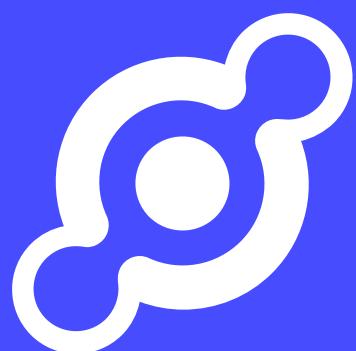




# DePIN:

*Decentralised Physical  
Infrastructure Networks*



# Key Takeaways

- 1** DePINs are rapidly growing as a solution for building real-world infrastructure through blockchain technology and token incentives, effectively solving the "cold start" problem for large-scale networks.
- 2** These networks provide a range of services, from wireless connectivity to data storage, offering real-world applications beyond speculative trading.
- 3** Despite their potential, DePINs face significant hurdles, including regulatory uncertainty, competition from Web2 incumbents, and the need for sustainable tokenomics to ensure long-term viability.

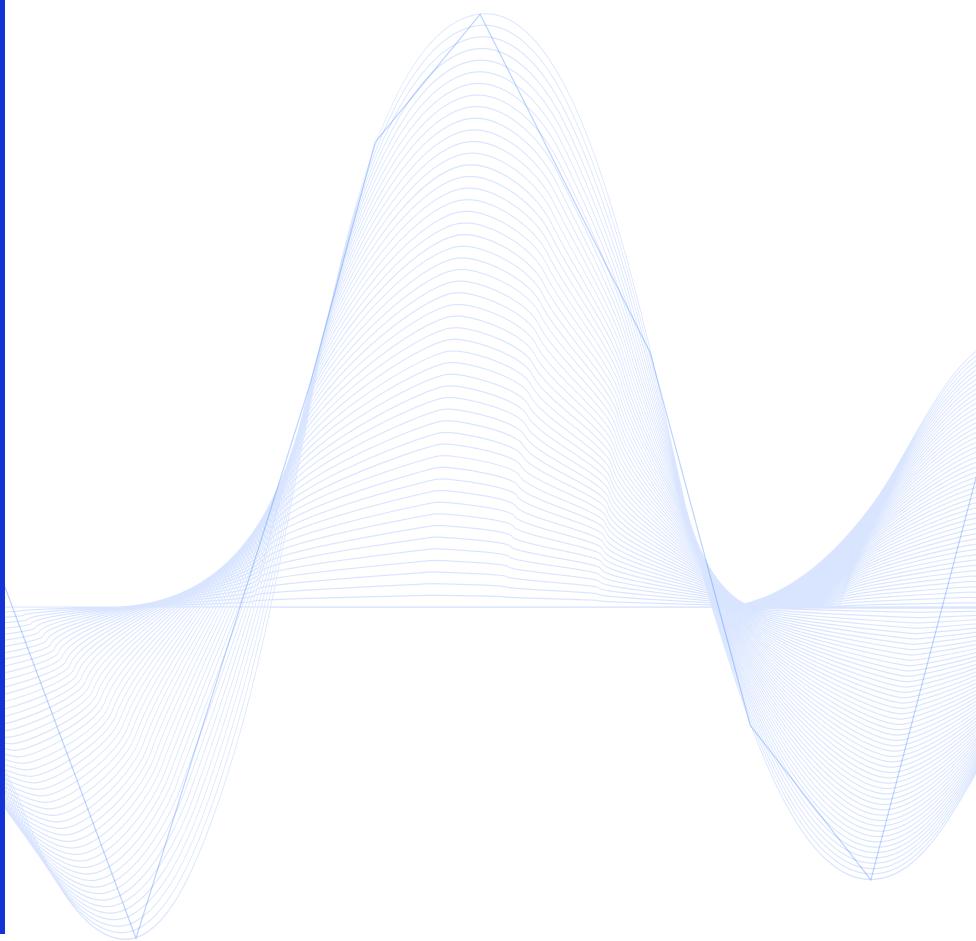
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# What Is DePIN?

DePINs, or decentralised physical infrastructure networks, leverage blockchain technology and token rewards to crowdsource the development of real-world physical and digital infrastructure networks. Participants in these networks contribute underutilised resources or financial capital and, in return, earn rewards in the form of project-specific tokens.

## *Did You Know?*

More than 2,300 DePIN projects exist, according to [DePIN.Ninja](#), a dashboard covering all things DePIN.

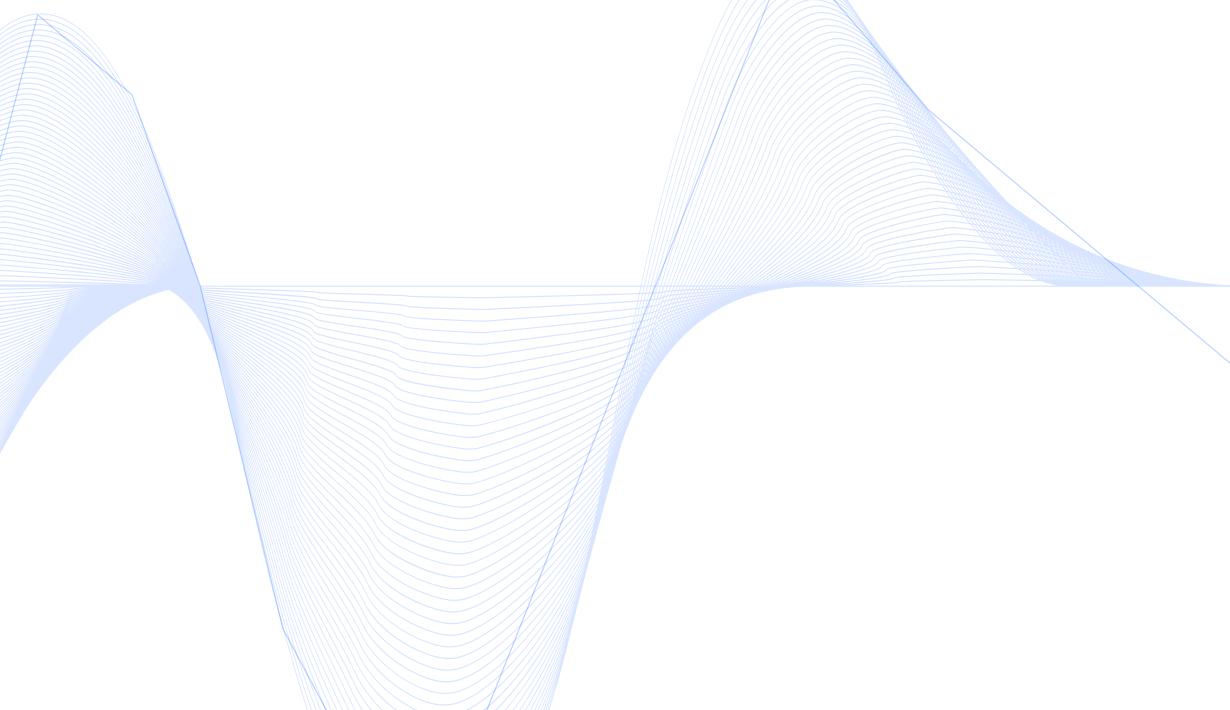


This approach offers a solution to the “cold start” problem that many networks face, especially those needing substantial initial capacity. By using innovative incentives, DePINs can encourage participation and infrastructure provision from day one.

Almost always, DePIN projects fall into one of the following two categories:

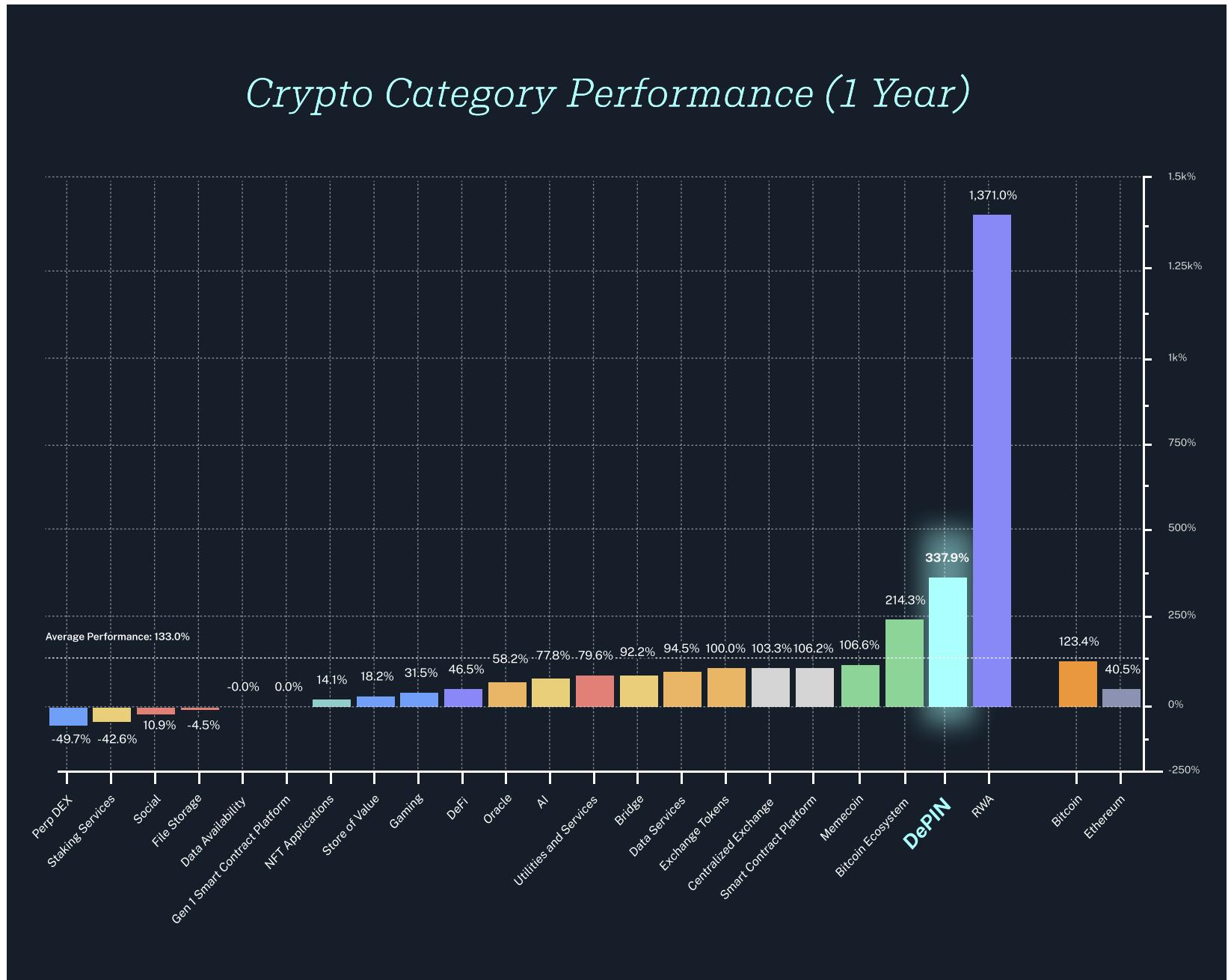
- 1 **Physical resource networks** incentivise participants to use hardware to offer real-world services, such as wireless connectivity, energy distribution, geospatial mapping, and sensor data collection. Examples include decentralised wireless networks and global sensor systems.
- 2 **Digital resource networks** focus on using software to provide services like computing power, storage solutions, and bandwidth. They extend beyond physical resources, offering globally accessible infrastructure and enhancing various digital services.

Physical Resource Networks	Digital Resource Networks
Servers	Computing power
Sensors	Bandwidth
Wireless networks	



# DePIN Category Performance

The DePIN category/sector has been among the top performers over the last 12 months, second only to [Real World Assets](#), according to Artemis data. However, this assessment includes just four DePIN coins, while there are actually several more. Despite this, DePIN has emerged as a growing narrative over the past year, with the term itself being coined in late 2022.



DePIN has been a top performing category in the last 12 months. Source: [Artemis](#).

# Potential Benefits of DePIN

DePIN projects aim to deliver several advantages over traditional infrastructure systems, offering unique solutions to both existing and emerging problems:

- 1 **Solving the cold start problem.** Many networks require a substantial initial supply-side capacity to function effectively. DePINs tackle this issue by using token incentives to encourage the early adoption of their networks. This makes it easier for resource providers to get involved without relying solely on a centralised authority to bootstrap the network.
- 2 **Tangible use cases for token incentives.** Token incentives in DePIN ecosystems serve a real purpose for both demand and supply sides. Resource providers are rewarded for contributing to the network, while consumers gain access to services such as internet connectivity, mapping data, or computing power. These incentives create an ecosystem where tokens have direct utility, rather than existing solely for speculative trading.
- 3 **Cost advantages.** One of the key benefits of DePINs is their ability to offer services at lower costs compared to traditional Web2 models. Since DePINs crowdsource resources from participants and reduce the need for central intermediaries, they can significantly cut operational expenses. For example, decentralised wireless networks like Helium provide more affordable 5G coverage by using user-operated hotspots.
- 4 **Flexibility and scalability.** DePIN networks can grow organically in response to local demand. This flexibility enables networks to expand or contract based on the resources available and the needs of the community, something centralised systems struggle to achieve. This local scaling allows for more targeted, efficient resource management.

“ *DePIN projects clearly show what crypto is really good for and can solve real-world problems.*



# Risks and Challenges For DePIN

While DePIN offers many benefits, it also comes with several risks and challenges that must be carefully managed:

## Unproven Tokenomic Models

Sustainable tokenomics is essential for the long-term success of DePIN networks. Projects need to implement reliable mechanisms that tie network activity to a reduction in token inflation and reward the most valuable aspects of supply-side infrastructure. A lack of sound tokenomics can lead to unsustainable network growth and diminished value for participants.

## Difficulty In Challenging The Incumbents

One of the biggest challenges for DePIN projects is competing with established infrastructure giants. For example, decentralised storage networks like Filecoin and Arweave face stiff competition from cloud storage giants like Amazon Web Services (AWS), Microsoft Azure and Google Cloud.

Similarly, decentralised wireless networks like Helium aim to disrupt major telecom companies (e.g. Telstra, Optus). These incumbents have significant market presence, established customer bases, and vast financial resources, making it difficult for DePIN projects to capture market share. Moreover, convincing consumers and businesses to switch to blockchain-based alternatives requires overcoming concerns about reliability, performance, and security.

## Infrastructure Reliability

Since DePIN projects rely on crowdsourced resources, the quality and reliability of the services provided can vary. For instance, a decentralised wireless network might suffer from inconsistent coverage due to differences in hotspot performance and location.

## Regulatory Uncertainty

DePIN projects often interact with real-world assets and services, which can bring about regulatory challenges. The decentralised nature of these networks makes them difficult to regulate, creating uncertainty around compliance with existing laws and standards.

## Adoption and Monetisation

The success of DePIN projects hinges on user adoption and the ability to monetise the services or data they offer. Without sufficient demand-side growth, the network may struggle to maintain its supply-side incentives.

Despite these challenges, DePINs continue to attract significant interest, given their potential to solve real-world problems through decentralised infrastructure.

# 2 DePIN Projects to Watch

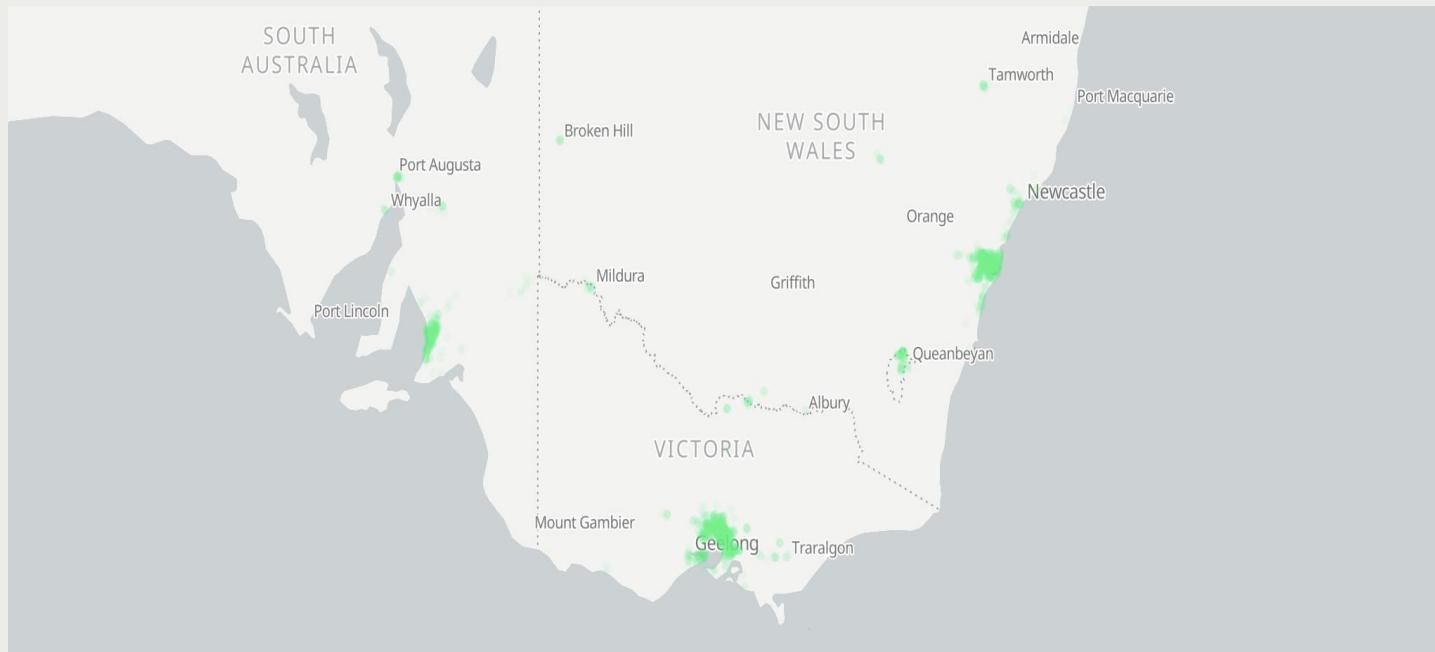
## Helium (HNT)



### What It Does

Helium (HNT) is one of the most notable success stories in the DePIN space. It is a decentralised wireless network that incentivises users to provide and maintain 5G coverage through blockchain-based rewards. Users run Helium hotspots, which support the network's connectivity. In return, they earn MOBILE tokens, which are used to incentivise hotspot deployment and data transfer activities on the network.

#### *Helium's Coverage in Parts of Australia*



(Source: [Helium](#))

## Notable Features

- Helium migrated to Solana in April 2023, enhancing its capabilities and reach within the crypto space.
- In December 2023, the project launched its consumer mobile service in the U.S., Helium Mobile, offering 5G coverage for \$20 USD per month. The network has since crossed 100,000 paying subscribers, showcasing considerable adoption for a crypto-based consumer service.
- Helium plans to expand into other sectors, such as launching an "Energy Network" that rewards solar power and battery resources, demonstrating the network's potential to coordinate multiple DePIN projects.

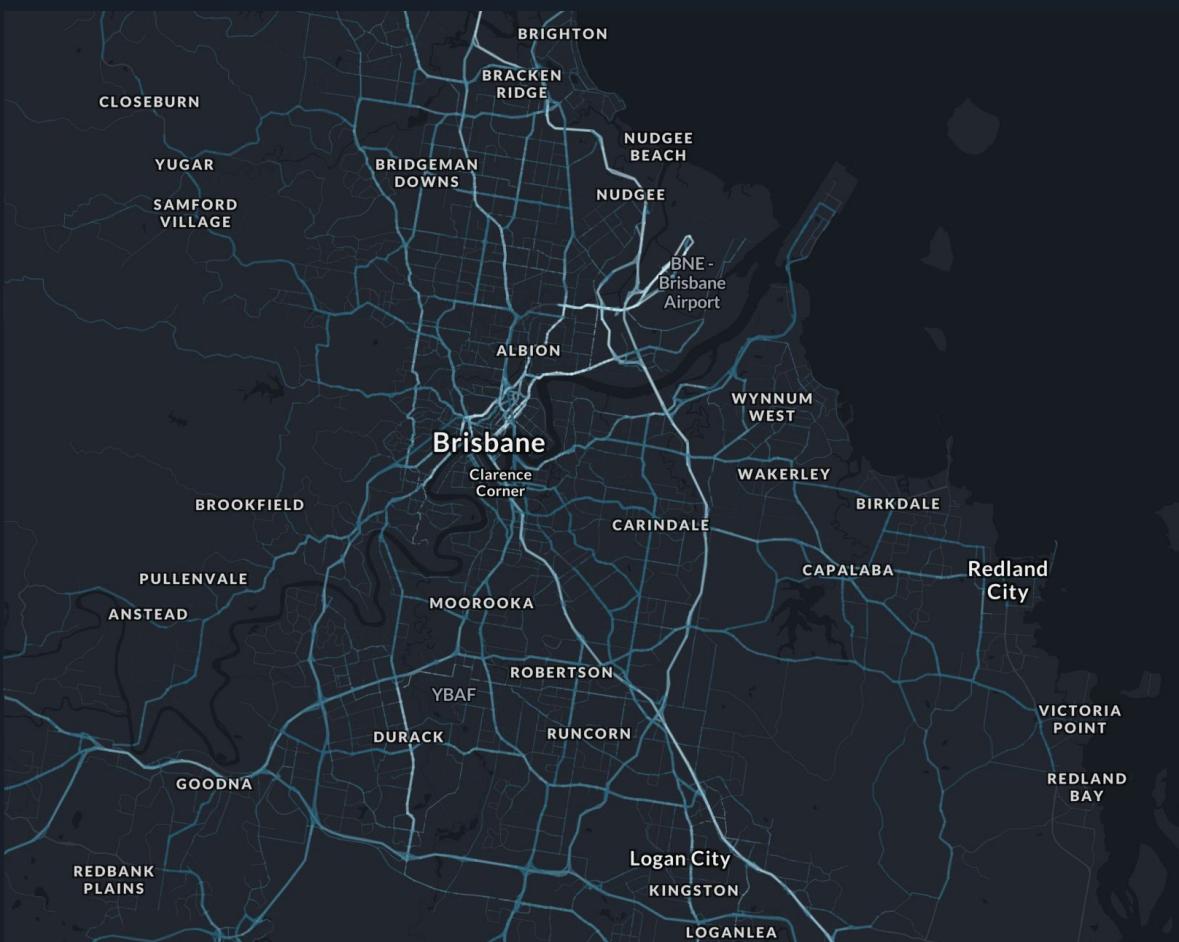
# Hivemapper (HONEY)



## What It Does

Hivemapper (HONEY) aims to build a living map of the globe using a decentralised fleet of drivers. Users attach specialised cameras to their cars, which automatically capture images and data. This data is then sent to the Hivemapper network to create up-to-date 3D maps. In exchange for providing this data, drivers earn HONEY tokens.

*Hivemapper's Coverage of Brisbane*



## Notable Features

- The data collected by Hivemapper's network is a valuable resource for enterprises and fleet managers, who can purchase access using HONEY tokens. This creates a direct incentive for contributors, linking network activity to token utility.
- Hivemapper has seen rapid growth, with more than 6,000 weekly mapping contributors. As of mid-2024, Hivemapper had already mapped the equivalent of 25% of the global road network.