

# Ethereum Business Readiness Report 2022

Assessing the potential and capabilities  
of public Ethereum and the broader  
Ethereum ecosystem for businesses



ENTERPRISE  
ETHEREUM  
ALLIANCE

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# Executive Summary

Ethereum has never enjoyed as much mainstream visibility as at the present moment. Yet the public discussion today is generally focused on cryptocurrencies, consumer-facing decentralized finance (DeFi), non-fungible tokens (NFTs) for art or collectibles, and other use cases dealing with finance or speculation. There is less visibility for business use cases or consumer-facing decentralized applications (dApps).

This paper aims to remedy that. Our goal is to help the broader business community understand the potential and capabilities of public Ethereum and the Ethereum ecosystem for business use by a) shedding some light on the use of Ethereum and Web3 technologies to solve real-world business problems; and b) by providing businesses a framework by which they can understand and assess the various options available to them in the Ethereum ecosystem today.

Based primarily on qualitative research in the form of case studies and interviews, but also incorporating quantitative research from a database of business projects developed for this report, our mission is as much to educate as it is to provide what we hope are useful insights.

Here is a summary of what readers will find:

## SECTION 1: THE EVOLUTION OF ETHEREUM AS A BUSINESS PLATFORM

In the first section of the report we provide a short history of the Ethereum platform, focusing on the main developments and trends that are important to understand from a business perspective.

We think it useful to look at this evolution in three main phases.

The early days of the platform were characterized by initial excitement and experimentation with decentralized approaches, but also by a nascent ecosystem with a lack of tooling and services as well as certain limitations of the technology – primarily concerning performance and privacy – that created challenges for business use.

This was followed by a period of focus on the part of the business community on private blockchain, generally incorporating a consortium model. While this helped address some of the challenges of using public blockchains for business at the time, the private consortium model also proved to have its limitations.

Since around 2020, we have entered a third phase characterized by renewed interest in public Ethereum driven by the maturation of the ecosystem. Awareness has been supported by the highly visible successes of consumer DeFi platforms and NFTs for art and collectibles. Despite recent market downturns, these platforms have served as influential proof points for decentralized business models and blockchain-based digital assets.

Today, we find the business Ethereum ecosystem characterized by a high level of maturity, but also by a certain degree of fragmentation. The Ethereum Mainnet has grown into a significant settlement layer. That said, sustainability and performance of the Mainnet remain a concern. Ethereum's high energy use, its relatively limited capacity and high transaction costs surfaced time and again in our research as blockers for businesses interested in using the platform. This is set to change as the Mainnet undergoes scheduled upgrades over the coming months and years.

In the meantime, numerous scaling solutions are enhancing the platform as regards performance and scalability, and many of these also contribute to better sustainability. Thanks to these ancillary components,

businesses can already use Ethereum in highly performant and sustainable ways today. They can find support among the wide selection of service providers and vendors that have since entered the ecosystem, including large, well-recognized players as well as startups and new entrants. Because of these developments, it is significantly easier for businesses to build solutions on Ethereum today than has been the case in the past.

## SECTION 2: BUSINESS ETHEREUM 2022 – OBSERVATIONS AND TRENDS

In the second section of the paper, we provide a snapshot of the use of Ethereum in business today and examine some of the key trends we think are of interest to businesses exploring this space.

Looking at our project dataset, we find – unsurprisingly for a still-young technology – that the lion's share of activity is focused on blockchain infrastructure projects and blockchain development services. This is followed by financial services-related industries and use cases such as capital markets, payments and insurance. Of the non-financial services activity in our data sample, we find supply chain provenance and marketplaces – long recognized as two key use cases for blockchain – well represented.

As for key ecosystem trends, we find first and foremost that there is a growing appreciation of the opportunities of public blockchain among many of the projects we analyzed and people we spoke to. This is a reflection of a number of factors including the maturation of the ecosystem, the availability of sufficient tools and standards, Ethereum's reliability as a global settlement layer, and the aforementioned examples of large-scale DeFi and NFT platforms.

We also find that the circumstances under which decentralized business models make sense is becoming clearer to many. These circumstances include situations in which broad-based collaboration between multiple parties is a necessity, or where businesses have concerns – for example, around data sovereignty – with the use of large, centralized platforms for business-critical operations.

In our opinion, the Layer 2 (L2) solutions and sidechains that have been providing important enhancements to the Ethereum ecosystem will remain relevant for a long time. These will continue to add key functionalities and provide extra capacity for business use, in some cases morphing into use case-specific subnets. Businesses should, however, keep in mind that many of these represent relatively new technologies and deploying on an L2 or sidechain can mean being constrained to that sub-ecosystem to some degree.

There is no doubt that privacy remains a key concern when using public blockchains, but advances in cryptography and privacy-preserving computing are addressing the issue, and may well help to reconcile the tension between transparency and privacy that has long been a priority in the blockchain community.

We also note that, as the technology is maturing, the world of private and public blockchain is converging. Companies today can use Blockchain-as-a-Service (BaaS) offerings, or those L2s that offer private options, to quickly spin up application-specific blockchain-based solutions. Given the right use case, fully private blockchains remain excellent platforms for business collaboration among a fixed set of participants, with or without a formal consortium.

After sustainability, regulation turned up most often in our research as a barrier to adoption, particularly among enterprises. This is, however, not true for all use cases. While governments around the world are scrutinizing the use of cryptocurrencies, many jurisdictions understand and support the potential of blockchain-based digital assets and decentralized business models, and are regulating accordingly. Businesses should keep this difference in mind.

Lastly, although an old idea, NFTs are today showing the way to the future of digital assets. We find that the migration of real-world assets to the blockchain via tokenization, and their varied use cases – ranging from new, regulatory-compliant digital securities to tokenized assets for new kinds of marketplaces to digital twins in supply chains to NFTs for fostering brand loyalty – is an important trend, and it should prove a lasting one.

## SECTION 3: ASSESSING THE BUSINESS READINESS OF THE ETHEREUM ECOSYSTEM

In the third section of the paper, we propose a Business Readiness Framework as a way for businesses to understand and evaluate the pros and cons of different Ethereum-based network setups. To demonstrate this framework in action, we also apply it to four key use cases.

A fairly detailed framework, it does not lend itself well to a summary. What readers will find, however, is a set of technical and non-technical criteria that we feel are important to different types of businesses as they consider this technology, as well as an evaluation of how different types of businesses might prioritize these criteria. We then map our criteria against four basic network configurations (we call them “archetypes”) that businesses can choose from, and we evaluate each of the criteria by business type and network configuration, pointing out the relative merits and risks.

While we have tried to be precise and to explain our conclusions, this is a new approach, which by its nature involves judgment calls that can be questioned. We welcome all feedback.<sup>1</sup> Our hope is that by developing this framework and providing our examples of it in use, we can at a minimum educate business users and give businesses a conceptual model and a toolkit to use as they evaluate Ethereum technology and the ecosystem for their particular needs.

## SECTION 4: CONCLUSION

So where has all of this left us? As we maintain in our conclusion, we think that there is a good case to make that Ethereum today is a technology, platform and infrastructure that is ready for business, though with a few caveats.

Specifically, we find that the pieces are in place for the safe and productive use of Ethereum as a business platform. That said, these pieces do not necessarily fit together seamlessly yet. But with many options available for different setups based on type of business and particular needs, there is enough variety in the available architectures to make it possible to find an option to build a successful solution.

Last but not least, we think there are good reasons for businesses to explore decentralized business models and processes of the type Ethereum makes possible.

In its early days, Ethereum promised to support decentralized business and collaboration through, among other things, tokenization and smart contracts. Today, this promise is becoming a reality. Since what previously relied on faith between two or more parties can now be proven mathematically on a blockchain, any situation in which someone has to say “I have to trust you” is an opportunity for an Ethereum-based solution. Going forward, the opportunities are as numerous as the myriad business challenges that depend on this kind of trust.

## APPENDICES: CASE STUDIES AND INTERVIEWS

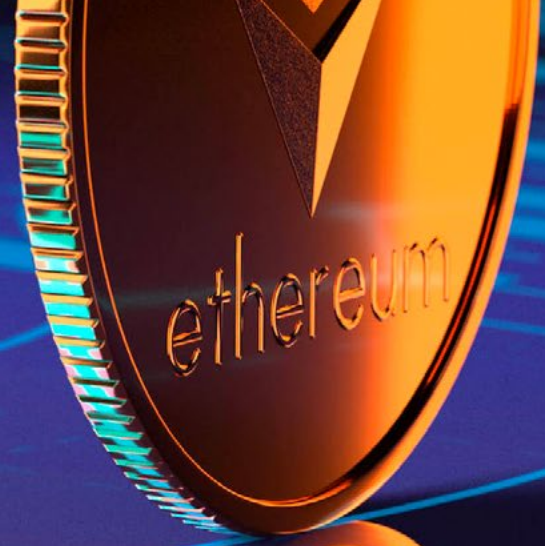
In our appendices, we print in full nine of our case studies and six of our interviews. As we refer to these cases and interviews throughout the paper, we thought it would be useful to give the reader the full context. We also think these stories and voices provide an excellent “view from the ground”, and invite our readers to spend some time with them as a way to round out the picture we have been attempting to paint with this report.

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<sup>1</sup> Readers are welcome to provide feedback to this report via [this form](#).



# Introduction



In July of 2015 the Ethereum blockchain “went live” with the mining of its first block. Its ambitions were lofty: nothing less than to extend the blockchain idea pioneered by Bitcoin to create a decentralized, general-purpose, world computer capable of bringing decentralized approaches to all manner of applications, including business applications.

In the seven years since then, the technology, the platform and the ecosystem have continued to grow. There have been ups and downs, and booms and busts. But there is no doubt that blockchain generally – and Ethereum specifically – has made its mark.

Today, driven above all by the mainstreaming of cryptocurrencies as well as recent highly visible successes in consumer DeFi, the use of NFTs for art and collectibles, and investment-oriented DAOs, it is safe to say that Ethereum has never been so entrenched in the public imagination.

But much of the attention comes from the investment- and fintech-type use cases mentioned above, as well as the highly public but largely ephemeral rises and falls of the crypto, DeFi and NFT markets that go along with them.

There is less visibility for business use cases or consumer-facing dApps. This is unfortunate, as we strongly believe that it is in Ethereum’s original promise as a platform for decentralized approaches to business (or other types of) challenges that the real innovation lies.

To remedy this situation, and assist the broader business community in understanding the potential and capabilities of public Ethereum and the Ethereum ecosystem today, we at the Enterprise Ethereum Alliance have prepared our first Ethereum Business Readiness Report. With this we are taking the first steps into what we hope will be a longer

journey mapping and illuminating the use of Ethereum and Web3 technologies to solve real-world business problems.

As with all first steps, there have been difficulties. Day-to-day business projects do not tend to make the headlines. They are brought to life to solve problems, make money, and improve life. Unlike a unique piece of digital art selling for record sums at a famous auction house, they are not ends in themselves. That makes such projects harder to find. Unlike cryptocurrencies, which are traded on blockchains that can easily be analyzed and measured, business projects are harder to quantify. Getting statistics, if at all possible, requires a great degree of legwork, and not a little guesswork.

We believe that this will change over time, and in future we expect far more transparency into what is going on “on the ground” than we have today. In the meantime, we hope with this report to shed some light and to help point the way forward. In doing so, we have a number of different goals.

At the top of our list is to reach a broad audience. This paper is consciously geared to educate and raise awareness of the business Ethereum ecosystem among the broader business community “outside the blockchain bubble”. And despite the “Enterprise” in our name – which for many people implies large corporations – we are writing this report for all kinds of businesses: large enterprises, small- and medium-sized enterprises, micro-businesses and even freelancers. We are writing for profit-oriented enterprises as well as mission-driven enterprises such as governments, public administrations, NGOs and charities.

We hope to be able to speak plainly to all those audiences: to educate and raise awareness about the possibilities of this new space, and to speak to them frankly about its challenges and current limitations.

## Introduction *(continued)*

### A NOTE ON OUR RESEARCH

The information in this report is based on both qualitative and quantitative research. Because our goal is not to produce a scientific paper but to shed light on what is actually happening on the ground in the ecosystem, the emphasis has been on the qualitative – above all, case studies and interviews – although we have also relied on quantitative data.

Below are some notes on how we approached our work.

#### Case studies

The core of this work is our case studies. We believe such cases have great value in demonstrating what is really happening and possible as opposed to what could potentially occur. Using the projects in our database as a starting point (see below), we developed a short list of approximately 40 cases that we looked into in more detail. Of these, we conducted deep-dives, including interviews, for 12 cases. We have relied on these for our analysis. We also present nine of these cases in full in this report, as we believe these are representative of some of our key trends or otherwise shed light on our overall themes. Inclusion does not imply any kind of endorsement. Developing case studies is a labor-intensive task, and our choices also represent to an extent what was available to us in the time we had at our disposal. We intend to keep up this work with an eye to building a comprehensive case study collection to help with further research. In the next report we hope to be able to draw on a deeper well.

#### Interviews

We also believe in the value of hearing directly from practitioners and experts, and so we conducted a wide range of interviews. These include 20 interviews conducted expressly for this report, as well as a number of other relevant conversations and interviews conducted in the course of other projects within the EEA. As with the case studies, we have relied heavily on all these interviews for our analysis. We have also chosen to present six of them in full in the appendix. Here too, inclusion does not imply any endorsement other than that we found the opinions expressed apropos of our main themes.

### Data: Active projects in business Ethereum

On the quantitative side, we collected data on 118 “business-oriented” Ethereum projects. We did this both through desk research and by means of a survey. Our survey responses were not sufficient to provide a statistically valid sample, so we do not include them here. But survey responses did provide good anecdotal evidence that helped shape our views. Gathering data was not without its challenges in other respects. While it is easy to measure what happens on the Ethereum blockchain, and so follow the developments of things like cryptocurrencies, consumer DeFi platforms or NFTs, there is less available on the use of blockchain for building business solutions. We had to dig deeply. As this is our inaugural report, we were also starting from scratch. For future reports, we hope to be able to build on what we have started.<sup>1</sup>

To paint a picture based on our “business” lens, we focused mainly on companies or projects that are active now, have live teams, and are developing solutions that are being used by traditional businesses for solving traditional business problems. This naturally reduced the number of projects, and precluded many of the more well-known purely crypto, consumer DeFi or NFT-oriented ones. We also tried to favor projects that are in production, but we included some that are in development, either because they have a good chance of coming to fruition or are significant to us for some other reason.

**We would like to stress that ours is not meant to be an exhaustive data set, nor a scientific one.** Our intention is to shed light where we could, and to identify some general trends. That said, we believe our data sample does let us develop an initial and reasonably accurate snapshot of where the activity in business Ethereum is today.



**We sincerely hope you enjoy – and profit from – your reading.**

**Daniel Burnett**

Executive Director, Enterprise Ethereum Alliance

<sup>1</sup> If you would like to contribute your project to our database, please fill out our online form at <https://bit.ly/EEAEthSurvey>.

## Section 1

# The Evolution of Ethereum as a Business Platform

In the first section of this report we provide a short history of the Ethereum platform, focusing on the main developments and trends that are important to understand from a business perspective. This history can be divided into three main phases: i) the early days of the founding of the platform and initial excitement and experimentation with radical decentralization; ii) a realization of the limitations of Ethereum for business use, leading to a focus on private blockchain consortia and the discovery of certain limitations in this model; iii) a revival of interest in public blockchain and decentralized business models driven by the maturation of the Ethereum ecosystem and the example provided by consumer DeFi and NFTs.

## PHASE 1: THE EARLY DAYS OF ETHEREUM

The genesis of Ethereum lies with Bitcoin.

Bitcoin had introduced the idea of a blockchain: a decentralized, append-only ledger that could be used by groups of strangers to keep a tamper-resistant record of their transactions with each other using a currency that lived on the chain. But Bitcoin's blockchain was limited to this specific use case.

Ethereum's founders wondered whether it would be possible to extend the idea by creating a general purpose blockchain that could be used to decentralize not just money, but anything else that might be represented in code. These ideas were sketched out in the Ethereum white paper. Published in 2014, it marks the date of the start of the Ethereum project.<sup>1</sup>

Like Bitcoin, Ethereum has its own currency: ether. Like Bitcoin, it is also a fully decentralized, open network administered along open-source project principles. Nobody owns Ethereum, and anybody can use it. The work of the network is done by miners, who validate transactions and

record information, earning ether in exchange. Anyone with the technical means can become a miner. For someone new to Ethereum, the main thing to understand is that this is a public, open infrastructure that more or less runs itself. It is maintained by a community of core developers, but there is no single entity in charge of it.

The principal innovation in Ethereum – and what differentiates it from Bitcoin – is the idea of a smart contract. Despite its name, this is not really a contract, but rather a computer program that can be deployed to and run on the blockchain. Because the computer language used to code Ethereum smart contracts is “Turing complete,” they can be programmed to do almost anything. What makes a smart contract different from other types of computer programs is that, once deployed on the blockchain, it cannot be altered, can generally be inspected by all users of the blockchain, and will run exactly as programmed.

If Bitcoin enabled trusted money without a third party, the big idea of Ethereum was to enable trusted, decentralized computing with no central authority. With the platform's native currency providing the economic incentives for the community to run the network and the resources to administer and develop it; and with the smart contracts providing the programmability, the ingredients were in place to build a decentralized world computer.

<sup>1</sup> [Ethereum White Paper](#), Ethereum Foundation.



## The Evolution of Ethereum as a Business Platform *(continued)*

With financial transactions at its core, Ethereum was from the outset seen as a potential business platform. But these were meant to be new types of businesses, based on principles of decentralization. The idea was to use the blockchain to reduce or eliminate the need for trusted intermediaries, and so provide a means to replace centralized, top-down structures with decentralized, bottom-up, community-driven ones. We can call this the idealist's view of blockchain, and it is a view that is still very influential in the community today.

In the early days of Ethereum, these ideas remained nascent. The ecosystem consisted mostly of the blockchain itself – what we refer to in this report as the Mainnet – and a small community of enthusiasts building on and experimenting with it. Not unlike the early days of the Internet, there were not a lot of tools or services available to them, and so many began to build these themselves, driven by necessity and a desire to improve the platform. With the price of ether slowly appreciating as the network gained traction, many of these efforts had the advantage of being able to self-fund. In this way the ecosystem and the technology began to slowly grow and mature, and people began to experiment with the new, decentralized models and applications that were the primary inspiration for many in the community. Like Bitcoin (though perhaps less virulently), the Ethereum project was meant to be disruptive of the status quo.

Despite the fact that it was conceived as a technology to disrupt the financial and business establishment, that establishment had fairly early on seen the potential of this technology to help solve business problems.

In what we might call the pragmatist's view of blockchain, decentralized technology is seen not as a means to completely upend existing ways of doing business, but as a tool to extend and improve upon them. Key claims for the technology included:

- **Efficiency:** Using blockchain and smart contracts to replace complex, expensive, siloed legacy infrastructure with simplified, decentralized, shared infrastructure, and so introduce massive efficiencies and cost savings to many key business processes
- **Automation and collaboration:** Using blockchain and smart contracts to support automation of business processes, and so add efficiencies but also open

up new means of collaboration, in particular across multiple parties

- **Trust and transparency:** Using distributed ledgers to bring higher levels of trust and transparency to shared business processes
- **New business models:** Exploring decentralization and digital assets to open up new kinds of business models and markets

## PHASE 2: THE ERA OF PRIVATE BLOCKCHAINS AND CONSORTIA

As it became more familiar with the technology, the enterprise community began turning its interest in blockchain into investment. Early experiments, however, uncovered some limitations with using the original, public, decentralized, open-to-all version of Ethereum for enterprise use cases.

One big problem was data privacy. Because data written to the blockchain is saved permanently, it is easy to view and analyze. Even if the contents of the transaction are encrypted, transactions on a blockchain leave sufficient trails that, given enough time and resources, senders, receivers and other information can generally be uncovered. Smart contracts written to a blockchain can be examined by anyone as well, potentially revealing the business logic, the underlying agreements, and who is doing business with whom.

This is a problem for businesses keen to guard commercial secrets. It can also be a compliance nightmare. Data protection and similar laws require businesses to protect customer data, and, in many cases, to be able to delete that data if requested. The Ethereum blockchain is based on an immutable ledger where erasure is not allowed. Similarly, as an open platform, Ethereum has no native way to identify its users. That makes compliance with Know Your Customer (KYC) standards and similar financial regulations difficult, at least without some kind of added permissioning.

Another major problem was scalability. The Ethereum blockchain as originally designed could process about 15

## The Evolution of Ethereum as a Business Platform *(continued)*

transactions per second. In times of heavy traffic, it can be prone to network congestion. This can drive up transaction fees. All of these are blockers for large-scale, industrial use.

The answer to these issues came in the form of private blockchains. A private blockchain is a bit like an Intranet: there is a blockchain, but unlike a public version, it is walled off from the outside. Users generally have to identify themselves and receive access permission. In this way the decentralization aspect is sacrificed, often greatly, in order to gain desired features like privacy and speed.

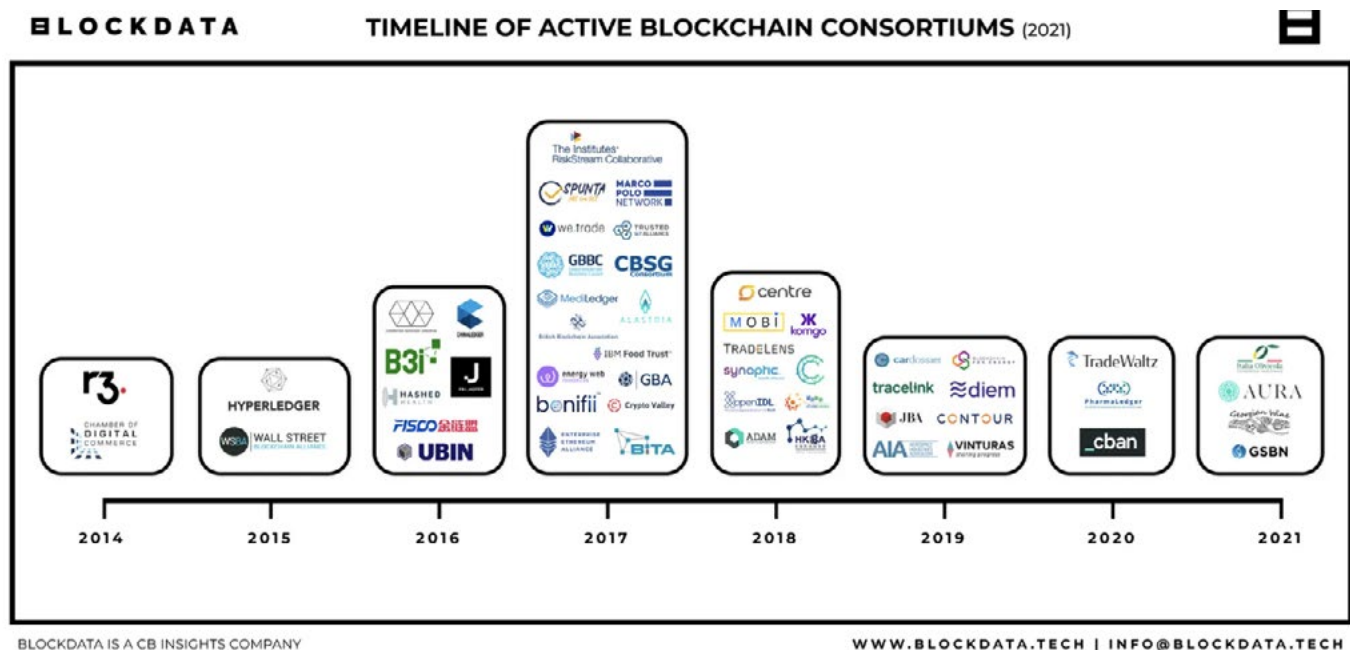
The idea of private forms of blockchain goes back to before the launch of Ethereum with projects like Ripple and Corda. But it was the advent of Hyperledger, an open source project under the aegis of the Linux Foundation but promoted to a large extent by IBM, that really catalyzed the idea of enterprise blockchain.

Early use of private blockchains was often based on a consortium model in which a number of companies got together to build a blockchain-based infrastructure and business process, usually for a specific use case. During this period high-profile consortia were launched in areas

like trade finance, insurance, energy, food and luxury goods. Many of them are still in operation and thriving. But many others have either failed or dramatically scaled down their aspirations.

The main issue was not technological, but organizational. While consortia are meant to be collective efforts, in practice, many were started and/or dominated by a single player. Getting competitors to join could be a challenge, especially if it meant giving up control of their business-critical data. Where competitors did come together to collaborate on a platform, it could be difficult for participants to agree on a single course of action. This is often referred to as the “social scalability” problem of blockchain consortia.

There were other issues too. Building blockchain platforms from scratch, especially in those early days when there were fewer providers and less tooling than today, was no mean feat. Doing so for a small group of players struck many as unnecessary. But here, too, there were lessons to be learned, and the idea of private blockchain is still very much with us. As we discuss later in this paper, it has, however, evolved.



Blockchain consortia reached a peak in 2017. Source: [Blockdata](https://www.blockdata.tech).

## PHASE 3: RENEWED INTEREST IN PUBLIC ETHEREUM

In the meantime, the public Ethereum ecosystem continued to evolve and mature. The appearance of more and better infrastructure, tools and approaches has made public Ethereum-based decentralized models more accessible, and more viable, for business purposes. As a result, the period from 2020 has seen renewed interest in public Ethereum as a business platform.

### CONSUMER DEFI AND NFTS

Two developments have been particularly important in driving this interest: the rise of consumer DeFi and the success of NFTs for art and collectibles.

Decentralized Finance (or DeFi) describes the use of blockchain to build decentralized, autonomous, community-run and funded alternatives to the traditional financial system. The key characteristics of DeFi are that there are no banks or centralized authorities. Everything runs on

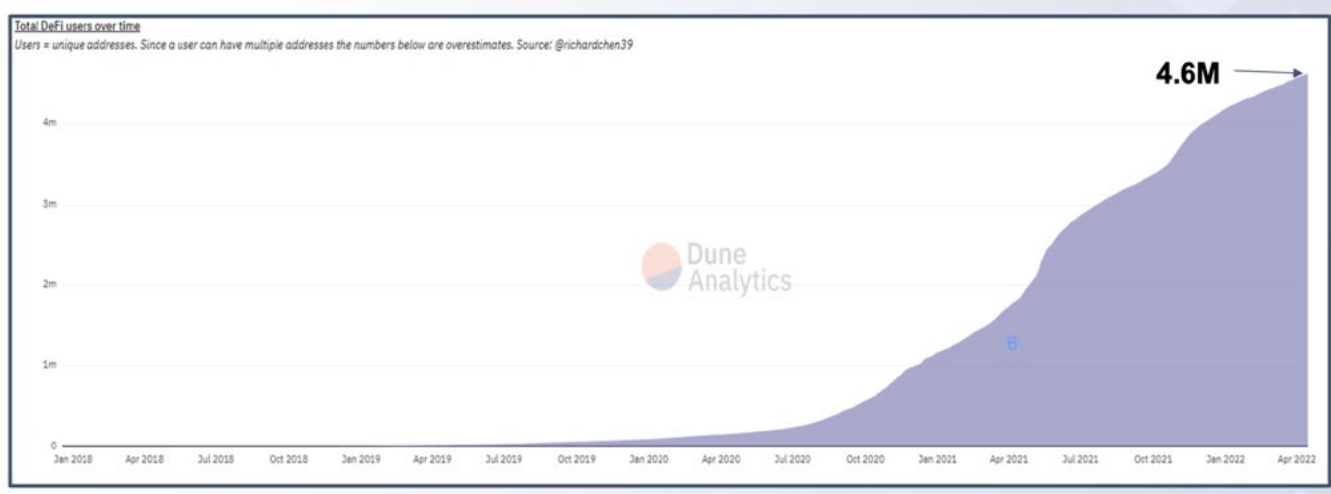
smart contracts, users transact directly with each other, and they have custody of their own digital assets.

The idea of DeFi goes back to the early days of Ethereum, but it was only during 2020 that interest in DeFi exploded among consumers and individual investors. Total value locked (a metric for DeFi investment) went from an almost negligible few hundred million dollars at the beginning of 2020 to 16 billion dollars at the end.<sup>2</sup> There has been a sharp correction recently triggered by the failure of the Terra stablecoin. On the other hand, consumer DeFi users as measured by wallet addresses (a good but not perfect proxy for individual users) remains high, having risen from two million in 2021 to just over 4.5 million today.<sup>3</sup> That is a lot of people who are now familiar with DeFi concepts such as self-custody.

The relative success of DeFi platforms has proven to many that a large-scale, decentralized, high-value use case can work from a technical perspective. As we learned during our research, it can serve as a potent example in business circles. More than one interviewee for this report told us that the example of Uniswap – the most successful DeFi exchange – has greatly helped them illustrate and make the case for decentralized, blockchain-based approaches among their colleagues.

<sup>2</sup> For up-to-date DeFi statistics, see [defillama.com](https://defillama.com).

<sup>3</sup> See <https://dune.com/rchen8/defi-users-over-time>.



Despite a sharp recent drop off in DeFi volumes, the number of DeFi wallets is at a record high. Source: [Dune](https://dune.com).



## The Evolution of Ethereum as a Business Platform *(continued)*

The second trend of interest for our story is the recent “NFT craze”. NFT stands for “non-fungible token” and is simply a crypto-token that is designed to be unique (instead of fungible, or interchangeable, like a currency). On Ethereum, NFTs are generally tokens that follow the ERC-721 token standard,<sup>4</sup> though there are other standards for NFTs as well. Because they are non-fungible, NFTs are not particularly good for representing (fungible) money. But they are very good for representing unique digital assets.

People have long realized the potential of NFTs to create “digital twins” of physical or intangible assets. This includes, but is not limited to, the idea of using NFTs for digital art and collectibles. The first art/collectibles NFTs date back to 2014, and early successes of this idea include Crypto Punks and Crypto Kitties in 2017. But it was only in 2021 that the idea took off, going mainstream when Beeple sold an NFT of an artwork for almost 70 million U.S. dollars at Christie’s. Since then the blockchain-based digital art and collectible world has exploded, with collections coming from artists, sports stars, celebrities and mainstream brands.

Like consumer DeFi, the success of NFTs has validated another key blockchain ideal, showing that it is possible to build an ecosystem and market around blockchain-based tokenized assets. NFTs, which appear in many different guises in our case studies and other research, are already being used for a wide variety of functions.

## THE ELEPHANT IN THE ROOM: SUSTAINABILITY AND SCALABILITY CHALLENGES

Rapid growth of the Ethereum ecosystem since 2020 has also highlighted issues with the blockchain’s capacity and its energy consumption. As these are major themes in the community today, businesses should be aware of them.

Like other public Proof-of-Work (PoW)-based blockchains, the Ethereum Mainnet uses an inordinate amount of electricity. This is by design, as it helps secure the network. But the environmental costs are high. This is a serious concern, surfacing time and again in our research as a blocker for businesses interested in using the platform. For

the same reason, blockchains like Bitcoin and Ethereum have a negative reputation in the public mind.

Another big issue is the scalability of the network. Not only is Ethereum slow compared to traditional payment networks, but its present capacity is often not sufficient for demand. In times of heavy usage, the network can become congested. This can slow things down for users as well as raise costs, because Ethereum’s transaction fees rise and fall based on network usage. After sustainability, high fees are the most cited blocker by businesses in our research.

The good news for businesses looking to use Ethereum is that there are workarounds to these problems available in the ecosystem now in the form of scaling solutions (which we discuss below). Over the course of 2022 and 2023 a number of planned upgrades to the Ethereum Mainnet will address these issues as well (more detail in Section 2).

## THE EXPANSION OF THE ETHEREUM ECOSYSTEM

The first block of the Ethereum blockchain was mined on July 30, 2015. In July of 2022, the platform will have turned seven years old. Over this time Ethereum itself has evolved, and a large and diverse ecosystem of infrastructure, product and service providers has grown up around it. Many of these cater to businesses. Here we provide a few key highlights of the ecosystem today that we think businesses should be aware of.<sup>5</sup>

### THE ETHEREUM BLOCKCHAIN HAS GROWN INTO A SIGNIFICANT SETTLEMENT LAYER

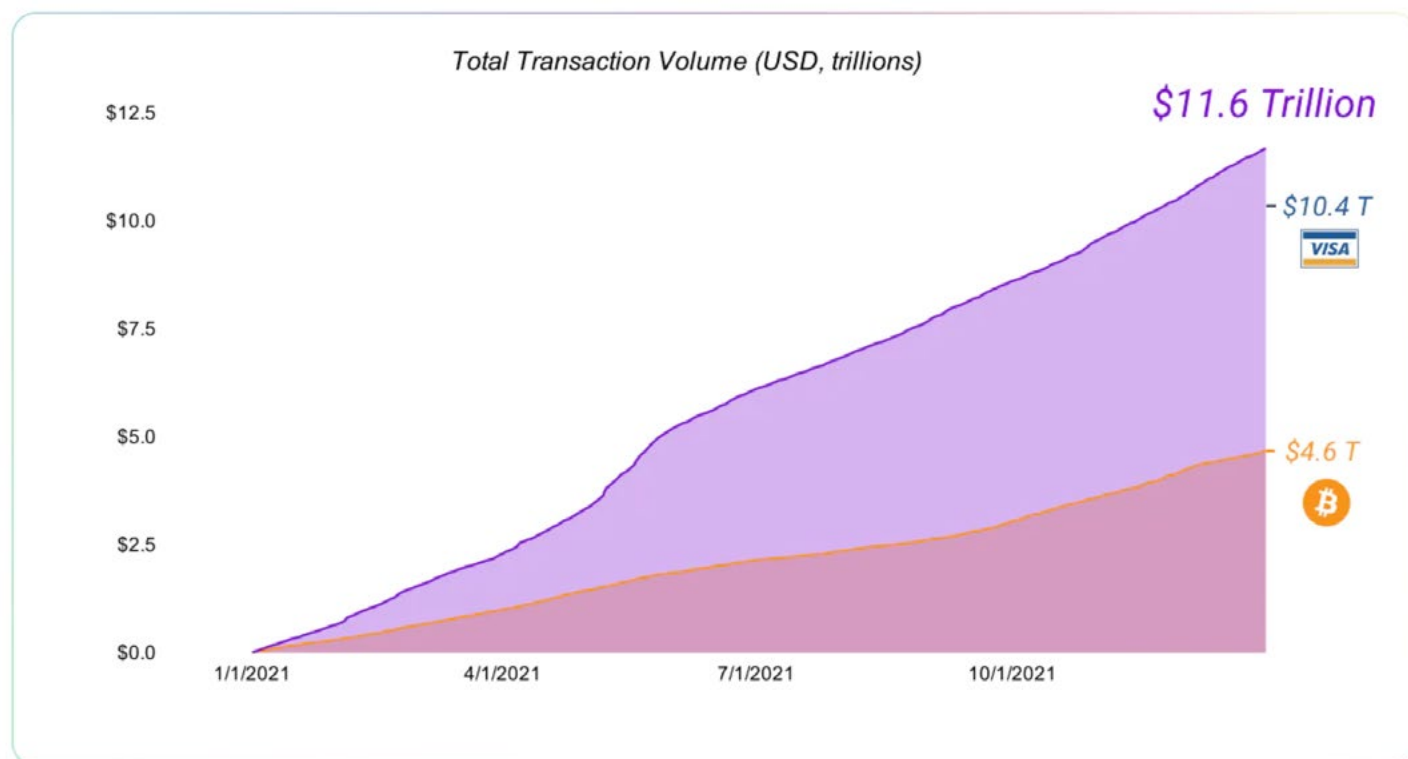
There is little doubt that Ethereum has evolved into a globally significant settlement layer. Last year, the Ethereum blockchain settled over 11.6 trillion U.S. dollars worth of transactions. This is more than Visa (10.4 trillion) and Bitcoin (4.6 trillion).<sup>6</sup> It is interesting to note that about half of this activity is connected to stablecoins, which themselves are tied to fiat currency. That means that about half of Ethereum’s transactions are connected in some way to real-world financial activity. This is significant as it indicates not only that the Ethereum blockchain works, but that it is a robust, trustworthy platform for holding value.

<sup>4</sup> [Token Standards](#), Ethereum Foundation.

<sup>5</sup> [State of Ethereum and the Ethereum Ecosystem](#), EEA 2022 Ethereum in the Enterprise Conference, May 4, 2022.

<sup>6</sup> [The Year in Ethereum 2021](#), Josh Stark and Evan Van Ness, January 17, 2022.

## The Evolution of Ethereum as a Business Platform *(continued)*



In 2021, Ethereum settled more value than Visa. Source: [The Year in Ethereum 2021](#), Josh Stark and Evan Van Ness.

### SCALING SOLUTIONS ARE ENHANCING THE PLATFORM WITH RESPECT TO PERFORMANCE AND SUSTAINABILITY

While the Ethereum community has been working on a number of upgrades to the Ethereum Mainnet to address its sustainability and scalability issues (see Section 2), others have been working for a long time on improving performance through additional technology layers that can be added on top of the Mainnet. These have become known as scaling solutions, and they generally take the form of ancillary blockchains that gather and process transactions from the Mainnet.

There are two main types of scaling solutions: Layer 2s (L2s) and sidechains. Without going into the details, L2s are separate systems (often, but not always, other blockchains) tied to Ethereum that bundle transactions together (known

as a “rollup”) and anchor the data onto the Ethereum Mainnet in a way that ensures its validity. In this way, they “inherit” the security properties of the Mainnet, and so can be considered equally secure. Through bundling, L2s can massively increase transaction volume and reduce transaction fees. Sidechains are separate blockchains that work with the Ethereum Mainnet, but are not as directly tied to it as L2s, and so do not necessarily inherit its security properties.

While development of various scaling solutions has been going on for many years, it is only in the last year or so that solutions have begun to appear and be used on a large scale. These are already having a positive effect. We expect the use of scaling solutions to grow dramatically, which will also significantly increase the overall capacity of the Ethereum network.

## The Evolution of Ethereum as a Business Platform *(continued)*

### THERE IS A WIDE SELECTION OF SERVICE PROVIDERS AND VENDORS

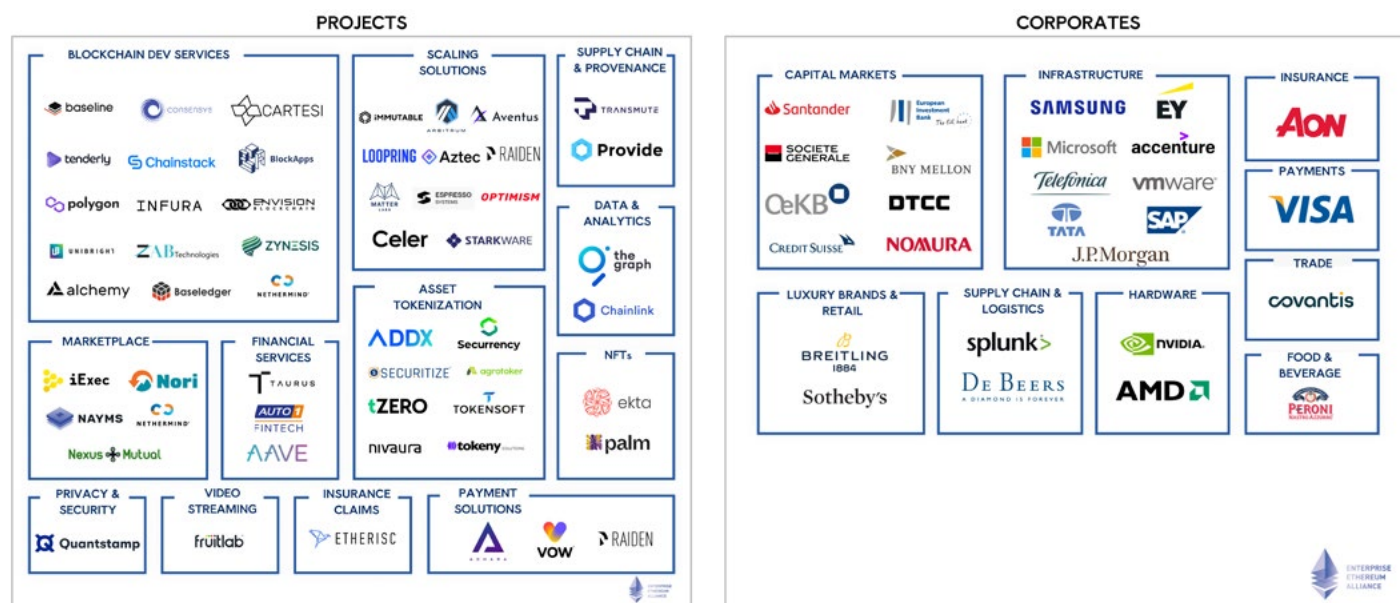
Another important technological trend in the Ethereum ecosystem relevant to business use is the rise in the number of Ethereum service providers, vendors and Blockchain-as-a-Service (BaaS) platforms. Many of these are large, well recognized players; others are startups or new entrants in the space. These offerings make it relatively easy for businesses to develop either public or private blockchain-based solutions. The ecosystem now features a wide array of services providing developer environments and offering frameworks and tools to help businesses integrate with blockchain applications, software and devices. These can include development platforms and infrastructure providers offering technologies and services for solution building. Businesses can also find an increasing number of providers to assist them in asset tokenization, the process by which an issuer creates blockchain-based digital tokens to represent either digital or physical assets.

Thanks to the current interest in DeFi and NFTs, large communities of providers and ancillary services have grown up around these new industries as well. Businesses

wishing to engage will find a large selection to choose from. Custody, which means the safeguarding and safe use of the private keys that represent the ownership and control of digital assets, is an extremely important subject in blockchain, as you cannot safely use this technology if you cannot manage your keys. Businesses will find a large selection of custodial services to assist them in doing so, either by providing custodial services or by helping businesses understand and implement self-custody of their assets.

In sum, we find that the Ethereum ecosystem has matured over the past seven years to a point where it can provide a basis for businesses to safely and effectively solve real-world problems. That said, while the pieces are in place, they do not necessarily fit together seamlessly. Businesses will find a certain amount of fragmentation in the ecosystem, due mainly to a lack of the kind of comprehensive development and deployment suites that are often to be found in more mature technologies. This should improve over time. But compared to its early days, the barriers and blockers to using this technology have fallen.

### Business Ethereum Ecosystem 2022 – Selection of business-related projects and providers



The Ethereum ecosystem is growing, as seen in this selection of business-related Ethereum projects and providers (generally excludes consumer DeFi and art/collectibles NFTs) as well as corporate players from our data sample. Source: Enterprise Ethereum Alliance. If you would like to contribute your project to our database, please fill out our online form at <https://bit.ly/EEAEthSurvey>.



## Section 2

# Business Ethereum 2022 – Observations and Trends

In the previous section we looked at the evolution of the Ethereum ecosystem from a business perspective. In this section we take a look at how Ethereum is being used by businesses today and discuss some of the key trends we have identified in our research, case studies and interviews with experts and practitioners.

## A SNAPSHOT OF THE USE OF ETHEREUM IN BUSINESS TODAY

One key question we set ourselves was to ask which industries seem to be attracting the most attention. To get an answer, we took a look at our dataset of “business” projects, which – while not a definitive sample – we believe is sufficient to provide a reasonable snapshot of current activity among businesses looking to build or offer solutions in the Ethereum ecosystem.

### RELATIVE NUMBER OF PROJECTS BY INDUSTRY

Perhaps unsurprisingly, the lion's share of activity today is to be found in the new industry of **blockchain infrastructure**. These are blockchain companies focused on the core infrastructure of the industry, including businesses that are building protocols, base layers, and development platforms others can utilize to build their own applications and blockchain-related services. Many big players and familiar names have entered this space, looking to be the infrastructure providers – the sellers of picks and shovels – for the growing number of Ethereum-based projects.

Under **capital markets**, we find projects looking to bring buyers and sellers together to trade stocks, bonds, currencies, and other financial assets. Much of the blockchain-based innovation in capital markets is

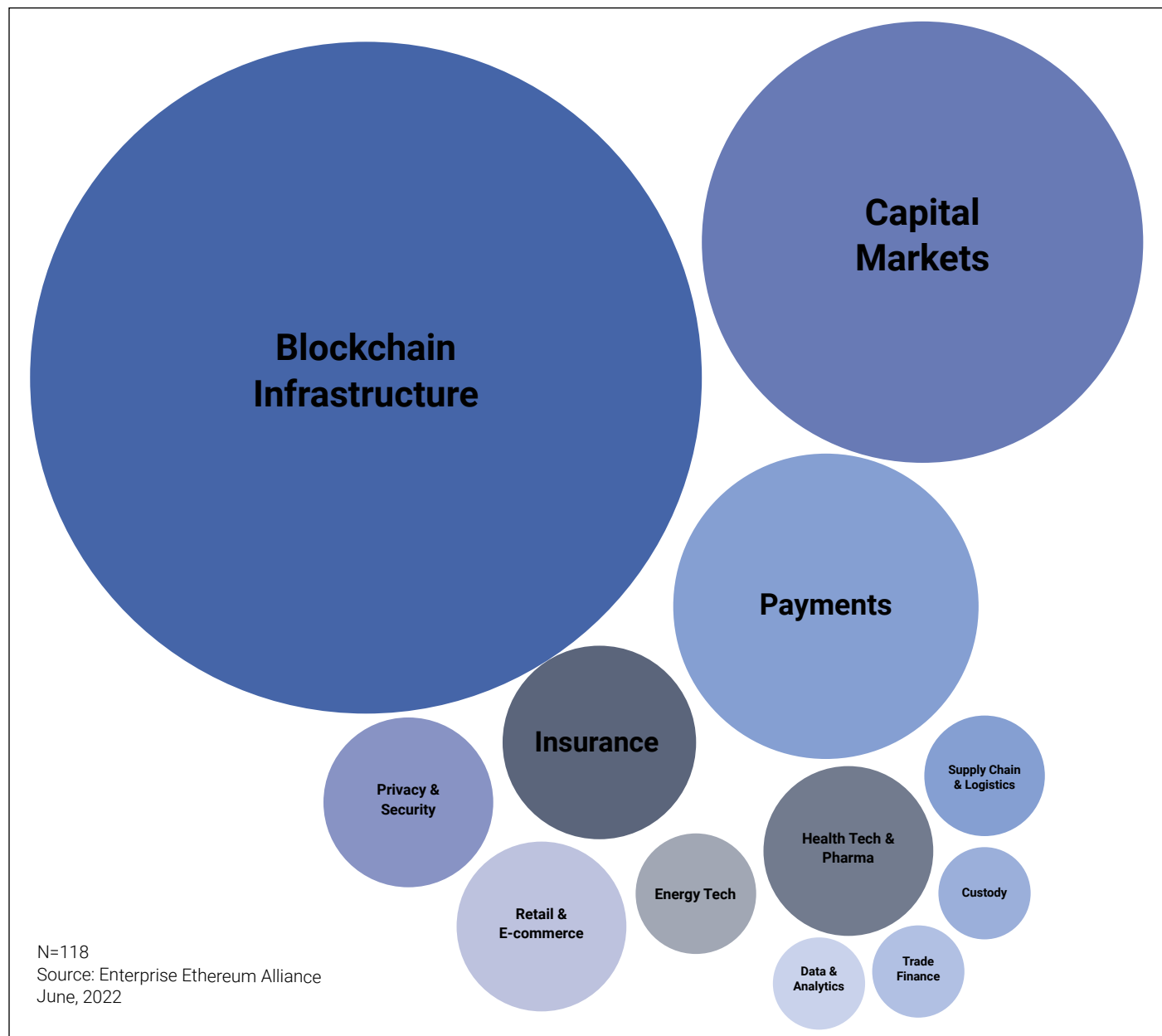
happening in consumer-facing DeFi (which is not directly in the scope of our research). Other activities in capital markets include securities issuance on blockchain, marketplaces and clearing and settlement activities. Our Alaiia case study offers an interesting example of an Ethereum-based solution for a regulatory compliant, tokenized private placement of company shares. The fact that the tokenized shares are booked in the core banking infrastructure of a traditional bank illustrates the merging of the old and new in capital markets.

**Payments** are an obvious industry for blockchain, as blockchains by their very nature are payment platforms. There are projects covering such areas as micropayments, peer-to-peer transfers, cross-border payments and settlements, as well as digital currencies and CBDCs. In this context we might point out the growing acceptance of cryptocurrencies and stablecoins by traditional payments providers like Visa and PayPal. Our Vow case study, which involves tokenized private stablecoins for cashback schemes, can be taken as an example of a special-purpose payments solution.

We would also point out that **insurance** solutions are fairly well represented in our sample. Insurance has a long history in Ethereum, and there are many potential uses, from peer-to-peer insurance marketplaces to streamlining claims or opening up new kinds of insurance models. Our ACRE Africa case study offers a very good example of the use of Ethereum to automate weather index parametric micro-insurance for farmers in sub-Saharan Africa, with a smart contract connected to satellite weather data and triggers for automatic payments based on weather events like droughts.

## Business projects by industry

(Excludes consumer DeFi and art/collectibles NFTs)



The relative activity by industry in our data sample, measured by number of projects. The lion's share of projects is in blockchain infrastructure or financial services-related industries. Source: Enterprise Ethereum Alliance. If you would like to contribute your project to our database, please fill out our online form at <https://bit.ly/EEAEthSurvey>.

## RELATIVE NUMBER OF PROJECTS BY UNDERLYING USE CASE

It can be interesting to differentiate between industries and the underlying use cases that power them. Tokens, just to take one example, are a part of almost all blockchain applications, making asset tokenization a key use case across industries. Below we have analyzed our data sample along use case lines.

Not surprisingly, infrastructure use cases make up the largest share. These are the projects above the diagonal line in the chart on the next page. Of these, we find the most projects in **blockchain development services**. These are predominantly vendors that provide a developer environment offering frameworks and tools to help customers integrate with blockchain applications, software and devices. These can include development platforms and infrastructure providers that offer underlying technologies and services for solution building.

As tokens are a key part of most blockchain solutions it is not surprising that **asset tokenization & issuance** figure prominently in our sample. It is also not surprising to find a lot of tokenization services on Ethereum, which provides by far the most widely used token standards, including ERC-20 and ERC-721. Tokenization shows up often in our case study selection as well. We have already mentioned the Alaia case study as an example of tokenization of shares in a private placement. In the Avalon case study, Ethereum is used to tokenize the receivables of small and medium-sized companies and offer them for sale in a marketplace.

**Supply chain provenance** is a key blockchain use case, and it cuts across a large number of industries. Supply chain lends itself well to blockchain use because it tends to involve a large number of parties who need to coordinate

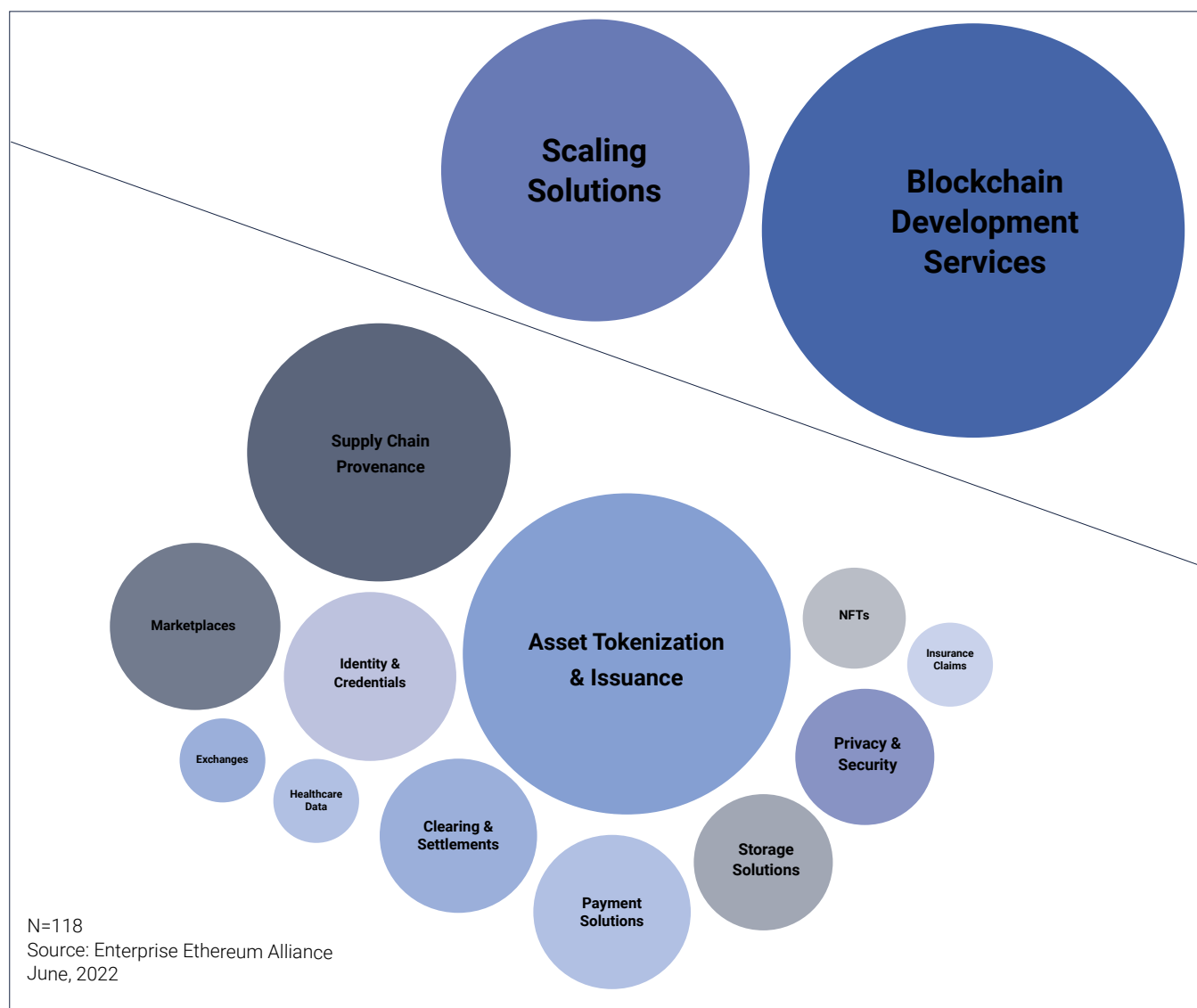
with each other, share data, and provide trustworthy audit trails. Blockchain supply chain solutions often focus on tracking and tracing materials across a supply chain and so providing proof of their authenticity. This can be of value in consumer goods. In the Birra Peroni case study, for instance, data collected along a beer brewing supply chain is tokenized, allowing consumers to verify the provenance of ingredients in a single batch of beer. There are many industrial supply chain solutions in blockchain as well. In our MS Azure case study, a private blockchain is used to track individual hard drives and components along the supply chain from manufacturers to Microsoft's data centers. Provenance use cases need not be only for tangible items. In our ANSAcheck case study public Ethereum is used to trace the provenance of news articles, and so combat fake news and protect the ANSA brand.

Blockchain also lends itself to the creation of **marketplaces**, and in particular peer-to-peer marketplaces where buyers and sellers are directly connected. We see this in our case study collection as well. We have already mentioned the Avalon market for receivables. The iExec case study is an interesting example where blockchain is being used to create a marketplace for goods and services – in this case, computing power, algorithms and data sets – that generally have not lent themselves to markets before. The case is also indicative of a larger trend: through tokenization blockchain is helping to make data markets viable, and there is a lot of activity in this space in areas such as healthcare. A marketplace can also be a byproduct of a blockchain-based solution. In the MS Azure case study, while the platform was built to help improve a supply chain, a side benefit of the setup is that it allows suppliers to transact directly with one another simply by virtue of being on the platform, and without having to involve Microsoft at all. That makes it a market in all but name for those who choose to use it..



## Business projects by use case

(Excludes consumer DeFi and art/collectibles NFTs)



The relative activity by use case in our data sample, measured by number of projects. Many key blockchain use cases can be applied across multiple industries. The bubbles on top of the diagonal line represent infrastructure projects. Source: Enterprise Ethereum Alliance. If you would like to contribute your project to our database, please fill out our online form at <https://bit.ly/EEAEthSurvey>.

## KEY THEMES AND TRENDS

In this section we identify and elaborate on some of the key trends shaping business Ethereum that have come out of our qualitative research.

### THERE IS A GROWING APPRECIATION OF THE OPPORTUNITIES OF PUBLIC BLOCKCHAIN

**“Over the longer term, we see the most promise and value on public networks. This is where the innovation is happening from a use case, scaling and privacy perspective.”**

*Karen Scarbrough, BP*

**“We could have done this on our own with a database, but we wanted public proof that those triggers that the customers signed up for when buying are still the same ones used when it comes time to pay out.”**

*Benson Njuguna, ACRE Africa*

**“I think that right now there is a pivot towards more public blockchain in the industry.”**

*Victor Busson, Taurus*

Many of the practitioners and experts we spoke to said that there is a growing awareness and understanding among the blockchain-savvy business community of the opportunities afforded by public blockchains and decentralized business models. This is reflected in several of our case studies. For this reason we can speak of a return to public blockchain as an industry trend.

This is, among other things, a product of the maturing of the Ethereum blockchain and ecosystem. Public Ethereum today is simply more suitable for more types of business uses than it has been in the past. In our Avalon case study, the company had wanted to build its platform on public Ethereum years ago, but did not feel the ecosystem was ready. It is now relaunching on public Ethereum because it feels the time is right (see the case study to understand why).

As we have mentioned, the success of consumer-facing DeFi has served as a highly influential example of the viability of public blockchain, demonstrating that a large-scale, decentralized, consumer-facing business model can indeed work.

Businesses will find many advantages to building on a public blockchain if the use case allows it. It provides access to the largest addressable market. Like the Intranets before them, private blockchains tend to be walled gardens. Public blockchains are open to all. The public blockchain (like the public Internet) offers the most opportunities for broad-based collaboration. If all participants in a business process are already “on” the blockchain, no one has to build extra infrastructure to interact with them. The tools are there. So, too, are many of the standards, such as the ERC-721 “NFT” standard that shows up in so many of our case studies. Because it is so widely used, ERC-721 is interoperable across many platforms. Larger markets, easier collaboration and interoperable digital assets make it easier to achieve network effects.

Public blockchains are also good for fostering trust. ACRE Africa uses the Mainnet because it wants a public audit trail. In the ANSACheck case study, Italy’s largest news organization uses public blockchain for proof of authenticity of its articles because proofs stored on a public blockchain can be easily checked by anyone with an Internet connection.

### THE CIRCUMSTANCES UNDER WHICH DECENTRALIZED BUSINESS MODELS MAKE SENSE ARE BECOMING CLEARER TO MANY

**“To be honest, any business process with more than three parties starts to get hard to manage. ... Move this to an open blockchain platform, and everybody can just look at the blockchain and dApp. The whole thing becomes collaborative.”**

*Lloyd Keays, SAP*

**“It [blockchain] is about doing what I can do with an ERP but across other companies and boundaries and without a centralized intermediary.”**

*Paul Brody, EY*

Business Ethereum 2022 – Observations and Trends *(continued)*

**“I always say: decentralization doesn’t matter until it does.”**

*Bruno Maia, Cartesi*

From its early days, blockchain has been about decentralization, and decentralization is a theme throughout many of our case studies and interviews.

What exactly decentralization means in a business context can sometimes be hard to say; the term is broad, vague, and often thrown about rather freely - making it difficult to pin down. For our purposes, a decentralized business model is defined as one in which there are no intermediaries, users control their own data and assets, and transactions are peer-to-peer. (These days, such setups are also often labeled as “Web3”.)

Decentralized business models can offer businesses certain advantages, and can open up new ways of doing things. For example, we saw above that one limitation of consortia blockchains was getting partners to agree on the rules of the platform. A decentralized platform offers a neutral ground where the rules are given. It is also transparent, predictable and collusion-resistant. If this decentralized platform is built on a public blockchain, then it can in theory open up larger markets than a privately controlled, centralized platform, simply because its reach is theoretically unlimited. Many businesses are wary of centralized platforms because of concerns about revealing sensitive information. Decentralized approaches provide more scope for data sovereignty, not just for individuals but for businesses, too. Decentralized business models can also make collaboration easier. We have seen this in our supply chain case studies like Birra Peroni and MS Azure. Indeed, for many, the real power and *raison d’être* of blockchains lie in multiparty coordination.

## MAINNET SUSTAINABILITY AND SCALABILITY REMAIN ISSUES, THOUGH THIS IS SET TO CHANGE

**“There is no doubt that Ethereum needs upgrading before it is really ready for business on a large scale. But as we know, this is happening.”**

*Heather Flannery, Equideum*

Throughout our research, sustainability was cited as one of the main concerns, along with transaction fees, when it came to using the Ethereum Mainnet. While a series of upgrades to the Mainnet scheduled for the second half of 2022 and 2023 should address most of these concerns, businesses new to the space should be aware of them.

Ethereum’s energy consumption comes mostly from its consensus mechanism – this is the part of the protocol that allows for decentralized agreement on what transactions are valid and in what order they should be recorded. Without decentralized consensus, you cannot have a decentralized blockchain.

Ethereum uses the same energy-intensive Proof-of-Work (PoW) consensus mechanism that Bitcoin does (and it is why Bitcoin is also known for its heavy use of energy). It does so chiefly because Bitcoin demonstrated that PoW is robust and secure enough for use on the hostile Internet. Yet it was clear to Ethereum’s founders back in 2015 when the blockchain launched that PoW might not be sustainable over time, and that effort should be put into finding better options. The most promising of these was a method known as Proof-of-Stake (PoS), which at the time was more of an idea than a tried-and-true technology. Much work in the Ethereum ecosystem has since gone into developing PoS to a state where it is ready for real-world use, and in 2022 Ethereum will switch over to this method. At that moment, energy consumption on the Ethereum blockchain is expected to drop by 99.9%.<sup>1</sup>

The performance of the Mainnet and the cost to use it as measured by transaction fees are also a concern across the board. In our case studies we find a good sample of the ways in which projects are addressing it. Many choose to use the Mainnet plus a Layer 2, for example Avalon or Vow. ANSACheck addressed fee volatility by updating its original smart contract to allow batch processing of articles, bringing per-article gas fees down significantly. iExec built its own sidechain to gain extra functionality but also to improve performance.

Scheduled upgrades should address cost and performance too.<sup>2</sup> The chief of these is the introduction of sharding, a well-known method for improving database speeds by splitting them into parts. With sharding, the throughput of the Mainnet is set to improve dramatically. As a result, we expect fees to come down, as network congestion will be

<sup>1</sup> [Ethereum’s energy usage will soon decrease by ~99.95%](#), Carl Beekhuizen, Ethereum Foundation blog, May 18, 2021.

<sup>2</sup> [Upgrading Ethereum to radical new heights](#), Ethereum Foundation.



## Business Ethereum 2022 – Observations and Trends *(continued)*

less of a problem. All of this should make the Ethereum Mainnet a stronger, more performant base layer for building blockchain-based solutions.

### LAYER 2 SOLUTIONS AND SIDECHAINS ARE IMPORTANT ENHANCEMENTS TO ETHEREUM, AND WILL REMAIN RELEVANT FOR A LONG TIME

**“And in almost every community we are looking at there is a need for these application-specific block-chains.”**

*Sophia Lopez, Kaleido*

**“But for some tasks, gas fees are too expensive compared to the cost of the task. So we have also chosen to deploy our own sidechain, built on Ethereum, that allows us to lower the prices of transactions and execute tasks more quickly.”**

*Francis Otshudi, iExec*

Many of our case studies involve the use of an L2 or a sidechain. Businesses should note that, not only are these scaling solutions available today, they are here to stay and will play a role in Ethereum even after the upgrades. Going forward, we can expect them to continue to mature and evolve, adding key functionalities, providing extra capacity, or in some cases morphing into use case-specific subnets, such as payments – all while keeping the Mainnet as the publicly available, always-on anchor of security and trust.

This will be important, as it provides not just more choice and higher performance, but also contributes to the robustness and staying power of the overall ecosystem, as more resources are focused on Ethereum and Ethereum-compatible technologies, more developers are trained, and more businesses become familiar with it and build on it.

Businesses working with scaling solutions should, however, keep a few things in mind. Firstly, many L2s and sidechains are relatively new projects, with relatively new technology. They do not necessarily have the track record or proven security and stability of the Mainnet. Today deploying on an L2 or sidechain generally means being constrained to that sub-ecosystem to some degree. That can reduce the size of a potential market, and it puts the solution at the

mercy of the developments of that particular platform. Assets can usually be transferred via bridges over the Mainnet, but this requires extra effort, and L1 bridges have been prone to hacks and failures. As we expect users to continue to demand interoperability, bridging technologies should improve.

That said, as long as a scaling solution is EVM-compatible (meaning its code is compatible with the Ethereum Mainnet), businesses will be in a good position to move their assets and applications to other scaling solutions or the Mainnet. In this way they can avoid “vendor lock-in” in L2s or sidechains while making use of their advantages and reaping the benefits of the ubiquity and reach of Ethereum itself.

### PRIVACY REMAINS A KEY CONCERN WHEN USING BLOCKCHAINS, BUT TECHNOLOGICAL ADVANCES ARE ADDRESSING THE ISSUE

**“If you can have business logic and data with privacy and no intermediary, then you have solved the great puzzle.”**

*Paul Brody, EY*

**“And in the case of a dispute, our auditors and other parties provided access do not need to request information after the fact. We can just unpack the proof.”**

*Antonio Di Perna, BankUnited*

One of the problems with public blockchain that has been a hurdle to adoption has been the inherent – in fact, purposeful – transparency of information on the ledger.

This has led to a dilemma: on the one hand, transparency is a desired trait for reasons of both security and trust. On the other hand, most business (as well as personal) transactions and use cases require privacy. How to square that circle has long been one of the main challenges facing the blockchain community.

One answer is coming from advances in cryptography specifically, and in privacy-preserving computing more generally. Of these, zero-knowledge proofs are probably

## Business Ethereum 2022 – Observations and Trends *(continued)*

the most well-known in the blockchain world. A zero-knowledge proof is a (mathematically highly complex) way of proving that you know something about some data without revealing that data. These are being applied in the Ethereum ecosystem in different ways.

Some, but not all, L2s and sidechains rely on zero-knowledge proofs to achieve scaling. That is because, since the proof that a bundle of transactions is valid is computationally more efficient to verify than the individual transactions, it is possible to bundle more transactions into a block by writing the proofs to the blockchain instead of executing the transactions directly on the blockchain. The Baseline Protocol (see below) uses zero-knowledge proofs as a way to synchronize data between systems of record without the data leaving the respective companies.

Along with zero-knowledge, there are many other cryptographic and computational techniques available today to help businesses make use of public blockchains and the benefits of decentralization, while maintaining privacy. These include things like homomorphic encryption or multiparty computation. The iExec platform, for instance, uses trusted execution environments (TEEs) as the basis of a platform for securely sharing computing resources.

While getting into the details is beyond the scope of this paper, businesses should keep in mind that there is a lot of activity in these areas these days that could help usher in new generations of privacy-preserving blockchain technology.

### A NOTE ON THE BASELINE PROTOCOL

One development in the area of the secure use of blockchains for business purposes that deserves special mention is the Baseline Protocol.<sup>3</sup> (Disclosure: Baseline is administered as an EEA Community Project.)<sup>4</sup>

Baseline is not a product, but a new standard that describes patterns that allow businesses to synchronize business processes and data between their systems of record, without actually having data leave those systems.

While it is quite complex under the hood, it is based on the simple observation that, in order to trust each other, businesses cooperating in a multiparty process do not necessarily need to share data between their systems of

record (which usually involves expensive reconciliation processes and is prone to error). They just need to be absolutely sure that everyone in the process has the same agreed-upon information in their systems of record.

This can be done using zero-knowledge circuits and other technologies to allow businesses to share proofs of data consistency, while keeping their data safe in their own systems. This has the added advantage that the companies involved do not need to change their existing systems or build new ones. Our BankUnited case study demonstrates some of the early uses of the Baseline pattern.

## PRIVATE AND PUBLIC BLOCKCHAIN ARE CONVERGING

**“I think the most interesting thing happening is how public and private blockchain are converging. And really, it doesn’t make sense to have this artificial separation.”**

*Sophia Lopez, Kaleido*

While we think public blockchain is in the ascendant, private blockchains clearly still have a place in this evolving world. It just is not the place they used to have.

The difference is in the maturity of the technology. As we have seen, in the past, when the infrastructure was not available, it was common for one large player to build a blockchain-based market or value chain and invite competitors to join. Not surprisingly, many balked. Today there are Blockchain-as-a-Service (Baas) offerings that allow companies to spin up a blockchain in a matter of a few minutes. This does not mean it is a whole platform ready to use. But because the infrastructure is neutral, if one company makes the first move and builds something, it will be easier for the others to understand and trust it.

Certain L2s offer private versions, which can be used to create application-specific blockchains, such as for a specific industry or business process, or when it is necessary or desirable to know the identity of the participants. One major difference from private blockchains in the past is that today with an L2 the public blockchain

<sup>3</sup> See [baseline-protocol.org/](https://baseline-protocol.org/)

<sup>4</sup> [EEA Community Projects](#)

## Business Ethereum 2022 – Observations and Trends *(continued)*

is still readily available, allowing, for instance, the use of standard tokens.

Fully private blockchains have also by no means disappeared. They still offer excellent platforms for business collaboration among a fixed set of participants. In the MS Azure supply chain case study, private blockchain is deployed and the supply chain setup is Microsoft's, but all the partners using the platform can now also transact directly with each other, without Microsoft's involvement. Other cloud providers could also easily join if they wanted.

Last but not least, several interviewees told us that they see private blockchain as a good training ground. Depending on the use case, it can make sense to build a proof of concept in a private environment, and so try things out in a safe way. As long as it is EVM-compatible, the solution is easily transferred to the public blockchain when the time comes.

## REGULATION IS STILL A BLOCKER, BUT NOT FOR ALL USE CASES

**“A large challenge for public blockchain development is the surrounding regulatory uncertainty in many jurisdictions, which prevents companies from launching or testing with confidence – and without apprehension.”**

*Karen Scarbrough, BP*

**“It is the product of our industry coming together in a holistic way to define regulated templates that are compliant with Swiss regulations.”**

*Victor Busson, Taurus*

After sustainability, regulation is cited most often as a blocker to adoption, particular among enterprises. It shows up in many of our use cases, generally in the form of cryptocurrency regulation hindering companies from holding ether to pay gas fees (and so necessitating a

workaround of some kind). As long as there is regulatory uncertainty around certain kinds of tokenized assets, securities regulation can be a barrier too.

But it is important to differentiate between cryptocurrency and blockchain-related regulation. While many governments are scrutinizing the use of cryptocurrencies, and worry (often rightly) about fraud and investor protection, many jurisdictions also understand and support the potential of blockchain-based digital assets and decentralized business models. Our Alaïa case study provides an excellent example of this, as it was expressly enabled by the Swiss Lex DLT, which gives tokenized assets on a blockchain legal status.

That said, there is no doubt that regulatory progress is lagging behind the technology. One problem is that, unlike other technologies, decentralized technologies and associated business models are sometimes difficult to fit into existing regulatory concepts. The classic example is the European General Data Protection Regulation (GDPR). Written in the age of centralized, client-server computing, where there is a clear data controller, its concepts do not map easily to decentralized, public blockchains, where there is not. We can see similar dynamics at play in other areas: for example, in the interaction of contract law and smart contracts, organizational law and DAOs, and securities laws and certain types of digital assets.

But the chasms are not insurmountable. Quite the contrary: many regulatory bodies have taken blockchain seriously and are working to adapt in sensible ways. As noted above, Switzerland now recognizes digital assets stored on a distributed ledger as having legal standing.<sup>5</sup> The EU is working to ratify its Markets in Crypto Assets (MiCA) legislation, which aims to build a regulatory framework for digital assets.<sup>6</sup> In the United States, the U.S. Office of the Comptroller of Currency is making it possible for federally chartered banks to use stablecoins for payments.<sup>7</sup>

5 [New Swiss DLT Regulations to enter into force starting February 2021](#), MME, January 25, 2021.

6 [EU's Sweeping Crypto Regulations Package One Step Closer to Ratification](#), Coindesk, March 14, 2022.

7 [Federally Chartered Banks Can Use Stablecoins: OCC](#), Investopedia.

## ALTHOUGH AN OLD IDEA, NFTS ARE TODAY SHOWING THE WAY TO THE FUTURE OF DIGITAL ASSETS

**“We used the ERC-721 standard because it is quite good. It has everything you need to track a document through a supply chain.”**

*Cody Burns, Accenture*

**“Since we are using the NFT standard, our receivables could for example be listed on an NFT marketplace like OpenSea.”**

*Marc Meyer, Crowdiz*

**“We think that NFTs can be the new CRM.”**

*Giuseppe Perrone, EY*

For people who have been in the Ethereum ecosystem for a long time, there is a certain irony in the fact that the term NFT has become so associated with digital art, and so entrenched in popular culture. At heart, the ERC-721 standard, which specifies a non-fungible token, is simply meant to define a unique, non-interchangeable digital asset on the Ethereum blockchain. The idea is neither new, nor particularly artistic.

What is interesting for businesses is the way that NFTs are being used for very practical, commercial purposes. We can see this in many of our case studies.

In the Alaia case study, the “NFT” is used to represent a company share on a blockchain. In the Avalon case study, NFTs are used to tokenize accounts receivables, and make them easily tradable. In the MS Azure case study, the “NFT” is used as a data record: a “digital twin” that represents a hard drive or other server farm component.

The migration of real-world assets to the blockchain via tokenization is the important trend here from a business perspective. The innovation is this idea that, instead of imprisoning a piece of information in a database record, you can tokenize it and set it free on an open network. That makes it much more easily accessible, transferable and, if the token contains a smart contract, also programmable. This goes as much for tokenized financial assets as it does for tokenized physical assets or, as in our iExec case study, tokenized intangible assets like the results of a private computation.

Another trend worth mentioning is the use of NFTs to foster brand loyalty. Here we are going back into the world of collectibles. In the Birra Peroni case, the token represents proof of provenance of the ingredients of the beer. In future, it could be used as a way to interact directly with the beer drinker. Many people are beginning to talk of the NFT as the new CRM.<sup>8</sup> We are not there quite yet, but this is a trend that businesses should pay attention to, too.

<sup>8</sup> [Are NFTs the new CRM?](#), Ledger Insights, September 20, 2021.



## Section 3

# Assessing the Business Readiness of the Ethereum Ecosystem

In this section we propose a framework for companies to use to assess the business readiness of the Ethereum ecosystem. To demonstrate this framework in action, we also provide our own assessment of four key use cases.

## INTRODUCING THE EEA ETHEREUM BUSINESS READINESS FRAMEWORK

In this section, we propose a Business Readiness Framework as a way for businesses to understand and evaluate the pros and cons of different Ethereum-based setups.

While we have tried to be precise, and while our results are informed by analysis of our data and conversations with experts and practitioners, this is not an exact science, and we freely admit that our results are reliant on a fair number of judgment calls.<sup>1</sup>

We believe this is the first attempt to do something of this kind for Business Ethereum, or business blockchain in general, and that this exercise has value simply in the attempt.

Despite the “scoring” that is inevitable in any kind of assessment, our intention here is not to provide a definitive rating system. By developing this conceptual framework and providing our example of it in use, our hope is that we can both educate and give businesses a tool to use as they evaluate Ethereum technology and the ecosystem for their particular needs.

Our framework is based on the following factors.

## NETWORK ARCHETYPES

The Ethereum ecosystem is not confined to the well-known public Ethereum blockchain alone. Instead it is a large community consisting of many components that can be combined to create different types of networks. For our framework, we have chosen four basic network “archetypes” from which businesses can choose.

- **Mainnet:** Applies to any dApp or other solution that runs only on the Ethereum Mainnet, with no dependence on an L2, sidechain or other blockchain. The Uniswap protocol is an example of a purely Mainnet application.
- **Mainnet & Layer 2.** An architecture dependent on a Layer 2 solution. We define Layer 2s (L2s) as systems that provide scalability and performance enhancements to the Ethereum Mainnet, but are fully dependent on the Mainnet for security and trust. An L2 cannot exist without the Mainnet. Most L2 solutions today depend on “rollup” technology. Arbitrum and Optimism are examples of L2s.
- **Mainnet & sidechain.** A sidechain is a blockchain designed to add performance, scalability and other enhancements to the Ethereum Mainnet, but is not dependent on the Mainnet. Sidechains are usually compatible with Mainnet, but their security and

<sup>1</sup> Readers are welcome to provide feedback to this report via [this form](#).

## Assessing the Business Readiness of the Ethereum Ecosystem (continued)

trust properties are their own, and so need to be evaluated separately.

- **Private blockchain.** For the purposes of this framework, we are using the term to mean networks or solutions based on a private, Ethereum-compatible blockchain like Quorum or Besu. These are generally created for a specific use case and are often deployed in a consortium or similar setup involving a fixed number of participants who are known to each other.

### AN IMPORTANT NOTE ON THE UPCOMING ETHEREUM UPGRADES

The Ethereum Mainnet is due to undergo a number of upgrades during the course of 2022 and 2023, including The Merge (move to Proof-of-Stake), the cleanup and the introduction of sharding.<sup>2</sup> This will significantly improve its performance, make Ethereum more eco-friendly and add other characteristics that are outside the scope of this report. For this reason, we have also included **Mainnet (post upgrades)** among our network archetypes in our charts and tables. For comparison purposes, we provide assessments based on our expectations of business readiness after the upgrades take effect, *but we caution that these are estimates only.*

### A NOTE ON PUBLIC/PERMISSIONED BLOCKCHAINS

For the purpose of comparison within our framework, we use a definition of private blockchains that reflects a “walled garden” approach – a blockchain-based solution in which participation requires some kind of onboarding, and which generally involves a limited number of participants. We are aware that this does not capture the nuances of the wide variety of private blockchain setups that are possible.

Some private blockchains, for instance, can be fairly “public” in that they do not involve a consortium and are not restricted with respect to users. Like an e-commerce site, any user who signs up, or anyone who passes a KYC, can participate.

“Public/permissioned” blockchains are worthy of note in this context. In this hybrid approach, there is no separate private blockchain. Instead, a public blockchain is used

for validating transactions, while there is a registration or onboarding procedure through a dApp. In this way, participants are known (and can, for example, be KYC’d), but otherwise can take advantage of the decentralization and security of public blockchain. While interest in this approach is growing, we have not found many examples in production at the moment and so have not taken it into account in our framework. We do expect, however, to have more to say about “public/permissioned” blockchains in the future.

## BUSINESS ARCHETYPES

Since not all businesses are the same, we have also chosen four business archetypes for our comparison that businesses can use as identification points within the framework. Here, too, we are generalizing for the sake of simplicity and clarity.

- **Corporates.** Large companies with significant resources, often in highly regulated industries. While always on the lookout for innovation, enterprises can have limited risk appetites and are not always nimble. This is a “theoretical” archetype to a certain extent. Today the blockchain efforts in large enterprises tend to be centered around small teams, often in innovation or R&D departments, and so can behave like startups. For the purpose of our framework, this archetype is meant to capture the case of a large corporation employing blockchain for a large-scale use case.
- **Small and medium-sized enterprises (SMEs).** Smaller-sized, established businesses, generally in traditional industries. SMEs will have more limited resources than larger enterprises, but more than most startups. They can be considered more nimble than large enterprises, and they are often hungry for innovation. We think the SME segment can benefit greatly from blockchain’s ability to level the playing field in many types of markets, and to provide efficient tools for large-scale collaboration among multiple parties.
- **Startups.** Startups in all industries, not limited to technology or blockchain startups. Key characteristics are limited resources, small teams and large failure rates. They can also be highly nimble, very

<sup>2</sup> [Upgrading Ethereum to radical new heights](#), Ethereum Foundation.

## Assessing the Business Readiness of the Ethereum Ecosystem *(continued)*

innovative, keen to embrace new technologies and willing to take risks. While we do not include non-profits separately in our framework, they share many characteristics with startups.

- **Government agencies and public bodies.** There are many blockchain use cases for public entities. Generally, governments can count on large budgets for approved projects or programs, but are characterized by slow decision-making, slow development cycles, and limited risk appetite. That said, government agencies in certain jurisdictions – for instance the European Union – have been active experimenters with blockchain.

## BUSINESS READINESS CRITERIA

Based on our data, case studies, discussions with experts and our own experience, we have broken down our framework into a set of basic technical and non-technical criteria we think are relevant for businesses. Some of these criteria are fairly broad and so in certain cases we have had to focus on specific aspects of them.

Below we provide an overview. In the assessment section that follows, we define in detail what we mean by each criterion.

### TECHNICAL CRITERIA

- **Network cost.** Costs to use the network, generally measured by transaction fees (“gas” fees on Ethereum).
- **Network decentralization and security.** The degree to which a given network is decentralized. Decentralization has a very large impact on security in blockchain networks, and is generally measured by the number and independence of nodes. Other, non-technical aspects of decentralization (such as governance) are not addressed here, but are also important.
- **Network scaling.** The speed and capacity of a given network type. This is measured by transactions per second (tps) as well as by susceptibility to network congestion.

- **Privacy.** The degree to which transaction information is private on the network. Most public blockchains are highly transparent. Other types of blockchains may offer more privacy but generally with tradeoffs as regards security.
- **Environmental sustainability.** The energy consumption required to run the network. Proof-of-Work blockchains, like the Ethereum Mainnet today, use a lot of electricity. Other consensus mechanisms, like Proof-of-Stake, do not. (Mainnet is scheduled to switch to Proof-of-Stake this year.)
- **Usability.** How easy it is for a business to use a particular network or architecture. Usability has many facets. Here we are focusing on ease of implementation or use of the network for business purposes, not on end-user experience.
- **Interoperability.** The ability to communicate between different components within the Ethereum ecosystem, generally with the intention of transferring digital assets or data. Here we do not address interoperability between different Layer 1 blockchains and their ecosystems.

### NON-TECHNICAL CRITERIA

- **Regulation and compliance.** The degree to which the network can be used in regulatory compliant ways. This is a very important factor for many businesses, but it is also highly use-case dependent. Our focus is on the regulatory issues around digital assets, including digital financial assets, but not cryptocurrencies.
- **Ecosystem resources.** Availability of resources (developers, services, tools, applications) that support businesses in building and implementing blockchain-based solutions.
- **Ecosystem robustness.** The expected “staying power” of the ecosystem, as measured both by past performance and expectations as to the ability of the ecosystem to prudently govern, maintain, and evolve the technology, as well as expected availability of resources over a longer-term horizon.

# ASSESSING THE BUSINESS READINESS OF THE ETHEREUM ECOSYSTEM

## TABLE 3.1: BUSINESS READINESS PRIORITIES BY BUSINESS TYPE

		Corporate	SME	Startup	Gov
Network cost	Costs to use the network, generally measured by transaction fees ("gas" fees on Ethereum).	Lower priority	Medium priority	Higher priority	Lower priority
Network decentralization and security	The degree to which a given network is decentralized. Decentralization has a very large impact on security in blockchain networks, and is generally measured by the number and independence of nodes. Other, non-technical aspects of decentralization (like governance) are not addressed here, but are also important.	Medium priority	Higher priority	Higher priority	Medium priority
Network scaling	The speed and capacity of a given network type. This is measured by transactions per second (tps) as well as susceptibility to network congestion.	Medium priority	Higher priority	Higher priority	Higher priority
Privacy	The degree to which transaction information is private on the network. Most public blockchains are highly transparent. Other types of blockchains may offer more privacy but generally with tradeoffs as regards security.	Higher priority	Medium priority	Medium priority	Higher priority
Environmental sustainability	The energy consumption required to run the network. Proof of Work blockchains, like the Mainnet today, use a lot of electricity. Other consensus mechanisms, like Proof-of-Stake, do not. (Mainnet is scheduled to move to Proof-of-Stake this year.)	Higher priority	Medium priority	Lower priority	Higher priority
Usability	How easy it is for a business to use a particular network or architecture. Usability has many facets. Here we are focusing on ease of implementation or use of the network for business purposes, not on end-user experience.	Medium priority	Medium priority	Higher priority	Medium priority
Interoperability	The ability to communicate between different components within the Ethereum ecosystem, generally with the intention of transferring digital assets or data. Here we do not address interoperability between different Layer 1 blockchains and their ecosystems.	Lower priority	Higher priority	Higher priority	Medium priority
Regulation/compliance	The degree to which the network or architecture can be used in regulatory compliant ways. This is a very important factor for many businesses, but is also highly use-case dependent. We generally refer to digital assets, including digital financial assets, and not cryptocurrencies.	Higher priority	Higher priority	Medium priority	Higher priority
Ecosystem resources	Availability of resources (developers, services, tools, applications) that support businesses in implementing blockchain-based solutions.	Medium priority	Higher priority	Higher priority	Medium priority
Ecosystem robustness	The expected "staying power" of the ecosystem, as measured both by past performance and expectations as to the ability of the ecosystem to prudently govern, maintain and evolve the technology, as well as expected availability of resources over a longer-term horizon.	Higher priority	Higher priority	Higher priority	Higher priority

Enterprise Ethereum Alliance  
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# ASSESSING THE BUSINESS READINESS OF THE ETHEREUM ECOSYSTEM

## TABLE 3.2: BUSINESS READINESS BY NETWORK ARCHETYPE

		Desired/ideal	Public Mainnet	Mainnet post upgrades predicted	Public + Layer 2	Public + sidechain	Private Network
Network cost	Cost to use the network measured by transaction fees	Low cost	High cost	Medium to low cost	Medium to low cost	Medium to low cost	Extremely low cost
Network decentralization and security	Security of the network measured by decentralization	High grade security	High security (decentralized security model)	High security (decentralized security mode)	High security (utilizes L1 security model)	Does not rely on Layer 1 security	Limited set of nodes/ security controls of network
Network scaling	Speed and capacity measured by network congestion and TPS	Highly scalable	Suffers from network congestion and slow throughput	Sharding	Off-chain scaling, rollups	Off-chain via bridges	Scalable due to fewer nodes and ability to choose more powerful hardware
Privacy	Privacy of user data on the network	Privacy-oriented	Pseudonymous, fairly transparent	Pseudonymous, fairly transparent	Privacy solutions, zero-knowledge proof	Privacy-oriented sidechains	Private computation / A central authority has access to KYC data
Environmental sustainability	Energy required to run and secure the network	Low energy consumption	High energy consumption	Low energy consumption	Can decrease energy consumption, but does not address Mainnet energy use	Can decrease energy consumption, but does not address Mainnet energy use	Low energy consumption
Usability	Ease of use for businesses	Easy to use	Need to "figure it out" and deploy	Need to "figure it out" and deploy	Heavy ecosystem and funding support	Heavy ecosystem and funding support	Have to set up and deploy an entire network
Interoperability	Ability to share data between Ethereum ecosystem components	Highly interoperable between other networks & services	High interoperability with the Ethereum ecosystem	High interoperability with the Ethereum ecosystem	Constrained in its interoperability & size of its ecosystem	Needs bridges and creates vendor "lock in" but EVM-compatible	Has customization, but only within its private network
Regulation/ compliance	Ability to use the network in regulatory compliant ways	Compliant with regulation	Highly decentralized, more difficult to comply	Highly decentralized, more difficult to comply	Less decentralized, can integrate compliance tooling	Less decentralized, can integrate compliance tooling	Being private, compliance can be built in. Easy to adhere to regulation
Ecosystem resources	Availability of resources and services	Lots of integrations, and large choice of tools	Large number of ecosystem resources available	Same as current Mainnet resources	Growing number of services, but many still in development	Services are more developed, but limited	A lot of EVM-compatible, private Ethereum services
Ecosystem robustness	"Staying power" of the technology and community	Technology that is adaptable, persistent and proven	Proven to be robust, no downtime	Same as current Mainnet robustness	Strongly linked to Mainnet, but nascent tech and potential subnet "lockin"	Depends on ecosystem support	Centralized. Dependent on how customized

## Assessing the Business Readiness of the Ethereum Ecosystem *(continued)*

Here we employ our framework to look at how different types of businesses might prioritize the different criteria, and to assess the properties of the different network types with respect to the different business readiness criteria.

### TECHNICAL CRITERIA

#### Network cost

In our framework we have focused on the cost to use a given network. This generally comes down to transaction fees, “gas” in the Ethereum world, and so is easy to measure. All businesses would ideally like, and so place a higher priority on, lower-cost solutions. In practice there are nuances depending on the business type as well as use case.

Today the Mainnet has far higher transaction fees than the other network types in our framework, but also offers the highest security and is the most interoperable with other parts of the ecosystem. The good news is that transaction fees on the Mainnet are set to come down significantly after all the Ethereum upgrades are implemented.

All the other network types offer far lower transaction fees than the Mainnet today. Most L2s and sidechains in use today were developed in part to address the transaction fee problem (as well as the scaling problem; see below). To the extent that an L2 or sidechain depends on the Mainnet, transaction costs might be slightly higher. Private blockchains generally offer the lowest transaction fees, but they come with tradeoffs.

Sensitivity to transaction fees will be different depending on business type. Corporates and governments with large budgets may be better placed to pay the higher fees in order to get the benefits of the Mainnet today. Many corporate, B2B-type use cases, or government G2B (government to business) or G2G (government to government) ones, may also not involve high transaction volumes as they are geared to a limited number of players or are “settlement” type use cases that, for example, carry out one transaction per day. For these reasons, fees might not be a barrier to these types of businesses.

Smaller organizations with limited budgets will naturally be more cost sensitive. High volume use cases, B2C (retail) or G2C (government to citizen), would be more sensitive to transaction fees. So too solutions requiring

heavy computing loads. For this reason, a large number of projects we looked at during our research rely on L2s or other services on top of the Mainnet.

#### Network decentralization and security

Decentralization is a key component of blockchain networks, particularly with respect to network security – whether that be security against technical failure, attack or manipulation.

Generally, in systems designed to function in hostile environments like the open Internet – as public blockchains are – the higher the number of nodes, and the easier it is to join the network (in public networks, anyone can join and become a miner or validator), the more robust, resilient and secure we can expect the network to be. Networks with fewer nodes or a single operator are prone to single points of failure or collusion.

In practice, network security and integrity are reliant on off-chain factors as well. Security knowledge and best practice among developers are very important, for instance. This is particularly the case when deploying smart contracts, which tend to be the parts of a blockchain solution most vulnerable to attack.

There are other considerations when it comes to private networks, which generally do not function in an open, hostile environment, but are also not very decentralized. If all parties are known to each other, as is generally the case, then security can be handled through trust and other off-chain means such as legal contracts. Businesses then need to decide how trustworthy counterparties are. Private networks accessible through the Internet can also be more vulnerable to hacks, since there are fewer nodes to attack than in a large, decentralized, public network. Due to the smaller number of nodes, private networks are also more susceptible to technical failure than large, decentralized and distributed ones. As in the non-blockchain world, private networks built and/or run by a single entity, or reliant on a single provider, are dependent upon the competence and good will of that entity for security as well.

All companies want the highest possible security. Corporates and governments with the resources (for instance financial, legal or technical) to ensure security through other means may be in a better position to trade

## Assessing the Business Readiness of the Ethereum Ecosystem *(continued)*

off the security that comes from decentralization for other benefits, like scaling. For other businesses with limited means, one of the main appeals of blockchain is precisely the security against technical failure, attack or manipulation that network decentralization offers. They may therefore be less willing or able to compromise.

### Network scaling

Different networks will have different characteristics as regards speed and overall capacity, and businesses will want to understand what these characteristics are and the tradeoffs needed to achieve them.

Today's Mainnet typically handles only around 30 transactions per second. It is also prone to network congestion, though we expect the Mainnet to improve markedly in both speed and capacity after the upgrades. L2s and sidechains, most of which were developed precisely to improve scaling and capacity, can process far more transactions at greater speeds. That is why they have risen to such prominence. Private blockchains with limited numbers of participants tend not to have congestion problems, and so can be more performant.

The rule of thumb in blockchain is that scalability comes at the cost of either security or decentralization. Businesses should, however, keep in mind that there are many use cases where scaling or capacity are not particularly important. To take one example, there are use cases involving IoT sensors in which the device sends a small amount of data once an hour or once a day to the blockchain. A high-speed, high-capacity network is not needed. Wholesale-type use cases, such as bulk settlement of interbank payments on a daily basis, are also not highly dependent on speed.

That said, most businesses will want to place a fairly high priority on scaling and capacity. Corporates with B2B use cases may, however, find themselves with more lower-volume/higher-value use cases, in which case they may prioritize direct settlement on the Mainnet, as it is the most secure.

### Privacy

Privacy and integrity of data are very important in almost all business settings. In our framework, we look at privacy in terms of the ability to keep transaction data secret

by design (this is why it is a separate category from security, which is the ability to keep data safe). Because non-transactional data is written to a blockchain via a transaction, transaction privacy (who sent what to whom and when) and data privacy are closely related.

Public blockchains are transparent by design. All transactions are written to the blockchain and cryptographically linked to each other to make a permanent record. This is what makes publicly verifiable trust possible.

Because users do not need to identify themselves when sending a transaction on a public blockchain like Ethereum, there is a misconception among many that their transactions are anonymous. This is false. In reality, all transactions leave traces on the blockchain that, using clever analytics, can be used to reveal the identities of the senders and receivers. The code of smart contracts deployed on Ethereum, which also involves a transaction, is also open to inspection. Like Bitcoin and other public blockchains, the Ethereum Mainnet is therefore considered pseudonymous, not anonymous. For this reason it has become a strong rule of thumb that it is not desirable to save personal or business-critical data on public blockchains.

When looking at privacy on blockchains, businesses therefore need to consider what level of transaction privacy is appropriate for their needs. There are many use cases – for example, those involving creating a public audit trail of some kind – where transparency is desired. In other cases, the blockchain is used as a timestamp to record that a transaction took place, but the actual data is held off-chain.

All businesses will want to consider the regulatory aspects of blockchain privacy. Depending on the use case, businesses might be compelled to keep data private and hence off the public Mainnet. The same goes for regulations requiring that private user data be modifiable and deletable upon request (right-to-be-forgotten rules). Neither of these is possible with user data on a public blockchain. KYC and similar types of laws may make it necessary for businesses to know the identities of participants in their use cases. This can affect the choice of network as well, or require building an onboarding application or procedure of some sort on top of the blockchain solution.

## Assessing the Business Readiness of the Ethereum Ecosystem *(continued)*

Generally, the more personal or business-critical data there is in the use case, the higher the priority on privacy. Corporates, especially heavily regulated ones, will therefore likely put a high priority on this aspect. The same will be true for governments serving businesses and citizens. Smaller companies and startups may find themselves in a position to accept tradeoffs here, although it is heavily use-case dependent.

While the Mainnet alone is transparent by design, other network configurations offer better privacy options. To achieve scalability, L2s and sidechains often use privacy-preserving techniques like zero-knowledge proofs. These provide a privacy benefit as well, although for sidechains that needs to be weighed against the reduced security. Private blockchains can be designed to be very private, though, as mentioned above, there may be security issues with these types of networks, too.

### Environmental sustainability

As we have pointed out previously in this paper, the Ethereum Mainnet currently uses a lot of electricity. This is a major concern for businesses, and so we include it in our framework. Generally speaking, L2s, sidechains and private blockchains, almost all of which do not use Proof-of-Work, do not have sustainability issues, making this a purely Mainnet concern.

The good news is that energy consumption on the Mainnet is set to improve dramatically with the upcoming Mainnet upgrades, so much so that we expect that this environmental sustainability criterion may no longer be part of our framework in subsequent editions of this report. But it does remain an issue today, which is why the Mainnet has low scores.

Almost all businesses care about the environment, and it goes without saying that most will prioritize sustainable solutions if they can. Because blockchains are associated with high energy consumption in the public mind, corporates – especially those with high public visibility – may also face extremely high and costly reputational risk if they are associated with this technology. Governments will, too. This may be a concern even after Ethereum moves to Proof-of-Stake, as there could be a substantial lag before the general public understands the “greening” of Ethereum.

There are some nuances to the sustainability discussion that businesses may want to consider nonetheless. For

instance, they may want to compare the carbon footprint of a blockchain-based solution with that of their current setup. One reason Proof-of-Work blockchains get such bad press is that it is relatively easy to measure their energy consumption. It is harder to measure the energy consumption and other climate-related externalities of cloud-based platforms and traditional ways of working (consider, for instance, setups involving lots of travel). A blockchain-based solution that introduces efficiencies and reduces paperwork, travel and other effort, may have a smaller overall carbon footprint compared to an existing solution. That said, the greening of the Ethereum Mainnet expected this year, and which the Ethereum community has long recognized as a priority, is an extremely welcome move.

### Usability

To get the most out of Ethereum technology, it has to be easy to work with, and so we look at usability in our framework. Here we do not mean end-user experience, but rather the ease of use for businesses when it comes to building their solutions. That means looking at factors like complexity in implementation, customization and maintenance.

As a rule of thumb, businesses can consider Mainnet usability the same way they look at the Internet: it is simply the base layer, and businesses can develop on it as they please. While this makes it highly customizable, the Mainnet scores lower on usability because using it requires specialist expertise. This has to be either developed in-house or purchased via a provider. Luckily, as with the Internet, there are plenty of providers out there for Mainnet solutions, and a large educational and developer community.

L2s and sidechains are generally run by for-profit organizations, and so will have dedicated onboarding and support teams. Working with them is more like working with a traditional platform or cloud provider, meaning high usability but only within the parameters of the solution on offer. Luckily, there are also Blockchain-as-a-Service (BaaS) providers that offer platforms for building blockchain solutions, and can assist with projects. Private blockchains tend to be custom setups, and so score lower in “out-of-the-box” usability.

Corporates and companies with a lot of resources will be able to afford full-scale solutions and support options.



## Assessing the Business Readiness of the Ethereum Ecosystem *(continued)*

We think usability is therefore more an issue, and hence a priority, for those organizations with limited technical and financial means.

### Interoperability

Interoperability refers to the ability to transfer assets within a network or across different networks and platforms. In our framework, we have focused on interoperability within the Ethereum ecosystem, not between Ethereum and other Layer 1s or outside platforms. Depending on the use case, however, this kind of interoperability is important, too.<sup>3</sup>

As the base layer of the Ethereum ecosystem, the Mainnet is interoperable with all components. For example, if a company issues an ERC-20 token, by default it is extremely interoperable with various parts of the Ethereum Mainnet ecosystem as there is wide support for that token standard. The same will be the case after the upgrades.

As a rule of thumb, most interoperability between the other components of the ecosystem happens via a bridge (a form of “connector” for assets between two networks). Sending a token from one L2 to another, for instance, usually means sending the token to the Mainnet and then from the Mainnet to the other L2. This can involve cost and time as often multiple transactions and settlement costs are incurred. The same can be said of private networks, where interoperability will depend on their design and trust assumptions. Using Ethereum-compliant standards for tokens can improve interoperability. Building direct bridges between a private blockchain and other components is a possibility, too, but requires extra effort. Interoperability matters most in use cases where it is desirable to reach the largest markets at the lowest costs, as it means that digital assets and data can more easily be transferred to other platforms and marketplaces. Interoperability is also a factor when businesses want to ensure that their assets or data are not locked into a particular network.

In use cases involving a fixed number of parties, as is often the case in B2B or G2B scenarios, this may not be such a problem. For this reason, corporates and governments may not put as much priority on this.

## NON-TECHNICAL CRITERIA

### Regulation and compliance

Regulation is the single most important non-technical factor affecting blockchain for business. As we have previously mentioned, it is important to differentiate between cryptocurrency- and blockchain-related regulation. While many governments are scrutinizing the use of cryptocurrencies, most jurisdictions understand and support the potential of blockchain-based digital assets and decentralized business models. That said, all businesses should thoroughly understand and evaluate the regulatory implications of their projects.

Because the Mainnet offers no native identity or KYC capabilities, it scores lowest as regards regulatory compliance. Many companies, especially heavily regulated ones, avoid cryptocurrencies and DeFi for this reason, as there is no native way to know with whom you are doing business or the source of their funds. Similarly, since the Ethereum blockchain is immutable, businesses can run into problems with data protection regulation; for instance, those specifying an individual's right to be forgotten.

This is not necessarily a hindrance to building a regulatory-compliant solution on the Mainnet; it just means that some additional regulatory and compliance functionality will be needed. Luckily there is an increasing number of ecosystem companies offering such tooling such as KYT (Know Your Transaction) tools. Providers of L2s, sidechains and even applications increasingly understand the importance of compliance integrations as part of their offerings. Companies should keep in mind that many L2s save data to the Mainnet at some point, and this data can not be erased. For their part, private blockchains can be custom designed to be highly regulatory compliant.

Another factor in regulation is geography: in a public network, nodes can be anywhere in the world. This can make it hard to comply with rules that require processing of data within a certain jurisdiction. L2s can help here, too, as their servers can be centralized and run by known entities. All businesses will want to be compliant, and therefore this is a high priority across the board. Those with more resources will have an easier time of it because they

<sup>3</sup> For more on this, see the work of the [EEA's Crosschain Interoperability Working Group](#).

## Assessing the Business Readiness of the Ethereum Ecosystem *(continued)*

can hire compliance expertise to help design and vet a particular setup. Depending on the use case, startups may find they can or have to make do with fewer dedicated compliance resources, perhaps relying more on industry best practice and common sense to keep on the right side of regulators.

### Ecosystem resources

Resources, whether developers, services, tools or support applications, are a key consideration for businesses. For this framework, we therefore consider the availability of resources within the ecosystem that allow businesses to build and implement blockchain solutions on different types of networks.

Overall, the resource situation in the Ethereum ecosystem is quite good. The Ethereum Mainnet has the largest developer community of any Layer 1<sup>4</sup> and the Ethereum ecosystem generally has the largest number of and most mature/sophisticated offering of services.

That said, blockchain developers have historically been limited in supply, and developer resources are not at the same levels as is common in more traditional software (although this continues to improve).

To the extent that other components are Ethereum (or EVM) compatible, these resources will be available to them, too. There are generally fewer services available for L2s and sidechains today, as these are newer technologies, while there tend to be a lot of services catering to private Ethereum blockchain networks.

Businesses should keep in mind that in the Ethereum ecosystem, there are many important non-technical resources essential to building solutions. Depending on the use case, legal, compliance and tax expertise can be particularly important, as well as expertise in some of the new fields to come out of blockchain, for example tokenomics.

### Ecosystem robustness

Before choosing a platform, businesses will want to have confidence that the technology will be around for a while. This is a question of the development of the technology itself, but also the growth of the ecosystem around it. We call this ecosystem “robustness”, and it is the final part of our framework.

Through this lens, we consider the ecosystem around the Ethereum Mainnet to be extremely robust. The Ethereum Mainnet has never crashed and never been hacked, despite being under almost constant attack.<sup>5</sup> Its community is also very large and has proven to be a capable steward of the platform, as witnessed by the current upgrades. It is a common complaint against Ethereum that the upgrades have been slow in coming and often delayed. We consider this rather an indication of responsible governance and the prudent management of a platform that is ultimately responsible for billions of dollars in value. Overall, the Ethereum governance model, which is based on open-source models and traditions, has been successful and has remained fairly decentralized. That said, like other open source, not-for-profit projects building public goods, decisions are still made by a finite group of people.

L2s and sidechains, generally run by for-profit entities, though often with communities around them, are only as robust as those communities. Because they are part of the overall Ethereum ecosystem, many of these are quite invested in the larger community, and contribute to it, either financially or with services. The same can be said of private blockchain providers working on Ethereum.

All businesses building solutions meant to last will put a high priority on ecosystem robustness. For the reasons mentioned above, we think Ethereum scores high on this scale.

<sup>4</sup> [Project Strength: Which Blockchain Has The Highest Developer Count, And Why It Matters](#), chaindebrief, February 1, 2022.

<sup>5</sup> When you hear or read about a hack on Ethereum it is always something built upon it, not the network itself. The famous [DAO hack](#) was an attack on a smart contract. When exchanges are hacked, it is almost always a vulnerability on the exchange side.

## BUSINESS READINESS: EXAMPLES FOR FOUR KEY USE CASES

To demonstrate our framework in action, and in acknowledgment of the fact that the use case involved will have a large influence on business readiness, we have provided assessments of four archetypal use cases that we consider of particular importance at the moment (for a broader discussion of use cases, see Section 2).

### ASSET TOKENIZATION

With Ethereum providing the de facto token standards across most of the blockchain industry, and with a large ecosystem of providers, Ethereum is very well suited for asset tokenization. While the Mainnet scores high on usability and interoperability for tokenization, projects for which high performance and regulatory compliance are priorities will want to work with L2s/sidechains or build a private network.

**What is asset tokenization?** This refers to using blockchain to “tokenize” real-world assets, whether physical or digital, and so create unique, tamper-resistant “digital twins” or records that can be bought, sold, traded and, if desired, programmed. These are generally referred to as digital assets and are one of the main benefits that blockchain offers. NFTs are an example of digital assets, as are tokenized financial instruments and cryptocurrencies.

Ethereum is by far the most popular blockchain for tokenization. Its ERC-20 token is a de facto standard for fungible tokens and cryptocurrencies, ERC-721 is the most used standard for NFTs, and there are many other token standards available that are highly proven and well established. That makes the Mainnet a solid base layer technology for this use case.

Many of the case studies in this report involve asset tokenization in its various guises. Alai is about the regulatory compliant tokenization of company shares so that they can be bought and sold on a blockchain. In Avalon, company receivables are being tokenized for the same reason.

But tokenization need not be only about financial assets or collectibles. At heart, a token is an “independent”, secure data record. In the MS Azure case study, tokens based on the NFT standard are used in a supply chain scenario to record data about hard drives and make this data transferable along the chain and easily available to all participants in it.

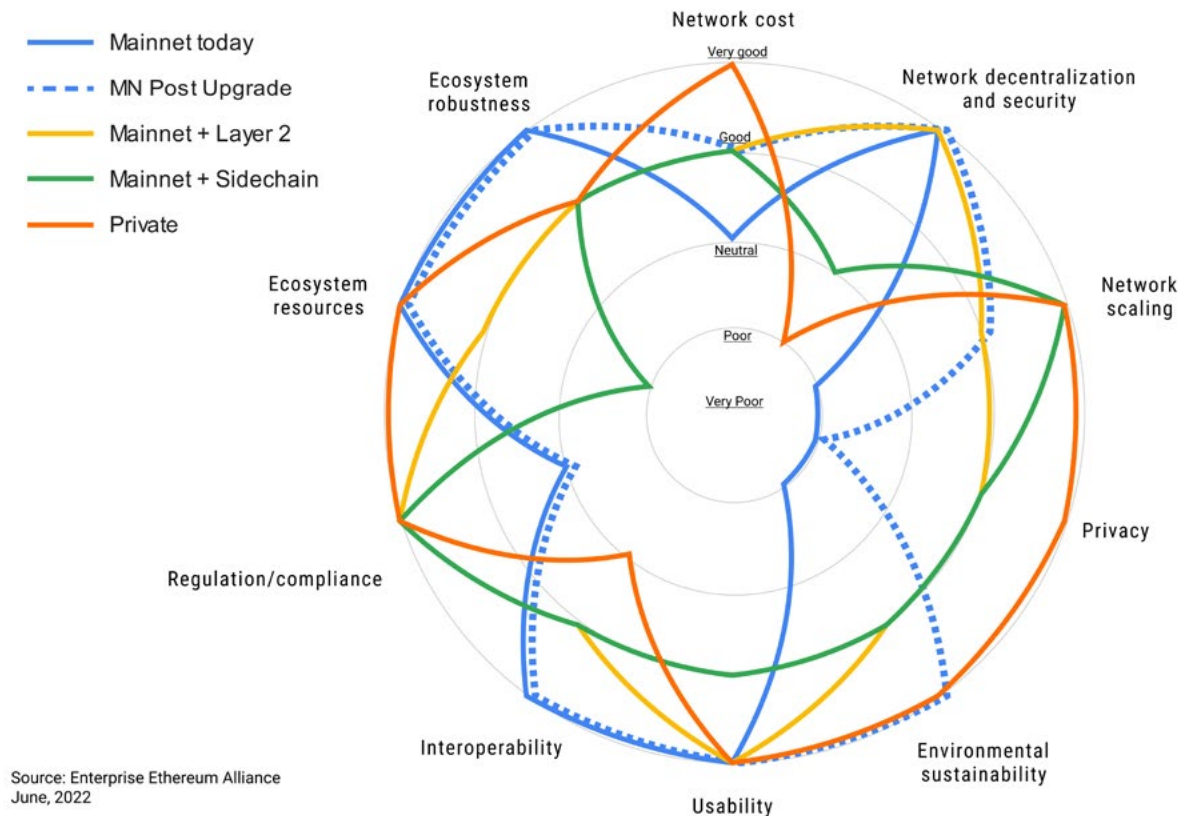
While it is easy and efficient to create tokens on the Mainnet, due to its performance constraints today, the Mainnet alone is not advisable for projects with high volumes or requiring speedy transaction times. This will improve after the upgrades. For now, many businesses turn to L2s or sidechains for scalability.

Many tokenization projects, in particular those involving financial assets, will be subject to KYC and similar regulations. Private networks offer the most robust choice of regulatory and compliance tooling. An increasing number of L2 and sidechain providers do so as well. So these network types are recommended. There are also services available to add compliance to a Mainnet-based solution via a dApp.

Because asset tokenization is core to what blockchains do, and because this use case is very mature in the Ethereum ecosystem, businesses will find a large choice of providers, above all in the private blockchain space. There are fewer options for Layer 2 and sidechains, but the resources are there.

Assessing the Business Readiness of the Ethereum Ecosystem *(continued)*

## Business Readiness for Asset Tokenization



## PAYMENT SOLUTIONS

Ethereum is a payments platform by its nature. The Mainnet provides a good basis for building payments solutions for a wide variety of use cases, especially where interoperability and broad access are important. For high-volume use cases, such as retail, or where privacy and regulatory compliance (KYC) are high priorities, as in financial services, businesses will want to rely on L2s or sidechains to reduce network costs and gain scalability. For wholesale-type payment solutions among a small number of participants, private Ethereum networks provide a good alternative.

**What are blockchain-based payments?** These use blockchain to create alternative payment solutions, either as replacements for existing solutions or in new types

of blockchain-based platforms, such as decentralized exchanges. Blockchain-based payments are generally characterized by the ability to easily make P2P payments and by near-instant settlement.

Ethereum is a transaction platform and a public ledger “out of the box,” so can be considered by its very nature a payments platform. It is not surprising that payments are a mature use case in the ecosystem.

When we think of payments in blockchain, we tend to think of the increasing number of established players, such as Visa or PayPal, who are now accepting cryptocurrencies. There are also many projects dedicated to building new payment solutions for wholesale or retail use. It is also possible, and can be interesting, to use Ethereum to build smaller-scale payment solutions for specific markets



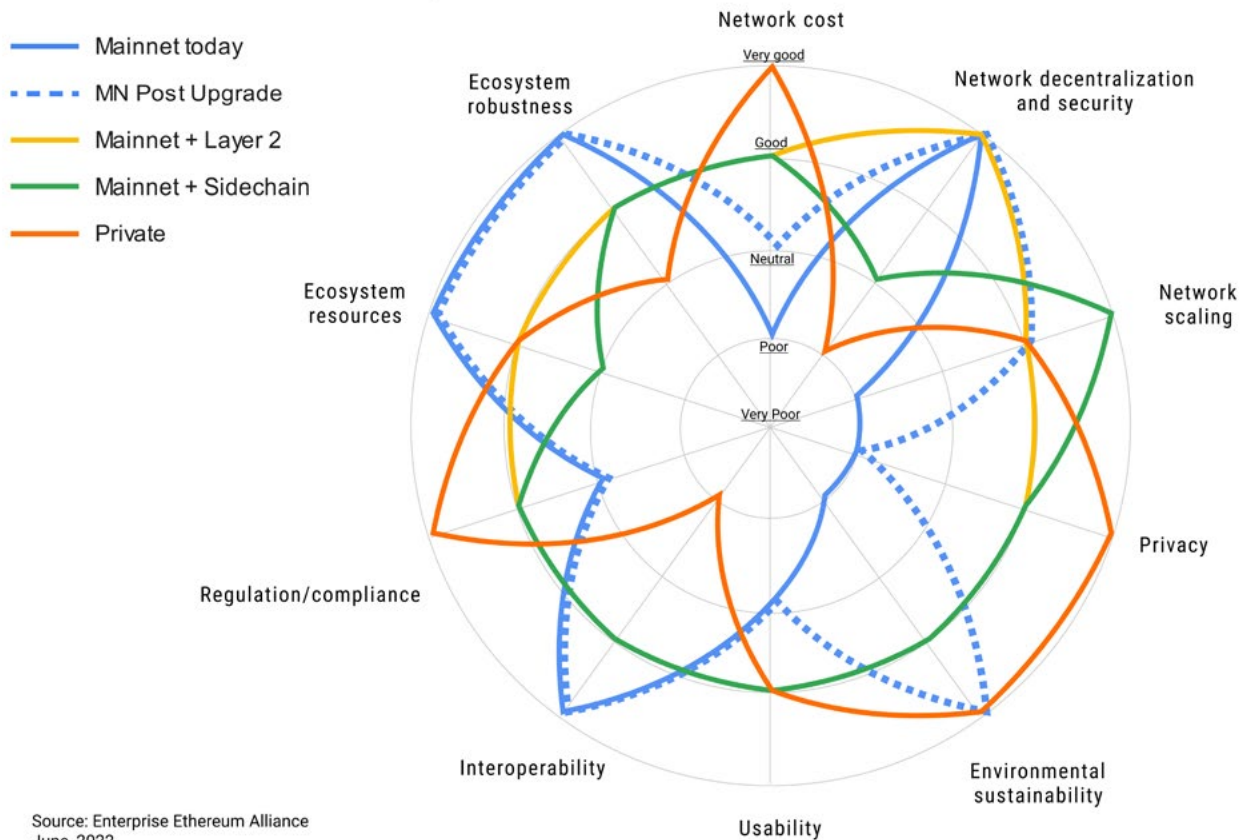
## Assessing the Business Readiness of the Ethereum Ecosystem *(continued)*

or use cases. The Vow case study in this report, with its bespoke currency and payments platform for merchant cashbacks, could be taken as an example.

When building a payment solution, the Mainnet offers the highest level of interoperability, with either ether itself or ERC-based tokens as widely accepted standards. This can be highly desirable, depending on the use case. But most retail-oriented payments solutions need high performance and low transaction costs, so most projects turn to an L2 or sidechain today.

Private blockchains are also very good for building use case-specific payments solutions, especially where regulation and compliance as well as privacy are concerns. Private payments solutions can be scalable; however, they might not need to be. Private networks for wholesale-type payments use cases, such as Interbank settlement, can live with low tps as they tend to have a low number of high-value transactions.

### Business Readiness for Payment Solutions



Source: Enterprise Ethereum Alliance  
June, 2022

Assessing the Business Readiness of the Ethereum Ecosystem *(continued)*

## MARKETPLACES

Ethereum can be used to build marketplaces for almost any kind of asset. While there are a lot of resources available to build on the Mainnet, making it highly business-ready for this use case, for high performance and low cost, L2s and sidechains are currently needed as well. Markets that require participants to be KYC'd or otherwise vetted will need a separate onboarding dApp or use a private network.

**What are blockchain-based marketplaces?** *These use blockchain to create centralized or decentralized markets, typically for digital assets, but can be for any asset that can be represented by a token. Blockchain-based marketplaces are generally characterized by the ability to easily make P2P payments and by near-instant settlement. Marketplaces generally reduce centralization as the marketplace itself becomes a "center of control".*

When we think about blockchain-based marketplaces today, we tend to think of the large centralized and decentralized cryptocurrency exchanges or the NFT marketplaces that have been successful and now dominate the headlines. The mantra in the early days of blockchain was to build markets for everything, even things that you couldn't make markets for before, and we see this happening, too.

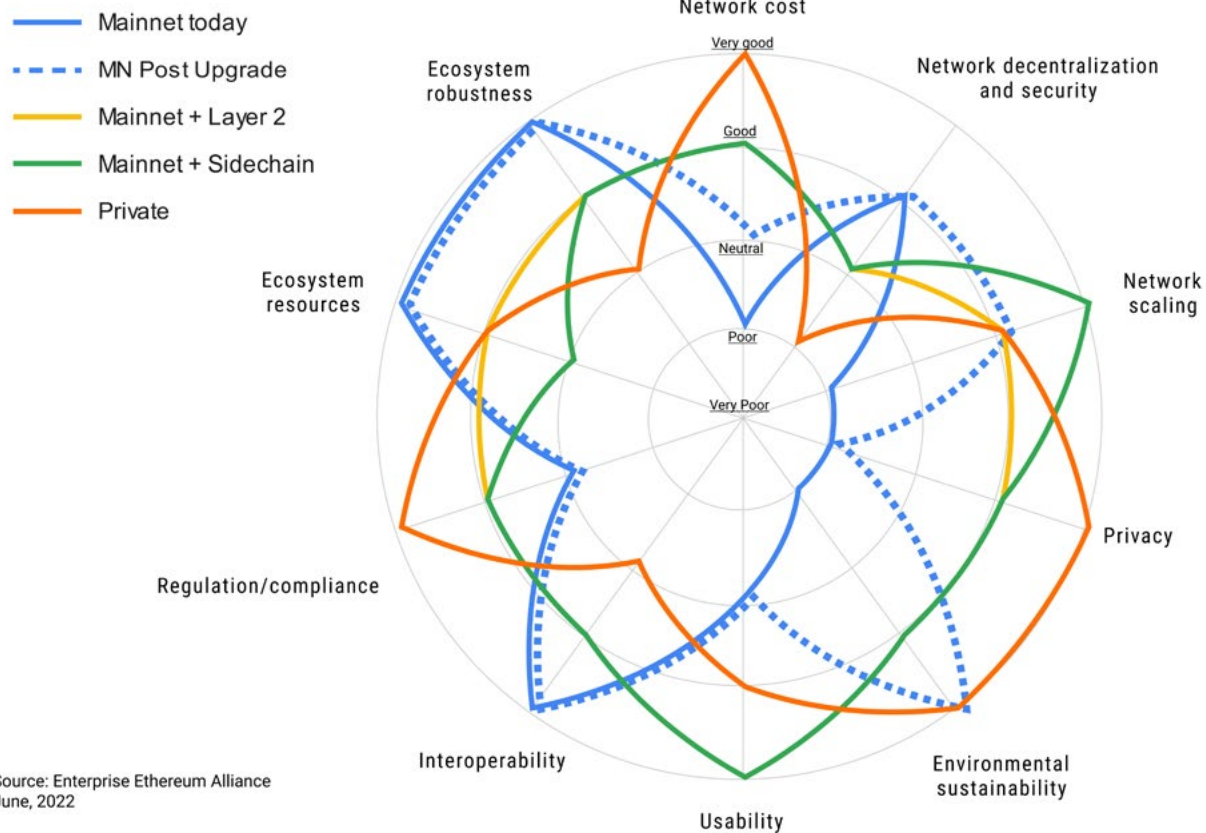
In our case studies, Avalon is a marketplace for tokenized SME receivables. Alaia, which involves private placement of equities, is a type of highly controlled, regulatory compliant marketplace for qualified investors. The iExec project is a marketplace for computing assets, a good example of using blockchain and other technologies to build a marketplace for something ephemeral that you could not have done without blockchain. Data markets can also be seen in this light. Without tokens and public blockchains, large-scale, trustworthy, privacy-preserving data markets would be very difficult to build.

Businesses wanting to build their own marketplaces will find many options in the Ethereum ecosystem. If broad reach is desirable, then solutions based on Mainnet will be the most open and accessible. Since large-scale markets tend to have high volumes, doing so via an L2 or sidechain is the most viable option today. This will look different when the upgrades are finished, and we can expect large-scale marketplaces being built on the Mainnet as well.

The good news is that businesses will find a fairly large number of L2/sidechain services offering marketplaces already. Private blockchains can be used to build bespoke marketplaces, which can be useful, for example, if privacy is an issue or there are not that many market participants.

## Assessing the Business Readiness of the Ethereum Ecosystem (continued)

## Business Readiness for Marketplaces



## SUPPLY CHAIN PROVENANCE

Supply chain tracking has long been a popular use case in the Ethereum ecosystem. While Mainnet-based standards can be used for tokenizing data and creating “digital twins” for “track and trace” purposes, and the Mainnet provides a secure audit layer, adding a Layer 2 for performance, privacy, scalability and regulatory requirements compliance is currently the norm. As participants in a supply chain are generally limited in number and known to each other, this use case lends itself particularly well to private networks as well.

**What is blockchain-based supply chain provenance?**

This uses blockchain to prove provenance and for “track and trace” in supply chain and other value chains. Typically it involves either a shared, append-only ledger entry or

tokens as “digital twins” of real-world items in the chain. Tokens can be data carriers, containing proof of the asset’s provenance and information on its state. Tokens can also be programmed to help automate processes.

Supply chain provenance and “track and trace” are among the oldest recognized use cases for blockchains beyond cryptocurrencies. Typically, a blockchain-based supply chain will use a shared, append-only entry in the ledger. This provides a tamper-proof audit trail of who did what and when. Tokens can also be used to represent real-world assets in the supply chain; for instance, a raw material or a component. In this case the token acts like an independent data record. It can contain proofs of the asset’s provenance, and then, as it “travels along the chain”, can accumulate information on what has happened to it along the way, supplied by those handling the assets or by sensors. Smart contracts can be used to automate

## Assessing the Business Readiness of the Ethereum Ecosystem *(continued)*

processes, add efficiencies, and incorporate payments and other business processes.

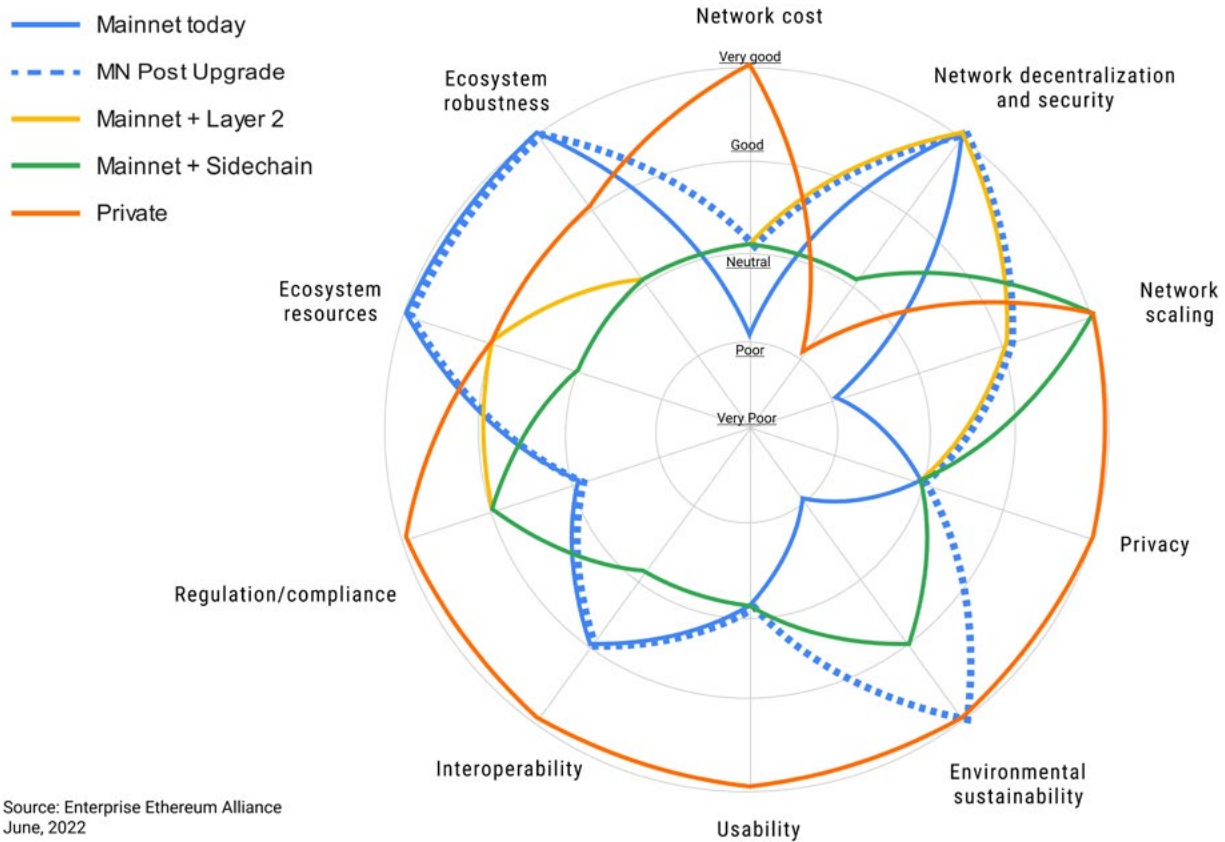
It is this relative independence of the data records that makes blockchain interesting for supply chain, because it makes it easier for larger numbers of participants to access and contribute to this information, without necessarily building or being beholden to a large, centralized platform. The MS Azure case study is a good example of all of these things in action.

The Mainnet provides a very good basis for tokenization and for a secure, publicly available audit trail, which can be useful in many supply chain use cases. (While not strictly a supply chain use case, our ACRE Africa case study

provides a good example of the Mainnet being used for public auditability, and the BankUnited/ServiceNow of the same being achieved using the Baseline pattern.)

But supply chain use cases, especially large-scale ones, depend heavily on low-cost transactions (no one wants to spend a lot of money just to send data around), as well as privacy. They may also have regulatory requirements. In most cases, the number of participants in the supply chain, while potentially large, is finite, and they will be known to each other. For this reason, private Ethereum blockchains are particularly suited to supply chain use, and there are many vendors who cater to this need.

### Business Readiness for Supply Chain Provenance







## Section 4

# Conclusion – Is Ethereum Ready for Business?

*To conclude, we believe that the Ethereum ecosystem is indeed “ready for business”, even if it is not yet “out-of-the-box” ready. With the right use case and an understanding of how to use the various options available to them, businesses can today begin to take advantage of decentralized business models and approaches made possible by this technology.*

In this paper we have tried to paint a picture of Ethereum as a business platform based on what we could observe and learn about how it is being used and thought of today. Where has all this analysis left us? Is Ethereum “ready for business”? We believe that it is safe to say that it is, though perhaps not yet quite “out-of-the-box” ready. Much depends on having the right use case and understanding how best to use the various options and components of the larger Ethereum ecosystem.

With this in mind, we would like to leave our readers with the following main takeaways:

**The pieces are in place for the safe and productive use of Ethereum as a business platform.** The Ethereum Mainnet has matured greatly. It is battle-tested, proven and currently serves as a globally significant settlement layer. The important thing for businesses to keep in mind in this context is that Ethereum is a complete ecosystem. Compared to its early days, there is a rich assortment of standards, tools, providers and platforms that businesses can turn to. Many of these enhance the Mainnet in important parameters such as sustainability, performance and privacy. The regulatory environment for digital assets and blockchain technology (as opposed to cryptocurrencies), while still uncertain in many respects, need not be seen as a blocker. Indeed, many jurisdictions see the potential of blockchain and look favorably on it. The

ecosystem itself has proven robust, and businesses can expect Ethereum to last.

**These pieces do not necessarily fit together seamlessly yet.** That said, many of the pieces outside of the core blockchain – for example, scaling solutions – are relatively new, and carry the risks associated with any new technology or platform. Interoperability between components still generally requires a bridge of some sort. We have yet to see the rise to prominence of comprehensive development and deployment suites that are often to be found in more mature technologies, and that can be used to seamlessly bind all the pieces together into a whole. We expect this to change and improve over time, however.

**There are many options for setups based on business type and needs.** While the pieces do not necessarily fit seamlessly together yet, they can be used today, and arranged in a number of different ways to meet specific needs. As we have tried to show above all in our Business Readiness Framework, there are different network options that represent different tradeoffs that businesses can make depending on the type of business, the use case and the relative importance of the different criteria. We think it fair to say that there is enough variety in the available architectures to make it possible to find an option to build a successful solution.

## Conclusion *(continued)*

**There are good reasons for businesses to explore decentralized business models and processes of the type Ethereum makes possible.** Last but not least, we hope that we have been able to show that, given the right use case, there are good reasons for businesses to build on Ethereum. In its early days, Ethereum promised to support decentralized business models and collaborations through tokenization and smart contracts, two simple but fairly powerful concepts. With tokens, what before was “referred to” online can now be “uniquely and verifiably represented”. With smart contracts, agreements about these digital assets can be programmed, validated and executed by machines more quickly and accurately and cost-effectively than by humans alone. This reduces cost, but also opens

up the possibility for new products and services that were not cost-effective before, due to the cost of verification or the costs and risks associated with coordination.

In sum: since what previously relied on faith between two or more parties can now be proven mathematically on a blockchain, any situation in which someone has to say “I have to trust you” is an opportunity for a blockchain-based solution. Today we increasingly see this being put into practice. Going forward, the opportunities are as numerous as the myriad business challenges that depend on this kind of trust.



# APPENDIX 1: STORIES – REPRESENTATIVE CASE STUDIES



# Case Study: ACRE Africa

## Automation, efficiency and trust in parametric insurance

<b>Description</b>	ACRE Africa uses Ethereum Mainnet to automate weather index parametric micro-insurance for farmers in sub-Saharan Africa, reducing costs and complexity while speeding up claims payouts and increasing demand for the product.	
<b>Target users</b>	<ul style="list-style-type: none"> <li>• Smallholder farmers in Sub-Saharan Africa</li> </ul>	
<b>Technology</b>	Ethereum Mainnet, Gnosis Chain, Etherisc Generic Insurance Framework	
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• Automate most of the claims processing process via smart contracts and satellite-based weather oracles</li> <li>• Reduce payout times to farmers from months to weeks, and enable in-season payouts</li> <li>• Increase trust through availability of near real-time information on status of a policy</li> <li>• Increase demand and sales for ACRE Africa's product</li> </ul>	
<b>Product type</b>	App-based micro-insurance connected to blockchain-based micro-insurance platform	
<b>Launch date</b>	April, 2021	
<b>Production phase</b>	In production	
<b>Notable partnerships</b>	<ul style="list-style-type: none"> <li>• Etherisc</li> <li>• Chainlink</li> <li>• Ethereum Foundation</li> <li>• Swiss Agency for Development and Cooperation SDC</li> <li>• Mercy Corps Ventures</li> <li>• Climate Ledger Initiative</li> </ul>	
<b>Milestones/achievements</b>	Over 12,000 farmers reached and over 500 receiving in-season payouts during first year	
<b>Next steps</b>	Fully automate claims processing by eliminating current manual check of payout schedule	



## Case Study: ACRE Africa *(continued)*

Farmers in Kenya, like those elsewhere, face many risks they cannot control. These include things like inclement weather, pestilence, and drought. Most have relied on traditional, indemnity-based insurance to help mitigate these risks. This insurance can however be expensive and cumbersome: claims are adjudicated by assessors on the ground, and decision-making processes can be impersonal and opaque. This can translate into long wait times for payouts. Farmers with valid claims typically wait up to three months after the end of a growing season for a claim to be settled, which can impact their ability to invest in next year's crops.

Parametric insurance, in which payouts are tied to externally measurable events and conditions instead of losses, can be much more efficient as it does not rely on manual adjudication of each claim.

"We create insurance products that are parametric and unique in sub-Saharan Africa," says ACRE Africa's Benson Njuguna. "There are no assessors, just remote sensed data and parameters used to make a decision to pay or not."

ACRE's product is innovative in many ways. Farmers can buy the insurance directly via their mobile phone, with no paper forms or the need to appear in person at a branch. Because the policy is parametric, ACRE can easily build custom products based on climatic and other aspects.

The company faced a problem, however. "The missing link for us was the claims," Njuguna says. As ACRE is not an insurance company but a calculating agent, its products still rely on traditional insurers for the actual policies. "That meant there were still bureaucratic procedures," he adds.

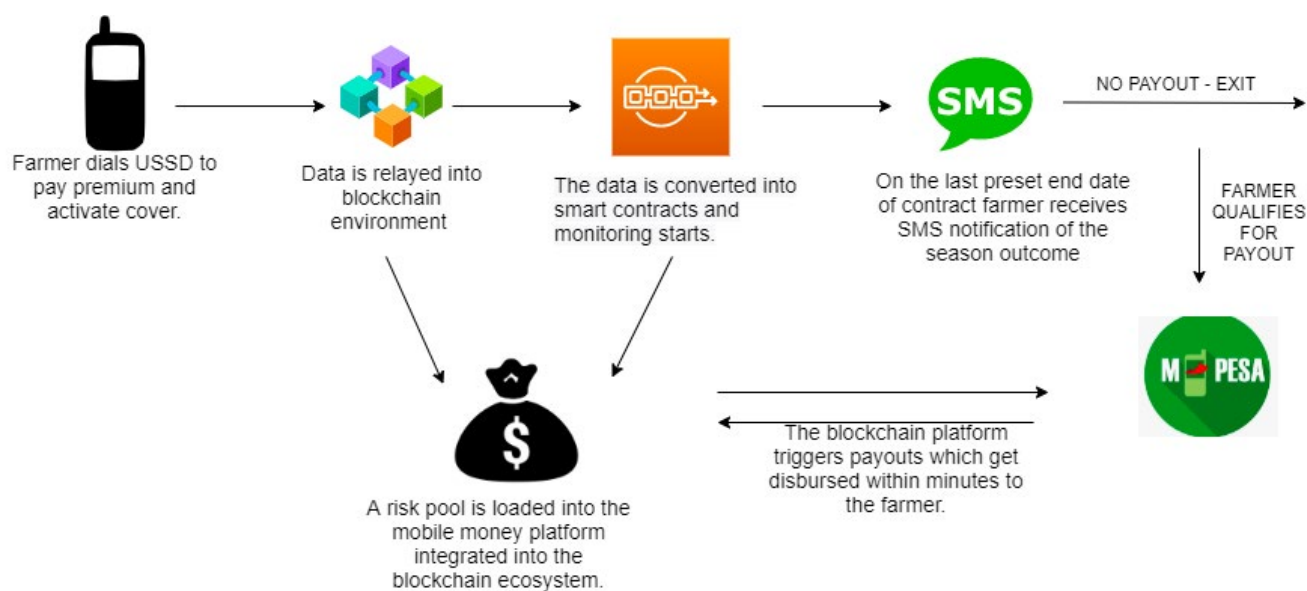
ACRE found a solution with public blockchain.

"We built an application on top of the Ethereum Mainnet that would manage the claims process. For the parametric side, we use a satellite to monitor our parameters. We get data in real time, this goes into a smart contract which has some defined decision trees and parameters in it, which we call 'triggers'. If a certain trigger is met the smart contract produces a payout schedule and lists who should receive the money."

The process is not yet fully automated. ACRE still has to do a simple quality check manually. But Njuguna expects it to be fully automated soon, so that the smart contract can also execute the payment directly.

Njuguna says blockchain is essential for this kind of setup for a number of reasons.

"One important blockchain part is the smart contract, deciding who can be paid or not. The other is the audit trail. We book every policy on the blockchain, but as a hash,



Process flow for the blockchain-based smart contract automated insurance product

Source: [Mercycorps](#)

**Case Study: ACRE Africa** *(continued)*

so it remains private. We then have public proof against tampering: for example, we can show that neither we nor anyone else has changed the triggers. If triggers are met, we can prove which triggers were engaged, how much was triggered, and so on.”

For Njuguna, public blockchain is an important part of the equation. “We could have done this on our own with a

database, but we wanted public proof that those triggers that the customers signed up for when buying are still the same ones used when it comes time to pay out. With a public audit trail, we can give the private key to an outside expert, for example an advocate representing a farmer, and he or she can inspect the data.”

**FOR MORE, SEE**

- 🌐 [ACRE Africa case study \(March 2021\)](#)
- 🌐 [Etherisc Update: Etherisc and Acre Africa Announce First Payouts through blockchain based platform with over 17,000 Kenyan Farmers insured during First Season \(April 2021\)](#)
- 🌐 [Mercycorp Finx update: Smart Contract-Based Weather Index Insurance for Smallholder Farmers in Kenya \( May 2021\)](#)

## Commentary and key takeaways for businesses

This case illustrates how public Ethereum can be used not only to increase efficiencies and reduce costs, but also to increase trust in otherwise “black box” processes and so improve the attractiveness of a product.

There are two things in particular we would point out to other businesses.

First, we note that blockchain-based automation reduced the cost of the company’s micro-insurance. That made it affordable for their customers while still being financially viable for the firm.

Second, ACRE believes that offering trust via a publicly accessible audit trail makes a difference in their market, and could not be achieved by traditional means.

Such properties should be transferable to many different business contexts.



# Case Study: Alaïa/Credit Suisse (Taurus)

## Regulatory compliant equity private placement on Mainnet

<b>Description</b>	Organizing a regulatory-compliant, tokenized private placement of shares in a fast-growing Swiss company with international ambitions using Ethereum Mainnet. Tokenization and private placements made by a systemically important bank. Tokens are booked with the bank.
<b>Target users</b>	Qualified investors
<b>Technology</b>	Ethereum Mainnet and smart contract based on the Swiss CMTA token framework open standard
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• Reduce costs and friction in asset issuance, placement and custody</li> <li>• Immediate settlement on blockchain</li> <li>• Automation of asset servicing</li> <li>• Convenience for investors and issuers</li> <li>• Tradability of the securities on T-DX, regulated marketplace</li> </ul>
<b>Product type</b>	Regulated digital asset marketplace
<b>Launch date</b>	2021
<b>Production phase</b>	In production
<b>Notable partnerships</b>	<ul style="list-style-type: none"> <li>• Credit Suisse</li> <li>• Alaïa</li> </ul>
<b>Milestones/achievements</b>	<ul style="list-style-type: none"> <li>• Tokenization of Alaïa shares completed</li> <li>• Integration of Taurus technology within Credit Suisse core banking infrastructure completed</li> </ul>
<b>Next steps</b>	Private placement and trading of Alaïa shares on the public Ethereum network on <a href="http://www.t-dx.com">www.t-dx.com</a> T-DX

**Case Study: Alaïa/Credit Suisse (Taurus) (continued)**

Alaïa is a fast-growing, action sports startup in Sion, Switzerland. In a pioneering project, the company plans to raise an eight-figure sum via an equity private placement using tokenized shares on the Ethereum blockchain and booked in the core banking system of Credit Suisse (CS), a systemically important bank. The last step of the vision is to trade the shares on T-DX, the regulated marketplace of Taurus for tokenized assets. To do so, the company has been working with Credit Suisse, leveraging the integrated platform (booking, custody, trading) of Taurus, a Swiss-based company that provides digital asset infrastructure for banks.

Besides the vision of Alaïa's founders, the main catalyst of this project, says Taurus CMO Victor Busson, was changes to Swiss banking regulation that gave full legal recognition to ledger-based securities. "Under the new Swiss DLT law, which came into force in February 2021, one tokenized share on a distributed ledger is now legally equivalent to one traditional share," he says.

Regulatory certainty has opened the door to a number of digital asset innovations in Swiss capital markets – innovations that issuers, banks and others in the industry are now beginning to take advantage of.

The tokenization smart contract is a good example of this.

"We used the Capital Markets and Technology Association's (CMTA) token framework as our template," says Busson. "This is an open standard developed by Swiss law firms, auditing firms, banks, core banking providers and tech firms like ourselves, under the aegis of the Swiss CMTA. It is the product of our industry coming together in a holistic way to define regulated templates that are compliant with Swiss regulations."

In the first phase of the project, the team was able successfully to tokenize Alaïa's shares, though not without first clearing a few hurdles.

"One big challenge of this project was integrating our blockchain technology, including tokenization and custody capabilities, as well as the blockchain connectivity, within Credit Suisse's core banking systems so they can book tokenized assets directly," Busson says. "This was

the first time such a large bank was performing a real-production tokenization exercise and where we had to bring together business, technology, risk and compliance experts, among others."

Another hurdle was how to pay for transaction fees on Ethereum without any of the parties involved having to hold ether.

"Like many large, regulated companies, Credit Suisse is not comfortable holding cryptocurrencies on its balance sheet even for paying gas fees. So we developed a gas station network solution to take care of the ether payment ourselves – it works like a gas pump that CS can fill with fiat and which we then convert to ether to automatically pay the fees."

Busson says that, despite these compliance-related challenges, all parties were keen on seeing the project through. This is indicative of the increasing recognition of the potential of digital assets even in regulated environments.

"For issuers, especially midsize companies like Alaïa, ledger-based tokenization of shares offers a number of advantages over traditional approaches," he says. "For one, it dramatically reduces the cost of issuance through efficiency gains and reducing administrative overhead."

It also simplifies the private placement part. "Once investors have been KYC'd, all they need to do is an IBAN transfer. They can even purchase a tokenized share directly via their wallet," says Busson. "The settlement is done immediately on the blockchain."

Thanks to the smart contract, Alaïa can automate the asset servicing as well, including tasks like dividend payments or reporting corporate actions.

For their part, banks have recognized digital assets as an important innovation that they need to understand and be able to offer to clients.

"With blockchain, you can start to deliver services to SMEs in a digital manner," Busson says. "In the same way that mobile banking is replacing traditional banking for



**Case Study: Alaïa/Credit Suisse (Taurus) (continued)**

consumers, companies will soon be able to perform their corporate banking activities from their phones. Banks see these trends.”

This project also shows how banks are becoming more familiar and comfortable with asset tokenization generally.

“There is increased understanding that digital assets go beyond cryptocurrencies, and that they have more innovation potential than just increasing efficiency and convenience,” says Busson. “Tokenized assets can help make unbankable assets, like real estate or art, more easily bankable. This has long been a draw for banks as well.”

With the tokenization complete, the next step is the private placement on TDX, Taurus’s regulated market platform, with all tokens and settlement done on the Ethereum Mainnet. For Busson, the choice of a Mainnet-based solution indicates a key trend in the ecosystem as well.

“I think that right now there is a pivot towards more public blockchain in the industry,” he says. “And when a bank like Credit Suisse moves into the tokenized assets space, they choose Ethereum because it is the most used network at the moment. That is where the volumes are, where everyone is. That is where they can find the critical mass to succeed.”

**FOR MORE, SEE**

[!\[\]\(17413706fd4997a1a4bdf85c6864eee1\_img.jpg\) Taurus Capital Digital issuance and tokenization platform](#)

[!\[\]\(faf942dc3e59ce8eb64b4ac481eca7e0\_img.jpg\) GitHub - CMTA/CMTAT: Token developed by CMTA to tokenize securities in compliance with the Swiss law](#)

## Commentary and key takeaways for businesses

We think this case is noteworthy as an example of DeFi coming into the traditional capital markets space, with both the advantages and the challenges on display.

Businesses should note above all the key role of regulation here. On the one hand, regulatory certainty around tokenized assets provided by the Swiss Lex DLT made the project possible. The Swiss CMTAT tokenization framework is interesting in this regard as it shows that, given regulatory certainty, an industry can quickly come together and agree on standards. We expect that many will.

On the other hand, the fact that Taurus had to build an ether “gas tank” to enable participants to transact on the blockchain without holding ether on their books demonstrates the continued regulatory uncertainty around cryptocurrencies on a global level.

We naturally like this story for its innovation angle too. Busson’s comments on the allure of digital assets for issuers and banks are worthy of note. So too the choice of public Ethereum as a way to access the biggest markets.



# Case Study: ANSAcheck (EY)

Combating fake news – and protecting a brand – with Mainnet

<b>Description</b>	Blockchain-based information provenance verification for syndicated news stories
<b>Target users</b>	Blockchain-based information provenance verification for syndicated news stories
<b>Technology</b>	Ethereum Mainnet
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• Protects ANSA brand and business</li> <li>• Protects readers from fake news</li> <li>• Enables better tracking of re-use of news</li> <li>• Enables introduction of new business models</li> </ul>
<b>Product type</b>	Verification “sticker” on each news page allows any reader to verify article authenticity on the Ethereum Mainnet
<b>Launch date</b>	April, 2020
<b>Production phase</b>	In production
<b>Notable partnerships</b>	EY Blockchain
<b>Milestones/achievements</b>	<ul style="list-style-type: none"> <li>• Over 5,000 articles hashed and posted to blockchain per day</li> <li>• Low per-story transaction costs through batching</li> <li>• Ca. 35-40% of readers use the verification button</li> <li>• High visibility among ecosystem partners, social media companies</li> </ul>
<b>Next steps</b>	<ul style="list-style-type: none"> <li>• Extending capability outside the ANSA ecosystem</li> <li>• Extend to authenticate images and video</li> <li>• Introduce more sophisticated features (fact checking, picture data protection, copyright protection)</li> </ul>

## Case Study: ANSAcheck (EY) *(continued)*

ANSA is Italy's largest news agency. It publishes over 3,500 articles, 1,500 photos and more than 50 videos daily. The vast majority (90%) of its articles are syndicated to media outlets (B2B customers) while the rest are made available to the general public (B2C) under a subscription model with a 30 article per month free tier.

ANSA's reputation has been damaged in the past by impostors posting ANSA-branded fake news. This is both a danger to society (there were many fake posts during the pandemic with spurious Covid information) and to ANSA's business.

"We were attacked in the past when fake news were tagged as ANSA news," says Stefano De Alessandri, ANSA's CEO. "We contributed to the problem because we cannot know who created and published fake news."<sup>1</sup>

To fight back, ANSA went looking for a way to guarantee to readers that a given ANSA-branded news story really originated with ANSA. The system had to be able to handle updates of the articles over time as well as reposts. The

latter was important as the ANSA business model rests primarily on syndication.

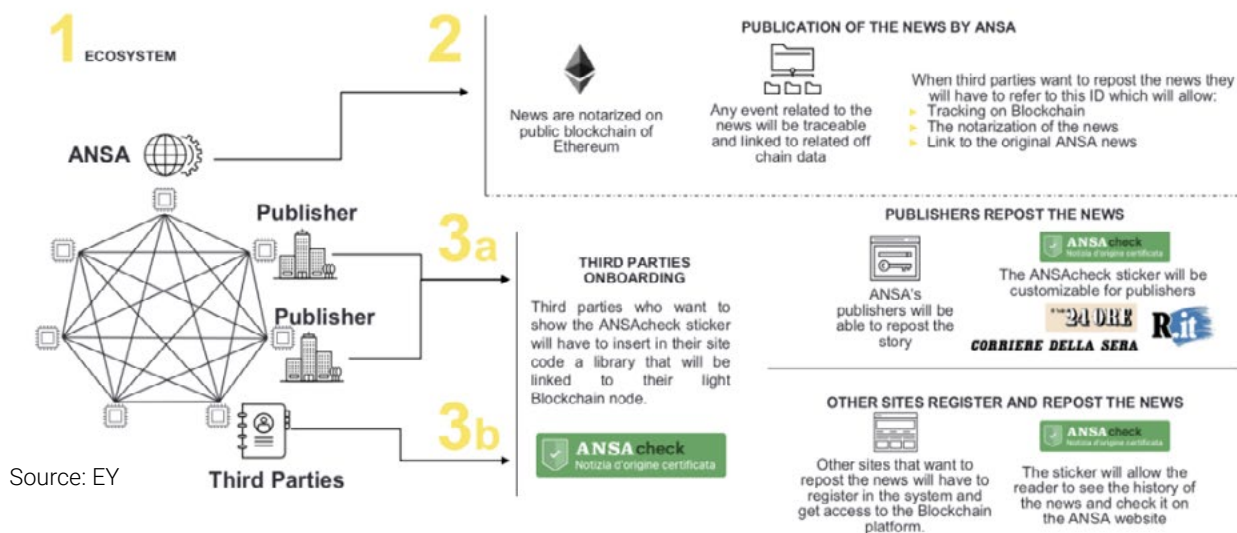
To be able to offer trust, tamper-resistance and easy access to all readers, ANSA chose to use the public Ethereum network. Working with EY Blockchain, it built a news verification system based on a "News of Certified Origin (Notizia d'origine certificata)" sticker that appears on the bottom of every article ANSA publishes. This acts like a digital notary seal for that particular piece of news.

The system works as follows: Whenever an article is published, it is hashed to create a digital fingerprint. This hash along with metadata such as the story ID and date and time of publishing or recording, is then sent to the blockchain via a smart contract.

Clicking on the label at the bottom of an article brings the reader to a page containing the stored metadata for the article and relevant data about the blockchain transaction. It also allows users to verify the blockchain transaction on Etherscan.

<sup>1</sup> [Blockchain Center of Excellence Case Study Series](#), University of Arkansas.

### 3 steps solution overview: Ecosystem, publication and repost of the news



**Case Study: ANSAcheck (EY) (continued)**

In this way readers can see the history of a piece of news as well as its original source. That in turns allows them to compare news read on other sources and purporting to come from ANSA with the original. As De Alessandri notes: “With ANSAcheck, imposters cannot [imitate ANSA] anymore because if it doesn’t have an ANSAcheck tag, we didn’t publish it.”<sup>2</sup>

The service is managed on ANSA’s behalf by EY, which wrote the smart contract and manages the wallet ANSA uses to pay for the transactions. Originally, the contract was designed to process articles every 15 minutes, at a cost of about USD 0.6 per article.

As fee volatility on Ethereum rose, the contract was modified to allow batch processing (generally 500-600

articles every six hours). This has at times brought per-article fees down to as low as USD 0.006 per story.

ANSA’s solution was originally rolled out to its ecosystem of direct partners. In the future, the idea is to broaden capabilities so that the “sticker” can follow the article through any kind of re-post, for example on Facebook. More sophisticated functionality, including fact checking, semantic language analysis, or protecting images, is also planned. This could include means to prove the authenticity of articles that have been slightly adapted or commented upon (using techniques similar to those used by plagiarism software).

<sup>2</sup> Ibid.

**FOR MORE, SEE**

[!\[\]\(aa53ad6fea213b8b2226d3077e30533a\_img.jpg\) ANSA leveraging blockchain technology to help readers check source of news - English](#)

[!\[\]\(dd161862f9164df98f62b726e9846241\_img.jpg\) Authenticating real news with ANSAcheck, a blockchain-enabled solution developed by ANSA and EY, Mary Lacity and Dan Conway, Blockchain Center of Excellence, University of Arkansas, Sam Walton College of Business, February, 2020.](#)

## Commentary and key takeaways for businesses

We think this case is instructive as an example of how public blockchain can be used to protect intellectual property (IP), and why that matters.

Fake news, of course, is first and foremost a societal problem. But for companies like ANSA, whose product is information, it is also a business problem – and It is not surprising that ANSA saw a direct connection between imposter news and material damage to its brand.

By hashing articles and posting the hashes to the blockchain, ANSA has a simple way to “notarize” the articles and prove authenticity. Since it is on the Ethereum Mainnet, that seal is easily verifiable to anyone with an Internet connection.

Such proof-of-authenticity of data is a classic blockchain use case, and should be of interest to any business – not just news organizations – trying to protect their IP online.





# Case Study: Avalon.Market (Crowdz)

Tokenizing invoices to open up new markets for invoice financing

<b>Description</b>	Moving an existing global receivables finance marketplace to public Ethereum to take full advantage of tokenized receivables and smart contracts
<b>Target users</b>	<ul style="list-style-type: none"> <li>• Small and medium sized businesses looking to sell receivables (Sellers)</li> <li>• Investors interested in buying receivables at a discount, and support environmental and ethical supply chains (Funders)</li> </ul>
<b>Technology</b>	<ul style="list-style-type: none"> <li>• Mainnet plus Sidechain (Polygon)</li> <li>• IPFS</li> </ul>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• Instant transactions</li> <li>• P2P trading between participants</li> <li>• Smart contracts to automate processes and enable more complex transactions</li> <li>• NFT standard to enable broader markets, with receivables trading eventually outside the platform</li> <li>• Enable efficiency in complex transactions that are usually done manually in traditional players</li> </ul>
<b>Product type</b>	Marketplace, Fintech
<b>Launch date</b>	Expected Q3 2023
<b>Production phase</b>	In development – currently migrating all invoices on existing platform to ERC-721
<b>Notable partnerships</b>	<ul style="list-style-type: none"> <li>• Meta (formerly Facebook)</li> <li>• EG</li> </ul>
<b>Milestones/achievements</b>	Migration of all receivables to testnet
<b>Next steps</b>	Launch of platform

**Case Study: Avalon.Market (Crowdz) (continued)**

Crowdz is a Fintech company focused on helping small businesses (SMBs) reclaim the future. Crowdz is building a business capital platform that offers an alternative financing solution for small businesses so they can accelerate their cash flow. Invoices are at the heart of everything small and mid-sized enterprises (SMEs) do. They impact hiring, buying products, and growth. Every day spent waiting to receive a receivable is a missed opportunity. Crowdz' goal is to level the playing field by providing SMBs access to more working capital to grow their business.

The venture has been a success so far. Last year, the Crowdz platform financed 50 million U.S. dollars' worth of receivables, and is projecting that it will finance one billion U.S. dollars' worth in 2023.

Although the platform runs well on its current technology, Crowdz is in the process of upgrading it by migrating to the Ethereum blockchain. Avalon, the new version of Crowdz decentralized marketplace that bridges receivables with decentralized finance, is expected to launch in the second half of 2022.

According to Marc Meyer, Head of Product at Crowdz, this move to public blockchain represents the fulfillment of the company's original vision.

"Our company founder, who came from Cisco, has been very keen on blockchain for a long time, so our idea from the outset was to use this technology," he says. "But the time wasn't right before. Early investors weren't necessarily comfortable with the technology, and the banks we worked with – while originally also quite heavily involved in experimenting with blockchain – have had more of a 'wait-and-see' attitude the last few years."

These attitudes, according to Meyer, are changing quickly across the board. "We see a huge move into adoption of this technology now," he says. "People are generally much more comfortable with blockchain."

Meyer puts this down, among other things, to recent developments in the Ethereum ecosystem. "We were always very keen on Ethereum, but it is quite expensive these days. But now we have side chains like Polygon that make it more effective, more ubiquitous, and cheaper."

That said, Crowdz is keeping a close eye on the Ethereum roadmap. "When Ethereum moves to Eth2.0<sup>1</sup>, we will use that," Meyer says. Avalon, Meyer also points out, is not restricted to Ethereum. "We're chain free."

With public blockchain infrastructure in the background, the company can now, as it puts it, "bridge receivables with the DeFi (decentralized finance) world." The key to this is turning all of the receivables on the current Crowdz marketplace into tokens based on the ERC-721, or NFT (non-fungible token), standard. This in turn opens up a host of interesting possibilities.

"The combination of an NFT representing a receivable and a stablecoin for payment makes it very easy and efficient to use the public blockchain for instant transactions," Meyer says. "This in turn makes it easier to introduce P2P (peer-to-peer) trading between Funders on the platform; for example large banks."

Smart contracts also make it possible to carry out complex transactions, such as syndicating large receivables, or to have automatic investment based on pre-programmed criteria. This is a big step forward for an industry still heavily dependent on spreadsheets and manual processes. "To us, this is really where the breakthrough is," Meyer adds.

Tokenizing receivables also makes them more easily tradable. In theory, this could include on other platforms beside Avalon. "Since we are using the NFT standard, our receivables could for example be listed on an NFT marketplace like OpenSea," says Meyer.

Another innovation enabled by the blockchain is the introduction of a native token on the platform. This, Meyer explains, will be used for governance, collateral and as rewards to encourage "good behavior."

While the technology is ready for what the company wants to do, there are challenges. The most pressing is navigating the current regulatory environment.

"We are very careful on the legal and regulatory front," Meyer says. "We don't want to be in a position where these tokenized receivables could be considered securities. So we are not doing things like liquidity provision or traditional

1. Eth2.0, or Eth2, is a term referring to a number of imminent changes, including the move to Proof-of-Stake consensus, planned for the Ethereum Mainnet. The term Eth2.0 is generally no longer used by the Ethereum developer community, which prefers to refer to the move to Proof-of-Stake as "The Merge". See [The great renaming: what happened to Eth2](#), Ethereum Foundation, January 24, 2022.

**Case Study: Avalon.Market (Crowdz)** *(continued)*

invoice factoring. Right now, each NFT represents the full receivable, and not a fraction of it.”

Customers are also still hesitant to use cryptocurrencies for payment. “Many of our Funders are happy to work with stablecoins, but most Sellers are probably not ready for crypto quite yet. Right now, we are trying to blend fiat with stablecoins. It will probably take five years for the fully crypto part.”

Privacy is also a factor. “We need to fulfill GDPR and other data protection requirements,” Meyer adds. “Our customers also want privacy for themselves. They don’t want competitors, for example, to know what kinds of

receivables they are buying. We therefore put the minimum necessary information on the NFT. Other information that could help support the buying decision is stored on IPFS. The rest is in a private database.”

This, admittedly, represents something of a compromise with the ideals of fully decentralized finance. Meyer is comfortable with that.

“We want to take the aspects of DeFi that create efficiencies and other benefits,” he says. “But we will never be fully decentralized, nor do we want to be.”

**FOR MORE, SEE**

 [EEA 2022 Product & Services Showcase: Crowdz](#)

 [Crowdz](#)

## Commentary and key takeaways for businesses

This case caught our attention above all as an example of the key principles of DeFi starting to be applied to traditional areas of finance.

Through tokenization, Crowdz can in effect turn each receivable into an independent, secure and trustworthy data record – one that can be easily transferred among different owners. Such transfers do not require a central platform to verify. By using NFTs, the tokenized receivables can be traded on any platform recognizing the standard. That opens the door to larger markets and more liquidity, which is a basic tenet of DeFi.

Businesses should also note the use of a native token on the platform for governance purposes. While Crowdz remains centralized to a degree on purpose, autonomous or semi-autonomous governance of platforms (a hallmark of DeFi too) will in our opinion also be seen more often in traditional financial markets, where they can bring welcome levels of efficiency and transparency to platforms.

The token standard also helps with cross-chain interoperability, as many other chains recognize ERC-721 too or can bridge to it. That opens even more possibilities.

Finally, we would point out how both securities and privacy regulation have influenced decision-making regarding the platform.



# Case Study: BankUnited/ServiceNow (Provide)

## Synchronizing records in an enterprise Incident Management System using Baseline

<b>Description</b>	Using the PRVD stack implementation of the Baseline Protocol to synchronize IT workflows across multiple parties
<b>Target users</b>	End users at BankUnited and its managed service providers
<b>Technology</b>	PRVD stack implementation of the Baseline Protocol; Polygon, Ethereum Mainnet; ServiceNow
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• Significant reduction or elimination of dispute resolution</li> <li>• Real-time synchronization and reconciliation of incident data</li> <li>• Privacy for internal incident data</li> </ul>
<b>Product type</b>	ServiceNow Application
<b>Launch date</b>	Q4 2022
<b>Production phase</b>	Pre-production
<b>Notable partnerships</b>	<ul style="list-style-type: none"> <li>• Provide</li> <li>• ServiceNow</li> </ul>
<b>Milestones/achievements</b>	Initial proof of concept successfully integrating ServiceNow instances using Baseline Protocol and the Ethereum Mainnet
<b>Next steps</b>	<ul style="list-style-type: none"> <li>• Improve UX and package ProvideNow application for distribution via ServiceNow Store</li> <li>• Production rollout to BankUnited MSPs</li> </ul>



## Case Study: BankUnited/ServiceNow (Provide) *(continued)*

Like many companies, BankUnited uses the ServiceNow platform for IT Incident Management, and for other business applications. While this was straightforward when IT service was purely internal, BankUnited has begun to onboard external Managed Service Providers (MSPs). This complicates the setup on two fronts.

First, instead of one connection to the internal IT service unit via BankUnited's ServiceNow system, BankUnited has to build and manage multiple ServiceNow MSP connections. Also, multiple connections increase the complexity of auditing the performance of the providers against their Service Level Agreements (SLAs).

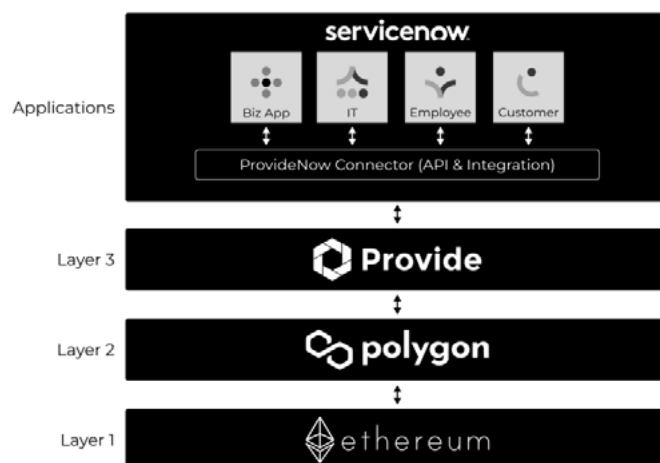
IT Incident Management SLAs often stipulate turnaround times in hours or even minutes. Failure to meet targets can result in penalties, and disputes commonly arise about when exactly a ticket arrived or when exactly something was fixed.

While it is easy to capture this kind of data, using it to settle a dispute means retrieving the data after the fact from a participant's system of record, and trusting its accuracy. Relying on third-party data can be challenging, particularly around SLAs, and especially when there are strong financial incentives at play.

"Last year when we started talking about this we learned that ServiceNow was looking at blockchain capabilities as well as the Baseline Protocol, and we wondered how we could bring that in," says Antonio Di Perna of BankUnited. "We felt ticketing would be a good use case."

The solution consists of a ServiceNow integration with Provide's Shuttle product which makes adopting the PRVD stack and Baseline Protocol very easy for organizations. Shuttle is a no/low-code BPM solution that generates recursive zero-knowledge circuits. End users will be able to "install" the ProvideNow application from the ServiceNow Store.

Shuttle offers a single and efficient onboarding pathway for all service providers via the ProvideNow application. This reduces the complexity and cost associated with onboarding a network of counterparties.



The Baseline Protocol preserves privacy of an organization's sensitive data while granting counterparties the ability to verify state changes and maintain the synchronization of processes in real-time. As tickets are opened and interacted with, the data is processed in real time by an instance of the PRVD stack running at each edge of the network; point-to-point messages are exchanged among the instances and each organization's ServiceNow instance is updated. The artifacts produced by this process (zero-knowledge proofs) are staged for eventual settlement on the Ethereum Mainnet by way of a custom EVM-compliant Layer 3 (provide.network) and then Layer 2 (Polygon).

"That is where we see the real value," says Di Perna. "You don't have to go to the system of record, or even to the client. Sensitive data stays where it belongs, in each participant's internal system of record, whether it is ServiceNow, SAP or something else. And in the case of a dispute, our auditors and other parties provided access do not need to request information after the fact. We can just unpack the proof."

BankUnited has recently completed a proof of concept with Provide. Di Perna describes the project like this:

"Our PoC demonstrated and validated how a ServiceNow client, in this case BankUnited, could leverage the integration with Provide to baseline multi-company

**Case Study: BankUnited/ServiceNow (Provide) (continued)**

business processes involving the client and its designated MSPs. We demonstrated how blockchain combined with Baseline Protocol allows multiple organizations to synchronize their ServiceNow Incident Management processes by registering every interaction as a zero-knowledge proof (ZKP) on the Ethereum blockchain. The ZKP can be used to cryptographically verify the interaction, and remediate any data disputes without disclosing

sensitive data.” Di Perna says initial results are positive, though these are still early stages. “Right now it is a working POC; it is creating data on the blockchain. What we are working on now is to move to production and make commercial use. We are excited as this is the first Web3 initiative of its kind.”

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**FOR MORE, SEE**

 [Baseline Protocol](#)

 [Provide](#)

## Commentary and key takeaways for businesses

Baselining is in our opinion one of the most promising recent developments in the business blockchain space. We think this BankUnited/ServiceNow/Provide case study offers a good example of the reason why. There are two things in particular we think businesses should take away from this case.

First, thanks to Baseline (here implemented via the PRVD stack) the system allows multiple participants in a shared workflow to synchronize critical – and potentially contentious – business information while keeping their actual data in-house. Creating this trust in shared data among multiple parties, while at the same time preserving privacy, is at the heart of what Baseline is intended to achieve.

Second, the Baseline standard, in this case as implemented via the ProvideNow app and easily available in the ServiceNow store, also offers a fairly simple and above-all standardized means of onboarding without building expensive new connectors.



# Case Study: Birra Peroni (EY)

## Supporting brand engagement through NFTs

<b>Description</b>	NFTs to prove the provenance of the ingredients in individual bottles of beer, with data accessible via a QR code and an app
<b>Target users</b>	Retail consumers of Peroni beer
<b>Technology</b>	Ethereum Mainnet with ERC-721 tokens (NFTs)
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• Supports brand engagement: Initially 45% of beer buyers clicked on the QR code via the app; today some 25% still do</li> <li>• Project forced the company and suppliers to fully digitize their supply chain, bringing efficiency benefits</li> </ul>
<b>Product type</b>	A consumer-facing app which uses a QR code to allow users to verify batch information on the blockchain
<b>Launch date</b>	April, 2021
<b>Production phase</b>	In production
<b>Notable partnerships</b>	<ul style="list-style-type: none"> <li>• EY Blockchain (blockchain services)</li> <li>• pOsti (app, brand storytelling)</li> </ul>
<b>Milestones/achievements</b>	Some five thousand batches tokenized to date, equivalent to millions of bottles of beer
<b>Next steps</b>	<ul style="list-style-type: none"> <li>• Extend the data gathering to include sustainability information</li> <li>• Plan to make NFT collectibles to further support brand loyalty</li> </ul>

## Case Study: Birra Peroni (EY) *(continued)*

Birra Peroni, founded in 1846, is Italy's best-selling beer. During a major rebranding exercise, the company decided that it wanted to promote maximum transparency in its supply chain to prove to consumers the provenance and quality of the ingredients of its beer, among other things to emphasize its pure "made in Italy" quality.

As Federico Sannella, Corporate Affairs Director, Birra Peroni, put it: "For Birra Peroni, the bond with the agricultural supply chain and the quality of our 100% made-in-Italy malt are fundamental strategic assets."<sup>1</sup>

With this in mind Peroni, in Sannella's words, set out to allow the consumer to "follow the journey of the malt from the field to the bottle."<sup>2</sup> The company was also interested in exploring how it could leverage the trust and transparency properties of public blockchain for this purpose. After a tender process, the project was carried out together with the agrifoodtech start-up pOsti and based on EY's OpsChain technology to develop and implement an end-to-end blockchain traceability solution which also includes the consumer-facing app and the storytelling around the project.

The project's goal was to collect data on all the ingredients and steps in its beer-making process – from cultivation of the barley through malting, brewing and distribution – and to tokenize this information on a batch-by-batch basis in the form of NFTs that could be used as proof

of provenance or of quality. These would then be made available to end consumers via a QR code on an app. According to Virgilio Maretto, CEO of pOsti, this was an end-to-end process: "A fully automated traceability process was implemented, starting with the acquisition of the information, its registration on the blockchain, and the processing and presentation on the landing page of significant data from the 100% Italian malt supply chain."<sup>3</sup>

Giuseppe Perrone of EY adds that public blockchain was a key part of this process. "Peroni uses public blockchain to guarantee maximum trust and transparency," he explains. "Their data-gathering systems are connected via APIs with the different entities. We collect the information, capture the data in our data model and create the token associated with that."

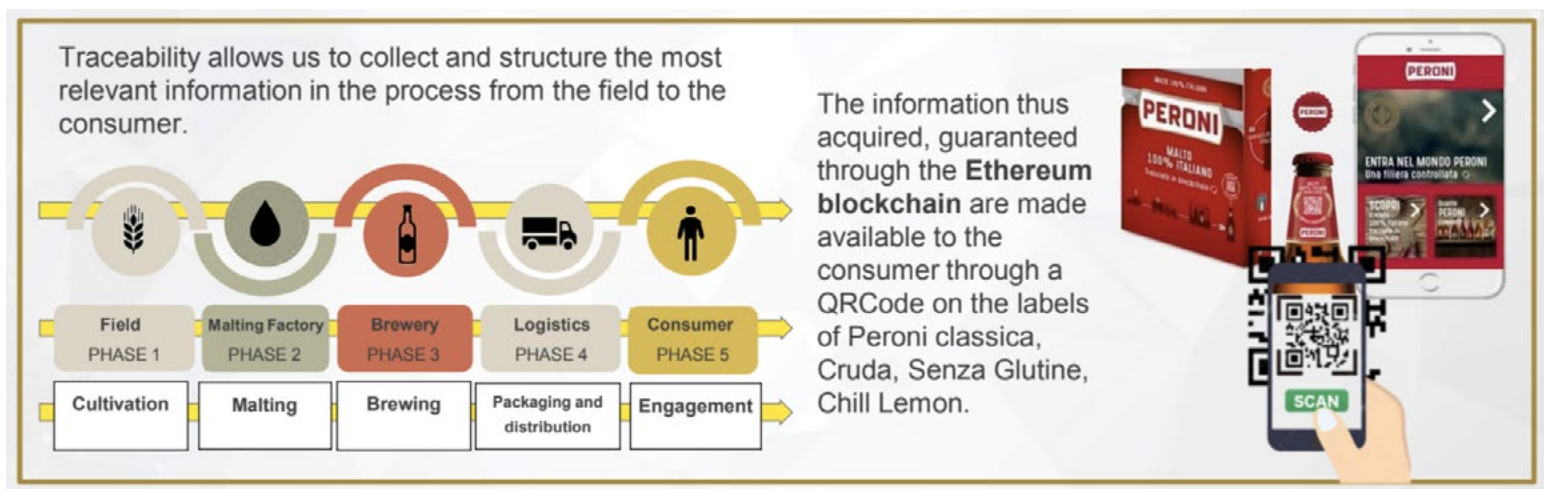
This was not without its challenges. "There was a need to be more interoperable inside the company supply chain," Perrone says, "and to digitize suppliers' data."

This setup was implemented and went live in April, 2021. The various data sources are aggregated daily, and the platform then mints a token associated with a specific batch of beer and containing all the relevant supply chain data. Three batches are tokenized per day. Some five thousand batches, which have gone into producing millions of bottles of beer, have been tokenized since the project began.

1 [Birra Peroni is the first industrial organization to mint unique non-fungible tokens using EY OpsChain Traceability](#), EY, May 17, 2021.

2 Ibid.

3 [Brewing Up a Blockchain Solutions for Supply Chain Transparency](#), MIT SMR Connections, May 2022.



Source: pOsti



**Case Study: Birra Peroni (EY) (continued)**

The information collected along this supply chain is not just of interest to consumers (and not all of it is made public). It helps internally as well. “During this process we digitized the entire data access and data sharing, and set up a trusted environment between the parties,” Perrone says. “This has brought multiple benefits in terms of cost reduction, quality of the information, as well as other things.”

Along with efficiencies, having this amount of information available will allow the company to extend the scope of the project. Peroni is for example interested in using the blockchain to provide information on the carbon footprint of its supply chain which it can then use for offsetting.

But customer engagement remains the main priority. This has been generally high. When first released, some 40-

45% of beer buyers clicked on the QR code. These rates have fallen as the novelty of the program has worn off (though some 20-25% of end users still click on the code). This is driving new blockchain-based innovations on the engagement front.

“New users will scan the QR code once because they are curious. But to maintain this level of engagement we want to continue the journey from traceability and sustainability through to the NFT metaverse,” Perrone says. “For example, we are working to create an NFT collection to capture more data, things like nationality, geography, gender, geo-localization or other marketing insights. We think that NFTs can be the new CRM.”

**FOR MORE, SEE**

 [Peroni app video \(YouTube\)](#)

 [Brewing Up a Blockchain Solution for Supply Chain Transparency, MIT SMR Connections, May, 2022](#)

 [Birra Peroni is the first industrial organization to mint unique non-fungible tokens using EY OpsChain Traceability](#)

**Commentary and key takeaways for businesses**

The Birra Peroni case is interesting as an early example of a consumer brand using blockchain and NFTs for supply chain traceability in order to foster brand loyalty in a consumer context.

With engagement rates of around 25% in the app, the project has been successful on a consumer engagement level. (We think it noteworthy in this context that the consumer-facing app assumes the average beer drinker in Italy is familiar at least to some degree with the idea of blockchain.)

Businesses might also note that in order to have all the information needed for the tokens, Peroni had to digitize its whole supply chain. This brought additional benefits, including cost reductions and improvements in data quality as well as enabling new uses of the data.

Last but not least, the comment that “NFTs can be the new CRM” is important. Because NFTs are unique and can hold data, they can be used for highly personalized, timely consumer interactions in ways not possible before.



# Case Study: iExec

## Creating a decentralized marketplace for computing assets

<b>Description</b>	Decentralized marketplace for computing assets
<b>Target users</b>	<ul style="list-style-type: none"> <li>• Computing power, dataset, application providers</li> <li>• Computing power, dataset, application requesters</li> </ul>
<b>Technology</b>	<ul style="list-style-type: none"> <li>• Ethereum Mainnet</li> <li>• Proprietary sidechain</li> <li>• Confidential computing</li> </ul>
<b>Benefits</b>	Allow owners and developers of computing assets to monetize their assets in new ways while protecting privacy
<b>Product type</b>	Decentralized marketplace
<b>Launch date</b>	2016
<b>Production phase</b>	In production
<b>Notable partnerships</b>	Intel
<b>Milestones/achievements</b>	<ul style="list-style-type: none"> <li>• ICO</li> <li>• Recognition by AMF in France (equivalent to US SEC)</li> <li>• Launch of decentralized, no code Oracle solution</li> </ul>
<b>Next steps</b>	Continue expansion of the user base

**Case Study: iExec** *(continued)*

Computing assets – processing power, data and programs – are some of the most valuable properties in our digital age. But it can be challenging to monetize them to their full potential.

The challenges are myriad and non-trivial. How can a company or individual with excess computing capacity find users in need of computation, and then be able to safely and efficiently rent, monitor the use of and charge for the computations carried out on their hardware? How can owners of valuable data sets allow others access to this data without compromising privacy or losing ownership of their data to copy/paste? How can developers rent their algorithms to data owners without losing their intellectual property, and while guaranteeing to the data owner that the algorithm correctly processed the data as promised?

These are the challenges that French company iExec has set out to solve.

“We have built a Web3 marketplace for all types of computing assets,” says iExec’s Francis Otshudi. “If you are a computing power provider, you can join to provide your extra capacity to others. If you have built an interesting AI model, you can provide that on the marketplace and monetize it. If you are a data provider, you can monetize usage of data sets in privacy-preserving ways.”

Users come from all over the spectrum, from startups to large companies to individual data scientists, sometimes in combination.

“We have a startup using iExec to enable the connection between large corporations and data scientists,” Otshudi says. “The platform allows the large companies to benefit from the expertise of data scientists while never revealing their data, and allows application providers to monetize their algorithms by selling results based on the data sets.”

In another example, iExec worked for a listed French company to support an app that encourages employees to use alternatives to cars, like bicycles or public transport, for going to work. The marketplace makes it possible for employees to prove they adhered to the requirements and win the rewards, without revealing to their employers the private details of exactly when, where and how they commuted.

iExec is also working with Cetim - the French Technical Centre for Mechanical Industry representing 6000+ companies in the industrial sector - in the implementation of a consortium blockchain to bring trust and secure data from manufacturing facilities, test benches and data transfer from remote IoT systems.

The iExec marketplace is based on two main technologies: confidential computing and the Ethereum blockchain.

“We use confidential computing techniques, mostly based on Intel’s Trusted Execution Environments (TEE), to guarantee privacy,” Otshudi says. “And we use the Ethereum blockchain to match buyers and sellers, provide governance, enable payments, and generally make the market work.”

While confidential computing can ensure that a program runs correctly on a data set without exposing any of the computations, it is the blockchain that takes care of all the necessary coordination.

“Blockchain handles the trust part,” says Otshudi. “With it we can store the proof that the result of an off-chain computation is correct, and so ensure consensus among stakeholders about this result. It also handles the agreements between buyers and sellers via smart contracts, and the payments via our utility token, which acts as escrow during the computation and can easily be exchanged for fiat.”

As Otshudi explains, for various reasons iExec uses both the Ethereum Mainnet and its own proprietary sidechain. “We have chosen Ethereum because it has the biggest ecosystem, the largest community of developers, and because the technology provides trust, transparency, and auditability to the transactions. But for some tasks, gas fees are too expensive compared to the cost of the task. So we have also chosen to deploy our own sidechain, built on Ethereum, that allows us to lower the prices of transactions and execute tasks more quickly.”

Dubbed “Bellecour”, and bridged with the Mainnet, iExec’s sidechain does more than just improve performance. It also uses iExec’s own Proof-of-Contribution (PoCo) algorithm, which, according to Otshudi, “supplies the trust between the stakeholders and provides consensus over off-chain computations.”

**Case Study: iExec** *(continued)*

Otshudi says there are many benefits to this setup, particularly for smaller players. “If you are an independent data scientist, you now have an easy way to monetize your work.” But even for larger players, such a platform means opportunities for new business models and markets.

“Cloud providers can find new revenue streams for underutilized servers and workstations, while application and dataset providers have new and easy means to monetize their wares,” Otshudi adds.

While the marketplace has been running for several years, the company continues to add functionality, including, recently, a no code oracle solution.

“We believe the next generation of the Internet will be decentralized and powered by blockchain,” says Otshudi. “This new Web3 paradigm will ensure more trust, ownership and resilience.”

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**FOR MORE, SEE**

 [iex.ec](https://iex.ec)

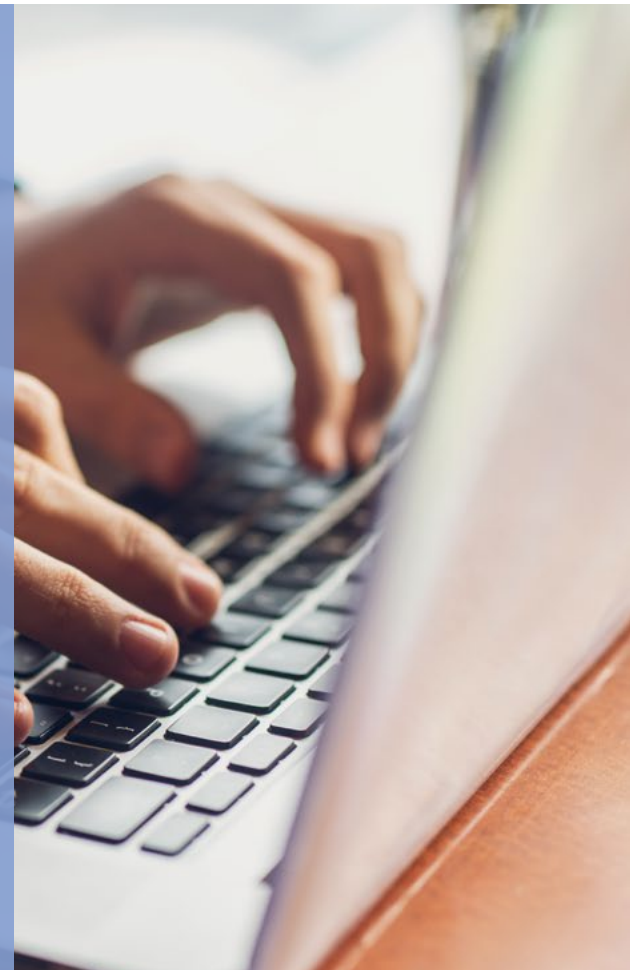
## Commentary and key takeaways for businesses

In the early days of blockchain, many people saw the technology as a way to create marketplaces for almost anything – including non-material items like digital data or the computing assets described here. This case demonstrates such ideas coming to fruition.

In this case, the blockchain does not solve the whole problem. The key enabler is the confidential computing. Yet without blockchain as the trustworthy carrier of the proof of correctness of the computing, as well as facilitator of the marketplace by matching buyers and sellers, providing marketplace governance mechanisms, and enabling escrow and payments, it would be difficult to build such a marketplace at scale.

We think it noteworthy here that iExec chose to use both the Mainnet for overall security and trust, and its own sidechain to increase performance and add functionality.

We would also note the motivation of sharing data while preserving control and privacy. Solving this problem has long been a goal of the blockchain community, among other things because it paves the way for large-scale, blockchain-based data markets. iExec’s computing assets marketplace provides a good example of how this can indeed be done.





# Case Study: MS Azure Supply Chain (Accenture)

Saving 50 million U.S. dollars a year through a blockchain-based supply chain setup

<b>Description</b>	Fully digitized, private blockchain-based supply chain platform using tokenized data records for serialized parts
<b>Target users</b>	Participants in the Microsoft Azure data center supply chain
<b>Technology</b>	Private blockchain (Quorum with private channels) using tokens based on the ERC-721 (NFT) standard
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• USD 50m savings annually</li> <li>• Efficiency, error reduction, and increased supply chain “market data”</li> <li>• Highly “green” thanks to data for carbon offsetting</li> <li>• Point-to-point transactions between all participants</li> </ul>
<b>Product type</b>	Private supply chain platform
<b>Launch date</b>	November, 2020
<b>Production phase</b>	In production
<b>Notable partnerships</b>	<ul style="list-style-type: none"> <li>• Lenovo</li> <li>• Samsung</li> <li>• Micron</li> <li>• ZT Systems</li> <li>• Wiwynn</li> <li>• SK Hynix</li> <li>• Kioxia</li> <li>• Arrow</li> </ul>
<b>Milestones/achievements</b>	Received the 2021 Gartner Supply Chain Breakthrough of the Year Award
<b>Next steps</b>	Open platform up to other major cloud providers and suppliers

**Case Study: MS Azure Supply Chain (Accenture)** *(continued)*

Microsoft relies on a vast supply chain for the computers and other hardware components used in its Azure cloud data centers. Overseeing it is challenging on many fronts. There is quality control: identifying bad parts, keeping counterfeit goods out. There is financial control: accounting, invoicing, keeping track of agreements. There is track and trace: keeping on top of the location and condition of the components as they make their way through the chain. And there is coordination: keeping synchronized with the many different suppliers and partners involved.

As with any complex supply chain, meeting these challenges is primarily a question of reliable, detailed and timely information.

“Basically, Microsoft wanted to be able to walk into any of their data centers, grab a hard drive, and know everything that ever happened to it over the course of its life from manufacture to that moment,” says Cody Burns of Accenture, who worked with Microsoft to make this possible through a blockchain-based solution.

The system unites a group of suppliers with Microsoft and tracks components throughout the chain on a common ledger. This tracking is comprehensive. Starting with the millions upon millions of SSDs and DRAMs needed for the hardware, in principle the system can encompass any component with a serial number. Because these can easily be linked to orders and contracts it becomes easier to track things like price, location and status on a single ledger. This allows for the integration of financial, physical and documentation workflows in ways that were not possible before.

An interesting aspect of the platform is the fact that each record is “packaged” as a token following the ERC-721 standard used in public Ethereum – in today’s common parlance, you could say each record is an NFT. This NFT represents a digital twin of the component and can easily be tied to transactions, associated documentation and other information in a transparent and trustworthy way.

“We used the ERC-721 standard because it is quite good,” says Burns. “It has everything you need to track a document through a supply chain. Besides the use of Quorum and private channels, this is not much different than public blockchain.”

Microsoft reckons that digitizing information on hardware components at the serial number level brings a number of advantages. These include making it easy to create digitized statements of work, invoices, and purchase orders. That in turn greatly facilitates reconciliation and helps reduce errors in things like pricing and rebates.

These advantages extend to all participants in the chain. The blockchain provides previously unavailable types of market data. By spurring a transformation in payment and settlement, it helps improve cash flow and ease financing fees for even the smallest suppliers.

“The suppliers could also use this platform to sell to each other,” says Burns. “They don’t need Microsoft for that. The system allows point-to-point transactions between any of the partners.”

The benefits are highly quantifiable. “Microsoft figures it saves 50 million U.S. dollars a year just by increasing efficiencies, stopping losses, and having enhanced visibility for planning,” adds Burns.

There is a large sustainability benefit as well. All this data will make it easier for the consortium to purchase carbon offsets. By using the Quorum blockchain, which uses a Proof-of-Authority consensus model, energy use of the platform is negligible.

“For the partners the bigger story is that this is probably the greenest supply chain that they have,” Burns says.

Other benefits are expected in future as well. These include capabilities such as tokenized payment settlements that are not available in traditional systems.

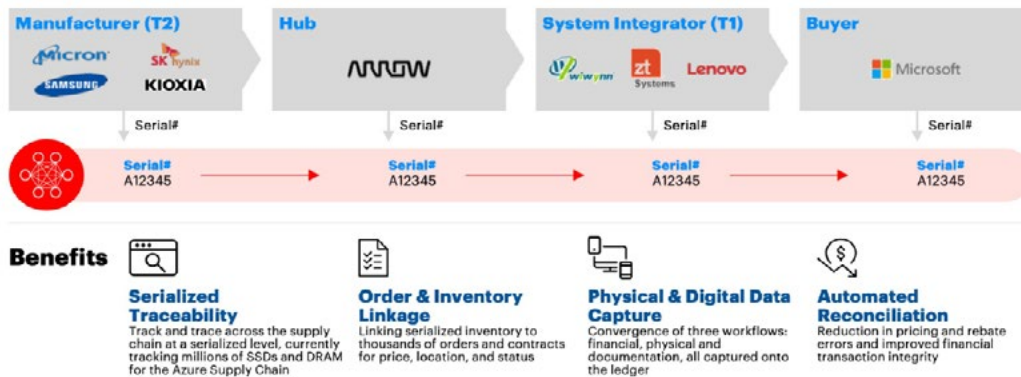
Microsoft is also talking to other large cloud providers as well as suppliers about joining and so transforming the current setup into a global, comprehensive cloud supply chain platform.

Burns says this would have been inconceivable had the platform relied on a centralized database controlled by Microsoft. With blockchain, however, the situation is different. “The view is that if we use blockchain, that makes it easier for someone else to join. They can just stand up a node.”

## Case Study: MS Azure Supply Chain (Accenture) (continued)

## MICROSOFT AZURE DATA CENTER SUPPLY CHAIN

### How does it Work



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- Microsoft's Cloud Supply Chain blockchain initiative receives top award from Gartner for Supply Chain Breakthrough of the Year - Microsoft Industry Blogs
- Improve supply chain resiliency, traceability, and predictability with blockchain - Microsoft Industry Blogs

## Commentary and key takeaways for businesses

From its earliest days, the blockchain community has pointed out the technology's huge potential in improving supply chains. We think this case is an excellent example of why.

While the 50 million U.S. dollars a year in cost savings make for a very impressive headline, businesses should also note the added advantages of better data: for example in supporting sustainability through the carbon offsetting or creating enhanced visibility along the supply chain.

Regarding blockchain, the use of the ERC-721 (NFT) token as a data carrier is also of note. We expect to see more of this in future.

This is also a good example of why blockchain shines in multiparty situations. Even though this is Microsoft's platform, by being on a blockchain, not only can other buyers easily onboard, suppliers can also interact directly with each other. That makes this, at least potentially, a de facto marketplace.



# Case Study: Vow/cashbackAPP (Aventus)

Privately issued, collateralized stablecoins to streamline cashback schemes

<b>Description</b>	Blockchain-based platform to create business- or community-specific currencies
<b>Target users</b>	<ul style="list-style-type: none"> <li>• Businesses</li> <li>• Merchants</li> <li>• Consumers</li> <li>• Payment networks</li> <li>• Banks</li> </ul>
<b>Technology</b>	<ul style="list-style-type: none"> <li>• Ethereum Mainnet</li> <li>• Aventus Layer 2</li> <li>• ERC 777 token standard (to create VOW token and vcurrencies)</li> </ul>
<b>Benefits</b>	<ul style="list-style-type: none"> <li>• Immediate rewards for consumers</li> <li>• 80% reduced liabilities on merchant's balance sheets</li> <li>• No counterparty risk or collateral needs for cashback platform</li> </ul>
<b>Product type</b>	Consumer-facing with wallet to handle private vcurrency
<b>Launch date</b>	2020
<b>Production phase</b>	In production
<b>Notable partnerships</b>	Aventus Network
<b>Milestones/achievements</b>	<ul style="list-style-type: none"> <li>• Deployment of the system</li> <li>• Live in UK, Denmark and India</li> <li>• 8 million transactions processed to date</li> <li>• Acquisition of Swipii</li> </ul>
<b>Next steps</b>	<ul style="list-style-type: none"> <li>• Scale up transaction volumes</li> <li>• Roll out in additional territories</li> </ul>



## Case Study: Vow/cashbackAPP (Aventus) *(continued)*

cashbackAPP is a successful global rewards network. It provides a platform for merchants to offer cashback to their customers who pay by credit card, and oversees an ecosystem of brands and retailers in 11 countries. As the middleman, the cashbackAPP provides the platform: among other things, it builds and maintains the consumer-facing app, enables the connectivity to their credit cards through payment network integrations, and collects and distributes the cash rewards from the merchants.

Cashback schemes have become a popular mechanism. Merchants use them to foster brand loyalty and provide incentives to buyers. Many consumers like cashback rewards because, unlike loyalty points, they are tangible, easy to understand and easy to value.

But cashback schemes are not without their problems. People have to wait to get their money back, sometimes months. These schemes, which are centrally controlled, also expose consumer data, like spending patterns. And for merchants, cashback rewards are liabilities on their balance sheet, since they owe their customers the value of the rewards. While it can be a successful business, platform providers like cashbackAPP face challenges managing the collateral used to mitigate merchant counterparty risk, which in turn requires financing its cash flow as well as handling a fairly complex operational setup.

Jersey-based company Vow Limited offers rewards companies like cashbackAPP a more efficient alternative way to run this kind of business, using their own blockchain-based tokens as parallel discount vouchers.

“Every year, consumers spend two trillion dollars’ worth of merchant promises in the form of discount vouchers, points, cashback and gift cards – but delivery is often slow and inefficient,” says Alan Vey of Aventus, an Ethereum-based layer 2 provider that worked with cashbackAPP to implement Vow. “By leveraging the power of blockchain, Vow is able to tokenize these promises. Vow is bringing efficiency and scalability to this market, allowing merchants to more easily tap full market potential.”

As Vey explains it, Vow has two parts. First there is the Vow token, a freely floated cryptocurrency based on the Ethereum ERC-777 fungible token standard. Then there are the vcurrencies: tokens issued by individuals or companies that are valued at par with different fiat currencies. One vUSD is worth one US dollar, one vGBP is worth one British pound, and so on.

Vcurrencies as used by cashbackAPP or in other rewards schemes behave like stablecoins, in that they provide a stable digital discount voucher equivalent to a fiat currency that can be used on a blockchain as a means of payment. Unlike large-scale stablecoins like Tether or USDC, vcurrencies are not backed by a centralized organization. Instead, they are minted and backed by the merchants who want to take part in the cashback scheme.

While the details are slightly more complex, in essence, this backing takes two forms: first, merchants have to contractually agree, or “vow,” to accept the vcurrencies for goods and services. Since they have issued out the points at 1 vcurrency unit, they legally commit to receiving it back at the same level. They also have to purchase 20% of the minted amount of vcurrency in its sister Vow currency as collateral (the merchant receives the Vow back when a consumer cashes in a vcurrency).

While this may sound complicated, in practice it is quite simple. And using a purpose-issued digital currency has a number of advantages.

For consumers, vcurrencies mean immediate rewards, as the tokens are deposited into the consumers’ wallet at the time of sale. This also means that no private data is exposed. For merchants, it means there is no more need for an expensive rewards infrastructure. The vcurrencies also do not appear on merchant’s balance sheets. And while there is still collateral to pay, in the form of the 20% Vow in escrow, these costs are fairly low and highly predictable.

As the overseer of a network of retailers, Vow has been advantageous for cashbackAPP too. “Following six months of testing on the Aventus Network testnet, we concluded that we will continue to increase our net margins by almost 25% long-term with the introduction of the Aventus Network mainnet,” says Bish Smeir, Chairman of VOW Ltd.

The biggest technical challenge that needed to be solved was scalability. While Vow and vcurrencies are native Ethereum tokens, the mainnet is currently not suitable for retail transactions due to the high fees, slow transaction times and periodic network congestion. That is where Aventus, as a Layer 2, comes into the picture.

“Aventus is an enterprise-grade layer 2 blockchain that marries the scale of a permissioned blockchain with the security and interoperability of public blockchains – with

**Case Study: Vow/cashbackAPP (Aventus) (continued)**

none of the drawbacks of either world,” says Vey. “Aventus was founded in 2016 and makes building on Ethereum and other Layer 1 blockchains accessible for businesses and decentralized platforms, bringing interoperability, scalability and sustainability to Ethereum transactions.”

In its first year of operation, the Aventus Network has processed over 15 million transactions for business clients. As an L2, it can be used in a wide variety of contexts.

“Our mission is to enable companies in any ecosystem to capitalize on a vast series of use cases,” says Vey. “These include NFTs, video games, event ticketing, supply chain

provenance and cargo management as well as loyalty schemes. We provide an enterprise-grade modular architecture and ensure our users can future-proof themselves via blockchain interoperability.”

Vow is active across the UK, Denmark and India and will soon be announcing expansion into various other territories. The focus is now on scaling the number of users of the platform. The system already integrates 27 financial services organizations that collectively process point-of-sale transactions for up to 90% of the world’s merchants. Over eight million transactions have been processed on-chain to date.

**FOR MORE, SEE**

 [Aventus Network](#)

 [Vow Currency](#)

## Commentary and key takeaways for businesses

Privately issued currencies have been a core ideal in Ethereum since the platform was founded. While there are thousands of Ethereum-based cryptocurrencies in existence, there has been less activity in commercially oriented, community money. This case provides one example.

There are several things we think businesses should take note of.

One is that digital cash by its nature adds massive efficiencies to a payments infrastructure by removing the need for bookkeeping: instead funds are directly exchanged for goods.

Second this can be seen as an asset tokenization use case, with the asset here being a promise that the customer can redeem the vcurrency “voucher” for its equivalent in fiat.

Third, this is also an instance of community money – in this case, among a community of merchants. Local currencies are hardly a new thing. Ethereum, however, makes issuing them in digital form fairly easy. We think we will see more of this as time goes on and as businesses as well as consumers get more and more used to digital currencies, wallets and decentralized value exchange.



# APPENDIX 2: VOICES – REPRESENTATIVE INTERVIEWS







## Paul Brody – EY

**“If you can have business logic and data with privacy and no intermediary, then you have solved the great puzzle.”**

### **What are the main challenges facing blockchain adoption by enterprises?**

The most important issue right now is privacy.

The basic question facing enterprises has always been: How do we make the business run end-to-end, and connect the right hand with the left hand, using information technology? And we have seen a progression over the years in terms of the answer. First, we had MRP. Then for the last 20 years it has all been about ERP. Then we added planning and scheduling with machine learning.

This has worked great within companies. The huge problem everyone is trying to solve today is how do you do that outside the boundaries of the enterprise? That is where blockchain comes in. It is about doing what I can do with an ERP but across other companies and boundaries and without a centralized intermediary. And this is all useless without privacy.

Historically, in order to share processes and information between organizations, you had to have an intermediary. The problem is that these intermediaries become powerful. There is a reason why there are no large platforms for industrial applications the same way there are for consumer-facing ones. Companies are rightly concerned that third-party platforms will see their sensitive information: what they are doing, how much they paid and to whom, etc. That is a barrier.

If you look at all the things we have been working on at EY Blockchain, it is all about: “How do we industrialize privacy at scale across industries?” When we can do that, we can do procurement, supply chain, third-party logistics, anything really.

If you can have business logic and data with privacy and no intermediary, then you have solved the great puzzle.

### **Is it difficult to explain the benefits of blockchain to enterprises?**

Not really. People get it rather quickly. What I do notice in my conversations however is a yawning chasm between crypto natives and enterprises. I think this chasm is very important in understanding the dynamics in this industry today.

The crypto natives are young and really smart, but they never connected up two companies, they never thought about: “This is really sensitive information that I just can’t share.” When you explain that to them they will either ask “why do you need privacy?” or they will say “just throw it all in a mixer”.<sup>1</sup> But you can’t throw an NFT in a mixer. You can’t put a B2B smart contract into a mixer.

On the other side, when I explain blockchain to enterprises and the light bulb goes on, they want it right away. And they get frustrated because they can’t have it quite yet. That’s because we haven’t fully industrialized privacy. A common question is: “Why can’t we have that now? Isn’t this whole thing built on cryptography?” And you have to explain why cryptography is not enough – it secures the chain itself but doesn’t make the content private. Indeed, by default, information on chain is public and that’s necessary to make the decentralization work. That makes privacy a particularly large challenge, but it’s one we’ve managed to surmount with time and effort.

Another place we see this chasm is with the topic of decentralization versus centralization. A great example is solving the problem of how to get reliable data from the

<sup>1</sup> A mixer is a program designed to provide privacy to cryptotokens and/or transactions by “mixing” a large number together in such a way that the original senders and receivers are no longer traceable.



**Paul Brody - EY (continued)**

real world into a blockchain, for instance as triggers in a smart contract.

The blockchain world has come up with the idea of oracles, many of which work on the assumption that if multiple parties attest to something being true, it is most likely true. But this doesn't always work in business settings. There is only one company on earth who knows if a shipping company delivered a certain package on time, and that is the shipping company.

The business world has mechanisms for this: they are called auditors. You can have a System of Controls (SOC) report to show you are following the right procedures to be truthful. And you can hire an auditor to check all is correct. There are options.

For crypto natives, this smacks of unwanted centralization. That's because they often confuse trustworthy third parties with centralization. There is a huge difference. There are many auditing firms to choose from: having one out of many is a different dynamic than relying on a single, centrally controlled third party for everything.

**What should businesses be thinking about when they start with blockchain?**

There are a number of important things we look at when we talk to clients.

First are use cases. What are the use cases you can accomplish with blockchain that add value, that will get you ROI? You really have to know what these are. Most don't know, but they are learning.

Then comes privacy. There will be use cases without privacy, and there will be use cases that require privacy. For the latter, businesses need to understand the privacy mechanics and how to manage security and privacy on a public network.

At the heart of public blockchain are tokens and smart contracts, and these are the next two things businesses need to understand. At the heart of all business relationships is a fairly simple situation: I have money and you have stuff and we want to exchange these under the terms of an agreement. Tokens represent the money and the stuff; smart contracts are the rules of the agreement.

Then the question becomes, how do I know if your stuff is real, and how do you know if my money is real? This works fine when parties are known to each other, but it gets tricky at scale and in open, public settings. So the question of attestation and verification are on my list as well.

Analytics are important too. Let's say I am transacting on a network, some blend of private and public settings. What is my plan to assemble a complete picture of what is going on in my business? I think I sold some stuff, did I really? Did I get paid? Where is the money?

Last but not least is security. This one shows up all the time in many different ways. Some are not so obvious. For example, it is often underestimated on the enterprise side by people who operate only in private blockchains. We assume that the vast majority of people in business making transactions on a public blockchain would not be coders. So they have to understand for instance how wallets work, what is best practice, or there could be problems.

*Paul Brody drives EY initiatives and investments in blockchain technology across consulting, audit and tax business lines. He has held a number of leadership positions in the areas of Internet of Things (IoT), supply chain and operations and business strategy, working with many client organizations.*

*He led EY's first blockchain strategy engagement, examining how digital services, payments and IoT are coming together in new ecosystems, and building a strategy and technology roadmap for one of EY's major clients.*

*He has 20 years of consulting and strategy experience in mobile and electronics. Prior to joining EY, he served as Vice President and Global Industry Leader of Electronics at a multinational technology company.*

*He earned a bachelor's degree in Economics and a certificate in African Studies, both from Princeton University.*



# Heather Flannery – Equideum

**“It’s the business models that are experimental today, not the technology.”**

## **What should businesses be thinking about when they look at blockchain?**

When I talk to organizations about blockchain, it’s generally with a healthcare and life sciences industry lens, as that is where we specialize. That said, as an extremely large, complex, data-driven industry, I think we have a number of excellent use cases for blockchain that are applicable elsewhere.

Generally I focus on two things. One is what blockchain can do, and the other is the fact that it is most powerful and useful when combined with other technologies.

For us, the blockchain part helps fulfill our promise to build Health 3.0, which we define as Web3 in healthcare and life sciences contexts. This is about people owning and controlling their information, especially who it is shared with and for what purpose, and potentially monetizing it. Blockchain does great things with the consensus, immutability and trust needed for that. It does great things with automation across organizational boundaries. It gives you tokenized assets and decentralized applications, all of which are essential for any kind of Web3 vision.

Another important aspect of blockchain is the ecosystem part. In healthcare, despite what many people might think, individual organizations are often quite sophisticated with how they handle data and processes internally. Scratch the surface of many healthcare and life sciences enterprises and you will find a wondrous machine of efficiency. Where it breaks down, certainly in our industry, is working together across those silos. Blockchain can help with that. But we always say blockchain by itself is not sufficient.

## **What other technologies do you think are necessary for Web3 applications?**

It’s no secret that there are important things blockchain does not do. For instance, it does not provide privacy.

In fact, to work properly, it can’t. So you have to use privacy-preserving computing for a lot of data-driven use cases, especially when talking about personal data like healthcare records. There are a whole host of these kinds of technologies out there, like zero knowledge proofs or trusted execution environments, where you can do computation while keeping data private and intact, and simply produce the result and a proof that the computation was done correctly. We call that provable privacy.

And while blockchain is good for securing or transferring data, it doesn’t offer anything in terms of analytics. In healthcare and elsewhere, there are many important use cases that depend on big data, but where privacy is also necessary. So the other piece of the puzzle is what we call decentralized AI. These are things like federated learning, where you send the algorithm to learn from the data and not the other way around. This idea of being able to send compute to data is becoming a central part of Health 3.0, and I think would apply in many other industries.

One thing blockchain technology can do that is not always apparent to people is coordinate between these technologies. If you have proof that the data has not been seen by anyone during a computation, this provable privacy I mentioned, blockchain is great for disseminating it. With AI, we can use blockchain to verifiably deliver an analytical payload to data at rest in ways we couldn’t before. So when I say blockchain isn’t sufficient alone, it’s also true that blockchain helps us get more out of these technologies in concert than by themselves.

## **How would you assess the state of the Ethereum ecosystem as a business platform today?**

Clearly Ethereum is firmly established as a business platform. It’s been around for a while. It’s well proven. In terms of its ecosystem and both corporate support and grass roots developer support it is way ahead of anyone

**Heather Flannery – Equideum (continued)**

else. There are some very big companies with world-class operations focused on Ethereum. This is combined with a really rich, deep, extensive developer community. There are few if any other Layer 1 blockchains out there that have anything like this kind of community.

There is no doubt that Ethereum needs upgrading before it is really ready for business on a large scale. But as we know, this is happening. In my experience, if you go to startups and ask what blockchain they are using to develop their new dApp or product, in a majority of cases you will get one of two answers. Either: “we are using Ethereum,” or: “we’d like to use Ethereum but there are some blockers at the moment, gas fees, scalability, and so on, so we are working around those for now.” This could be using an L2 or a sidechain, or it could be using a different Layer 1 blockchain.

I think it’s telling, though, that almost all alternative Layer 1s have made themselves EVM-compatible in some way. I think businesses evaluating their choices here should at least ask themselves: are people building on other blockchains because they want to, or because they can’t use Ethereum yet? And then, when those problems they mentioned are solved on Ethereum – and many should be solved soon – will they switch over?

**What are the most important trends today in decentralized business?**

What’s most exciting right now in our world is the merging of healthcare with finance through this concept of monetizing your healthcare data. This makes sense: healthcare is essentially a data business, yet healthcare data – despite being one of the highest value asset classes in the economy – is not a financialized asset class. Why couldn’t it be?

Now that we have the ability for individuals to own and safely share healthcare data, we are developing a kind of DeFi for people. I have my data. In the world of Web3, I own it. I can set a value on it. I can put it out in the market for price discovery, for example for clinical trials, which is a huge market. And then it behaves like a financial marketplace, with the price set by supply and demand. And companies can build products on top of that. You might provide risk management services to data buyers, like forwards and futures or other kinds of derivatives.

This is being driven bottom-up, as individuals become more and more aware of the fact that their data has value, and that they can share in the value chain if they want. But it is also driven top-down, as regulation makes ownership of data by third parties less desirable.

If the customers and providers both want it, that makes for strong momentum.

**What are the main barriers to using blockchain in business contexts today?**

Unlike new technologies that have appeared in the past, with decentralized technologies the IT department can’t just purchase it and then go implement it. You need to rethink how you do business. You need new types of ventures, new legal entity types, and so on.

It is no longer true that the technology is too immature. What’s holding us back right now, and what needs to be done, is to experiment with different business models and iterate until we can find the ones that deliver the value propositions we have been talking about. The good news is that it’s the business models that are experimental today, not the technology.

*Heather Leigh Flannery is the Founder and Chief Executive Officer of Equideum Health, a spin-off from ConsenSys AG effective March 2nd, 2020. ConsenSys Health rebranded to Equideum Health on January 18th, 2022. Equideum Health is a ConsenSys partner and a ConsenSys Mesh portfolio company. Heather is a member of the Board of Directors of the Equideum Foundation, Vice Chair of the IEEE SA Open P2418.6 Standards Development Working Group (blockchain in healthcare and life sciences), served as FY19 and FY20 Co-Chair and FY21 Chair of the global HIMSS Blockchain in Healthcare Task Force, and is an Associate Editor of the peer-reviewed journal, Frontiers Blockchain for Science. Ms. Flannery is an active consultant, advisor, and keynote speaker.*



## Lloyd Keays – SAP

**“That link between ERP data and transactional data from the blockchain, that is the holy grail of blockchain for enterprises.”**

### **What is the biggest hurdle for the business community when it comes to understanding blockchain?**

There is an incredible amount of information about blockchain available on the Internet. But most of this is either about crypto investing or about how the technology works, what goes on under the hood. There is much less about what you can do with it, about blockchain-based business processes. It's not that people in industry don't care about how it works, it is that the question of why you need it has to come first. Outside of use cases like DeFi that have a lot of visibility because they are successful right now, the blockchain community hasn't yet done a good enough job answering the “so what?”, or of explaining what blockchain does differently and better than current technologies for real-world business problems.

### **What do business people not understand about blockchain?**

I realized some years ago that blockchain was coming but there wasn't necessarily a lot of awareness at SAP outside some specialized circles. But we are one of the world's largest software companies, and so are the operating system for businesses around the globe. We run banks, hospitals, airlines, pretty much everything. So I knew we had to bring an understanding of this technology to ourselves internally and to our customers. That is why we are adding a blockchain module to our Open SAP free learning platform.

One of the most critical things that people don't talk enough about is wallets. Think about any large company that will start using tokens for their projects. Maybe it's for selling things on their website. Maybe it is for paid functions or for liquidity pools. They need access to some form of a wallet.

The company needs to be linked to that. Even if for legal or other reasons a company doesn't want to hold crypto directly, if you touch blockchain you are touched by wallets. So you have to understand them. How to use them yourself. Imagine you have 5,000 employees having some form of interactions with blockchains. Those 5,000 employees will each need wallets - most likely multi-signature wallets. And it is not just holding. Wallets function like an identity, helping define what you can do, what you can access. But that connection is not well understood. It is a very hidden issue.

Another big issue is connecting your blockchain-based data and processes back to the traditional principles of accounting. Everyone talks about regulation as a hurdle, but this I think can be a bigger challenge. Go to any top 100 company, and look at their annual report, where they review their financials. You will find hundreds of pages of tables and data giving the details of their finances. Then think of what blockchain does. At some point, all the crypto world needs to be absorbed into those principles of accounting. You have to be able to map it. Think for example of something as simple as paying VAT across borders - and claiming it back. There is a lot that goes on behind the scenes in a transaction like that. And there will be a moment when governments say we need to absorb these principles into our crypto or blockchain regulations. And it is not just the crypto you need to track, not just the payments. It is the content of the transaction. What exactly was paid for, when, etc. So there needs to be a connection between a dApp and a company's ERP system. This doesn't really exist, although there are projects, like Baseline, that are trying to address it. The point is, as the regulation starts to kick in, companies will need to represent all that activity inside their back ends.



## Lloyd Keays – SAP (continued)

And it is not just accounting systems. You also need to be able to extract data for business processes. If you have smart contracts for say a supply chain, you need to be able to link that world of smart contracts to that world of supply chain systems that manage your inventory. Think of an Ikea or Amazon warehouse and all the work that goes into making sure everything is tracked and sent to the right place. There are armies of logistics people doing that, with huge, sophisticated logistics platforms behind them. If you are going to use blockchain, you need to link to those systems. That link between ERP data and transactional data from the blockchain, that is the holy grail of blockchain for enterprises. Much more than DeFi in my opinion.

### Why should businesses care about decentralization?

There are things that will always be difficult or even impossible in centralized systems. To be honest, any business process with more than three parties starts to get hard to manage. There is a lot of coordination involved, as well as control.

There are several large consumer product companies that have their own engineers and designers, but outsource all the manufacturing of their products. That is a large amount of people and a lot of information to manage. Think of the bill of materials of something as simple as a toaster: all the parts, each individual screw, the paint, etc. All of these things are made by different suppliers. The companies might be managing a multi-level tier approach for supplies. Think of “supplier of the supplier of the supplier” (sometimes up to five levels down). And they will

set the price of the parts used by all those sub levels of suppliers. The screws (level 4) in the circuit board (level 3) in the component (level 2) assembled in the toaster (level 1) are all part of the spend management of the company. And the only way to achieve this is to force everyone along that fairly large and complex supply chain to work through one system.

Move this to an open blockchain platform, and everybody can just look at the blockchain and dApp. The whole thing becomes collaborative. Instead of updating endless Excel sheets, everyone just watches smart contracts. No one has to install someone else’s platform or use someone else’s processes. That makes it easier and more agile for suppliers. For buyers, it provides more agility to use different suppliers.

And there are other, indirect but very important advantages. Consider if you want to trace the carbon footprint of some manufactured product along a supply chain. If you have a centralized platform, you can do that for all those who are on the platform. You know who bought what, where it came from, and you can make the calculations. But at some point there will be other suppliers or people involved, small mom and pop operations for instance, who are not going to pay to be on the system or be bothered with the technological complexity. With a public blockchain-based system, we can get everyone in. Then it becomes possible to track carbon data in a much broader space while still maintaining privacy and intellectual property.

*For the past 20 years, Lloyd Keays’s work has focused on building bridges between technologies, people, and process efficiency. He was already working on web user experience design in the early 2000s when he decided to focus on cloud end-to-end procurement. His clear and personable communication style makes it simple to understand and put disruptive innovations into context. He has a master’s degree in Analytical History from Université Laval and is currently exploring the effects of blockchain on businesses, particularly in the areas of finance and supply chain.*



## Sophia Lopez – Kaleido

**“The public vs private dichotomy was always a bit forced, and did not reflect how businesses were thinking about this.”**

### **What is the most interesting trend you see in business blockchain?**

I think the most interesting thing happening is how public and private blockchain are converging. And really, it doesn't make sense to have this artificial separation between permissioned and public blockchain.

If you look at the public space today, projects like Polygon, Avalanche, Polkadot, etc., they all have application-specific blockchain options. Polygon has supernets, Avalanche has subnets, Polkadot has parachains. These are generally built to increase performance, but they can be used for permissioned use cases.

And in almost every community we are looking at there is a need for these application-specific blockchains or also permissioned L2s. When businesses come together in many use cases they might need to know who they are transacting with, there are business and legal agreements that people need to agree to, but there is also a public aspect, tokens to align incentives or public access through the tokens. This is different than consortium blockchain. Here you can do a rollup and do the checkpoints with the Mainnet.

The public vs private dichotomy was always a bit forced, and did not reflect how businesses were thinking about this. It was more of a religious debate within the blockchain community.

### **Can you give some examples?**

We have a good example with some clients in healthcare insurance. There was a group of large payers, and they

started working together on blockchain in a purely B2B use case, to solve shared data problems. In some cases they are using tokens to align incentives, in a kind of enterprise version of a DAO.

Once the payers were all better aligned on claims data themselves, they saw it could be good to open that up information up to patients. So patients can get in and see the data ahead of time and better understand things like costs. So this is a B2B use case that morphs into a B2B2C use case. And I think this is the kind of journey into the Web3 world we will see lots of companies taking. That's why we donated five years of industry learnings to the Linux Foundation to create Hyperledger FireFly, which is a supernode for Ethereum and other protocols.

Hyperledger FireFly is not a layer 1; we don't think the world needs another Layer 1. Enterprise solutions need things like multi-protocol blockchain support, digital assets, API gateways, integration and orchestration, Web3 APIs, off chain data flows and organizational identity. Ethereum is the de facto standard, the successful chains all have EVM compatibility. But you might have built a supply chain use case on Hyperledger Fabric and now want to add tokens to it. You can enter the Web3 world via Ethereum, and a product like Hyperledger FireFly is an enterprise gateway for Web3 multi-protocol apps.

### **Is it hard to get businesses to buy into Web3 concepts?**

Not at all! I have been working with enterprise blockchain since 2015, and I have never seen clients so excited about a new technology before. In my previous roles in cloud, analytics, and mobile, I had to explain the use cases. In blockchain, clients constantly bring us use cases.

**Sophia Lopez – Kaleido** *(continued)*

One reason is that they have these skeletons in their closets; they have had big problems for a long time with things like coordinating with others and shared data in their industry. People are used to middleware inside of a company. With blockchain you can have connective tissue or middleware for the whole ecosystem. That makes it easier for people to join up and add value. You can democratize access, share data, and develop new types of business models.

That said, typically we see a maturity curve. It is a journey, a crawl, walk, run model. But that is how things work in the business world. First you get people comfortable with it. Then you do one use case. And once they get the first use case in production, it gets easier to do more. You need futurists and idealists and people painting the grand

vision, but you need a pragmatic roadmap too. That's why we have a free tier at Kaleido. And we have had Web3 startups that came to us and used the free tier to raise millions of dollars.

And this pattern repeats itself. Often it starts with one enterprise doing it, but then they look to open it up to others. So they develop some kind of business network operating guidelines. There is a process, people understand what it is and how to get the group together. There are more Web3 providers today too and so it is becoming as common as using Salesforce or SAP. It is definitely much easier for groups of businesses to come together today under this Web3 paradigm than it was in the days of consortium blockchain.

*Sophia Lopez is a founder and COO of Kaleido. She began working with blockchain in 2015 helping shape the community and developing new commercial approaches for the enterprise market. Prior to Kaleido, Sophia led the IBM Blockchain Platform product portfolio developing high-value offerings to help clients achieve better business outcomes through adoption of blockchain technology. Sophia has held various leadership positions in IBM as a Profit and Loss (P&L) Leader with responsibility for multi-billion dollar lines of business. Sophia has an engineering degree from Harvard University and an MBA from University of North Carolina Chapel Hill. Sophia is an Adams Apprenticeship Advisor, and a coach & judge for startup initiatives such as Launch the Venture and Carolina Challenge programs sponsored by the Center for Entrepreneurial Studies at UNC's Kenan-Flagler Business School.*



## Bruno Maia – Cartesi

**“I really doubt that Bitcoin and Ethereum would have reached this market cap if they were centralized.”**

### **What is your assessment of the state of the Ethereum ecosystem today?**

We are very keen on Ethereum, and I think the ecosystem today is in a unique position. While it has competitors, none of them have the ecosystem or the level of load that Ethereum has. Really only two blockchains have experienced the load that matters: Bitcoin and Ethereum.

That doesn't mean Ethereum doesn't have problems. We all know what these are. But the problems that Ethereum faces now the others will face sooner or later. The issues that Ethereum has with scalability today are the result of a conscious design choice in order to achieve decentralization. And decentralization is what matters for Ethereum. And rightly so. I really doubt that Bitcoin and Ethereum would have reached this market cap if they were centralized.

Most of the platforms and dApps that we have now that say they are decentralized are not really. They have a thin layer of decentralization and the rest is centralized. So you don't have the insight into the impact of that.

Uniswap is an example of a purely decentralized system. You cannot mess with its logic. Whatever is over there is running and cannot be stopped. When Uniswap released v3 you could and can still use v1 and v2, it is still there in the blockchain somewhere. The Uniswap v1 is still alive. I could point a new UI (user interface) to the Uniswap contract. I can launch my own DEX. That is how decentralization works.

### **Why do you think businesses should care about decentralization?**

I always say: decentralization doesn't matter until it does.

Take the NFTs that are being used in gaming. People think they are decentralized, but really they are controlled: the minting, the behavioral relationships and everything else about it is derived from a logic that is centralized.

There is a saying: not your keys, not your tokens. I say, not your code, not your NFTs. If you don't have control over the code of that NFT, it can be changed. It's true that if it is an ERC 721 or 1155, what is inside of that smart contract cannot change, it is immutable. But what is in there is probably a URL pointing to something else. So you don't have control over the representation of that NFT into the game play, if the logic of that representation changes. Take a magic sword: the game logic could change one day such that the magic sword is no longer magic. They change the sword. The gamers complain all the time about that.

There are other examples of decentralization not mattering until it does. There was recently a case on another blockchain where the founder of an NFT art marketplace just shut it down one day and left, leaving the users with nothing. Luckily the logic of the marketplace was decentralized, so it was still available. The community was able to get together, rebuild the UI, which is just an interface, and revive the marketplace. You can't do that with centralized systems.



**Should businesses be thinking about decentralized business models as well?**

Yes. Decentralization opens up new business models, there is no doubt. Like I already mentioned, there is this beautiful revolution going on with gaming and NFTs and all these new business models, etc. It is fantastic. Truly a breakthrough and really remarkable.

The new approach to making games is bottom up. People start a DAO and that decides how the logic will be developed. It is otherwise quite hard to get this level of symbiotic relationship with a community. With a DAO you can do this. And decentralized systems like this are highly open to improvements, to quickly finding the best product market fit. It is like an evolutionary race.

And here is where the Layer 2 projects will help bring a whole new level of decentralized applications into reality, providing the scalability to allow further decentralized complex logic and applications to be created. Cartesi is one of these projects, and we are working with an expectation to help the ecosystem grow even stronger

We are only scratching the surface of the kinds of community-based economies that blockchain unlocks. DAOs are an initial step in this direction. There will be much more.

*Bruno Maia has more than 17 years of experience in the tech industry. He obtained both bachelor's and master's degrees in Telecommunication engineering in Brazil and started his professional career on one of the biggest mobile operators in Brazil. After a few years working, he took the challenge and moved into the international consulting market, working as an independent consultant in more than ten different countries across three different continents. Most of his international experience was within Qualcomm as a strategic consultant for ESG (Engineering Services Group). His interest in blockchain and cryptocurrencies started in 2016 as a passionate investor and self-learner in this new industry. In 2018 he moved to the Netherlands to officially begin his blockchain industry career as the Global Presales Director for SW and HW verticals on Bitfury Group.*

*Since 2020 he has been leading the business development division for Cartesi, The Blockchain OS, as The Head of Business Development. The Blockchain OS is a decentralized layer-2 infrastructure that supports Linux and mainstream software components. With a groundbreaking virtual machine, optimistic rollups, and side-chains, Cartesi paves the way for developers of all kinds to build the next generation of blockchain apps.*



## Karen Scarbrough - BP

**“Over the longer term, we see the most promise and value on public networks. This is where the innovation is happening.”**

### **What is the most interesting thing happening today in blockchain for business?**

Probably it's the move to public blockchain from the private, consortium model that used to be prevalent, at least among large enterprises. In our case, after 2021 we really have not had as many conversations around private blockchain anymore. Private blockchains lack the settlement layer advantage of public blockchains and can add needless complexity to many use cases in which other technologies are sufficient or better.

Over the longer term, we see the most promise and value on public networks. This is where the innovation is happening from a use case, scaling and privacy perspective. Just look at all that has been going in areas like decentralized finance or zero knowledge proofs on public blockchains.

### **How do you see public blockchains developing over the near future?**

At BP, we are currently focused on a few main trends that we think will be shaping public blockchains.

The first trend is the development of public blockchain into a significant settlement layer for value. It is already happening. Ethereum has settled 11.2 trillion dollars' worth of value in 2021. However, what's more interesting is that 50%+ of those transactions involved stable tokens. That's a large sum overall, and a large sum for stable tokens. We do see robust and battle tested stable tokens as critical infrastructure for the future of public blockchains as they allow users to exchange value with more confidence than other cryptocurrencies.

Another trend is the rise in the number of people actually using the blockchain through non-custodial wallets to get directly involved in decentralized finance (DeFi), decentralized autonomous organizations (DAOs), or non-

fungible tokens. In January 2020, there were less than 100,000 accounts linked to DeFi applications. This has grown to over 4.7million today. This number is several orders of magnitude less than people who simply own cryptocurrencies. In the long term, it will not be enough for users to simply own cryptocurrencies through custodial exchanges, public blockchain applications and tokens should be used directly on-chain or through layer two systems.

We also expect to see increasing tokenization of real-world or digital assets. Additionally, we believe DAOs are a significant trend, providing a means for communities to manage more transparent financial decision making amongst a larger number of stakeholders.

From a technical perspective, we see a growth in new kinds of cryptographic proofs systems, like optimistic or zero-knowledge rollups. We believe this design is a strong path for scalability and will continue to have an important influence on public blockchains as they help improve the speed and performance of the blockchain but maintain decentralization.

### **What barriers or blockers do you see?**

To properly test and validate use cases, we need to deploy on Mainnet and in a layer two ecosystem. A large challenge for public blockchain development is the surrounding regulatory uncertainty in many jurisdictions, which prevents companies from launching or testing with confidence -- and without apprehension.

Additionally, enterprise ready tooling for development and deployment of decentralized applications is a niche area that needs to grow for adoption. A secure wallet system that can manage decentralized application deployment and transaction management in an enterprise ecosystem is definitely needed.

**Karen Scarbrough – BP** *(continued)***Is it difficult to explain the technology internally?**

To get buy-in to work on public blockchain involved some knowledge sharing within the company. It was about explaining what blockchains can do that traditional tech cannot. A lot of what we have done in private blockchains could be replicated in a traditional database, but there are some scenarios in decentralized finance and verifying proofs that cannot be accomplished in the same way.

When DeFi took off, we had large-scale, live examples to point to with user adoption and growth. We could explain DeFi and show that you can't replicate something like that

in existing systems. So we looked to find standout use cases like with real users and real volumes and that let us give more credibility and validity to the public Ethereum Mainnet in our internal discussions. For example, in a decentralized exchange, when you show that it is the users providing liquidity, that this is the Uber of exchanges, that the exchange doesn't own any of the liquidity or wallets, then you get people's interest. Calling out core differentiators, without trying to oversell what blockchains can do, has led us down a precise, strategic path that we look forward to continuing to grow.

*Karen Scarbrough is a Senior Technology Associate at bp.*