Navigating Crypto: Industry Map

March 2024

Contents

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.

BINANCE RESEARCH

I. Infrastructure

Infrastructure
Vertical Spotlights

We identified 5 key areas of innovation.

Scalability and Fairness

As Layer-1 ("L1") 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

L1 blockchains are far from being fully connected and interoperable. Numerous cross-chain solutions are being developed to improve the current on-chain user experience.

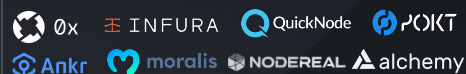# Infrastructure
Vertical Overview

Scalability and Fairness

Zero-Knowledge ("ZK")
zkSync · Scroll · Linea · STARKNET · polygon zkEVM · LOOPRING

Optimistic
BLAST · ARBITRUM · OP

Maximal Extractable Value ("MEV") Solution
Jito · EDEN · SKIP · manifold

Data Usability and Tooling

Remote Procedure Call ("RPC") Provider
0x · INFURA · QuickNode · POKT · Ankr · moralis · NODEREAL · alchemy

Data Indexing
the graph

Smart Contract Automation
OpenZeppelin

Security and Privacy

Security Solution
Forta · Immunefi · OpenZeppelin

Privacy Solution
NYM · anoma · hopr

Multisig Wallet
Safe · Squads · MSafe

Cloud Networks

Cloud Computing
4EVERLAND · Flux

Content Delivery Network ("CDN")
MESON.NETWORK · THETA · Media Network

File Storage
sia

Connectivity

Cross-Chain Bridge
Celer cBridge · PORTAL · Synapse
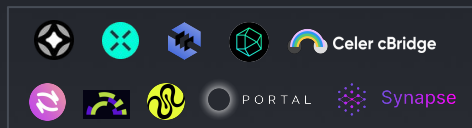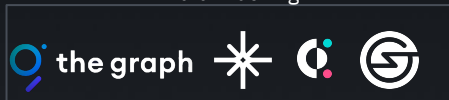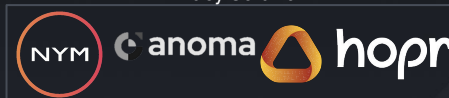
Oracle
API3 · nest · Chainlink · UMA · PYTH
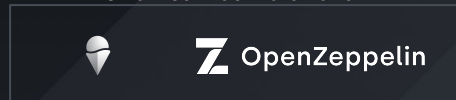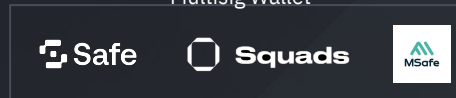
Wireless Networks
POLLEN MOBILE
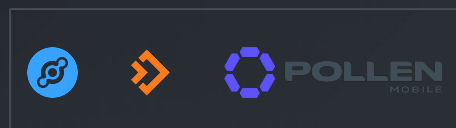
Infrastructure
Subcategory Description

Zero-Knowledge ("ZK"):
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	Manta Pacific is a modular zkEVM built on top of Celestia DA, and Polygon Development Kit ("CDK"). Please note that Manta Pacific is transitioning to a Polygon zkEVM-based L2 as part of its roadmap.
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:
Protocols that assume the validity of transactions and then combine them to execute off-chain.

ARBITRUM	Arbitrum is the largest optimistic rollup network on Ethereum based on total value locked.
OP	OP Mainnet is a low-cost L2 optimistic rollup network.
BLAST	Blast is an L2 network with a feature of native ETH and stablecoin yield.
Metis	Metis is a permissionless optimistic L2 solution developed by MetisDAO Foundation.
Base	Base is an L2 network launched by Coinbase and built using OP Stack.

Source: Binance Research, company websites.

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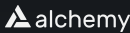
	Flashbots works on mitigating the negative externalities of current MEV techniques and avoiding the risks that MEV causes to state-rich blockchains.
Jito	Jito Labs builds high-performance systems to scale Solana and maximize validator rewards.
EDEN	Eden Network is an optional, non-consensus-breaking,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

Source: Binance Research, company websites.

Infrastructure
Subcategory Description (cont.)

Remote Procedure Call ("RPC") Provider:
RPC is the most direct interface through which developers can communicate with the blockchain system.

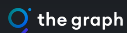|	
0x	0x is a protocol that enables the creation of decentralized exchange on Ethereum.
alchemy	Alchemy is a platform that enables developers to interact with the blockchain, mainly through API calls.
INFURA	Infura provides Ethereum API, IPFS API and Gateway, and ETH nodes-as-a-service.
moralis	Moralis provides a suite of APIs for developers to seamlessly integrate blockchain into their dApps.
QuickNode	QuickNode is a platform for developers to scale blockchain applications.
Ankr	Ankr enables developers to build upon a distributed network of nodes.
POKT	Pocket Network provides RPC access to Ethereum, Polygon, etc.
NODEREAL	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	OpenZeppelin Relay sends transactions via HTTP API, automating smart contract operations securely.

Data Indexing:
Platforms that provide network data indexing and querying services.
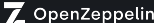
the graph	The Graph is an indexing protocol for querying networks like Ethereum.
	Covalent is a unified API that brings data from different chains and other searchable endpoints.
	0xScope is a protocol that aims to standardize Web2 and Web3 data by building a knowledge graph.
	SubQuery offers data indexing on Polkadot, Cosmos, Avalanche, Algorand, NEAR, Ethereum, and more.

Source: Binance Research, company websites.

Infrastructure
Subcategory Description (cont.)

Security Solution:
Protocols that contribute to the security of blockchains.

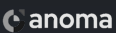|	
	SharkTeam is a leading Web3 security service provider that offers smart contract audits, chain analytics, and emergency response services.
★ Forta	Forta is a real-time detection network for security and operational monitoring of blockchain activities.
Z OpenZeppelin	OpenZeppelin provides security products to build and operate dApps.
◈ Immunefi	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	Safe is a platform to manage digital assets on Ethereum.
MSafe	MSafe developed the first multisig, non-custodial asset management solution for the Move ecosystem.
Squads	Squads is a multisig management protocol for Web3-native teams.

Privacy Solution:
Projects that contribute to the protection of user privacy.

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

Source: Binance Research, company websites.

Infrastructure
Subcategory Description (cont.)

Content Delivery Network ("CDN"):
CDNs are decentralized, distributed networks that provide fast delivery of internet content.

MESON.NETWORK	Meson Network is a bandwidth marketplace using blockchain to replace traditional sales models.
Media Network	Media Network is a privacy-first and community-governed CDN.
THETA	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.

Source: Binance Research, company websites.

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	Latitude helps developers deploy dedicated servers globally through the bare metal cloud platform.
Akash	Akash is a decentralized computing marketplace built for public utility.
Render	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.
Swarm	Ethereum Swarm is a decentralized storage and communication system.
Sia	Sia is a decentralized cloud storage marketplace that allows direct transactions without third parties.
Storj	Storj offers low-cost cloud storage with zero-trust security.
Arweave	Arweave offers permanent and decentralized storage in an open ledger.
BNB Greenfield	BNB Greenfield is a blockchain and storage platform that is EVM-compatible.
Zus	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	Supported Blockchains
	Polygon, Ethereum, BNB Chain, 10 other chains
PORTAL	Ethereum, Solana, BNB Chain, 21 other chains
Synapse	Ethereum, BNB Chain, Polygon, 15 other chains
Celer cBridge	Ethereum, Arbitrum, BNB Chain, 26 other chains
	Ethereum, Polygon, Arbitrum, 4 other chains
	Ethereum, Base, Arbitrum, 3 other chains
	Ethereum, BNB Chain, 8 other chains
	Ethereum, BNB Chain, opBNB, 7 other chains

Project	Supported Blockchains
	Ethereum, BNB Chain, Arbitrum, 6 other chains
	Ethereum, BNB Chain, 63 other chains for V1, Ethereum, BNB Chain, 12 other chains for V2 (Beta)

BINANCE RESEARCH   *Source: Binance Research, company websites.*

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	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 MOBILE	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 Supernets.

Source: Binance Research, company websites.

II. Decentralized Finance ("DeFi")

BINANCE RESEARCH

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.
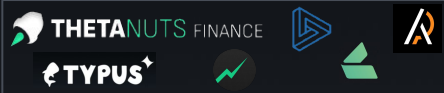
DeFi
Vertical Overview
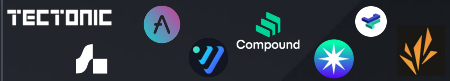
Issuance

Synthetic Assets

Options/Structured Products

Yield

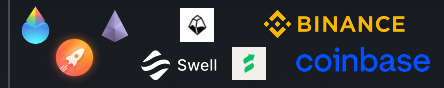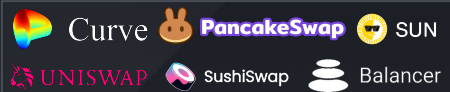**Liquidity**

Lending

ETH Liquid Staking Providers

Collateralized Debt Position ("CDP")

Trading

Decentralized Exchange ("DEX")

Prediction Market

Derivatives

Risk Management

Insurance

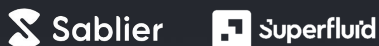Security Analytics

Other

Stream Pay

Launchpad

BINANCE RESEARCH

DeFi
Subcategory Description

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

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

DeFi
Subcategory Description (cont.)

Options/Structured Products: Yield optimizers, yield tranching, automated LP managers, options trading, etc.

Project	Description
	AlgoRai Finance is a decentralized structured product protocol on the Algorand ecosystem.
THETANUTS FINANCE	Thetanuts Finance offers automated strategies through structured products for users to earn and optimize their yields.
	Lyra Finance operates on its own L2, Lyra Chain, providing perpetuals, options and spot trades.
	Hegic offers $ETH and $WBTC options and one-click option strategies.
	Deri Protocol is a derivatives protocol providing $BTC and $ETH options and perpetuals.
TYPUS	Typus Finance is a yield infrastructure that offers options and options vault on Sui Network.

Source: Binance Research, company websites.

DeFi
Subcategory Description (cont.)

Yield: Projects providing yield strategies such as tokenized yield, yield boosting, etc

Project	Description
PENDLE	Pendle Finance is a yield-trading protocol where users can execute various yield-management strategies.
	Convex Finance allows Curve liquidity providers to earn trading fees and claim boosted CRV without locking CRV.

Source: Binance Research, company websites.

DeFi
Subcategory Description (cont.)

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

Project	Description
Aave	Aave is the largest lending protocol in terms of TVL that allows users to earn interest, borrow assets, and build applications.
JustLend	JustLend is a decentralized lending protocol that allows users to supply, borrow, and earn.
Compound	Compound is an algorithmic, autonomous interest rate protocol built for developers to unlock open financial applications.
Venus	Venus is a DeFi algorithmic money market protocol on BNB Chain. It is also the largest lending platform on BNB Chain.
TECTONIC	Tectonic, a fork from Compound, is a Cronos-based money market platform for earning passive yield and accessing instant backed loans.
Radiant	Radiant is an omnichain money market protocol allowing users to deposit and borrow assets cross-chain.
Margin.fi	Margin.fi is a decentralized lending protocol on Solana with variable interest rates.
Spark	Spark is a DeFi lending infrastructure powered by MakerDAO.

Source: Binance Research, company websites.

DeFi
Subcategory Description (cont.)

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

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

Project	Description
	Stader is a multichain liquid staking protocol, supporting Ethereum, BNB Chain, Polygon, and more.

Source: Binance Research, company websites.

DeFi
Subcategory Description (cont.)

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

Project	Description
⋈ MAKER	MakerDAO enables the generation of the stablecoin DAI, which is the largest decentralized stablecoin.
(Liquity)	Liquity enables the generation of the stablecoin LUSD against ETH as a collateral.
(Curve)	CrvUSD is a CDP stablecoin that is minted after users deposit collateral such as stETH on Curve.
(Lybra)	Lybra Finance is a decentralized finance protocol that allows users to mint its overcollateralized, interest-bearing stablecoin, eUSD.
prisma	Prisma Finance is a decentralized, Ethereum-LST backed stablecoin protocol.
(Ethena)	Ethena is a synthetic dollar protocol that allows users to mint its delta-hedged synthetic dollar, USDe.

DeFi
Subcategory Description (cont.)

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

Project	Description
UNISWAP	Uniswap is a leading decentralized exchange that allows users to swap, earn, and build on its platform.
Curve	Curve is a multi-chain automated market maker-based decentralized exchange that allows users to trade at the lowest slippage.
PancakeSwap	PancakeSwap is the leading decentralized exchange on BNB Chain.
Balancer	Balancer is an automated portfolio manager and trading platform on Ethereum.
SUN	SUN is a platform for stablecoin swap, stake-mining, and self-governance on TRON.
SushiSwap	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	Description
▧ Polymarket	Polymarket allows users to build portfolios based on their forecasts and earn a return if they get it right.
azuro	Azuro is an infrastructure and liquidity layer for on-chain betting.
🅦	Winr is a fully autonomous liquidity and incentive infrastructure for on-chain games.

Source: Binance Research, company websites.

DeFi
Subcategory Description (cont.)

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

Project	Description
▲ GMX	GMX is a decentralized spot and perpetual exchange providing low swap fees, zero price impact trades, and leverage positions.
dYdX	dYdX is a open trading platform that allows margin trades, borrowing and lending.
Drift	Drift is an onchain spot and perpetual trading platform on Solana.
Kiloex	Kiloex is a perpetual DEX on BNB chain/opBNB/Manta Network.
Hyperliquid	Hyperliquid is an orderbook perpetual DEX operating on its own Layer 1, the Hyperliquid L1.
Jupiter	Jupiter is an exchange on Solana offering token swaps and perpetuals.
Aevo	Aevo is a derivatives L2 focusing on options and perpetuals trading.

Source: Binance Research, company websites.

DeFi
Subcategory Description (cont.)

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

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

Source: Binance Research, company websites.

DeFi
Subcategory Description (cont.)

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

Project	Description
Nexus ✦ Mutual	Nexus Mutual is the largest decentralized insurance protocol that covers against smart contract failures.
(InsurAce logo)	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	PinkSale allows users to launch tokens and create their initial token sale.
team by TrustSwap	Team Finance is a toolkit that helps founders create tokens to raise funds from investors.
DxSale	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	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")
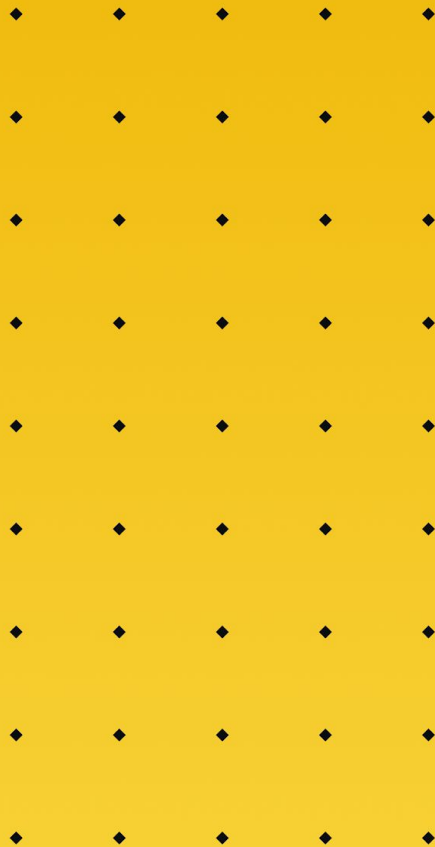
NFT
Vertical Spotlights

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.
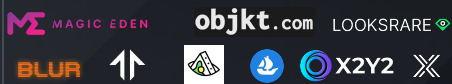
Services

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.
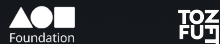
NFT
Vertical Overview

Marketplace

Open Marketplace
- MAGIC EDEN
- objkt.com
- LOOKSRARE
- BLUR
- X2Y2

Curated Marketplace
- Foundation
- TOZFU

Aggregator
- BLUR
- element

Financialization

Lending
- BendDAO WEB3 DATA LIQUIDITY
- nftfi
- BLUR
- JPEG'd
- GONDI
- MetaStreet

Fractionalization
- FRACTON X

Buy Now, Pay Later
- Teller
- CYAN
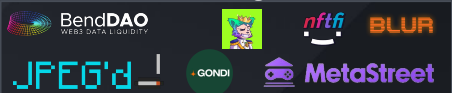
Derivatives
- NFEX
- nftperp

Options
- hook
- Wasabi

Rental
- {reNFT}
- DOUBLE

Services

Portfolio Analytics and Appraisal
- UPSHOT
- NFTBank
- nftvaluations
- NFTGO
- NFTSCAN

Membership and Content Gating
- AUDIUS

Storage
- Pinata
- NFT STORAGE
- filebase

Launchpad
- Mintbase
- NFTLAUNCH
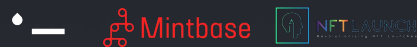
Safety
- Doppel
- optic
- YAKOA

NFT
Subcategory Description

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

Project	Description
BLUR	Blur is a NFT marketplace designed for pro traders offering 0% marketplace fees.
OpenSea	OpenSea is a digital marketplace for crypto collectibles and non-fungible tokens.
LOOKSRARE	LooksRare is a decentralized NFT marketplace offering community rewards for participating.
X2Y2	X2Y2 is an NFT marketplace on Ethereum with 100% revenue shared with token stakers.
X	Immutable X is a NFT marketplace built on the Immutable X blockchain.
MAGIC EDEN	Magic Eden is a NFT marketplace on Solana with 0% listing fees.
objkt.com	Objkt is the largest NFT marketplace on Tezos.
Talis	Talis is a NFT marketplace for the Injective ecosystem.
Tensor	Tensor is a NFT marketplace on Solana.

Source: Binance Research, company websites.

NFT
Subcategory Description (cont.)

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

Project	Description
BLUR	Blur is a NFT marketplace aggregator for pro traders offering 0% marketplace fees.
(OpenSea Pro logo)	Opensea Pro, formerly known as Gem, is a low-fee NFT marketplace aggregator. Gem was acquired by OpenSea.
element	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	Foundation is a curated, decentralized NFT marketplace.
TOZ FU	tofuNFT is a NFT marketplace focused on GameFi.

Source: Binance Research, company websites.

NFT
Subcategory Description (cont.)

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

Project	Description
BendDAO WEB3 DATA LIQUIDITY	BendDAO is a decentralized peer-to-pool-based NFT liquidity protocol.
BLUR	Blend enables NFT owners to borrow ETH against their assets with a buy now, pay later feature for NFT purchases.
nftfi	NFTfi is a peer-to-peer lending protocol.
(Banx logo)	Banx is a perpetual peer-to-peer NFT lending protocol.
JPEG'd_	JPEG'd is a decentralized lending protocol on the Ethereum network that enables holders to borrow using NFTs as collateral.
MetaStreet	MetaStreet is a liquidity scaling protocol for NFT credit markets.
GONDI	Gondi is a non-custodial NFT lending platform providing loan primitive and credit market for NFTs.

Source: Binance Research, company websites.

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 X	Fracton is an NFT fractionalization protocol for top and high potential NFT projects.
	Flooring Protocol allows people to fractionalize their NFTs into micro-tokens called µ-Tokens.

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

hook	Hook is an NFT-native options protocol.
Wasabi	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	Nftperp is a perpetual futures DEX for NFTs.
NFEX	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	Teller is an oracle-less lending protocol that has a buy now, pay later system with as little as a 25% down payment.
CYAN	Cyan offers buy now, pay later for NFT purchases with a 25% down payment.

Source: Binance Research, company websites.

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.
NFTSCAN	NFTScan 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.

Source: Binance Research, company websites.

NFT
Subcategory Description

Launchpad:
Platforms for projects to launch their own NFTs.

NFT LAUNCH	NFT Launch is a launchpad for upcoming NFT projects.
Mintbase	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	Doppel is an IP protection platform for NFTs.
optic	Optic monitors blockchains to reveal the origins of NFTs and how they have been reimagined, remixed, or copied.
YAKOA	Yakoa is an NFT fraud detection network.

Source: Binance Research, company websites.

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
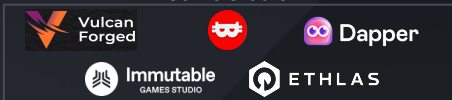
Toolkit

Launchpad

Player Experience

Gaming Guild
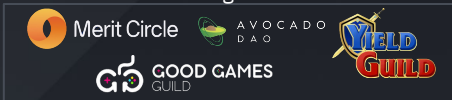
Game NFT Marketplace

Analytics

Analytics

Note: Map is not an exhaustive list of projects in the industry. Projects showcased are mapped according to their primary use cases. The mention of specific projects does not constitute endorsement or recommendation by Binance.
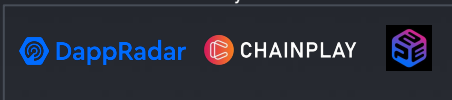
Gaming
Subcategory Description

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

Project	Description
THE SANDBOX	The Sandbox is currently the largest metaverse project where players can build, own, and monetize their gaming experiences on the Ethereum blockchain.
Decentraland	Decentraland is a 3D virtual world where users can create and monetize content.
StarryNift	StarryNift is an immersive VR-supported metaverse.
	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.

Source: Binance Research, company websites

Gaming
Subcategory Description (cont.)

Play-to-Earn:
Games where users can monetize their gaming experiences in the form of cryptocurrencies.

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

Source: Binance Research, company websites

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.

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

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

Source: Binance Research, company websites.

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.

Source: Binance Research, company websites.

V. Decentralized Physical Infrastructure Network ("DePIN")
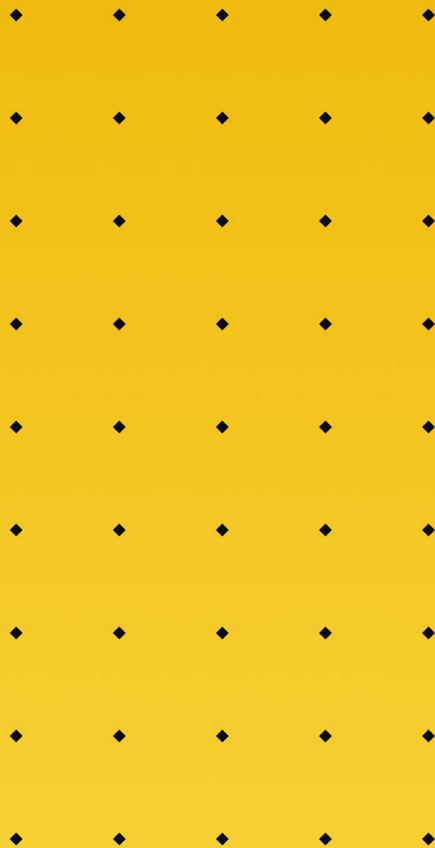
DePIN
Vertical Spotlights

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

General Purpose

Machine Learning

Wireless Networks

WiFi

5G

LoRaWan

Storage Networks

File Storage

Sensor

Environmental

Smart City

Mapping

BINANCE RESEARCH

Note: Map is not an exhaustive list of projects in the industry. Projects showcased are mapped according to their primary use cases. The mention of specific projects does not constitute endorsement or recommendation by Binance.
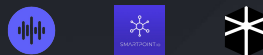
DePIN
Subcategory Description

General Purpose:
Projects provide computing resources, managing diverse tasks such as running apps, handling data, 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.
	Cudos is a Web3 cloud infrastructure that powers applications like gaming, rendering, AI, metaverses, and node infrastructure by leveraging data centers and idle resources.
	DeepBrainChain provides GPU computing services for artificial intelligence, cloud games, movie rendering, and more.
	Flux is a decentralized Web3 cloud infrastructure comprised of user-operated, scalable and globally distributed computational nodes.
	Bacalhau is a platform for fast, cost efficient, and secure computation by running jobs where the data is generated and stored.
	Golem network is peer-to-peer marketplace for distributed computing resources.

Source: Binance Research, company websites

DePIN
Subcategory Description (cont.)

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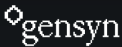A subset in artificial intelligence that focuses on training computer systems to make inferences based on data and algorithms.

gensyn	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.
T	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.
ChainML	ChainML is an AI research and development company dedicated to shaping a better future powered by AI agents.

DePIN
Subcategory Description (cont.)

WiFi:
Protocols that provide access to wireless internet connections.

WiFi Map	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	WiCrypt provides a marketplace for users to earn from unused data capacity.
Wayru	Wayru Network is a decentralized Wireless network that provides affordable and reliable internet access to users.

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

helium	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	Pollen is a community-owned, privacy focused mobile network, providing connections in areas where internet is needed.
Karrier One	Karrier One is a decentralized wireless network that enables carrier-grade connectivity through its upcoming Karrier One Mobile.
XNET	XNET is a full-featured mobile network that offers carrier-grade secure access to phone number, voice, SMS messaging and more.

Source: Binance Research, company websites.

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.
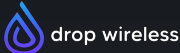
helium	Powered by the Solana blockchain, Helium network is a decentralized wireless infrastructure. It has partnered with T Mobile for its crypto carrier, Helium Mobile.
Chirp	Chirp is creating a unified wireless network for IoT and broadband through the use of blockchain technology. Their flagship product, Blackbird, has a range of long range precision that is able to connect to IoT devices indoors and outdoors.
drop wireless	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.
Crankk	Crankk aims to build and operate a LoRaWAN network providing coverage for IoT devices, such as smart meters, GPS trackers, etc.

Source: Binance Research, company websites.

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	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	WeatherXM is a community-powered weather network that rewards weather station owners and provides accurate weather services to Web3 enterprises.
PlanetWatch	PlanetWatch uses blockchain and cost effective sensor to deploy hyperlocal air-quality monitoring networks to help fight air pollution.
t°	Tempest provides personal and professional weather solutions using crowdsourced and AI-driven modelling, delivering accurate weather information.
Fry Foundation	Fry Foundation is building a decentralized network of decentralized networks that spans a wide range of industries and applications. In addition to its existing dVPN and dGNSS networks, it plans to expand to other areas such as Air Quality, Water Quality, Weather Stations, etc.
	AquaSave is a DePIN project that uses IoT and blockchain technologies to analyze and track the status of the planet's water resources.

Source: Binance Research, company websites.

DePIN
Subcategory Description

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

Mapping:
Decentralized networks that provide accurate geographical information.

	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.

	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.

Source: Binance Research, company websites.

VI. Artificial Intelligence
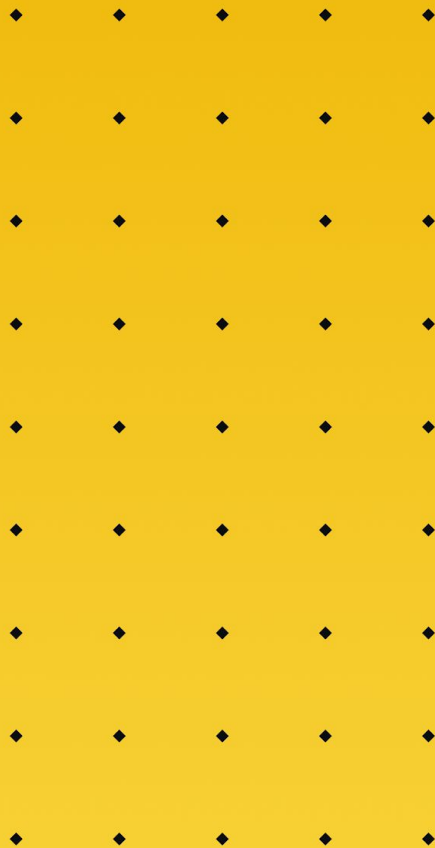
Artificial Intelligence
Vertical Spotlights

We identified 3 key areas of innovation.

Infrastructure

Projects that provide permissionless access to compute resources and the services of model training, fine tuning, and inference.

Middleware

Projects that utilize the resources from infrastructure projects to provide products and services like AI agents, inference verification, authentication, etc.
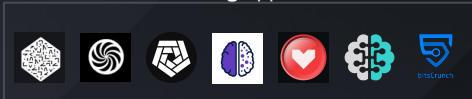
Application

Projects that leverage the power of AI to offer consumer-facing use cases such as trading, image generation, data analytics, gaming, etc

Artificial Intelligence
Vertical Overview

Application

User-facing Application
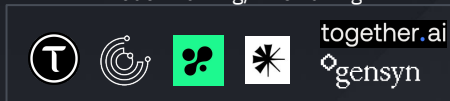

Middleware

Middleware Layer Application

Infrastructure

General Purpose Compute

Model Training/Fine Tuning

Artificial Intelligence
Subcategory Description

User-facing Application:
Projects that leverage the power of AI to offer consumer-facing use cases such as trading, image generation, data analytics, gaming, etc.

	Numerai is a quant hedge fund built on thousands of crowdsourced machine learning models.
	Mozaic provides AI-optimized yield and liquidity strategies powered by LayerZero.
	Arkham is a crypto intelligence platform with featured powered powered AI algorithm.
	PAAL features AI-powered bot for use cases such as AI assistance, trading, and more.
	0x0 provides AI smart contract auditor and a suite of AI privacy tools.
	Sleepless AI is a Web3+AI companion gaming platform.
	BitsCrunch is an AI-powered NFT data analytics platform, utilizing AI and machine learning to detect wash trading or suspicious trading patterns in real time.

Artificial Intelligence
Subcategory Description (cont.)

Middleware Layer Application:
Projects that utilize the resources from infrastructure projects to provide products and services like AI agents, inference verification, authentication, etc.

	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.
	Ocean is an open-source protocol that allows individuals and businesses to exchange and monetize data and data-based services.
	Worldcoin is a project and financial network that aims to preserve human identity privacy, featuring elements such as the World ID, Worldcoin Token, and World APP.
	Oraichain is an AI-powered blockchain and AI Oracle service provider.
	Modulus uses Zero-Knowledge Machine Learning ("ZKML") technology to allow smart contracts leverage the power of AI while maintaining the security and transparency of blockchain technology.

Source: Binance Research, company websites.

Artificial Intelligence
Subcategory Description (cont.)

General Purpose Compute:
Projects that provide permissionless access to computing resources such as GPU based on a decentralized infrastructure and crypto-incentive mechanism.
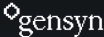
	Akash Network is a decentralized cloud computing network that allows users to delegate spare GPU resources for purposes such as artificial intelligence.
	Render Network is a decentralized cloud computing platform that allows anyone to share spare GPU resources and is typically used in rendering graphics.
	Nosana is a decentralized computing platform that allows anyone to contribute spare computing power and earn token rewards.
	Cudos is a Web3 cloud infrastructure that powers applications like gaming, rendering, AI, metaverses, and node infrastructure by leveraging data centers and idle resources.
	Golem network is peer-to-peer marketplace for distributed computing resources.

Artificial Intelligence
Subcategory Description

Model Training/Fine Tuning:
Projects that focus on training computer systems to make inferences based on data and algorithms.

|	
(T)	Bittensor is a decentralized machine learning platform reshaping AI development through collaborative and shared intelligence.
gensyn	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.
together.ai	Together AI offers decentralized cloud services that empower developers and researchers to train, fine-tune, and deploy generative AI models.
enqAI	enqAI aims to provide unrestricted AI with image/audio generation and large language models, powered by a decentralized GPU network for bias-free, agenda-free and censorship-free operations.
	Hypercycle is a L1 blockchain designed to supply scalable, low-cost infrastructure for decentralized AI, aiming to increase AI's intelligence and profitability by enabling AI systems to communicate and collaborate more efficiently and securely.
	Nimble is building a decentralized AI framework that enables AI models and data to be combined and reused.

VII. Restaking
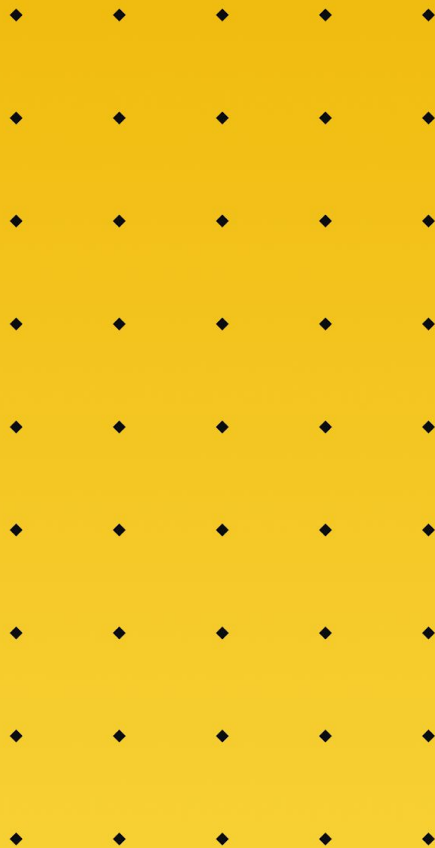
Restaking Ecosystem
Vertical Spotlights

We identified 2 key areas of innovation.

◆

Restaking

Projects that provide a set of smart contracts that allow staked tokens to be repurposed and staked again (i.e., restaked) to provide security to applications beyond the primary blockchain.

◆

Liquid Restaking

Projects that allow users to participate in restaking while maintaining liquidity through a token ("LRT").

Restaking Ecosystem
Vertical Overview

Restaking

Ethereum

Eigen Layer

Bitcoin

Babylon

Solana

P.

Liquid Restaking

Ethereum

ether.fi

RENZO

Swell

BEDROCK

Restaking Ecosystem
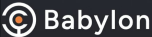## Subcategory Description

Ethereum:
Project utilizing Ethereum to provide restaking solution

	EigenLayer is the originator of restaking and the largest project in the space. It has over US$11.6B in TVL on its platform, split across native ETH, and 12 different LSTs e.g. stETH, wBETH, etc.

Bitcoin:
Project utilizing Bitcoin to provide restaking solution

	Babylon is a Bitcoin staking protocol that aims to leverage the US$1T+ of crypto-economic security of Bitcoin to enhance the security of other PoS chains. It recently launched its testnet, with a mainnet launch expected later this year.

Solana:
Project utilizing Solana to provide restaking solution

	Picasso is an infrastructure layer which aims to improve DeFi interoperability and is in the process of connecting Ethereum and Solana to Cosmos' IBC network. It has built a Restaking Layer on Solana, which accepts SOL, as well as a number of SOL LSTs.

Restaking Ecosystem
Subcategory Description (cont.)

Liquid Restaking:
Projects provide liquid restaking solution for $ETH

ether.fi	ether.fi is a liquid restaking provider that offers the eETH LRT.
	Puffer Finance is a liquid restaking protocol and provides stakers with its native LRT, $pufETH.
RENZO	Renzo is a liquid restaking and strategy manager protocol for EigenLayer, offering the ezETH token.
	Kelp DAO is a liquid restaking protocol offering the rsETH token.
	Eigenpie is a SubDAO created by Magpie, focusing on the restaking of ETH LSTs via EigenLayer.
Swell	Swell is a non-custodial staking protocol that provides both liquid staking and liquid restaking solutions for users.
BEDROCK	Bedrock is a non-custodial solution designed for users to natively restake and harness additional EigenLayer rewards.
	Prime Staked is a liquid restaking protocol that offers the primeETH LRT.

BINANCE
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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.
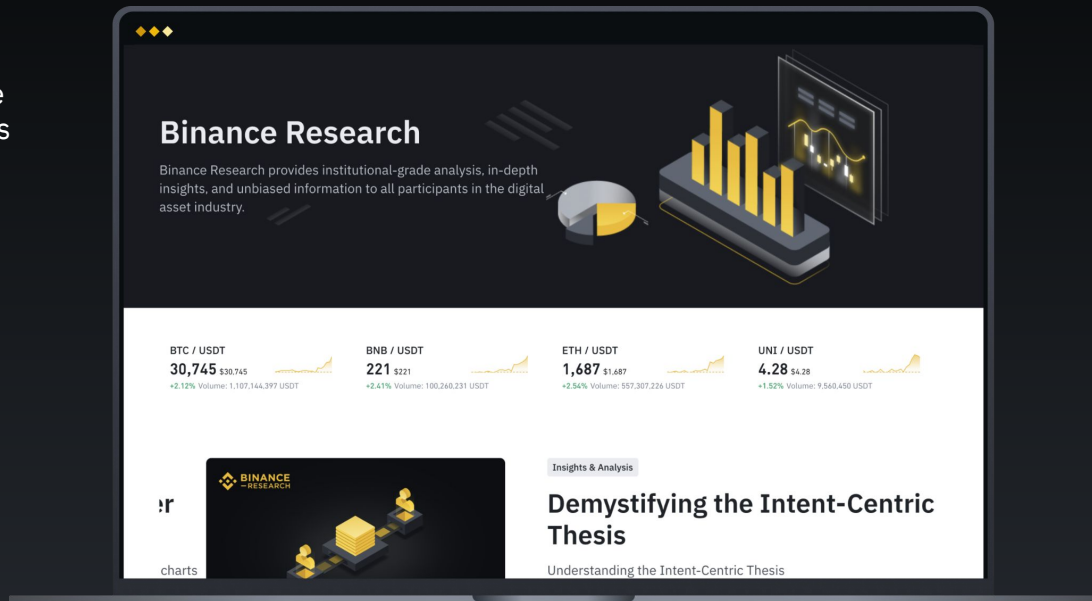
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✈ **@BinanceResearch**

Contributors

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Brian is currently working for Binance as a Macro Research intern. Prior to joining Binance, he worked as a DeFi researcher at a financial service startup and a Web3 education organization. He holds a Master of Finance degree from the University of California, Irvine ("UCI"), and has been involved in the cryptocurrency space since 2021.

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