Archway

Whitepaper



AN INTRO TO ARCHWAY.

CAPTURE THE VALUE YOU CREATE.

May 2023

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CREATE VALUE. CAPTURE VALUE.

At its core, Archway is designed to enable developers to capture the value they create through sustainable economic models built into the blockchain.

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INTRO

We are on a mission to build an equitable blockchain system that enables developers to capture the value they create for the protocols they build on. An active and engaged developer community is the single most important determinant of long-term success for any smart contract platform. Developers are the life force of a network, creating decentralized applications (dapps) and services that attract new users and generate millions of dollars in daily network fees.

The rapid rise in valuations of many blockchain networks has largely been driven by these vibrant developer communities. Yet, the individual contributors and builders behind the dapps rarely capture much of the network-level value that they help create.

Typically, the lions share is accrued by a small group of entrenched “whales” and well-connected industry insiders. Visionary dapp developers who build out products and communities typically do not hold a significant stake in the Layer 1’s they contribute to, and so don’t directly share in its success. As a result, they adopt alternative fundraising techniques and business models to sustain their creations. The Archway protocol reshapes how value is created and distributed across blockchain ecosystems, opening up a completely new kind of developer-centric economy.

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ARCHWAY OVERVIEW

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Archway is a Cosmos-native incentivized smart contract chain that enables developers to easily deploy high-performance dapps that capture the value they create for the network. As developers build and launch impactful dapps, they receive a proportional share of network fees, inflation, and premiums. This shared revenue model enables dapps to access recurring value generation and participate in the upside of the underlying protocol. For Archway, it tightly aligns the incentives of developers and their dapp communities with the overall ecosystem. Archway's technical design is optimized for a seamless developer experience.

The protocol provides a full WebAssembly (Wasm) implementation for cross-language support, a Web3-compatible API, and native bridges that connect to other networks for cross-chain communication and asset transfers. Built on Cosmos and with native integration of the Inter-Blockchain Communication protocol (IBC), Archway makes it possible to create cross-chain dapps that scale. With no need to spin up a new dedicated chain, developers can launch their contracts straight to an established Proof-of-Stake (PoS) network and instantly connect with users, assets, and communities from across the Cosmos ecosystem.

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VALUE CAPTURE ENGINE

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VALUE CAPTURE ENGINE



1. GAS REBATES

50% for dapps
50% burned

2. INFLATION

25% for dapps
75% for validators

3. PREMIUMS

100% for dapps
0% for validators

With Archway, dapps can earn both transaction fees and a percentage of inflation in proportion to their contributions to the network. This earning model is similar to that of validators, who're incentivized for operating nodes for a Proof-of-Stake chain.

By allocating a portion of network-level fees and inflation to dapps, developers and their communities are directly incentivized and gain a true stake in the protocol. Additionally, dapps earn 100% of any premium they add to their smart contracts.

Archway allows each dapp developer and their community to configure how tokens earned are managed and distributed. When a contract is instantiated, the developer specifies an "owner" address where all tokens earned are automatically deposited. This target address can be their own, a multisig, or controlled by a separate custom contract. Ownership can then be transferred to a new address as needed, only requiring the signature of the previous owner.

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GAS REBATES

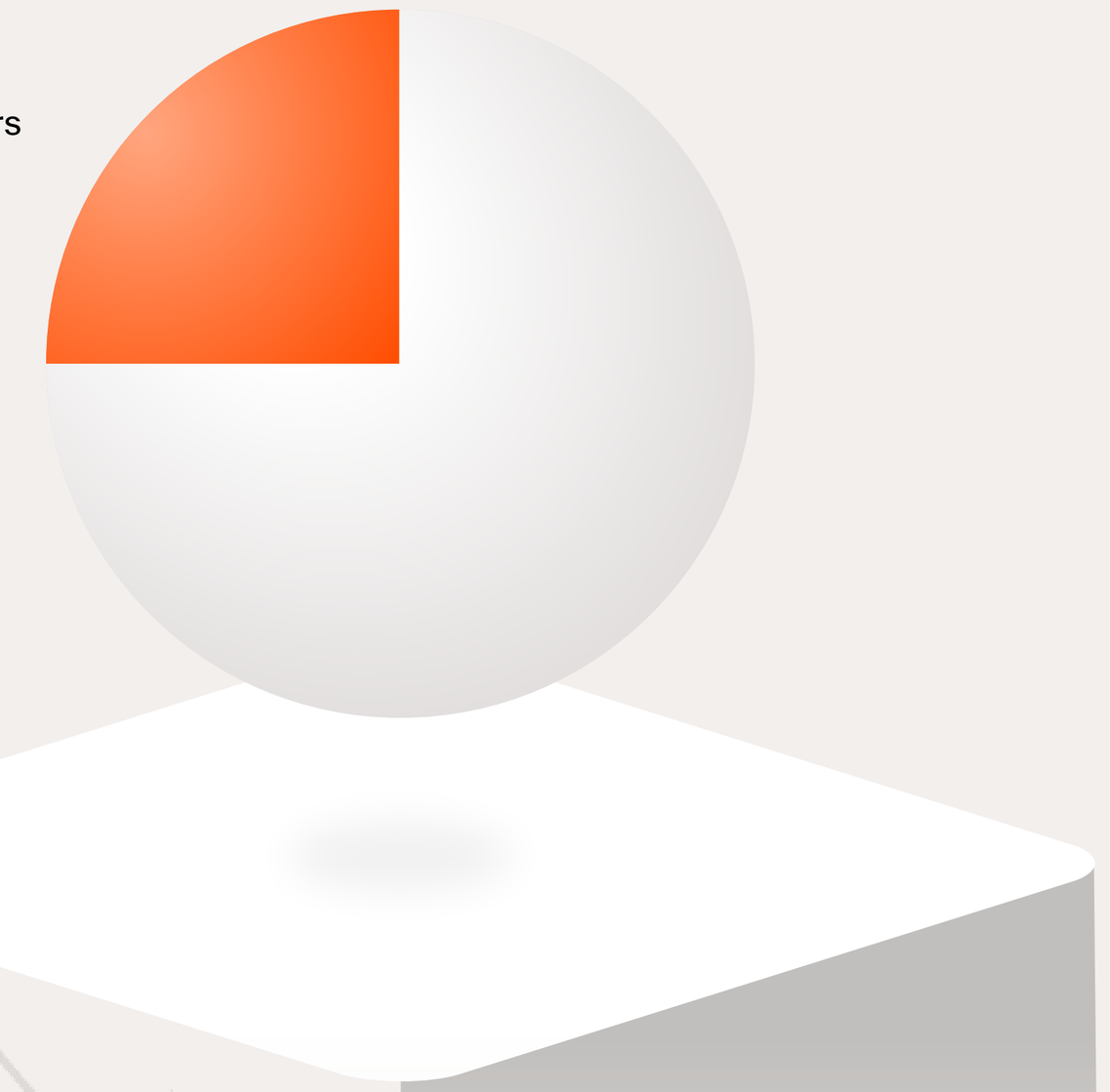
Archway protocol splits the collected gas fees between dapp developers and validators. 50% of base gas spent will be burned, and 50% will go to the contract creators in the form of Gas Rebates. These are configurable parameters and can be adjusted over time through network governance. From the dapp developer's perspective, a contract receives a 50% rebate on all gas paid. From the validator's perspective, foregoing a portion of gas fees in the near-term effectively drives transaction volumes, fees, and value of the underlying network up in the future.

From a protocol security perspective, it would not be profitable for an attacker to spam transactions on the network as gas rebates recoup only part of the fees paid (50%) and the protocol enforces a minimum consensus fee per transaction. As an additional safeguard against potential abuse, uploading new contracts requires higher gas fees than normal transactions to prevent the deployment of spam contracts. However, this number does stay sufficiently low as to allow smaller projects to upload contracts. Gas fee rebates are automatically paid out by the network on a per-block basis.



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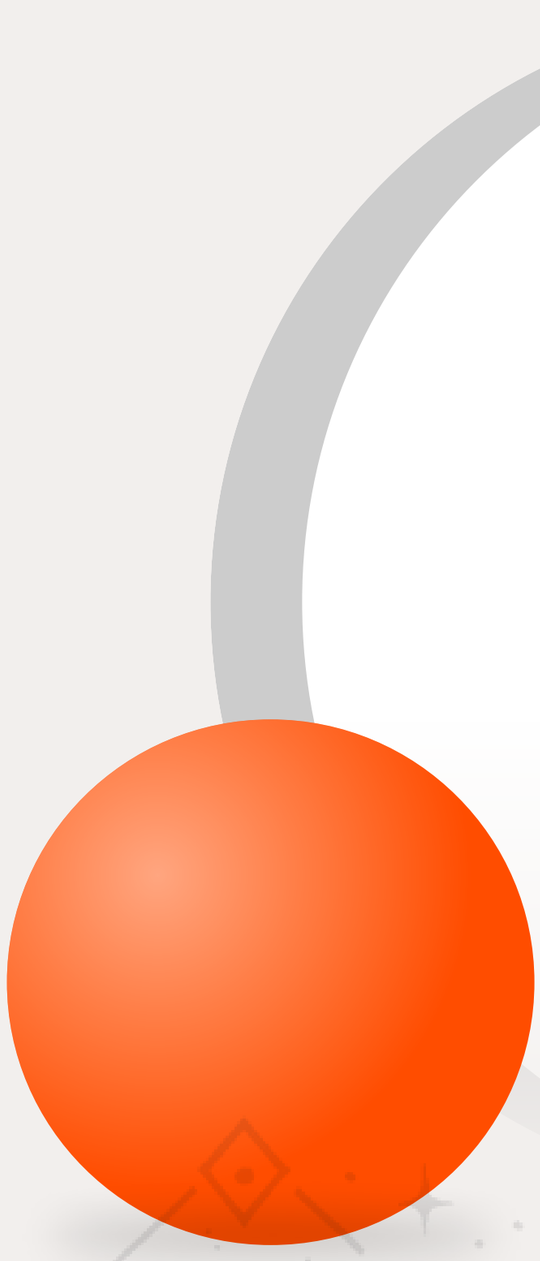
INFLATION

The overall inflation rate on the Archway network follows the model of the Cosmos Hub, with total token supply increasing between 7% and 20% annually, depending on the ratio of tokens that are actively staked on the network. The Archway protocol then shares a portion of this total inflation directly with dapps, something Archway refers to as ‘Devflation’. At genesis; 25% will go to dapps and 75% will go to validators. For example, if the network sees total annual inflation of 8%, then 2% would go to dapps and 6% would go to validators. Again, these distribution values are configurable parameters that can be adjusted by the Archway community through network governance. The dapp inflation pool (2% in the previous example) is then proportionally distributed based on the relative amount of gas fees that each dapp generates within a given block. For example, a dapp that is responsible for 10% of gas consumption would be awarded 10% of the available pool.

To mitigate potential Sybil attacks and ensure that spamming transactions is not profitable, each transaction enforces a minimum consensus fee and a minimum price of gas. At network launch, there will be a hard cap based on the total gas fees paid per dapp. A contract deployed to Archway cannot earn inflation greater than the total gas it generates within a block. Implementation of a dynamic inflation cap is being actively researched and can be updated through future governance. Transitioning to a floating cap will provide more flexible distribution and further incentivize developers to continuously improve their dapps. Any surplus in inflation will be contributed to the Archway community pool, where the funds are managed through governance. Inflationary token emissions will be paid out by the network on a per-block basis.

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SMART CONTRACT PREMIUMS



100% for dapps
0% for validators

Smart contract platforms today charge network fees (“gas”) based on the amount of computational processing required by on-chain transactions. While this method of measurement works for the underlying economics of a network, it does not support use cases where a developer has to cover additional costs such as distributed storage, access to off-chain processing, external data sources, or other features such as audited and insured contracts.

With Archway, dapp developers can define custom fees for interacting with their smart contracts. Also known as the “contract premium” this fee provides developers a flexible option to charge different fee levels that are based on their specific use case and operational needs. By default, the smart contract fee is set to 0 $ARCH. On initial deployment, a dapp developer can define their premium. The premium is configurable and the dapp owner can adjust it at any time, even after a contract has been deployed. To streamline the user experience, the smart contract premium is embedded directly in the network fee, so end users are simply presented with a single combined fee when signing a transaction.

Since contracts can be integrated into multiple dapps, developers can earn multiple lines of value across any user base that interacts with their code. They can write and monetize a single contract rather than a fully built out out dapp. Since contracts can be integrated across multiple dapps, they can have multiple streams of fees from any user base or service that interacts with it.

This fee structure is similar in nature to a built-in licensing model, but can be entirely automated through smart contracts on Archway. These new capabilities and incentives encourage more composability, faster iteration cycles, and greater innovation.

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II

EXAMPLE USE CASES

Dapps can choose to allocate the funds they accrue in whatever way is most beneficial to their ecosystem. For instance, they could redistribute funds to their governance token holders, fund core development efforts, cover users' gas fees, seed liquidity pools, contribute to a community DAO, open project bounties, and more. Here's a deeper look into what these use cases can unlock for your dapp.

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SUBSIDIZE GAS FEES

Gas payments remain one of the critical barriers to delivering a simple, intuitive user experience for dapps. Archway supports gasless transactions through the use of pool accounts. A dapp can pull funds from a common pool to sponsor gas payments and completely abstract away that aspect of complexity and friction for their end users. To fund the balance of the pool account, a developer can use the fees and value captured by the dapp itself. In effect, the dapp gets a 50% discount on each transaction from gas rebates along with a portion of inflation and any premiums added. By recycling these funds, dapps have the option to dramatically reduce or eliminate the gas burden for end users, leading to a smoother onboarding process and stronger retention over time.

GOVERNANCE INCENTIVES

The Archway model adds utility to the standard governance token of a dapp or dao. A developer can automatically redirect ARCH tokens earned by the dapp, including gas rebates, a portion of inflation, and even smart contract premium fees, straight to the dapp or dao’s governance token holders. By creating incentivized voting models, developers can actively engage their community.

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SUPPORT THE CORE DEVELOPMENT TEAM

When a dapp is launched, developers supporting the codebase may find it difficult to cover ongoing development costs, as the blockchain industry is still nascent and sustainable business models have yet to materialize. The model introduced by Archway can counter some of these early financial pressures by allocating tokens earned directly to core development teams. This revenue source could serve as a supplement to help sustain projects and allow the team to focus on what really matters — shipping the best possible product, growing their user base, and supporting the community.

Tokens earned by Archway dapps could help developers bootstrap further project developments without requiring external resources. Development teams usually conduct private insider sales that skew early token distribution, or rely on foundation grant programs. Rather than prioritizing the best technology and ecosystem for their dapp, they often choose a layer 1 based on available grants, getting them locked into a single platform, which may not be the best technological solution.

CONTRIBUTE TO A DAO

Tokens earned by a dapp can be contributed to a community-owned DAO that is focused on coordinating and supporting critical work for its ecosystem. These rewards can be continuously deposited to the DAO's treasury which allows members to collectively manage and deploy the assets based on the specific needs of the project. Such a DAO could issue grants, vote to fund core development teams, sponsor events and hackathons, commission code audits, open bug bounties, launch education programs, subsidize third-party integrations, and so on.

The DAO itself could exist and operate as a set of smart contracts on top of Archway, so the entire process would be automated and transparent throughout its fund collection, voting, grants distribution, and so on. Giving members collective control over revenue helps actively engage the dapps community, and contributes toward progressively decentralizing the project itself.

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BOOST LIQUIDITY MINING PROGRAMS

DeFi projects that build on Archway could use the tokens earned from Archway to boost liquidity mining yields, a vital strategy for attracting new users and encouraging active participation. For instance, a decentralized exchange (DEX) can be designed to distribute tokens on top of the fees already paid to their liquidity providers (LPs), while a lending platform can allow users to earn supplemental tokens for depositing and borrowing assets. Although similar matching and subsidy programs have been run elsewhere as temporary promotions, the steady drip of additional incentives from the Archway protocol creates unique opportunities to serve as a continual source for boosted yields.





CREATE A PAYMENTS SYSTEM

Stablecoin issuers may partner with payment processors built on Archway to allow for more cost-effective transactions for the end user. Let’s say a user wants to make a purchase using a stablecoin on top of Archway. The user would trigger a contract on the payment processor, which in turn would trigger the stablecoin contract, allowing both contracts to earn half of the gas fees, plus whatever premium was added to each contract. These fees could help forgo or lower traditional fees charged by traditional payment processors such as Visa or Mastercard (usually 3%).

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ACCESS TO COSMOS AND BEYOND

Archway: the launchpad to Cosmos.

Built on Cosmos, the Archway protocol enables dapps to plug directly into a vast multi-chain ecosystem, reaching as many users and assets as possible.

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INTER-BLOCKCHAIN COMMUNICATION PROTOCOL (IBC)

The IBC protocol makes it possible for blockchains to connect to each other. Built on Cosmos, Archway natively integrates IBC so users can frictionlessly exchange assets and data with other Cosmos-enabled chains. Dapps deploy straight to Archway and plug directly into IBC without requiring additional development or the need to spin up an independent chain. This native integration helps expand a developer's addressable market by opening up access to users and liquidity from other chains, while also allowing their token to be ported and utilized elsewhere. IBC was successfully launched in early 2021 and is now running at scale and growing rapidly.

The IBC protocol has been adopted by leading networks such as the Cosmos Hub, Crypto.org, Akash, Kava, Secret Network, Injective, and Osmosis; while more and more major networks are integrating each month. With each new chain, IBC is unlocking more and more value, while its network effect gains momentum.

In a sense, Archway's native IBC integration enables developers to future-proof their dapps. Rather than betting on a single isolated chain or scaling solution, dapps built on the Archway protocol exist across an interconnected network of chains that can be accessed with ease.

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BRIDGES TO MAJOR NETWORKS

Beyond interchain communication between Cosmos-based networks, efforts are underway to connect major chains such as Ethereum, Polkadot, Solana, and Celo. Integrating with other major Layer 1 networks helps dapp developers extend their reach even further by connecting with dapps, assets, and users outside of the Cosmos ecosystem.

Advanced bridges such as Gravity Bridge, Axelar, Nomad, and Connext, among others, are unlocking advanced interchain communication between the Cosmos ecosystem and Ethereum and other Ethereum Virtual Machine (EVM)-based chains. These integrations will enable developers to pull native Ethereum assets such as ERC-20s and ERC-721s into their dapps, as well as bring their own assets over to Ethereum.

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FAST AND LOW COST TRANSACTIONS

Archway is powered by Tendermint Core (aka CometBFT), the most advanced and proven BFT consensus in existence. Considered the gold standard for building Proof-of-Stake (PoS) systems, the Tendermint Core consensus engine has been widely adopted across the industry. This efficient consensus model makes it possible to process transactions in as little as 6 seconds and at an approximate cost of $0.01 per transaction. Capabilities for fast and low-cost transactions allow developers to create applications and experiences for mainstream users.

AN ENERGY EFFICIENT BLOCKCHAIN

By nature of its design, Archway is a fast and scalable network with a dramatically smaller environmental impact relative to major Proof-of-Work (PoW) blockchains such as Bitcoin. The Archway Proof of Stake consensus mechanism utilizes the Tendermint engine to achieve high performance while still maintaining a low carbon footprint. Compared to traditional Proof-of-Work consensus on other major chains, the Archway network consumes roughly 2M times less energy (less than 1%).

See Why Blockchains Need Cosmos Proof-of-Stake for a Sustainable Environment ↗.

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IV

NETWORK IMPACT

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THE POSITIVE FEEDBACK LOOP

Building on top of the Archway network encourages a positive feedback loop through its programmatic incentives. The opportunity to earn a portion network fees and inflation, as well as premiums in the form of tokens incentivizes developers to build on Archway. The more dapps are built on top of Archway, the more users and liquidity the network acquires. In turn, this attracts more developers that are looking to leverage those users and assets.

This feedback loop draws in more developers, users, liquidity, and dapps, creating a flywheel effect that continually drives both the utility of, and value to, the underlying protocol.

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SUSTAINABLE OPEN SOURCE DEVELOPMENT

Open source software for dapps is very different from traditional open source software. Unlike traditional open source software, smart contracts are immutable, meaning that the code doesn't have to be continuously updated or tightly maintained. One well-deployed smart contract can generate recurring fees to supplement a developer's income and business model for however long the contracts are utilized.

A key benefit of building on the Archway protocol is the ability for developers to directly receive protocol token supply for their work, without having to rely solely on a business model of their own. Since network fees and incentives are shared with dapp developers, they can earn recurring streams of revenue and use the funds to pay the core team and continuously develop future versions of their dapp.

VALIDATORS' POINT OF VIEW

Though validators share fees and inflation with dapps, the network distribution model is designed to sustain long term growth. In essence, validators forego a portion of fees now in order to attract more developers to the network later. More developer activity means more end-user adoption, which ultimately drives volume and value to the network and validators themselves over time.



BURNING VERSUS REDISTRIBUTING TOKENS

The difference between burning and distributing tokens to dapp developers on Archway was evaluated in depth. Ultimately, the Archway protocol's approach of continuously redistributing network fees to the community is more sustainable than the alternative. While there are merits to burning tokens and its deflationary impact, such as increasing scarcity, doing so could translate into even more expensive gas fees, which risks pricing out developers and further complicating the user experience. The Archway protocol is designed to support and attract builders by incentivizing and supporting developers through continuous revenue generated directly by the dapps themselves.

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V

NETWORK ARCHITECTURE

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ARCHITECTURE OVERVIEW

The Archway network is built using the Cosmos SDK, Tendermint, IBC, and CosmWasm. The network starts as a Proof-of-Stake (PoS) network, with modified Minting, CosmWasm, Distribution, Staking, Group, and Governance Cosmos-native modules that manage the Archway inflation and value capture system.

SMART CONTRACTS

The Archway protocol uses CosmWasm, WebAssembly (Wasm), Rust, and Go. Over 40 high-level programming languages support Wasm, including C and C++, Python, Go, Rust, Java, and PHP.

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Dapp vs. App Chains

While the ethos of Cosmos is to allow the creation of self-sovereign chains, in many cases, it may make sense for a project to first deploy as a dapp. There is a lot of overhead involved in launching and maintaining a standalone chain. While the Cosmos SDK simplifies much of the technical effort to build your own self-sovereign app chain, a developer still needs to attract and sufficiently incentivize a strong community of validators to run the network, which can be a daunting endeavor for early projects. Consider the following tradeoffs between building your core logic as dapp versus building your logic as an independent app chain.

	App Chain	Dapp
Speed of development	○	●
Ease of development	○	●
Complexity of Logic	●	●
Maintenance overhead	○	●
Level of customization	●	○
Strict resource control	○	●
Native chain features	●	○
Scalability	●	●

MIGRATING DAPPS TO SELF-SOVEREIGN CHAINS

Some projects may find that starting to build their solution as a dapp rather than a self-sovereign app chain better suits their needs. However, the requirements of software projects inevitably evolve over time. Archway is built around the Cosmos vision of self-sovereign chains that provides proven migration support. Archway provides a simple way to deploy contracts to the Cosmos ecosystem. For many developers, continuing to run those contracts on an established chain like Archway is sufficient.

However, for those dapps that hit a certain level of traction and require a network that can be tailored to their specific requirements, it makes sense to run their own dedicated chain. This migration is straightforward because CosmWasm contracts are portable across chains, and the Ignite CLI allows developers to spin up and configure their own independent chain in a matter of minutes. In this sense, Archway can be seen as a launchpad into Cosmos, with the flexibility for developers to easily migrate to a standalone chain if and when a dapp is ready.

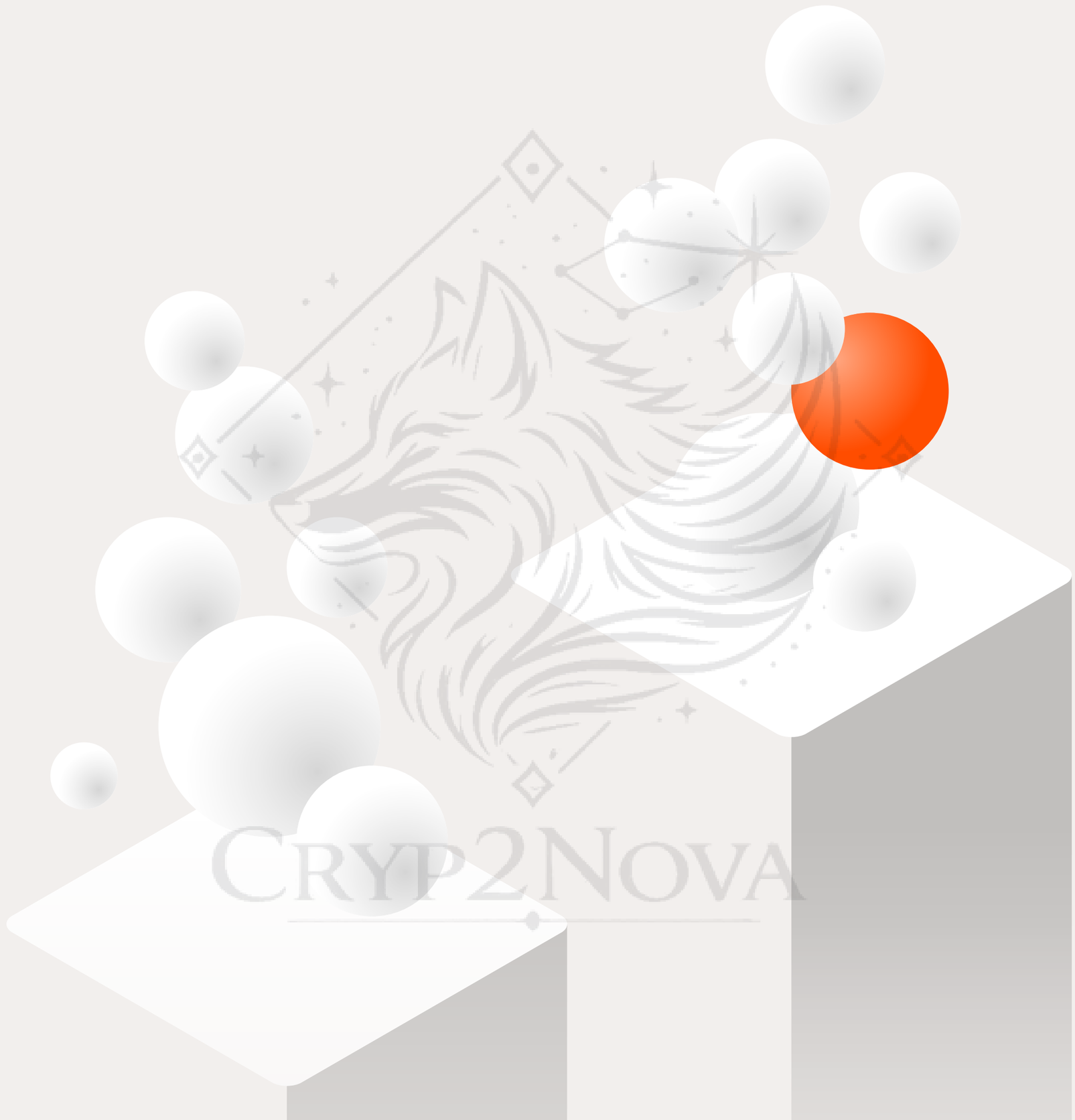
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DECENTRALIZED GOVERNANCE

Archway governance is the process by which network participants and token holders can influence the future direction of the protocol through proposals and on-chain voting.

In addition to fees and staking, Archway's native token is used for governance. This helps maintain and support Archway's decentralized community while ensuring fair and transparent participation.

All holders of the native token can propose changes to the Archway protocol, and all stakers of the native token can vote on active proposals. Proposals that reach a consensus threshold are adopted. Proposals can range from specific feature upgrades to even changing the governance system itself.



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Appendix A:

Archway Terminology

CosmWasm

A framework that allows developers to write multi-chain smart contracts using any programming language, including Rust, which compiles to Wasm.

Dapp

A decentralized application built on Archway that combines a smart contract and a frontend user interface.

Inter-Blockchain Communication protocol (IBC)

A generalized cross-chain communication protocol for transferring value and data between independent networks.

Pool Account

A common pool Archway dapps can fund and then use to sponsor gas payments for end users.

Ignite CLI

An easy-to-use CLI tool for creating sovereign application-specific blockchains using the Cosmos SDK and Tendermint.

Tendermint

A byzantine fault tolerant (BFT) blockchain engine that handles networking and consensus, and a generic application interface (ABCI).

WebAssembly (Wasm)

An open standard developed by a consortium of tech companies that defines a portable binary-code format for executable programs, and a corresponding textual assembly language, as well as interfaces for facilitating interactions between such programs and their host environment.

Value Capture Engine

The combination of Archway's core modules that enable dapps to earn.

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