



# **Cosmic Network**

**DePin Solutions for Building  
A Decentralized VPN**



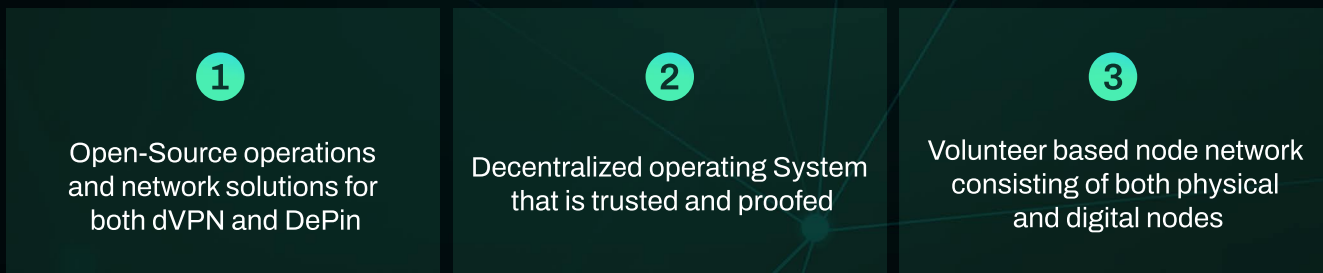
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# 1. Introduction

Cosmic Network has set forth an ambitious path to enable global internet access through a decentralized mechanism that is both trusted and verifiable in its operations. Cosmic Network offers both organizations and individuals alike access to a web of network solutions offered. Cosmic Network operates under three main pillars:



We find ourselves inherently reliant on the internet and computers in general. Every single daily personal and business operation now has a connection to either the internet or to some sort of computer operation, more than likely connected to the internet. This connection is now the most important aspect of a functioning society, both logistically and socially.

But this integration into core societal operations has created an increase in global censorship and mass data collection. In combination with the global dependency on the internet, we can see this trend has foreseeable consequences leading to an infringement on our human rights to information access and to our privacy.

Data is a property that we ourselves should have the privacy to delegate with and our speech shall not be censored or infringed upon. These inherent human rights already exist and have always existed, they have just evolved through the internet and technology. These rights must be protected. Hence the rise of VPN services who claim, unconvincingly, that the data you generate is not logged and is safely protected. They are risking our privacy, our data and our right to the protection and ownership of our data property giving rise to a new solution: **Cosmic Network**.

Traditional web browsing and its associated data is generated, stored, and used as an asset by internet service providers. To subvert this breach of data, people opt for services like a VPN. A VPN routes your IP address to different servers across the world and 'blinds' your service provider to your browsing activities. An added benefit is that your true location is also hidden from the site that you are browsing on.



However, the danger of using these services is the centralized operations and servers that are provided to you, and you are at the mercy of a single entity and its decisions regarding your personal data. Large VPN companies have hundreds of large server centers that route thousands of users through those centers every minute. Access to these servers and their associated data is controlled and gated by these companies. The 'logs' of this data is claimed to be deleted or not sold by the VPN companies, but these claims have come into question in recent years. These centralized VPNs also limit users access through a singular 'tunnel' and all your traffic is routed through this tunnel to the VPN servers on the other side. Because of this, you are limited in your active applications to only those that are routed through a singular access tunnel at a time and you cannot have multiple apps running through multiple tunnels simultaneously.

Cosmic Network's inception was initially inspired by the layered and multi hop encryption employed by tor operating systems. However, historically, tor operating systems have suffered to gain wider adoption and trust for total global use that Cosmic is aspiring for with our decentralized VPN design. Decentralized VPN networks typically must operate under the following conditions:

1. No Logs - Demonstrating that no user browsing or data history logs are centrally stored by the application developers.
2. Encryption - Ensuring end-to-end encryption between users and servers through open-source transparency and application integrity checks.
3. Relay Network - A well-governed, participant-rich relay network designed to deter malicious actors, ensuring exit node hosts do not know user identities.
4. Bandwidth - A system that verifies bandwidth provision by the server provider in return for compensation from the user, in a trustless and verifiable way.
5. Exit Nodes - A network of dVPN servers (exit nodes) owned by multiple parties who remain unaware of the users' identities.

The Cosmic network consists of multiple volunteer participants and is crucial to the decentralization of us as a network:

1. Cosmic Token Holders - Key stakeholders in the forthcoming Cosmic - Cosmos Hub, tasked with securing the network and governing the Cosmic ecosystem.
2. xCosmic Token Holders - Developers who create dVPNs using the Cosmic framework and infrastructure layer, responsible for attracting users and marketing their applications to generate revenue for compensating dVPN node hosts.
3. User - Individuals seeking to use a dVPN built on the Cosmic framework to securely access the internet.
4. dVPN Node Hosts - Community members who contribute their unused bandwidth to dVPNs on the Cosmic network by hosting exit or relay nodes, in return for compensation, provided they meet certain service standards.



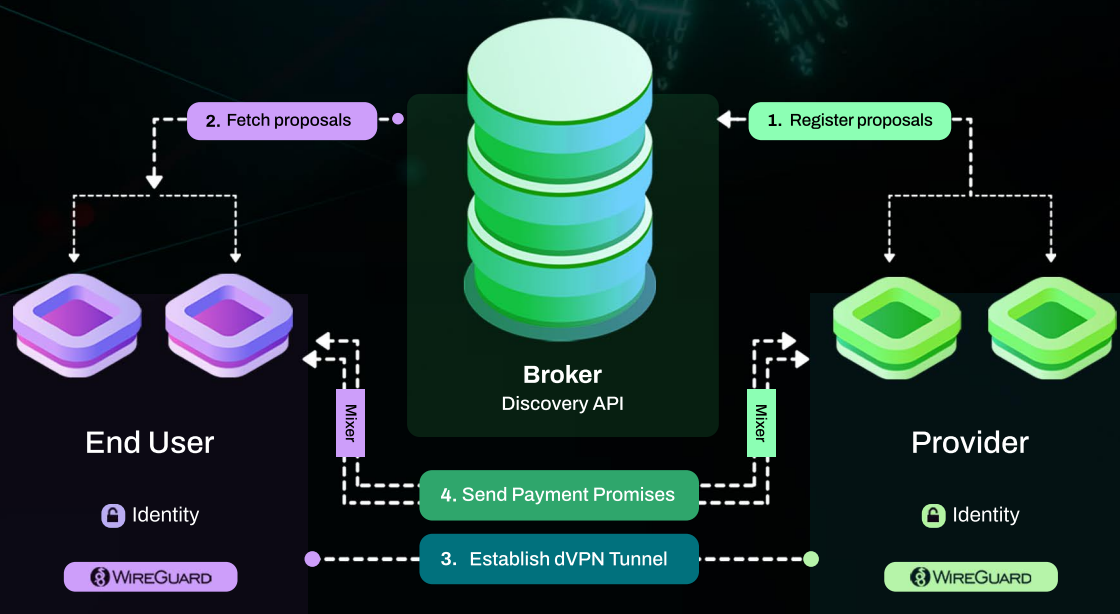
## 2. Cosmic dVPN Design

The architecture of a centralized VPN is built around a network of intermediary servers that play crucial roles in managing user permissions and establishing connections to the VPN node. This reliance on intermediary servers introduces vulnerabilities, including potential points of failure and security breaches, which could compromise the network's resilience. Issues with any of these servers can lead to downtimes, adversely affecting user experience and satisfaction.

By reducing reliance on intermediary servers, Cosmic's architecture ensures a higher level of network resilience and security. Account management and server selection are conducted entirely on-chain, ensuring continuous operation without the risk of disruptions common in centralized systems. This global, decentralized approach to infrastructure, unaffected by outages in one or more data centers, guarantees superior uptime and a better user experience compared to centralized VPN services.

Cosmic's decentralized design relies on the computing power of volunteer operators of the network which offers resiliency that centralized solutions do not have. Cosmic's dVPN is resilient because it is not reliant on central servers, but instead has its load distributed across the globe in highly redundant manners to increase and manage bandwidth capacity and total up-time.

The multi-hop design we implore is necessary to ensure that all users are confidently and successfully shielded from their exit node. In other words, we have designed the system so that the exit or interacting IP address in no way has a connection to the initial user who is properly anonymized.





## 2.1 Blockchain Integration

Exit nodes are the end destination. But, traditionally, to reach these exit nodes, you must first pass through an intermediate server controlled by a third party, introducing a breach point or vulnerability into the system. Cosmic however, leverages the blockchain itself as a sort of registry for user queries for nodes. Nodes have the capability of interfacing with the blockchain to register and update their current details and parameters. Users of Cosmic dVPN can access available dVPN nodes through our Peer-to-Peer marketplace which simplifies this operation and allows the user to select available nodes seamlessly and intuitively. Because this operation of identity verification occurs entirely on-chain there theoretically are only two system vulnerabilities:

1. **Sybil Attacks**
2. **Security breach on the blockchain level**



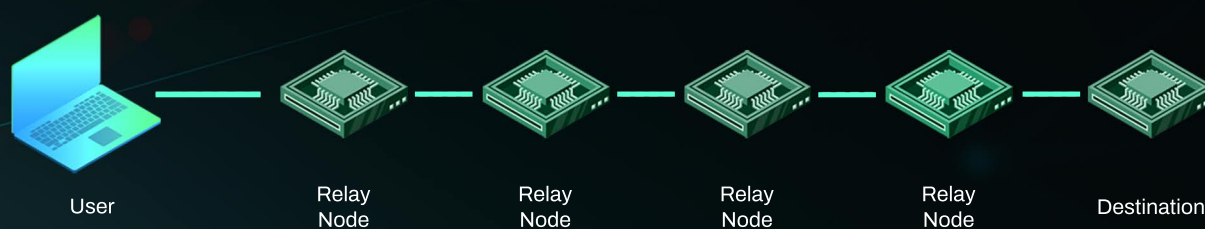


## 2.2 Relay Networks

A core operating principle of a dVPN design is no-log proofs. Inherently, in the Cosmic system, neither of us as the developers nor any other users on the peer-to-peer marketplace can see a user's IP address. However, theoretically, the exit node operator could in fact see the users IP address and is a challenge to verify that this data is in fact not logged. A relay node in our multi-hop system in this scenario would operate as the intermediary solution to this problem as they interact only with the user, other relay nodes, or the exit node as a layer of the onion.

To operate under this mechanism, we must have governance of a wide operating base across multiple networks. While this may impact total internet speed, it ensures the highest blanket of safety and privacy is in effect. It is imperative that relay nodes do not know if they are connecting to the user to prevent a go-between attack of relay nodes to access user information. In a widespread system, even if an attacker attempts to gain access to both relay nodes and exit nodes, there is theoretically a wide enough network to thwart these attempts.

Tor operates under the premise of upholding the principles of decentralization by contributing without direct financial incentives. Contrary to this, the bitcoin network does reward network validators through financial incentives to circumvent potential 51%+ control by a single entity. Therefore, a volunteer-only model is an insufficient mechanism to ensure complete privacy and security. Cosmic employs a Bitcoin like contribution mechanism by operating as a decentralized volunteer-only network, where said volunteers are financially rewarded for their network contributions.





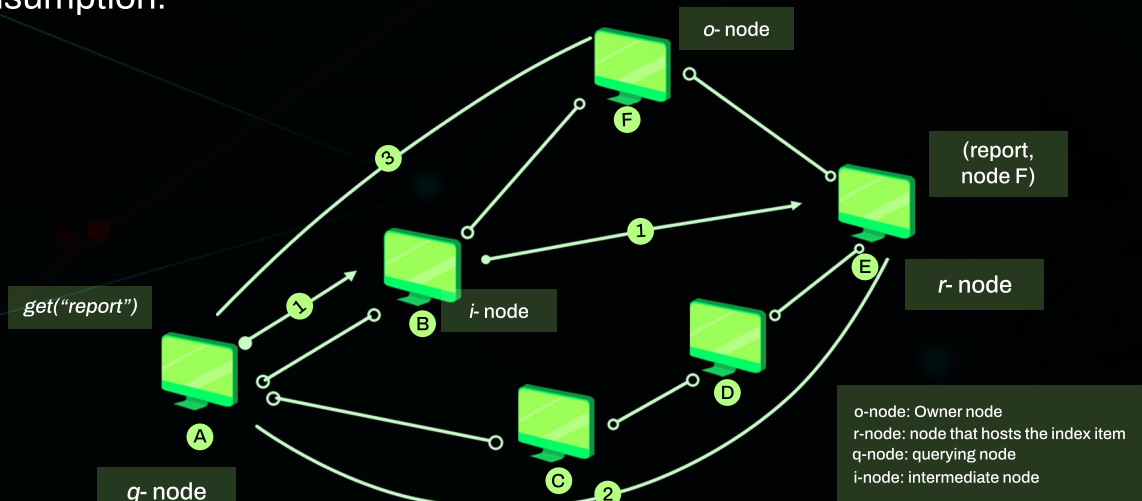
## 2.3 Proof of Bandwidth

Like Proof of Work networks, dVPN networks face challenges in proving the integrity of the reported contributions – whether it is the hashes generated in a PoW mechanism or the bandwidth generated in a dVPN mechanism. Therefore, the implemented Peer-to-Peer system of Cosmic must deter spoofing and ensure fairness and trust among volunteer network participants. Ensuring the verifiability of bandwidth distribution is critical not just for network-centric applications but also for those focused on storage and computing, which likewise consume significant amounts of bandwidth. To address this concern, Cosmic operates with bandwidth signatures provided by the node operators and the user. Should there be any discrepancies in the reported bandwidth usage within this period, indicating at least one malicious participant, the connection is automatically terminated to uphold integrity and fairness in the exchange.

## 2.4 Payment System

The integration of blockchain into the inherent operating system allows for flexible payment options. Payments for dVPN services will be managed with \$Cosmic tokens via the peer-to-peer marketplace for node queries. Additional options such as additional cryptocurrencies and fiat will be onboarded at later dates. However, bandwidth providers can typically expect to pay in fiat denominations as these hardware nodes incur other overheads such as cloud computing, electricity and hardware costs for physical node set up.

For dVPN users, options include a pay-as-you-go mechanism to pay for bandwidth time slots only and a lifetime/pre-paid use option. There are no bandwidth consumption limits under pre-paid options, but the pay-as-you-go option is denominated in 'per GB' consumption.



- (1) A queries the network for "report" - request is forwarded to E via B
- (2) E returns the value "node F" to A
- (3) A consults F for the document "report"





## 2.5 WireGuard Protocol

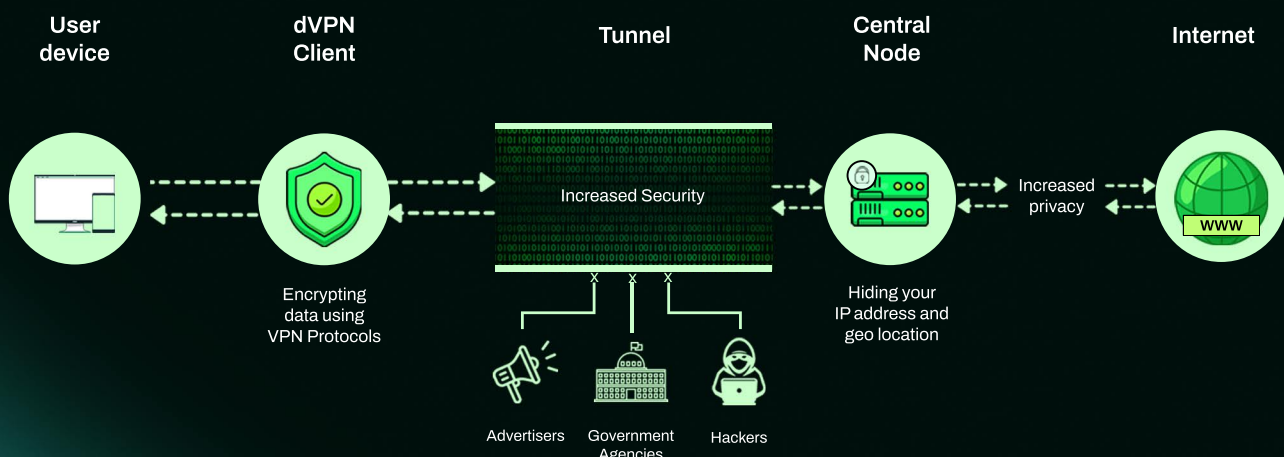
WireGuard functions as a VPN protocol, a crucial set of guidelines for encrypting data and guiding it through a virtual private network (VPN). VPNs act as digital cloaks, hiding user IP addresses and protecting online activities from external scrutiny. The efficiency of a VPN, including the speed of its data encryption and decryption and the robustness of its security, largely depends on the protocol it uses. WireGuard distinguishes itself with its high speed, strong security features, and lean codebase, making it not only faster but also easier to implement and troubleshoot due to its simplified coding.

WireGuard provides a fast and secure way to protect and transmit data over a VPN. It works by creating an encrypted channel between two key components: the client (such as an app on your smartphone) and a VPN server. This secure channel ensures that all data passing between the WireGuard client and the server is encrypted, keeping it safe and private unless decrypted with the correct keys.

What makes WireGuard unique among VPN protocols is its superior connection and data transfer speeds. Instead of utilizing the widespread AES-256 encryption, WireGuard employs ChaCha20-authenticated encryption, which benefits from shorter keys for faster encryption and decryption processes.

WireGuard enhances its efficiency by integrating directly into the Linux kernel for servers and Linux-based desktops. This integration contrasts with other protocols that switch between kernel space and user space, potentially causing delays. By operating directly within the kernel, WireGuard achieves a performance advantage over other VPN protocols.

### How WireGuard VPN works





## 2.6 Split Tunneling

Split Tunneling allows the user to route a portion of their data through an encrypted tunnel while other portions of data maintain internet access. This allows for the user to select apps or windows to be encrypted and others to not be if they are existing trusted apps and do not require VPN protection. These selections can be chosen via the following:

### Policy-based Split

With policy-based split tunneling, routing is based on predefined policies that you or the network admin set up.

### Route-based Split

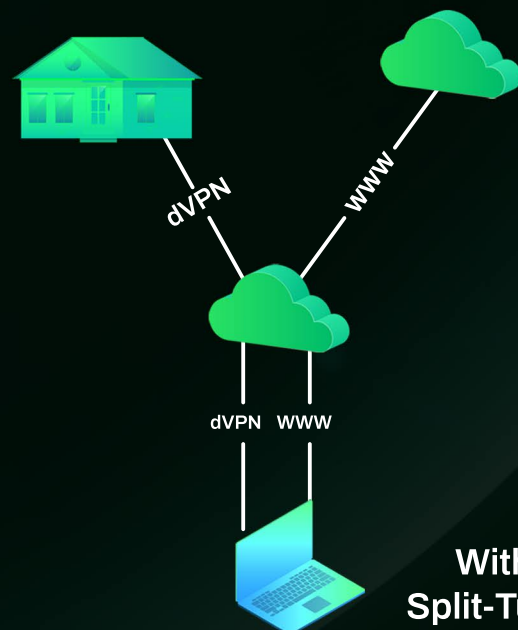
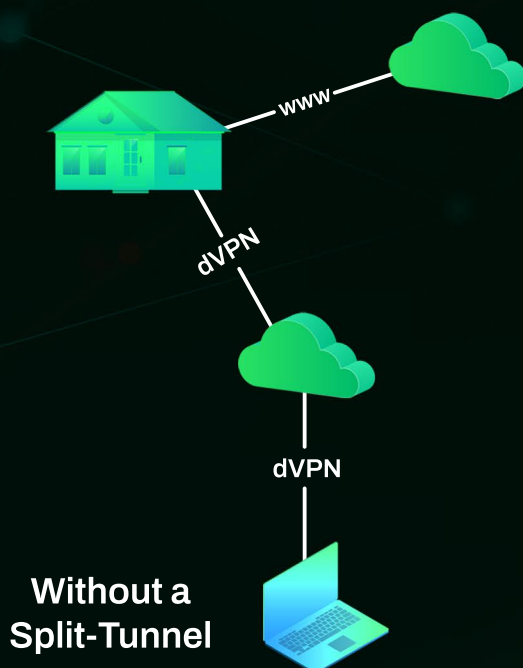
In route-based split tunneling, the traffic is divided based on predefined network routes (which can be dynamic).

### App-based split

App-based split tunneling means you choose which apps do not need VPN protection. The rest of your internet traffic is encrypted.

### URL-based split

URL-based VPN split tunneling lets you specify which URLs you want to exclude from the secure connection. This feature is available either





## 2.7 Multi Hop Connections

Originally inspired by the data encryption techniques used in Tor networks, Cosmic Network has integrated a multi-hop dVPN approach. This method channels traffic through several dVPN nodes, applying multiple layers of encryption to the user's data, thereby significantly boosting anonymity. The general process is outlined as follows:

- 1. INITIAL CONNECTION:** Your device links up with the initial VPN node, encrypting your data at the first connection point. This server provides the first level of encryption and serves as the initial "jump" for your data.
- 2. FURTHER TRANSITIONS:** Post the initial jump, your encrypted data travels through one or more VPN nodes. Each server it passes adds an extra layer of encryption, like layers of an onion, further masking the origin of the data.
- 3. DESTINATION:** After traversing the sequence of multiple VPN nodes, your encrypted data arrives at the exit node, where your data has subsequently been encrypted multiple times over before reaching this end point.

### Dynamic MultiHop Benefits



#### Choose your end point IP

Dynamic MultiHop allows you to select any server you want & create your own server pairs, fully adapting to your security needs.



#### Avoid Censorship

Similar to regular VPN, a double VPN lets you enjoy the internet freely and in a more secure way, thanks to doubled traffic encryption.



#### Increase Untraceability

Dynamic MultiHop allows you to select any server you want & create your own server pairs, fully adapting to your security needs.



## 3.Token

### 3.1 Taxes: 5% buys | 5% sells (50% to marketing | 50% to development)

#### Marketing Wallet

The marketing wallet covers all promotion-related expenses for Cosmic Network. The two main areas of focus are described below:

##### 1. Project promotion for Cosmic Network:

- KOLs covering Social Media promotion such as Twitter, Telegram, YouTube, Tiktok, Instagram etc.
- Conferences & other events for IRL promotion
- AMAs with other communities and partnered projects of Cosmic Network

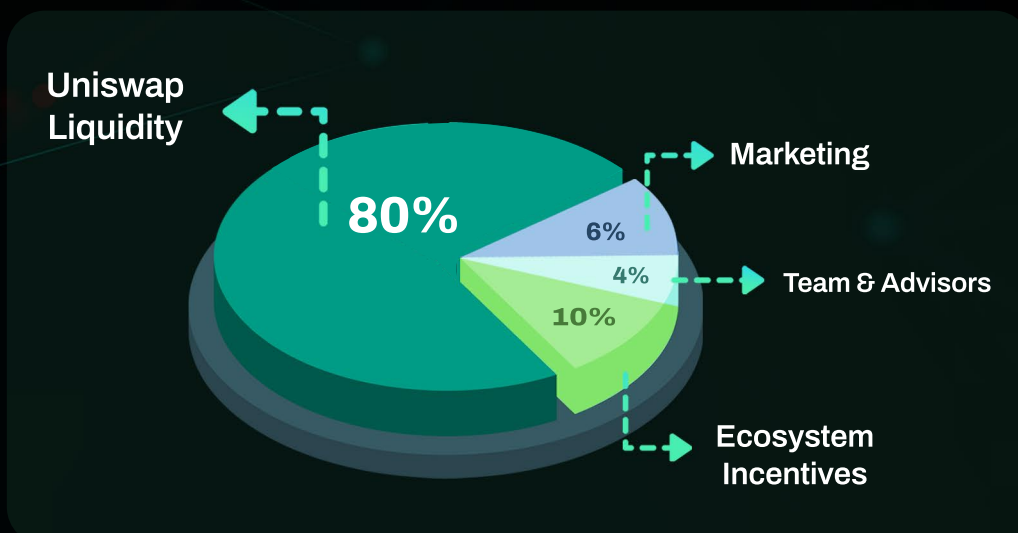
##### 2. Product promotion for Cosmic Hardware:

- Video Ads | Hardware Review | Unboxing Videos
- Physical shops
- Virtual marketplaces
- Billboards

#### Development Wallet

The development wallet covers all expenses associated with the products Cosmic Network is building: this encompasses everything from non-tangible services such as custom smart contracts, marketplaces, and desktop and mobile applications. This also covers tangible physical hardware including router prototypes: smaller routers with basic specifications, to larger routers with AI querying and GPU

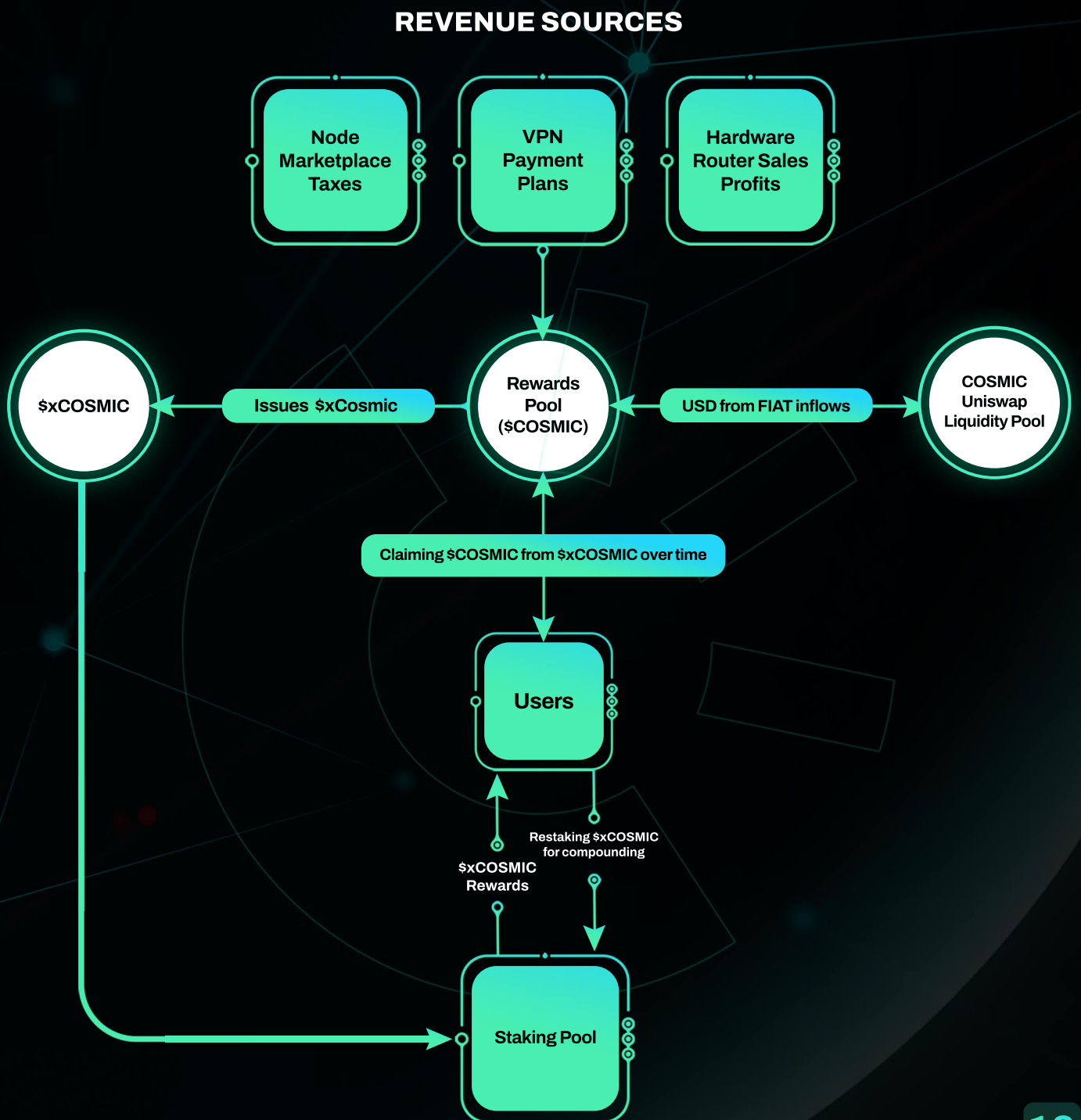
### 3.2 Supply Distribution





### 3.3 Revenue Share Model

Our revenue share model functions as a dividend for \$Cosmic stakers who will earn passive income. This is encompassed by our project and product revenue streams being funneled back into \$xCosmic and, over time, back into \$Cosmic. These revenue streams include, but are not limited to, marketplace sales, VPN payment plans and hardware router sales, thereby adding intrinsic and tangible value to \$Cosmic token holders.





## 4. Hardware Integration

The concept of a Decentralized Physical Infrastructure Network (DePIN) refers to a distributed network model where the physical infrastructure—like servers, routers, and other networking hardware—is owned and operated by a multitude of independent parties rather than centralized within a single organization. This model stands in stark contrast to traditional centralized networks, where all physical components are under the control of one entity, leading to potential points of failure and centralized control over network operations and data.

By distributing the physical infrastructure across numerous locations and operators, the network inherently becomes more resilient to attacks, failures, and censorship. This setup ensures no single point of failure can compromise the network's integrity or availability, significantly enhancing its robustness.

Cosmic's dVPN service naturally aligns with and benefits from the DePIN model. In the context of a dVPN service, DePIN is realized through the network of individual nodes—each node being a part of the physical infrastructure (e.g., routers or servers) spread across various geographical locations and managed by different individuals or entities.

dVPN services can play a prominent role in the DePIN space by serving as a practical application of what DePIN really is. By utilizing and contributing to the development of DePIN, dVPN services drive the adoption and growth of decentralized networks and highlight the viability and benefits of decentralization, encouraging further investment in and expansion of DePIN as an industry.

Moreover, dVPN services can innovate within the DePIN model by developing new protocols, security measures, and user interfaces that leverage the unique characteristics of decentralized infrastructure. This innovation can lead to advancements not only in dVPN technology but also in broader applications of DePIN, potentially transforming how networks are built and operated on a global scale.

dVPN services are not just users of DePIN; we are key players in its development and expansion. By demonstrating the practical benefits of decentralized physical infrastructure, dVPN services help pave the way for a more secure, private, and resilient digital future.



In developed economies, where stable internet connections are the norm, it's both simple and economical for individuals to contribute to the network. This ease of participation presents a stark contrast to the substantial investments required for activities like Bitcoin mining, which necessitates specialized, costly equipment.

Cosmic presents a chance for users to earn passive income by sharing their bandwidth with dVPN services from anywhere in the world. Nevertheless, setting up a Cosmic dVPN node on a virtual machine can be a technically challenging task, which might restrict the growth and diversity of the community of node hosts. Addressing this technical challenge is vital, calling for a straightforward setup process for both engaging with the Cosmic dVPN and hosting nodes to exchange bandwidth for tokens.

For those cautious about using their home IP addresses for hosting exit nodes, Cosmic offers an alternative to run relay nodes. This alternative allows router owners equipped with Cosmic dVPN capabilities to stay anonymous to their internet service providers and profit from providing this specialized service, thus boosting privacy and monetization possibilities for our users.



# Meet The Cosmic Team

## CORE TEAM



### **Asad, CEO:**

With 15 years of experience in enterprise IT infrastructure, security, and networking, Asad has a strong foundation in the technological aspects critical to a tech company's growth. His foray into the crypto world since 2021 has equipped him with valuable insights into blockchain technology, making him an adept leader for Cosmic Network.



### **Farhan, CSO (Chief Strategy Officer):**

As the Web3 Lead, Farhan's transition from Web3 Lead for a 3D Realworld Metaverse project to focusing on blockchain applications in finance and leasing showcases his versatility. With seven years of experience working with top-tier enterprises in Asia and Europe, he possesses a deep understanding of the strategic applications of blockchain technology across various industries.



### **Mahad, CTO (Chief Technology Officer):**

Mahad's five-year tenure in the cryptocurrency sector, working on diverse projects, positions him as a key figure in overseeing Cosmic Network's technological direction, ensuring that the company remains at the forefront of blockchain innovation.

## Overview

The collective expertise of Cosmic Network's team, from leadership to development and project management, underscores the company's capacity to tackle the challenges and leverage the opportunities within the dynamic fields of blockchain and cryptocurrency. Each member's unique background and skill set contribute to Cosmic Network's strategic direction, technological innovation, and project execution, positioning the company for success in the ever-evolving tech landscape.





# DEVELOPMENT TEAM



## Ax, Lead Blockchain Developer:

Ax, Cosmic Network's Lead Blockchain Developer, uniquely combines expertise in blockchain, web development, and artificial intelligence, underscored by a dedication to AI ethics. In blockchain, he excels in creating innovative solutions, utilizing Solidity and web3 technologies. His web development skills include React and Django, focusing on high-performance, user-centric applications. Ax's AI knowledge spans TensorFlow, PyTorch, and ethical AI considerations, enhancing his interdisciplinary approach. This blend of skills enhances Cosmic Network's innovation and mirrors the tech industry's ethical and cross-disciplinary trends.



## Q, Product Manager:

With 17 years of experience in tech and real-time products, Q has led multidisciplinary teams on projects for high-profile clients like Toyota, Disney, Tencent, Samsung, Audi, and UPS. His extensive experience ensures the seamless integration and execution of Cosmic Network's projects.



## Zain:

With seven years of experience as a Principal Software Engineer, Zain brings a comprehensive skill set that includes the MERN stack, AWS, SQL/NoSQL databases, CI/CD, Blockchain, and Web3 technologies. His dedication to delivering high-quality, secure software solutions marks him as a valuable asset to the development team.



## Jay:

Specializing in blockchain innovation, Jay's seven years of experience encompass working on blockchain forks, decentralized exchanges, tokenization, and NFT marketplaces. His deep expertise in blockchain technology is instrumental in propelling Cosmic Network's projects forward.



## Alex:

Specializing in web application development, Alex's expertise spans over five years, with a focus on creating scalable, high-performance applications. His proficiency in a wide range of technologies, from React to NodeJs and MongoDB, alongside his experience with agile methodologies, makes him a key player in the development team.

## 6. Conclusion

Looking forward, Cosmic Network is stepping into an era ripe with promise for reshaping how we think about online privacy, decentralization, and the freedom of the digital world. Drawing inspiration from the intricate encryption of Tor networks and leveraging blockchain's transformative power, Cosmic Network is not just a technological advancement; it's a beacon for a future where internet access is unfettered, and personal data remains personal.

Our journey involves broadening the private internet ecosystem and making it simpler for people to get involved more intricately than they currently are. By partnering with Open-WRT based routers and exploring compatibility with more open-source routers, Cosmic is opening doors for individuals to contribute to a decentralized web right from their living rooms. This strategy aims to empower users, allowing them to earn by sharing their bandwidth, and at the same time, strengthen the network's fabric of operations.

The urgency for a platform like Cosmic has never been clearer in an age where data privacy concerns loom large, and censorship threats persist. As Cosmic evolves, it's set to refine its offerings, enhancing ease of use, and ensuring the network remains robust against disruptions. The initiative to welcome a wider audience of users and node hosts is crucial for fortifying the network's security and operational resilience.

Moreover, the future of Cosmic Network is intertwined with the evolution of its economic model, including token utility and incentivization schemes. The development of an intuitive and fair compensation system for bandwidth sharing will be pivotal in fostering a vibrant community around Cosmic's dVPN services.

The trajectory of Cosmic Network represents a continued shift towards reclaiming the internet as a space for secure, private, and unrestricted exploration. By committing to a user-friendly, decentralized approach, Cosmic not only challenges the status quo but also lights the way for a digital landscape where privacy and freedom are paramount. The path Cosmic is charting is ambitious, yet our potential to redefine our online experiences is undeniable. Here's to navigating this journey, with Cosmic guiding us toward a more liberated digital realm.