Node Star

WHITEPAPER

https://nodestar.io/

Introduction

Web 3.0 is a possible future version of the internet based on public blockchains, a record-keeping system best known for facilitating cryptocurrency transactions. The attractiveness of Web 3.0 is that it is decentralized, meaning that rather than consumers accessing the internet through services mediated by companies like Google, Apple, or Facebook, individuals, themselves, own and govern sections of the internet.

Web 3.0 doesn't require "permission," which means that central authorities don't get to decide who gets to access what services, nor does it require "trust," meaning that an intermediary isn't necessary for virtual transactions to occur between two or more parties. Because these agencies and intermediaries are doing most of the data collection, Web 3.0 technically protects user privacy better.

Web 3.0, also known as Semantic Web or read-write-execute, is the era (from 2010 onwards) that alludes to the web's future. Artificial Intelligence (AI) and Machine Learning (ML) enable computers to analyze data in the same way that humans do, which aids in the intelligent generation and distribution of valuable content according to a user's specific needs.

There are a few key distinctions between Web 2.0 and Web 3.0, but decentralization is at the heart of both. Web 3.0 developers rarely create and deploy apps that run on a single server or store data in a single database (usually hosted on and managed by a single cloud provider).

Instead, Web 3.0 apps are built on blockchains, decentralized networks of numerous peer-to-peer nodes (servers), or a hybrid of the two. These programs are known as decentralized apps (DApps), and you'll hear that term a lot in the Web 3.0 community. Network participants (developers) are rewarded for delivering the highest quality services to establish a stable and secure decentralized network.

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Contents

Description of the market and the problem

01

Internet Centralization

Technology that starts out as "nice to have" can rapidly become fundamental to the way we operate. But too often, resilience is an afterthought. One of the world's most widespread web outages in history is a stark reminder of the inherent fragility of our over-centralized internet infrastructure.

Most recently, a large chunk of the internet dropped offline, with some of the most popular sites, apps and services on the internet experiencing outages, including UPS, FedEx, Airbnb, Fidelity, Steam, LastPass, and the PlayStation Network. This is the second major interruption in a month.

Over the course of a morning in June, the world was hit by a 49-minute internet outage, with a string of publishers and online businesses as well as critical national government websites (such as gov.uk) knocked out. Just 49 minutes of one infrastructure provider going down caused vast troves of the internet to go offline. It was yet another incident putting a microscope on the tiny concentration of companies that underpin the internet, one that cannot easily be dismissed as an isolated event. It demonstrates a lack of resilience at the heart of critical online services. A host of essential government services became inaccessible, affecting businesses and individuals alike. The UK's Covid vaccine booking site was impacted, as was the official White House website.

The Guardian migrated reporting to Twitter to run a dedicated liveblog, while tech news sites like The Verge published news to a shared Google Doc as a temporary replacement. It is clear that the assumed security and accessibility of the information and the durability of the sources we depend on are under threat.

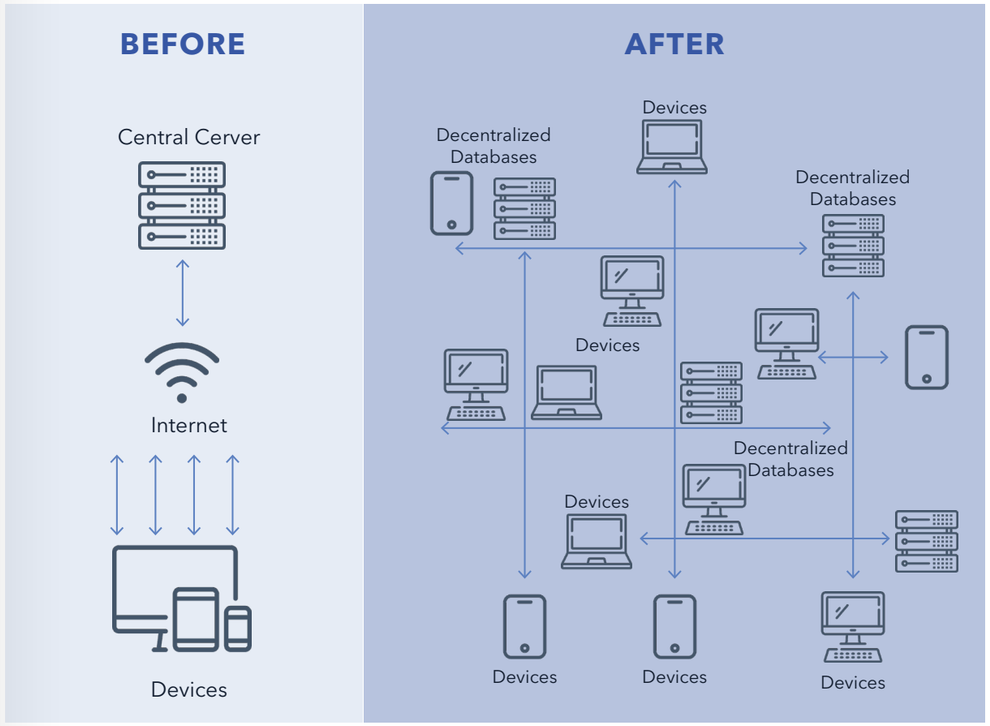
The increasing centralization of internet infrastructure in the hands of a few large companies means that single points of failure can result in sweeping outages. The volume of large-scale Internet outages seems only to be increasing, with some of the world's largest sites often the most heavily impacted. Last Thursday's outage resulted from a DNS failure. An outage in June stemmed from a content delivery network failure. Both are not isolated events.

In November 2020, AWS, Amazon's cloud-hosting arm, suffered a multi-hour outage. The collapse in the service, which interacts with about 40% of the entire internet, took out sites and services, including; 1Password, Flickr, iRobot, and the Washington Post.

Months earlier, a failure at Cloudflare led to a half-hour outage for most of the internet in major cities across Europe and the Americas. The Cloudflare outage was traced to a single error in a physical link between data centers in Newark and Chicago, which spiraled into an outage that took almost two hours to fix

The vast majority of internet traffic is routed through one of three content delivery networks (CDNs): Fastly, Cloudflare, or Amazon's CloudFront. All three operate on the same principle: the internet is faster and more stable if users can connect to servers physically close to them, optimized for handling lots of traffic.

Centralized VS Decentralized Internet



In a traditional internet app deployment model, an outage of a server or misconfigured application might take out a single website. Now we know that similar problems with a cloud solution provider can end up taking out all of their customers, resulting in not one website being taken offline, but hundreds or thousands. The impact can affect organizations' digital experiences in the short term, and affect revenues and reputations in the long term.

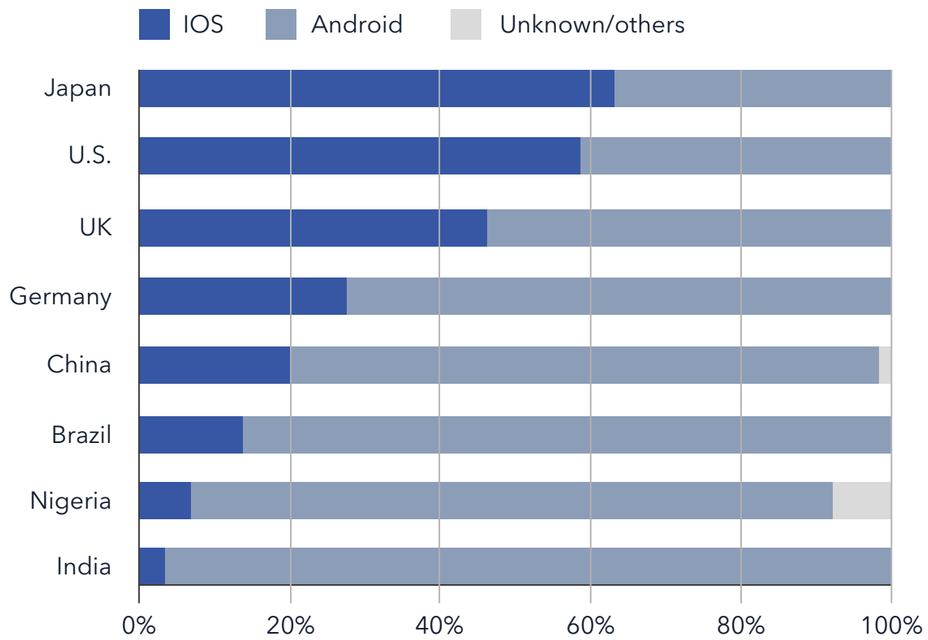
The sequences of outages underscore an important point. The Internet was originally designed to be decentralized and fault-resistant—but as the world's biggest sites and services coalesce around a few massive infrastructure providers, failures at those providers have increasingly significant effects on the Internet ecosystem as a whole.

By not relying on any central system, it meant many different components could fail and internet traffic could still find a way to get where it needed to go. Over the past decade, however, we have witnessed the unintentional centralization of many core services through large cloud solution providers like infrastructure vendors and CDNs.

The Web is thriving beyond the "walled gardens" of social media. Over 1 billion websites exist as a result of the decentralized domain name system (DNS) that catalogs all Web addresses. Around 27% of these websites are powered by WordPress, an open-source content management system that is free and easy to use, even without coding skills.

A small handful of companies – including Facebook, Google, Apple, Tencent, AliBaba and Amazon – dominate the global Internet sector. While these companies provide hugely valuable services to billions of people, they are also consolidating control over human communication and wealth at a level never before seen in history.

Mobile operating systems marlet share in selected countries (as of July 2020)



As for smartphones just two companies, Google (Android) and Apple (iOS), dominate the market. Everything from the phone's operating system, to what applications can be purchased in their app stores, are ultimately controlled by these two companies. And speaking of apps – the global app economy is centered in just a few high-income countries (95% of the value is from just 10 countries) with emerging economies accounting for only 1% of app value.

Internet acquisitions by the tech giants feed consolidation. Facebook, for instance, controls most of the messaging market in almost every country except China since acquiring WhatsApp and Instagram in addition to their own Facebook Messenger.

In China, WeChat is the dominant player. It is used for messaging by more than 90% of mobile Internet users in major cities. WeChat is also used for dating, banking, ordering taxis, shopping, and more. It is a daunting degree of centralization, where the app takes the place of mostly anything you would do on the decentralized Web. This kind of seamless experience is also desired by other app developers. It's not healthy for the Internet. It destroys competition and gives one company intimate knowledge of the movements and likes of all its users.

Web 3.0 Development

The last few years have experienced the rapid evolution of the internet and its application ranging from Web 1.0 to Web 2.0 and now Web 3.0. Web3 – the decentralized web – is the latest major iteration of the internet which promises to achieve a stable and secure decentralized network while offering a variety of innovative features.

Since the inception of the world wide web in 1989, it has changed dramatically through the years. While Web 1.0 was read-only; Web 2.0 saw a significant shift towards user participation via centralized platforms such as Google, Facebook, Amazon, etc. In this era, personal data is controlled by middlemen: those running the digital platforms. As such, people do not have control over their data as well as the content they create.

Web 3.0 was originally called the Semantic Web by World Wide Web inventor Tim Berners-Lee, and was aimed at being a more autonomous, intelligent, and open internet.

The Web 3.0 definition can be expanded as follows: data will be interconnected in a decentralized way, which would be a huge leap forward to our current generation of the internet (Web 2.0), where data is mostly stored in centralized repositories.

Furthermore, users and machines will be able to interact with data. But for this to happen, programs need to understand information both conceptually and contextually. With this in mind, the two cornerstones of Web 3.0 are semantic web and artificial intelligence (AI).

Web 3.0 is generally regarded as the future of the internet. Unlike the Web2 era, ownership and control is decentralized. Conceived by the Ethereum ecosystem, Web3 enables enhanced privacy, boosted transparency, eliminates intermediaries, facilitates data ownership and digital identity solutions. Similar to how Web2 improved front-end functionality, Web3 is focused on revolutionizing back-end functionality.

Today, Web3 architecture has gone far beyond the internet capabilities which run on a decentralized layer. It has become the convergence of several innovative technologies like edge computing, artificial intelligence, IoT, decentralized data networks. With Web3, the trend of data and computing moving to the edge is inevitable. Powerful computing resources are put together to create the next generation of decentralized, user-owned, hyper-efficient edge networks. Decentralized data networks can enable different data generators to transact their data without losing ownership control and privacy or the need for an intermediary.

Meanwhile, Web3 technology also combines artificial intelligence and machine learning to create a substrate that connects users and machines as well as connects problem owners with problem solvers without the need for a third party. This synergy facilitates a better understanding of human preference and more accurate analysis and results. As such, Web 3.0 goes from technology to disrupt the structure of society.

However, the adoption of Web 3.0 has so far been driven by crypto-related use cases. This is because the majority of Web3 protocols rely heavily on initial use cases of cryptocurrencies. This has led to the majority of projects focusing on crypto and not on the mainstream adoption of Web3 technology beyond cryptocurrency.

The thing is, decentralized technologies can be used to eliminate value-capturing middlemen. And this could be a boon for different, new economies that have appeared in the 21st century. One such economy that could be shaped by Web3 tech is the gig economy, with the new technologies promising to eliminate the centralized platforms like Uber and Upwork to give gig workers the chance to earn without lining the pockets of big corporations. A great example of this is AnyTask, which aims to enable people living in poverty to access the global digital economy commission-free and bankless.

Another such use case for Web3 technology is integrating it into the creator economy and intellectual capital-centric applications. A 2020 survey showed that the growth of intangible assets, which are the basis of the creator economy, has been so much that they now command over 90% of the S&P500's market value.

As the stat above shows, the world is evolving to an intellectual capital-centric creative economy and a world where most resources other than intellectual and human capital are commodities doesn't seem too far away. So, the creative economy encapsulates intangible assets that have become the most valued assets in the world, especially the innovative enterprise, but their total value outside of enterprise is far beyond what we can imagine. Aside from holding high intrinsic value, intellectual assets also provide an opportunity for investors to speculate as their price increases. Therefore, the ability to capture value from these assets becomes vital.

To foster mainstream adoption of Web 3.0 for the creator economy, there are projects building a whole host of tools to enable the discovery, evaluation, licensing, and exchange of intangible assets to boost liquidity flowing into the creative economy.

These projects aren't governed by a board of directors but by decentralized autonomous organizations (DAO). DAOs enable democratic governance models that anyone can be part of and can direct any fees levied on creator or gig economy workers to the further development of the platforms themselves and are not geared towards the profit-centric model of capitalism and Web 2.0.

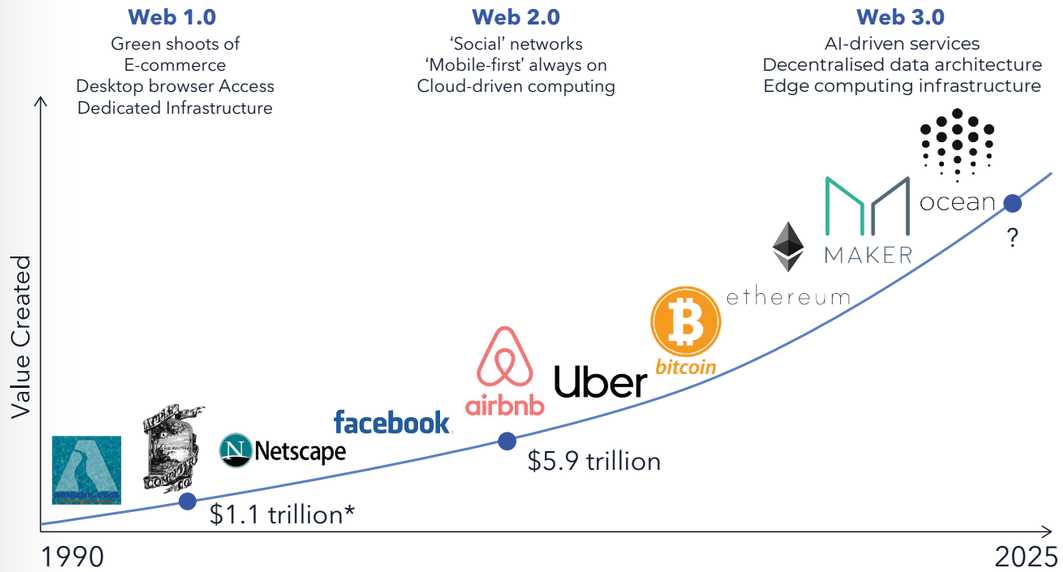
The internet has become a center of business, communication, and much more. And Web 3.0 has the potential to transform agreements and value exchange. This means that the transition to a more democratic internet via Web 3.0 may allow the world to unlock opportunities not only just to reclaim the Internet by revolutionizing infrastructures around storage, data exchange, financial transactions, but also many aspects of our lives.

Web 3.0 and Blockchain

As Web 3.0 networks will operate through decentralized protocols – the founding blocks of blockchain and cryptocurrency technology – we can expect to see a strong convergence and symbiotic relationship between these three technologies and other fields. They will be interoperable, seamlessly integrated, automated through smart contracts and used to power anything from micro transactions in Africa, censorship-resistant P2P data file storage and sharing with applications like Filecoin, to completely changing every company conduct and operate their business. The current slew of DeFi protocols is just the tip of the iceberg.

Evolution of the Web 3.0 Technologies

Web 3.0 will be born out of a natural evolution of older-generation web tools combined with cutting-edge technologies like AI and blockchain, as well the interconnection between users and increasing internet usage. Apparently, Internet 3.0 is an upgrade to its precursors: web 1.0 and 2.0.



** Internet companies market cap as of 2000*

Web 1.0 (1989-2005)

Web 1.0, also called the Static Web, was the first and most reliable internet in the 1990s despite only offering access to limited information with little to no user interaction. Back in the day, creating user pages or even commenting on articles weren't a thing.

Web 1.0 didn't have algorithms to sift internet pages, which made it extremely hard for users to find relevant information. Simply put, it was like a one-way highway with a narrow footpath where content creation was done by a select few and information came mostly from directories.

Web 2.0 (2005-present)

The Social Web, or Web 2.0, made the internet a lot more interactive thanks to advancements in web technologies like Javascript, HTML5, CSS3, etc., which enabled startups to build interactive web platforms such as YouTube, Facebook, Wikipedia and many more.

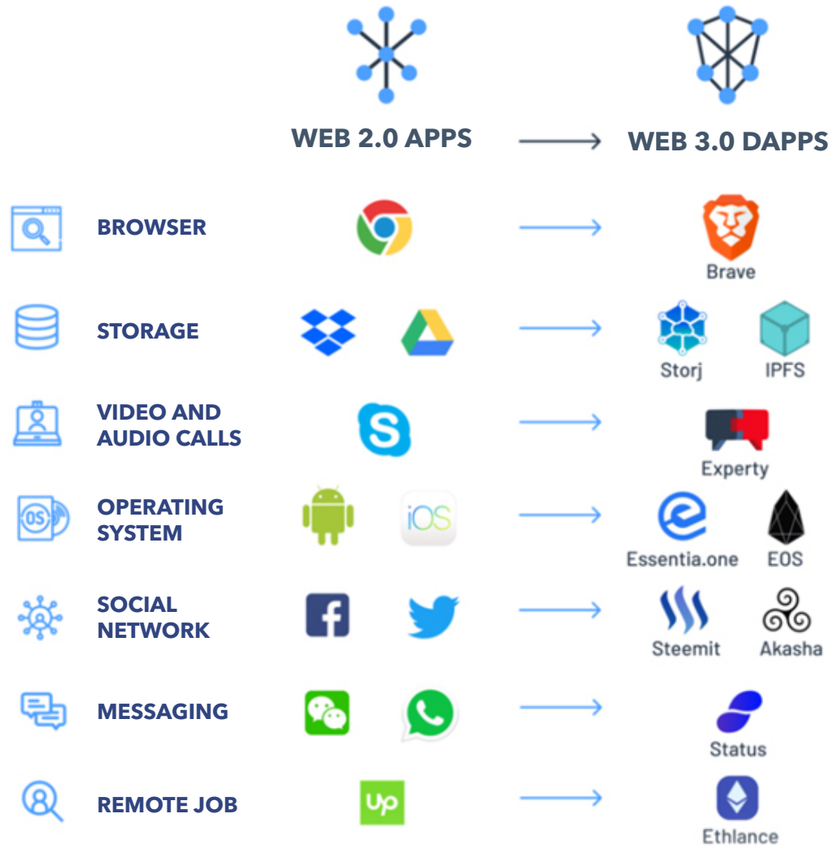
This paved the way for both social networks and user-generated content production to flourish since data can now be distributed and shared between various platforms and applications.

The set of tools in this internet era was pioneered by a number of web innovators like the aforementioned Jeffrey Zeldman.

Web 3.0 (yet to come)

Web 3.0 is the next stage of the web evolution that would make the internet more intelligent or process information with near-human-like intelligence through the power of AI systems that could run smart programs to assist users.

Tim Berners-Lee had said that the Semantic Web is meant to "automatically" interface with systems, people and home devices. As such, content creation and decision-making processes will involve both humans and machines. This would enable the intelligent creation and distribution of highly-tailored content straight to every internet consumer.



Key Features of Web 3.0

1 UBIQUITY

Ubiquity means being or having the capacity to be everywhere, especially at the same time. In other words, omnipresent.

Web 2.0 is already ubiquitous: a FB user can instantly capture an image and share it, which becomes ubiquitous since it's available to anyone no matter where they are, as long as they have FB access.

Web 3.0 simply takes this a step further by making the internet accessible to everyone anywhere, at any time. At some point, internet-connected devices will no longer be concentrated on computers and smartphones like in Web 2.0 since IoT (Internet of Things) technology will bring forth a plethora of new types of smart devices.

2 SEMANTIC WEB

Semantic(s) is the study of the relationship between words.

Therefore, the Semantic Web, according to Berners-Lee, enables computers to analyze loads of data from the Web, which includes content, transactions and links between persons.

Applying semantics in the Web would enable machines to decode meaning and emotions by analyzing data. Consequently, internet users will have a better experience driven by enhanced data connectivity.

3 ARTIFICIAL INTELLIGENCE

Wikipedia defines AI as intelligence demonstrated by machines.

And since Web 3.0 machines can read and decipher the meaning and emotions conveyed by a set of data, it brings forth intelligent machines.

Although Web 2.0 presents similar capabilities, it is still predominantly human-based, which opens up room for corrupt behaviors such as biased product reviews, rigged ratings, etc.

For instance, online review platforms like Trustpilot provide a way for consumers to review any product or service. Unfortunately, a company can simply gather a large group of people and pay them to create positive reviews for its undeserving products. Therefore, the internet needs AI to learn how to distinguish the genuine from the fake in order to provide reliable data.

Google's AI system recently removed around 100,000 negative reviews of the Robinhood app from the Play Store following the Gamespot trading debacle when it detected attempts of rating manipulation intended to artificially

downvote the app. This is AI in action, which will soon seamlessly fit into Internet 3.0, enabling blogs and other online platforms to sift data and tailor them to each user's liking. As AI advances, it wilal ultimately be able to provide users with the best filtered and unbiased data possible.

4 SPATIAL WEB AND 3D GRAPHICS

Some futurists also call Web 3.0 the Spatial Web as it aims to blur the line between the physical and the digital by revolutionizing graphics technology, bringing into clear focus 3D virtual worlds.

Web 3.0 Applications

A common requirement for a Web 3.0 application is the ability to digest large-scale information and turn it into factual knowledge and useful executions for users. With that being said, these applications are still at their early stages, which means that they have a lot of room for improvement and are a far cry from how Web 3.0 apps could potentially function.

Some of the companies that are building or have products that they are transforming into Internet 3.0 applications are Amazon, Apple and Google. Two examples of applications that utilize Web 3.0 technologies are Siri and Wolfram Alpha.

Siri

Over the years, Apple's voice-controlled AI assistant has grown more intelligent and has expanded its abilities since its first appearance in the iPhone 4S model. Siri uses speech recognition, along with artificial intelligence, to be able to perform complex and personalized commands.

Today, Siri and other AI assistants like Amazon's Alexa and Samsung's Bixby can understand requests such as "where is the nearest burger joint" or "book an appointment with Sasha Marshall at 8:00 am tomorrow" and immediately come up with the right information or action.

Wolfram Alpha

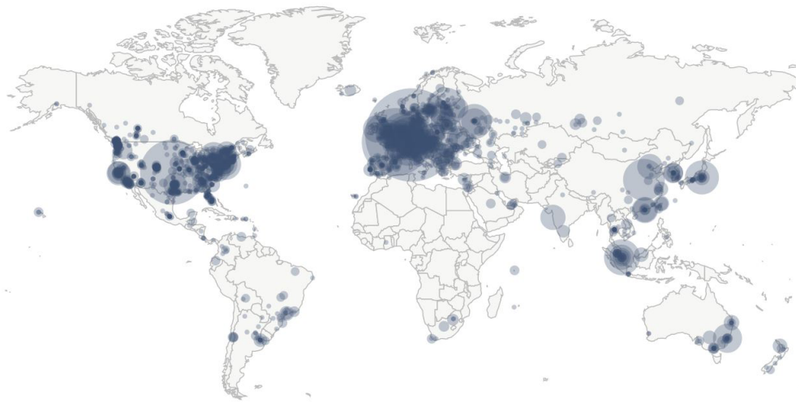
Wolfram Alpha is a "computational knowledge engine" that answers your questions directly by computation, as opposed to giving you a list of web pages like search engines do. If you want a practical comparison, search "England vs Brazil" on both Wolfram Alpha and Google and see the difference.

Google gives the results of the World Cup even if you didn't include "football" as a keyword, since it is the most popular search. Alpha, on the other hand, would give you a detailed comparison of the two countries, as you asked. That's the key difference between Web 2.0 and 3.0.

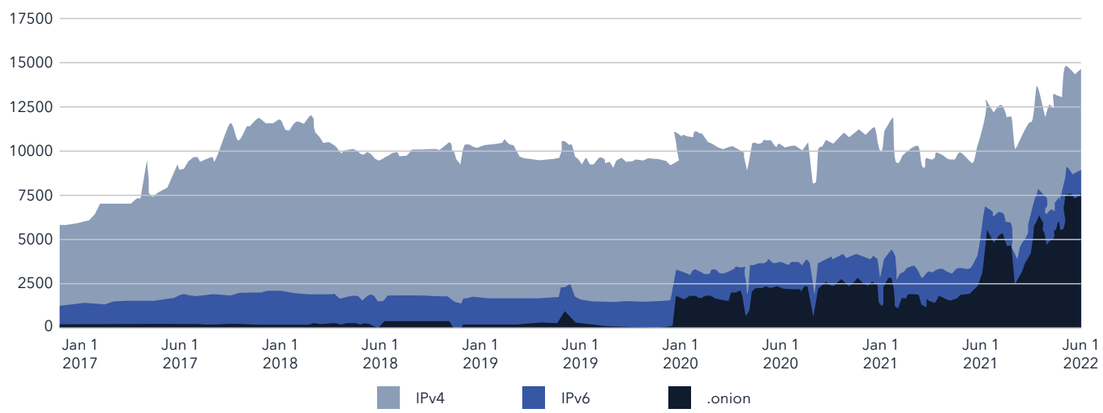
Blockchain Nodes

Traditional network services work on a client-server model. To access the shared resource, you (the client) connect to a server and request the official version of the file. This makes synchronization easy (since the server knows the most recent version) but is very centralized. This can be problematic because it requires trust in the server and the server is vulnerable to Denial of Service (DoS) attacks.

Global Bitcoin Nodes Distribution
Reachable nodes as of Tue Jan 4 20:06 2022 + 03
14613 NODES 24h 90d 1y
Top 10 countries with their respective number of Reachable nodes are as follow.



RANK	COUNRTY	NODES
1	n/a	7486 (51.23%)
2	United States	1781 (12.19%)
3	Germany	1734 (11.87%)
4	France	566 (3.87%)
5	Netherlands	374 (2.56%)
6	Canada	293 (2.01%)
7	United Kingdom	218 (1.49%)
8	Finland	210 (1.44%)
9	Russian Federation	168 (1.15%)
10	Singapore	130 (0.89%)



Blockchain is designed to be a completely decentralized system. Every node in the blockchain network has the ability to keep a copy of the distributed ledger, and the official version of the shared ledger is updated via blockchain consensus mechanisms (covered in detail in the fourth section of this series).

What Do Nodes Do?

Nodes are a vital part of the blockchain ecosystem because they're the ones that do everything. As a decentralized peer-to-peer system, everyone acts as a combined client and server. As a result, the duties of nodes are protocol-specific (rather than software-specific) and numerous.

Protocol Not Software

Like many other Internet applications, a blockchain is a protocol rather than a specific piece of software. Instead of mandating that everyone run the same executable to use a service (like Skype), the only requirement is that nodes communicate based upon the rules of the service.

An example is HTTP, the protocol that defines how websites work. The structure and order of packets on the network is defined by the protocol, but no one cares which software you're running. As a result, there are a couple of different web servers (Apache, IIS, etc.) and many different web browsers (Chrome, Firefox, Safari, etc.). These servers and browsers have agreed to follow the protocol, so they're able to communicate with one another with no issues.

Some blockchains are implemented using different software, while others have only one. When choosing blockchain software to run, it's always a good idea to cross-compare the options.

Common Node Tasks

The purpose of the node is to implement and operate the blockchain. Each node has the ability to store a complete copy of the distributed ledger, and, if they do, to update it based upon the consensus of the network as a whole. As a result, nodes can participate in a variety of activities including transaction processing, block creation, and ledger management.

Transaction Processing

One of the most common tasks that nodes have is transaction processing. Anyone connected to the blockchain network through the node will send their transactions to the node to be added to the distributed ledger. The node is responsible for sending these transactions on to the rest of the network as well as forwarding on any transactions that it receives from other nodes to its peers in the network.

Block Creation

The blockchain is updated by adding new blocks to the existing chain. These blocks contain the data stored on the distributed ledger, and someone needs to collect this information into the block and distribute it to the rest of the network. Since there is no centralized server in the blockchain, this means that the nodes are responsible for this as well. Using a blockchain consensus algorithm, a node is selected as the next block creator. They perform the tasks of creating the next block and starting its distribution (and are rewarded for their trouble).

Ledger Management

Finally, nodes are responsible for ensuring that the distributed ledger is properly stored and accessible. Every node has the potential to store a complete copy of the distributed ledger. Since not all users of the blockchain network are nodes (i.e. some people just use Bitcoin for performing transactions or investments), these nodes may occasionally be asked to send a copy of certain parts of the blockchain to a user in order to verify that a transaction made it onto the distributed ledger.

Types of Blockchain Nodes

The role distinctions in the blockchain network aren't even as simple as node and not-node. In some cases, it's possible to have different types of nodes. For example, Hyperledger permits a huge amount of role specialization, allowing nodes to only do the portion of the work that they are most suited to.

One of the more common distinctions between nodes on the blockchain is full and lite nodes. As their name suggests, full nodes perform all of the job roles associated with being a node. These guys store a complete copy of the ledger and participate in consensus and block creation. A blockchain network needs a certain critical mass of full nodes in order to maintain its security and decentralization.

Lite nodes are designed to make it easy for someone to perform and verify transactions without doing everything that a full node does. In the previous post in this series, we talked about how the block headers are "chained" together using hash values. Since these headers summarize all of the transactions contained in a block, they are all you need for verification of blockchain integrity. Lite nodes download the headers and only request the actual transaction data if they want to verify that a certain transaction was included in the block. This reduces the storage and communications requirements of lite nodes at the cost of a bit of decentralization.

What the node is for?

A blockchain node is an open-source, cross-platform runtime that allows developers to create various services. The P2P protocol allows nodes to communicate with each other within the network and transfer information about transactions and new blocks.

Network nodes are responsible for the correctness and reliability of storing the entered data in the distributed ledger. Each node can store a complete copy of the distributed ledger. Thanks to the blockchain nodes, any user can access the data and can view all transactions conducted or stored on the network.

Launching a network node used to be practically the only way to connect to the blockchain. Each new node contributes to the decentralization of the blockchain network, shortening the transaction time, and reducing fees.

By setting up your node, you receive a small income from the transactions that go through your channels.

Nodes participate in consensus, share information about transactions and the number of funds, confirm transactions and store copies of confirmations, participate in the building of new blocks in the chain, for which they receive a reward.

A business using nodes is built on receiving commissions for transfers, purchase/sale of cryptocurrency assets on the exchange.

How to deploy a node?

To deploy a full node, a number of requirements must be taken into account. If earlier it was possible to launch a node on weak equipment, now, when blockchains have grown into popular networks, memory and processor power are a decisive factor in the successful deployment of a node.

Before starting to deploy a node, you need to clarify the minimum hardware requirements. They may differ for each of the currently existing cryptocoins. For example, the minimum requirements for installing a Bitcoin node are:

- Your device must have the latest version of Windows, Mac OS X, or Linux.
- 500 GB or more of free disk space available with a minimum read speed of 100 MB / s.
- SSD capable of performing: 68 MB / s random write and 30.9 MB / s random read. At least 112GB capacity. At least 8 GB of random access memory (RAM)
- Broadband Internet connection with a download speed of at least 400 kilobits (50 kilobytes) per second. The connection must be unlimited with high upload limits.

Running your own Ethereum node requires system administrator skills. Synchronization of an Ethereum node is possible in three modes: fast, full, and light. By default, fast is used. In this mode, there is no download of transaction history, wallet balances, smart contract codes.

The most expensive is full mode as it requires powerful hardware: 16 Gb of RAM and a capacious SSD disk. Synchronization of the Ethereum archive node with tracing can take several weeks, and even then, on an SSD disk. In case of an error in the client/software version for a node, it is necessary to re-synchronize the node from scratch. This can be an expensive process. You should also take care of the security of your site, which will require cybersecurity skills.

If you start synchronization from the HDD (hard disk), the node may not "sync" due to the difference between the speed of blockchain creation (as a rule, it is higher) and the speed of writing to disk. Both the speed of the network connection and the power of the equipment are important.

The Ethereum light node synchronization mode has the most complaints. Errors often occur, although this mode is one of the most balanced: fast synchronization, less resource use, wallet balances, and smart contracts are pulled up.

At the time of writing, the Bitcoin network is supported by over 14 thousand nodes. Most of them are deployed in North America and Western Europe. There are 6447 active Ethereum nodes, according to the statistics of 10 countries with the highest number of nodes.

You can connect a node either to the main network or run it on a test network for any of your purposes: testing, development.

The standard Ethereum node runs right in the console by default. It runs as a background process by writing a service in the system or starting a node on the screen. You should carefully monitor in which mode the node is started. If the node is run in test mode, then you will not be able to track transactions.

To install a Bitcoin node, you need to create a folder to store blockchain data somewhere in your filesystem. To sync the full bitcoin blockchain, 380 GB is required today.

The process can take a long time. Hardware problems can also be detected, and an interrupted download will resume from the moment it was interrupted. After a successful copy, the client starts the blockchain synchronization process. Further, to start the node, you need to allow an incoming connection through port 8333 in your firewall.

The next step is to check if the node is working. To do this, send a request to the node with any information about the service, or request data from the blockchain.

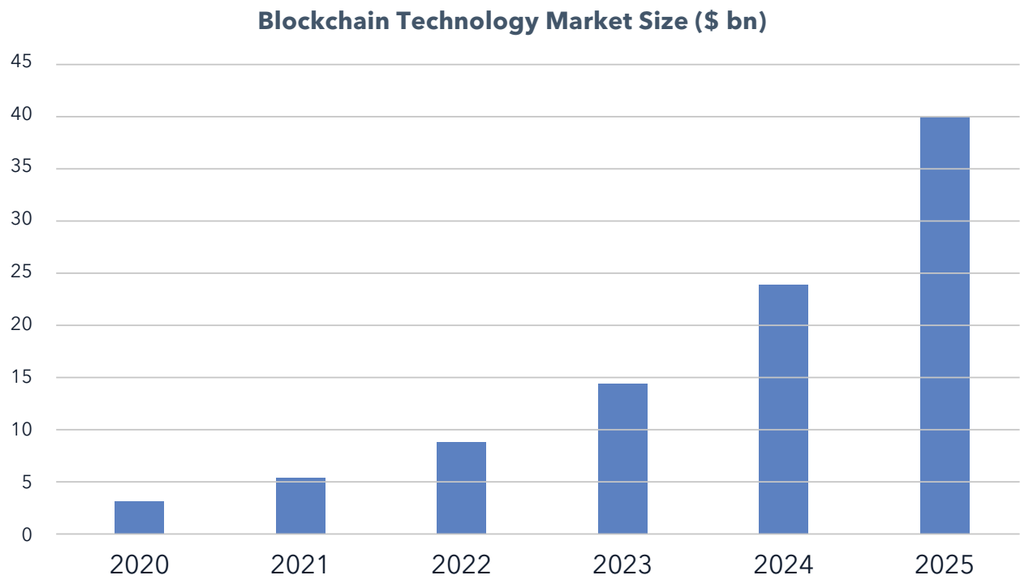
You will also want to monitor the node, for which you can use a standard service availability check on the TCP port. If the node crashes, you will have to restart it manually.

Problems you may face when deploying a node yourself:

- Limited bandwidth: Some internet plans will charge extra for using excess bandwidth not included in the plan. Make sure you don't have traffic restrictions before deploying your node. Additionally, the internet connection may be unstable. If the synchronization of the node with the blockchain network will be interrupted, then a restart is required.
- If site deployment occurs on your business network, it can slow down or bottleneck in normal network traffic.
- Parts of known computer viruses have been placed by a group of people on the bitcoin blockchain. It is not possible to infect your computer with such data, but some antivirus programs move them to quarantine, which makes it difficult for the bitcoin core to work. Most often this fact takes place on computers running Windows.
- A third party (hackers) might find that a new full node is up and running and try to hack it. You are entirely responsible to ensure your node is not hacked.

As a summary, launching a full node on your own requires you: financial costs for purchasing equipment complying with that node requirements, ensuring uninterrupted Internet connection, and the ability to use the command line.

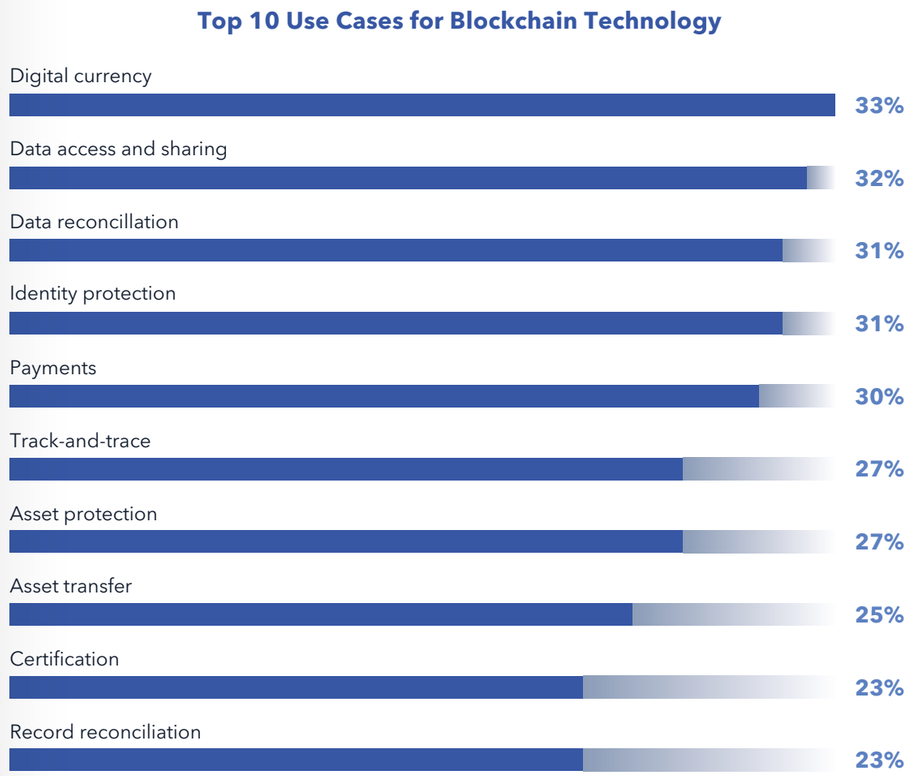
Blockchain Market



Gartner, the world's leading research and advisory company, recently completed a report on blockchain technology titled "How to Position Blockchain Platforms to Increase Adoption." This research has shown that this demand for crypto and blockchain will continue to grow in the next few years, with the blockchain technology market size estimated to grow exponentially from US$3 billion in 2020 to US$39.7 billion in 2025. Blockchain technology will also continue to provide value-add to businesses (mainly in the finance, private, healthcare and retail sectors) by an estimated US$3.1 trillion by 2030.

MARKET DRIVERS

Search engines in Web3 would provide personalized insights based on users' browsing and search context, where they can control their data. Moreover, Web 3.0 built on the blockchain can boost novel developments like uncensorable content and more comprehensive payment services.



As more people seek custom services, decentralized blockchain networks would replace centralized servers and information on multiple computing devices, acting more like a peer-to-peer internet with no single authority. Another critical benefit of Web3 is that it is able to avoid internet hacks and leaks, acting as a system for specific users, thus being a great pioneer for data security and privacy.

Once Web 3.0 becomes a reality, the world can virtually see resources, applications, and content that is accessible to all. As it penetrates more deeply, the Web 3.0 Blockchain market is expected to gain vast momentum in the years to come.

REGIONAL ANALYSIS

North America dominates the global Web 3.0 Blockchain market, witnessing the higher adoption of innovative technologies such as Web 3.0. Besides, advances in blockchain technologies positively impact the growth of the regional market. The region witnesses vast R&D investments in advancing web platforms.

Moreover, the strong presence of eminent technology providers and well-established development centers of WEB 3.0 Blockchain in the region boosts the market size. With the high adoption of digital assets, the US has emerged as a leading market for WEB 3.0 Blockchain platforms globally.

APAC is another lucrative market for Web 3.0 Blockchain, witnessing higher adoption among end-use industry verticals. Additional factors bolstering the market value include the increasing adoption of WEB 3.0 Blockchain and advances in 5G technology and AI/ML acceleration.

Furthermore, considerable investments in Web 3.0 blockchain developments increase the region's market shares. The APAC WEB 3.0 Blockchain market is expected to register robust growth during the forecast period owing to the demand for innovative and secured platforms.

Europe is showing significant progress in terms of Web 3.0 Blockchain market revenue. The market growth is driven by the rapid digital transformation among the BFSI industry and enterprises across industries. Moreover, the growing adoption of WEB 3.0 Blockchain is a key growth driver for the market.

Furthermore, the rapid adoption of 5G, AI, and ML technology increases the region's WEB 3.0 Blockchain market shares. Being home to organizations operating in the BFSI industry, the UK accounts for a larger market share among other European countries. The European Web 3.0 blockchain market is anticipated to be the fastest-growing market across the globe.

INDUSTRY TRENDS

Governments of most developed and developing countries are increasingly providing the required regulatory framework to enable and promote blockchain growth. They are initiating programs that can seek blockchain-based solutions usable across various business verticals, including fintech, sustainability, infrastructure & tooling, entertainment, agritech, logistics, and healthcare.

On the other hand, digital assets are rapidly becoming mainstream and are expected to demonstrate tremendous potential across countries in the next few years due to their rapid adoption. The adoption rate of digital assets is growing nearly twice as fast as that of the Internet.

The benefits of Web 3.0 blockchain, especially in the cryptocurrency industry, are attracting investors who are making heavy investments in the research & development of innovative technologies. Cryptocurrencies are expected to transform the way people interact day-to-day and gaming and non-fungible tokens (NFTs).

They are expected to help countries to achieve economic goals. Therefore, governments are also enforcing efforts in identifying various use cases in nonfungible tokens (NFTs), decentralized finance (DeFi), and other crypto initiatives for mainstream implementation.

Many organizations today are striving to explore more about the potential of Web 3.0 Blockchain, contributing to the success of these platforms. Enterprises have powered their marketing and advertising with previously private consumer data and very little security surrounding that data. However, internet benefits bring along consumer privacy concerns.

While the Internet helps businesses to understand their prospects better, data mining and exploitation aren't always good for brand perception. Businesses are often facing cyberattacks, with billions of records exposed. Since Web 3.0, also referred to as the Spatial Web/ Metaverse, could solve some of these privacy concerns and determine who can access the data and leverage profits from it, more and more companies are embracing the technology.

Blockchain Centralization Problem

As Elon Musk pointed out in response to a Twitter thread by crypto bull Peter McCormack, Bitcoin is highly centralized with a small number of miners controlling a majority of the hashing power. The Bitcoin hash rate plunged 35% when a single coal mine in Xinjiang flooded in April this year. It was a stark reminder of how centralized the Bitcoin network has become.

According to the Cambridge Bitcoin Electricity Consumption Index, China's share of the global Bitcoin energy consumption has declined from 75% in September 2019 to 46% in April 2021. Miners have slowly been moving away from China, but it remains a dominant player in Bitcoin mining.

Since millions of users from around the world would be involved in mining the blocks and securing the network, it will be censorship-resistant. To take control of such a network, an individual or institution has to get hundreds of millions of users from across the globe on their side, which is practically impossible.

Blockchain Without Incentives?

Proof-of-Work (PoW) blockchains such as Bitcoin and Ethereum rely on a relatively small number of nodes to accept valid transactions and maintain the security of the network. But the nodes only validate transactions. They don't mine new blocks. That's the job left to miners.

Miners are incentivized to find new blocks for the entire ecosystem. More often than not, where there are strong incentives, power gets concentrated in the hands of the few. In the case of Bitcoin, the hashing power is centered in the hands of the Chinese miners. If forced or incentivized by Beijing, these miners could take over the network.

Decentralization reduces the level of trust the network participants place in one another. It deters each participant's ability to exert control or degrade the network's functionality.

Even the Proof-of-Stake (PoS) blockchains have only a handful of whales staking most of the tokens, effectively controlling the underlying mechanisms. In short, there are no fully decentralized blockchains at this point.

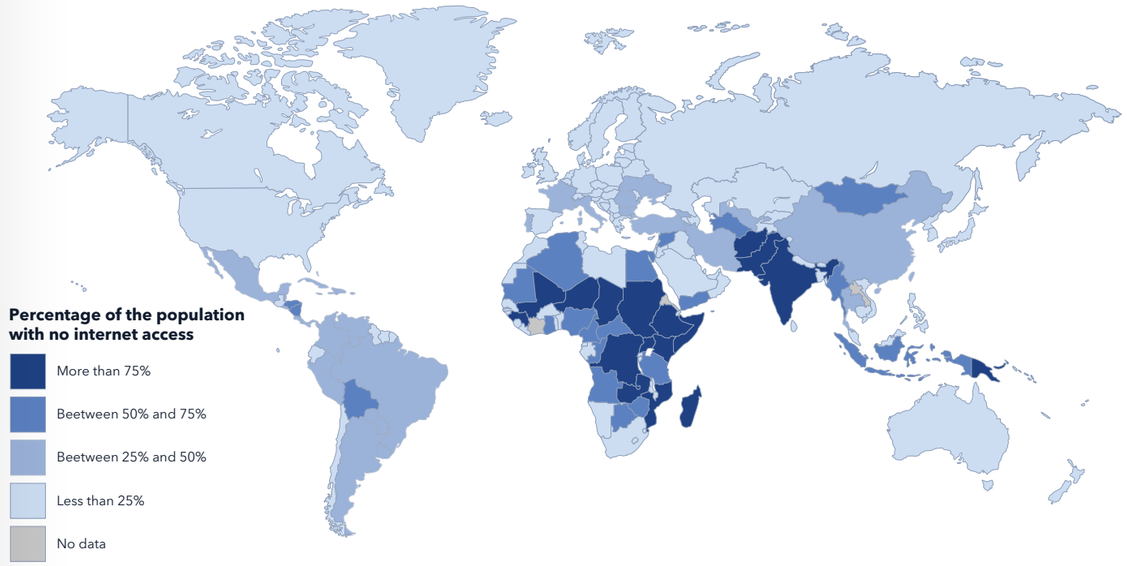
There need to be a lot of miners, and a lot of node providers, but a lot fewer incentives for mining blocks to achieve true decentralization.

Internet Access Problems

Broadband (or high-speed) internet access is not a luxury, but a basic necessity for economic and human development in both developed and developing countries.

It is a powerful tool for the delivery of essential services such as education and healthcare, offers increased opportunities for women's empowerment and environmental sustainability, and contributes to enhanced government transparency and accountability. It also helps foster the social development of communities, including within the broader global context.

The challenge is to expand broadband access to all. Only about 35 percent of the population in developing countries has access to the Internet (versus about 80 percent in advanced economies). In total, 3.7 billion people have no internet access.



Among the many inequalities exposed by COVID-19, the digital divide is not only one of the most stark, but also among the most surprising. Even in developed countries, internet access is often lower than it has to be.

Take the United States for example. More than 6% of the population (21 million people) have no high-speed connection. In Australia, the figure is 13%. Even in the world's richest countries, the web can't keep everyone connected.

Globally, only just over half of households (55%) have an internet connection, according to UNESCO. In the developed world, 87% are connected compared with 47% in developing nations, and just 19% in the least developed countries.

In the US, the Federal Communications Commission (FCC) says that estimates of the number of Americans without internet access may be understated. A 2017 Congress report said 12 million American children were growing up in homes that had no internet connection.

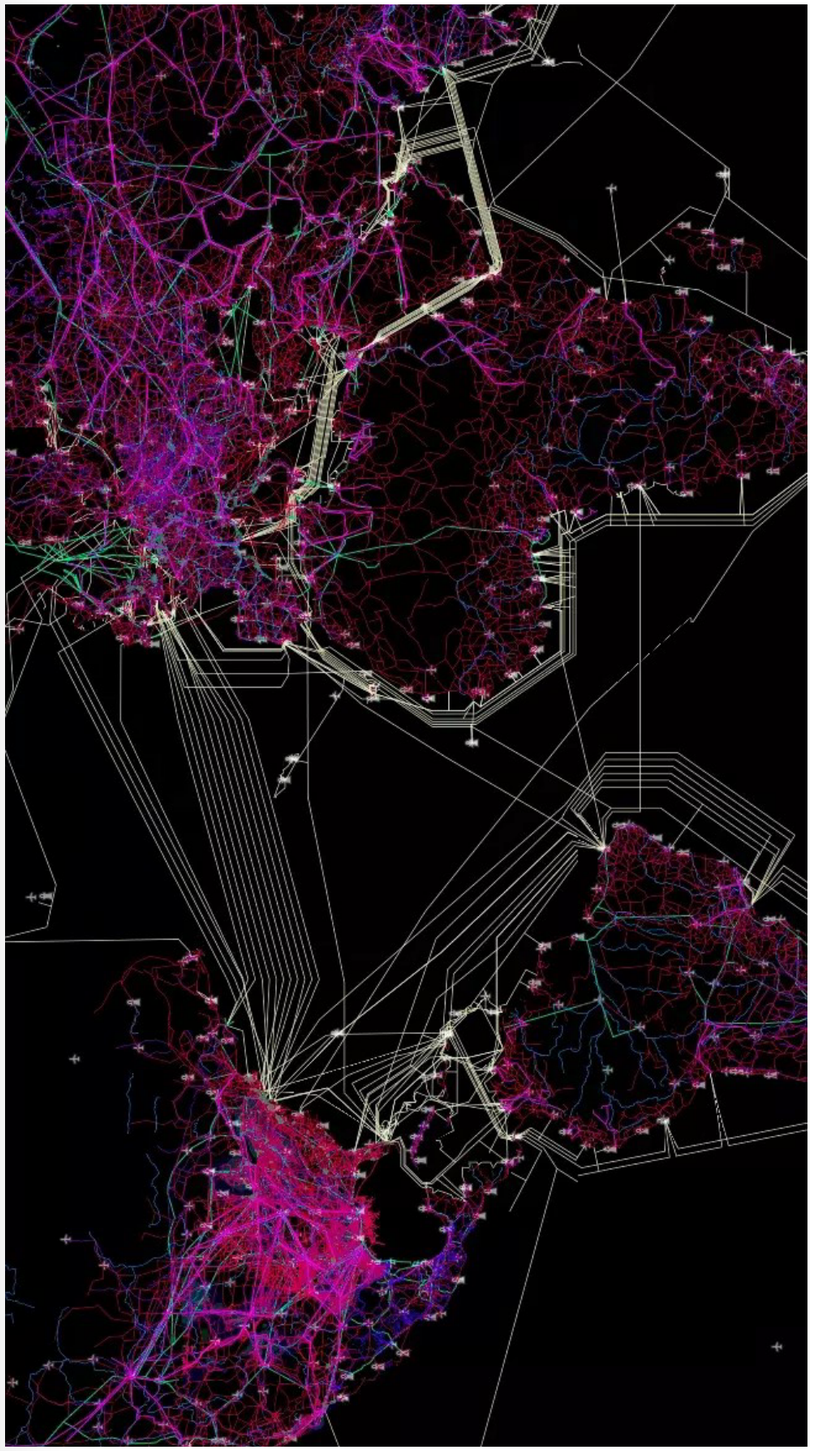
Microsoft President Brad Smith has pointed out that 19 million unconnected households in America are in rural areas. Research for the company's rural internet project Airband suggests more than 157 million Americans don't use the internet at broadband speeds.

"Without a proper broadband connection, these communities can't start or run a modern business, access telemedicine, take an online class, digitally transform their farm or research a school project online," says Smith.

UNESCO and the ITU's Broadband Commission for Sustainable Development set a target of connecting 75% of the world's population to fast internet via cable or wireless by 2025. Although uptake of mobile technology is rising in the developing world, the costs of mobile internet are higher.

In sub-Saharan Africa, one gigabit (GB) of data - enough to stream a standard-definition film for one hour - costs nearly 40% of the average monthly wage.

According to the World Bank, 85% of Africans live on less than $5.50 a day. Small wonder, then, that most find themselves cut off by the digital divide. And it's not just a problem in developing nations. In Australia, almost a third of less well-off homes have no internet connection



Product Definition

02

What is Node Star DAO?

Node Star DAO hopes to help decentralize the internet and make ALL blockchain networks more resilient, by operating as many nodes as possible, supporting as many networks as possible, helping the entire web3 ecosystem thrive.

We believe humankind should use technology as a liberating tool to unleash all the goodwill and creativity of our species, rather than as a tool to enslave and take advantage of one another.

Thus, Node Star DAO is a fight for freedom. We empower freedom by creating liberating tools that leverage decentralized technologies.

Node Star DAO was established to empower everyone, regardless of their technical ability, to be able to break free of any centralization and possibility of access censorship by running their own node and hosting their favorite DApps.

We try to make the internet become decentralized by helping different blockchains. We are providing a service to them, by running their software on our computers. They provide the software and the incentive payments. We provide the computers and the people to operate them.

For the user, Node Star DAO works as hosted in a machine that this person owns, allowing them to use blockchain nodes and DApps in their own machine and access them directly via a decentralized protocol without using any centralized gateways or gatekeepers.

Since running a node is an activity that needs technical knowledge, we provide instructions and demos, instructional videos and blogs, tutorials on our website, and on platforms like medium.com.

To raise awareness we will release a commercial. Our YouTube/TV commercial is currently filming over next few days in L.A. This is courtesy of award-winning short film director, Hunter Huddleston.

Node Star DAO uses nodes of Lightning Network (Bitcoin), Ethereum, Avalanche, Chainlink, Stratos, Ankr, Polygon, SpaceChain, Theta, Fantom, Thorchain, Flux, Akash, Cosmos, Polkadot, Cardano, Solana, Algorand, HarmonyOne, Near Protocol, Helium, Elron, Kusama, Terra Luna, Oasis, Celo.

The platform has several connection options that allow the user to access their own platform securely from anywhere and from any device, their phones, laptops. The platform also allows users to earn cryptocurrencies by participating in the maintenance, validation or resource sharing of certain decentralized networks.

The Node Star DAO is an inclusive platform that Node Star's users will carry on its mission to keep the web decentralized, uncensored and resilient. Active Node Star DAO members will have the opportunity to vote on Node Star's future projects and on how to expand its array of solutions.

To get involved in Governance, DAO aspirants will need to make contributions to the ecosystem and help kick-start the NODE economy. Those who provide liquidity in the sanctioned pools, or commit NODE to Governance Staking on Ethereum Mainnet or other Mainnets will be granted voting powers proportional to their contributions. This rule allows us to make sure that those with a voice are also those with a stake. The higher level of participation will earn users some extra tokens as well.

Node Star DAO Infrastructure

Our DAO platform was developed on Aragon software. Aragon is software that allows anyone to create decentralized autonomous organizations (DAOs) on the Ethereum blockchain and its Rinkeby test network. Aragon software can be used to create clubs, companies, non-profits, and other organizations that collaboratively manage finances and decision-making through its decentralized apparatus. Aragon also scales for use by private companies and public sector organizations with a number of more advanced implementations. According to Aragon, more than 1,700 organizations are built on Aragon, and it is used by projects including Curve, Decentraland, and PoolTogether – with a total project market cap of over $3 billion USD.

When serving our community of token holders, we deliver our solutions through decentralized Software applications, mainly, Aragon. It's made of Solidity smart contracts developed on the polygon blockchain, developed with tools and code audited by the Aragon Foundation.

Node Star DAO Ecosystem

We built our platform through Polygon Ecosystem. Many platforms use the Etherum ecosystem for development. Ethereum is the blockchain development platform of choice, but it has limitations.

- Low Throughput
- Poor UX (gas, delayed PoW finality)
- No sovereignty (shared throughput/clogging risk, tech stack not customizable, governance dependence)

Many projects are exploring Ethereum-compatible blockchains as a way to mitigate these limitations while still leveraging Ethereum's thriving ecosystem. However, there is no specialized framework to build such blockchains nor a protocol to connect them. This introduces significant development challenges and causes ecosystem fragmentation.

Polygon combines the best of Ethereum and sovereign blockchains into a full-fledged multi-chain system.

Polygon solves pain points associated with Blockchains, like high gas fees and slow speeds, without sacrificing on security. This multi-chain system is akin to other ones such as Polkadot, Cosmos, Avalanche etc, but with at least three major upsides:

- It is able to fully benefit from Ethereum's network effects
- It is inherently more secure
- It is more open and powerful

With polygon, any project can easily spin up a dedicated blockchain network that combines the best features of stand-alone blockchains (sovereignty, scalability and flexibility) and Ethereum (security, interoperability and developer experience). Additionally, these blockchains are compatible with all the existing Ethereum tools (Metamask, MyCrypto, Remix etc), and can exchange messages among themselves and with Ethereum.

By joining the Polygon ecosystem, NODE STAR can now ensure near-zero gas fees for DAO creation, management, and voting, as well as faster transactions and a seamless user experience.

Aragon is using Polygon as a full-stack scaling solution. Integrating with Polygon brings more than a 5000x reduction in the cost of DAO creation, from well over $500 on Ethereum, to around $0.1 on Polygon. This is a game-changer for DAOs.

Offering the highest support from Day 1 for any developer, Polygon PoS is the most developer-friendly platform after Ethereum, providing its rapidly growing developer community with access to their favorite tools, including Hardhat, Truffle, Metamask, Etherscan, and more.

That's why Polygon is witnessing a surge in innovative projects, like Aragon, launching on its platform. Currently, there are more than 500 Dapps in the Polygon ecosystem including Sushiswap, Curve, Aave, Balancer, Kyber, the highest number compared to chains outside of Ethereum.

Collaborations

Our main purpose is to increase the node users and make the internet decentralized. There are many blockchain networks trying to reach the same goal and as a part of our policy, we collaborate with them.

For instance, DFINITYNodes is one of them. DFINITYNodes is a DAO that aims to give the average Internet Computer user a chance to provide and benefit from nodes on the Internet Computer. They do this by leveraging NFTs as shares that can be staked in a boardroom to participate in node governance. The Core Team proposes withdrawals to the DAO, backed by receipts, quotes, and contracts, to fund the development of nodes. Node shareholders then govern these proposals, with perhaps a 70% threshold to pass proposals. The DAO also hosts a shared marketplace, where users can freely trade node shares at competitive rates. This will be coupled with a buy-back mechanism that utilizes 5% of monthly node rewards and 2.5% of market transactions to buy as much of the floor as possible. This will provide liquidity to the investor while also steadily increasing the ICP reward per share. All shares accumulated through the buy-back mechanism will be burned, resulting in fewer total node shares overall.

There are many arguments on accepting the internet as a utility like electricity and water. Especially in pandemic times, everyday life heavily relied on the internet and voices rise to make it one of the utilities. Many decision-makers share this idea, as well as authorities. Node Star DAO believes that being able to access the internet is one of the core rights of people.

In addition, rural internet access is at low numbers, especially in developing countries. There are many solutions for delivering high-speed internet to rural areas such as Space Chain, Helium, World Mobile Chain, and StarLink and we fully support these organizations by helping them grow their network and make it stronger. To do that we simply install their software on some of our computers. That's what turns them into "nodes". The more computers we install their software on, the more it helps them process their transactions, store their important data, validate changes to the blockchain, etc.

Tokenomics

03

At the first stage, our biggest expenses are setting up the infrastructure and personnel costs. To make our system available to everyone and to create a smooth workflow, we will use the initial funds to purchase/rent computer servers in data centers. These servers will be used to run our own nodes. Initially, we expect that 95% of the nodes that we use will be ours.

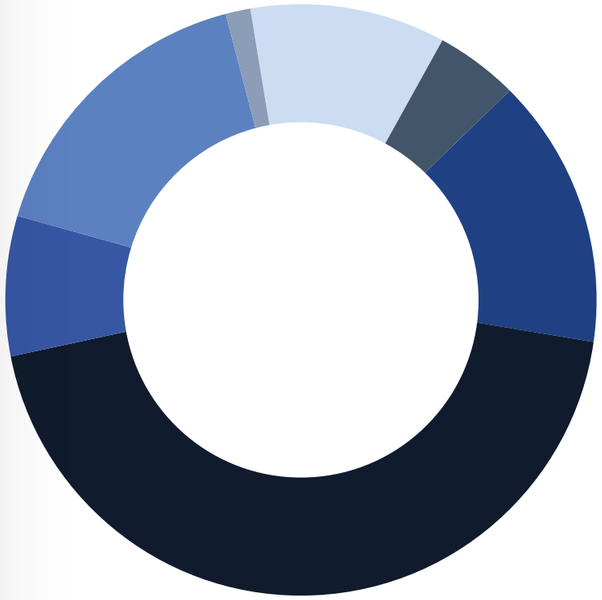
There is a team consisting of advisors and experts behind our platform. The personnel cost is another priority for the usage of initial funds.

As a part of our growth plan, we plan to acquire small companies such as internet service provider company, web hosting company or telecom company and change their business model to community-owned. This step will be a demonstration of a decentralized internet. After the initial funding, we plan to use funds for this purpose.

Based on a recent research, the below findings are observed:

- Investor allocations are decreasing.
- Team allocations are increasing.
- Airdrops have become a cornerstone of most distributions.
- Public Sales have all but disappeared.
- DAOs have shifted the majority of ownership to the Community Treasury and Ecosystem Incentives.

DAOs dedicated less to the Team - averaging around 10%. A minimal amount was typically allocated to Investors at around 5%, and the largest portion went towards Treasury and Ecosystem Incentives.



Average token distribution for new DAOs in 2021

- Treasury/ Endowment 44.2%
- Public Sale 14.4%
- Investors 4.2%
- Team 10.9%
- Service Providers/ Partnerships 1.3%
- Ecosystem Growth 16.2%
- Development Fund 7.2%

In line with this recent information, we will distribute the tokens accordingly.

The Team

04

ZACH PERLMAN

Co-Founder

Certified in Blockchain Technologies by MIT, and as a Blockchain Developer by the Blockchain Council, Zach is a mid-career professional with demonstrated work history in website design and organizational development. He has almost 20 years of experience in website design and over 25 positive endorsements. He is passionate about decentralization, blockchain, and everything Web3!

MICHAEL SPURLING

Co-Founder

Michael is an entrepreneur, innovator, and blockchain enthusiast. He is the owner of Go Taxi, LLC and HA Transport, LLC. He has 15 years of experience running a medical transportation company and recently got educated in Blockchain Innovation.

NOAH BLUM

Cybersecurity Expert

Noah is a Senior Computer Forensic Examiner and Web Application Penetration Tester. He has experience in computer forensic examination, penetration testing, ethical hacking, malware analysis and reverse engineering.

TARA HAMMA

Accountant/Book Keeper

Tara has more than 10 years of experience as an Accountant/Book Keeper. She has expertise in all aspects of accounting and financial management with a solid track record of developing and implementing financial systems and policies. She is an innovative problem solver skilled in supporting rapid growth in startups and bootstrapped companies. She is tech-savvy with in-depth knowledge of key accounting software and an ability to quickly learn proprietary systems and applications. She is an excellent communicator able to translate complex financial information into clear and concise reporting for non-financial stakeholders.

DANIEL CADY

Branding Expert/Creative Director

Daniel has more than 20 years of professional experience. As an accomplished hands-on Creative Leader he creates lasting value, driving profit and purpose for brands large and small. As a part coach, curator, and pitchman, he has a distinguished track record executing high-impact strategies and leading creative teams. By using best practices across the customer journey, he positions established and emerging brands forward - maximizing engagement and competitive advantage.

The Traction and Roadmap

05

- Established the discord server on December 5th.
- Published first introductory article on December 20th.
- Organized Core Development Team
- Set up a Medium, Discord Teams.
- Began DAO Development
- Installed the ICO website template
- Created a 4-year business plan

Phase One – First Quarter

- Technical & Non-Technical Whitepaper
- Connect with Strategic Partners to coordinate a "public launch."
- Source Datacenter Quotes in applicable countries
- Apply for a node Star DAO Grant

Phase Two – Second Quarter

- Launch of the Node Star DAO
- Node Star Crowd-Funding Event
- Finalize Generation Details through proposals, ex; Location of the Nodes, Datacenters, etc.
- Finalize Datacenter Contracts & assemble Node Star DAO Nodes

Phase Three – Third Quarter

- Activation of Nodes
- Excess funds are returned to Node Share-Holders
- Node Rewards are shared among Governors who stake Node Shares within the Node Star DAO.
- Additional features proposed to share-holders.

Two-Year Vision

- At least 75 Nodes hosted through the Node Star DAO
- 30% of all Node Star Nodes hosted outside of North America
- 150,000 Unique Node Providers in the Node Star DAO
- Acquiring a small internet service provider company, web hosting company or telecom company

https://nodestar.io/