Web3+AI: A New Frontiers in the Decentralized Ecosystem

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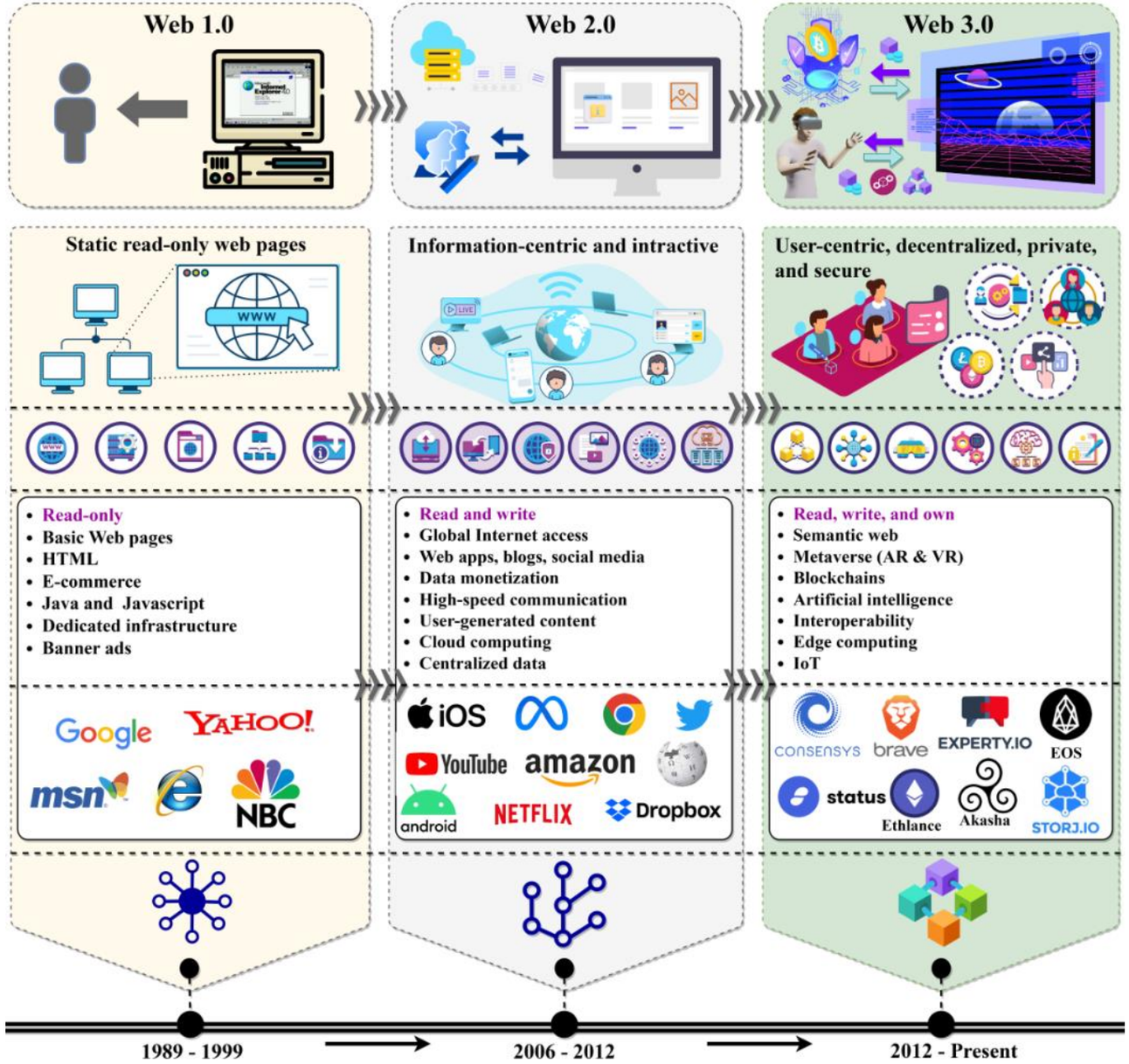
Outlines

Web3: The Decentralized Internet

Evolution of Web

- **Web 1.0** is based on the idea of providing information services to consumers and is called the **read-only Internet**.
- **Web 2.0** is based on the idea of bringing together workers and consumers; It is called the **read-write Internet**.
- **Web 3.0 or Web3** is based on the concept of de-trust, de-intermediation and digital assetization, and is called the **Value Internet**.
  - It aims to solve the problems of **ecological imbalance** and **non-transparent development** brought by Web2.0.



Source: M. A. Hassan et al., "Enabling Technologies for Web 3.0: A Comprehensive Survey." arXiv, Dec. 29, 2023.

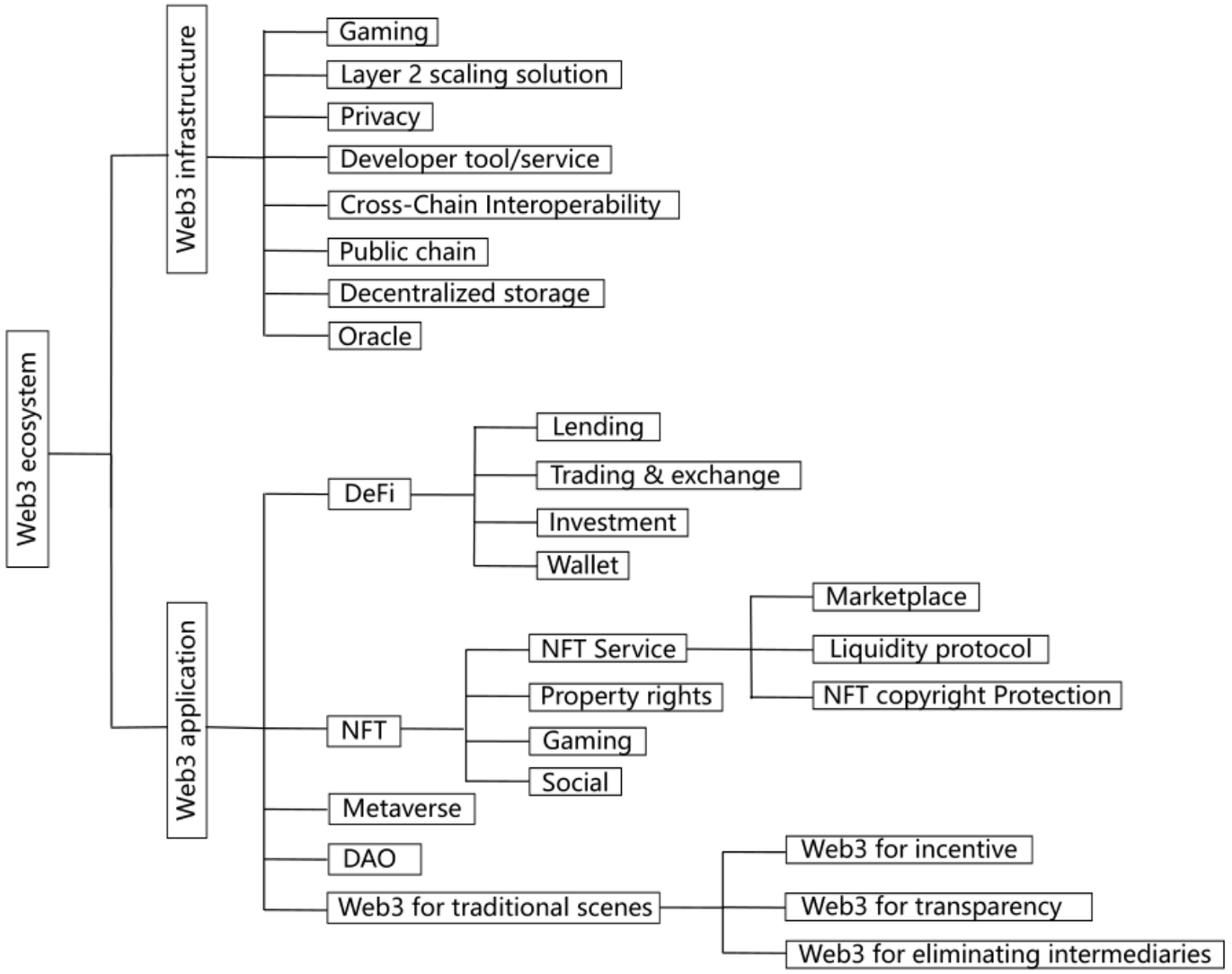
What is Web3

Web3: The Decentralized Internet

- **Web3**, also known as the **third generation of the internet**, is a concept aimed at creating a more **open**, **autonomous**, and **secure** network environment through **decentralized protocols**.

- The core concept of **Web3** is to build **a new Internet infrastructure** that eliminates the need for **intermediary trust** and gives users **full control** over their **digital identities** and **assets**.

Generic Structure of Web3



Popularity of Web3 Projects on GitHub

Code-related data of Web3 projects.

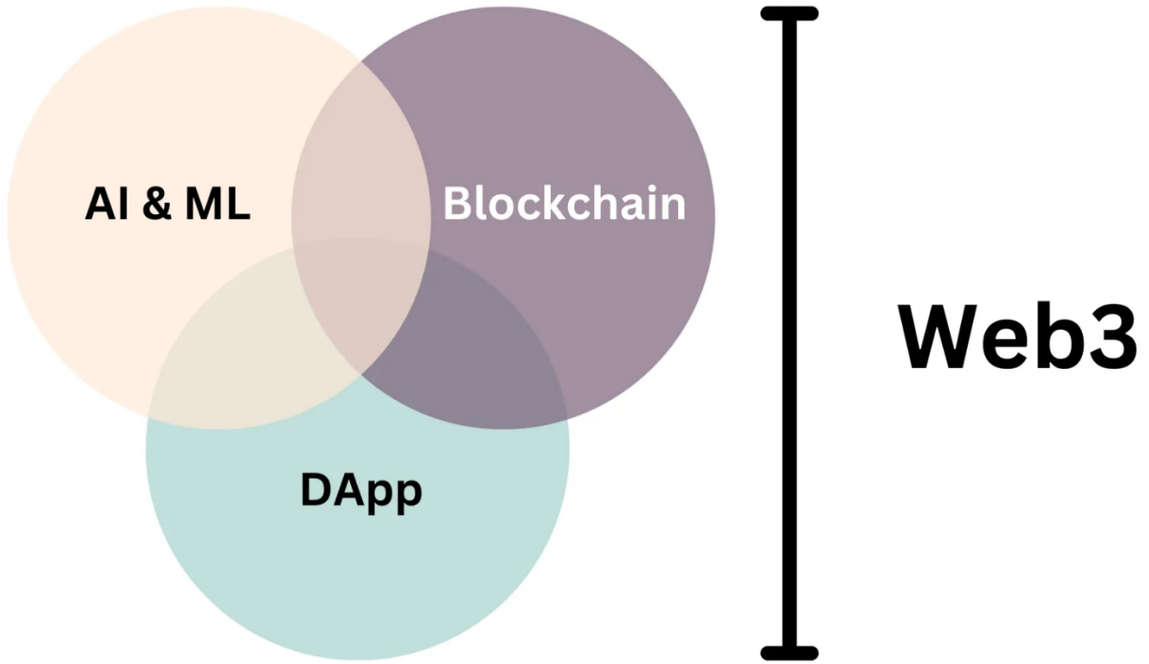
Subcategory	Count	Code line	Commits
Public chains	17	3,386,348	124,040
# Cross-Chain	9	3,156,655	39,720
Developer tool	8	641,749	11,998
# Dstorage	7	421,291	17,708
Oracle	3	364,499	872
# Gaming infra	2	309,826	6,330
Layer 2 scaling	2	2,071,208	15,594
Privacy	2	436,352	7,960
# DeFi infra	1	105,496	17,137
Lending	12	595,999	11,205
Trading & exchange	7	214,912	2,756
Investment	4	80,193	2,919
DAO	1	2,793	55
Wallet	2	162,163	4,533
NFT Marketplaces	2	117,305	2,977
NFT Liquidity	2	56,843	454
# NFT CP	1	14,091	3
# Property rights	2	105,070	806
Gaming	3	28,002	162
Metaverse	1	462,462	5,656
Web3 for incentive	2	98,049	3,804
# Eliminating inters	4	20,992	321

Source: R. Huang et al., "An overview of Web3 technology: Infrastructure, applications, and popularity," Blockchain: Research and Applications, vol. 5, no. 1, p. 100173, Mar. 2024.

Key Enablers of Web3

Intersection of AI & ML, Blockchain, and DApps creates a robust Web3 framework.

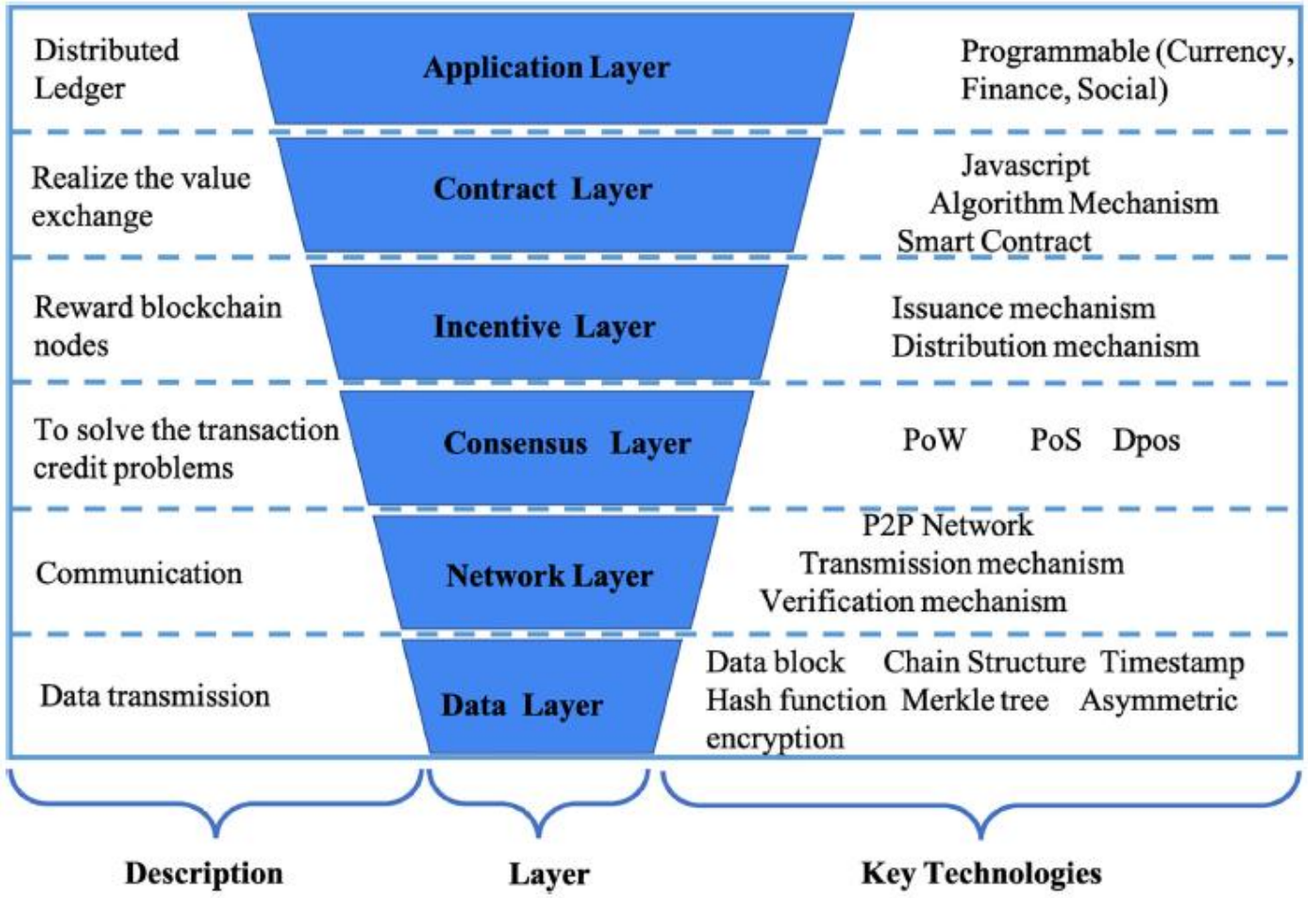
- **Artificial Intelligence (AI)** and **Machine Learning (ML)**
  - Powers intelligent and adaptive **Web3 applications**
  - Facilitates predictive **analytics** and **decision-making**
- **Blockchain**
  - Provides a **decentralized** and **secure ledger**
  - Enables trustless interactions and **smart contract execution**
- **Decentralized Applications (DApps)**
  - Operate on a **peer-to-peer network**
  - Allow users with **open-source development** and operation



Blockchain

Blockchain is the foundational technology behind Web3

- **Blockchain** is a **distributed ledger** technology that enables **secure** and **transparent** **transactions** without the need for **intermediaries**.
- It consists of a **chain of blocks**, where each block contains a **list of transactions** that are linked together using **cryptographic algorithms**.
- The **decentralization** of blockchain ensures that **no single entity** has **control over the data** or can **manipulate** it.



Source: Q. Yang, Y. Zhao, H. Huang, Z. Xiong, J. Kang and Z. Zheng, "Fusing Blockchain and AI With Metaverse: A Survey," in IEEE Open Journal of the Computer Society, 2022.

Decentralized Apps (DApps)

- **DApp**, or **Decentralized Application**, is a **smart contract** and a web-based user-interface that is built on top of **open**, **decentralized**, **peer-to-peer** infrastructure services.
- **DApps** enable access to financial services for unbanked populations, facilitating **cross-border remittances**, **microfinance**, and **peer-to-peer lending**.
- **DApps** facilitate the **tokenization** of **real-world assets** such as real estate, art, and commodities, enabling fractional **ownership** and **liquidity**.

Highly diverse and competitive universe of dapps

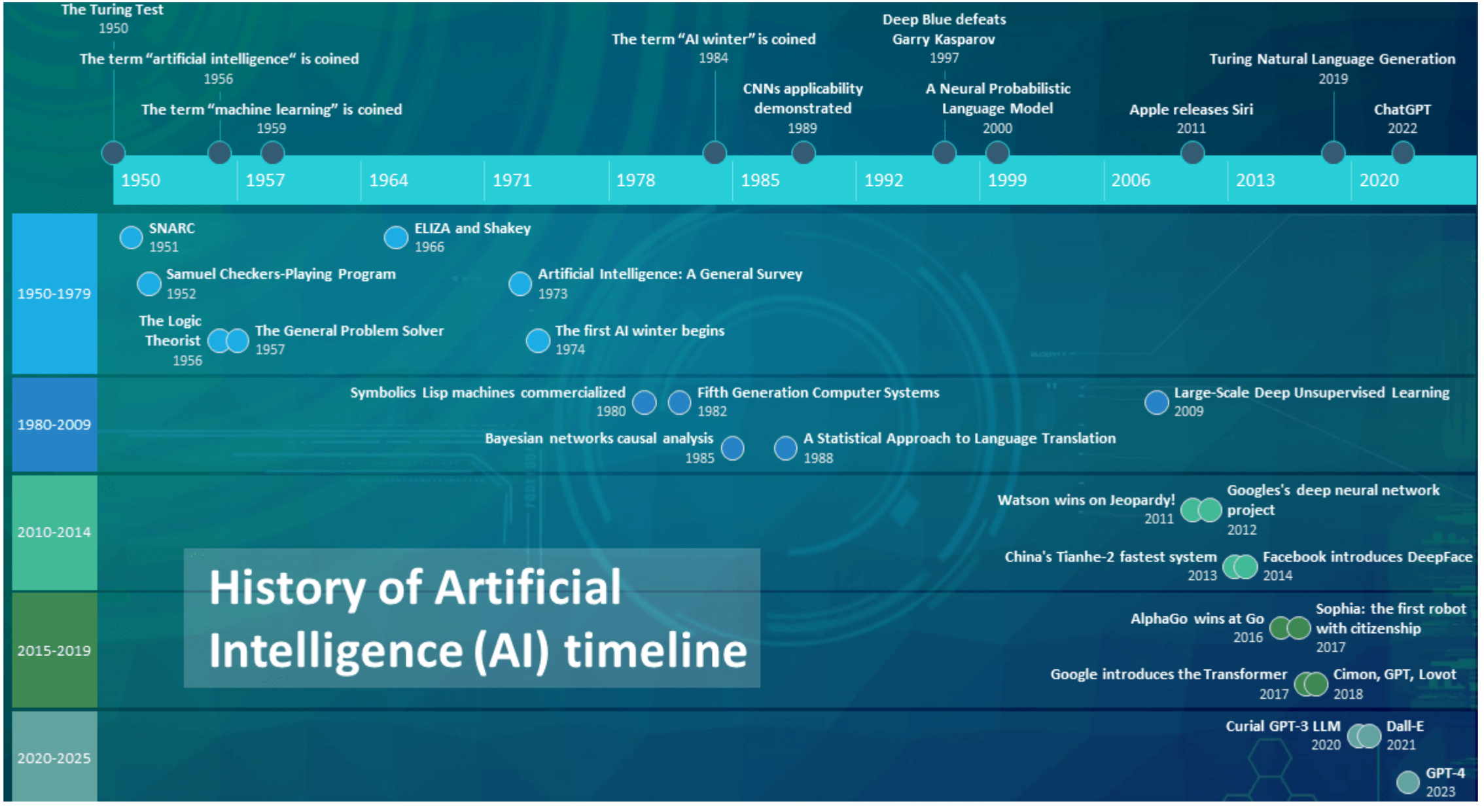
WalletConnect

Neutral, chain-agnostic protocol to establish a secure connection between any dapp and any wallet

Highly diverse and competitive universe of wallets & blockchains

ethereum SOLANA celo Polkadot. COSMOS NEAR

Evolution of AI

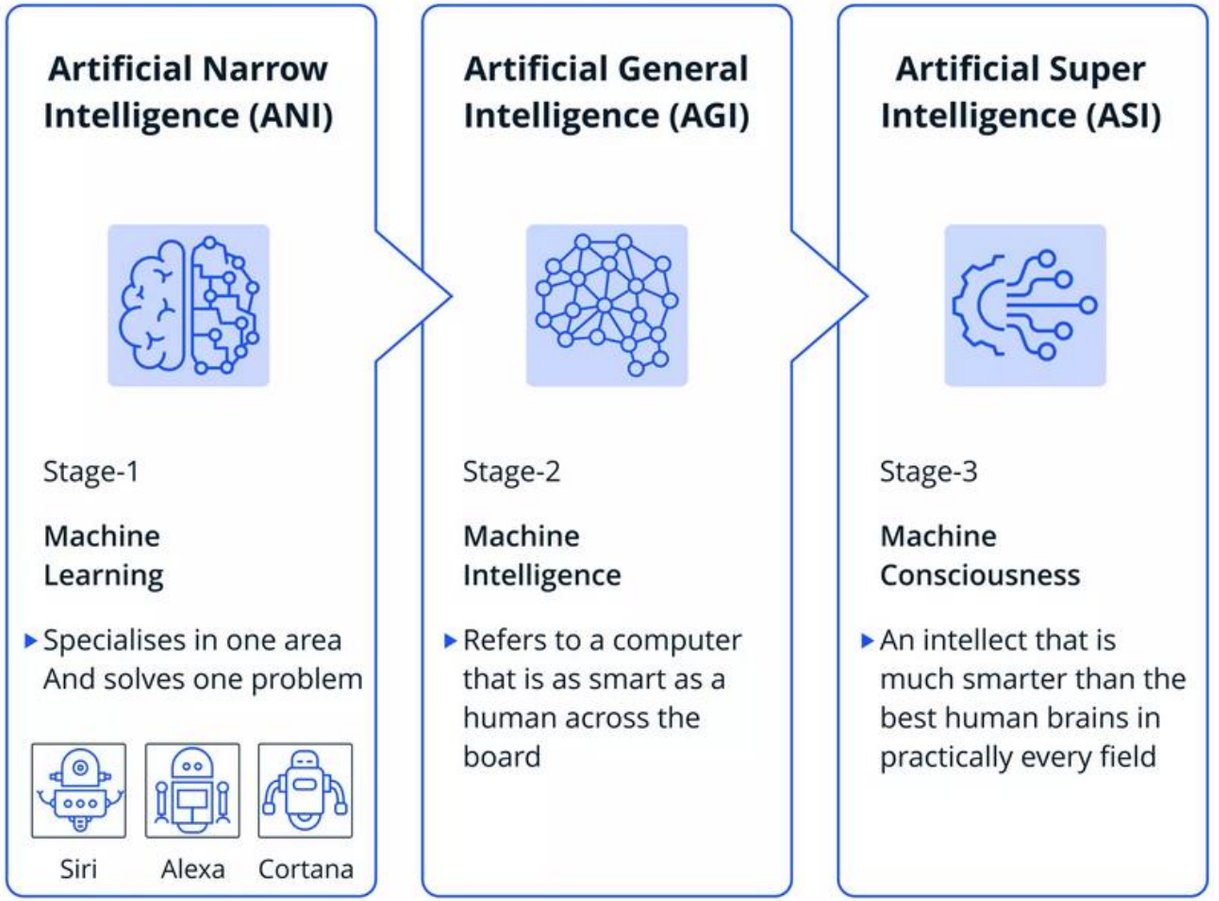


Three Stages of AI Development

- **ANI (Artificial Narrow Intelligence)**, also known as Weak Artificial Intelligence, is a **trained AI** that focuses on performing tasks in a certain domain (e.g., **search engines**, **voice assistants**, **image recognition**). Majority of the current AIs are based on ANI.

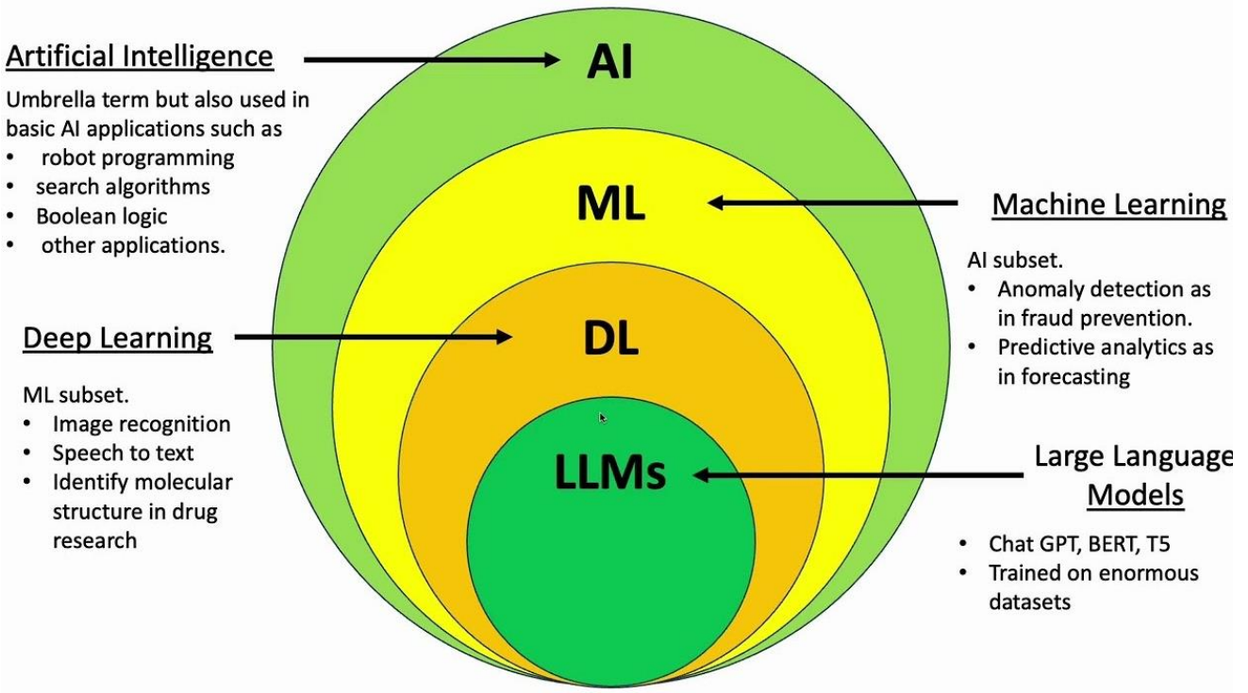
- **AGI (Artificial General Intelligence)** refers to an **intelligent system** with **cognitive** abilities comparable to those of **humans**, capable of **understanding**, **learning**, **planning** and **problem solving**, which has yet to be truly realized. **Large language models** are an important possible path to **realize AGI**.

- **ASI (Artificial Super Intelligence)** refers to an intelligent system that exceeds the intelligence, knowledge, **creativity**, **wisdom**, and **social skills** of the **best humans** in almost all areas.



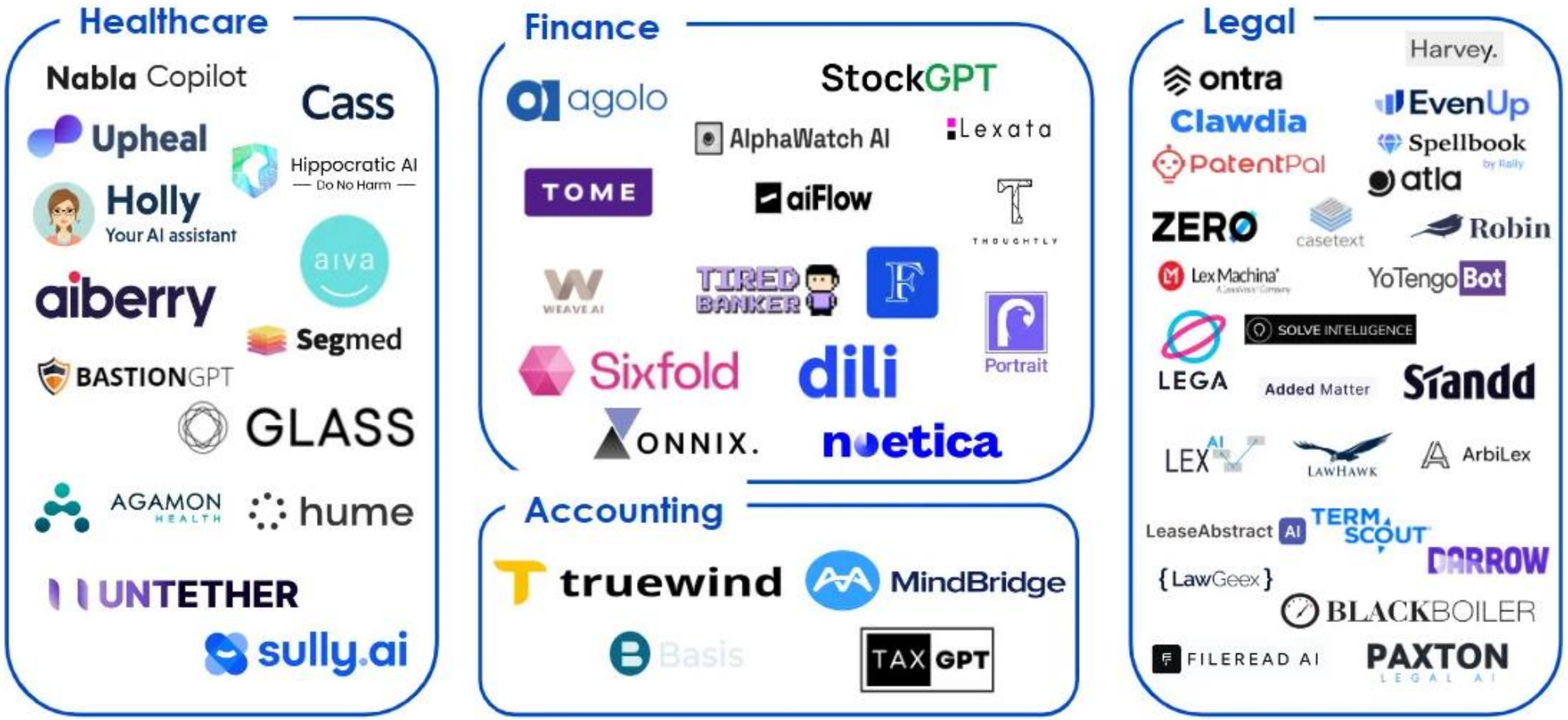
Artificial Intelligence (AI)

- **Artificial Intelligence (AI)** refers to the improvement of **computer systems** that carry out operations that normally require **human intelligence**.
- **Big data**, **Machine Learning (ML)** algorithms, and **Neural Networks (NN)** are combined in AI to analyze huge amounts of **data**, discover **patterns**, and make **predictions** or **judgments**.
- **Large Language Models (LLMs)** are a subset of **Deep Learning (DL)** that solve various **language-related problems** such as text classification, question answering, document summarization, and text generation.
- **ChatGPT** leverages **LLMs** to simulate human-like conversations to serve diverse functions from customer support to any sort of assistance.

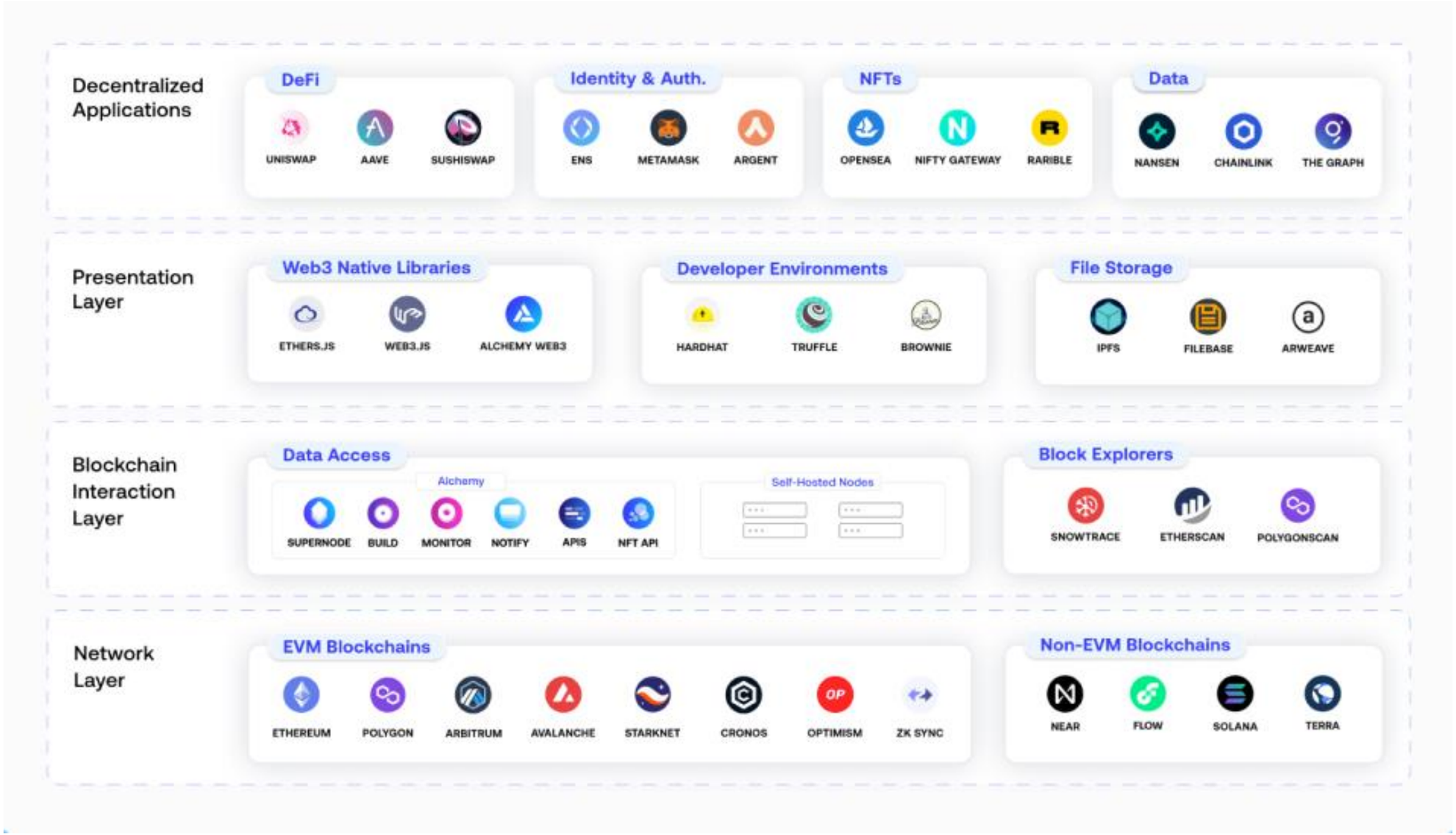


Generative AI

Generative AI is a type of **AI** that creates entirely new content, like **text**, **images**, music or **videos** by analyzing massive **datasets** to learn the patterns and **relationships** within the **data.**



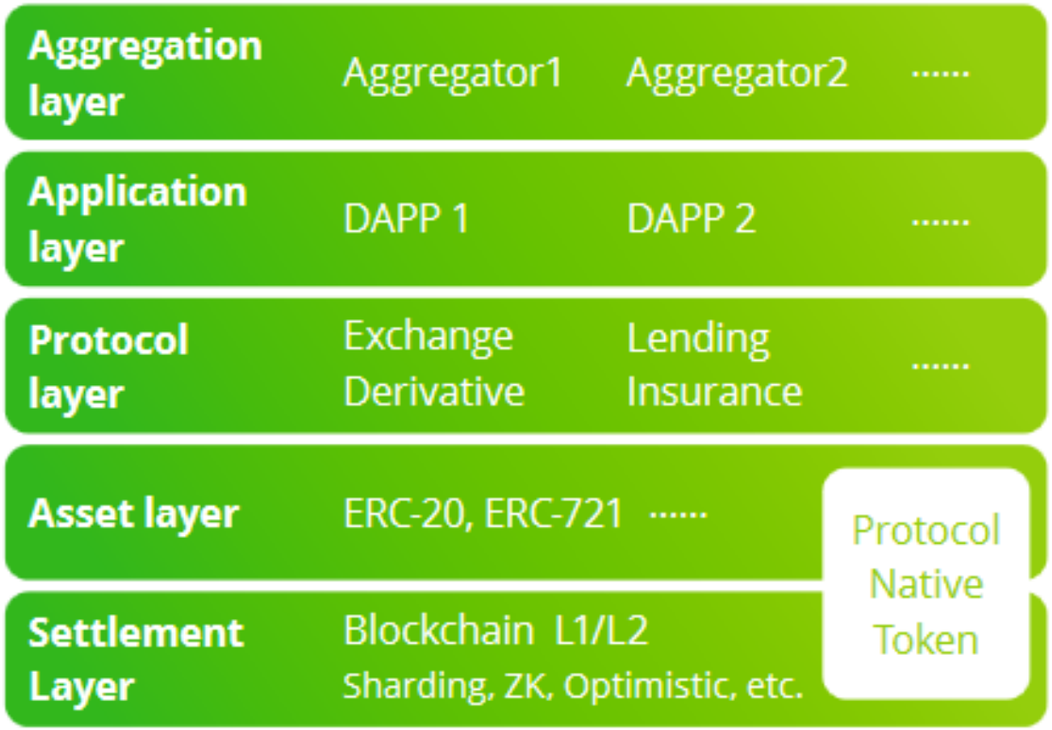
Web3 Stack


Decentralized Applications
DeFi
UNISWAP
AAVE
SUSHISWAP
Identity & Auth.
ENS
METAMASK
ARGENT
NFTs
OPENSEA
NIFTY GATEWAY
RARIBLE
Data
NANSEN
CHAINLINK
THE GRAPH
Presentation Layer
Web3 Native Libraries
ETHERS.JS
WEB3.JS
ALCHEMY WEB3
Developer Environments
HARDHAT
TRUFFLE
BROWNIE
File Storage
IPFS
FILEBASE
ARWEAVE
Blockchain Interaction Layer
Data Access
Alchemy
SUPERNODE
BUILD
MONITOR
NOTIFY
APIS
NFT API
Self-Hosted Nodes
Block Explorers
SNOWTRACE
ETHERSCAN
POLYGONSCAN
Network Layer
EVM Blockchains
ETHEREUM
POLYGON
ARBITRUM
AVALANCHE
STARKNET
CRONOS
OPTIMISM
ZK SYNC
Non-EVM Blockchains
NEAR
FLOW
SOLANA
TERRA

Decentralized Finance (DeFi)

DeFi is a complete rethinking of Financial Services through Blockchain

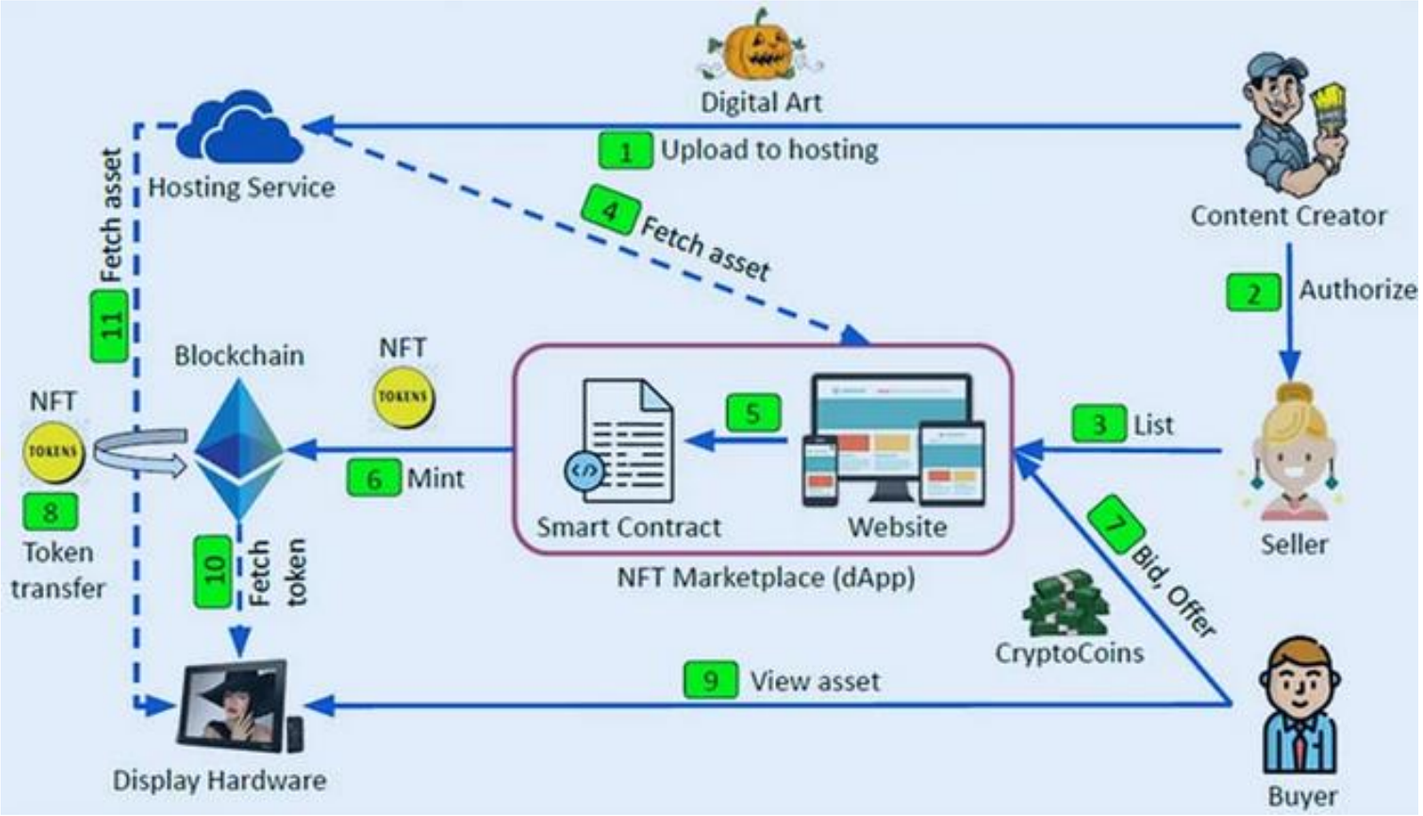
- **DeFi (Decentralized Finance)** is an alternative **financial infrastructure** built on top of the **Ethereum blockchain**. DeFi uses **smart contracts** to create **protocols** that replicate existing financial services (e.g., exchanges, borrowing, lending) in a more open, **interoperable**, and **transparent** way.
- It an **extension** of the current trend in **Fintech** towards greater **automation** leveraging continuous advances in **computing**, **data generation**, **analyses**, and **global connectivity**.



Source: [How Digital Asset Infrastructure Carries A City to Become a Web 3.0 Hub]

Non-Fungible Tokens (NFT)

- A **Non-Fungible Token (NFT)** is a unique and **non-interchangeable** unit of data stored on a digital ledger, i.e., **Blockchain**.
- NFT is used to represent easily-reproducible items such as **photos**, **videos**, **audio**, and other types of **digital files** as **unique** items.
- NFT uses blockchain to establish a **verified** and **public proof of ownership**.



Central Bank Digital Currencies (CBDCs)

Central Bank Digital Currencies (CBDCs) are digital forms of national fiat currencies issued and regulated by central banks.

Why CBDC is preferred over Cryptocurrencies

Regulatory Compliance

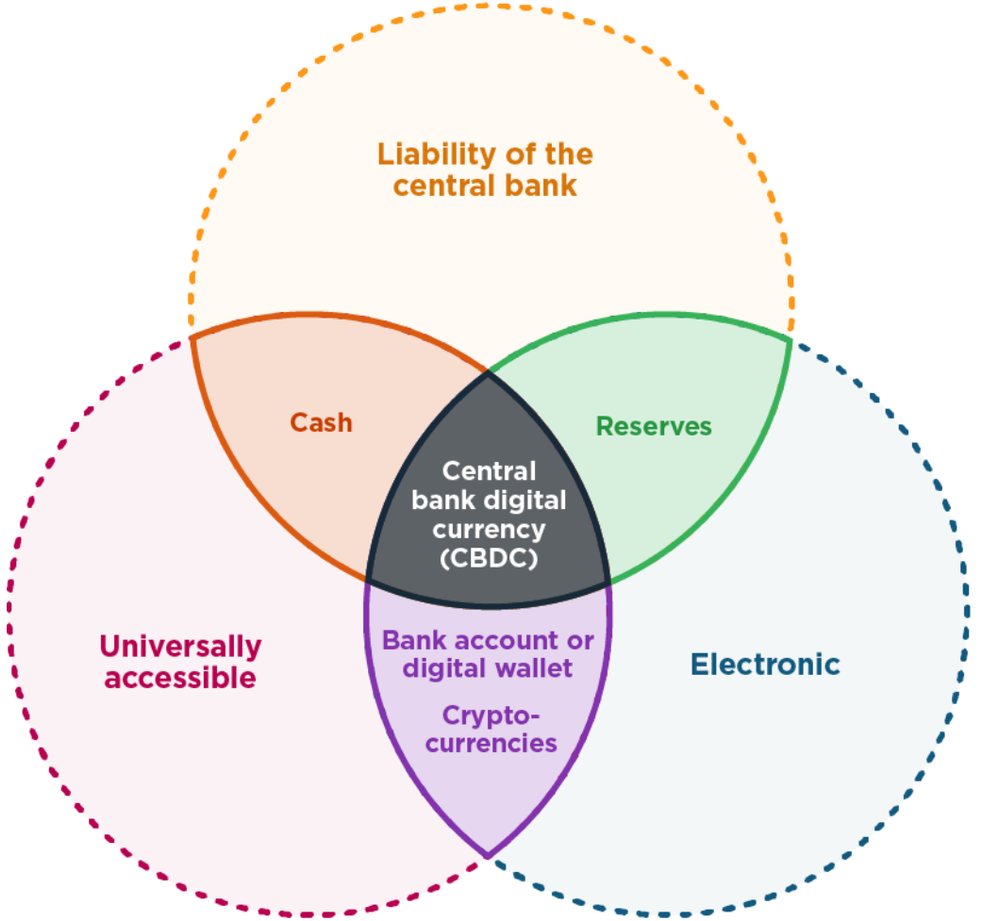
- CBDCs are issued and regulated by **central authorities**, ensuring compliance with **financial laws** and **stability** protocols, which aligns with Web3's push for regulated decentralization.

Stable Value

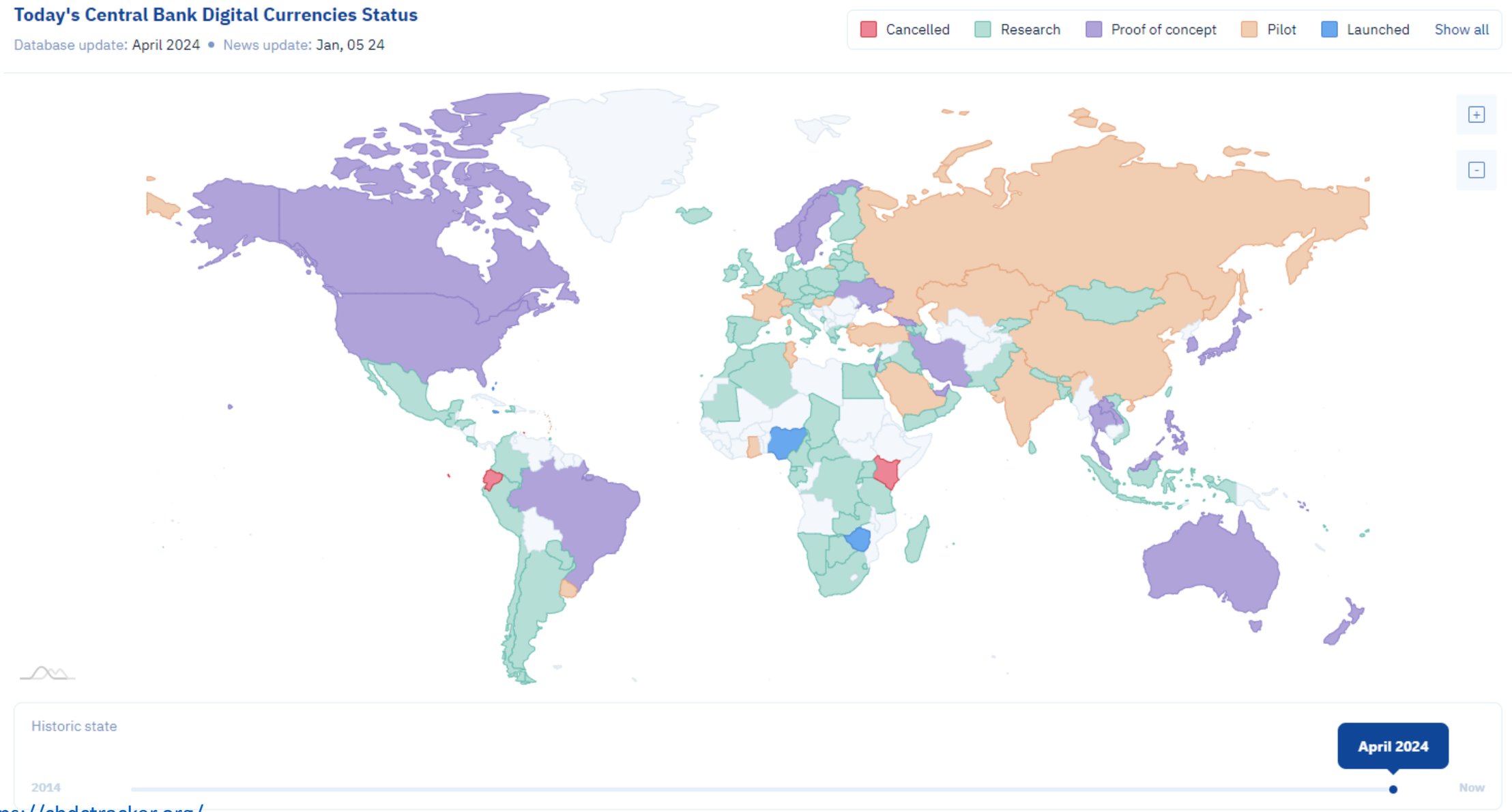
- Unlike cryptocurrencies, which are known for their **volatility**, CBDCs are typically **pegged to the value** of the issuing country's **fiat currency**, providing a **stable exchange** in Web3 ecosystems.

Programmability and Interoperability

- CBDCs can be specifically designed for the Web3 infrastructure, with **programmable** features that enable seamless integration with other **digital assets** and smart contracts.



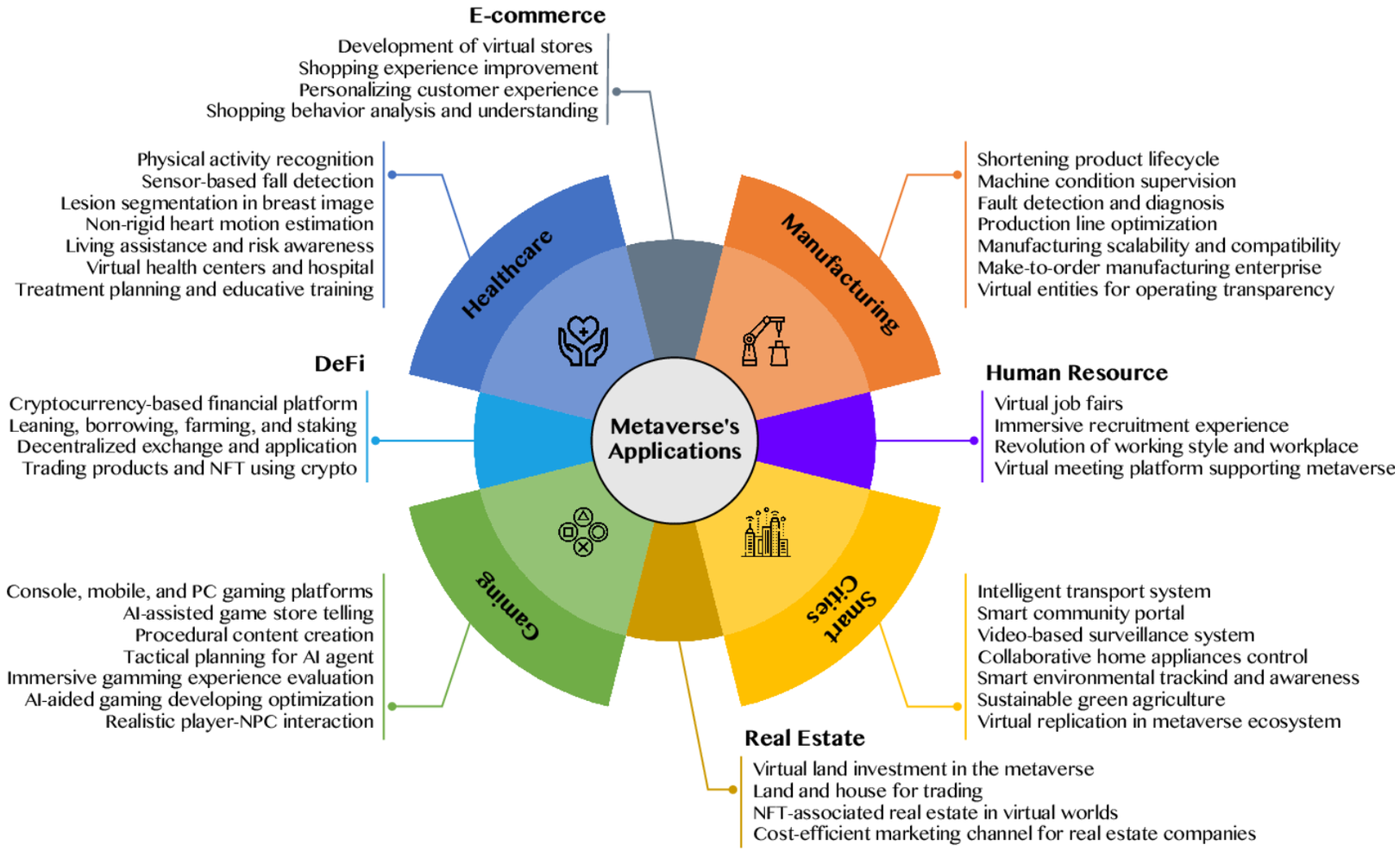
Global Status of CDBC



Source: https://cbdctracker.org/

Metaverse

Metaverse is a **decentralized and** virtual environment that utilizes **Web3** for distribution and exchange to grant users an increased **autonomy** and **control** over their **digital assets**, and virtual experiences (e.g., **social media**, **gaming**, and **virtual reality**).



Decentralized Autonomous Organizations (DAOs)

- **DAO** stands for **decentralized autonomous organization**, which operates through smart contracts.
- **Smart contract** manages the DAOs by executing the **rules predefined** by the organization's **members**.

	Traditional organizations	Decentralized autonomous organizations
Decision-making	Centralized, often limited to a small group of people	Decentralized, involves all members, uses a voting system
Ownership	Owned by a small group of shareholders	Decentralized ownership by all members
Transparency	Decisions are generally kept confidential	All decisions are published on a public blockchain ledger
Type of governance	Hierarchical, with clear lines of responsibility	Flat, with no hierarchy
Speed of making decisions	Slow, often because of the need for approval from multiple levels of authority	Often faster due to the ability for all members to vote on proposals collectively

Web3+AI Merge: Unlocking a New Era of Fintech

Web3+AI: The Merge

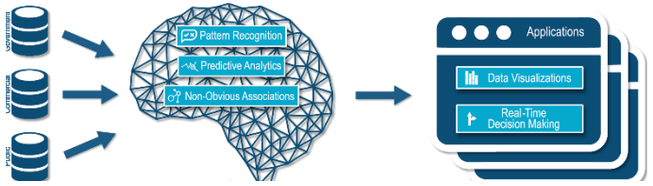
Web3 complements AI

1. Web3 **trains AI** models in a **privacy-preserving** way
2. Scalable and **distributed computing** to enhance AI model
3. **Zero-knowledge proofs** for verifying reasoning
4. **Token incentives** for collecting and labeling datasets
5. **AI Agent** payment track
6. Distributed **GPU** network

AI complements Web3

1. **Protect**, **audit** and **monitor smart contracts** with AI
2. AI models for efficiently searching **on-chain** data
3. **LLM** for creating data **analytics** on dashboards
4. **Intent**-based **transactions**
5. Customized **Bots** for **on-chain gaming**
6. **AI Agent** for managing **DAOs**

Web3+AI: Innovations



Decentralized Intelligent Applications

- Combines Web3-enabled **decentralized** apps with AI for **smarter**, **autonomous** applications.
- Examples: blockchain-based decentralized **prediction markets** and automated **supply chain management** systems with learning capabilities.

Smart Contracts and Machine Learning

- Integrates machine learning with smart contracts for **adaptive**, **autonomous** execution.
- Example: In the **insurance sector**, smart contracts automatically assess the risk and compliance of insurance claims based on **real-time data** and **AI algorithms**. This simplifies the process, reduce the **risk of fraud**, and improve **user satisfaction**.

Data Privacy and Security

- Merges Web3's distributed ledger technology with AI's **encryption** and **privacy** mechanisms to enhance data security.
- Ensures trusted **data processing** and storage to minimize risks of **data leakage** and **misuse** through the decentralized execution of **smart contracts**.

Why this Merge is important?

Driving Fintech Evolution

- The merge catalyzes a technological revolution, enhancing fintech's core: **payments**, **purchases**, and **asset management**.

Enhanced Privacy and Security

- Provides **robust privacy** with different layers of security which is essential for **financial transactions**.

Global Value Transfer

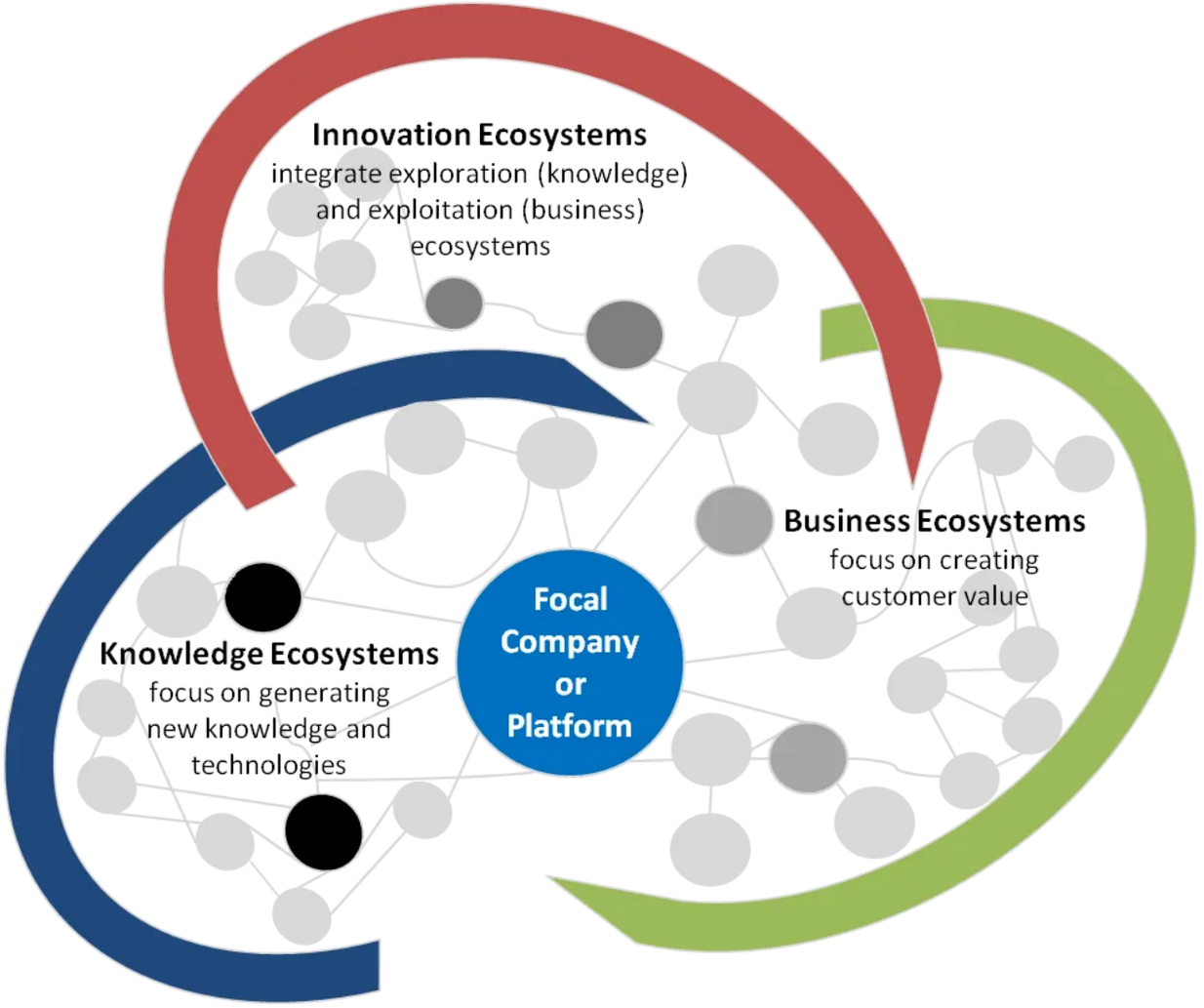
- Facilitates **seamless**, **borderless value exchange** through **intelligent** and **automated** applications.

Smart Understanding of User Needs

- **AI** intelligently understands and **predicts** user **behavior**, **personalizing financial services**.

Accessibility to broader Users and Regions

- **Accessibility**, **transparency** and **intelligence** of Web3+AI have the potential to **democratize financial access** for **underbanked populations** and regions.



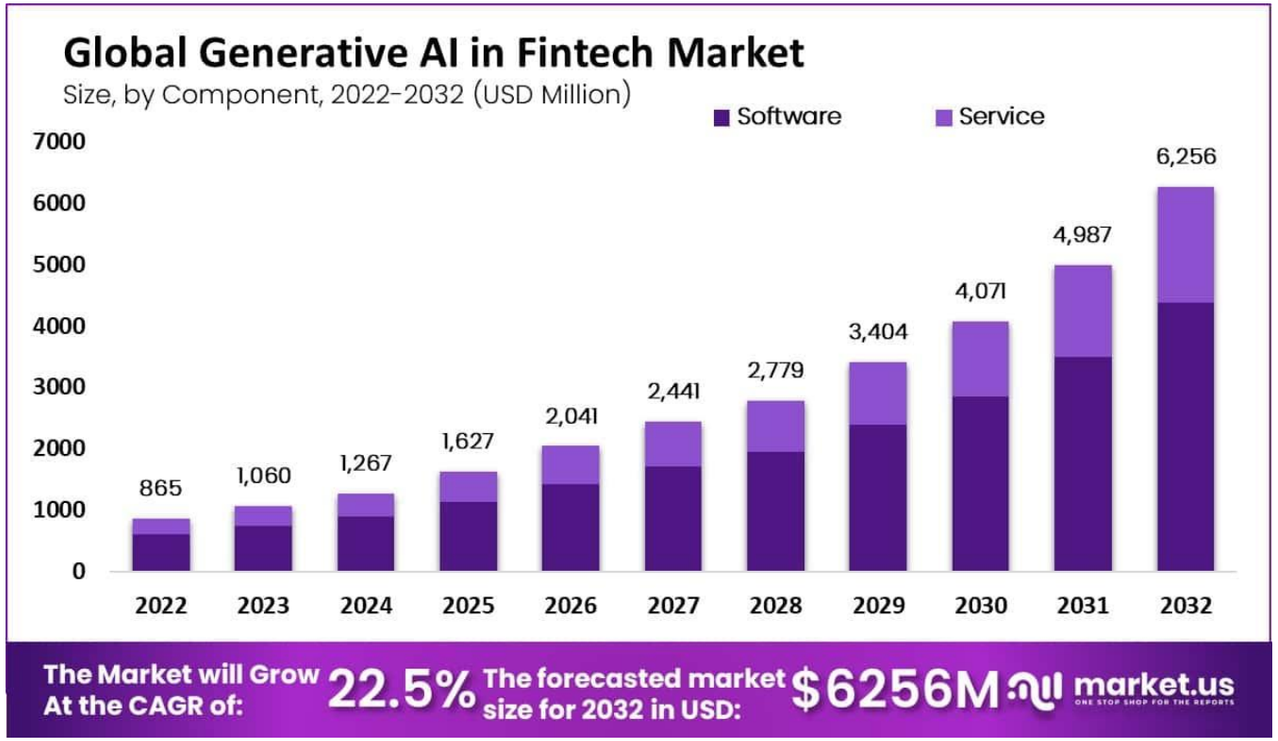
Why Fintech needs this Merge?

Addressing Fintech's Challenges

- Current Fintech tools lack effective methods for complete privacy and security in financial transactions.
- Many financial processes rely on **manual human** intervention, leading to inefficiencies and potential **errors**.
- Traditional payment systems are often **isolated** across **regions**, leading to **high transaction fees** and complexities.

The Merge as an Answer

- **Security and Fraud Prevention**
  - Web3's cryptographic security and AI's advanced **anomaly detection** mitigate the risk of **cyber threats**, **data breaches**, and **financial fraud**.
- **Intelligent and Autonomous Financial Application**
  - Intelligent and self-executing financial applications adapt to **user needs** and **market conditions**.
  - Streamline financial processes, optimize investment strategies, and provide personalized **financial advice**, enhancing the overall **user experience**.



Possibilities of Web3+AI in Fintech

Next-Generation Payment

- Evolution from **cash** (1st gen) and information-based systems (2nd gen) to a globally **accessible**, **secure**, and cost-effective **payment network** built on Web3+AI.
- Example: **CBDCs** leveraging AI for enhanced security and user experience.

AI-powered Financial Services

- Intelligent **Wealth Management** and **Investment**
- Automated **Lending** and **Credit Scoring**
- Automated **Unified Payment System**
  - **CBDC**s and **stablecoins**, combined with AI-powered **financial agents** enable new models of automated financial transactions and decision-making.

The Future of Fintech

- Automated financial tasks with AI
  - For example, **Robots** using **Web3** for **transactions** while we are **sleeping**.

Generative AI-powered fintech applications

Parcha

Overview	Automate and scale compliance and operations
Location	San Francisco, CA
Founded	2020
Investors	Initialized Capital, KindredVentures, Liquid 2 Ventures
Funding	Seed & PreSeed $5Mn (August 2023)

JustPaid.

Overview	AI-powered smart bill pay and invoicing
Location	Mountain View, CA
Founded	2022
Investors	Y Combinator, Rebel Fund, Decacorn Capital
Funding	Seed $4Mn (June 2023)

TAX GPT

Overview	Payment and process integration solution
Location	San Francisco, CA
Founded	2023
Investors	LAUNCH, Flight Ventures
Funding	Pre-Seed $2Mn (October 2023)

Fintech fighting against frauds powered by generative AI

CERTIFID

Overview	SaaS security platform validating identity bank account information
Location	Austin, TX
Founded	2017
Investors	Arthur Ventures WakestreamVentures
Funding	Series B $20Mn (September 2023)

DEDUCE

Overview	Deduce detects SuperSyntheticidentities in real time
Location	Philadelphia, PA
Founded	2019
Investors	Freestyle Capital, Foundry Group, True Ventures
Funding	Series B$9Mn (September 2023)

chargeflow

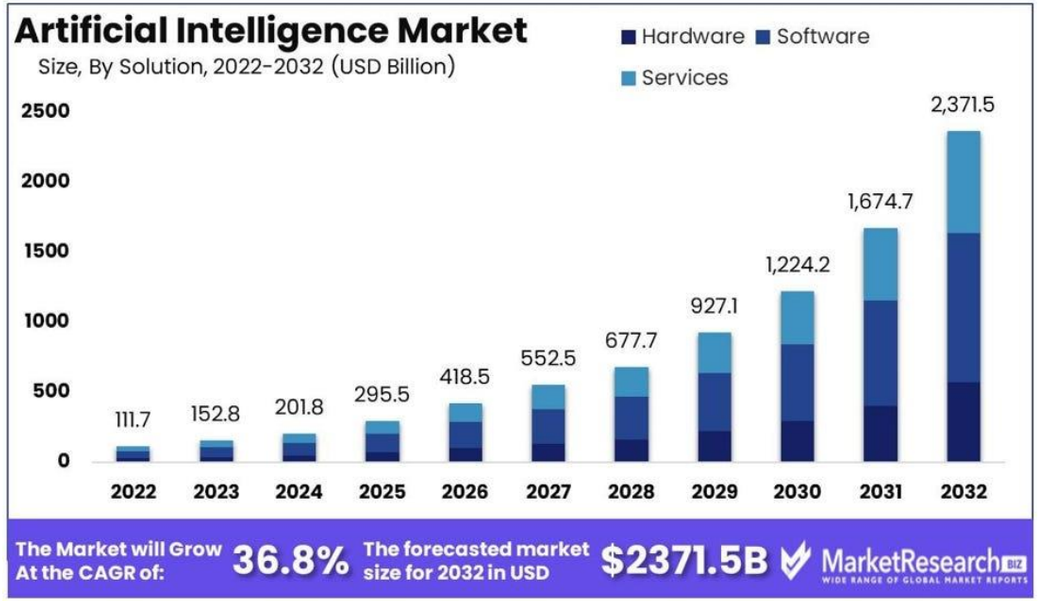
Overview	Chargeback automation solution for eCommerce Merchants
Location	Modi'in, Israel
Founded	2021
Investors	OpenView
Funding	Seed $11M (August 2023)

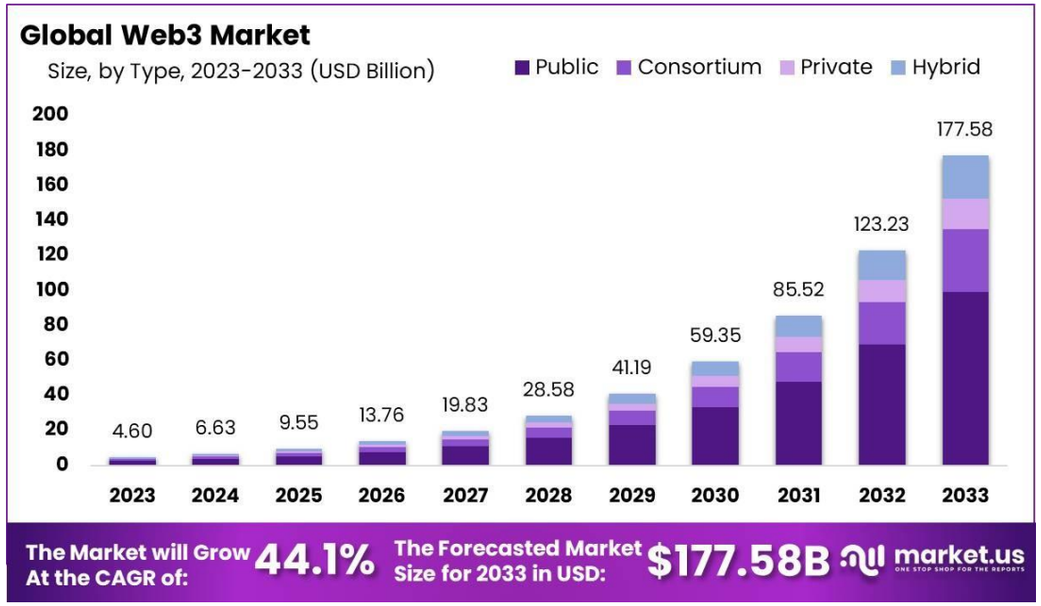
Global Economic Impact

A Dynamic Duo Transforming User Experiences

- **AI** will contribute a staggering **$2371.5 billion** to the **global economy** by **2032**, leading to a **36.8%** increase in **global GDP**.

- Some of the **existing companies** are leveraging **Web3** and **AI** to improve functionalities such as **development support**, **trading efficiencies**, and **privacy-focused browsing**.





Source: Forbes Digital Assets

Privacy and Security

Web3, as the **next generation of the Internet** built on top of **blockchain**, offers **decentralization**, **openness**, and **transparency**. When AI is combined with Web3, it can gain many advantages over **traditional AI**.

Decentralized Authentication

- **Web3** enables decentralized **authentication**, giving users **control** over their **identity** and **data sharing**.
- **AI enhances** these systems, ensuring **access** is restricted to **authorized** users, thereby protecting **privacy**.

Encryption and Privacy-Preserving Technologies

- AI employs advanced **cryptographic** and **privacy-preserving** techniques in **Web3**.
- Techniques include homomorphic **encryption** and **zero-knowledge** proofs, safeguarding data during **transmission** and **storage**.

Data Sharing and Data Marketplaces Model

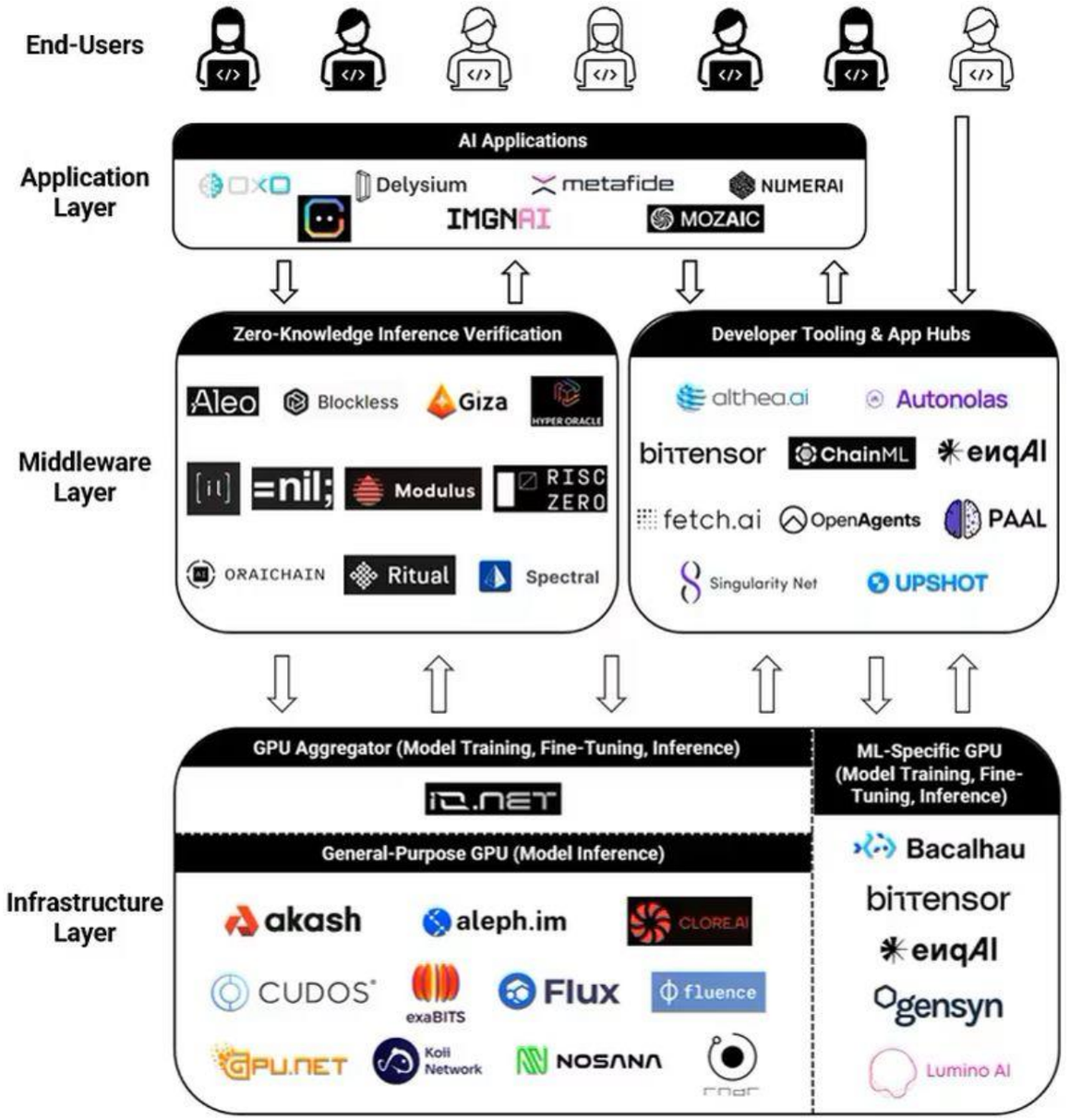
- AI leverages blockchain's decentralized **data marketplaces** to **establish trust** and **transaction** protocols.
- Utilizes **smart contracts** and **decentralized** authentication for secure and **trustworthy** data sharing, facilitating data exchange.

Technical Stack

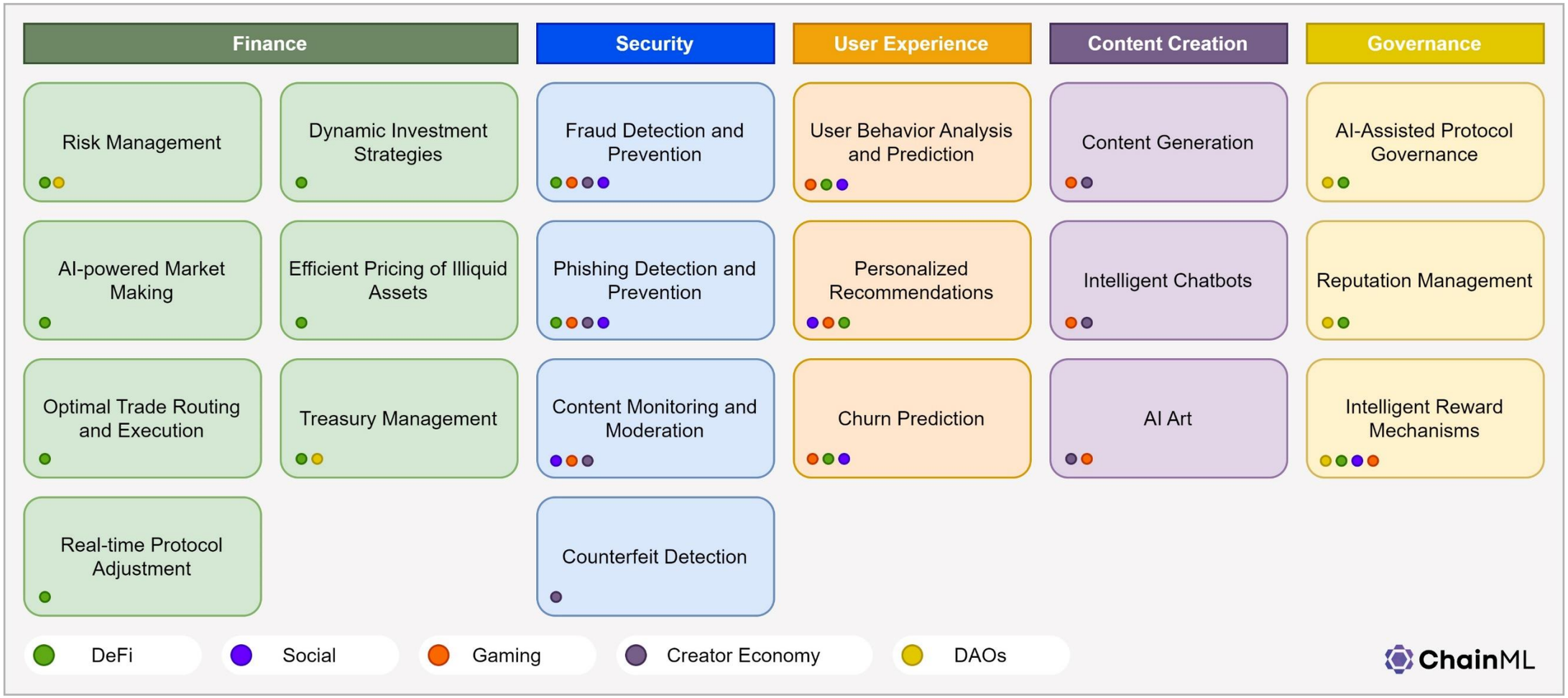
- At the top of the stack, the **application layer** leverages Web3's **permissionless AI processing power** (enabled by the two bottom layers) to complete specific tasks for a variety of use-cases.

- The **middleware layer** connects the **computing resource** to **on-chain smart contracts** in a trusted-manner (i.e., for Web3 applications).

- The **infrastructure layer** features **generative AI** (powered by **LLMs**) that runs on high-performance GPUs. This layer is divided into **general-purpose GPU**, **ML-specific GPU**, and **GPU aggregators**, which are characterized by their different workload capabilities and use-cases.



Application Development Sectors



Source: [Web3 Needs AI to Realize Its Potential]

Real Use Cases of Web3+AI

Growing Interest from Web2 to Web3+AI Projects

	Crypto Projects	Category	Partnership	
Singularity Net	SingularityNET (AGIX)	AI Marketplace	▪ Cisco	September 2019
fetch.ai	Fetch.ai (FET)	AI Marketplace	▪ Bosch via Fetch Foundation	February 2023
ocean	Ocean Protocol (OCEAN)	Data share market	▪ Mercedes-Benz	July 2020
Filecoin	Filecoin (FIL)	AI infrastructure	▪ Seagate, EY and AMD via Decentralized Storage Alliance	October 2022
iExec	iExec (RLC)	AI infrastructure	▪ NVIDIA Inception & IBM	October 2020
akash	Akash (AKT)	GPU compute	▪ Equinix Metal	March 2021
	Render Network (RNDR)	GPU compute	▪ Potential partnership with Apple via parent company OTOY	June 2023
PHOENIX	Phoenix (PHB)	AI infrastructure	▪ WeChat, Tencent, JD.com	2021-2023
WORLDCOIN	WorldCoin (WLD)	AI infrastructure	▪ OpenAI CEO (Sam Altman) ▪ Multiple integrations[1]	2023
	Alethea (ALI)	Generative AI	▪ AWS	October 2023
IMGNAI	IMGNAI	AI generated images	▪ NVIDIA Inception	October 2023

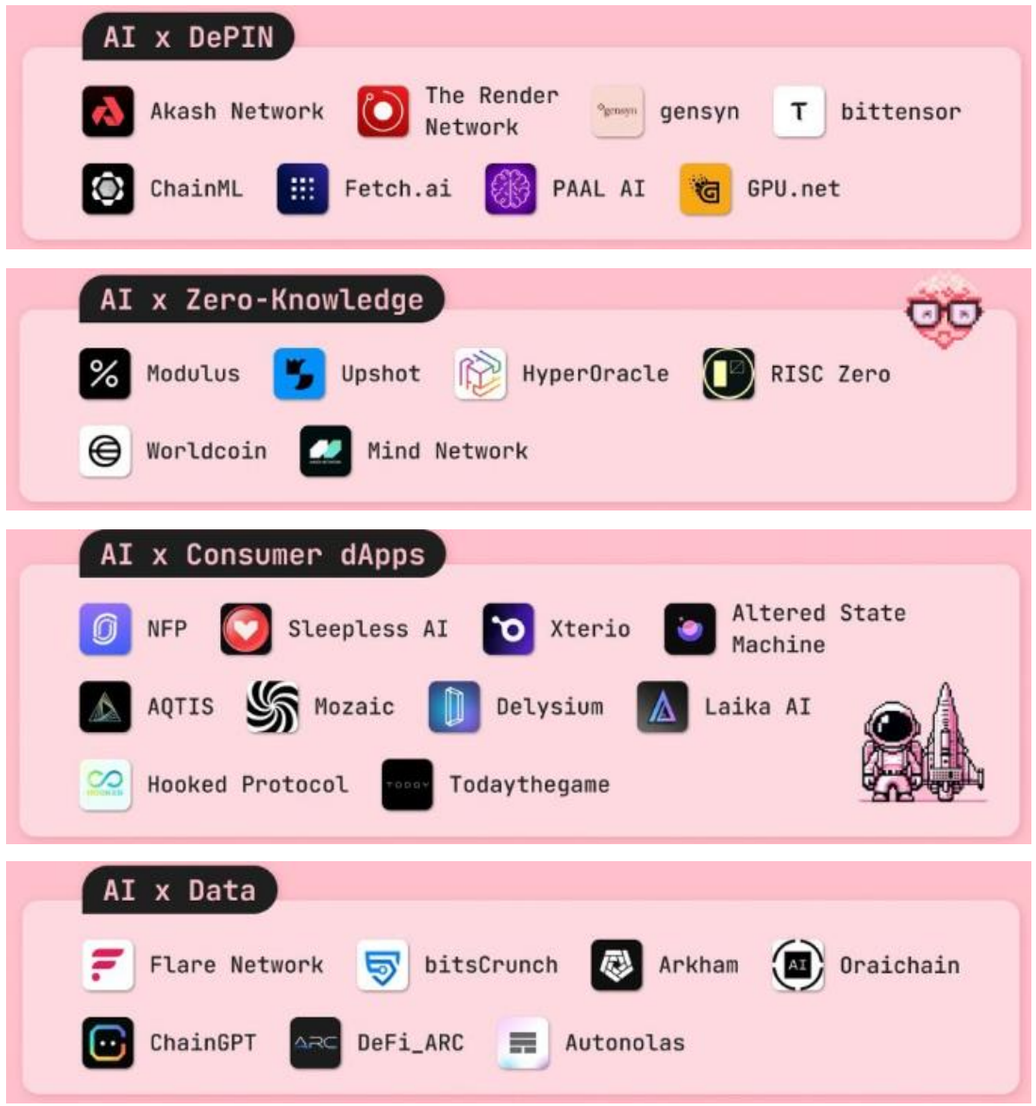
Industrial Landscape

- There are at least **140 Web3 + AI** projects in the industry, with **85** having already **issued tokens** and some planning to issue tokens next year.

- These projects include infrastructure, data, prediction markets, computing and computational power, education, DeFi and cross-chain, security, **NFT /gaming/metaverse**, search engines, social and creator economy, **AI chatbots**, **governance**, **healthcare**, and trading bots.

Source: [A Panoramic Review of the Web3 + AI Track]

Existing Projects



AI x DePIN: Decentralized Personal Identification Network

AI x Zero-Knowledge: Proof of Zero-Knowledge

AI x Consumer dApps: Decentralized Applications for Consumers

AI x Data: Data collection and Analysis

Decentralized Computing Resource Markets

Overview

Decentralized computing resource market utilizes **blockchain** to trade computing assets, including **GPU resources** and **datasets**. It enables direct transactions between providers with **idle resources** and users requiring substantial **computing power**.

- **Examples:** iExec, AIOZ Network, and Aethir.
- **Transparency and trust:** Blockchain's transparency ensures tamper-proof records of computing resource transactions to bolster trust in the market.
- **Efficient Matching:** Smart contracts automate allocation and billing to simplify traditional cloud market processes for efficient resource matching.
- **Incentive mechanism:** Cryptocurrency incentives draw resources to a cost-effective, resilient infrastructure, ideal for compute-intensive AI tasks like model training and inference.
- **Data Security and Privacy:** Blockchain secures data transmission and projects like Aethir to optimize GPU resources for specialized, decentralized AI graphics processing.

Metaverse Protocols

Overview

Metaverse and gaming protocols engage in a personalized worlds where users can create **assets**, enjoy AI-generated contents, and **interact** with AI-driven **characters**.

- **Examples:** Delysium, rct AI, Virtual Protocol.
- **Dynamic Content Generation: AI (e.g., DL, RL)** creates diverse, **real-time** game **content** and storylines to enhance **player engagement**.
- **Player Autonomy:** Web3 enables players to own game assets (e.g., **NFTs**) and influence game rules, enhanced by AI's personalized recommendations for a **player-centric experience**.
- **Economic Innovation:** Decentralized AI characters promote an expanded Web3 game economy to offer players' **economic benefits** and encourage **participation** and **creativity**.
- **Cross-Platform Interoperability:** AI and Web3 infrastructure support seamless asset and identity migration across **meta-universes** to enhance players' flexibility.

Data Sharing and Privacy Protection

Overview

Web3+AI utilize blockchain to support **data sharing**, **querying**, **analysis**, and **trading** with a focus on privacy protection . **Data** acts as the core engine to drive development of the **digital economy** and **society**.

- **Examples:** Space and Time, AxonDAO.
- **Trustworthy Data Exchange:** Blockchain ensures secure and transparent data transactions in Web3, while AI enhances efficient data analysis.
- **Data Sovereignty and Privacy: DePIN (Decentralized Personal Identification)** empowers users to control their **health data**, while blockchain and AI desensitizes, encrypts, and anonymizes information to ensuring privacy.
- **Real-time Analysis and Prediction:** AI and blockchain enable rapid, low-latency data querying and analysis across chains, as seen in applications like **AxonDAO** for predictive **health status analysis** and **healthcare** management.
- **Data Monetization:** Tokenization allows **user-contributed data** to be monetized within compliance frameworks to enable data sharing and supporting sectors like **medical research** and **drug development**.

Personalized Service and Interaction

Overview

User experience is enhanced with personalized services like customized **voice chatbots** to provide efficient, accurate access to AI-driven solutions for information retrieval and problem-solving.

- **Examples:** MyShell and Openfabric AI.
- **User-centric:** Web3 enhances **user ownership** of **digital assets** (e.g., **Shell NFTs**) to enable personalized AI assistants tailored to individual styles and needs.

- **Convenient Access:** Platforms such as **Openfabric AI** simplify **AI adoption** to offer single-click access to AI services without requiring specialized knowledge.
- **Social and Emotional Interaction:** AI-powered voice chatbots on platforms like MyShell facilitate open dialogue to provide **emotional support** and companionship.
- **Economic Incentives:** Web3's cryptocurrency model rewards users for contributions to AI products, such as **personalized robot** designs to create a self-sustaining ecosystem that fosters growth in AI development.

Future Integration and Potentials

Unlocking Potential Value

Increased Productivity

- AI boosts **efficiency** and **reduces** transaction **costs** in Web3 environments.
- **Automates** complex **tasks**, such as smart contract execution to **minimize** legal **disputes** and delays.

Enhanced Data Sovereignty

- Web3 and AI empower **users** with better **control** over **their data**.
- Users decide data access and usage to **enhance privacy** and support **ethical data** innovation.

Reinventing Trust Mechanism

- Blockchain ensures **immutability** and **transparency**; AI adds intelligent **analysis**.
- Enhance **trust** in financial services, **identity verification**, and copyright protection to **reduce fraud** and **increase fairness**.

Socio-Economic Impact

1

Industrial Transformation

- AI and Web3 drive digital transformation across **finance**, **healthcare**, **education**, and **entertainment**.
- Examples: AI-assisted NFT creation and evaluation for art and **Intellectual Property** management, and AI-enhanced **supply chain** management.

2

Innovates Employment Structure

- New technologies create roles like **AI governance** experts, **blockchain developers**, and **decentralized data analysts**.
- **Automation reduces** some **traditional** roles, but overall, it **promotes** a shift to **higher-skilled**, **higher-value** positions.

3

A New Business Model

- Platforms like MyShell introduce **new profit models** by merging AI applications with Web3 economic mechanisms.
- This model fosters innovation, ensures **equitable distribution**, and provides direct **economic incentives** to creators, innovative projects and **community engagement**.

Summary

Ecological Impact of Web3 and AI Integration

Cross-border Collaboration-driven Integrated Web3 and AI

Cross-border Collaboration

Requires **collaboration** among **blockchain**, **AI**, and **computer science experts** to drive technological innovation and application.

Standards Development

Stakeholders must develop unified technical **standards** to enhance **interoperability** of Web3 and AI applications.

Innovation Incubation

Research collaborations between **Universities** and **Industries** are crucial for incubating **innovations** in Web3 and AI, supporting rapid technology implementation.

Ecological Construction

Building a Web3 and AI ecosystem with technology **providers**, **developers**, and **users** promotes technological synergies and application development.

Research Collaboration in Greater Bay Area

Hong Kong

- Established **Financial Center**
- Strong Regulatory Environment
- Potential for
  - Regulatory Sandbox for Web3/AI Innovation
  - Hub for CBDC Adoption

Shenzhen

- Technological **Innovation Hub**
- Flexible Regulatory Approach
- Potential for
  - Fostering Development of DeFi applications
  - Experimentation with Web3 Data Ownership Models

Challenges of Web3 and AI Integration

1 Security Concerns

As technology convergence continues, new **security threats** emerge, such as **malicious algorithm** attacks, distributed **ledger vulnerabilities**, and private **data leakage**. These threats require constant attention and effective **mitigation** solution.

2 Non-unified Standards

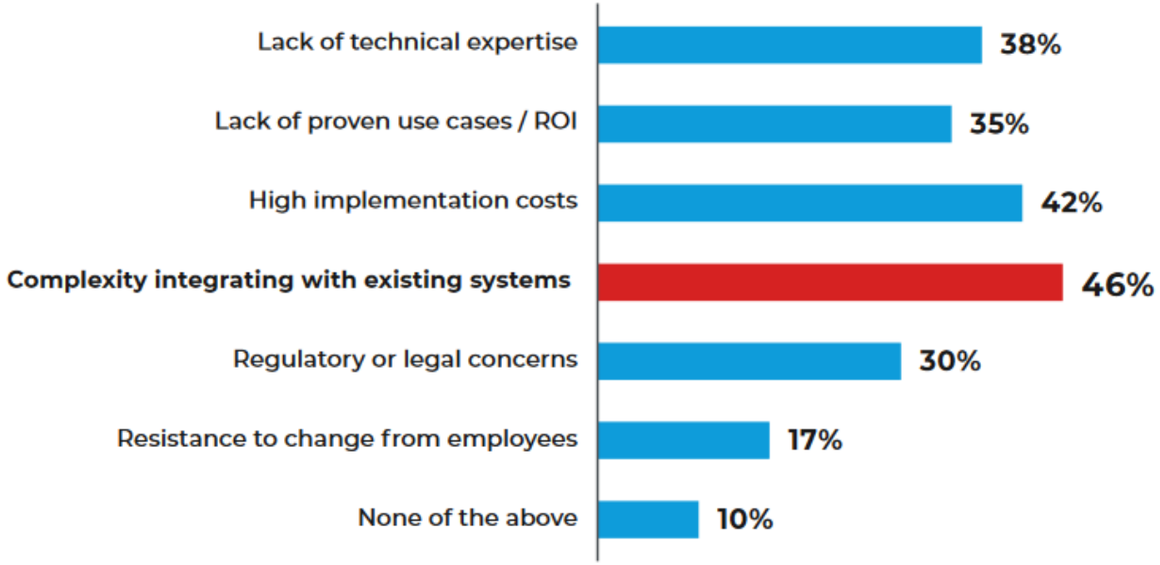
Currently, Web3 and AI technology **standards** are not **unified**, which may hinder **cross-system** and **cross-industry interoperability**. The development of harmonized technical standards and **specifications** is key.

3 Governance Model

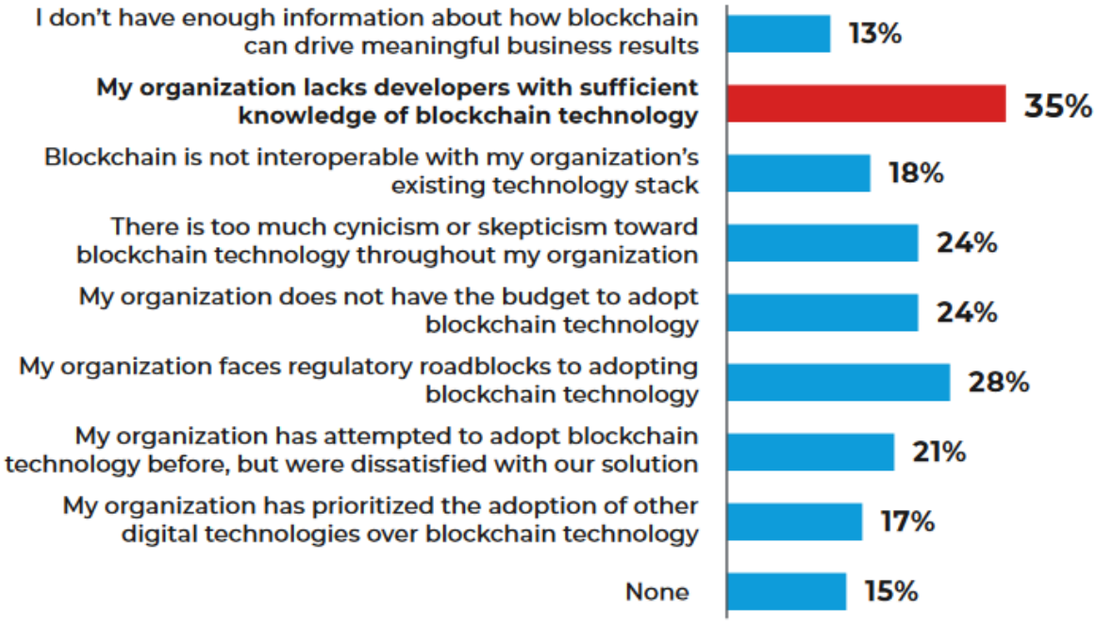
The **decentralized** nature of **Web3** and the **complexity** of **AI** bring new challenges to regulation and governance. A better **governance system** is needed to strike a **balance** between **innovation** and **regulation**.

Adaptation Challenges in Organization

What challenges do you anticipate in integrating AI and blockchain technology within your organization?



Which of the following best describes an obstacle to blockchain adoption that your organization faces?



Source: Web3 and Artificial Intelligence: The State of Play

Overview of Our Research @ SIAT

Key Research Areas

We are also working in the following Key Areas

- Security Issues of DeFi and Web3
- Scalability Issues of Blockchain
- AI-enabled DNA Storage

Collaboration with Technological Frontiers

- Huawei
- JD

Security Issues of DeFi and Web3: MEV

Maximal/Miner Extractable Value (MEV)

- **MEV** refers to the **maximum value** a **block producer** (e.g., miner or validator) can **capture** by including, excluding, or **reordering transactions** within a **block**.
- **AI-based** MEV **mitigation** strategies are crucial for building a robust and secure Web3, AI, and Fintech ecosystem that prioritizes **user experience** and **fair market dynamics**.
- **Total profit** generated from **MEV** transactions on Ethereum in 2022 was around **$117 million**, with $75 million from **arbitrage**, $26 million from **sandwich attacks**, and $16 million from **liquidations**.

Source: MEV Outlook 2023

Scalability Issues of Blockchain: ZK-Rollup

"A Rollup is a blockchain **scalability** solution that **processes transactions outside** the **main chain** to improve efficiency. ZK-Rollup uses **zero-knowledge (ZK)** proofs to **validate transactions**, ensuring **security** and **privacy**."

➢ Scalability Challenges

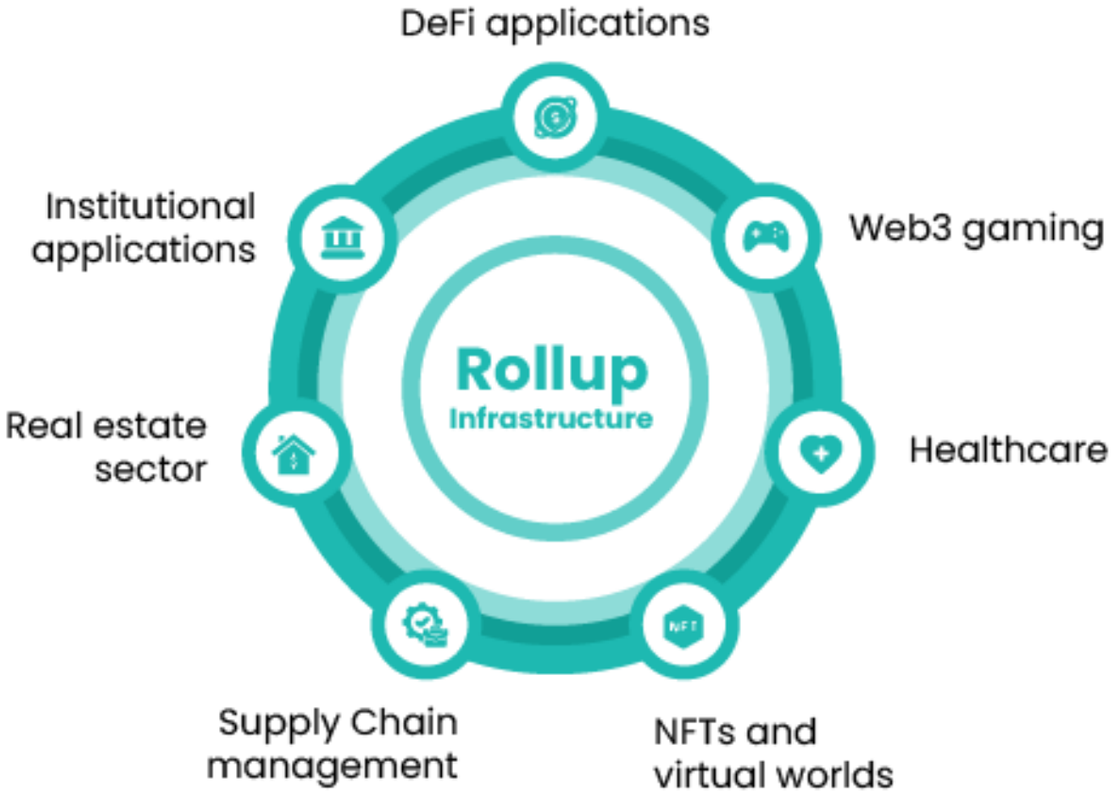
- ❑ As blockchain networks **grow**, **transaction speed** and **cost** become **bottlenecks**.
- ❑ **High demand** leads to **network congestion**, increasing **transaction fees** and **delayed confirmations**.

➢ Importance

- ❑ Rollups process **transactions off-chain** to enhance blockchain **scalability** and **reduce fees**.
- ❑ ZK-Rollups now account for over **90%** of the **L2 market share**, alongside **Optimistic Rollups**, demonstrating their dominance as the **preferred scaling** solution for **Ethereum**

➢ Implications for Web3 and AI

- ❑ **Scalability** in blockchain is essential for **AI-driven** applications requiring extensive **data exchange**.
- ❑ Rollups can support the **high transaction volumes** generated by **decentralized AI services**.



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2. H. Chen, H. Duan, M. Abdallah, Y. Zhu, Y. Wen, A. E. Saddik, and W. Cai, “Web3 Metaverse: State-of-the-Art and Vision,” ACM Trans. Multimedia Comput. Commun. Appl., vol. 20, no. 4, p. 101:1-101:42, Dec. 2023, doi: 10.1145/3630258.
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Thank You

Any Questions?