Cosmos IBC: Unlocking the Blockchain Multiverse

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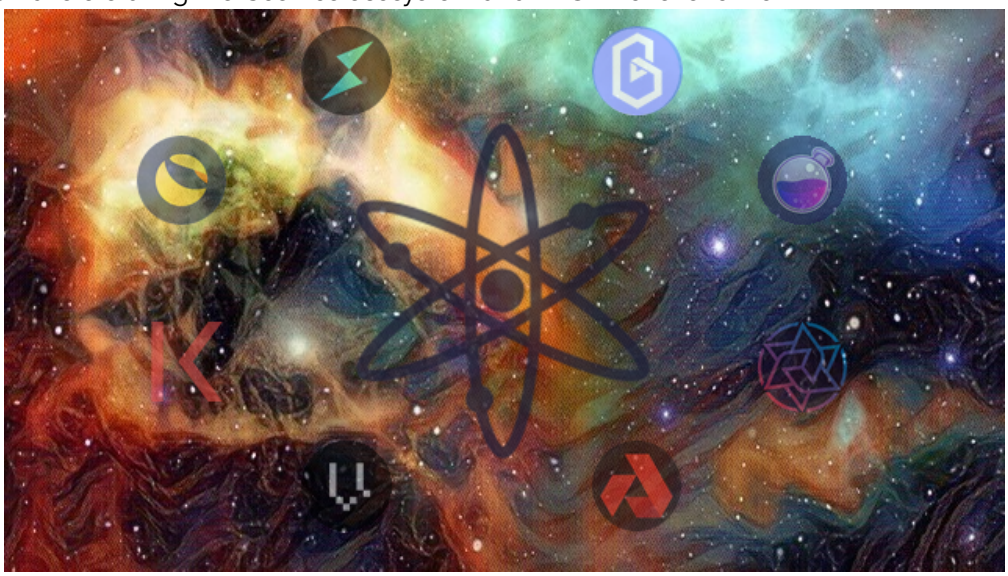
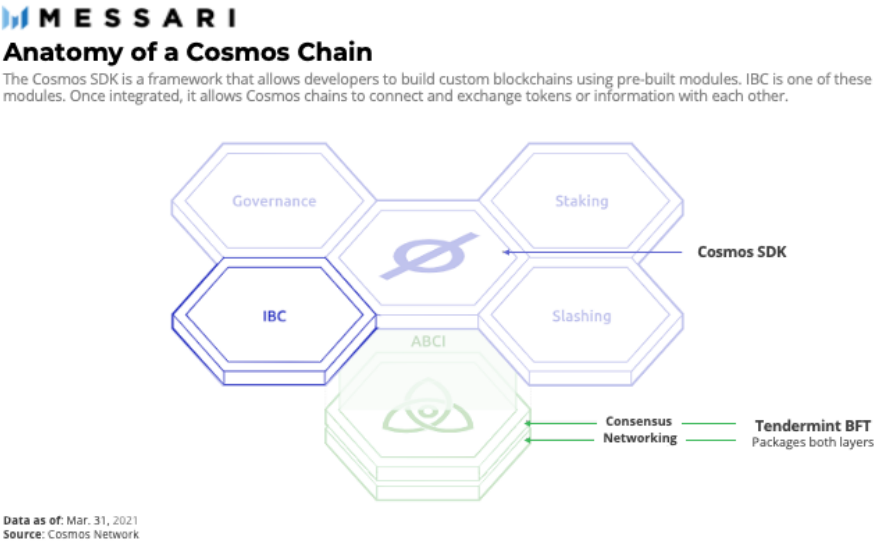
Apr 2, 2021

On March 29, Cosmos Hub stakeholders approved a proposal to enable Inter-Blockchain Communication (IBC) transfers, allowing users to send tokens between different Cosmos chains for the first time. The upgrade marked the realization of the vision set out by Cosmos' founders over five years ago. The Cosmos ecosystem now has the foundation to break down the barrier of siloed blockchains and become a system of interconnected networks. In other words, IBC transfers bring the Cosmos ecosystem and ATOM tokens to life.



IBC: The Gateway for Cross-Chain Communication

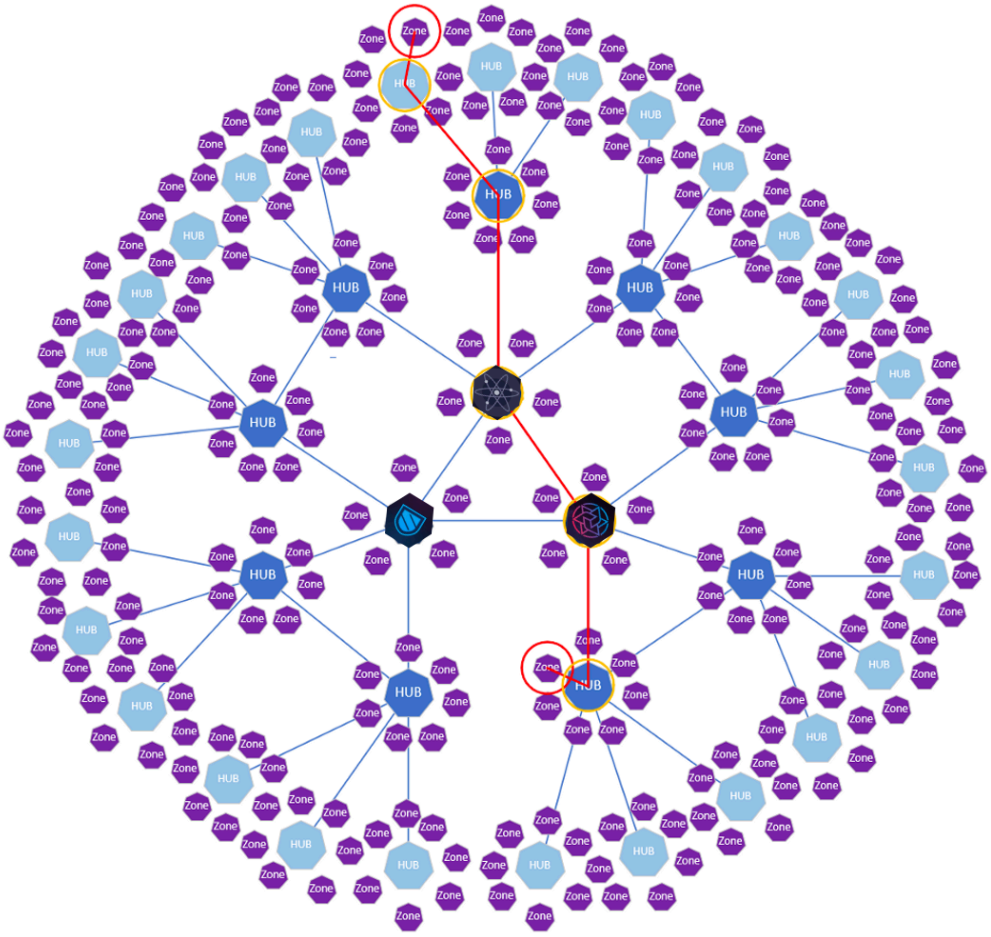
The cosmos ecosystem requires an interoperability framework like IBC due to its design. Unlike Ethereum, Cosmos doesn't rely on a single root chain to facilitate data and asset transfers. Instead, it consists of various independent chains that build their base infrastructure using a modular toolkit called the Cosmos SDK. This development tool comes with a series of pre-built modules (building blocks) that developers can select on an as-needed basis when building a new chain.



IBC is one of these modules. Once integrated, it allows Cosmos chains to send tokens and arbitrary data between each other. These chains connect and communicate through a two-way peg, the same mechanism used to move tokens from Ethereum to sidechains like xDai or Polygon. When a user submits a valid cross-chain transaction to an IBC endpoint, the origin chain freezes (effectively burning) the tokens being sent while the receiving chains mint an equal number of voucher tokens. Users can send these voucher tokens back to the original at any time to reclaim their "real" tokens. It's a relatively cumbersome but secure process. Tokens can travel in either direction, but only one set of tokens is transferable to keep the total supply in check.

Establishing an IBC connection with every Cosmos chain individually would be a massive undertaking. In response, the Cosmos ecosystem has adopted a hub and spoke topology (although it's not a true one since there can be multiple "hubs") to minimize the number of hops between chains. Most Cosmos chains, called zones, are either application-specific and offer one primary function, or they provide a more general platform for application development like Ethereum. A select few have optimized to be communication hubs, with the Cosmos Hub being the primary example. Cosmos zones can plug into hubs, which route and validate the information passed between different chains in exchange for fees.

IBC allows zones and hubs to open communication portals between one another, serving as the information rails. The whole system resembles how Internet Service Providers (ISPs) deliver Internet access to users. In this case, hubs act as ISPs, spokes support the end-user applications, and IBC gateways are like fiber-optic cables.



Source: Cosmos - an early in-depth analysis at the ecosystem of connected blockchains

Going Modular

Cosmos opted for this modular model because it offers developers more flexibility than Ethereum's one-size-fits-all tech stack. The Cosmos SDK allows developers to craft custom chains optimized for specific use-cases. Ethereum applications don't have this luxury as they all must function within the same parameters established at the base layer. Ethereum's limitations have led some projects, such as Aragon, to pursue migrating their primary operations from Ethereum to a Cosmos chain.

Flexibility has already played a pivotal role in Cosmos' burgeoning DeFi ecosystem. Cosmos darlings Terra and THORChain leveraged the Cosmos SDK's modularity to design highly-optimized protocols that would have been infeasible on a network like Ethereum. Terra baked its algorithmic stablecoin system into the protocol, enabling network validators to benefit directly from this system's growth. THORChain's cross-chain exchange for short-tail assets ties validator rewards with its AMM's liquidity pool incentives to help secure the protocol and bootstrap liquidity.

IBC is the cornerstone of this otherwise sprawling network of sovereign chains. It will unlock the ability for Cosmos' DeFi chains to play off each other. For instance, THORChain could

bridge external assets like ETH and BTC into the Cosmos ecosystem. Users would then have the option to move these assets to the Cosmos Hub and provide liquidity to the Hub's Gravity DEX (more on this below). They could also move their assets from the Hub to Kava and earn interest by lending through Kava's HARD Protocol.

Cross-chain interactions like the ones described expand the surface area of use cases while compounding the utility (and potential revenue) of each chain. These theoretical relationships bear a resemblance to the composable nature of Ethereum's DeFi sector.

But cross-chain data gateways won't necessarily unlock Ethereum-level composability. Cosmos applications built on different chains won't be able to interact as seamlessly as their Ethereum counterparts. Transactions spanning the Cosmos ecosystem will require routing information across the Cosmos Hub or, in some cases, multiple hubs (undergoing the pegging process at each stop), which adds an extra layer of friction and trust. While the Cosmos SDK framework doesn't limit intra-zone composability, the independent nature of Cosmos zones doesn't naturally lend itself to inter-chain composability. If the Cosmos ecosystem ever fails to gain significant adoption, the lack of a shared state (logical decentralization) will be the culprit.

Impact on the Cosmos Hub and ATOMs

IBC transfers fundamentally change the value accrual for ATOM tokens. Until this point, ATOMs have been a claim on seigniorage and granted holders voting rights within the Cosmos Hub's on-chain governance system. ATOM stakers now have a proportional claim on the fees generated by the network for routing information and tokens across different chains. Fee capture is a more sustainable value accrual mechanism than relying on inflation rewards alone.

While IBC is a significant step forward for the Cosmos Hub's utility, it won't be the only hub vying for the market of cross-chain transfers. Cosmos' hyper-modular design opens the door for other hubs to claim a share of the market. This competition between hubs could dampen the outlook (albeit slightly) for the Cosmos Hub and ATOMs.

The goal for hubs within the Cosmos ecosystem is to become the one with the best reputation, thereby attracting the most transaction submissions and associated fees for network stakers. But decentralized protocols should trend towards being lean and efficient routers of economic activity, which would limit the percentage of validator income generated by fees. Fierce competition among hubs could further eat into fee revenue. Ironically, the Cosmos Hub and its ATOM tokens aren't privileged within the ecosystem despite their central role in Cosmos' origin.

The fees collected by the Cosmos Hub could become meaningful if it evolves into a central component that routes significant volumes of information within a robust ecosystem. This outcome seems more likely since the Cosmos Hub has the most value staked (highest cost of attack), the largest community, and the most developer firepower on its side. These characteristics should make the Hub the most sought-after IBC connection point, and its upcoming upgrades should strengthen its place in the pole position among hubs.

IBC Transfers are Only the Beginning

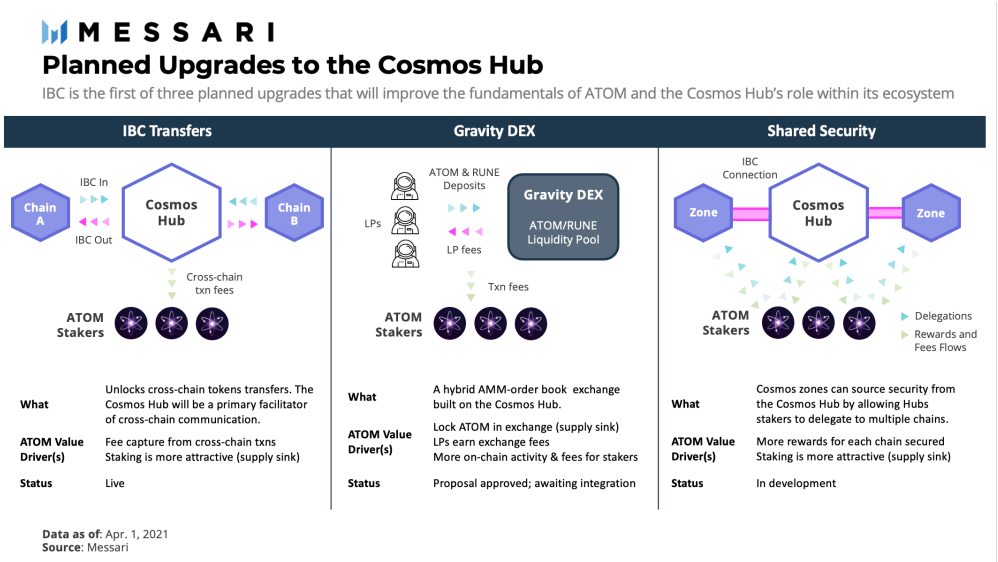
IBC is the first in a series of upgrades developers have planned to improve the fundamentals of ATOM and the Cosmos Hub's role within the ecosystem. ATOM stakers recently approved a proposal to add a "liquidity module" to the Hub during its next major network upgrade. This module will be the underlying primitive for Gravity, a hybrid AMM-order book DEX designed to run on the Cosmos Hub.

While Gravity won't force-fit specific tokens into the user flow, there's a strong chance that ATOM becomes one of the more widely used tokens within the AMM's liquidity pools. This DEX represents another supply sink for ATOM while allowing ATOM liquidity providers to earn a portion of exchange fee revenue. It may also lead to an increase in on-chain activity, translating to more transaction fees paid. These fees would all go directly to ATOM stakers.

Cosmos developers also intend to introduce shared security to the Cosmos Hub. This feature will allow Cosmos SDK chains to source security from the Cosmos Hub's validator set. Shared security isn't a new concept. It's at the core of Polkadot's design and token economic model. But Cosmos' approach is different because it plans to use an opt-in model. Adjacent chains can benefit from the Cosmos Hub's interoperability features while remaining independent. In contrast, Polkadot chains must win a parachain slot to communicate with other parachains (without building individual bridges to each one).

The design for Cosmos' shared security feature is less-defined relative to Polkadot. At a high level, it will let Cosmos Hub stakers delegate their ATOMs to secure multiple zones, earning fees and even rewards (e.g., the zone's native token inflation) for each chain secured.

While the details are still in the works, the concept alone is a mutually beneficial one for the Cosmos Hub and neighboring chains. Newly established chains would be eligible to get immediate economic security (and avoid the complexity of forming a new validator set) while cross-chain validators and stakers could receive incentives or fees from the new chain in addition to their Cosmos Hub income. The increase in staking rewards should also make staking more attractive (another supply sink).



The Cosmos Hub has several catalysts in the works, but these future efforts wouldn't be possible or as interesting without IBC in place. Cosmos has spent several years in the shadows as core developers built out the ecosystem's defining feature. Now momentum is on its side.

Learn more from Mainnet 2021

Watch main stage programming from Messari's annual summit Mainnet 2021 to learn more about this exciting topic. Hear Charlie Noyes, Charly Fei, Billy Rennekamp, and Zaki Manian discuss these topics during, "Mainnet 2021: The Future of Cosmos". See **more programming** on the event portal.

Video: https://www.youtube.com/embed/q2G_ww3zMC8