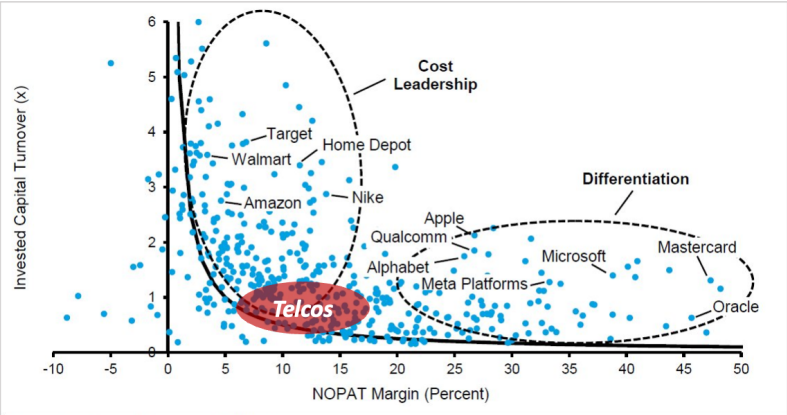
GIANT Protocol: DeWi's Proof-of-Stake

All business models face a tradeoff between leanness (asset turnover) and efficiency (operating margins). Somehow, telcos manage to be bad at both. With a 5:1 ratio of assets to revenues, telcos are five times more capital intensive than FAANGs; and with operating margins of ~23%, telcos are meaningfully less efficient than FAANGs too.



Source: FactSet and Counterpoint Global.
Note: Top 500 companies by 2021 sales; Excludes financials and real estate; Truncated axes for visualization.

DeWi promises a brighter future for the world's communication networks.

By sharing key resources - property, spectrum, and labor - DeWi runs lean, with capital intensity in between FAANGs (1:1) and telcos (5:1). By using token dilution, rather than cash expenses, as the primary financing mechanism, DeWi generates operating margins more like FAANGs (30%+) than telcos (23%). And by nature of being open-source and decentralized, DeWi is more resilient to physical and software-based attacks. For all these reasons, we expect DeWi networks will be valued at a multiple closer to FAANGs (15x+ EBITDA) than telcos (7x).

If you believe telcos can generate FAANG-like economics, then DeWi has an enormous potential to improve the world for the better. To our left-brained audience, consider this: at the mid-point of the ranges above, DeWi replacing incumbent telcos would drive $40T+ of global wealth creation - half of global GDP. For our right-brained readers: that's enough wealth to fund fast, reliable, and neutral internet connectivity for everybody on earth, *multiple times over.* Given that a third of humanity has never used the internet as of 2021, the downstream economic effects of global connectivity will be measured in the tens of trillions of dollars.

But there's no clear path to getting there. Entrepreneurs building DeWi networks face designing a system that: 1) incentivizes a community of providers and users in a way that can *eventually* become self-sustaining, and 2) must be able to start as a small community and become stronger as it grows bigger, i.e. exhibit network effects. Once you apply real-world technical, economic, and regulatory constraints, designing such a system becomes near-impossible. Who are the connectivity-providers? How are they incentivized? Who is the end-user? How are they acquired and serviced? Who provides the cash financing? At what cost? What technical and legal risks should the network take? On what timeline does it need to become self-sustaining?

Luckily, over the past decade crypto has grown from one to thousands of experiments in incentive design running in parallel on a live audience. So far, we've uncovered three ways of achieving consensus around who owns what on-chain: proof-of-work, proof-of-stake, and centralized counterparties.

- PoW systems are characterized by miners doing a bunch of useless work, an algorithm verifying the useless work as legitimate, and a small amount of useful work getting done as a byproduct. This is how Bitcoin works: miners run SHA-256 hashes, an algorithm verifies it, and the useful work of block production is a byproduct. This is also how DeWi works today: miners do useless work (beacon / witness in the case of Helium LoRa; bumblebees in the case of Pollen), an algorithm verifies it, and the useful work of providing coverage is a byproduct. Proof-of-work networks (-) tend to be highly inefficient, given most of the work done is non-productive, but (+) are easy to decentralize because of the relatively low barriers to mining (although in the long-term, declining rewards drives miner consolidation anyway).
- PoS systems are characterized by stakers putting capital at stake and incurring losses if they fail to provide certain critical services for the network. This is how post-merge Ethereum works: validators stake ETH, propose/attest to honest blocks, and incur penalties/slashing losses if they fail to deliver. PoS has the opposite tradeoffs to PoW: it's (+) much more efficient, but (-) harder to decentralize (stakers need tokens in the first place in order to earn tokens), and because of the higher relative complexity of being a validator vs being a miner.
- Centralized counterparties are exactly what they sound like (mostly uninteresting).

Looking at the past six years of data shows that proof-of-work went from ubiquitous in '16 (97% of top-10 market cap), to dominant in '18 (80%), to merely competitive today (50%). Meanwhile, proof-of-stake models grew from 1%, to 3%, to 30% of top-10 market cap. Which begs the question… what would a proof-of-stake system look for DeWi?

Top 10 Cryptoassets by Market Cap

December 2016		December 2018		October 2022	
Bitcoin	$14.4	Bitcoin	$67	Bitcoin	$384
Ethereum	$0.6	Ripple	$15	Ethereum	$166
Ripple	$0.2	Ethereum	$14	Tether	$68
Litecoin	$0.2	Bitcoin Cash	$3	USDC	$46
Monero	$0.1	EOS	$2	BNB	$46
Ethereum Classic	$0.1	Stellar	$2	Ripple	$24
Dash	$0.1	Tether	$2	BUSD	$21
MaidSafeCoin	$0.05	Litecoin	$2	Cardano	$15
NEM	$0.03	Bitcoin SV	$1	Solana	$12
Steem	$0.03	Tron	$1	Dogecoin	$8

Summary

December 2016		December 2018		October 2022	
PoW	97%	PoW	80%	PoW	50%
PoS	1%	PoS	3%	PoS	30%
Other	1%	Other	17%	Other	20%

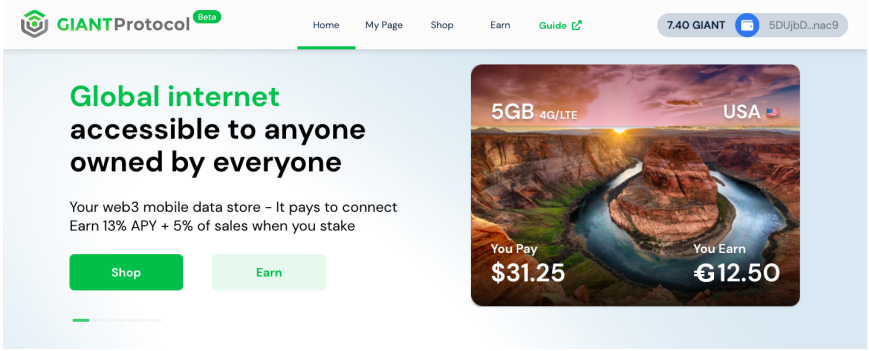
Source: Coinmarketcap

Luckily we don't have to think too hard - the entrepreneurs at GIANT Protocol launched the testnet last month and private beta this week. GIANT is a new way for telcos and connectivity users to leverage the benefits of public blockchains, a novel approach to DeWi incentive design, and an ambitious vision for creating a global liquidity pool of tokenized bandwidth.

What is GIANT?

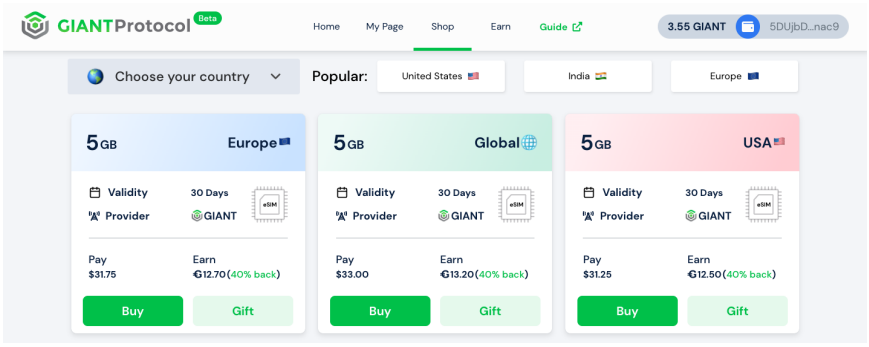
GIANT enables users to seamlessly buy data plans from a global network of connectivity providers. After purchase, a user scans a QR code and downloads an eSIM that comes encoded with the data plan. Connectivity is available out-

of-the-box, without any annoying onboarding flows, usernames, or passwords. GIANT users buy connectivity without having to reveal anything about themselves besides a Polkadot wallet address. You can try it for yourself here.



Source: GIANT Private Beta Home Page

GIANT was founded in 2021 by three technical entrepreneurs - Suruchi Gupta (CEO), Merijn Terheggen (COO), and Jinesh Doshi (CTO) - with a vision for using crypto-incentives to unlock unused network capacity. Suruchi has been starting connectivity-related businesses for the better part of a decade, including a photo-sharing company, a roaming company, and most recently a crypto-powered WiFi-sharing protocol called Wificoin; Merlin is one of the co-founders of HackerOne, a bug bounty platform that would go on to raise $160M+ in venture capital and now prevents more than 17K+ critical vulnerabilities annually; and Jinesh was a lead member of Salesforce' technical team. The company raised a $5M seed round led by CoinFund in Dec'21, and shortly thereafter announced the launch of the GIANT Protocol and its first native application, GIANT Connect, which offers international in-flight WiFi and data roaming plans for frequent travelers in 115+ countries.



Source: GIANT Private Beta Shop Page

How Does the GIANT Protocol Work?

These are the mechanics of the protocol:

- **1) Coverage providers register for approval.**
  Providers undergo KYC and pay a registration fee. In the initial phase, provider approvals are managed by the GIANT Labs team. In the future, provider approval can be managed by a committee of the DAO.
- **2) Coverage providers list data plan offerings.**
  Data plan offers specify the provider, the type of network, and the contract terms being offered to users, and are priced in fiat $. Under the hood, the protocol uses this information to create an on-chain vault ("provider pools") that can issue semi-fungible tokens called data contract tokens ("DCTs"). The vault serves as collateral backing a provider's service delivery guarantees.

- **3) Stakers add liquidity into provider pools.**
  Anyone with a Polkadot wallet can permissionlessly stake $GIANT towards individual provider pools, receiving $sGIANT. In aggregate, $sGIANT holders for a given pool receive 5% of net DCT sales (net of refunds), and can also bond to validators to earn incremental yields of up to 13% APY.
- **4) Users mint DCTs, which are backed by the collateral inside the provider pool.**
  Users who want connectivity can purchase DCTs using a credit card or USDC. Once the payment is complete, the corresponding DCTs are minted on-chain, backed by the collateral in the provider pool. DCT sales are allocated 90% to providers, 5% to stakers, and 5% to the GIANT protocol treasury.
- **5) Users transfer data over the provider's network by burning data contract tokens.**
  Users connect to providers using established technologies and integration paths, so that providers are never required to expose the internal details of their networks. Users experience some small UX hurdles, but technologies that have recently become mainstream (eSIMs / WiFi6) abstract away nearly all of the complexity of connecting to a new provider.
- **6) Validators collect off-chain session connection data from both users and providers.**
  Users and providers must share standardized records about each session in order to collect their token incentives (discussed below). In the cellular industry, these documents are known as TAP records (transferred account procedures); within GIANT, the generalized versions are called SEDs (session evidence documents).
- **7) Validators post the reconciled connection records on-chain.**
  In order to participate in consensus and earn rewards, validators must stake 10,000 $GIANT and compete over a fixed number of 100 validator slates determined by the bonding of $sGIANT holders. Validators earn a 13% gross yields on their stake, declining to 3% over a decade, and will likely need to pay a substantial portion of their rewards to bonders (thereby boosting $sGIANT yields). Validators are incentivized to: 1) submit accurate SEDs or face penalties/slashing on their staked capital (although these are not yet implemented at launch), and 2) work with trustworthy providers, since any slashed provider pool tokens (for refunds) are automatically unbonded.
- **8) Burned / expired / refunded DCTs impact the pool's collateralization ratio.**
  Tokens that are burned (used) or expired *raise* a pool's collateralization ratio, allowing the providers and stakers to withdraw more $GIANT tokens from the pool. If a user buys DCTs but a provider fails to deliver the service, then the user is refunded with $GIANT tokens from the pool. Refunds *lower* a pool's collateralization ratio, reducing the amount of $GIANT tokens available to be withdrawn by providers and stakers.

What Makes GIANT Interesting?

GIANT is a truly novel approach - based on proof-of-stake incentives - for DeWi's vision of providing fast, reliable, and neutral connectivity around the world.

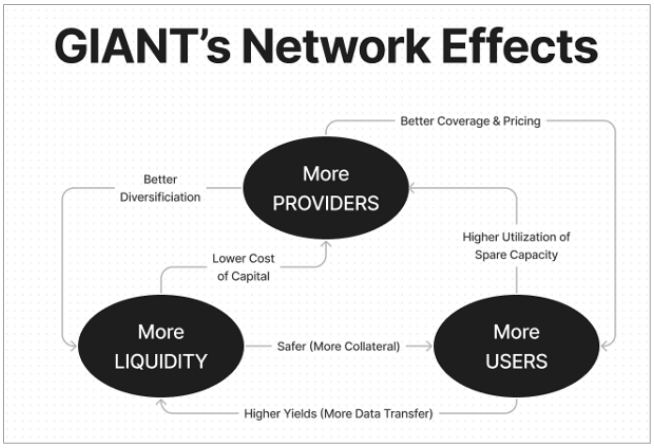
1. GIANT has a unique value prop for incumbent providers.
To date, most of the conversation around TradWi<>DeWi partnerships has focused on neutral-host small cell networks. Imagine being a telco executive and hearing the pitch from a DeWi network: "Our community has built an amazing network footprint of [x] hotspots in [y] locations with [z] backhaul speeds and [w] reliability. Would you like to pay us $0.50-$1/GB to use it? And by the way, you need to expose your network core so we can integrate to it."

Then a second DeWi network comes in with a different pitch: "Our community has [x] active buyers of connectivity and $[y] staked capital ready to provide liquidity for telcos. Would you like to post your unused capacity on it? Purchases are pre-paid, so any offers that are purchased puts money into your pocket *today*. And by the way, we require zero integrations and never touch your network core."

To be clear, we think both of these conversations are happening, will continue to happen, and will eventually be successful. All we're saying is this: if you're a telco exec taking a career risk by exploring a DeWi partnership, the latter deal sounds a hell of a lot easier to sell to your boss.

2. GIANT's model has the potential for strong network effects, driving a flywheel of providers, users, and liquidity.

As more providers post offers on GIANT, users gain access to a wider range of coverage and pricing options, and stakers gain access to a more diversified set of risk exposures. As more users purchase data offers on GIANT, providers are incentivized to join the network to monetize their spare capacity, and the resulting cash flow incentivizes stakers to tap into the higher yields. As more $GIANT is staked as collateral, providers are able to monetize more of their capacity at a lower cost of capital, and users gain a higher degree of certainty that refunds will be honored.



Source: Escape Velocity research

On top of providing liquidity to coverage providers, creating a global liquidity pool for tokenized bandwidth unlocks a number of interesting new use cases - for example, using tokenized bandwidth to back currencies, using tokenized bandwidth as collateral for secured loans, and creating futures/options markets for tokenized bandwidth prices - all of which could be $100B+ opportunities.

3. PoS affords product flexibilities not available to PoW DeWi networks.

We can now classify two visions for the future of DeWi: vertical and horizontal. The vertical approach, taken by Pollen and XNET, focuses on a specific networking protocol (e.g., cellular, WiFi, LoRa). The pro-vertical camp believes that having separate protocols drives more competition/innovation, is more robust to economic/technical bugs, and properly aligns incentives (i.e. no cross-subsidization). In the other corner, the horizontal approach taken by GIANT and Helium focuses on the ambitious *network-of-networks*. This camp believes that combining liquidity across different networks, and eventually creating a tokenized claim on global bandwidth, is the true end-state for DeWi.

The vertical vs horizontal categorization misses a lot of nuance - Helium and GIANT, for example, are clearly different approaches. At its core, Helium enables *property owners* to increase the yields on real estate by deploying networking equipment. GIANT enables *network operators* to increase the yields on their networks by monetizing unused capacity. The two networks have the same long-term goal, but are taking two entirely different paths to get there, with different value propositions and customer bases.

Aggregating capacity at the network operator level means that GIANT never has to touch incumbents' core networks, driving faster integration timelines, more partnership announcements, and a broader set of offerings for users. For

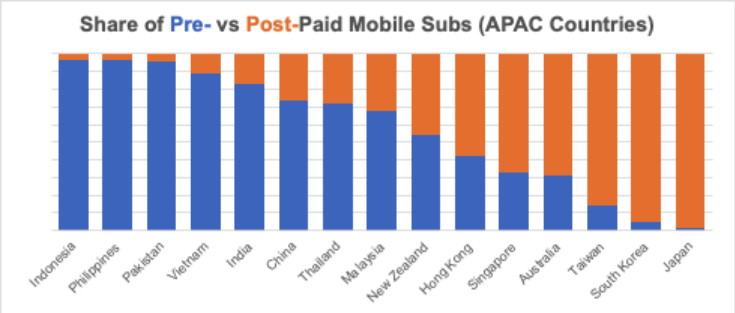
example, GIANT already operates in both licensed and unlicensed bands - a feat which may elude PoW DeWi networks for years. PoS comes with other advantages, namely that it's easier to punish the cheating/gaming that is prevalent across all open networks.

What Makes GIANT Risky?

GIANT faces a number of challenges on the way to realizing its full potential:

1. GIANT does not currently support post-paid plans, which is how most of the developed world buys connectivity.

It's possible that eSIM drives people, particularly those living in developed economies, to churn off their post-paid data plans en masse - in fact, we think it's likely! But if we're wrong, GIANT's addressable opportunity will be limited to: 1) emerging markets where pre-paid is the norm (e.g., India, Mexico, Nigeria), and 2) niches within post-paid markets with acute pain points related to connectivity (e.g., frequent flyers, digital nomads).



Source: GSMA 2021

A similar concern applies on the provider side. We explained above why we believe MNOs will find it more palatable to integrate with GIANT vs other DeWi protocols (no need to expose their core network). But that's not the full story: telcos are equally, if not moreso, reluctant to expose their captive customer bases. The largest telcos, who have the most to lose, will resist joining GIANT to avoid letting churn from their dissatisfied customers exploring other providers (e.g., AT&T has an average NPS of -11).

2. GIANT's collateralization mechanics are unproven.

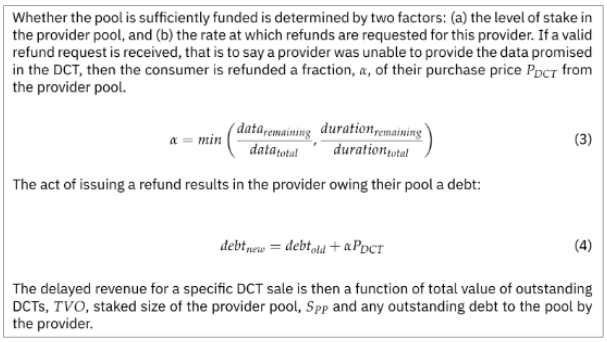
GIANT is building the global liquidity pool for bandwidth. In the simplest of terms, this means creating a "box" made of software, where users/stakers deposit cash into the box and network providers "deposit" the promise of future network capacity. In order to protect its users from getting scammed, the GIANT protocol keeps a portion of DCT revenues on reserve as collateral, which it then uses to pay refunds to users if a provider fails to fulfill its data offers. As DCTs are redeemed or expire, the pool rebalances and providers / stakers are able to withdraw more of their capital out of the pool and earn higher yields.

In order to incentivize stakers to put their $sGIANT at risk rather than hold spot $GIANT, staking yields must be high enough to offset "provider credit risk" (i.e., risk that providers do not deliver on their promised service). All other risks - including GIANT/USD price risk and technical/hack risk - are borne equally by $GIANT and $sGIANT holders. Evaluating credit risk boils down to two factors: 1) how certain am I that the debtor (i.e., the provider) will deliver? and 2) how much collateral will I collect on if they don't?

Given the high barriers to entry being a coverage provider (i.e., relative to the DeFi equivalent barrier of launching a token), we expect GIANT's provider base will be a relatively attractive credit risk over time, especially in developed

markets. As the GIANT protocol matures, providers with long operating histories will build on-chain track records on which stakers will evaluate their trustworthiness. For new providers with low liquidity, protocol mechanics will set a higher yields to offset the credit risk (e.g., a 50% collateralized pool earns 60% APY, vs a 100% collateralized pool earns 30% APY). In order to drive trust in providers, we believe GIANT will need to create a robust process for onboarding providers that quickly weeds out hostile and/or low-quality providers (perhaps using a similar mechanism to the Helium's Manufacturing Oversight Committee), and also build tools for stakers to easily evaluate providers' historical performance.

While the amount of collateral in a pool at a given time is always visible on-chain, the movements in required collateral are not trivial to figure out and in fact depend on empirically-driven weights which are yet to be determined. Lack of clarity with respect to collateral mechanics may deter early stakers from putting large amounts of $GIANT at risk, hindering TVL growth. However, there are reasons why we think this will not be the case: 1) the GIANT team has suggested fully-collateralized pools will deliver a staking yield of ~30% — with DeFi yields currently in the <10% range even for highly risky exposures like bridges, such a yield is likely to be enough to persuade investors to back pools of known providers; 2) Many of the leading DeFi lending protocols also use off-chain weights to set collateral ratios, for example Aave and Compound both delegate parameter updates to Gauntlet; and 3) the GIANT team has developed a handy monte carlo simulation tool to help the community intuitively understand the range of potential outcomes for staking $GIANT.



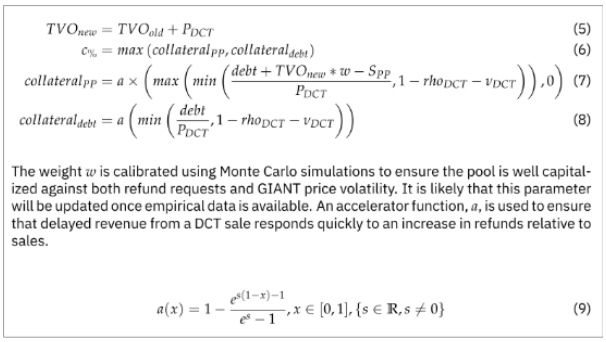
Whether the pool is sufficiently funded is determined by two factors: (a) the level of stake in the provider pool, and (b) the rate at which refunds are requested for this provider. If a valid refund request is received, that is to say a provider was unable to provide the data promised in the DCT, then the consumer is refunded a fraction, α, of their purchase price P_{DCT} from the provider pool.

$$\alpha = min\left(\frac{data_{remaining}}{data_{total}}, \frac{duration_{remaining}}{duration_{total}}\right) \quad (3)$$

The act of issuing a refund results in the provider owing their pool a debt:

$$debt_{new} = debt_{old} + \alpha P_{DCT} \quad (4)$$

The delayed revenue for a specific DCT sale is then a function of total value of outstanding DCTs, TVO, staked size of the provider pool, S_{PP} and any outstanding debt to the pool by the provider.



$$TVO_{new} = TVO_{old} + P_{DCT} \quad (5)$$

$$c_{\%} = max\left(collateral_{pp}, collateral_{debt}\right) \quad (6)$$

$$collateral_{pp} = a \times \left(max\left(min\left(\frac{debt + TVO_{new} * w - S_{PP}}{P_{DCT}}, 1 - rho_{DCT} - v_{DCT}\right)\right), 0\right) \quad (7)$$

$$collateral_{debt} = a\left(min\left(\frac{debt}{P_{DCT}}, 1 - rho_{DCT} - v_{DCT}\right)\right) \quad (8)$$

The weight w is calibrated using Monte Carlo simulations to ensure the pool is well capitalized against both refund requests and GIANT price volatility. It is likely that this parameter will be updated once empirical data is available. An accelerator function, a, is used to ensure that delayed revenue from a DCT sale responds quickly to an increase in refunds relative to sales.

$$a(x) = 1 - \frac{e^{s(1-x)-1}}{e^s - 1}, x \in [0,1], \{s \in \mathbb{R}, s \neq 0\} \quad (9)$$

Source: whitepaper

At launch, the GIANT protocol will operate as independent provider pools, with no commingling of risk across pools. In other words, if I stake $GIANT to one providers' pool and every other provider on the network goes bankrupt for idiosyncratic reasons, my stake is protected — there's no protocol-wide backstop.

We believe this is suboptimal for the long-term, and that in the future the GIANT DAO should look to implement a global backstop mechanism, perhaps similar to Aave's safety module or Lido's insurance fund. Given the DAO is already explicitly managing risk via provider registration and onboarding process, we believe all $GIANT holders should bear some risk of loss incurred on other pools. Multicoin said it well: protocols don't capture value, DAOs manage risk. GIANT's network effects become stronger with a global backstop mechanism — every dollar of staked $sGIANT increases the collateral backing for *all* pools, thereby making the protocol safer for *all* users and lowering the cost of capital for *all* providers. We believe the GIANT team is already developing these mechanisms and expect to see them implemented into the protocol over time. Such an insurance fund is likely to be funded by the DAO's treasury, which includes 100M $GIANT tokens (per the initial token allocation) as well as a 5% commission on all DCT sales.

3. Critical parts of the GIANT protocol have yet to be tested in a decentralized setting, namely the validator network and reconciliation of SEDs. In TradWi, this is an operationally intensive part of the value chain - telcos roaming on each other almost always have differences between records and generally agree to ignore discrepancies under a certain amount (~$500) in either direction to reduce paperwork load. To be fair to GIANT, no DeWi network has figured out how to decentralize this layer either, i.e. Nova Labs is the only company reconciling TAP records on the Helium network and the same goes for Pollen and XNET. However, given the number of providers using GIANT's protocol already, we suspect they'll be faced with the issue of how to decentralize session reconciliation before anyone else.

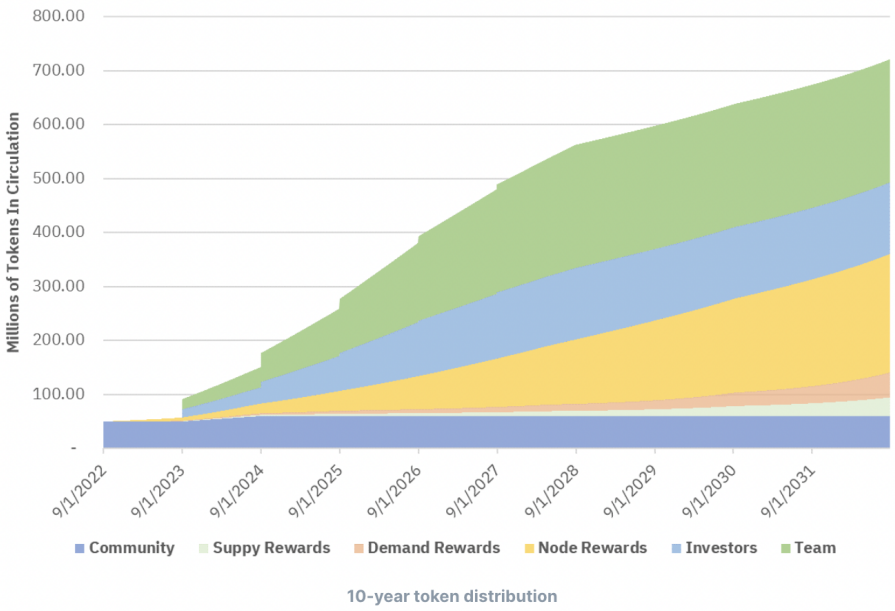
How Does The $GIANT Token Work?

There is a maximum supply of 1B $GIANT tokens, to be issued over a decade as follows:

- **450M tokens for team and investors, time-vested.** Although exact figures are undisclosed, charts suggest ~50M tokens are set to unlock in Sep'23, with the remaining ~400M tokens roughly linearly over the following five years.
- **250M tokens for supply/demand incentives, usage-vested.** Initial connectivity providers earn 30% of the first 1M $GIANT worth for data transfer. The percentage declines by 10% with every doubling of data transfer (27% of next 1M tokens, 24% of next 2M, 22% of next 4M, etc). Initial users earn "cash-back" of 40% of the first 10M $GIANT burned for data transfer, with the percentage declining by 20% with every 1.5-fold increase in data transfer (32% of next 15M tokens, 26% of next 23M, 20% of next 34M, etc). Both users and providers must send their SEDs to validators in order to claim these incentives.
- **200M tokens for validator/staker incentives, time-vested.** Given there is a fixed number of validator slots to participate in consensus (100), these tokens unlock on a fixed time-vesting schedule that guarantees a gross validator yield of 13% at launch (in $GIANT) declining to 3% over a decade. It's likely that the majority of these tokens are paid out to $sGIANT bonders, with validators retaining a minority commission.
- **100M tokens for the DAO treasury** (unclear vesting schedule)**.**

Allocation	Quantity
Nodes	200,000,000
Team	250,000,000
Investors	200,000,000
Treasury	100,000,000
Demand	125,000,000
Supply	125,000,000
Total	**1,000,000,000**

Source: whitepaper



10-year token distribution

Bottom Line

GIANT is building the first horizontal, PoS-based decentralized wireless network. In the short-to-medium term, GIANT unlocks unused capacity for coverage providers and provides a low-risk way for users to buy global connectivity services on demand. In the medium-to-long term, GIANT aims to become a global pool of tokenized bandwidth, enabling financial markets and other novel use cases built on top bandwidth primitives.