic.

## 10.4  Your first Degen Strategies

We'll now learn the following strategies:

1. DCA
2. HODL

### 10.4.1  DCA

An important point in the above section was that we have to have a monthly contribution. This means that every month you'll need to find $10 in Fiat and convert it into BTC. This is what is meant by DCA, or Dollar Cost Averaging. You are averaging the price of the BTC you purchase over 8 years. The beauty of this strategy is that sometimes you'll buy high and sometimes you'll buy low, but by consistently buying every month you'll average it out.

### 10.4.2 HODL

The ultimate HODL Coin is BTC. Considering we're planning for 8 years, we have a perfect timeline for HODLing.

# 11 Mid Brain
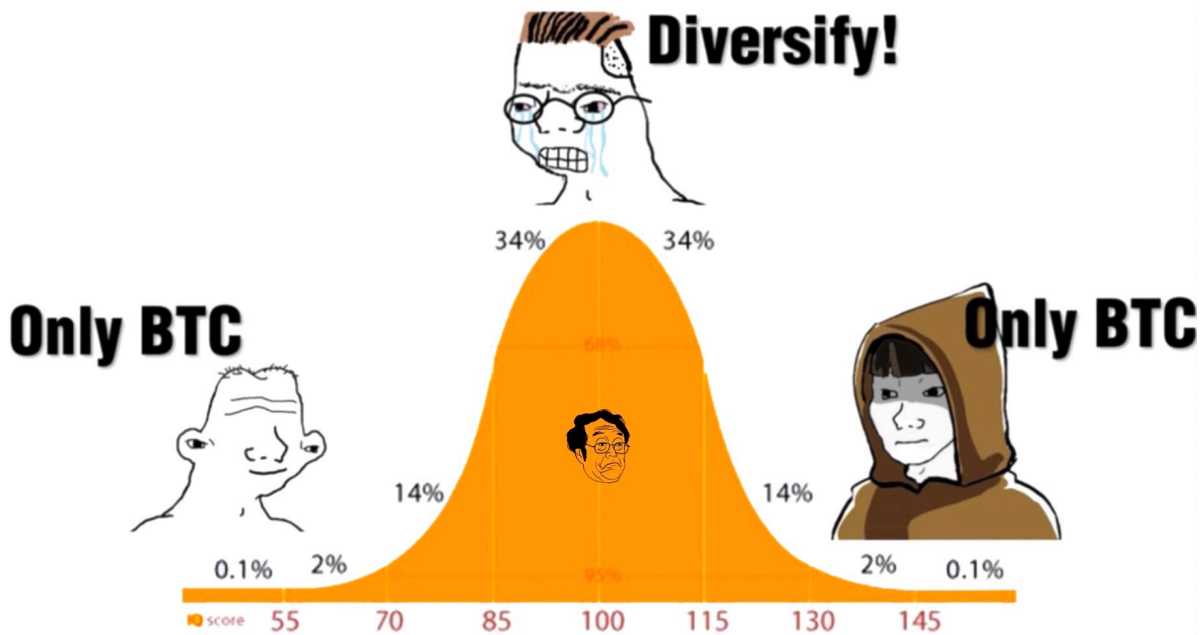


Figure 11.1: You are currently the guy in the middle

While this section will probably be the most fun to write, it will result in unbounded destruction.

Let the fun begin!

## 11.1 Shit Coins

DeFi truly started on Ethereum in DeFi Summer 2020.

Some pedants will argue it started in 2016, with the launch of EtherDelta and the 2017 ICO boom where it handled about 10% of all Ethereum token trading volume. But degen DeFi started in 2020 with the most degen of crazes. Food tokens and farming.

Meme coins had started in 2013 with Doge. However in the early days even the worst shit coins had to have a network. So even the scammers needed to have enough technical proficiency to create a network to issue a token to scam you. That changed with the advent of the ERC20 token standard on Ethereum in late 2015. Now scammers and purveyors of shit coins could just copy and paste some code and voila, shit coin!

Scammers everywhere rejoiced.

In 2020 when DeFi Summer started kicking off, we got a flood of that special brand of shit coin, the Governance token. We can probably blame MakerDAO for this atrocity, with the introduction of "Liquidity Mining" or "Yield Farming". You see, shit coin creators crave liquidity above all else. Without liquidity, they cannot dump on the market. Without liquidity, you cannot manipulate the market to think your shit coin is worth billions. Traditionally shit coin creators had to go to CEX's to get liquidity. The problem is CEX's are just as, if not more, crooked than shit coin creators. CEX's charge astronomical prices to list. And then they dump on the market before the shit coin creator can. For a great case study see how $GALA shat the bed after getting listed on that dodgiest of the dodge, FTX.

So Yield Farming allowed shit coin creators a new way to gain liquidity and if anything better PsyOps for dumping on mid brains. What you do is, you create your shit coin, with a massive supply, think billions. Then you allocate 10% of this token supply for Yield Farming. Now liquidity on CEX's are provided by mature market makers. Retail is excluded as they're not mature enough or have the resources to provide market making services. So since Uniswap provided an easy way for retail (read marks) to provide liquidity, you could offer these gullible people rewards for providing liquidity. So let's say you put in $10 of liquidity, you'd offer these users $10 a month in Yield Farming rewards for that liquidity. Easy money for the mark. Except that $10 a month is in the shit coin. Shit coin creator gets liquidity so they can dump their allocation into Stables or a blue chip Coin. Farming Yields go to shit. **YOU** get rekt. Unlucky.
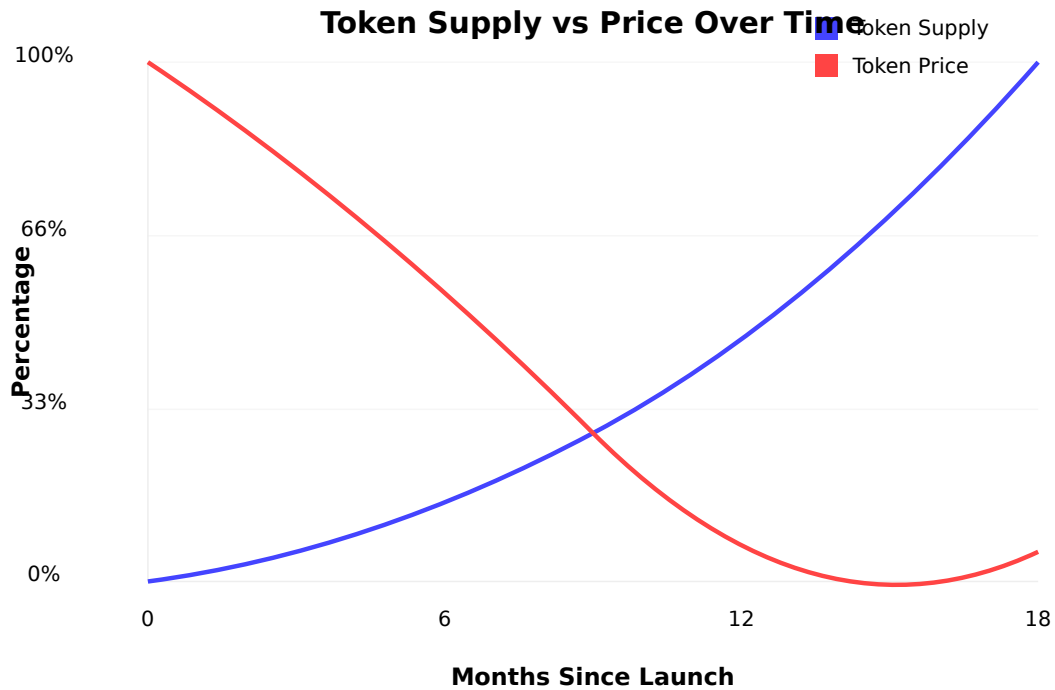
Figure 11.2: Governance Tokens Tokenomics

So now we have all the ingredients for a Yield Farming.

- A plethora of shit coins, masquerading as Governance tokens
- A mature trading environment facilitated by Uniswap's innovation in the AMM space
- An unsuspecting market of victims easily lured by promises of huge profits

Welcome to DeFi Summer 2020.

There were also some cool examples of Vampire Attacks. Or more broadly, a protocol ripping off the source code of a naive project, wrapping a token around their stolen work and trying to unfairly profit. How very James Taggart of them.

So first lesson, we don't deal with shit coins. Or if we're forced to, it's because there's enough zealots around it that the market is being stupendously foolish and we can profit from their idiocy.

> Be fearful when others are greedy, and greedy when others are fearful - Warren Buffet

I really should try categorize shit coins. This is tough to do.

> "I shall not today attempt further to define the kinds of material I understand to be embraced within that shorthand description [of pornography]; and perhaps I could never succeed in intelligibly doing so. But I know it when I see it, and the motion picture involved in this case is not that." - Supreme Court Justice Potter Steward's ruling on Porn

Just like old mate Potter, I don't think I can define a shit coin, but I know it when I see it. The only way you'll be able to get that level of maturity is time in the market. Your battle scars will be your wisdom in years to come.

## 11.2 Notification System

Since we're going to be playing with the sharks, we're going to need protection. This is where alerts come into it.

Being good at DeFi is being able to remain emotionless. Being online 24/7 during bull markets is going to make you stupid, strung out and will ensure your strategies are riddled with mistakes. Being a balanced person will make you way more money than some sleep deprived, Twitter obsessed doos. Let the machines work for you.

So we need a good notification system. We can use:

- Tenderly Web3 Actions, or
- OpenZeppelin Defender Sentinels

We'll use Tenderly's Web3 actions as they're more flexible and powerful. Since we'll be using Ethena's USDe quite alot through this strategies it's important that if it shits the bed, we can get out quickly before losing everything. As an example UST on May 10th 2022 from holding it's dollar peg to losing half it's value in about 38 hours. So if USDe loses more than 10%, we must assume a death spiral and get our money out.

!UST depeg

So what we want to do is to go to CoinGecko and find the biggest amount of on chain liquidity for USDe. So find USDe and then go to Markets to find the on DEX with the biggest depth. Currently that's Uniswap V3 with a USDE/USDT pool on Ethereum. https://app.uniswap.org/explore/pools/ethereum/0x435664008F38B0650fBC1C9fc971D0A3Bc2f1e47

So we can set a notification for event emitted in Tenderly through the UI. However this doesn't give us the exchange rate. So it's good enough for now, but we'll eventually revise this to have common notifications that will apply across all our strategies.

## 11.3 Getting in early

In crypto, if you're not a VC, one of the ways to get the highest multiples on shit coins is by getting in early. Currently the easiest way to see where the most meme coin activity is occuring is by looking at DEX Screener's new pairs. At the time of writing, you can clearly see this is Solana.

Let's analyse the criteria to determine what they all mean

- Price - How much in USD to get 1 of the tokens
- Age - Determines how long the token has been trading. However we actually care about contract deployment date too
- Buys & Sells - Large amount of numbers doesn't necessarily mean much due to the prevalence of bots.
- Volume - Important to see if there is wash trading here. $1 million volume with $100k liquidity may indicate manipulation
- Makers - Some DEX's can act as CLOB's where Makers as a term originate. Makers are trades with a limit order waiting to be filled
- Liquidity - How much liquidity there exists for the token. We can also check to see if the liquidity was burnt
- MarketCap
- Holders - How many wallets hold this token.

# 12 Big brain

## 12.1 Converting FIAT into a Cryptocurrency anonymously

This may be the hardest part of being a Degen. A Degen values privacy. Important to distinguish there is a difference between privacy and secrecy. I'd like my cryptocurrency to display the same characteristics as cash. A means of exchange that has been working just fine for centuries. Cash is private by default and people have seemed pretty happy with that arrangement for over 3 centuries.

The hardest part of ensuring privacy is making sure that when you create a new wallet there is no trace back to your off chain identity.

The two biggest footprints you can leave are:

1. Funding your wallet to pay for Gas
2. Receiving funds in your wallet from a compromised account

When funding your on chain wallet from a CEX, it becomes very easy to trace your identity. Almost all CEX's require you to KYC. So when you transfer $10 of ETH into your Metamask wallet, anyone will be able to find out that the funding of the wallet came from a CEX and via the CEX will be able to link your identity to your wallet.

So currently the best way to do this is:

- Create two wallets. Compromised and Clean
- Save the Private Keys
- Connect to your VPN
- TOR doesn't support add ons, so we can't install a wallet, but rather need to run a script in order to shield our funds

We can also try Railgun. I'll run through both Tornado and Railgun and eventually Payy wallet and then based upon the results of all those experiments I'll make a recommendation about the best approach to obtain a private by default wallet.

- Purchase USDC or USDT from a CEX
- Transfer the stable coins to the throwaway account
- Download Railgun Client
- Create a Shielded Address

- Transfer it in common increments similar to how Tornado Cash to the clean wallet at random intervals

# Part VII

# Financial

# 13 Digital Assets

The logical place to start this Almanack is Digital Assets. These include all the financial instruments that exist within the Web3 sphere. For us to represent all Digital Assets within this space, it means we need to include all Web3 financial instruments, both on chain and off chain.

We take inspiration from the Fat Protocol Thesis(Monegro 2016) to define the major categories of Digital Assets within the Web3 realm. We also adhere to the naming convention that stipulates Coins are digital assets relating to the running and operation of a Blockchain, whereas Tokens are digital assets that are issued on a Blockchain.

We thus break down Digital Assets into the following Categories:

- Coins
    - Primary Networks
    - Secondary Networks
        * Ozempic
        * Sugar
    - Derivatives
- Tokens
    - Fungibles
    - Non Fungible

After describing the various categories and classes of Digital Assets we'll then delve into the Markets existing for these Digital Assets, as well as how an entity hodls the Digital Asset and the yield properties of the various types of Digital Assets.

## 13.1 Coins

This section deals primarily with Digital Assets as a Financial Instrument and as such any information relating to the technical makeup can be found in the Blockchain documentation.

### 13.1.1 Network Economics

Token Models Utility Tokens: Gas fees, staking, governance Security Tokens: Validator requirements, slashing deposits Network Tokens: Transaction fees, block rewards Incentive Structures Validator Rewards: Block rewards, transaction fees, staking yields User Incentives: Fee markets, priority mechanisms, rebate systems Developer Incentives: Grant programs, protocol fees, treasury funding Economic Security Minimum Stakes: Validator requirements, delegation minimums Slashing Conditions: Downtime penalties, malicious behavior penalties Market Making: Liquidity incentives, trading pair support

### 13.1.2 Base Networks

This Almanack distinguishes between the financial properties of Coins versus the technical properties of a Blockchain. As such we don't refer to networks here by Layer 1 or Layer 2. That's a classification and distinction you can explore here.

We define a Base Network that maintains it's own Sovereignity. This means that the Coin on the network is used to economically secure the chain as well as final settlement to occur on this network.

### 13.1.3 Secondary Networks

These are networks that market themselves as settling the transactions on another network. The nuances of how they settle is covered under the Blockchain chapter. We'll encompass the full breadth of L2's including, but not limited to Plasma, Sidechains, Rollups etc.

We then break these networks into Ozempic or Sugar networks. This reflects a hat tip to the Fat protocol metaphor. Ozempic networks are net extractors of value from their host chain, while Sugar networks cause the host chain to become fatter and therefore hold more value.

Please see Ozempic Effect to see how we determine if a network in a net ozempic or sugar network.

### 13.1.4 Derivatives

- On chain
  - Wrapped
    * Pure
    * Bridged
- Off Chain
  - Spot ETF's

### 13.1.4.1 On Chain Derivatives

### 13.1.4.2 Off Chain Derivatives

## 13.2 Tokens

### 13.2.1 Fungible

Fungible is a pretty terrible name, but it roughly means divisable. It's easier to explain via an example. If I have 10 dollars and I give you 3. I still have 7. It's divisable. If I have a car and I want to give you 30% of it, I cannot cut it up and give you a portion of it. It's Non fungible, or non divisable. There's more nuances which we can deal with in the vocabulary section. But that's the general idea of it.

We have the following types: * Stable Coins * Fiat backed * Crypto backed * Delta Neutral backed * Shit Coins * Governance * Meme * Utility

Then we have numerous standards. We'll add only the most popular and relevant ones here.

Namely: * ERC20 * ERC777 * ERC1363 * BRC20 * Runes * Solana's SPL Token Standard * ICS20

### 13.2.1.1 ICS20

The Inter-Chain Standard 20 is a Cosmos based standard for fungible token transfers between blockchains using the Inter-Blockchain Communication Protocol (IBC)

### 13.2.2 Non Fungible

Has the following attributes:

- Art & Collectibles
- Profile Picture (PFP)
- Gaming
- Domain Names and Identity
- Real World Assets (RWA)

The NFT floor price is the lowest price at which an NFT from a particular collection is listed for sale on a marketplace. It serves as a benchmark for the collection's market value and is widely used to assess the entry point for potential buyers and to gauge the collection's popularity and liquidity.

## 13.3 Markets

Where can I buy these Digital Assets? The major markets are regulated and unregulated.

These are then divided into spot vs derivatives.

For regulated it's interesting as RedBelly in a blockchain, but it has KYC/AML. So is that regularly compliant. It's probably more truthful to break it down not by regulatory compliance, but anonymity. For if your on chain activity can be tracked then most mature jurisdictions will be able to force an individual to be compliant.

## 13.4 Hodling

Wallets

### 13.4.1 Custodial

### 13.4.2 Non-Custodial

- Pure
  - Cold
  - Hot
- Smart
  - MPC
  - Smart Contract Based (Includes Account Abstraction)

## 13.5 Yield Properties

Major categories are:

- Network Yield
- Trading Yield
- Protocol Yield

### 13.5.1 Trading Yield

- Pricing appreciation
- Arbitrage Yield

    - Spot Arbitrage
    - Peg Arbitrage - These are unique to stable coins

- Options and Derivatives Premiums
- Futures funding rates

### 13.5.2 Network Yield

- Mining Yield

    - Solo Mining
    - Pool Mining
    - Cloud Mining

- Validating Yield

    - Staking

- Network Fee Yield

    - Gas

- MEV

    - Toxic
    - Non Toxic

- Derivatives

    - Liquid Staking

### 13.5.3 dApp Yield

- Staking
- Liquidity Provision
- Governance Participation
- NFT Rental Income

### 13.5.3.1 Liquidity Provision

We break this down into the following Categories

- AMM Pool fees
- Concentrated liquidity positions
- Order book market making
- Lending and Borrowing markets

### 13.5.3.1.1 Concentrated Liquidity Provision

Here we will break down rebalancing and focus on Loss Versus Rebalancing as per this paper https://arxiv.org/pdf/2208.06046

# 14 Market Structures

Financial markets are complex systems that have evolved over centuries to facilitate the efficient exchange of assets. In this chapter, we'll explore the fundamental structures that make modern markets possible, with a particular focus on how traditional market mechanisms have influenced and been adapted by cryptocurrency markets.

## 14.1 Understanding Market Structure Basics

At its core, a market is where buyers and sellers come together to trade. But the way this meeting happens has profound effects on how prices are discovered, how fairly participants are treated, and how efficiently trades are executed. Let's examine the key concepts that underpin all market structures.

### 14.1.1 Price Discovery

Price discovery is the process by which markets determine the true price of an asset. Think of it as the market's way of collectively agreeing on what something is worth. This process is influenced by:

- The flow of new information
- The number of market participants
- The transparency of trading activity
- The rules and mechanisms of the trading venue

For example, when a company announces unexpected positive earnings, traders rushing to buy the stock help discover its new, higher price. In crypto markets, this process happens 24/7, with global participation leading to near-instant price adjustments as new information emerges.

### 14.1.2 Liquidity

Liquidity is the ease with which an asset can be bought or sold without causing a significant price movement. It's like the depth of a swimming pool - the deeper it is, the less splash you make when jumping in. High liquidity is characterized by:

- Tight bid-ask spreads
- Large order book depth
- High trading volumes
- Minimal price impact from trades

## 14.2 Central Limit Order Books (CLOBs)

The Central Limit Order Book (CLOB) is perhaps the most important innovation in market structure history. It's essentially a sorted list of all the prices at which market participants are willing to buy (bids) and sell (asks) an asset.

### 14.2.1 How CLOBs Work

A CLOB operates on simple but powerful principles:

1. **Order Types**
   - Limit Orders: Instructions to buy or sell at a specific price or better
   - Market Orders: Instructions to buy or sell immediately at the best available price

2. **Price-Time Priority**
   - Orders are matched based on price priority (best prices first)
   - When prices are equal, earlier orders get priority
   - This creates a fair "first come, first served" system

Here's a simplified visualization of an order book:

```
    ASKS
Price | Size
105   | 10
104   | 15
103   | 20
-----------------
102   | 25
101   | 30
100   | 35
    BIDS
```

### 14.2.2 Order Matching Logic

When new orders arrive, they're matched against existing orders following strict rules:

1. Market orders match immediately with the best available price
2. Limit orders join the book if they can't match immediately
3. Partial fills are possible when order sizes don't match exactly

For example, if someone submits a market buy order for 30 units in the above book, they would: - Buy 20 units at 103 - Buy 10 units at 104 - Pay an average price of 103.33

## 14.3 Evolution to Electronic Markets

The transition from physical trading floors to electronic markets marked a revolutionary change in market structure. Electronic markets brought:

- Faster execution speeds
- Lower transaction costs
- Broader market access
- More sophisticated trading strategies
- Better price transparency

However, they also introduced new challenges like: - Need for robust technology infrastructure - Complex failure modes - High-frequency trading arms race - New forms of market manipulation

## 14.4 Crypto Market Adaptations

Cryptocurrency markets have taken traditional market structures and adapted them for a decentralized world. This has led to several innovations:

### 14.4.1 Centralized Exchange Order Books

Crypto exchanges like Binance and Coinbase operate traditional CLOBs but with some key differences: - 24/7 trading - Global access - Multiple quote currencies - Faster settlement - Novel order types

### 14.4.2 On-Chain Order Books

Attempting to put order books entirely on-chain has revealed interesting challenges: - High gas costs for order placement - Front-running vulnerability - Block time limitations - Settlement finality considerations

### 14.4.3 Hybrid Solutions

Modern crypto trading often uses hybrid approaches that combine the best of both worlds: - Off-chain order books with on-chain settlement - Layer 2 scaling solutions - State channels for high-frequency trading - Automated Market Makers (AMMs) as complementary liquidity sources

## 14.5 Market Structure Implications

The choice of market structure has far-reaching implications for:

### 14.5.1 Trading Strategy

Different market structures favor different trading approaches. CLOBs are ideal for market making and arbitrage, while AMMs excel at providing passive liquidity.

### 14.5.2 Market Quality

Market structure affects: - Price efficiency - Transaction costs - Market stability - Fair access

### 14.5.3 Regulatory Compliance

Market structure choices impact: - Regulatory oversight capability - Market manipulation risk - Customer protection measures - Systemic risk management

## 14.6 Looking Ahead

Market structures continue to evolve as technology advances and new requirements emerge. Future developments may include: - Greater integration between TradFi and DeFi markets - Novel hybrid market structures - Improved privacy solutions - More efficient cross-chain trading mechanisms

# 15 Key Takeaways

- Market structures fundamentally shape how assets are traded
- CLOBs remain the gold standard for price discovery and fair trading
- Electronic markets have transformed trading but introduced new challenges
- Crypto markets are innovating on traditional structures while maintaining their core principles
- The future likely holds further convergence between traditional and crypto market structures

# 16 Further Reading

- Flash Boys by Michael Lewis
- Trading and Exchanges by Larry Harris
- "Understanding Market Microstructure" series on the CME website

### 16.0.1 Market Caps

Let's start with a practical example. Imagine two tokens:

Token A: - Total supply: 1 million tokens - Current price: $1 - Market cap: $1 million - Liquidity in DEX pools: $500,000

Token B: - Total supply: 1 billion tokens - Current price: $0.001 - Market cap: $1 million - Liquidity in DEX pools: $5,000

While both tokens show the same market cap, they tell very different stories. Token A has deep liquidity - you could sell $100,000 worth without crashing the price. Token B might crash 90% if someone tries to sell just $1,000 worth.

## 16.1 Types of Market Cap

In DeFi, we need to understand several variations:

1. Circulating Market Cap = Current Price × Circulating Supply The value of tokens currently trading in the market

2. Fully Diluted Valuation (FDV) = Current Price × Total Supply The theoretical value if all tokens were in circulation

3. Realized Market Cap = Sum of (Price × Amount) for each token last moved A measure that helps identify actual economic activity

## 16.2 The Liquidity Ratio

One of the most important metrics rarely discussed is the liquidity ratio: Liquidity Ratio = Total DEX Liquidity / Market Cap

Generally: - Ratio > 0.1: Healthy liquidity - Ratio 0.01-0.1: Exercise caution - Ratio < 0.01: High manipulation risk

## 16.3 Market Cap Manipulation

Understanding how market cap can be manipulated helps avoid common traps:

1. Supply Manipulation

   - Burning tokens to artificially reduce supply
   - Hidden minting capabilities
   - Lock-up periods that temporarily restrict supply

2. Price Manipulation

   - Wash trading to create fake volume
   - Thin liquidity pools easily moved by small trades
   - Strategic buying to push price before token launches

3. Liquidity Games

   - Temporary liquidity adds before major announcements
   - Cross-chain liquidity that's hard to track
   - Flashloan attacks that distort price momentarily

## 16.4 Real Value vs. Market Cap

Market cap becomes more meaningful when viewed alongside other metrics:

- Daily Active Users (DAU)
- Revenue or fees generated
- Treasury holdings
- Protocol-owned liquidity
- Cross-chain presence and activity

Think of market cap as just one instrument in an orchestra - it only makes sense when played in harmony with other metrics.

## 16.5 Red Flags in Market Cap Analysis

Watch for these warning signs: - Market cap growing faster than user adoption - Large gaps between circulating and total supply - Sudden changes in supply without clear reason - Market cap much higher than total value locked (TVL)

## 16.6 Using Market Cap in Trading Decisions

Market cap can be valuable when used correctly:

1. For relative valuation between similar protocols
2. Identifying potential manipulation
3. Assessing room for growth
4. Understanding total risk exposure

Remember: Market cap is a trailing indicator showing where a token has been, not necessarily where it's going.

## 16.7 Conclusion

Market capitalization in DeFi requires a more sophisticated understanding than in traditional finance. While it shouldn't be ignored, it should never be the only metric you consider. The most successful traders and investors learn to look beyond market cap to understand true value and risk.

# 17 Ratings

This section will describe our ratings model for Digital Assets.

## 17.1 Core Rating Categories (60% of Total Rating)

### 17.1.1 1. Protocol Value Capture (30%)

A. Network Effect Metrics

- Daily Active Users (DAUs)
- Total Value Locked (TVL)
- Transaction volume
- Fee revenue generated
- Protocol revenue retained

B. Value Accrual Mechanisms

- Token economics design
- Fee distribution model
- Staking mechanisms
- Burns and supply dynamics

C. Ozempic Network Effects

- Value extraction efficiency from L1
- Transaction fee capture rate
- User migration metrics from L1
- TVL migration patterns
- Gas savings versus L1
- L1-L2 Value Dynamics
- Sequencer revenue distribution
- MEV capture and distribution
- Bridge volume and efficiency
- Settlement layer costs
- Sustainable Value Creation
- Net new users versus L1 migration

- Ecosystem-specific applications
- Novel transaction types impossible on L1
- Cross-L2 interoperability metrics

### 17.1.2  2. Protocol Security & Risk Assessment (30%)

A. Smart Contract Security

- Audit history and quality
- Bug bounty program effectiveness
- Historical vulnerability incidents
- Code complexity metrics
- Upgrade mechanism security
- Testing coverage

B. Network Security

- Consensus mechanism robustness
- MEV exposure and protection measures
- Node distribution
- Network attack resistance
- Cross-chain bridge security
- Oracle dependency and security

C. L1 Dependency Risks

- Settlement layer congestion exposure
- Bridge security and liquidity depth
- L1 fee market correlation
- Sequencer centralization risk
- Value extraction sustainability

## 17.2  Risk Categories (40% of Total Rating)

### 17.2.1  1. Technical Risk Assessment (15%)

A. Smart Contract Vulnerabilities - Code audit findings severity - Time-tested deployment - Complexity of interactions - Dependencies on external protocols - Historical incident analysis

B. Network Level Risks

- MEV exposure metrics
- Network partition resistance

- Node centralization factors
- Infrastructure dependencies
- Cross-chain vulnerability exposure

C. Key Management & Wallet Security

- Multi-sig implementation
- Key generation processes
- Hardware security modules usage
- Social recovery mechanisms
- Access control systems

### 17.2.2 2. Economic Risk Assessment (10%)

A. Market Dynamics

- Liquidity concentration
- Price impact resistance
- Collateral quality
- Market manipulation resistance

B. Economic Model Vulnerabilities

- Game theory attack vectors
- Incentive alignment analysis
- Economic exploit resistance
- Stress test scenarios
- Flash loan attack surface

### 17.2.3 3. Operational Risk Assessment (10%)

A. CeFi/CeDeFi Risks

- Centralization points
- Custody arrangements
- Third-party dependencies
- Operational redundancy
- Emergency procedures

B. Oracle Dependencies

- Oracle manipulation resistance
- Price feed reliability
- Backup oracle systems

- Historical oracle incidents
- Data quality metrics

### 17.2.4 4. External Risk Assessment (5%)

A. Regulatory Risk

- Jurisdictional exposure
- Compliance frameworks
- Regulatory clarity
- Legal structure
- Historical regulatory interactions

B. Social Engineering Risk

- Team security practices
- Access control policies
- Social attack history
- Security awareness training
- Incident response readiness

## 17.3 Risk-Adjusted Rating Scale

AAA: Exceptional protocol with comprehensive risk mitigation

- Multiple independent security audits with no critical findings
- Proven resistance to all major attack vectors
- Strong regulatory compliance framework
- Decentralized operations with minimal points of failure
- Multiple layers of economic security

AA: Strong protocol with robust risk management

- Regular security audits with minor findings
- Documented resistance to common attack vectors
- Clear regulatory strategy
- Limited centralization risks
- Strong economic security measures

## 17.4 Risk Multipliers

Each risk category can apply a multiplier to the base rating:

- Critical Risk: -3 rating notches
- High Risk: -2 rating notches
- Medium Risk: -1 rating notch
- Low Risk: No adjustment
- Minimal Risk: +1 rating notch

## 17.5 Continuous Monitoring Triggers

- Smart contract vulnerability disclosure
- Network attack detection
- Regulatory action
- Economic model stress
- Oracle deviation events
- Cross-chain bridge incidents
- Social engineering attempts
- MEV activity spikes

## 17.6 Review Framework

- Monthly security metric review
- Quarterly risk assessment update
- Annual comprehensive review
- Real-time monitoring of critical indicators
- Incident-triggered reassessment

## 17.7 Ozempic Effect

We'll base this upon value flows. Defillama doesn't actually display this. So we'll need to get this data directly from the smart contracts. We can start with Base, Arbitrum, BSC, Optimism and Polygon.

Let's build a comprehensive framework for tracking the true "Ozempic effect" of L2s on Ethereum. We'll need several interconnected metrics to understand the complete value flow dynamics.

1. Wallet Migration Analysis

- Track addresses that first appeared on Ethereum before a certain date (let's call them "Ethereum Native Wallets")
- Monitor their activity transition to L2s over time
- Analyze their ETH holdings distribution between L1 and L2s
- Calculate the ratio of their transaction activity on L2s versus L1

2. L2 Native User Analysis

- Identify wallets that first appeared on L2s
- Track what percentage never bridge to Ethereum
- Measure their total value held
- Calculate their transaction activity

3. Fee Flow Dynamics

- Track L2 sequencer fees paid back to Ethereum
- Calculate the net fee difference (what these transactions would have cost on L1 versus actual L2 + L1 calldata costs)
- Monitor the ratio of fees paid back to Ethereum versus fees retained by the L2

We could create a composite "Value Migration Score" that looks like:

```python
def calculate_migration_score(l2_data):
    # Value Migration
    eth_native_migration = (
        eth_native_wallets_on_l2 / total_eth_native_wallets *
        eth_value_moved_to_l2 / original_eth_holdings
    )

    # Activity Migration
    activity_migration = (
        l2_transactions_by_eth_wallets /
        (l1_transactions_by_eth_wallets + l2_transactions_by_eth_wallets)
    )

    # L2 Native Growth
    l2_native_strength = (
        l2_only_wallets / total_l2_wallets *
        l2_native_value / total_l2_value
    )

    # Fee Economics
```

```
    fee_efficiency = (
        sequencer_fees_to_ethereum /
        theoretical_l1_fees_for_same_transactions
    )

    return (
        eth_native_migration * 0.3 +
        activity_migration * 0.3 +
        l2_native_strength * 0.2 +
        fee_efficiency * 0.2
    )
```

This would give us a quantitative measure of how effectively an L2 is:

1. Attracting value from Ethereum
2. Generating new value through native users
3. Maintaining a sustainable fee relationship with Ethereum

A true Ozempic L2 should show:

- High migration of ETH native wallets
- Strong L2 native user growth
- Efficient fee generation that still provides meaningful revenue to Ethereum
- Sustained or growing activity ratios over time

Would you like me to elaborate on how we could implement the data collection for any of these metrics, or should we explore additional factors to consider in the scoring?

- Net Value Extraction Rate = (Value Bridged In - Value Bridged Out) / Total Time Period

## 17.8  Risk Factors

### 17.8.1  1.  Technical Risks

- Implementation bugs
- Security vulnerabilities
- Upgrade coordination failures
- Network splits

### 17.8.2 2. Governance Risks

- Capture by special interests
- Low participation
- Contentious decisions
- Unclear processes

### 17.8.3 3. Social Risks

- Community fragmentation
- Loss of developer support
- Reputation damage
- Market impacts

## 17.9 Future Considerations

### 17.9.1 1. Emerging Trends

- Automated governance systems
- AI-assisted proposal analysis
- Cross-chain governance
- Dynamic parameter adjustment

### 17.9.2 2. Challenges

- Scaling governance participation
- Balancing security and innovation
- Managing increasing complexity
- Maintaining decentralization

### 17.9.3 3. Opportunities

- Improved governance tools
- Better simulation capabilities
- Enhanced coordination mechanisms
- More sophisticated voting systems

## 17.10 Dependent Network Ratings

Polygon zkEVM Settlement Guarantees (10/10 weight): Score: 9/10 The zkEVM uses zero-knowledge proofs to validate all state transitions. Every transaction batch includes a proof that mathematically demonstrates the correctness of all computations and state changes. These proofs are verified by Ethereum's consensus mechanism, providing cryptographic certainty that state transitions are valid. This is nearly the highest level of settlement guarantee possible, just slightly below fully integrated L2s because of some optimizations in the proving system.

Dispute Resolution (9/10 weight): Score: 10/10 Ethereum serves as the absolute source of truth for the zkEVM. If there's ever a dispute about the state, the zero-knowledge proofs verified by Ethereum's consensus provide mathematical certainty about what is correct. There's no dependency on fraud proofs or challenge periods - the cryptographic proofs mean disputes are resolved immediately and with absolute certainty by Ethereum.

Economic Security Inheritance (8/10 weight): Score: 9/10 The zkEVM inherits its fundamental security from Ethereum. The validity proofs mean it can't confirm invalid state transitions, and its assets are secured by Ethereum's consensus mechanism. While it has its own token (MATIC) for gas fees and other purposes, the core economic security - particularly for assets like ETH and tokens - comes directly from Ethereum.

State Finality (7/10 weight): Score: 9/10 Once Ethereum confirms a zkEVM batch and its validity proof, that state is final with the same guarantees as Ethereum itself. The mathematical nature of the zero-knowledge proofs means there's no waiting period for finality beyond Ethereum's own finality period. This is as strong as state finality can get for a settlement-dependent network.

Exit Rights Guarantees (6/10 weight): Score: 8/10 Users can always withdraw their assets back to Ethereum by submitting a withdrawal request. These withdrawals are guaranteed by Ethereum's consensus - once a withdrawal is proven valid through a ZK proof, no one can prevent the user from claiming their assets on Ethereum. The only limitation is the normal proving and processing time.

State Progression Dependency (5/10 weight): Score: 7/10 While the zkEVM can process transactions independently, it can't finalize new states without submitting proofs to Ethereum and having them verified. This creates a strong dependency on Ethereum for state progression, though there's some independence in transaction processing.

Asset Movement (4/10 weight): Score: 10/10 Native ETH and ERC-20 tokens can move seamlessly between Ethereum and the zkEVM. When assets move to the zkEVM, they're locked on Ethereum and can only be unlocked through valid proofs. This provides the strongest possible guarantees for asset movement between the networks.

Total Score: 62/70 (approximately 89%)

This analysis places Polygon zkEVM firmly in the "Fully Non-Sovereign" category. Arbitrum Let me analyze Arbitrum's relationship with Ethereum as a Settlement-Dependent Network by carefully examining each criterion. This will help us understand how optimistic rollups differ from ZK rollups in their settlement dependency.

Settlement Guarantees (10/10 weight): Score: 7/10 Arbitrum uses an optimistic rollup design where transactions are assumed valid but can be challenged during a dispute period (currently 7 days). While this provides strong settlement guarantees, it's not as immediate or mathematically certain as ZK rollups. The challenge period introduces a time-based element to settlement finality. However, the ability to prove fraud on Ethereum's consensus layer still makes this a robust settlement mechanism.

Dispute Resolution (9/10 weight): Score: 8/10 Ethereum serves as the ultimate arbiter for Arbitrum through its fraud proof system. If someone identifies an invalid state transition, they can submit a fraud proof to Ethereum, which will automatically resolve the dispute and revert invalid transactions. This is strong dispute resolution, though not as immediate as ZK proofs since it requires active challengers and a challenge period. The key strength is that Ethereum's consensus automatically enforces the correct resolution once fraud is proven.

Economic Security Inheritance (8/10 weight): Score: 9/10 Arbitrum inherits its fundamental security from Ethereum. The ability to prove fraud on Ethereum means that any attempt to corrupt Arbitrum's state would require corrupting Ethereum itself. The sequencer role adds some centralization risk, but the fundamental economic security - particularly for assets - comes directly from Ethereum. Users can always force transactions through Ethereum if the sequencer fails.

State Finality (7/10 weight): Score: 6/10 While Arbitrum's state updates are recorded on Ethereum, true finality requires waiting through the challenge period. This creates a tradeoff between practical finality (which can be quite fast) and absolute finality (which requires waiting for the challenge period). This is lower than ZK rollups where finality is immediate once proofs are verified.

Exit Rights Guarantees (6/10 weight): Score: 8/10 Users can always withdraw their assets to Ethereum, guaranteed by Ethereum's consensus. While withdrawals require waiting through the challenge period, they cannot be prevented by Arbitrum's operators. The delay is longer than with ZK rollups, but the guarantee is just as strong once the period passes.

State Progression Dependency (5/10 weight): Score: 7/10 Arbitrum can process transactions independently but must submit state roots to Ethereum for potential verification. While it has more processing independence than some systems, it ultimately depends on Ethereum for final state confirmation, especially during disputes.

Asset Movement (4/10 weight): Score: 10/10 Native ETH and ERC-20 tokens move seamlessly between Ethereum and Arbitrum through a strong bridge mechanism backed by Ethereum's consensus. When assets move to Arbitrum, they're locked on Ethereum and can only be unlocked through valid withdrawals after the challenge period.

Total Score: 55/70 (approximately 79%)

This analysis places Arbitrum in the "Fully Non-Sovereign" category, though with a lower score than Polygon zkEVM. The main differences come from the challenge period required for absolute finality and the reliance on fraud proofs rather than validity proofs.

Stacks Settlement Guarantees (10/10 weight): Score: 4/10 Stacks uses Bitcoin for check-pointing and security anchoring However, it lacks cryptographic enforcement of settlement by Bitcoin's consensus Bitcoin doesn't automatically enforce or validate Stacks' state transitions Falls into the "checkpoint systems" category rather than stronger settlement guarantees Dispute Resolution (9/10 weight): Score: 3/10 While Stacks records its state on Bitcoin, Bitcoin's consensus doesn't serve as the ultimate arbiter Disputes are primarily resolved within Stacks' own consensus mechanism Bitcoin can't automatically correct or resolve issues in Stacks' state Economic Security Inheritance (8/10 weight): Score: 6/10 Miners must commit actual Bitcoin through PoX mechanism This creates some economic security dependency on Bitcoin However, Stacks maintains its own economic incentives through STX State Finality (7/10 weight): Score: 5/10 Stacks achieves finality through a combination of its own consensus and Bitcoin anchoring State is recorded on Bitcoin but not in a way that Bitcoin consensus enforces Provides stronger finality than fully independent chains but weaker than true L2s Exit Rights Guarantees (6/10 weight): Score: 4/10 With sBTC, users can move Bitcoin between chains However, this relies on Stacks' mechanisms rather than being guaranteed by Bitcoin's consensus Exit rights depend on threshold signatures rather than cryptographic guarantees State Progression Dependency (5/10 weight): Score: 7/10 Stacks blocks are linked to Bitcoin blocks through PoX State progression is tied to Bitcoin's block progression However, Stacks can still process transactions independently within this framework Asset Movement (4/10 weight): Score: 5/10 sBTC enables Bitcoin movement between chains But this movement isn't directly enforced by Bitcoin's consensus Relies on threshold signatures and Stacks' mechanisms Total Score: 34/59 (approximately 58%)

This places Stacks in the "Moderately Dependent" category on our spectrum.


## 17.11  Risks

Sub categories of risks include smart contract vulns regulatory risks centralization risks for CeDeFi and CEX's MEV network level key and wallet compromise cross chain exploits oracle manipulation Social engineering exploitation of economic models

# 18 Trollip's Index

Trollip's index, taking a cue from the S&P 500, will aim to classify 500 Digital Assets.

The general approach would be to classify the top 500 via marketcap. However, a good characteristic of a degen is to not follow conventional wisdom and groupthink. So as the Almanack grows and more strategies are added to the the Degen Chapters, we'll add the assets as we discuss strategies around them. This means that it will contain some absolute shit coins. This will also help us to refine our Risk models

## 18.1 BTC

Bitcoin has emerged as the world's first successful digital store of value, creating a new paradigm for wealth preservation in the digital age. Much like gold served ancient civilizations through to modern times as a reliable store of wealth, Bitcoin provides similar characteristics but with distinct advantages native to the digital realm.

At its foundation, Bitcoin's value proposition rests on its absolute scarcity - there will never be more than 21 million bitcoins. This hard cap, combined with a transparent and immutable issuance schedule through mining "halvings" every four years, creates a predictability that even gold, with its uncertain mining output, cannot match. When new gold deposits are discovered or mining technology improves, supply can increase unexpectedly. Bitcoin's supply schedule, in contrast, is mathematically certain.

Bitcoin's digital nature offers significant advantages over traditional stores of value. Unlike gold, it can be transferred instantly across borders, divided into microscopic units, stored without physical vault costs, and verified for authenticity without specialized equipment. Its self-custody properties allow individuals to maintain direct control over their wealth without relying on third-party custodians or financial institutions.

The network's security model, backed by massive computational power through proof-of-work mining, has proven remarkably resilient over more than a decade. This track record has gradually built confidence among institutional investors, who increasingly view Bitcoin as a legitimate asset class for portfolio diversification and inflation hedging. Major financial institutions now offer Bitcoin investment products, while some corporations have adopted it as a treasury reserve asset.

While Bitcoin began as a peer-to-peer electronic cash system, its evolution into a store of value mirrors how gold transformed from a medium of exchange into a wealth preservation tool. The emergence of Layer 2 solutions like the Lightning Network now handles Bitcoin's payments functionality, allowing the base layer to focus on its primary role as digital gold - the foundational layer of monetary security in the cryptocurrency ecosystem.

### 18.1.1 Derivatives

#### 18.1.1.1 cbBTC

Coinbase Base Bitcoin (cbBTC) represents a novel approach to Bitcoin tokenization, launched by Coinbase to bridge the gap between Bitcoin and Ethereum-based DeFi applications. It functions as an institutional-grade wrapped version of Bitcoin, backed 1:1 by actual Bitcoin held in Coinbase's custody. What makes cbBTC particularly noteworthy is its institutional focus, leveraging Coinbase's reputation as a publicly traded company and its robust custody infrastructure to provide a secure and regulated way to use Bitcoin across different blockchain ecosystems.

The technical architecture of cbBTC operates through a burn-and-mint mechanism on the Base network, Coinbase's layer-2 blockchain built on top of Ethereum. When users deposit Bitcoin into Coinbase's custody, an equivalent amount of cbBTC is minted on Base. This process allows Bitcoin holders to participate in Base's growing DeFi ecosystem while maintaining exposure to Bitcoin's value. The token implements additional security measures, including proof of reserves and regular audits, making it particularly appealing to institutional investors who require high levels of security and regulatory compliance. Unlike some other wrapped Bitcoin tokens, cbBTC's key differentiator is its direct integration with Coinbase's established infrastructure and its focus on institutional-grade security and compliance measures.

## 18.2 ETH

Ethereum represents a revolutionary leap in computing - it's humanity's first attempt at creating a global, decentralized computer that's always running and accessible to everyone. Like how the internet connected computers worldwide for information sharing, Ethereum connects computers globally to create a single, unified computational platform that no one controls but everyone can use.

Think of Ethereum as a massive, worldwide computer with some unique properties: it never shuts down, can't be censored, and maintains perfect records of everything it processes. Instead of storing photos or documents like a regular computer, this world computer specializes in running smart contracts - pieces of code that automatically execute agreements and handle digital assets without needing intermediaries.

ETH, the network's native asset, serves as the essential "fuel" that powers this world computer. Every computation, whether it's processing a DeFi trade or minting an NFT, requires ETH to run. After Ethereum's transition to Proof of Stake through The Merge, ETH also gained a new role - network validators must stake ETH to participate in securing the network, similar to how a computer needs electricity to function and stay secure.

What makes Ethereum truly revolutionary is its programmability. Just as early personal computers transformed from specialized calculators into general-purpose machines that could run any software, Ethereum evolved blockchain technology from a simple transaction ledger into a platform that can run any programmable application. This has spawned entire new industries: decentralized finance (DeFi) protocols that operate 24/7 without human intervention, NFT marketplaces that enable digital ownership and royalties, and DAOs that coordinate human activity through code rather than hierarchies.

The platform continues to evolve through ambitious technical upgrades. Layer 2 scaling solutions like rollups act as specialized processors that handle heavy computations off the main chain, while the planned implementation of sharding will divide the network into parallel processing units - similar to how modern computers use multiple cores to increase performance. These improvements aim to make the world computer more efficient and accessible while maintaining its core properties of decentralization and security.

As this world computer grows in capability and adoption, ETH's value proposition strengthens - it's not just a digital asset, but the essential resource needed to access and use what might become the foundation of our digital future.

# Part VIII

# Technical

# 19 Cryptography

## 19.1 Symmetric Cryptography

Shared Keys. AES. But vulnerability is in sharing the Key between parties.

## 19.2 Asymetric Cryptography

Public Key Cryptography

RSA and elliptic curve cryptography. Slow than symetric cryptography. Enables secure communication over insecure channels

### 19.2.1 Passkeys

Think of passkeys as a modern, more secure replacement for passwords. Instead of remembering complex strings of characters, your device creates and stores a pair of mathematically linked keys - one public and one private. This system is built on public key cryptography, which has been proven secure over decades of use. Here's how the process works, step by step: When you first set up a passkey with a website or app:

1. Your device generates two mathematical keys: a private key that stays securely stored on your device, and a public key that gets sent to the service you're signing up with. The private key never leaves your device - this is crucial for security.
2. The service stores your public key along with your account information. Think of the public key as a special lock that can only be opened by your private key.

When you later want to sign in:

1. The service sends your device a random mathematical challenge - imagine it as a complex puzzle.
2. Your device uses your private key to solve this puzzle in a way that proves you have the correct private key, without actually revealing the key itself.
3. The service verifies the solution using your stored public key. If it matches, you're granted access.

What makes this particularly clever is the biometric integration. Your device typically requires your fingerprint, face scan, or PIN before it will use the private key. This adds an extra layer of security - even if someone stole your device, they couldn't use your passkeys without your biometric data. The system also handles synchronization elegantly. If you're using an ecosystem like Apple or Google, your encrypted passkeys can sync across your devices. When you want to log in on a new device, your phone can help authenticate you by displaying a QR code that creates a secure connection between devices. To make this more concrete, imagine you're signing into a banking app:

You open the app and enter your username Instead of asking for a password, the app sends a challenge to your phone Your phone asks you to verify with your fingerprint Once verified, your phone uses your private key to respond to the challenge The bank verifies this response and logs you in

All of this happens in seconds, and it's much more secure than traditional passwords because:

The private key never travels across the internet Each login uses a different challenge, so responses can't be reused by attackers Biometric verification adds an extra security layer The cryptographic math behind it is extremely difficult to break

## 19.3 Hash functions

These are like digital fingerprints

## 19.4 Zero-Knowledge Proofs

They solve a unique problem: how can you prove you know something without revealing what you know? Imagine proving you're over 21 without showing your actual birthdate.

## 19.5 Homomorphic Encryption

It allows computations to be performed on encrypted data without decrypting it first. Think of it like being able to ask someone to bake a cake following your secret recipe, but without ever revealing the recipe to them. While still computationally intensive, this technology could revolutionize cloud computing and data privacy.

## 19.6 Post-Quantum Cryptography

cryptographic systems that can resist attacks from quantum computers. This forward-looking field is essential because many current cryptographic systems (especially asymmetric ones) could be broken by powerful quantum computers.

# 20 Blockchains

We would prefer to use the term Decentralized Incentive Network instead of blockchain. But we also want to align on common nomenclature within the industry, so we'll stick with Blockchain for now.

The point of blockchains:

- Censorship resistance
- Deterministic State Transition (Mempool creates interesting nuances and complexity here)
- Credible neutrality
- Trustless coordination at scale
- Asset digitization and ownership

Censorship resistance is indeed crucial - it enables truly permissionless systems where no entity can prevent valid transactions. However, there are several other compelling candidates for blockchain's primary purpose:

One strong contender is deterministic state transition. Think about how traditional databases or financial systems might have ambiguity about the exact sequence or timing of transactions, especially across different locations or institutions. Blockchain provides absolute clarity about state changes - there's no ambiguity about which transaction came first or what the exact state was at any given moment. This property enables complex financial systems and smart contracts to operate with complete predictability.

Another fundamental purpose could be creating credible neutrality in computational systems. This goes beyond just censorship resistance - it's about creating systems where the rules are explicit, unchangeable without consensus, and apply equally to all participants. Traditional systems often have hidden biases or special privileges for certain users, while blockchain systems enforce their rules uniformly through code.

We could also argue that the primary purpose is enabling trustless coordination at scale. Before blockchain, coordinating economic activity among untrusting parties required trusted intermediaries like banks or governments. Blockchain enables direct peer-to-peer coordination without these intermediaries, potentially reducing costs and increasing efficiency.

Asset digitization and ownership might be another contender. Blockchain enables digital scarcity and verifiable ownership in ways that weren't possible before. This property enables everything from cryptocurrencies to NFTs to tokenized real-world assets.

We won't be taking any ideological approach to the point of blockchains but rather applying scores to DIN's and then comparing that to how the market values them.

A decentralized incentive network with state consensus

I've tried to simplify our definition as much as possible and even still it's verbose. Read that sentence to 99% of the world and I'll they'll give you a quizzical look and move onto the section about meme coins. There's a lesson there. A lesson the technical luminaries in this space ignore at their peril. Accessibility matters.

Let's break down each component of our definition.

Decentralized. This is how many Nodes participate. Centralized means 1. Therefore anything more than 1 is decentralized.

Network. This loosely means the participants computers/machines communicate via a communication method.

State Consensus. The network will record state and all nodes will agree about the state via consensus.

We don't need to worry too much about consensus yet, but you just need to know that the nodes must agree on the state. For example if Bob sends Alice 10 BTC. Everyone on the network must come to an agreement that Bob did indeed send Alice 10 BTC. Another important characteristic is that even if everyone agrees today, in the future that can't be disputed or changed. This is another important category called censorship resistance. We'll get to it.

Dependent Networks

A sovereign chain can be defined as a network that maintains complete independence in its settlement process, requiring no external chain to validate or guarantee its state transitions. This independence is fundamental to the concept of sovereignty in blockchain networks.

This section should start discussing why the need arose for dependent networks. Specifically Ethereum struggling with scale. Due to the trilemna: decentralization security scalability

Let's talk about scaling strategies monolithic Bigger blocks Faster blocks Higher minimum requirements for nodes Consensus optimizations modular Execution - The current crop of L2's Data availability - Storing and accessing blockchain data Celestia Consensus - Agreeing on the state of the network Settlement - Finalizing transactions and providing security guarantees. Ethereum and Bitcoin in the current Layer craze

## 20.1 Sovereign Networks

Pure Value Networks Pure value networks stick to the fundamental purpose of moving and storing value, avoiding the additional complexity that comes with being a platform for applications or other services.

What makes these networks "pure value" is what they don't include: They don't support complex smart contracts They don't host decentralized applications They don't provide programmable functionality beyond basic value transfer They don't serve as platforms for other tokens or applications

Application Chains Application Chains represent networks that go beyond pure value transfer to support various types of applications. They're divided into three main categories: Hubs, Specialized, and Generalized chains.

Hub Application Chains serve as central connection points in the blockchain ecosystem.

Specialized Application Chains focus on specific use cases or industries.

Generalized Application Chains aim to support a wide range of applications but differ from hubs in that they're not necessarily trying to be central connection points.

The key distinction between these categories lies in their approach to applications:

- Hubs prioritize becoming central platforms that other networks depend on
- Specialized chains optimize everything for specific use cases
- Generalized chains provide broad functionality but focus on being self-contained ecosystems

## 20.2 Layer 2's

We break these down into:

- Rollups

    - Optimistic
    - ZK

- Validiums
- Plasma
- Sidechains

So Ethereum has chosen decentralization and security. This means Ethereum is shit at scaling.

So we need to talk about the theory of Layers in Blockchain

That's why L2's became a major part of the roadmap. How does the scalability limitation affect the network. Congestion and high gas fee's. So people don't interact on the chain and it hits a ceiling. So logically we should start any discussion with transaction fee's, as that's the direct result of the scalability failure and the main reason users use L2's. Besides yield opportunities.

So we should first consider the Fee Markets on Ethereum and Bitcoin which are the two major chains looking to scale with L2's. There is a lot of debate and a lot of misinformation around this topic.

Dependent networks can really be divided into chains: External DIN required to validate state transitions External DIN required to guarantee state transitions

We'll define a framework for how we define a Dependent Network. There are few things we look at, in terms of priority:

- censorship resistance. Polygon zkEVM sequencer can censure, but you can go through the contract directly on Ethereum theoretically if censorship occurs. Same thing for Arbitrum. Although this is a very weak guarantee due to the complexity for regular users. For Stacks, it's more censorship resistant that the other two. Also if I were to interact directly with the smart contract on Ethereum, that makes the L2's pointless. Why do I need them if not to deal with congestion and high gas. dispute resolution. I believe all chains need to hard fork. Potentially not Movement due to Move's resource model. None of the chains will automatically hard fork if a dispute is found.
- settlement. So the base chain must validate and guarantee state transitions on the dependent chain. This is kinda stupid. It's guaranteeing the state transitions but makes no attempt to resolve things like censorship resistance.
- finality of settlement. Optimistic 7 days, zk 30 minutes, Stacks 16 hours
- economic security model inheritance - this is actually pointless as it just means the state transitions match the rules. Nothing about censorship resistance.

So my qualification of dependent networks means that they must inherit the censorship resistance of the base chain, settlement must be validated and guaranteed by the base chain, dispute resolution must be automatic and/or decentralized. else the chain can just fork.

Settlement Types In order of strength

- Cryptographically enforced settlement
- Validity proofs
- Fraud proof systems
- Checkpoint systems

## 20.3 Consensus Mechanisms

Consensus Mechanisms All DIN's have a consensus mechanism we have the consensus mechanisms. These can be divided into the following broad categories:

- Proof based mechanisms. Mainly Proof of Work and Proof of Stake
- Byzantine Fault Tolerance (BFT) Mechanisms. Tendermint
- Voting Based Mechanisms, Ripple and Stellar
- Directed Acrylic Graph based mechanisms
- Hybrid. PoS + BFT is used by Polkadot and Cosmos
- Novel Mechanisms

Need to talk about finality here about probabilistic vs deterministic. Also focus on Single Slot Finality

## 20.4 Application Models

Each application model represents a fundamental approach to how blockchains manage state, handle parallel execution, represent assets, enable composability, and provide safety guarantees.

We classify Application Models as:

- UTXO also includes Cardano's extened UTXO, Kaspa also falls into this
- Account

  - Pure EVM Ethereum, Polygon, Avalanche, TRON et al
  - Specialized XRP and Stellar

- Sharded account model Near falls into this.
- Object Sui
- Resource model Aptos and Movement
- Capability Solana
- Cell model TON
- Actor Based (ICP and CosmWasm

### 20.4.1 UTXO

The UTXO model treats the ledger as a set of unspent outputs that can be consumed as inputs to create new outputs. This model inherently supports parallel transaction validation since each UTXO can only be spent once.

**Key Characteristics:**

- State Management: Stateless, transaction-oriented
- Parallelization: Natural parallel validation
- Asset Representation: Native representation of tokens
- Composability: Limited without extensions
- Safety Guarantees: High through explicit ownership

### 20.4.2 Account Model

Accounts maintain state directly, with each account having properties like balance and nonce. This model enables rich programmability but can face challenges with parallelization. However if we look at EOA's, they only maintain state of the network token and not ERC20's.

**Key Characteristics:**

- State Management: Stateful, account-oriented
- Parallelization: Challenging due to state dependencies
- Asset Representation: Contract-based tokens
- Composability: High through contract interactions
- Safety Guarantees: Varies by implementation

### 20.4.3 Object Model

Objects are owned, independent state elements that can be transferred and modified. This enables parallel execution while maintaining rich programmability.

**Key Characteristics:**

- State Management: Object-oriented
- Parallelization: Natural through object independence
- Asset Representation: Native objects
- Composability: Through object references
- Safety Guarantees: Object-level ownership

### 20.4.4 Resource Model

Resources are linear types that cannot be copied or discarded, only moved between accounts. This provides strong safety guarantees for digital assets.

**Key Characteristics:**

- State Management: Resource-oriented
- Parallelization: Possible through resource independence
- Asset Representation: Native resources

- Composability: Through resource combination
- Safety Guarantees: Very high through linear types

### 20.4.5 Capability Model

Capability Model Access to resources is controlled through explicit capabilities, enabling fine-grained access control and parallel execution.

**Key Characteristics:**

- State Management: Capability-based
- Parallelization: High through capability isolation
- Asset Representation: Capability-protected resources
- Composability: Through capability delegation
- Safety Guarantees: High through access control

### 20.4.6 Cell Model

State is organized into cells that can be independently accessed and modified, enabling high parallelization.

**Key Characteristics:**

- State Management: Cell-based
- Parallelization: High through cell independence
- Asset Representation: Cell-based
- Composability: Through cell references
- Safety Guarantees: Cell-level isolation

### 20.4.7 Actor Model

Computation is organized around actors that can independently process messages, enabling natural parallelization.

**Key Characteristics:**

- State Management: Actor-local state
- Parallelization: Natural through actor independence
- Asset Representation: Actor-managed
- Composability: Through message passing
- Safety Guarantees: Actor isolation

| Application Model | Blockchains | Key Features |
| --- | --- | --- |
| UTXO | Bitcoin, Cardano (eUTXO), Kaspa, Ergo, Bitcoin Cash, Litecoin, Zcash, Dogecoin, Monero, BEAM | - Natural parallelism- Simple state model- High security |
| Account (Pure EVM) | Ethereum, Polygon, Avalanche C-Chain, BSC, TRON, Fantom, Arbitrum, Optimism, Mantle, WorldCoin, Gala, Flare | - Rich programmability- High composability- Standard tooling |
| Account (Specialized) | XRP, Stellar, Algorand, Stacks, Tezos, Hedera, VeChain, Quant, the Sandbox, StarkNet, Neo, BitTorrent | - Custom account models- Specific use-case optimization- Modified state management |
| Sharded Account | NEAR, Polkadot, Kusama, Elrond (MultiversX), Harmony | - Parallel execution- Cross-shard composition- Scalable state |
| Object | Sui | - Object-centric- Natural parallelism- Rich ownership model |
| Resource | Aptos, Movement, Flow, Virtual Protocol | - Linear types- Strong safety- Asset-oriented |
| Capability | Solana, Injective, SEI, Theta Network | - Fine-grained access- High parallelism- Explicit permissions |
| Cell | TON, Everscale | - Cell-based storage- High parallelism- Flexible structure |
| Actor | Internet Computer (ICP), CosmWasm chains (Osmosis, Celestia, Cosmos Hub), Fetch.ai, IOTA | - Message-passing- Natural isolation- Independent processing |
| Unknown | Filecoin, Arweave, Bittensor, Mantra, Ondo, Kaia, Brett, Jasmycoin | Still researching these |

## 20.5 Communication Protocols

We have

- IBC (Inter-Blockchain Communication) - Cosmos
- XCMP (Cross-Chain Message Passing) - Polkadot
- CCTP (Cross-Chain Transfer Protocol) by Circl
- CCIP (Cross-Chain Interoperability) by Chainlink
- Warp Messaging for Avalanche
- IMP (Interchain Messaging Protocol)

We can then further classify these standard by the following properties: * Security Model * Centralized vs Decentralized * Message Scope (General (IBC,CCIP, Hyperlane) vs Specialized (Circle's CCTP and Warp)) * Open vs Close networks * Message Verification Method

## 20.6 Fee Markets

We break down fee markets into:

- Block Space Markets
- Resources Markets

### 20.6.1 Block Space Markets

These are the most fundamental type. Users are paying for space in the next block, regardless of what they're doing with that space. It only considers the price of inclusion while respecting the limits of the network.

### 20.6.2 Resource Markets

These evolved with the advent of Ethereum as blockchains became more complex. We break these down into:

- Compute
- Data Availability
- Storage
- Hybrid

### 20.6.2.1 Compute Markets

Transaction fee's sometimes called Gas is what you pay to execute a smart contract on a blockchain. On some networks, like Ethereum, there is an execution limit on how much computational work can be done in a block. This parameter directly impacts the computational resources required to run a node.

Nodes can propose a gas limit

So the attributes for Transactions Fee's are: Tips/Bribes How Transactoin fees are distributed. Burnt or redirected to Miners How fee's are calculated Base Fee Dynamic Fee (based on something like network congestion)

## 20.6.3 Data Availability

We will compare the mechanisms of the following major DA layers:

- Ethereum
- Celestia
- Eignlayer DA
- Avail

Ethereum uses dynamic blob fees based upon a target amount of blob space per block.

Celestia charges by size. Celestia is designed to scale to handle increase demand with adding more validators

Avail also charges by size but also the type.

EigenDA creates a marketplace for data availability providers

### 20.6.3.1 Storage

### 20.6.3.2 Hybrid

### 20.6.3.3 Congestion Measurement Mechanisms

**Ethereum**

- Measures block gas utilization vs 15M target
- 12.5% base fee adjustment per block
- Block size can flex up to 30M gas

**Stellar**

- Uses surge pricing mechanism
- Triggers when ledger capacity exceeds 50%
- Fee increases proportionally to network load

**Polkadot**

- Uses weight-based system
- Measures block weight against target
- Adjusts fees based on block fullness

**Tezos**

- Monitors block saturation
- Adjusts fees based on recent block usage
- Uses gas limits per operation type

### 20.6.4 Data Availability market

Ethereum uses blobs, which are special containers for Layer 2 rollups to post their transaction data. They also disappear after a time.

Blob fee is calculated based on the target blob gas per block.

## 20.7 Network Change Management

### 20.7.1 Overview

Network change management in DINs encompasses the processes, mechanisms, and stakeholders involved in proposing, discussing, approving, and implementing network modifications. This framework covers everything from minor parameter adjustments to major protocol upgrades.

**TODO** Design something that can simulate

## 20.8 Clients

## 20.9 Bridges

Classification of Bridges. Need to include Lazy Bridges here https://blog.celestia.org/lazybridging/

- Trusted

- Custodial
- Multi Signature
- Federated

- Trustless Bridges

  - Light Client
  - ZK
    * Lazy Bridge
  - Relay

# 21 dApps

dApps can be single chain or multichain. However they must exist on a DIN and can't exist independently from a DIN. They don't need to have a token to be included here. If an NFT develops functionality, they they'll be inlcuded here too. They can be DeFi SocialFi GameFi CeDeFi Concepts Concepts Flash loans DeFi Derivatives Basis Trading DEX Lending Utility Yield Pendle 3k in Basis Trading Current dApps Ethena USDX BounceBit

Derivatives Liquid staking Derivatives such as Lido, and EtherFi is the primary element here Lending

SocialFi Meme Coins CeDeFi Circle fits in here GameFi

## 21.1 DEX's

## 21.2 Name Services

## 21.3 Privacy

< lipsum 1 >

### 21.3.1 Railgun

< lipsum 1 >

### 21.3.2 Tornado Cash

< lipsum 1 >

# 22 MEV

## 22.1 Proposer Builder Separation (PBS)

## 22.2 Multiple Concurrent Leaders

https://x.com/aeyakovenko/status/1810222589991583922

# 23 Languages

## 23.1 Solidity

Is a compiled language

# Part IX

# Social

# 24 Governance

This section will compare how Blockchains implement the three tiers of traditional governance. Namely:

- Legistlative - Who makes the rules and how they created
- Executive - Who executes the rules
- Judicial - Referee between them

So in Bitcoin BIP's cover the Legislative aspect, Executive is Node operators for Networks then for dapps it gets more complex. Judicial is where it gets challenging. This is pretty much the entire community. People interpret rules by economic activity and nodes. Look at Bitcoin Cash. No money. So everyone agreed with the block size of Bitcoin.

There is also the concept of Canvassing or Lobbying can also occur. Let's look at Ethereum. If I wanted to increase the gas limit from 30 million to 31 million. I'd need to canvas all the nodes to come along with me. Currently there is 5,333 nodes. So I'd need to convince ~3k node operators to increase the gas limit.

### 24.0.0.1 1. Hard Forks

- **Definition**: Protocol changes that make previously invalid blocks/transactions valid (or vice-versa), requiring all nodes to upgrade
- **Characteristics**:
  - Non-backwards compatible
  - Requires coordinated network upgrade
  - Creates potential for chain splits if not unanimously adopted
- **Use Cases**: Major protocol upgrades, fundamental rule changes, bug fixes
- **Examples**: Ethereum's merge to PoS, Bitcoin's SegWit upgrade

### 24.0.0.2 2. Soft Forks

- **Definition**: Backwards-compatible protocol changes that tighten rules without invalidating existing blocks
- **Characteristics**:

- Backwards compatible
- Old nodes can still participate (with limitations)
- Lower coordination requirements

- **Use Cases**: Adding new features, incremental improvements
- **Examples**: Bitcoin's P2SH implementation, taproot upgrade

### 24.0.0.3 3. Parameter Updates

- **Definition**: Changes to network variables within predefined bounds
- **Characteristics**:

  - No code changes required
  - Often automated through on-chain governance
  - Lower risk than protocol changes

- **Use Cases**: Fee adjustments, block size modifications, staking parameters
- **Examples**: Tezos' regular parameter updates, Cosmos' governance parameters

## 24.0.1 Governance Mechanisms

### 24.0.1.1 1. Off-Chain Governance

- **Characteristics**:

  - Social consensus through discussion forums, social media, conferences
  - Informal decision-making processes
  - Relies on node operator coordination

- **Advantages**:

  - Flexible and adaptable
  - Allows for nuanced discussion
  - Natural resistance to capture

- **Disadvantages**:

  - Can be slow and messy
  - May lack clear resolution mechanisms
  - Potential for contentious outcomes

### 24.0.1.2 2. On-Chain Governance

- **Characteristics**:
  - Formal voting mechanisms
  - Smart contract-based execution
  - Token-weighted or identity-based participation

- **Advantages**:
  - Clear process and outcomes
  - Automated execution
  - Transparent participation

- **Disadvantages**:
  - Potential plutocratic capture
  - Reduced flexibility
  - Voter apathy risks

### 24.0.1.3 3. Hybrid Systems

- **Characteristics**:
  - Combines off-chain discussion with on-chain execution
  - Multiple stages of proposal refinement
  - Mixed participation models

- **Advantages**:
  - Balances flexibility with formality
  - Combines benefits of both approaches
  - Can adapt to different types of changes

- **Examples**: Polkadot's governance system, Cosmos Hub's proposal process

## 24.0.2 Improvement Proposal Systems

### 24.0.2.1 1. Structure

- **Stages**:
  - Draft: Initial proposal development
  - Review: Community feedback and refinement
  - Last Call: Final period for major objections
  - Accepted/Final: Ready for implementation

– Rejected: Proposal declined

- **Components**:

  – Technical specification
  – Motivation and rationale
  – Backwards compatibility analysis
  – Reference implementation (if applicable)
  – Security considerations

### 24.0.2.2 2. Common Frameworks

- **BIP (Bitcoin Improvement Proposals)**:

  – Focus on consensus changes
  – Conservative approach
  – High emphasis on security

- **EIP (Ethereum Improvement Proposals)**:

  – Multiple tracks (Core, ERC, Interface)
  – Regular cadence of updates
  – Strong emphasis on standardization

- **Network-Specific Systems**:

  – Customized to network needs
  – Varying levels of formality
  – Different voting thresholds

## 24.0.3 Centralization Factors

### 24.0.3.1 1. Development Centralization

- **Core Development Teams**:

  – Control over codebase
  – Technical expertise concentration
  – Funding dependencies

- **Client Implementation**:

  – Diversity of node software
  – Implementation independence
  – Bug discovery and fixes

### 24.0.3.2 2. Governance Centralization

- **Voting Power Distribution**:

  - Token concentration
  - Delegate systems
  - Voter participation rates

- **Proposal Control**:

  - Who can propose changes
  - Filtering mechanisms
  - Discussion venue control

### 24.0.3.3 3. Infrastructure Centralization

- **Node Operation**:

  - Geographic distribution
  - Hardware requirements
  - Operating costs

- **Service Providers**:

  - API services
  - Block explorers
  - Development tools

## 24.0.4 Best Practices

### 24.0.4.1 1. Change Management

- Clear documentation of changes
- Adequate testing periods
- Coordinated upgrade schedules
- Emergency response procedures

### 24.0.4.2 2. Community Engagement

- Regular communication channels
- Multiple feedback mechanisms
- Transparent decision-making
- Educational resources

### 24.0.4.3 3. Technical Implementation

- Comprehensive testing frameworks
- Clear upgrade paths
- Fallback mechanisms
- Security audits

# 25 Contributing

This Almanack will change often and get things wrong. It's only by being intellectually honest that it can ever hope to be the canonical guide to crypto and Web3. We follow Sophocles as our North Star

> "All men make mistakes, but a good man yields when he knows his course is wrong, and repairs the evil. The only crime is pride." Here we'll list all the outstanding contributions we're looking for.

I'll also use it as a dumping ground where I can keep track of things I need to read to include:

- https://bitcoinrollups.org/
- https://tr3y.io/articles/crypto/bitcoin-zk-rollups.html

## 25.1 Current requirements

### 25.1.1 Translations

Be good to focus on the most widely spoken languages first. So

- Mandarin
- Hindi
- Spanish
- French
- Arabic
- Bengali
- Russian
- Portuguese
- Indonesian

### 25.1.2 Data Dynamism

I'd like an easy way to embed live data in every version publish. So for example if I want to reference the current ETH price, I should be able to do something like {{eth.current_price}} and it will embed the current price during the Quarto render with the latest price.

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