Understanding Staking: A Structured Taxonomy of Staking Mechanisms

Following our recently published paper, "Towards a reliable taxonomy and understanding of Proof-of-Stake," we recognized the need to simplify further and categorize information about staking for clarity. As blockchain technology continually evolves and terms like "staking" gain increasing prominence, it becomes necessary to lay down a clear and categorized framework that stakeholders can reference for accurate understanding. This document distills the core concepts and classifications from our position paper into a structured guide. Within, you'll find a taxonomy that differentiates between genuine staking mechanisms and tools. This is intended to serve as a quick reference for those looking to understand the staking landscape, its nuances, and associated implications.

In the subsequent sections of this document, we present a series of structured tables that categorize various staking mechanisms, ranging from direct technical staking to what's termed "Staking in Name Only" (SINO).

These tables were designed to outline the roles of token holders, third parties, custodial responsibilities, ownership dynamics, reward systems, associated fees, and regulatory considerations. By offering a visual breakdown, our aim is to enhance clarity, making it more intuitive for readers to distinguish between different staking models and comprehend the particularities associated with each.

These tables offer a clear overview to guide readers through the varied aspects of staking.

Technical Staking	Staking in name only- SINO
Individuals lock their coins to become validators. The core aim is to ensure network security. The locked coins, or "stakes", act as a commitment to the network's well-being. (Validators with malicious intentions risk penalties against their stake, thereby making attacks on the network cost-prohibitive and enhancing overall security.)	Activities that are labeled as "staking" but functionally operate differently, often mirroring traditional financial operations such as lending. Fundamentally, they are not implemented for the purpose of network security.

Technical Staking								
	Token Holder / User Role	**Participation**	**3rd party role**	**Custody**	**Ownership**	**Rewards**	**Fee**	**Regulation according to purpose**
Direct Staking	The user maintains custody.	Direct participation network security.	NO	Token holder / User.	Token holder / User.	Rewards gain directly.	NO	Data regulatory setting /Network Security.
Delegated Proof of Stake (DPoS) Services	Token holders delegate their staking power, which can be done directly or via a Staking-as-a-Service platform.	Delegated Participation to Validators.	Validators propose and vote on new blocks and form a consensus on (come to a decision about) canonical blocks - these are the blocks that the network considers "valid."	Token holder / User.	Token holder / User.	Staking balance is proportional to the reward. The validator receives a reward if all transactions in the block are correctly validated by them - this reward is shared with the users who selected them.	The fee is less than the token staked. Charged by the validator.	Data regulatory setting /Network Security.

Staking-as-a-Service Platforms (StaaS)						
Specialized platforms that manage all aspects of staking for users. Node setup and maintenance, managing infrastructure, and ensuring network security.						
	Participation	**3rd party role**	**Custody**	**Ownership**	**Rewards**	**Fee**
Custodial Staking Services	Token holders delegate their staking power with a transfer of ownership.	Everything	CASP / Wallet provider	CASP / Wallet Provider for the duration of the bonding period.	Passed on to the StaaS provider before being distributed to the user who staked their tokens.	Discounting a fee for the CASP/Wallet Provider.
Non-Custodial Staking Services	Users/ token holders participate in staking directly from their own wallets.	Providers do not have access to the user's assets. They only provide the software application logic that helps users participate in staking directly from their own (off-line) wallets	Token holder / User.	Token holder / User.	If the network supports native delegation, rewards go directly to Stake without charging a fee to the validator first.	If the network does not support native delegation, the validator charges a small commission fee.

Example of StaaS:

Staking-as-a-Service Platforms (StaaS) Staking Pools: A collective effort to combine stakes to increase chances of validating blocks and earning associated rewards							
	Token Holder / User Role	**3rd party role**	**Custody**	**Ownership**	**Rewards**	**Fee**	**Regulation according to purpose**
Custodial Staking Pools	Token holders delegate their staking power to the Pool.	Provides infrastructure, does the staking, and does the distribution of the rewards.	Validator	Custodian	Rewards need to be distributed proportionally or as determined by the pool provider.	The staked tokens need to be bigger than the fee.	Data regulatory setting /Network Security.
Non-Custodial Staking Pools	Token holders can either run their own validator or delegate validating to a non-custodial StaaS provider without transferring ownership.	Provides the infrastructure	Token holder/user	Token holder/user	Distributed among token holders based on the proportionality of the 32ETH deposit required to operate a validator on Ethereum.	It can range anywhere from 0-10%, depending on the pool.	Data regulatory setting /Network Security.

Staking-as-a-Service Platforms (StaaS) Liquid Staking: A liquid staking protocol uses smart contracts to pool users' coins before delegating or directly staking them to validators. Additionally, the liquid staking protocol issues a token(s) that represents the staked coins.							
	Token Holder / User Role	**3rd party role**	**Custody**	**Ownership**	**Rewards**	**Fee**	**Regulation according to purpose**
Liquid Staking (Non Custodial)	Token holders delegate their crypto (e.g., ETH) to secure a PoS blockchain.	Provides technical infrastructure.	Technically, it is still with the end user; however, it is delegated to a smart contract for the process of securing a PoS blockchain.	Token holder/user.	Distributed periodically as Liquid Staking Tokens (LSTs) to token holders who have pledged their crypto (e.g., ETH) to secure a PoS blockchain.	In order to unstake, users must first send their LSTs to a burner smart contract. Once validated, the underlying ETH is unstaked. Fees can range depending on the platform. Fees are generally higher than with other types of staking.	Data regulatory setting /Network Security.

Staking in name only- SINO.				
	Role of the user	**3rd party**	**role of 3rd party**	**outcome**
Earn Programs	Lock up specific cryptocurrencies to earn interest over time.	CASPs and Wallet Providers.	Providers use the locked-up deposits to support various activities, such as lending to margin traders or staking in Proof-of-Stake networks.	Share the generated profits with the depositors as interest/forms of pro-rata income.
Yield Farming	Liquidity Providers (LPs/users) are incentivized to provide their tokens to facilitate liquidity on Decentralized Finance (DeFi) applications in exchange for interest.	Decentralized Finance (DeFi) Decentralized Applications (DApps) such as Decentralized Exchanges (DEXs), Automated Market Makers (ammS) -which may not be limited to constant product function AMMs, non-custodial lending/borrowing platforms, algorithmic-based money market systems, automated portfolio managers, automated decentralized aggregation protocols.	Facilitates decentralized infrastructure.	Rewards for providing liquidity in mostly Decentralized Finance (DeFi) protocols.

About the Authors:

Mariana de la Roche is the Senior Regulatory Affairs Expert at IOTA and serves on the Board of Directors for INATBA. She holds a law degree, a specialization in human rights and humanitarian law, and a master's degree in public administration. With over nine years of experience, she has worked as a lead project manager and legal and regulatory advisor for various organizations in Colombia and Germany. Mariana has been a driving force behind INATBA's social impact and sustainability efforts since 2021, advocating for blockchain's positive contributions worldwide. Mariana also plays a crucial role in coordinating BC100+, an initiative with the patronage of the 77th president of the UNGA promoting blockchain aligned with UN Charter Values and the 2030 Agenda. In addition to extensive sustainability engagements, Mariana has actively influenced EU regulation, contributing to consultations at EU and international levels, notably with multiple responses to inquiries from French authorities, in particular around DeFi. She has engaged in insightful discussions about the interplay between AI and Blockchain, acknowledging their potential synergies and challenges. She further contributes to the field as a member of the EUBOF Expert Panel and Advisor of Build.5 and has served as an ambassador for the Global Blockchain Business Council (GBBC) since 2023.

Erwin Voloder has been in the blockchain sector since 2017, first as a start-up founder in Canada and now as a regulatory and technical expert in Europe. He is a former economist with both the European Commission and the European Central Bank. Currently, he is head of policy at the European Blockchain Association, where he leads advocacy and research initiatives between the web3 community and public institutions. He frequently participates in expert working groups around digital asset policy while advising EU Member State governments and private companies. He has published research on decentralized finance and cross-border payments, including the use of stablecoins/CBDCs for international trade and development.