[Proposal ##][LAST CALL] Launch Neutron on Replicated Security

Change log

- 2023-03-21 Created initial post
- 2023-03-30 Added provisional report from Informal Systems
- 2023-04-05 Economics and timeline update
- 2023-04-20 **Last call:** Added final report, soft opt-out, downtime window and cleaned up technical requirement section

Summary

Proposal 72 passed in July 2022, providing support and $ATOM funding to the development of Neutron, a DeFi Hub and permission-less CosmWasm execution layer to be launched on Cosmos Hub as a consumer chain.

Neutron's initial development is now complete: all core modules have been implemented, audited, and successfully run on testnet (`Quark`, `Game of Chains`, `Baryon`, `Rehearsal`, `Meson`, `Pion` and others). Through bleeding-edge Interchain Transaction and Interchain Queries modules, Neutron is now ready to bring truly interoperable smart-contracts to the Cosmos Hub.

This document provides detailed information about Neutron and its future relationship to the Hub, and proposes to launch Neutron as a consumer chain using replicated security. **It also incorporate community feedback in the form of a soft opt-out feature for the bottom 5% validators, an extended downtime window (~4 days) and allocating unclaimed airdrop tokens to the Cosmos Hub.**

Governance votes

The following items summarize the voting options and their significance for this proposal:

- YES - You agree with the terms of the proposed security agreement and want Neutron to be secured by the entire Cosmos Hub validator set using Replicated Security.
- NO - You do not agree with the terms of the proposed security agreement and/or do not want Neutron to be secured by the Cosmos Hub validator set using Replicated Security.
- NO WITH VETO - You consider this proposal (1) to be spam, i.e., irrelevant to Cosmos Hub, (2) disproportionately infringes on minority interests, or (3) violates or encourages violation of the rules of engagement as currently set out by Cosmos Hub governance. If the number of 'NoWithVeto' votes is greater than a third of total votes, the proposal is rejected and the deposits are burned.
- ABSTAIN - You wish to contribute to quorum but you formally decline to vote either for or against the proposal.

Replicated Security

Revenue share

An initial security agreement between Neutron and the Hub was set by Proposal 72: in exchange for providing security to Neutron, the Hub would receive 25% of its **transaction fees**. To better align incentives, Neutron proposes to also share 25% of its **MEV revenue**:

- **Transactions fees:** Transactions fees protect the network from spams and can be paid in ATOM or NTRN. Native USDC may be added shortly after launch. Transaction fee revenue scales with user and application adoption.
- **MEV revenue:** Neutron will be running on a version of tendermint that features a blockspace auction, enabling searchers to bid for specific bundles to be included by block producers at the top of Neutron's blocks. MEV revenue scale with activity, volume and TVL, and bids are denominated in NTRN.

As a result, if/when Neutron is launched on Replicated Security, the Cosmos Hub will receive and share **additional rewards with ATOM stakers and validators** denominated in NTRN from transactions fees and MEV bids, as well as extra ATOM from transaction fees.

Synergies

Vertically Scaling Replicated Security

Launching applications as appchains secured by the Cosmos hub requires validators to run additional nodes for each consumer network. This requires hardware, work, etc. which translates into additional operational expenses for the Hub's validators and limits the short-term scalability of the technology.

Smart-contracts, on the other hand, do not create any additional cost for the validators. By providing a permission-less smart-contract environment that is secured by the Cosmos Hub, Neutron lets projects launch on RS as smart-contracts without generating any additional cost for the Hub.

In other words, **Neutron allows Replicated Security to secure hundreds of applications and generate additional revenue for the Cosmos Hub without any additional cost**.

Strengthening ATOM

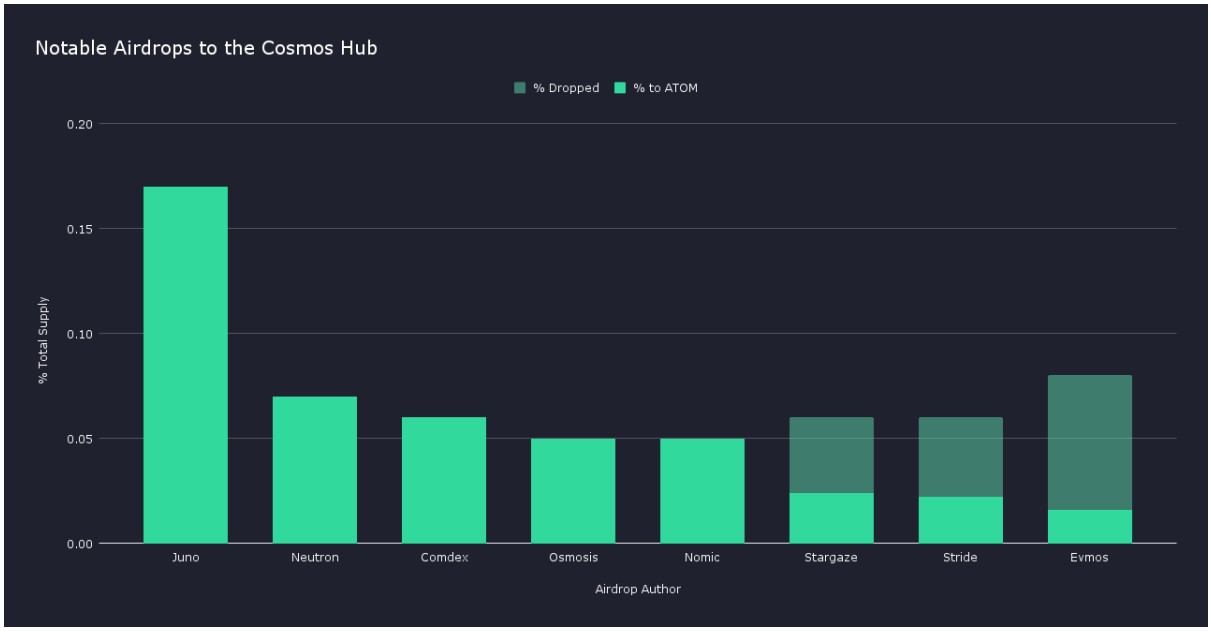
In addition to generating long-term revenue for the Hub, Neutron will help strengthen ATOM's position as **Cosmos' reserve currency**:

- **ATOM in DeFi:** Neutron is designed to host an ecosystem of DeFi product built around NTRN and ATOM, generating utility and demand for the tokens. Applications built on Neutron will enable Cosmonauts to use native and liquid staked ATOM to provide liquidity, lend, borrow, wield governance power, strip bonds, and more. They will drive demand for ATOM and reduce the circulating supply by enabling Cosmonauts to obtain rewards by locking up their tokens in DeFi protocols.
- **ATOM in Treasuries:** Neutron provides the cross-chain infrastructure and flexible execution-environment required to service large treasuries across the IBC ecosystem. With primitives such as DAODAO, Timewave and Gitcoin possibly launching on Neutron, the Hub would finally have the tools to enter secure, programatic agreements with other chains, protocols and treasuries: tokenswaps, quadratic funding rounds, loan agreements, protocol-owned liquidity, etc.

Initial Token Allocation

To give thanks to the Cosmos Community for its support and ensure the long-term alignment of both networks, the genesis state attached to this proposal will contain **an allocation of 70,000,000 NTRN tokens to the Cosmos Hub's validators and delegators.** This corresponds to 7% of the total NTRN supply and 58,3% of the

initial circulating supply. Tokens left unclaimed after three months, if any, will be sent to the Cosmos Hub.

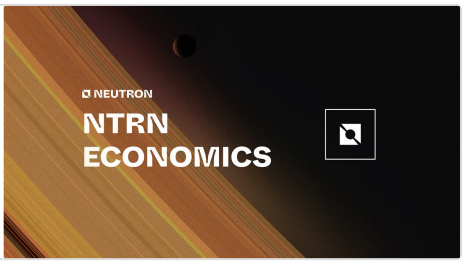


Learn more:

NTRN Economics

Or how the right to govern Neutron flows between participants.

https://blog.neutron.org/ntrn-economics-dcb520e2a776



Soft Opt-Out

The proposed network code includes a "soft opt-out" feature which protects the bottom 5% validators by voting power (more than 60 validators at the time of writing) from being slashed or jailed for downtime on the Neutron network. This feature is intended to alleviate the financial pressure on smaller validators during the network's bootstrapping phase by enabling them to choose whether or not to run a node. "Opted-out" validators will still be considered part of Neutron's validator set, and will still receive their proportional share of rewards as if they were running a node for the network.

Estimated Launch Timeline

Development of the core features of the Neutron network, including support for Replicated Security, Interchain Transaction module, Interchain Queries modules, and smart-contract based governance, was completed in January this year. Neutron’s second audit by Informal Systems started shortly thereafter.

In parallel, additional features such IBC-Hooks support (to facilitate integrations with protocols such as Axelar, Squid and Osmosis without adding protocol-specific logic to the network’s binary), and smart-contracts for the network’s Launch Event were developed.

To ensure the highest degree of security for the network, its ecosystem and users, extending the audit was required.

In addition, features that would significantly reduce the burden on smaller validators were developed and are currently undergoing testing ahead of a potential implementation as part of Neutron's mainnet code.

As a result, the following timeline seems appropriate:

Estimated time	Milestone
~31st of March :white_check_mark:	Final audit report: Neutron’s second audit, which covers the core modules, governance and the launch event contracts is completed.
4th of April :white_check_mark:	Baryon-1 Network Upgrade
5th of April :white_check_mark:	Internal Rehearsal: The finalized binary was launched and all contracts initialized and tested. The stability of the soft-opt out configuration was assessed.
11th of April :white_check_mark:	Public Rehearsal: All Cosmos Hub validators were invited to rehearse the possible launch of Neutron on Replicated Security by deploying the finalized binary on the Replicated Security testnet. A bug was identified on the Provider chain that could lead any consumer chain to halt. Neutron, Hypha and Informal identified, reproduced and patch the vulnerability. A final rehearsal was planned.
18th of April :white_check_mark:	Final rehearsal: Pion-1 successfully launched, and was proven to resist the bug identified the previous week. Neutron's code was thoroughly tested and readied for launch.

21st of April	Voting starts: The final version of this proposal is submitted on-chain.
~5th of May	Voting ends: The proposal is either rejected or accepted by the Hub Community. If the proposal is successful, the launch period starts shortly thereafter.
~8th of May to the 15th of May	Launch period: Neutron launches if/when validators representing two-thirds of the voting power on the Cosmos Hub start running nodes for the network.

Project details

Problem Statement

Driven by Ethereum's scalability issues, the competition between alternative layer-ones and the appchain thesis, Web3 has become increasingly multi-chain. As a result, the fragmentation of liquidity, user-bases and technologies has steadily increased.

Despite the impressive growth of the Cosmos ecosystem and its significant first mover advantage in the field of cross-chain interoperability, DeFi adoption in Cosmos has lagged behind other ecosystems. Developers looking to deploy application as Cosmos blockchains are still faced with significant challenges:

- Launching applications as appchains is time and resource intensive, and slows down iterations.
- PoS security is a chicken-and-egg problem: applications need to be secure to become successful, and they need to be successful to become secure.
- Securing an appchain is costly, and that cost is mainly supported by a single application and token.
- Cross-chain interoperability is asynchronous, preventing some applications and forcing appchains to divert their efforts towards the development of a dedicated ecosystem to complement their application.

Because they enable numerous applications to be deployed on a single blockchain, smart-contract platforms address some of these issues. Yet, deploying applications as smart-contract in Cosmos has so far been severely limiting:

- The economic security of Cosmos smart-contract platforms is low, increasing risk for TVL-intensive applications and bottlenecking growth.
- DeFi applications struggle to compete with high staking rewards, and suffer from shallow liquidity.
- Smart-contracts are incompatible with Cosmos' cross-chain infrastructure, limiting interoperability and growth.

Value Proposition

Neutron v1 solves these limitations by providing **the most secure platform for developers to easily build cross-chain DeFi applications.** Neutron combines the security of the Cosmos Hub, a top 10 blockchain by staked capitalization, with bleeding-edge cross-chain infrastructure to enable DeFi applications to securely scale across a network of 50+ blockchains connected by IBC.

- Through **Interchain Security (aka Replicated Security)**, Neutron provides applications with the highest degree of security possible. Interchain Security creates a mutually beneficial relationship between Neutron and the Cosmos Hub: the more successful Neutron becomes, the more valuable $ATOM is, and the more secure Neutron and the Hub become.
- **Interchain Transactions Module (ICT)**: Enables smart-contracts to own accounts on remote blockchains, execute transactions, track their execution status and react to successes, failures and timeouts through callbacks.

> Alice has ATOM on Neutron, and wishes to obtain ATOM-NTRN LP tokens from Osmosis. Usually, Alice would need to bridge her assets, change network, swap half of the ATOM to NTRN, provide liquidity, bond the LP tokens, etc. With ICT, Alice can instead use a simple smart-contract on Neutron to automate this entire sequence. She can start earning rewards from her LP position in a single transaction.

- **Relayer fee market:** Callbacks are essential to cross-chain composability, but they are capable of triggering infinite loops of cross-chain actions, which could deplete the relayers funds. Neutron's relayer fee market ensures smart-contracts cover gas fees incurred by public relayers. Relayers no longer need to obtain off-chain grants from network foundations to cover their costs. Smart-contracts benefit from a vibrant relayer market and callback capabilities.
- **Interchain Queries (ICQ):** Enables smart-contracts to retrieve data from remote blockchains permissionlessly without relying on trusted third-party oracles. Neutron's ICQs are compatible with every IBC-connected chains and do not require a dedicated module on the target blockchain.

> Bob is building a cross-chain DEX. He wants to let users deposit liquidity on any onboarded blockchains, but needs a way to check that the protocol receives the appropriate tokens and amounts before sending out LP tokens. Thanks to Neutron's ICQs, Bob can register cross-chain queries that stream results to the DEX's smart-contracts, customize the frequency of updates, set data filters, etc, so that his DEX remains secure and trust-less at scale.

Vision

Together, these features enable developers to build secure cross-chain application in a fraction of the time, and at a fraction of the cost. Beyond Neutron serving as a major DeFi hub in Cosmos, Neutron will sponsor the development of the ecosystem in at least three ways:

1. **The Cosmonaut's Homebase:** Neutron rekindles UX, liquidity and communities. It provides a shared execution environment where outposts and bridges can be deployed, enabling synchronous composability between disjointed appchains and with Neutron's DeFi ecosystem. It enables users to manage assets across Cosmos and removes cross-chain complexity from day-to-day operations. It enables communities from every part of IBC to come together, form DAOs and manage treasuries together. It enables Liquidity Providers to deposit once and earn fees from opportunities on 50+ blockchain.
2. **The Hub's Infrastructure Hub:** credible neutrality is paramount to the adoption of ecosystem-wide infrastructure such as nameservices, governance and capital management primitives, etc. As a result, these projects long sought to deploy on the hub. With ICS and Neutron, it becomes possible to deploy an unlimited number of ecosystem-wide infrastructure project on the Hub, while minimizing the strain on the Hub's validator set. In essence, Neutron v1 provides vertical scaling to Interchain Security.
3. **The DeFi dApp's Command Center:** pioneered by Mars Protocol, adoption of the hub-outpost model is accelerating. Yet, appchain are suboptimal hosts for cross-chain hubs: beyond technical overhead, such hubs' high security requirements and low revenues limit the profitability of the overall protocols. Neutron, on the other hand, provides a high degree of cost efficient security, and ships with the infrastructure cross-chain protocols need to manage outposts, making Neutron the optimal hub for DeFi hubs.

Hub requirements

- **Link to binary** - *Will be uploaded when the proposal goes on-chain*
- **Link to genesis file** - *The final genesis file will be provided before the spawn time*
- **Repositories**
  - Network
  - Governance
  - Launch Event
- **Genesis file details:**
  - **Chain type and version:**

        - Cosmos-SDK v0.45.15
        - wasmvm v1.2.3
        - wasmd v0.31.0
        - Go version: v1.20
    - **Economic parameters:**
        - Default fee token: uNTRN. Bridged IBC ATOM will also be accepted.
        - Fee split between consumer and provider: 25% Hub / 75% Neutron
    - **Network parameters**
        - Soft_opt_out_threshold: 0.05 (e.g. 5% of the voting power)
        - Commit_timeout: 1000ms (leads to ~2.5s blocktime on `Pion-1`)
        - Signed_blocks_window: 140,000 blocks (~4 days at 2.5s per block)
- **Software audit information**
    - **2022-12-07 Audit Report - Neutron v1.0 by Oak Security**
    - **2023-04-06 Audit Report - Neutron: Code Inspection and Protocol Analysis by Informal Systems**
- **Ongoing involvement required from Hub validators (e.g., Governance structure,**
  monitoring communication platforms, hardware requirements):
    - **No required governance involvement:** Neutron's governance does not rely on delegations and the gov module, but rather on a custom implementation of DAODAO smart-contracts. Validators are welcome to participate in governance but are not required to do so.
    - **Dedicated communications channels:**
        - Discord: a dedicated channel has been created for Cosmos Hub validators.
    - **Not required but recommended:** Setup relayer between neutron and Cosmos Hub to relay voting power updates
    - **Hardware requirements:**
        - 4 Cores
        - 32 GB RAM

    - 2x512 GB SSD

Reference and information links

- **Cosmos Hub Forum post and discussion**

Ongoing communication platforms

- **Website**
- **Github**
- **Documentation**
- **Twitter**
- **Telegram**
- **Discord**
- **Reddit**