Decentralized Autonomous Wireless Networks (DAWN)

A trustless, multi-gigabit last-mile wireless mesh network for providing decentralized broadband.

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1. Introduction

The vision for a decentralized Internet has been around since ARPANET, which laid the groundwork for collaborative digital communications more than 50 years ago. Unfortunately, the rise of the industrial Internet in the late '90s saw a historic boom-and-bust cycle that consolidated Internet infrastructure into local monopolies and duopolies. Today, 80m+ Americans are served by a single ISP, and the average spread between wholesale and retail internet prices is 100x. Realizing the extent of the problem, a handful of trailblazing communities have sought to build user-powered wireless networks that deliver more open, fair, and inexpensive Internet services[1].

More recently, advancements in wireless technology and distributed systems have unlocked the ability to scale community-powered networks nationally and eventually globally. **Multi-gigabit capacity**, **mechanical beamforming**, and abundant **high-frequency unlicensed spectrum** enable the current generation of wireless solutions to be competitive with fiber at a fraction of the cost, with the added benefit of programmability. Advancements in **privacy-centric cryptography**, **consensus mechanisms**, and **blockchain scaling** are enabling complex decentralized coordination at a global scale.

This paper describes DAWN, a token-incentivized protocol that leverages these advancements to build a new last-mile Internet that:

- Connects users directly to Internet Exchanges without trusted intermediaries.
- Collapses the 100x spread between wholesale and retail internet prices.
- Eliminates the reliance on any single network path by leveraging individual households.

Three main components will form this new last-mile Internet:

1. An incentive mechanism that rewards participants based on their contribution and performance to the network—this includes data centers, building owners, and network equipment deployers.
2. Decentralized consensus mechanisms such as 'proof of bandwidth' and 'proof of location' that provide crypto-economic guarantees around the performance of the network.
3. A marketplace for bandwidth that allows node operators to buy and sell connectivity, which manifests as a profitable investment into the household through Internet savings and Internet reselling.

With these three components in mind, the objective of the DAWN protocol can be stated as follows:

Crypto will drive a resurgence of the sovereign individual. Homeowners today achieve "energy independence" by deploying low-cost photovoltaic solar on their rooftops; DAWN enables "wireless independence" via autonomous software-defined radios on their rooftop. This protocol aims to do to Internet connectivity what solar panels have done to electricity.

In this paper we showcase how these participants (bandwidth providers, property owners, and end-users) can come together to create robust last-mile wireless networks. We have named this protocol DAWN (Decentralized Autonomous Wireless Network).

[1] *Roofnet (2004), Open-Mesh (2007), Guifinet (2004), NYC Mesh (2013)*

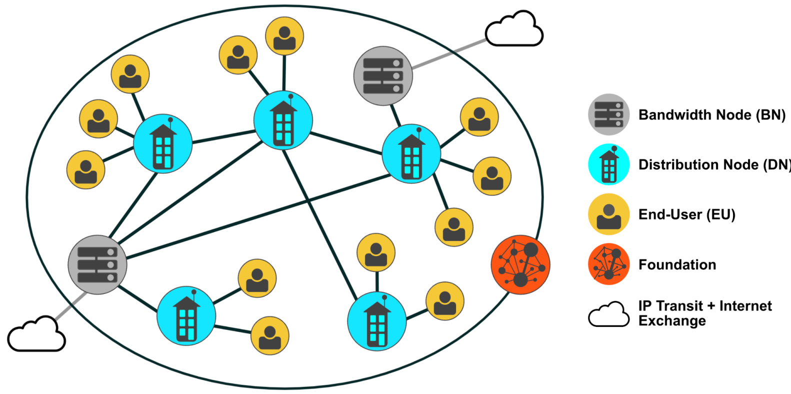


Figure 1 – Bandwidth Nodes (BN) provide the original source of connectivity, either through wholesale IP transit, Internet Exchanges, or Direct-Internet-Access connections. Connecting to Distribution Nodes (DNs), BNs, and DNs forms the backbone network, which makes high capacity backhaul available to End-Users (EU) across the last-mile. BNs sign smart contracts with DNs to purchase an Internet plan to provide service to End-Users (EU).

2. Network Overview

The DAWN protocol will orchestrate the deployment of rooftop robotic radios that form a self-healing, multi-gigabit, autonomous last-mile wireless network. The goal of DAWN is to create decentralized fixed Internet connectivity that liberates citizens from the incumbent Internet service monopolies.

2.1 Node Types

Each participant in the network fulfills at least one of the following roles:

- Bandwidth Node (BN) must have resellable wholesale Internet capacity, i.e. wholesale IP transit and Internet Exchange connections. They will deploy DAWN-approved >1Gbps point-to-multipoint radios to deliver downstream connectivity within a line-of-sight radius of up to 5 miles. A single radio can serve 15-100 receiving nodes.

- Distribution Node (DN), typically commercial or residential properties, connect to BNs via a rooftop robotic antenna system and share that connectivity further downstream. DNs can connect to multiple BNs and/or other DNs in real-time, forming the core of DAWN's programmable, self-healing wireless network.

- End-User (EN): End-users that consume bandwidth from DNs.

- Foundation: controls multisig control of the smart contracts that regulate the interaction between all the nodes, as well as authentication, identity, blockchain, internode communication, regulatory compliance, QoS monitoring, payment and transaction processing and settlement, and other various services at the global network layer.

2.2 Wireless Equipment

The DAWN protocol is designed to be hardware vendor agnostic. In order to leverage recent multi-gigabit advancements in wireless, the initial focus will be towards 60GHz and other millimeter-wave platforms as well as the 6GHz band. BNs and DNs will use a combination of point-to-multipoint and point-to-point radio and antennas, with an electromechanical beam steering system to propagate connectivity across the last-mile. We call this hardware and software system the robotic-antenna-system (RAS):

Figure 2 – The RAS will extend the backbone network from BNs and DNs and ENs. With a vendor agnostic radio and antenna, the RAS is designed to be a platform for any generation of wireless hardware.

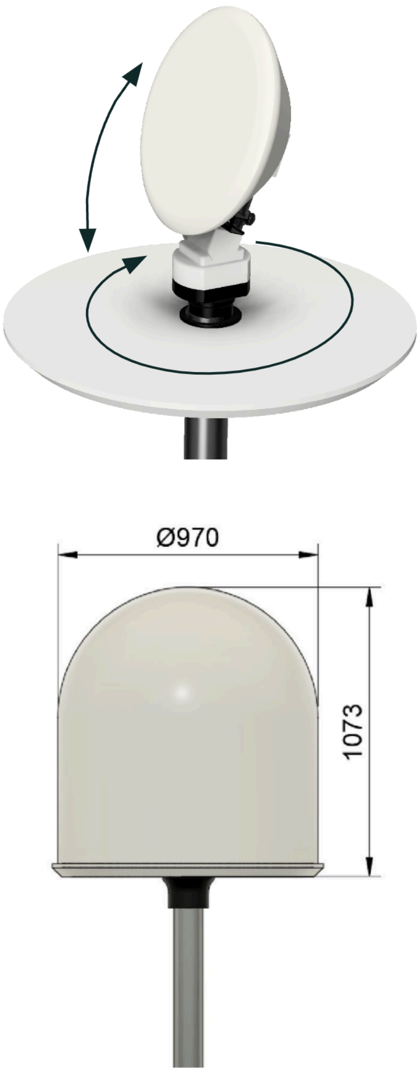


Figure 3 – The RAS mechanical beam forming enables cost-effective self-healing and rapid deployment, without professional intervention in a trustless environment.

2.3 Routing Elements

Rather than utilizing dedicated routing devices, DAWN will use general purpose machines with Cloud-Native routing. General purpose computing will address concerns of portability as additional hardware options become available to the ecosystem, and future functionality will be easier to realize. We envision a scenario where a household router is no longer a very specific MIPS/ARM appliance, but rather a general-purpose household server.

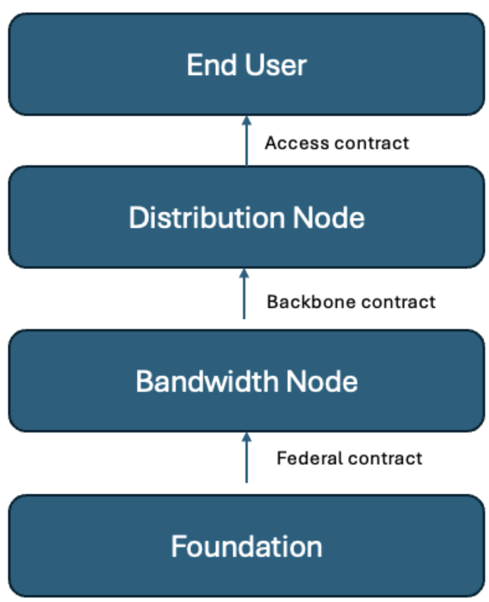
Applications such as VPP, Quagga, Bird, and FRR will be used, depending on various performance requirements of each of the nodes in the network. IPv6 will be the primary choice for layer 3 protocol, but IPv4 will be supported in dual-stack nature, with staking that is representative of the scarcity of IPv4 prefixes.

DAWN will use eBGP and its security features to manage network traffic. Each node functions like a traditional Internet Autonomous System (AS), which fits the design of the backbone network.

3. Network Trust and Validation

A distinguishing feature of a decentralized network is using trustless incentive mechanisms to reward participation vs relying on centralized reputation and record-keeping. In the context of a wireless network, relegating the trust function to an open network requires "proof of bandwidth" and other cryptographic telemetry systems. Witness Chain has built a proof-of-bandwidth system that measures network performance such as throughput, data usage and location; DAWNs subscribes to the Witness Chain network for these proofs, secured by re-staked ETH.

3.1 Service Contracts



The DAWN protocol defines three types of service contracts: Federal, Backbone, and Access. Federal contracts are incentives from the Foundation to the network nodes, Backbone contracts represent the agreement between a Bandwidth Node and its Distribution Nodes, and Access contracts are an agreement between Distribution Nodes and End-Users. The contracts are settled in DAWN tokens, the amount of which is determined by the following pricing factors:

- Bandwidth reservation: Represents the amount of data backhaul bandwidth allocated to the consumer - Used by both Access and Backbone contracts
- Data served: Represents the amount of data transferred between the supplier and consumer - Used by Access and Backbone contracts.
- Location: Reward incentives to Bandwidth nodes and Distribution nodes can be dependent on their location - higher incentives for communities with high expected demand - Used by Backbone and Federal contracts
- Oversubscription ratio: The ratio of the committed output bandwidth to the bandwidth received - Used by Backbone and Access contracts.

Proofs of Network Resources

We use "bandwidth" to describe network performance. Examples of network performance include: backhaul bandwidth, data served, and device geolocation. Rather than rely on centralized verification and settlement processes like traditional networks, DAWN sources several different types of proofs from a decentralized network of "watchtower" nodes orchestrated by Witness Chain. Watchtower nodes run on top of Ethereum validators and are secured by more than $5B of re-staked ETH, providing robust crypto-economic guarantees of network performance.

Proof of Backhaul

Proof of Backhaul is a decentralized speed test that measures a bandwidth or distribution node's backhaul bandwidth capacity with the help of a pool of *challengers*. Challengers send a small data payload to nodes and measure the speed and latency of the subsequent response. Backhaul bandwidth gathered from Proof of Backhaul will help determine a contract's bandwidth reservation and oversubscription ratio. The research paper here and client documentation here provide further details.

Proof of Service

Proof of service enables a decentralized data metering system that replaces centralized billing providers with a permissionless settlement system. The proof charges users after reconciling signed usage metrics from both parties and determines data served in a contract. The research paper here and the client documentation here provide further details.

Proof of Location

Proof of Location verifies that a DAWN node is at its claimed location. The proof works in two layers. The first layer verifies a Bandwidth Nodes' location using Witness Chain's wired proof of location. This proof utilizes network telemetry with Witness chain's network of *challenger* nodes in conjunction with a learned manifold of internet delay-distance curves to determine a BN's robust location. The second layer then pinpoints a precise location of Distribution nodes and Bandwidth nodes by utilizing a decentralized radio-based triangulation mechanism, with GNSS as a backup.

Proof of Frequency

Frequency coordination across any large wireless network is essential, as frequency reuse and noise mitigation are required to properly scale the network across the last-mile. While certain federally regulated systems like Automated Frequency Coordination (AFC) in 6GHz, and Spectrum Access System (SAS) in CBRS solve some frequency reuse problems, a trust-free solution is required in 60GHz. DAWN will use a staking mechanism by which nodes are required to lock-up tokens for exclusive access to a specific frequency channel in point-to-multipoint deployments. Neighboring nodes will scan relevant frequencies to validate proper channel utilization and earn rewards via automated smart contracts. The Foundation will fund access to clutter data and issue Geographic Information System (GIS) challenges to the network. Nodes will receive an encrypted subset of the clutter data required to validate wireless propagation of a BN or DN and be rewarded with tokens by automated smart contracts for corroborating expected RSSI and other wireless metrics. Based on this trust-free wireless propagation model (wireless heatmap), certain signal thresholds will be used to decide which channels are available to stake based on a node's location.

These proofs are consumed by the contracts that lie on the DAWN blockchain stack.

Blockchain Ecosystem

DAWN's service contracts will be deployed on Solana. Proof of Backhaul contracts will be on-chain, with validators running software (e.g. a Chrome extension or mobile app) to validate node operator capacity with their excess bandwidth. Proof of service will be deployed as a payment channel contract with tokens in escrow. Proof of location will be deployed as an optimistic oracle secured by a watchtower network. The service contracts will be used to query these oracles when desired as per the contract terms. This architecture is summarized in the figure below.

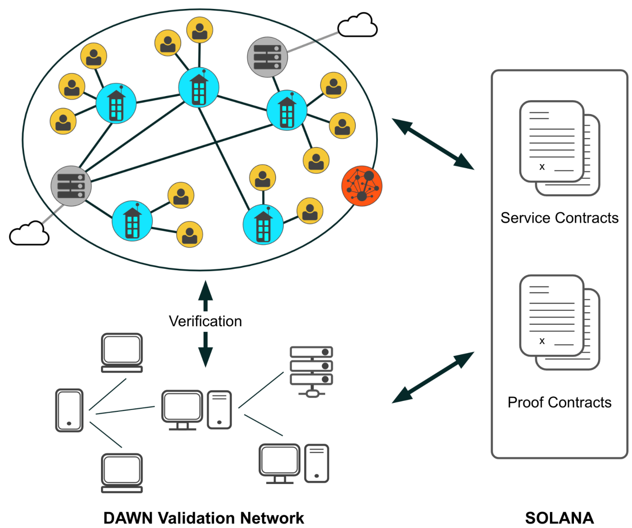


Figure 4 – DAWN will use outside challengers for various nodes to prove their available network capacity. The diagram above illustrates how these proofs rely on Solana to create a trust-free evaluation of the status of the network, including available capacity, latency, jitter, etc.

4. Tokenomics

The structure, supply, incentives, and staking mechanism of DAWN's token are based on the lessons learned while building a wireless network that currently connects 10 data centers and covers an area that includes approximately 3 million households for Andrena..

4.1 Token Function and Utility

A wireless network is a connected set of wireless hardware (i.e. radios and antennas) and routing elements (i.e. routers and gateways). Tokens are used to incentivize early adopters to install and deploy these assets as nodes to provide connectivity across the network. On the demand side, tokens can be staked to secure networking resources for individual and/or commercial use. This includes bandwidth, frequency, airtime, and packet prioritization.

To summarize, DAWN tokens will perform the following functions in the network:

1. Incentivize current Internet stakeholders (Bandwidth Nodes, Distribution Nodes, and End-Users) to become active members of DAWN.

2. Facilitate the purchase, sale, and trade of Internet connectivity via DAWN's operating protocol via a user-friendly mobile application.

3. Provide trust-free coordination and access to physical networking resources (bandwidth, frequency, etc.).

4.2 Flexible Token Supply Model

One of the major objectives of the DAWN protocol is to provide a mechanism for incentives not just for today's generation of wireless technology (e.g. 802.11ax, 802.11be, mmWave), but for all future wireless technologies to come.

Given the sinusoidal nature of telecom investment cycles, a **flexible token supply** is utilized where the total supply of tokens is determined at the onset of the project and is increased based on locked tokens.

DAWN embraces a flexible token supply model to fuel continuous innovation and network growth. This model allows the protocol to mint new tokens in response to investments in emerging technologies and network expansion, ensuring that the system can adapt to the evolving demands of the wireless industry.

This flexibility is key to DAWN's mission of fostering long-term technological advancement. By aligning token issuance with tangible investments, the protocol creates strong incentives for deploying cutting-edge technologies, keeping the network competitive and relevant. Unlike fixed supply models, which can hinder growth and innovation, DAWN's approach ensures that there are always enough incentives to drive development and expand coverage.

Moreover, the flexible token supply model is crucial for managing economic stability within the network. By strategically using inflation to offset staked token holder risk, the protocol can guarantee rewards and attract investments even in uncertain market conditions.] A progressive and automated burn mechanism further refines this approach by controlling excessive returns and preventing runaway inflation. This ensures that while staked token holders are rewarded for their contributions, the overall economic environment remains balanced and sustainable. In essence, a flexible token supply allows the DAWN protocol to adapt to market dynamics, foster innovation, and maintain a healthy, growing network that can support various wireless technologies for decades to come.

4.3 Token Allocation and Reward System

The allocation of tokens across all stakeholders and the reward mechanism for each one of them have been determined based on a few of DAWN's key objectives and growth strategy:

1. Rewarding a smaller pool of high-value early adopters with a disproportionate higher reward provides more value to the decentralized community.
2. Network security and validators are tantamount to facilitating the trustless layer, allowing nodes to interchange bandwidth without relying on honesty.
3. Network resources that need to be provided to the system to kick-start a market provide value to the community through providing an opportunity for the cost-effective bandwidth to scale.

Different model simulations were run to answer the following questions:

1. What is the minimum number of active BNs, DNs, and EUs that DAWN requires to reach the upward growth inflection point to reach the commercial adoption hockey stick curve? (i.e. The point at which the DAWN can reduce dilutive incentives because it has proved its commercial validity across a significant size of the market.)

2. Over the lifespan of the higher asymmetric incentives (~2 yrs.), based on a conservative daily use of the token to buy and sell connectivity across the network, what is a reasonable reward that will drive a node to overcome its initial inertia to becoming an active member of DAWN?

3. What are the behaviors that are worth rewarding, and which should be penalized, in an effort to promote healthy and steady growth, fair competition among Distribution nodes, and disincentivize short-term speculative investments.

The followings are the key behaviors the protocol will automatically incentivize via a predetermined amount of token for each node or stakeholder that engages in any of the following efforts:

1. **Bandwidth Seeding:** for BNs that provide verifiable bandwidth on the system to EUs, [the protocol will reward] these nodes with a certain number of tokens/month as a function of the provable capacity devoted to DAWN.

2. **Initial Activation**: for BNs, DNs, and EUs that activate an antenna to generate supply in a region deemed of interest, [the protocol will reward] these with a certain number of token/month equal to a percentage of a node's initial cost necessary to purchase, install, and go-live with the system at their premises.

3. **Geographic Focus**: BNs, DNs, and EUs located in areas of high strategic importance (e.g. high density of ideal buildings/residents assets) will be rewarded with a percentage incremental amount of tokens. The amount of tokens will be expressed as a multiple of the node's Initial Activation award, decided by Medallion allocation (see below). Regions are based on Uber's Hexagonal Hierarchical Spatial Index, also known as H3. The largest relevant unit of geography in DAWN is a resolution 4 H3 hexagon.

4. **Performance Validation**: for all parties that provide verification of data and performance of the network (e.g. bandwidth, latency, etc.) so as to ensure that every node delivers what it promised, [the protocol will reward] or incentivize parties that provide such work. Whether this incentive will come in the form of additional tokens and/or the validation process becomes a work requirement for each node and is tied to higher or lower staking requirements is still being determined.

5. **Service Delivery to End Users**: for any DN providing services to EUs, the protocol will reward the DN with tokens as a percentage tied to the cumulative value of transaction/connectivity the AN node provides to the end user.

6. **Redundancy**: In order to address the well known weaknesses of Web2 networks, one of DAWN's

primary objectives is to build a system with higher redundancy and self healing capabilities. To achieve this, [the protocol will reward] BNs and DNs that provide backup capacity to the network. The number of tokens delivered will be tied to the percentage of EUs the redundancy node is able to service in case of failure of the primary BN or DN in that same region.

7. **Outages Resolution and System Maintenance**: For analogous reasons as the Redundancy incentive described above, [the protocol will reward] nodes that embrace regular system maintenance and ensure swift resolution of any sudden connectivity problems that might occasionally arise.

DAWN Token Allocation		
Stakeholder	**No. Tokens**	**%**
Border Nodes (BN) - Ops		
Distribution Nodes. (DN) - Ops	250,000,000	25.00%
Access Nodes (AN) - Ops		
3rd Party Service Providers of Validatio	70,000,000	7.00%
Ecosystem Partners	30,000,000	3.00%
All Other Stakeholders	50,000,000	5.00%
Treasury	200,000,000	20.00%
Team	200,000,000	20.00%
Investors	200,000,000	20.00%
Total	1,000,000,000	**100.00%**

Figure 5 – Anticipated initial token allocation

Medallions

The Medallion system is a cornerstone of the DAWN protocol, designed to ensure the deployment of cutting-edge wireless technologies and ensure long term network coverage. The Medallion is a mechanism that enables anyone, whether they are participants in the network or not, to incentivize the development of a high-potential geographic area within the network. By staking DAWN tokens upfront, token holders can receive a percentage of the future revenues generated from these areas.

To begin with, protocol participants can stake 100,000 DAWN tokens to acquire a Medallion. The price of Medallions follows a bonding curve, meaning the cost of each successive Medallion in the same geographic area will be incrementally more expensive than the last, after an initial phase. This mechanism ensures there is an incentive for early participants that can acquire Medallions at a lower cost, while later participants pay a premium as more Medallions are issued.

In acquiring a Medallion, holders will be able to assign and delegate their Medallion to a specific hex code (using Uber H3 res4) combined with a specific technology, such as 60GHz mmWave or 6GHz 802.11ax. Signing up your Medallion for a chosen hex code will trigger a set of multipliers for all standard rewards listed above in the chosen hex, for the specific technology, incentivizing node operators to deploy coverage in that area. By boosting the reward multipliers in specific hex codes, holders make it more attractive for node operators to deploy their nodes, enhancing network coverage and capacity.

This approach of tying Medallion delegation to reward multipliers removes the need for governance intervention in deciding reward multipliers for a given region.

Medallion owners receive 12% of all bandwidth transactions that occur within their designated hex. With a limit of three Medallions per area, this creates a competitive incentive structure. As nodes receive a higher initiation and promotions' incentives, more nodes will be deployed in the same area leading to more End-users and higher transaction volumes lead to increased token yield for Medallion holders.

The Medallion system is designed to support the deployment of various wireless technologies over the next decades, ensuring the network's long-term relevance and competitiveness. To achieve this, the system employs an inflation mechanism that allows for continuous rewards for newer technologies. When 100,000 DAWN tokens are staked to acquire a Medallion, an equivalent 100,000 tokens are minted in the designated hex for the specific technology designated by the Medallion. These newly minted tokens form the basis for rewards in that area.

The approach is akin to micro-economic growth policies successfully deployed to revitalize clearly defined urban or regional social and business districts. Incentives and/or capital is provided at highly advantageous terms to encourage investment in superior technologies. This approach ties inflation (new token issuance) to tangible investments in DAWN's infrastructure network development. The method balances investor incentives with the need for economic stability, promoting sustainable growth and long-term network health. The bonding curve mechanism ensures that early investors benefit from lower costs and higher upsides, balanced by higher capital requirements for later participants. This dynamic pricing model reflects the growing value and built-in scarcity of Medallions, aligning with the network's expansion and increase in demand.

However, to prevent excessive inflation, a progressive burn mechanism is implemented. Returns up to 50% yield of staked tokens are not burned, but as returns increase, the burn rate escalates: 10% of excess returns are burned for yields between 50% and 100%, and 30% of excess returns are burned for yields above 100%. This burn mechanism ensures that while Medallion holders can realize rewards for staking their tokens, the overall inflationary impact is controlled.

Additionally, if the 100,000 newly minted DAWN tokens are not fully allocated due to insufficient deployment of nodes or network activity, the remaining tokens are not left in circulation. Instead, any unallocated tokens are burned, ensuring that excess supply does not contribute to inflationary pressures. This mechanism helps maintain the economic stability of the DAWN protocol by dynamically adjusting the token supply based on actual network participation and activity.

Staking incentives and Mechanism

While the Medallion system utilizes staking and higher localized rewards to steer network growth in a predetermined geographic area, there are numerous other motives for staking within the decentralized wireless network that would benefit directly from staking as a form of collateral. Specifically, there are scarce resources that require orchestration.

There are 4 resources that fit into the above two paradigms, with various scopes across the network:

1. Frequency – For an outdoor BD or a DN to serve downstream nodes with their hardware, it needs access to specific channels in its respective spectrum band. To access these channels, the protocol will require BNs and DNs to stake a certain percentage of tokens. Frequency is a limited resource, and efficient frequency reuse is integral to scaling the network. Additionally, some channels will inherently be more valuable than others, (oxygen saturation, rain fade, local noise, etc.). When staking to secure this resource, neighboring nodes will be able to validate proper spectrum use via proof-of-frequency. As described above, Geospatial Information System (GIS) challenges issued by the protocol will provide incentives for nearby nodes to perform free-space path computations to validate propagation of an asserted BN or DN. This information will form the basis for frequency reuse. The staking volume required to comply with accessing these channels has not been determined yet.

2. IP Space – Similarly to frequency, IP Space is a limited resource that will require staking. Even though IPv6 is less scarce, only 25% of websites as of 2024 support IPv6. Additionally, the foundation will be required to pay a yearly fee to ARIN. To support a myriad of vendors, IPv4 will be utilized on the system (in addition to IPv6)l, which is a much more scarce resource. Cloud-native NAT46 translations can be utilized to offset this once that functionality has reached maturity (VPP doesn't support this currently). The staking volume required to provide IP Space to each node has not been determined yet.

3. Airtime Staking – In the case of point-to-multipoint radios, the underlying wireless protocol often needs to implement Time Division Multiplexing to communicate to multiple downstream radios. This means that each radio gets a small slice of time that is being used to receive data (i.e. the airtime). Most radios support airtime priority which allows certain downstream radios to get either higher preference on timeslices, or larger timeslices. By allowing downstream nodes to stake for airtime, they can ensure priority access compared to other nodes in the local sector.

4. Packet Priority Staking – The same way that the airtime is virtually oversubscribed with multiple downstream links, we anticipate actual subscriptions to DNs and ANs to be oversubscribed, as is the case with traditional residential Internet service subscriptions. In the case of an oversubscribed link, both wired and wireless, packet prioritization is a policy that can be used to create a more reliable data stream for enterprise applications.

5. Initial Network Deployment

To bootstrap network deployment, the DAWN foundation will partner with Andrena (AS30038) for IP and initial network resources. Andrena is a hybrid fiber and wireless Internet Service Provider. Andrena builds various proprietary technologies for delivering Internet more cost effectively and more scalably, including the RAS mentioned above. The foundation will also partner with Flume (AS398816), also a hybrid Internet Service Provider in NYC. Between these two providers, the initial DAWN footprint will be able to cover approximately 3 million households in New York City and Philadelphia.

IP Space

BNs and DNs that further the distribution network will be allocated a /56 IPv6 space. This allows 256 /64 wireless distribution subnets off a given site. Given that nodes will stake for this subnet space, additional address space can be requested from the network to service downstream customers in a building, for example. Andrena will donate a /38 IPv6 subnet space to the foundation, specifically **2601:180F:FF::** for network provisioning. This includes enough address space for 262,144 BNs and DNs. The foundation will be able to purchase additional IPv6 subnet space to meet growing demand.

Andrena will also donate a /24 IPv4 subnet to the foundation to accommodate legacy devices. BNs will be able to distribute private IPv4 addresses and CGNat out of 253 available IPv4 addresses.

Day 1 Supply

One of the major objectives of the DAWN launch is to have enough supply on Day 1 to be able to realize significant demand for the wholesale-priced Internet. Below we detail the physical scale of this Day 1 Supply.

Bandwidth Nodes

Initial BNs in will include the following addresses:

- 375 Pearl Street, New York, NY 10038
- 882 3rd Avenue, Brooklyn, NY 11232
- 165 Halsey Street, Newark, NJ 07102
- 401 N Broad Street, Philadelphia, PA 19108

All of these facilities are Carrier Neutral Data Centers with a mix of wholesale IP transit providers, as well as regional Internet Exchanges, which makes them excellent choices for initial BNs on the network.

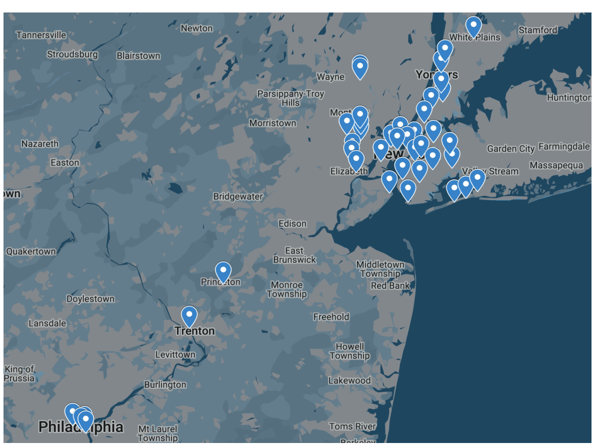


Figure 6 – Sites across 3 states to help provide supply across the network. Sites will be able to accommodate between 3 and 12 DNs for wireless coverage.

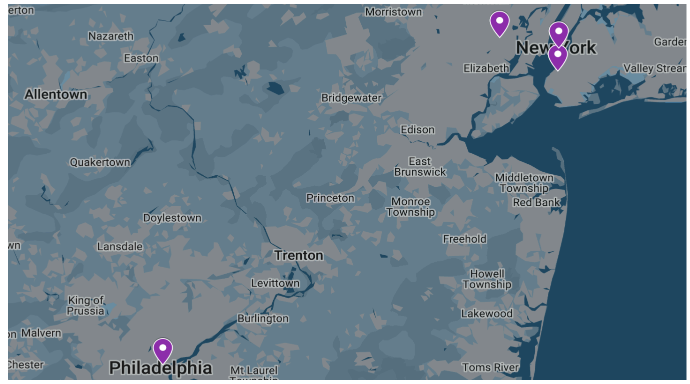


Figure 7 – Original BNs for the network to be provided by Andrena and Flume

Distribution Nodes

Andrena will contribute 240 DNs to the network on Day 1 across 40 individual sites. With a capacity of 15 nodes per DN, this would provide enough wireless infrastructure to support 3,600 downstream nodes. Based on a transaction blend of the types of services provided by a typical DN, this could support approximately $240,000 in monthly on-chain platform GMV, assuming a 75% discount on local ISP market rates.

Current Protocol testing and development

DAWN has successfully deployed its initial protocol across 30 households to begin capturing internet revenues alongside one of Andrena's real estate partners in Newark, NJ,. Following this, we scaled up by testing DAWN across 3,000 subscribers using the same billing protocol in phantom/test mode to ensure its robustness with a higher volume of transactions. Currently, we are capturing approximately $1M ARR in on-chain revenues.

The transition from our Web2 system to the new Web3 system has worked seamlessly for both residents and property owners. This demonstrated to us that we can migrate our current Web2 customers to DAWN without any disruption. The testnet was initially built on Caldera and Arbitrum Nitro. Further development on Solana has already started, and we are eager to move forward with Phase 2 of our test soon.