

Navigating Crypto: Industry Map

December 2023

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About Binance Research



About the Industry Map

The Industry Map provides an overview of the crypto ecosystem. In this report, we break down different verticals into subcategories and lay out a few projects in each of them. Additional details in terms of project descriptions and relevant metrics can be found in the following slides.

This map is compiled based on publicly available data, research, and qualitative analysis. It is not intended to be an exhaustive list of projects in the industry. Certain verticals, subcategories, or projects may or may not have been included, as we aim to share a variety of key leaders as well as emerging players. The projects showcased are mapped according to their primary use cases.

The mention of specific projects does not constitute an endorsement or recommendation by Binance.

I. Infrastructure



Infrastructure

Vertical Spotlights

We identified 5 key areas of innovation.



Scalability and Fairness

As L1s see increasing adoption, more projects aim to make blockchains more scalable by batching transactions off-chain and more fair by implementing efficient distribution of Maximal Extractable Value.



Data Usability and Tooling

Data generated on blockchain networks is far from being fully usable by developers. Data querying and indexing services are key innovation areas to improve the current developer experience.



Security and Privacy

The rising demand for network security and privacy has resulted in the emergence of projects aiming to prevent malicious data tracking, smart contract hacks, etc.



Cloud Networks

We see more projects focusing on providing users with access to web-based services that may entail storage, computing, and content delivery through decentralized infrastructure.



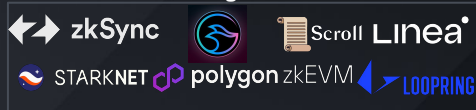
Connectivity

Layer-1 blockchains are far from being fully connected and interoperable. Numerous cross-chain solutions are being developed to improve the current on-chain user experience.

Infrastructure Vertical Overview

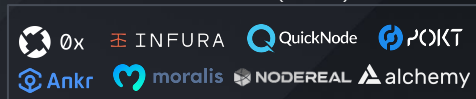
Scalability and Fairness

Zero-Knowledge ("ZK") Solution



Data Usability and Tooling

Remote Procedure Call ("RPC") Provider



Optimistic Rollup Solution



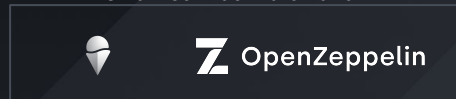
Maximal Extractable Value ("MEV") Solution



Data Indexing



Smart Contract Automation

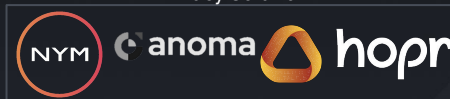


Security and Privacy

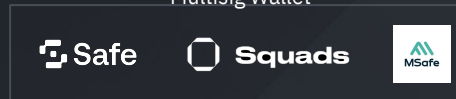
Security Solution



Privacy Solution



Multisig Wallet



Cloud Networks

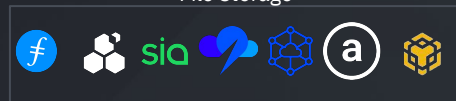
Cloud Computing



Content Delivery Network ("CDN")

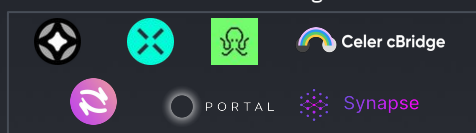


File Storage



Connectivity

Cross-Chain Bridge



Oracle



Wireless Networks










Infrastructure

Subcategory Description






Zero-Knowledge (“ZK”) Solution:

ZK rollups or Validium protocols execute bundled transactions off-chain and verify it on-chain using zero-knowledge proofs.

 zkSync	zkSync Era is a ZK rollup solution addressing Ethereum scalability issues with minimized security compromises.
	Manta Network is a modular ZK rollup network built on top of Celestia DA and Polygon zkEVM.
 STARKNET	StarkNet is a decentralised, permissionless ZK rollup developed by Starkware.
 LOOPRING	Loopring is a ZK rollup solution primarily for trading and payment.
 polygon zkEVM	Polygon zkEVM is an Ethereum L2 scaling solution that uses ZK proofs to offer validity and quick transaction finality.
 Linea	Linea is a zkEVM rollup developed by Consensys, which is also the developer of Metamask.
 Scroll	Scroll is a native zkEVM solution for Ethereum.

Optimistic Rollup Solution:

Protocols that assume the validity of transactions and then combine them to execute off-chain.







	OP Mainnet is a low-cost L2 optimistic rollup network.
 ARBITRUM	Arbitrum is the largest optimistic rollup network on Ethereum based on total value locked.
	Boba Network is an L2 scaling solution and a hybrid compute platform.
	Metis is a permissionless optimistic L2 rollup developed by MetisDAO Foundation.
	Base is an L2 network launched by Coinbase and built using OP Stack.

Infrastructure

Subcategory Description (cont.)

Maximal Extractable Value (“MEV”) Solution:

Solutions that prevent validators from unfairly profiting by including, excluding, or reordering transactions in a block.


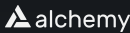






	Flashbots works on mitigating the negative externalities of current MEV techniques and avoiding the risks that MEV causes to state-rich blockchains.
	Jito Labs builds high-performance systems to scale Solana and maximize validator rewards.
	Eden Network is an optional, non-consensus-breaking, transaction ordering protocol for Ethereum blocks.
	Manifold is a block builder for users and validators on the Ethereum blockchain, aiding in the creation of MEV for all stakeholders.
	Skip Protocol is a MEV infrastructure for blockchains and protocols, currently serving Juno, Evmos, Injective, Neutron, dYdX, and Berachain..
	Shutter aims to prevent front-running and malicious MEV by using threshold encryption.

Infrastructure

Subcategory Description (cont.)



Remote Procedure Call (“RPC”) Provider:

RPC is the most direct interface through which developers can communicate with the blockchain system.

	0x is a protocol that enables the creation of decentralized exchange on Ethereum.
	Alchemy is a platform that enables developers to interact with the blockchain, mainly through API calls.
	Infura provides Ethereum API, IPFS API and Gateway, and ETH nodes-as-a-service.
	Moralis provides a suite of APIs for developers to seamlessly integrate blockchain into their dApps.
	QuickNode is a platform for developers to scale blockchain applications.
	Ankr enables developers to build upon a distributed network of nodes.
	Pocket Network provides RPC access to Ethereum, Polygon, etc.
	NodeReal is a one-stop blockchain infrastructure and services provider.





Smart Contract Automation:

Platforms that enable users to automatically execute smart contracts.

	Gelato Network enables users to automate smart contract functions on Ethereum.
	OpenZeppelin Relay sends transactions via HTTP API, automating smart contract operations securely.

Data Indexing:

Platforms that provide network data indexing and querying services.



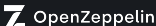




	The Graph is an indexing protocol for querying networks like Ethereum.
	Covalent is a unified API that brings data from different chains and other searchable endpoints.
	OxScope is a protocol that aims to standardize Web2 and Web3 data by building a knowledge graph.
	SubQuery offers data indexing on Polkadot, Cosmos, Avalanche, Algorand, NEAR, Ethereum, and more.

Infrastructure

Subcategory Description (cont.)




Security Solution:

Protocols that contribute to the security of blockchains.

	SharkTeam is a leading Web3 security service provider that offers smart contract audits, chain analytics, and emergency response services.
	Forta is a real-time detection network for security and operational monitoring of blockchain activities.
	OpenZeppelin provides security products to build and operate dApps.
	ImmuneFi is a leading bug bounty platform.
	QuantStamp provides security for hire, protecting over \$200B in digital asset risk from hackers.
	Harpie is the first on-chain firewall that protects users from scams, hacks, and theft.
	Revoke.Cash is a security management platform managing token approvals, protecting users against scams across 60+ networks.


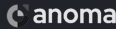


Multisig Wallet:

Cryptocurrency wallets that require two or more private keys to sign and send a transaction.

	Safe is a platform to manage digital assets on Ethereum.
	MSafe developed the first multisig, non-custodial asset management solution for the Move ecosystem.
	Squads is a multisig management protocol for Web3-native teams.

Privacy Solution:

Projects that contribute to the protection of user privacy.






	Nym is a decentralized and tokenized infrastructure that provides privacy from the network to the application layer.
	Anoma is an intent-centric, privacy-preserving protocol for decentralized counterparty discovery, solving, and multi-chain atomic settlement.
	Automata provides a blockchain-based authentication solution that secures access to accounts and protects users with an active defense.
	Hopr is a data-centric privacy tool that prevents bots from accessing the metadata of wallets when users run transactions against a blockchain.

Infrastructure

Subcategory Description (cont.)

Content Delivery Network (“CDN”):

CDNs are decentralized, distributed networks that provide fast delivery of internet content.






	Meson Network is a bandwidth marketplace using blockchain to replace traditional sales models.
	Media Network is a privacy-first and community-governed CDN.
	Theta Network is a blockchain infrastructure for video and media.
	Livepeer Network is a protocol for developers who want to add live or on-demand video to their project.
	Fleek is an open-source edge computing platform providing dynamic or static content acceleration.

Infrastructure

Subcategory Description (cont.)








Computing:

Projects that provide users with access to computing services based on a decentralized infrastructure.

 4EVERLAND	4EVERLAND is a cloud computing platform that integrates storage, computing, and network core capabilities.
 Flux	Flux is a scalable, decentralized cloud infrastructure.
	Latitude helps developers deploy dedicated servers globally through the bare metal cloud platform.
	Akash is a decentralized computing marketplace built for public utility.
	Render Network provides decentralized GPU-based rendering solutions.

Storage:

Projects that provide users with access to storage services based on a decentralized infrastructure.








 Filecoin	Filecoin is an open-source cloud storage marketplace, protocol, and incentive layer.
	Ethereum Swarm is a decentralized storage and communication system.
	Sia is a decentralized cloud storage marketplace that allows direct transactions without third parties.
	Storj offers low-cost cloud storage with zero-trust security.
	Arweave offers permanent and decentralized storage in an open ledger.
	BNB Greenfield is a blockchain and storage platform that is EVM-compatible.
	Zus is a 3-layer security multi-cloud storage with no vendor lock-in and free egress.

Infrastructure

Subcategory Description (cont.)

Cross-Chain Bridge:

Protocols that bridge tokens from one blockchain to another.








Project	Total Value Locked	Supported Blockchains
	US\$331.7M	Polygon, Ethereum, BNB Chain, 10 other chains
 PORTAL	US\$980.64M	Ethereum, Solana, BNB Chain, 21 other chains
 Synapse	US\$109.67M	Ethereum, BNB Chain, Polygon, 15 other chains
 Celer cBridge	US\$97.39M	Ethereum, Arbitrum, BNB Chain, 26 other chains
	US\$60.39M	Ethereum, Polygon, Arbitrum, 4 other chains
	US\$104.57M	Ethereum, Base, Arbitrum, 3 other chains
	US\$4.1M	Ethereum, BNB, Polygon, 19 other chains

Infrastructure

Subcategory Description




Oracle:

Protocols that connect off-chain with on-chain data.

 Chainlink	Chainlink decentralized oracle networks provide tamper-proof inputs, outputs, and computations to support smart contracts.
	UMA's Optimistic Oracle allows contracts to request and receive data.
 API3	API3 is a first-party oracle network.
 nest	Nest Oracle is an open, free of charge, decentralized oracle that uses non-cooperative game mechanism.
	RedStone Oracle is a modular oracle delivering cost effective data for DeFi.
 PYTH	Pyth delivers real-time, high-fidelity, high-frequency market data for DeFi applications.
	Supra Oracles is a cross-chain oracle network that runs on Distributed Oracle Agreement.

Decentralized Wireless Networks:

Protocols that leverage blockchain technology to offer seamless internet connection.

	Helium is a decentralized global network of Hotspots that provides accessible, wireless coverage for Internet of Things devices.
	Pollen is a decentralized, privacy-focused mobile network.
	Karrier One is a provider of a decentralized mobile network on a telecom-compliant blockchain built using Polygon Supernet.

II. Decentralized Finance ("DeFi")

DeFi

Vertical Spotlights

We identified 4 key areas of innovation.



Issuance

We see the emergence of a more diverse suite of financial products in the DeFi space, such as synthetic assets, options, and structured products.



Liquidity

Liquidity staking and collateralized debt positions (“CDPs”) are becoming more prominent, exposing users to a variety of on-chain liquidity opportunities.



Trading

More diverse financial products are being traded on decentralized exchanges (“DEXs”).



Risk Management

There are more projects focusing on providing users with monetary protection and other security measures against hacks, scams, and technical loopholes.

DeFi

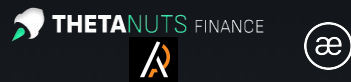
Vertical Overview

Issuance

Synthetic Assets

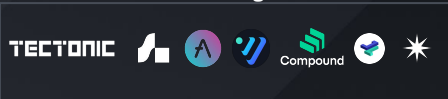


Structured Products



Liquidity

Lending



ETH Liquid Staking Providers

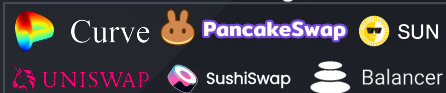


Collateralized Debt Position ("CDP")



Trading

Decentralized Exchange ("DEX")



Prediction Market



Derivatives



Risk Management

Insurance



Security Analytics



Other

Stream Pay






Launchpad



DeFi

Subcategory Description




Synthetics: Protocols that incorporate cryptocurrencies and traditional derivative assets, essentially tokenized derivatives.

Project	Total Value Locked	Description
SYNTHETIX	US\$797.88M	Synthetix is the largest derivatives liquidity protocol, allowing users to trade a wide array of derivatives in DeFi.
 ALCHEMIX	US\$60.11M	Alchemix is a DeFi protocol that allows the creation of synthetic tokens that represent the future yield of the deposit.
 m	US\$15.34M	Metronome allows users to post multi-collateral assets from their portfolio and create a multitude of synthetic assets.
 youves	US\$32.75M	Youves is a decentralized DeFi platform that facilitates the creation and management of synthetic assets.

DeFi

Subcategory Description (cont.)








Structured Products: Yield optimizers, yield tranching, automated LP managers, etc.

Project	Total Value Locked	Description
	US\$3.29M	AlgoRai Finance is a decentralized structured product protocol on the Algorand ecosystem.
	US\$33.37M	Aevo provides a suite of DeFi products for users to trade options and perps on-chain.
 THETANUTS FINANCE	US\$10.58M	Thetanuts Finance offers automated strategies through structured products for users to earn and optimize their yields.

DeFi

Subcategory Description (cont.)








Lending: Protocols that allow users to lend and borrow assets.

Project	Total Value Locked	Description
	US\$6.543B	Aave is the largest lending protocol in terms of TVL that allows users to earn interest, borrow assets, and build applications.
	US\$6.542B	JustLend is a decentralized lending protocol that allows users to supply, borrow, and earn.
 Compound	US\$2.371B	Compound is an algorithmic, autonomous interest rate protocol built for developers to unlock open financial applications.
	US\$826.84M	Venus is a DeFi algorithmic money market protocol on BNB Chain. It is also the largest lending platform on BNB Chain.
	US\$1214.14M	Tectonic, a fork from Compound, is a Cronos-based money market platform for earning passive yield and accessing instant backed loans.
	US\$310.98M	Radiant is an omnichain money market protocol allowing users to deposit and borrow assets cross-chain.
	US\$386.12M	Margin.fi is a decentralized lending protocol on Solana with variable interest rates.

DeFi

Subcategory Description (cont.)






ETH Liquid Staking Providers: Protocols that allow users to unlock liquidity through LSDs while keeping networks secure.

Project	Total Value Locked	Description
	US\$20.827B	Lido is a decentralized liquid staking platform for proof-of-stake cryptocurrencies (e.g., ETH, SOL, MATIC).
	US\$474.36M	Coinbase allows users to deposit ETH to get cbETH through their wallet.
	\$2.736B	Rocketpool is a decentralized staking protocol that allows users to deposit ETH in exchange for rETH.
	US\$1.77B	Binance provides users who staked ETH with LSD, WBETH, which is reward-bearing in nature.
	US\$240.01M	Swell is a liquid staking protocol that is currently having its Voyage incentive campaign to onboard users.
	US\$234.53M	Stakewise is a liquid staking protocol that allows anyone to stake ETH to node operators or be their own operator.
	US\$225.9M	Stakestone is a staking protocol for omnichain LST (\$STONE) liquidity on Layer 2s.

DeFi

Subcategory Description (cont.)







Collateralized Debt Position (“CDP”): Protocols that use collaterals to mint stablecoins.

Project	Total Value Locked	Description
 MAKER	US\$5.894B	MakerDAO enables the generation of the stablecoin DAI, which is the largest decentralized stablecoin.
	US\$732.5M	Liquity enables the generation of the stablecoin LUSD against ETH as a collateral.
	US\$184.98M	CrvUSD is a CDP stablecoin that is minted after users deposit collateral such as stETH on Curve.
	US\$328.42M	Lybra Finance is a decentralized finance protocol that allows users to mint its overcollateralized, interest-bearing stablecoin, eUSD.
 prisma	US\$416.35M	Prisma Finance is a decentralized, Ethereum-LST backed stablecoin protocol.

DeFi

Subcategory Description (cont.)




Spot Decentralized Exchange (“DEX”): A peer-to-peer marketplace for trading various assets in a non-custodial manner.

Project	Total Value Locked	Description
 UNISWAP	US\$4.081B	Uniswap is a leading decentralized exchange that allows users to swap, earn, and build on its platform.
 Curve	US\$1.658B	Curve is a multi-chain automated market maker-based decentralized exchange that allows users to trade at the lowest slippage.
 PancakeSwap	US\$1.506B	PancakeSwap is the leading decentralized exchange on BNB Chain.
 Balancer	US\$928.02M	Balancer is an automated portfolio manager and trading platform on Ethereum.
 SUN	US\$389.47M	SUN is a platform for stablecoin swap, stake-mining, and self-governance on TRON.
 SushiSwap	US\$334.84M	SushiSwap is a platform for users to swap, earn, stack yields, lend, borrow, and leverage.

DeFi

Subcategory Description (cont.)





Prediction Market: Protocols that enable users to wager, bet, and buy in future outcomes.

Project	Total Value Locked	Description
 Polymarket	US\$9.36M	Polymarket allows users to build portfolios based on their forecasts and earn a return if they get it right.
 azuro	US\$7.22M	Azuro is an infrastructure and liquidity layer for on-chain betting.
	US\$3.72M	Winr is a fully autonomous liquidity and incentive infrastructure for on-chain games.



DeFi

Subcategory Description (cont.)

Derivatives: Protocols that enable users to trade perpetual futures contracts with leverage

Project	Total Value Locked	Description
 GMX	US\$623.8M	GMX is a decentralized spot and perpetual exchange providing low swap fees, zero price impact trades, and leverage positions.
 dYdX	US\$359.67M	dYdX is a open trading platform that allows margin trades, borrowing and lending.
 Drift	US\$135.3M	Drift is an onchain spot and perpetual trading platform on Solana.
 Kiloex	US\$3.79M	Kiloex is a perpetual DEX on BNB chain/opBNB/Manta Network.




Stream Pay: Payment modules that allow continuous settlement via token streaming.

 Sablier	US\$3.75M	Sablier is a token streaming protocol used by DAOs and businesses for token vesting, payroll, airdrops, and more.
 Superfluid	US\$1.36M	Superfluid handles token payment streaming for subscriptions, salaries, and others for extreme capital efficiency.


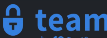

DeFi

Subcategory Description (cont.)

Insurance: Protocols that aim to provide users with insurance coverage to hedge risks..

Project	Total Value Locked	Description
 Nexus Mutual	US\$216.97M	Nexus Mutual is the largest decentralized insurance protocol that covers against smart contract failures.
	US\$8.43M	Helmet Insure is a crypto-assets insurance trading platform on Polygon and BNB Chain, protecting cryptocurrency traders.
	US\$2.58M	InsurAce is a leading multi-chain DeFi insurance protocol that is the first to issue cross-chain portfolio-based covers.





Launchpad: Composable modules for token issuance, liquidity, etc.

 PinkSale	US\$211.56M	PinkSale allows users to launch tokens and create their initial token sale.
 team <small>by TrustSwap</small>	US\$120.05M	Team Finance is a toolkit that helps founders create tokens to raise funds from investors.
 DxSale	US\$45.45M	DxSale is an initial DEX offering (“IDO”) launchpad.

DeFi

Subcategory Description

Security and Stress Testing: Modules that stress test or offer other security measures to protocols.

Project	Description
 CERTIK	Certik is a security-focused audit and ranking platform.
 Chainalysis	Chainalysis provides blockchain analysis for government agencies, projects, and financial institutions.
	Zokyo builds, secures, and funds crypto and DeFi projects.
 GAUNTLET	Gauntlet is a financial modeling platform that optimizes capital efficiency, ensures the systemic health of protocols, and mitigates platform risks.

III. Non-Fungible Token (“NFT”)



NFT

Vertical Spotlights

We identified 3 key areas of innovation.



Marketplace

We see the emergence of NFT marketplaces targeting a variety of use cases, such as chain-specific listings, aggregators, and thematic curations. Users gain access to a wider range of buyer experiences.



Financialization

There are more diverse NFT-based financial products and services, such as staking, lending, derivatives, fractionalization, etc. Users are exposed to liquidity opportunities for their previously illiquid NFT assets.



Services

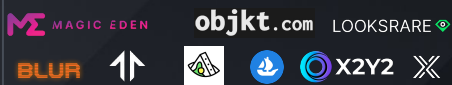
An increasing number of projects are helping users improve their experiences purchasing NFTs and managing portfolios. Other projects provide services to help creators launch, secure, and store their NFTs more seamlessly.

NFT

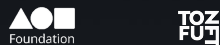
Vertical Overview

Marketplace

Open Marketplace



Curated Marketplace



Aggregator



Financialization

Lending



Fractionalization



Buy Now, Pay Later



Derivatives



Options



Rental



Services

Portfolio Analytics and Appraisal



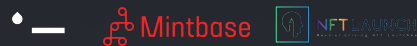
Membership and Content Gating



Storage



Launchpad











Safety



NFT

Subcategory Description




Open Marketplace: Platforms that allow for any NFTs from any brands to be sold.

Project	Traders (30D)	Volume (30D)	Description
 BLUR	51.92K	US\$679.07M	Blur is a NFT marketplace designed for pro traders offering 0% marketplace fees.
	116.90K	US\$163.99M	OpenSea is a digital marketplace for crypto collectibles and non-fungible tokens.
LOOKSRARE 	1.16K	US\$2.04M	LooksRare is a decentralized NFT marketplace offering community rewards for participating.
 X2Y2	2.21K	US\$23.79M	X2Y2 is an NFT marketplace on Ethereum with 100% revenue shared with token stakers.
	24.76K	US\$24.54M	Immutable X is a NFT marketplace built on the Immutable X blockchain.
 MAGIC EDEN	182.02K	US\$154.19M	Magic Eden is a NFT marketplace on Solana with 0% listing fees.
objkt.com	10.71K	US\$516.35K	Objkt is the largest NFT marketplace on Tezos.
	N/A	US\$9.21M	Talis is a NFT marketplace for the Injective ecosystem.
	193.6K	US\$302.92M	Tensor is a NFT marketplace on Solana.



NFT

Subcategory Description (cont.)

Aggregator: Platforms that allow users to easily trade NFT collections from different marketplaces in one central destination.

Project	Traders (30D)	Volume (30D)	Description
 BLUR	56.65K	US\$189.37M	Blur is a NFT marketplace aggregator for pro traders offering 0% marketplace fees.
	21.75K	US\$22.24M	Opensea Pro, formerly known as Gem, is a low-fee NFT marketplace aggregator. Gem was acquired by OpenSea.
 element	658	US\$150.85K	Element is a community-driven, aggregated marketplace for NFTs across 15 chains.







Curated Marketplace: Selective platforms that focus on a certain type of NFT, aesthetic, or set of values.

 Foundation	1.69K	US\$1.18M	Foundation is a curated, decentralized NFT marketplace.
 tofu	9.6K	\$949.12K	tofuNFT is a NFT marketplace focused on GameFi.

NFT

Subcategory Description (cont.)

Lending: Protocols that allow users to collateralize NFTs for loans.



Project	Total Value Locked	Description
 BendDAO WEB3 DATA LIQUIDITY	US\$48.94M	BendDAO is a decentralized peer-to-pool-based NFT liquidity protocol.
 BLUR	US\$50.23M	Blend enables NFT owners to borrow ETH against their assets with a buy now, pay later feature for NFT purchases.
 nftfi	US\$15.26M	NFTfi is a peer-to-peer lending protocol.
 frakt	US\$1.41M	Based on Solana, FRAKT allows users to buy, sell, earn yield, and get instant liquidity out of NFTs.
 JPEG'd	US\$28.4M	JPEG'd is a decentralized lending protocol on the Ethereum network that enables holders to borrow using NFTs as collateral.
 MetaStreet	US\$12.2M	MetaStreet is a liquidity scaling protocol for NFT credit markets.

NFT

Subcategory Description (cont.)



Fractionalization:

Protocols that allow users to create and trade fractionalized NFTs.

	NFTFY offers tools for NFT fractionalization and a marketplace of fractionalized NFTs.
	Fracton is an NFT fractionalization protocol for top and high potential NFT projects.




Options:

Protocols that allow NFT holders to earn yields on their NFTs and engage in options trading.

	Hook is an NFT-native options protocol.
	Wasabi Protocol is an Ethereum-based, decentralized, NFT option trading protocol.




Derivatives:

Protocols that allow users to trade NFT derivatives.

	Tribe3 is a DEX for social and gamified NFT futures.
	Nftperp is a perpetual futures DEX for NFTs.
	NFEX is an NFT derivatives exchange that allows trading NFTs with leverage.

Buy Now, Pay Later (“BNPL”):

Protocols that allow users to buy NFTs and pay for them later.




	Teller is an oracle-less lending protocol that has a buy now, pay later system with as little as a 25% down payment.
	Cyan offers buy now, pay later for NFT purchases with a 25% down payment.
	Pine is a decentralized NFT-backed borrowing and lending protocol with a buy now, pay later system.

NFT

Subcategory Description (cont.)

Rental:

Protocols that allow users to rent NFTs.






	Double Protocol is an NFT rental protocol.
	reNFT is a multi-chain NFT rental protocol that enables uncollateralized renting, lending, and reward sharing.
	Taker Protocol is a platform that allows users to rent NFTs based on their risk profiles.

NFT

Subcategory Description (cont.)




Portfolio Analytics and Appraisal:

Tools that analyze or appraise NFTs.

 NFTBank	NFT Bank is a NFT portfolio management service.
 UPSHOT	Upshot builds a scalable NFT pricing infrastructure.
 nftvaluations	NFT Valuations is a provider of AI-powered valuations and market insights.
 NFTGO	NFTGo is an all-in-one NFT analytics and trading platform.
 NETSCAN	NETScan is a professional NFT explorer and NFT data infrastructure.




Membership and Content Gating:

Tools that gate access to membership or content using NFTs.

 AUDIUS	Audius is a music streaming and sharing platform that puts power back into the hands of content creators.
 Moongate	Moongate is a no-code toolkit to create and adopt NFT-gated memberships for brands and events.
 Collab.land	Collab.land is an NFT token gating bot for Telegram and Discord with over 8M verified wallets.

Storage:

Solutions for storing NFT data.




 NFT STORAGE	Nft.storage is a long-term storage service designed for off-chain NFT data powered by IPFS and Filecoin.
 Pinata	Pinata is an IPFS solution for creators and developers.
 filebase	Filebase is a storage platform that allows on-ramp to IPFS and decentralized file storage networks.

NFT

Subcategory Description




Launchpad:

Platforms for projects to launch their own NFTs.

	NFT Launch is a launchpad for upcoming NFT projects.
	Mintbase enables users to build their own minters, markets, and NFT redeeming systems.
	DropSpace is a full-service minting platform that provides the technology to help founders launch their NFTs.

Safety:

Modules that offer security measures to protocols.

	Doppel is an IP protection platform for NFTs.
	Optic monitors blockchains to reveal the origins of NFTs and how they have been reimagined, remixed, or copied.
	Yakoa is an NFT fraud detection network.

IV. Gaming



Gaming

Vertical Spotlights

We identified 4 key areas of innovation.



Games

The question remains: what is the best way to most seamlessly implement crypto-based in-game economies without impacting gamer incentives in an unsustainable way?



Game Development

We see the emergence of projects in the form of game studios, initial game offerings (“IGOs”) launchpads, and developer kits that aim to help creators smoothly develop and launch their games with crypto-based in-game economies.



Player Experience

There are more diverse products and services that aim to improve the player experience by lowering the barriers to exploring and onboarding in crypto-based games.



Analytics

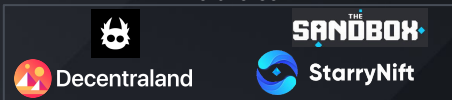
Developments in analytics tools continue to remain pivotal for game developers to make informed decisions.

Gaming

Vertical Overview

Games

Metaverse

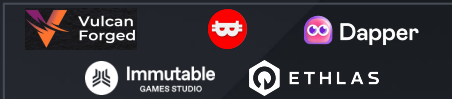


Play-to-Earn



Game Development

Game Studio



Toolkit



Launchpad



Player Experience

Gaming Guild

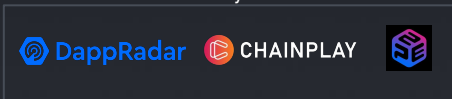


Game NFT Marketplace



Analytics

Analytics







Gaming

Subcategory Description

Metaverse:

Virtual worlds where users can engage in a variety of immersive virtual experiences.









Project	Market Cap	Description
 THE SANDBOX	US\$1.343B	The Sandbox is currently the largest metaverse project where players can build, own, and monetize their gaming experiences on the Ethereum blockchain.
 Decentraland	US\$1.084B	Decentraland is a 3D virtual world where users can create and monetize content.
 StarryNift	N/A	StarryNift is an immersive VR-supported metaverse.
	US\$642.72M	Otherside is a metaverse platform co-developed by Yuga Labs and Improbable, allowing voyagers (Otherdeed NFT holders) to develop and shape their in-game experiences.

Gaming

Subcategory Description (cont.)

Play-to-Earn:

Games where users can monetize their gaming experiences in the form of cryptocurrencies.






Project	Market Cap	Description
	US\$1.31B	Players of Axie Infinity collect and mint NFTs that represent digital pets and engage in the crypto-based in-game economy.
	US\$900.51M	Players can earn GALA and limited-edition NFTs by playing games on the Gala platform.
	US\$395.55M	Illuvium is a blockchain-based AAA game that includes open-world exploration games, autobattlers, etc.
	US\$257.20M	Parallel is a sci-fi trading card game developed by Parallel Studios.
	US\$193.56M	BigTime is a free-to-play, multiplayer action RPG game that combines fast-action combat and adventure through space and time.
	US\$107.93M	My Neighbor Alice is a multiplayer builder game where players can buy virtual islands, collect and build items, and meet new friends.
	US\$105.00M	Gods Unchained is a trading card game built on the Immutable X blockchain.
	US\$74.38M	Players can earn Trilium, which gives them power in the Planet DAOs.

Gaming

Subcategory Description (cont.)





Game Studio:

Studios that specialize in developing crypto-based games. The games listed are not meant to be exhaustive.

 Dapper	NBA Top Shot, NFL All Day, UFC Strike, CryptoKitties, etc.
 Immutable GAMES STUDIO	Gods Unchained (Strategy Cards), Guild of Guardians (Action RPG).
 Vulcan Forged	Vulcan Verse (MMORPG), Tartarus (Action Survival), etc.
 ETHLAS	Battle Showdown, Ethlas, My Pizza Story etc.
	Night Warrior, Naka Strike, Cycle Stunts, etc.

Launchpad:

Platforms that provide services to creators to launch games with crypto-based in-game economies.





	Combo Network provides a launchpad that aims to bridge more creators into crypto via GameFi incubation, investment, distribution, IGO, etc.
 Seedify	Seedify is a launchpad and incubator for crypto games.
	Web3Games is an integrated blockchain gaming ecosystem offering a suite of solutions for users and developers.
 ENJINSTARTER	Enjinstarter is a leading launchpad focused on GameFi/Metaverse/NFT/Music and Gamified utility projects.

Gaming

Subcategory Description (cont.)

Toolkit:

Tools for incorporating crypto-based economies into games.






 FORTÉ	Forte is a game platform that enables game companies to create blockchain games and scale in-game economies.
 ENJIN	Enjin offers a suite of products that make NFTs easy for individuals, businesses, and developers.
 ULTRA	Ultra is a platform that brings games, digital assets, tournaments, and live streams to one place through a single login.
 BREEDERDAO	BreederDAO is a specialist manufacturer of high-quality digital assets used in blockchain-based games and virtual worlds.

Gaming

Subcategory Description (cont.)





Game NFT Marketplace:

Platforms for gamers to trade in-game items in the form of NFTs.

	AirNFTs is a cross chain, gaming NFT marketplace on BNB Chain, Fantom, Polygon and Ethereum.
	dMarket enables secure buying, selling, and trading of in-game NFTs.
	Atomic Hub is a NFT marketplace on Wax, Immutable and EOS networks.
	Immutable Marketplace is a leading NFT marketplace on Immutable X for NFT and blockchain gaming.
	TokenTrove is a premier NFT marketplace on Immutable X.

Gaming Guild:

Gamer communities that collectively monetize the play-to-earn model and lower its entry barrier.




	YGG is a play-to-earn gaming guild. Within YGG DAO, members are able to rent NFTs to play popular games.
	Merit Circle is a guild that also allows players to rent NFTs to engage in these games.
	Avocado DAO community focuses on investing in NFT assets within games and emergent metaverses, NFT platforms, and P2E games.
	Good Games Guild is a leading gaming hub for blockchain-based games.

Gaming

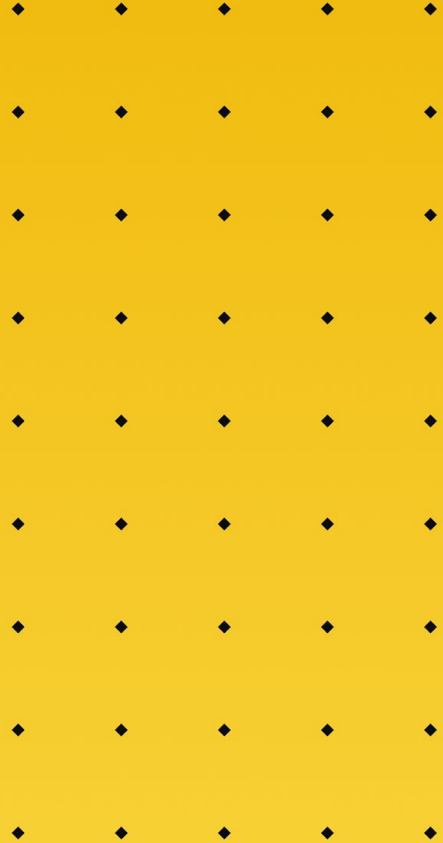
Subcategory Description

Gaming Analytics:

Platforms that provide data insights on the Web3 gaming landscape.

 DappRadar	DappRadar is an analytics platform that offers the latest data on various Dapps.
 CHAINPLAY	Chainplay.GG is a one-stop hub for all things blockchain gaming.
	P2E Analytics is an NFT gaming research hub that provides on-chain and off-chain data on Web3 games.

V. Decentralized Physical Infrastructure Network ("DePIN")



DePIN

Vertical Spotlights

We identified 4 key areas of rapid innovation within the infrastructure sector.



Compute Networks

The rising demand for artificial intelligence / machine learning has spurred growth for projects in this sector.



Decentralized Wireless Networks

Decentralized wireless networks are gaining traction due to their competitive fees and real-world use case which could see more adoption moving forward.



Storage Networks

We see more projects focusing on providing users with access to cheap, decentralized data storage.



Sensor Networks

Sensor networks that are leveraging blockchain technology are also gaining popularity specifically in the areas of smart city, mapping and environmental.

DePIN

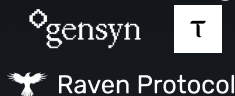
Vertical Overview

Compute Networks

Artificial Intelligence



Machine Learning



Wireless Networks

WiFi



5G



LoRaWan



Storage Networks

File Storage

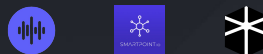


Sensor

Environmental



Smart City



Mapping











DePIN

Subcategory Description

Artificial Intelligence:

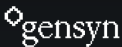


Platforms involved in AI-related tasks such as image generation, path finding, and more.

	Akash Network is a decentralized cloud computing network that allows users to delegate spare GPU resources for purposes such as artificial intelligence.
	Render Network is a decentralized cloud computing platform that allows anyone to share spare GPU resources and is typically used in rendering graphics.
	iExec is a decentralized marketplace for computing power, datasets and applications.
	Aleph.im provides users with computing resources and storage solutions. Liberta, a decentralized AI assistant that runs on top of aleph.im promises to deliver enhanced security and privacy
	Golem network is peer-to-peer marketplace for distributed computing resources.
	Ocean is an open-source protocol that allows individuals and businesses to exchange and monetize data and data-based services.
	Fetch.ai is a platform that allows users to easily build, deploy and monetize AI-related services. DeltaV by Fetch.ai, is a AI-powered e-commerce platform.
	SingularityNET is the leading decentralized marketplace for AI algorithms.

Subcategory Description (cont.)

Machine Learning:

A subset in artificial intelligence that focuses on training computer systems to make inferences based on data and algorithms.



	Gensyn network is a machine learning compute protocol that unites underutilised devices such as consumer GPUs, custom ASICs and SoC devices capable of training neural networks.
	Bittensor is a decentralized machine learning platform reshaping AI development through collaborative and shared intelligence.
 Raven Protocol	Raven Protocol is a decentralized compute platform for artificial intelligence and machine learning, built on the BNB chain.

DePIN

Subcategory Description (cont.)





WiFi:

Protocols that provide access to wireless internet connections.

	WiFi Map is an all-in-one app that provides features such as WiFi finder, eSIM and VPN services.
MetaBlox	Metablox is a decentralized WiFi network providing enterprise-grade WiFi roaming to the public worldwide.
	WiCrypt provides a marketplace for users to earn from unused data capacity.

5G:

5G is the fifth-generation technology standard for mobile cellular networks.



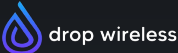
	Powered by the Solana blockchain, Helium network is a decentralized wireless infrastructure. It has partnered with T Mobile for its crypto carrier, Helium Mobile.
	Pollen is a community-owned, privacy focused mobile network, providing connections in areas where internet is needed.
	Karrier One is a decentralized wireless network that enables carrier-grade connectivity through its upcoming Karrier One Mobile.
	XNET is a full-featured mobile network that offers carrier-grade secure access to phone number, voice, SMS messaging and more.

DePIN

Subcategory Description

LoRaWAN:

Low Power, Wide Area networking protocol designed to wirelessly connect battery operated things to the internet in national, regional or global networks.








	Powered by the Solana blockchain, Helium network is a decentralized wireless infrastructure. It has partnered with T Mobile for its crypto carrier, Helium Mobile.
	Chirp is creating a unified wireless network for IoT and broadband through the use of blockchain technology. Their flagship product, Blackbird, has a range of long range precision that is able to connect to IoT devices indoors and outdoors.
	LoRaWAN wireless connectivity allows real-time monitoring capabilities of parking capacity when used in conjunction with Drop's smart parking platform that brings new opportunities in the sharing economy.

DePIN

Subcategory Description




File Storage:

Projects that provide users with access to storage services based on a decentralized infrastructure.

 Filecoin	Filecoin is an open-source cloud storage marketplace, protocol, and incentive layer.
	Ethereum Swarm is a decentralized storage and communication system.
	Sia is a decentralized cloud storage marketplace that allows direct transactions without third parties.
	Storj offers low-cost cloud storage with zero-trust security.
	Arweave offers permanent and decentralized storage in an open ledger.
	Zus is a 3-layer security multi-cloud storage with no vendor lock-in and free egress.
	BNB Greenfield is a blockchain and storage platform that is EVM-compatible.

Environment:

Projects that receive inputs from the physical environment and communicate this information to others.




	WeatherXM is a community-powered weather network that rewards weather station owners and provides accurate weather services to Web3 enterprises.
	PlanetWatch uses blockchain and cost effective sensor to deploy hyperlocal air-quality monitoring networks to help fight air pollution.
	Tempest provides personal and professional weather solutions using crowdsourced and AI-driven modelling, delivering accurate weather information.

DePIN

Subcategory Description




Smart City:

Projects that harness technology in IoT to make daily activities more efficient and effective.

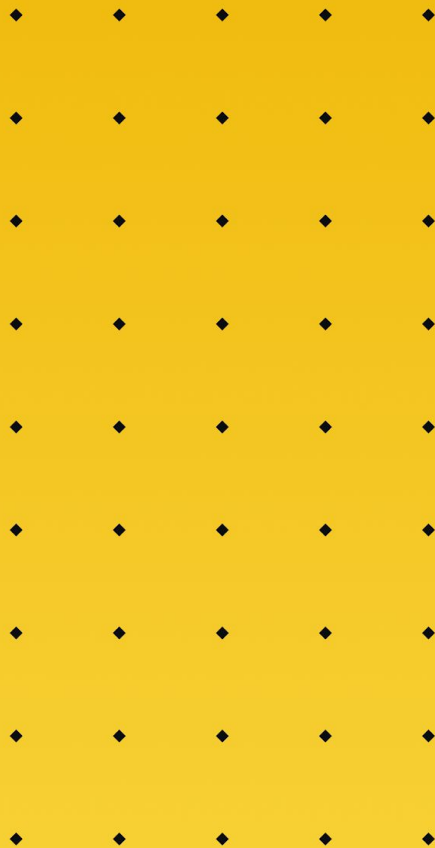
	Silencio is a community-powered network that rewards users for providing hyperlocal noise pollution data.
	SmartPoint offers an array of smart technologies all seamlessly connected and secured through discreet edge computing servers.
	Spexigon is a fly-to-earn platform that allows drone pilots to earn rewards for collecting aerial imagery.

Mapping:

Decentralized networks that provide accurate geographical information.

	Hivemapper is a decentralized global mapping network that rewards contributor through its Drive-to-Earn model.
	Natix provides an AI-powered dynamic map through its Drive-to-Earn model.
	MapMetrics is a Drive-to-Earn navigation app utilizing web3 technology.

VI. Bitcoin Ordinals



Bitcoin Ordinals

Vertical Spotlights

We identified 3 key areas of innovation.



NFTs

Protocols and companies that support BRC-20 token standard for NFT uses



DeFi

Protocols that support BRC-20 token standard for DeFi uses

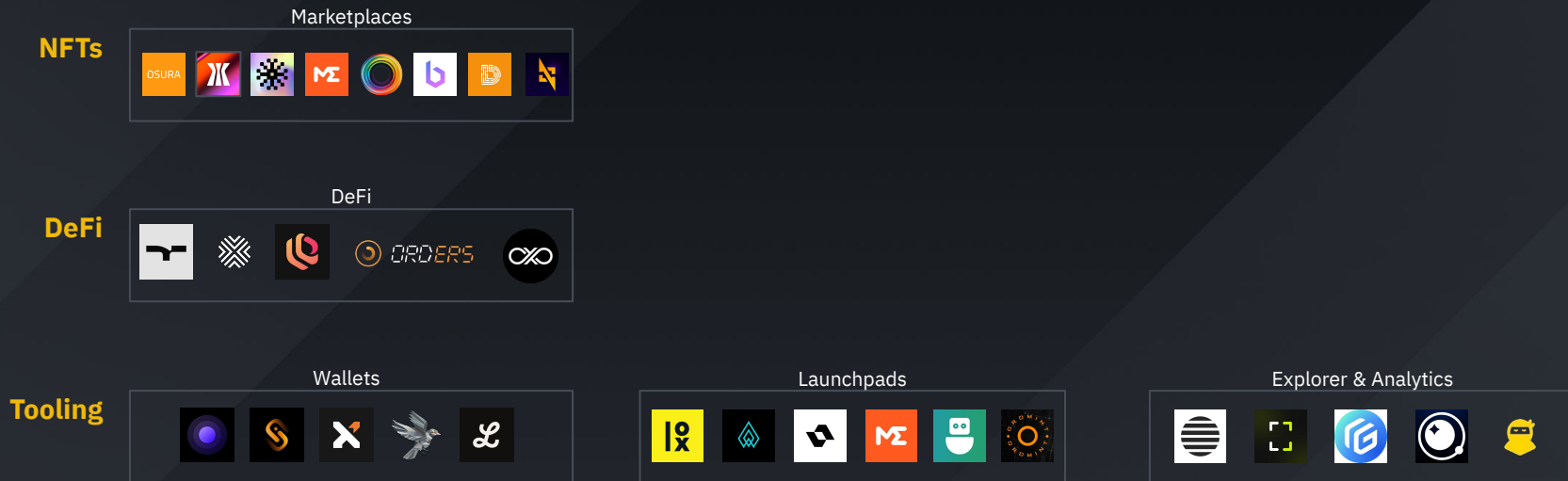


Tooling

Applications that help protocols to deploy, mint and manage BRC-20 tokens

Bitcoin Ordinals

Vertical Overview











Bitcoin Ordinals

Subcategory Description

Marketplaces:

Platforms that facilitate trading of Ordinal Inscriptions.




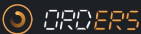

	Gamma is a bitcoin creator launchpad and NFT marketplace
	Ordinals Market allows bulk purchase, bidding and listing of Ordinals
	Magic Eden is an NFT marketplace that supports BTC, ETH, SOL and POL NFTs.
	Platform for trading Ordinals and BRC-20
	OpenOrdex is an open-sourced, trustless, zero-fees BTC NFT marketplace
	Bioniq marketplace offers no network fees and secure BTC/Ordinals wrapping
	Osura is a marketplace for high-end digital artifacts
	iDclub is a specialized marketplace for Ordinals

Bitcoin Ordinals

Subcategory Description (cont.)

DeFi:

Protocols that enable financial functions using Ordinals.






	Tap Protocol is a Bitcoin Ordinals-based development platform packed with functions such as fractionalization and token functions for games.
	Alex is a DeFi protocol that facilitates functions such as bridging, swapping and liquidity provision.
	Liquidium is a DeFi lending protocol that facilitates borrow and lending against Ordinals, while earning interest in Bitcoin
	Orders.Exchange is a DEX for BRC-20 tokens, allowing users to trade, list and inscribe BRC-20.
	Stackswap is a decentralized DEX on the Bitcoin network.

Bitcoin Ordinals

Subcategory Description (cont.)

Wallets:

The key to accessing Ordinals and the broader Bitcoin ecosystem.







	Ordinals Wallet is a wallet provider and also the creator of the first Ordinal marketplace. Available on mobile and desktop version
	Unisat is an open-sourced chrome wallet extension for Bitcoin Ordinals and BRC-20s.
	Xverse is a Bitcoin wallet with integrations with lightning network coming soon to offer instant transactions.
	Sparrow Bitcoin wallet emphasizes on security, privacy and usability. It offers a range of features such as support for single sig or multisig wallets on common script types.
	Leather wallet is a bitcoin wallet that provides secure management of collectibles and tokens, bridging services between Bitcoin and Stack, as well as having Ledger hardware support. Future developments include integration with Lightning network.

Bitcoin Ordinals

Subcategory Description

Launchpads:

Platforms that provide services to help communities and projects launch into the Bitcoin/Ordinal ecosystem.






	Luminex is a launchpad for projects looking to enter the Bitcoin ecosystem. Currently, it has more than 600 projects applications on its platform.
	Ordbit is a launchpad that allows creators to easily launch Ordinals, BRC-20, BRC-721. It also supports recursive inscription and airdrops.
	Ordmint is a community-driven Ordinals launchpad.
	Magic Eden's launchpad comes with a suite of tools for community engagement, as well as payment flexibility that foster a seamless user experience.
	OrdinalsBot provides anyone the ease of inscribing ordinals onto Bitcoin.
	Ordkit is a launchpad and minting platform for Ordinals.

Bitcoin Ordinals

Subcategory Description

Explorer & Analytics:

Tools that provide insights into the blockchain and promote data analytics.

	Ordiscan, is an explorer for ordinals on Bitcoin
	OrdinalHub is an analytics platform that comes with an Ordinal explorer, Sat scanner and marketplace aggregator.
	Geniidata is a data analytics platform that offers indexing services for NFT collections, BRC-20 and ORC-20 tokens, and provides alpha signals for its community.
	OrdSPACE is an explorer for ORC-20 tokens. ORC-20 tokens are an extension of BRC-20, with more functionalities added to them.
	Ninjalerts is an NFT alert and Ordinals portfolio tracking tool.

VII. Zero-Knowledge (“ZK”)



ZK Ecosystem

Vertical Spotlights

We identified 3 key areas of innovation.



Infrastructure

Projects that incorporate / provide zero knowledge technology for other applications to build on.



Consumer Stack

Projects with a focus on privacy operating within consumer identity, analytics and social networking space.



Financial Services

Projects that facilitate DeFi transactions

ZK Ecosystem

Vertical Overview

Infrastructure

Blockchains



Bridges



Developer Tools



Consumer

Identity & Security



Social



Financial Services

DeFi












ZK Ecosystem

Subcategory Description

Blockchains:

Permissioned or permissionless blockchains using zk technology.




 zkSync	zkSync Era is a zk-rollup on Ethereum.
 Linea	Linea is a zkEVM rollup developed by Consensys, which is also the developer of Metamask.
 STARKNET	Starknet, developed by Starkware, is a permissionless, decentralized zk-rollup on Ethereum.
 LOOPRING	Loopring is a ZK rollup solution primarily for trading and payment.
 polygon zkEVM	Polygon zkEVM is an Ethereum L2 scaling solution that uses zero-knowledge proofs to offer validity and quick transaction finality.
 Scroll	Scroll is a native zkEVM solution for Ethereum.
 Aztec	Aztec network is hybrid zk rollup that combines both private and public execution.
 Polybase	Polybase is a public blockchain with private transactions and MEV-resistance powered by zk-proofs.
	Manta Network is a modular zero knowledge L2 network built on top of Celestia DA and Polygon zkEVM.

ZK Ecosystem

Subcategory Description (cont.)

Bridges:

Projects that use zero-knowledge technology to facilitate transfer cross-chains.







	Orbiter Finance is a zk-tech based, decentralized cross-rollup bridge.
	Polyhedra Network's zkBridge provides trustless and efficient cross chain infrastructure for L1s and L2s interoperability.
	Electron Labs zkBridge facilitates cross chain transfers between Ethereum and Near Protocol using zk proofs.

ZK Ecosystem

Subcategory Description (cont.)

Developer Tools:

Tools that provide developers the ability to integrate zk technologies into their projects.






	Bonsai, built by Risc Zero, is a proving engine that allows developers to seamlessly integrate zk proofs into their applications, blockchains, and appchains without compromising on security.
	Light Protocol is a zk layer for the Solana network.
	Succinct's platform 1 click deployment workflow and reliable infrastructure allow developers to develop applications with ZKP properties.
	Cairo is a Turing-complete programming language that uses ZK-STARKS and recursive proving to boost efficiency.
	Horizon Labs is a web3 development company that specializes in privacy enhancing cryptographic technology, zero knowledge proofs and applications to real-world needs.
	ZeroSync provides Bitcoin developers with a toolkit that enables them to apply zk proofs to their products.

ZK Ecosystem

Subcategory Description (cont.)




Identity and Security :

Identity backed by zero knowledge proofs.

	Nocturne is a protocol enabling private account on Ethereum.
 holonym	Holonym is a privacy preserving protocol using zkSNARKs to enable use cases such as private KYC-analogs.
	Worldcoin Network consists of a privacy-preserving identity built on Proof of Personhood.
	ZK Pass is a private data protocol using 3P-TLS and affordable hybrid zk, incubated by Binance Labs.
 zkMe	zkMe builds identity oracles that verifies identity while preserving privacy using zk proofs and Multi-Party Computations (MPC), and ensuring compliance.

Social:

Protocols that use zk-proofs for social interactions.








	Galxe, a social tasking platform, has used Manta zk stack to develop its zkGalxe Passport used for privacy-preserving digital identification.
	Unirep social by Unirep Protocol, allows users to interact with each other anonymously using a zero knowledge reputation system.
	Snickerdoodle is building a web3 consumer data management platform that replaces 1st and 3rd parties cookies with zk proofs.

ZK Ecosystem

Subcategory Description (cont.)

Financial Services:

Projects that facilitate DeFi transactions.

	ZigZag is an order book DEX powered by zk-Rollups.
	xBankFinance is a zk-Rollup focused decentralized non-custodial liquidity market protocol on Starknet and ZkSync.
	Hashstack is a permissionless, decentralized yield farming and lending protocol on Starknet.
	Powered by zk technology, Syncswap is a seamless, decentralized DEX on zkSync Era.
	zkLend is a native money market protocol on Starknet.
	Zcash is a decentralized cryptocurrency that uses zk-SNARKS zk proof technology to preserve privacy in financial transactions.
	MES Protocol is a cross-rollup orderbook DEX that utilizes zkSNARKs for enhanced security and privacy.

About Binance Research

Binance Research is the research arm of Binance, the world's leading cryptocurrency exchange. The team is committed to delivering objective, independent, and comprehensive analysis and aims to be the thought leader in the crypto space. Our analysts publish insightful thought pieces regularly on topics related but not limited to, the crypto ecosystem, blockchain technologies, and the latest market themes.



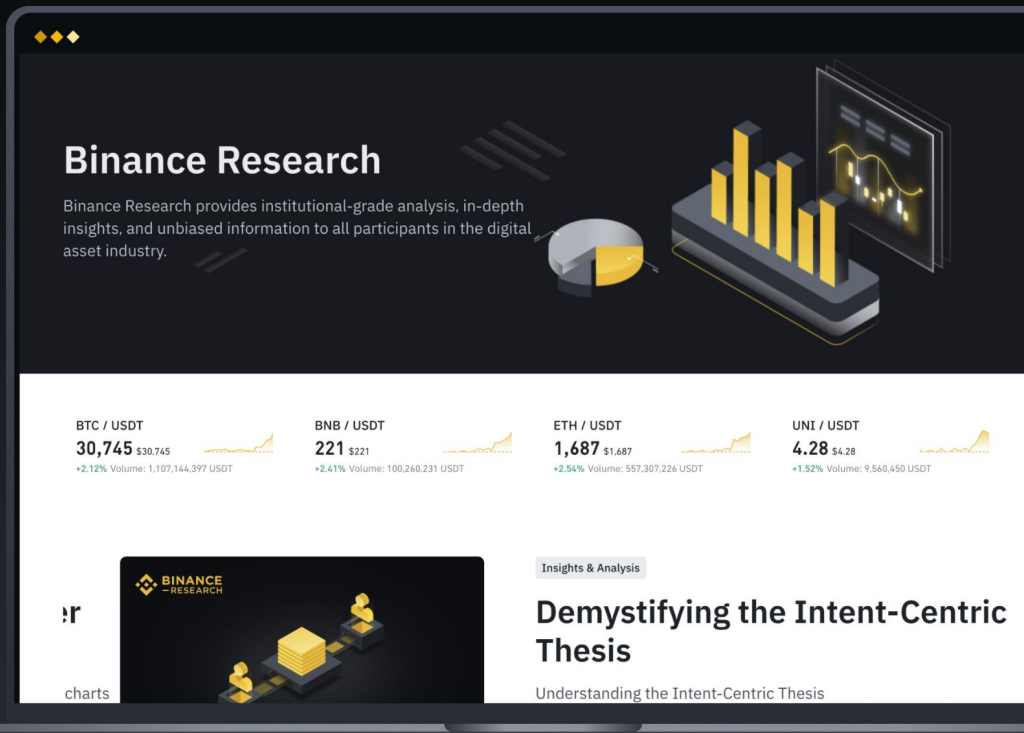
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Jin Ming is currently an intern with Binance on the Macro Research team. Prior to joining Binance, he had experience working in several family offices as an investment analyst intern. He was also part of the Coinbase Community Analyst Program, working closely with the crypto intelligence team. Jin Ming is currently an undergraduate at Singapore Management University, studying Business with a major in Finance.

