Network Effect

TECHNOLOGIES Season1 Episode1

THE INCREDIBLE EFFICIENCY OF VALUE PROTOCOLS

EXECUTIVE SUMMARY

This document examines value protocols, innovations that promise to transform value exchanges as significantly as the internet did for information.

The digital world constantly evolves, driven by open protocols that minimize costs, maximize creativity, and enhance competitiveness. The birth and success of the internet exemplify the historical win of open technologies.

The paper then addresses value protocols, demonstrating their revolutionary impact on how we exchange value and control our data. They offer increased security, integrity, and efficiency in transactions. Simplifying exchanges and reducing intermediaries, they lower costs, delays, and risks, becoming the secure and native internet medium for universal value exchange.

The implications of this study extend to all sectors - financial, commercial, and legal. Effectively leveraged, these evolutions could radically transform how we create, interact, and innovate in cyberspace, redefining the global economy.

However, for businesses to fully capitalize on this new era, acculturation and training are necessary. The challenge is to understand and adapt by integrating these technologies and actively exploring their application to enhance value propositions, reduce costs, and differentiate in the market. Businesses must study the strategic potential of this disruptive innovation.

Beyond the competitive advantage of being a leader, the opportunity for businesses of all sizes and technical levels is to pragmatically and thoughtfully bring their core business into these new domains. Careful implementation and an adaptive strategy are crucial to navigate this evolving ecosystem while minimizing associated risks.

The future digital landscape is establishing itself on a "protocols economy", and it's time for market players to engage now.

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INTRODUCTION

Before 2000, who would have predicted the appearance of the smartphone, streaming or cloud solutions? Their impact on businesses has undoubtedly been colossal.

Today, while all companies use the internet to operate, systems related to money and trust exchanges (messages, data) still seem stuck in the Stone Age: expensive, slow, opaque, rigid, or closed. Now there are open technologies to exchange value: value protocols. They represent an opportunity for the business world as significant as the rise of the internet. Are we on the dawn of a new "blue ocean" of opportunities for businesses?

1. ORIGINS

1.1 The parallel with the internet

To better understand value protocols, a direct parallel with the internet is necessary to illuminate:

- The scope of this innovation area and its potential impact on societal transformation
- The success and efficiency of these open technologies

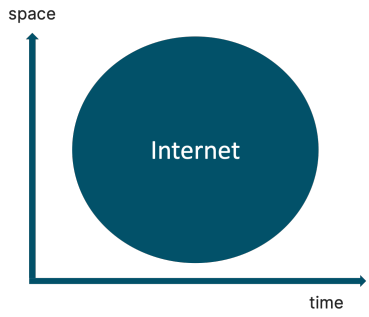
An innovation space

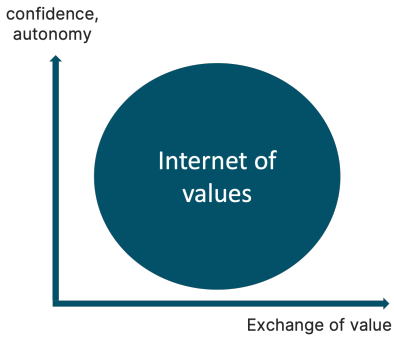
Firstly, the internet and value protocols can be compared because each is a matrix of innovation with 2 dimensions:

- The spatial and temporal aspects that define internet innovation, while
- Value assets and digital trust define those of the ongoing revolution.

The internet has made the world smaller by eliminating distances through networking. It has optimized time through almost instantaneous communication and distributed computing power. These are two degrees of freedom gained..

However, although the internet was designed as an open space, security and autonomy were neglected, leading to the need for later and awkward additions. This is evidenced by the woes of cybersecurity issues and the bidding war over personal data disclosure (e.g. KYC) we experience daily; as well as the constant need to depend on a third party's permission to exchange value.





In contrast, value protocols place security, trust, freedom, and individual sovereignty at the heart of their design. Instead of trying to "catch up" on these aspects retrospectively, they are integrated from the start, offering a promise of safer and more integral interactions.

Definition: Value protocols enable the exchange of valuable digital assets (money, financial assets, data, contracts, messages) in a space of trust and digital freedom. They are a means of exchanging value that is secure and native to the internet.

An additional clarification: while these protocols operate in cyberspace by exploiting the structure of the internet, they are not intended to replace it. On the contrary, they enrich its ecosystem by introducing novel functionalities.

INTERNET	INTERNET of VALUES
Instant communications between Anyone or Anything, Anywhere	Instant exchange of value between Anyone or Anything, Anywhere
Native solution to connect 2 machines in order to exchange data	Native solution to connect 2 entities in order to exchange value

A Layered Structure of Protocols

The second parallel with the internet is their technical structures based on the interaction of a set of open protocols.

These open protocols took a long time to establish, and some are still under construction. Note that the difference between a protocol and a standard lies in the scope: while a standard generally encompasses several protocols to cover a broader scope of action, a protocol aims to accomplish a well-defined task. On the other hand, a standard usually comes from official bodies and may be subject to royalties or licensing fees. In contrast, a protocol, by its open nature, operates without necessarily requiring formal approvals.

To better understand the interest of value protocols, it's essential to introduce a fundamental concept for those less familiar with these technological domains: the multi-layer architecture and how it is at the heart of our daily activities.

Similar to building construction, where each floor serves a specific purpose (parking, residence, offices), our digital technologies and applications often operate by overlaying multiple "layers" or levels of protocols. Together, these "layers" interact to offer the user a seamless experience..

Layer	INTERNET (exchange of data)		VALEUR (exchange of value)	
	Protocole	Usage	Protocole	Usage
Layer3	HTTP, FTP, POP3, SMTP, SNMP	Application layer ex: browser, server, mail, monitoring etc	Nostr, Fedimint, *RGB*, *DLC,* LN-AUTH-URL	Applications: private contracts, social network with payments, financial assets, login etc
Layer2	TCP, UDP, QUIC	Specific communication channels	LIGHTNING NETWORK, OpenTimeStamps, *ARK, BitVM*	Network for small instant transactions, digital proofs, programmable logic
	IP, ICMP	Packet routing between nodes		
Layer1	Ethernet, WIFI	Wired or wireless data mapping	Bitcoin, *DID*	Ultra secure peer to peer transactions (public ledger, 10 minutes audits, node consensus, finite supply), decentralized identity

layers and example of protocoles in each space

Let's take the example of buying clothing or subscribing to a service on the internet. At the lowest level, we have communication layers managing data transmission between your device and the provider's server. Above that, security layers ensure this transaction is encrypted and protected. Then, an application layer presents the user interface, where you make choices and place your order. Each of these layers uses specific protocols to function correctly.

We will further explore the importance of this multi-layer architecture in Chapter 2..

Everyday life examples

Every day, often without realizing it, we interact with a multi-layer structure: browsing the web, sending emails, streaming videos. Value protocols have a similar structure and offer new functionalities. Practically, this means businesses can combine them to create innovative applications. Opportunities are vast. Though it's impossible to predict all possibilities, here are some examples:

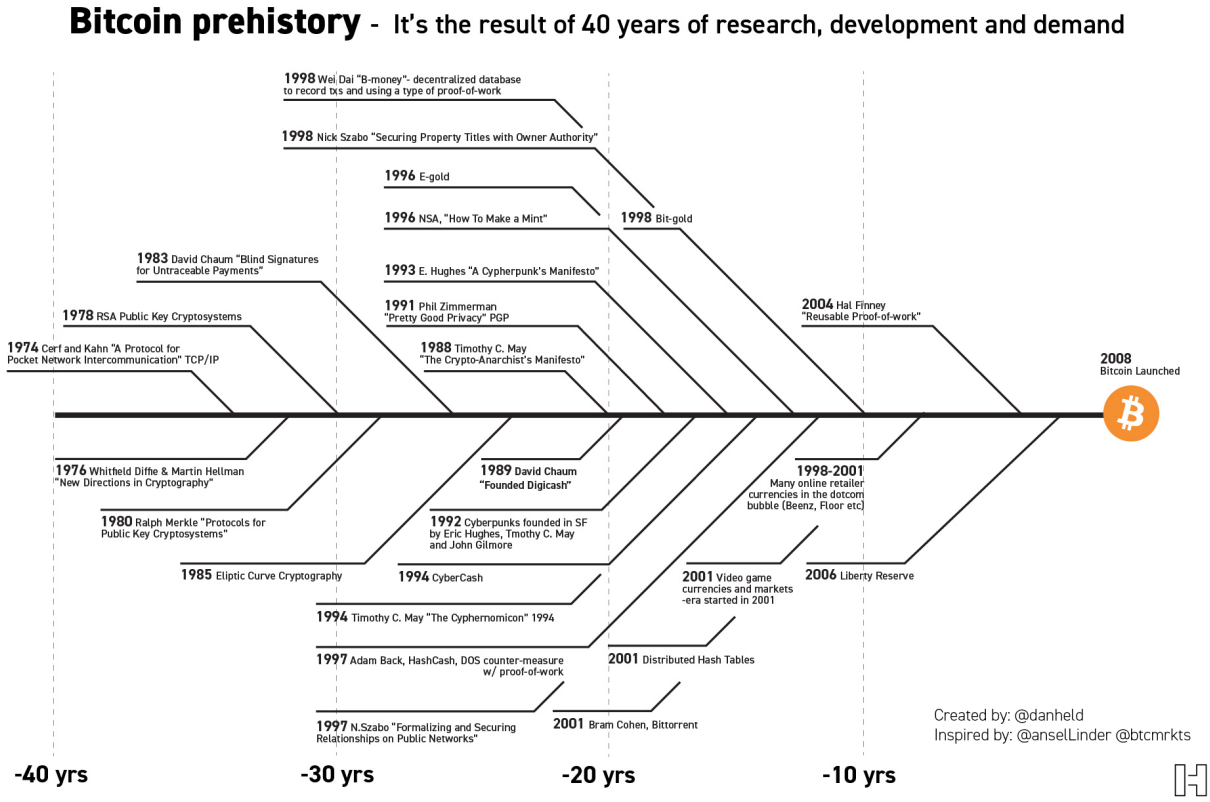
- Transfer funds to anyone, anytime, anywhere, without intermediaries, with minimal fees, as easily and universally as sending an email.
- Securely store the value of one's work and transport it through time and space without risk, effectively saving.
- Connect to a service more securely while remaining in control of one's identity and potential expenses.
- Offer access to a service without being limited to traditional economic models like subscriptions or licenses, with pay-as-you-go or streaming payments.
- Edit and sign contracts that remain confidential between parties, securely and perfectly notarized without intermediaries.
- Send frictionless, minimal amounts, for example, for per-unit consumption of a digital service, as gratification or donation, or as machine-to-machine payments, like between AI and IoT devices.
- Redefine advertising actions to be more qualitative, without intermediaries, creating a real relationship with targets.
- Explore new markets beyond a value-costs frontier, standing out from competitors.
- Build a transparent and secure electronic voting system.

Thus, this multi-layer architecture is not just technical jargon but the key to understanding this immense innovative potential in the business world.

1.2 Ancient origins

Value protocols are the culmination of a long history of progress, combining centuries of mathematical advancements with revolutions brought by early internet innovations.

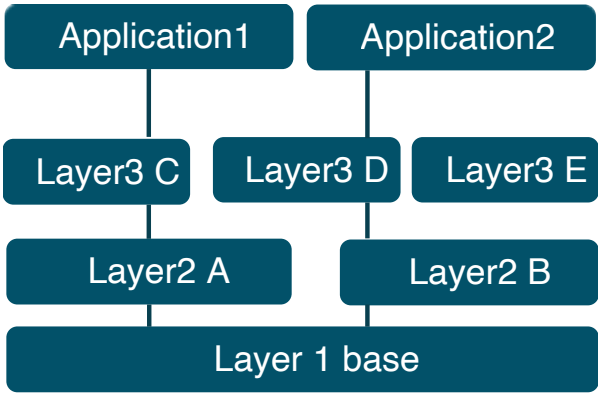
Take Bitcoin, for instance. Its creation was a singularity, a major turning point comparable to the "Cambrian explosion," a historic period when life on Earth underwent rapid, unprecedented diversification. In Bitcoin's case, it represented a diversification of mechanisms to exchange value, introducing the revolutionary concept of "digital scarcity," previously thought unattainable. With the subsequent emergence of technologies like the Lightning Network protocol, there's been a rapid acceleration in both the evolution of protocols and the development of practical applications leveraging these advancements.



To fully grasp these origins, it's also relevant to consider the historical influence of Fermat's theorem on elliptical curve mathematics. Surprisingly, the primitive notions of a "timechain" can even be traced back to humanity's oldest literary text, the Epic of Gilgamesh, illustrating the depth of the underlying concepts..

2. THE CASE FOR OPEN PROTOCOLS

The triumph of the internet lies in its multi-layer architecture: each protocol layer is specialized, simple, agnostic, and independent, offering immense flexibility. This structure allows the design of a myriad of diversified applications across different levels. Let's delve deeper into this dynamic.



2.0 Inspired by nature

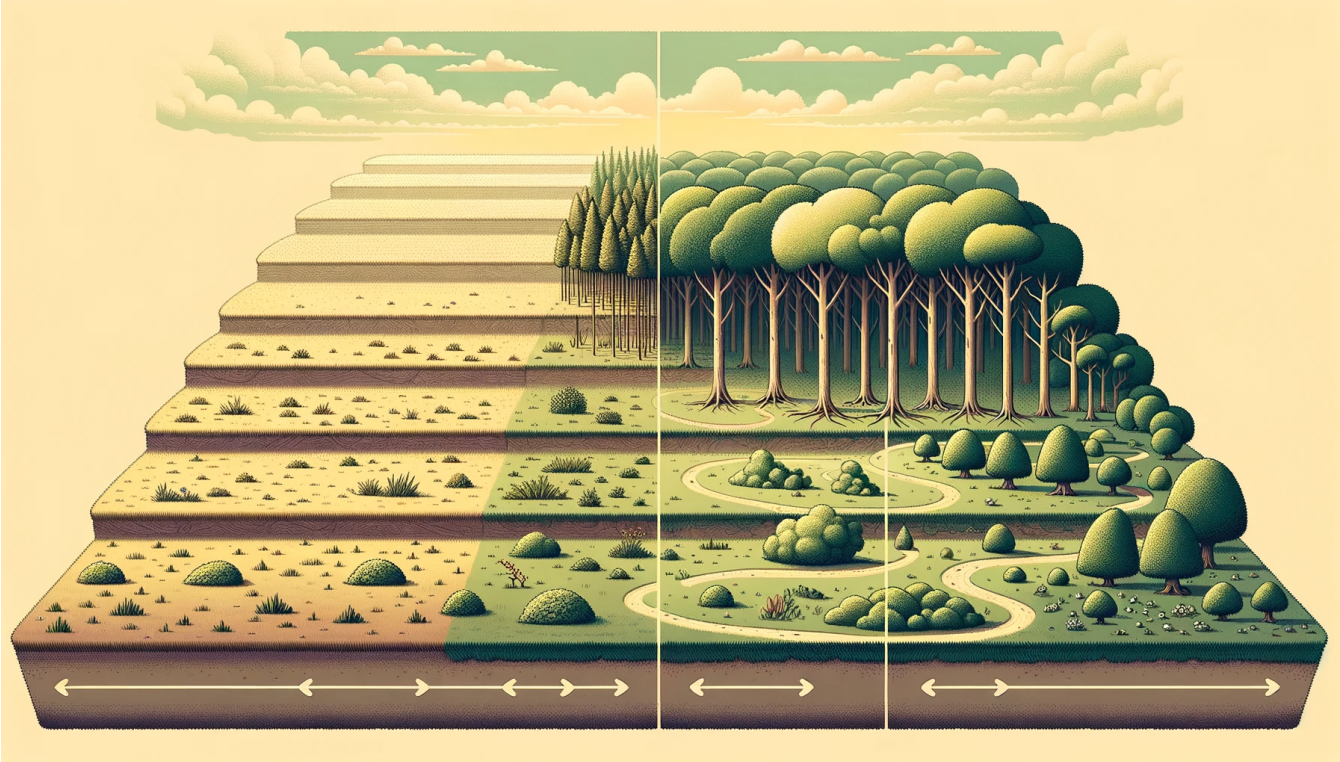
While biomimicry isn't ubiquitous, comparing structures in nature to those in ecosystems based on open protocols is an enlightening analogy.

In nature, we see the formation of ecosystems where each function finds its place: its "home" ("eco"). These ecosystems thrive by maximizing the three-dimensional space occupation by various organisms. Over time, successive "layers" form, evolving from simpler to more complex, akin to a prairie transforming into a forest (the principle of syntropy), symbolizing the transition from desert to abundance.

Similarly, the principles of permaculture are also evident in ecosystems based on open protocols:

- They employ a varied mix of techniques.
- They aim to maximize resilience by efficiently using resources and promoting diversity.

- Although the primary goal is individual autonomy, these systems ultimately promote the formation of strong communities.



2.1 Multiplicative effect

Here are some reasons why the multi-layer architecture structuring of the internet is so effective:

- **Specialization and evolution**: each layer is specialized, simple, and agnostic. It evolves at its own pace, tending towards stability ("ossification"). Because they are open, they mature slower than proprietary development (i.e., developed in-house by a company for its specific needs). However, they result from consensus and meticulous review.

- **Multiplication of performances**: the "efficiencies" of each layer can sometimes add or multiply with each other, depending on their role. For example, if a protocol producing a crucial resource, say a number of transactions, becomes twice as efficient, then potentially all the applications built on it also see their efficiency doubled, for example, 2 times more users or 2 times more exchanges. And this principle applies to each protocol layer. This encourages cooperation among actors in the development and maintenance of these protocols.

- **Natural Selection:** in this competitive ecosystem, the best technology or improvement suggestion prevails. However, "best" is subjective, and time ultimately judges. Protocols generally evolve according to the needs of the majority, while ensuring aspects of backward compatibility and robustness.
- **Flexibility:** like Lego pieces, protocol layers necessary for a specific application are assembled. There's no need to start from scratch. The tree of possibilities grows exponentially as new layers develop. There's no need to create "monolithic" applications.
- **Layer Independence:** the evolution or replacement of one layer does not necessarily affect the others, thus ensuring the stability of the whole. Interfaces are well specified.
- **Open Source:** protocols are open, meaning discussed, specified, and developed in an open and consensual manner; therefore, controlled by no entity. This means anyone can adopt, develop, and build on them without restriction. The benefits are immense, not least in terms of licensing fees or the need for permission to use them.
- **Freedom of Creation:** open source encourages innovation and creativity. Everyone can contribute, experiment, or improve a project without restrictions or hidden costs. There's an "exponentiality" of creativity.

This multiplicative effect allows achieving what is called "scalability". Take Netflix, for example. Without reinventing the fundamental protocols of the Internet or creating new video formats, they optimized existing technologies to offer a premium service to millions of people simultaneously.

This multi-layer architecture, when efficiently exploited, has the potential to radically transform our way of creating, interacting, and innovating in cyberspace.

2.2 Network Effect

The network effect is a virtuous circle: the value of a product or service increases with the number of users. The more users there are, the more useful the product or service becomes, attracting even more users. Metcalfe's law states that *the utility of a network is proportional to the square of the number of its users*.

A perfect example of this effect is the evolution of the Internet. As more people and businesses adopted it, the quantity and diversity of content, services, and applications increased. This abundance made the Internet increasingly attractive to new users, who, by integrating into it, enhanced its value. Today, the Internet has become indispensable due to this immense accumulated value.

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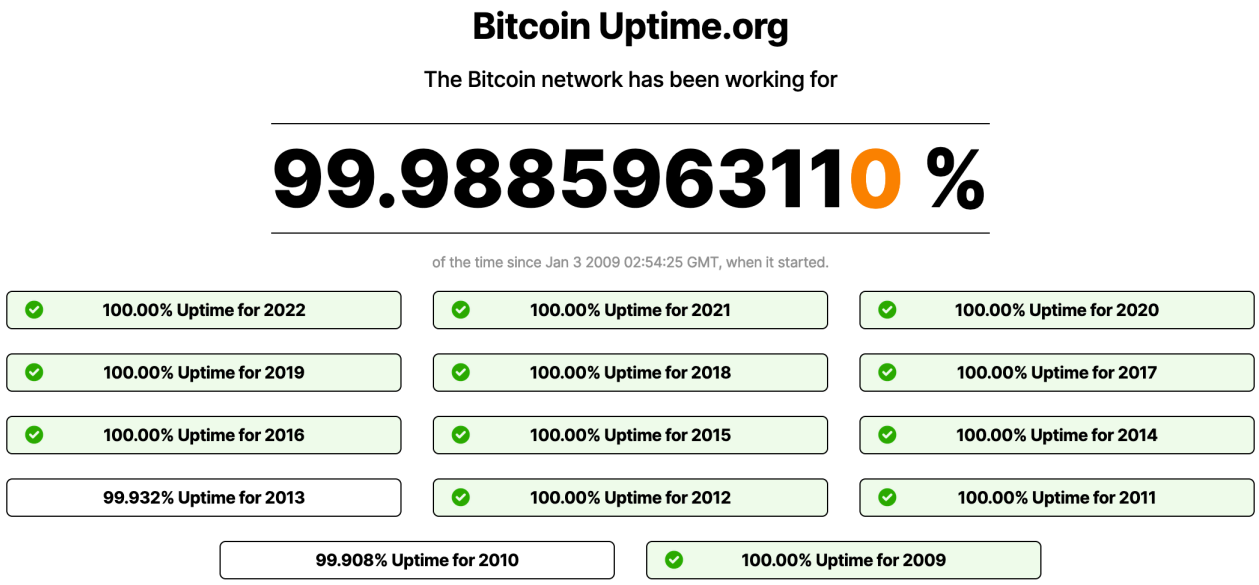
At the heart of this dynamic, open protocols play a crucial role. They promote interoperability, allowing different systems and applications to collaborate seamlessly. The more a protocol is adopted, the more beneficial it is for the community as a whole, facilitating interactions and encouraging more people to contribute to its improvement and security. This phenomenon is a brilliant illustration of large-scale human cooperation.

2.3 Uptime, Robustness, and Longevity

Uptime: this term refers to the duration a system or service is operational and accessible without interruption. It is typically measured as a percentage over a given time period. For example, an uptime of 99.9% means the system was operational 99.9% of the time during the considered period.

For the Bitcoin network protocol, uptime is crucial as it ensures transactions can be carried out at any time. Since its inception in 2009, Bitcoin has demonstrated an exceptionally high level of uptime, surpassing even the infrastructures of giants like Google or Amazon. Few realize the feat this represents for a decentralized system: doing better without means other than the goodwill of users (as there is no CEO, investors, marketing, etc.). Today's Bitcoin users are particularly interested in its availability and durability, especially for use cases of savings (Store of Value).



Robustness : it characterizes a system's ability to operate effectively even in the face of disruptions or unexpected conditions. A robust system is resilient to errors, failures, and attacks. The protocol-based structure is particularly robust because each element can be improved or repaired independently

Longevity : a protocol that endures and evolves is highly beneficial. This principle is about backward compatibility, meaning a protocol's ability to work with earlier versions of itself or interact with older equipment or software. This avoids having to replace hardware or rewrite applications. This durability stems from the flexibility of protocols, designed to be adaptive to new requirements. For example, while HTTP 1.1 dates back to 1997, it remains widely used by billions of devices. Although there is a newer version, HTTP/3, its future adoption will occur without impacting users.

2.4 Opportunity Costs

Opportunity cost is an economic concept referring to the value of the best alternative foregone in a decision-making process. Choosing one option means foregoing the benefits offered by other potential choices.

The adoption of open protocols reduces opportunity costs for several reasons:

1. **Interoperability** : open protocols are designed to be compatible with many systems and applications. This means businesses and developers don't have to give up using certain tools or technologies if they adopt an open protocol, reducing the opportunity cost associated with limiting technological flexibility..

2. **Evolutivity** : thanks to contributions from a vast community, open protocols are constantly evolving, updating in the face of innovations. Organizations benefit from these improvements without having to completely renew their systems, thus avoiding costs related to obsolescence..
3. **Reduction of Dependency Costs:** proprietary protocols can create costly dependencies on a single provider. Open protocols, on the other hand, offer long-term flexibility and reduce the risk of being locked in.
4. **Innovation** : open protocols, by their accessible nature, stimulate innovation. This frees up resources to develop novel solutions rather than replicating existing systems, reducing the opportunity cost associated with reinventing the wheel.

Despite the apparent advantages, many initiatives, both public and private, continue to follow less optimal paths:

- often preferring to reinvent the wheel rather than build on what works
- or choosing closed ecosystems or "open-in-name-only" systems (which are actually controlled and can be shut down by a small group of people).

The results are often not convincing: significant expenses to rebuild lower layers instead of focusing on the use case, experiments without production outcomes, and a lack of capitalization on previous efforts.

It is, therefore, essential to recognize the intrinsic value of open protocols to minimize opportunity costs.

2.5 Privacy

Open protocols and privacy may seem, at first glance, to be independent topics. However, a deeper analysis reveals that they are closely linked, especially when compared to closed and opaque protocols. While open protocols do not automatically guarantee better privacy protection, they offer a framework that promotes transparency, innovation, and accountability.

Transparency and trust : the transparent nature of open protocols gives them a distinct advantage in terms of trust. Since their source code and operation are visible to all, it is possible to ensure and verify that data is handled securely and confidentially. Closed protocols, on the other hand, are often opaque, leaving users uncertain about how their information is managed.

Evolutivity and adaptability : open protocols, with their collaborative development, can quickly adapt to privacy-related challenges. If a vulnerability is identified, the community can unite to resolve it swiftly. Closed protocols, however, rely on a single entity or organization for updates, potentially delaying responses to security or privacy concerns or making them costly (trapping clients).

Data freedom : With open protocols, users are not confined to a specific ecosystem, offering greater flexibility in managing their data. Closed protocols, however, can restrict this freedom, granting the controlling entity excessive power over user information.

In conclusion, it's crucial to remember that our discussion centers on value exchange protocols. These protocols are inherently linked to our most precious assets: our data, money, contracts, communications. In the real world, we wouldn't consider allowing unknown third parties to own the keys to our homes, rooms, and install cameras, or to disclose our identity to buy a newspaper or a fruit. The same goes for our digital life. Yet with the current web, we are already halfway to this dystopian future, and the proposed solutions to data breaches involve making the collection of personal data more mandatory and systematic by "trusted third parties." A dangerous escalation! In this context, transparency and respect for privacy are not only desirable but imperative.

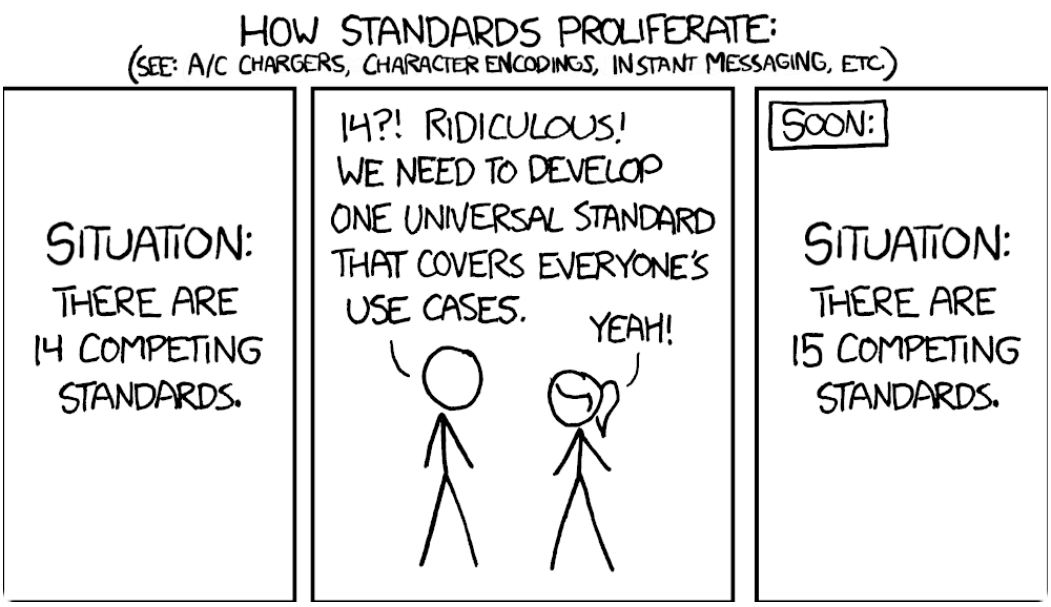
2.6 Alternatives, Competition, and Darwinism

As an introduction to the conclusion on the importance of open protocols, imagine a world where the Internet had been purely private, paid, and under exclusive control: would free and open alternatives have emerged? And at what pace? It's a pertinent question that deserves reflection.

Then consider this: in a totally open ecosystem, any innovator could theoretically propose a new protocol to surpass the existing one. However, the real challenge lies in building a community around this change. Consensus and cooperation remain central to this endeavor.

An example of unrestrained innovation is this world of "cryptos," with tens of thousands of initiatives. However, the results are not convincing: not only is the problem solved nonexistent or unnecessary, but the centralizing aspects of the traditional world are still present (small leadership team, venture capital funding, marketing, token minting, etc.). Ultimately, time proves to be the ultimate judge, attesting to the relevance, uptime, robustness, and longevity of these initiatives.

The golden rule of technological evolution is as follows: to dethrone an existing solution, the novelty **must offer significant advantages to justify the effort** and transition costs. It's not an easy task, as evidenced by many cases in the IT world where loyalty to established providers prevails. The network effect, the momentum of mass adoption that gives a system its power and significance, is another hurdle for newcomers. That is, it's not enough to be 'better' or 'open' in theory; it must be verified in practice by a critical mass of adoption and contributions.



The history of technology is filled with eloquent examples. The "protocol wars" is one such example, with the bureaucratic, overly elaborate, and largely theoretical European OSI model on one side, and the less formally organized but simpler and more pragmatic TCP/IP on the other, supported by a rich culture of contribution and functioning products.

Other notable competitions include Internet vs. Minitel, Linux vs. Windows in the server market, the battle for net neutrality, Wikipedia vs. traditional encyclopedias, and USB-C vs. Apple's Lightning cable.

There are also counterexamples:

- Monopolies that were effective for a time, like certain French institutions or companies post-World War II, driven by the National Council of the Resistance.

- Open protocols that failed, such as the relative failure of the open instant messaging protocol XMPP: initially adopted for interoperability and standardization, Google gradually abandoned it, driven by the commercial advantage of keeping users in its ecosystem. Meanwhile, platforms like Facebook Messenger, Telegram, etc., emerged and quickly became dominant. Today, these platforms are closed, with locked ecosystems; for example, WhatsApp and WeChat users cannot communicate with each other. The capture of an open protocol by a giant is not new; Microsoft has often been accused of providing proprietary extensions to these protocols, which then become a de facto standard due to their dominant market position, marginalizing existing players and creating a major barrier to potential new competitors.

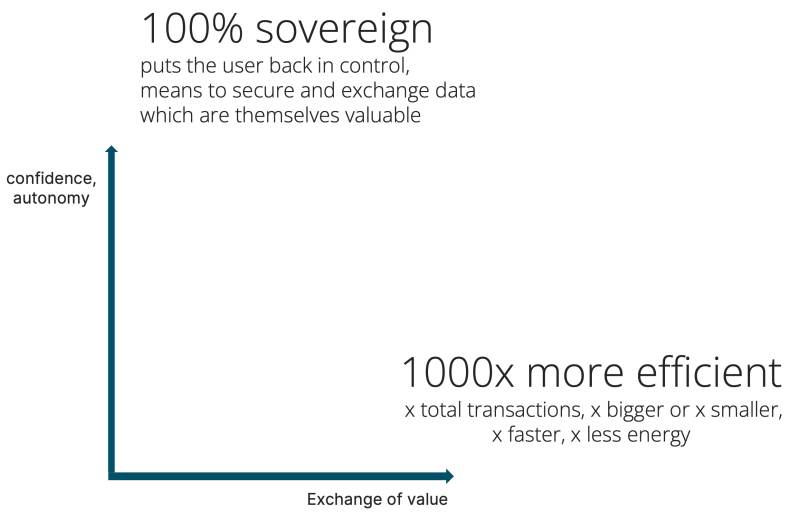
Although the ideal future is based on open foundations, companies, driven by pragmatism, must make wise choices. Adopting open protocols is highly advantageous, provided the following criteria are considered:

- Truly superior efficiency to the current system
- Adoption and ecosystem
- Uptime
- Robustness
- Longevity
- Digital trust

3. VALUE PROTOCOLS: THEIR INCREDIBLE EFFICIENCY

3.1 The Space of Expected Benefits

As we enter this new era of innovation, it is crucial to evaluate potential benefits and clearly present possible improvements in terms of efficiency.



innovation matrix

These figures offer a unique perspective on the radical transformations that current applications can undergo when transposed into this new space. Considering this transition, significant improvements can be observed, not only in operational efficiency but also in added value for end-users.

Imagine, for example, a traditional social network (SN) application we use today. In the current context, it functions well, meets basic business needs, and offers a certain level of efficiency. However, users are prisoners of the provider, its terms, and its network. If this same application were redefined and rebuilt in this new innovation space, users could use multiple different applications to access the same SN; control their identity, their data, their way of discovering and consuming content; and exchange money or data without intermediaries. In terms of results, not only would the network effect be immense, but new functionalities and capabilities that were previously unimaginable could emerge.

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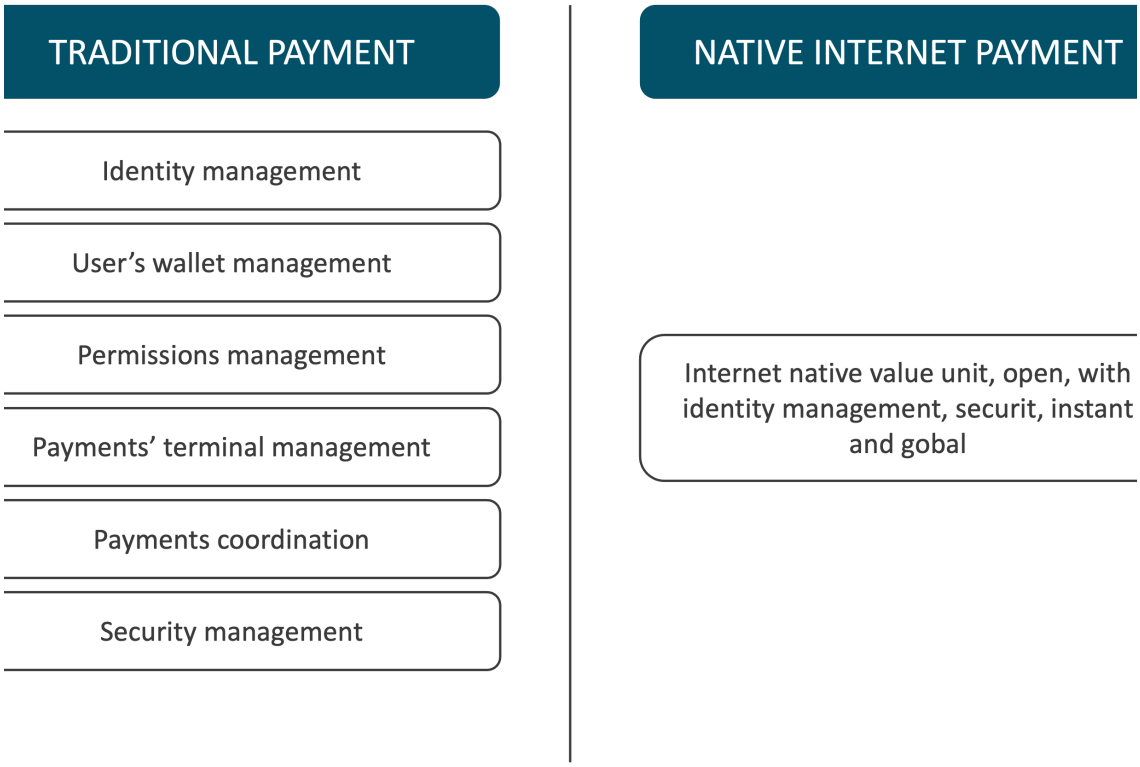
For these technological protocols to define a secure and native internet value exchange medium, they must have the following properties:

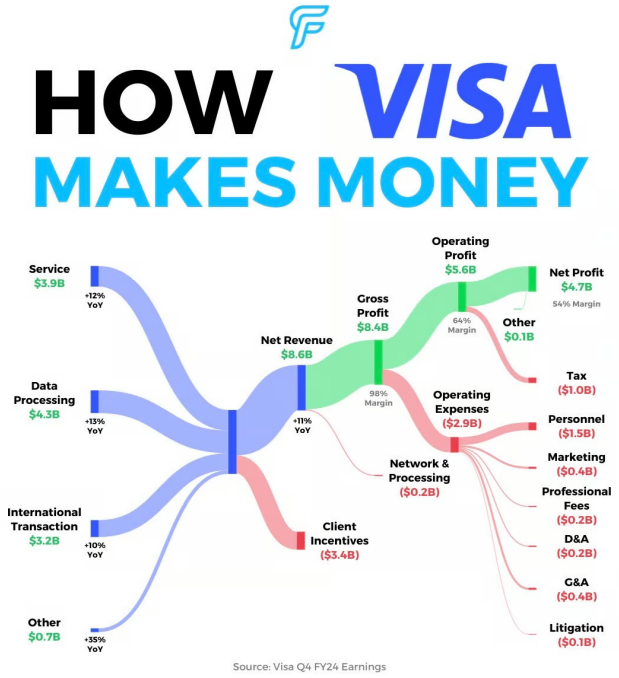
- Universal in time and space
- Regardless of the type of asset: money, data, contract, etc.
- End-to-end security
- Identity management (without third parties, autonomous, universal)
- Native routing of exchanges (without the need for an intermediary to reach the destination)
- Point-to-point, and point-to-multipoint
- As simple as a text message

This means that intermediaries are no longer needed. This is where much of the efficiency comes from:

- Sovereignty: native management of accounts and identities (whereas today, for example, account keeping for money is done by banks or neo-banks)
- Universality: native management of transaction routing (whereas today, for example, a money transaction involves the consumer's bank => credit card (e.g., VISA) => e-commerce payment provider (e.g., PayPal) => the merchant's bank)



Efficiency and costs driven by disintermediation



This represents much more than just an incremental improvement. It's a quantum leap in both efficiency and innovation dimensions. And this is just one example among many. By exploring and adapting more applications to this matrix, the potential for transformation is immense.

3.2 Benchmark Analysis: Store of Value and Monetary Exchanges

The significance of technological transformation, particularly in a crucial area like "store of value and monetary exchanges," cannot be underestimated. In the current context of digitalization and globalization, the ability to exchange funds and maintain their value is fundamental for individuals and businesses worldwide. Below is a benchmark for this use case, comparing the existing "Fiat" system and the internet-native system (Bitcoin + Lightning Network).

Electronic money	FIAT MONEY (central banks)	INTERNET NATIVE MONEY (peer to peer)
Monetary supply	Infinite, for example from jan2020 to jan2023 +36% euros were issued (M1)	Never more than 21 million Bitcoins, 19M already exist, infinitely divisible (21Quadrillions SATS)
Monetary policy	Non democratic, unreadable monetary policy, programmable CDBC planned, bank accounts are permissioned	Decentralized governance from the nodes (users). Strict monetary policy. Anyone can create a wallet and participate (« permissionless »)
Transactions	3.14 Trillions/year	Capable of 31 Trillions/an
Payment coordination	Multiple silos (bank accounts, fontiers) and routing through a chain of intermediaries (ex VISA, Mastercard), one to one	Universal routing, as simple as sending an email, with no intermediaries nor forntier, one to one and one to many
Smallest or biggest transaction	Almost no transactions <1 euros High limit transaction depends on banks, long process	1 SAT on the Lightning Network (about 0,003 of a cent of euro) No higher limit (billion dollars transaction happen and for the same fee)
Final settlement	Slow (multiple days), chargeback possible	Instant (LN) or 10 Min (BTC), final with no appeal or chargeback
Lifetime	The euro is 22 years old Facial value loose: from 40% (goods) to 80% (gold)	Almost 15 years old, 1BTC = 1BTC (never more than 21Millions) (started at 0, today at 30K$)
Security	Hacks in multiple parts of the chain	Never compromised
Audit	Opaque, closed circuits, unverifiable by the public	Decentralized ledger, audited every 10 minutes, immutable in time, inscriptions possible (e.g. proofs)
CASH (pseudonymous transaction)	Yes but regulated, soon to be extinct	No, but there exist cash equivalent via physical NFC cards
Uptime	Depends on banks and their subsystems	24/7, 100% since 2013
Correlation with equities market	Markets totally tethered to FED announcements (QE/QT)	99,89% not correlated with equities market (diversifying asset))
Energy consumption	1000 TWH /year	80 TWH/year

Here's another way to present these data demonstrating the incredible efficiency of these protocols compared to the current system:

1 000 000 x	more energy efficient /transaction ** for instant payment
1000 x	capable transactions/sec** for instant payment
1000x	bigger or smaller transactions
14x à 400x	faster until final settlement (** and *)
100%	secure* (zero hacks)
100%	uptime since 2013*
98%	mature* (ossification)
10x	total annual transaction capabilities *+***
8%	Total energy consumption of traditional system*
0,11%	correlated with equities market*
0%	deviation from monetary policy*

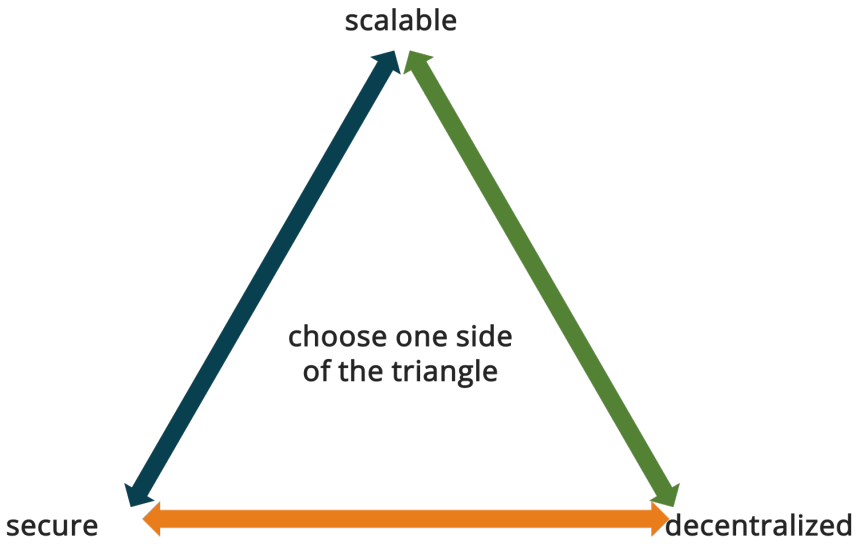
*Layer1 BTC **Layer2 LN

Source (cf Annexe)

As previously explained: "to supplant a solution, it must bring a significant increase in functionality." The quantifiable benefits presented above are key indicators of its potential success in an ever-evolving world.

3.3 Scalability through Layering of Protocols

Let's be clear: one should not stop at Bitcoin but examine the system as a whole. The overall efficiency comes precisely from the stacking of layers. A prime example is the Lightning Network. As an additional protocol layer (layer2), it was designed to solve Bitcoin's scalability problem, enabling near-instant payments and offering a solution to the main network's capacity limits.



To better illustrate this concept, one can refer to the well-known trilemma: "fast, cheap, good quality." In most fields, it's generally accepted that one cannot have all three simultaneously and compromises must be made. Transposing this trilemma to the world of Bitcoin, it would state: "decentralized, secure, scalable." In its original design, Bitcoin is focused on being 100% decentralized and 100% secure. Scalability, meaning global scaling, is not its focus and isn't intended to be solved by Bitcoin itself. This property is achieved through the use of higher layers.

3.4 Maturity

It would be inaccurate to see Bitcoin simply as a digital currency. Its development and operational robustness demonstrate a very high degree of maturity:

- **Traffic**: every day, billions of euros in value are exchanged on Bitcoin.
- **Availability**: even more impressive is its constant availability, with an unmatched uptime since 2013 (100%).
- **Integrity and Security:** Bitcoin's security has never been compromised.
- **Perception**: the media perception is finally changing. Remaining detractors are either those who have not made the effort to study and understand (the "ignorant") or competitors (such as some central banks). KPMG's latest paper from the summer of 2023, "Bitcoin's role in the ESG imperative" perfectly illustrates this change.

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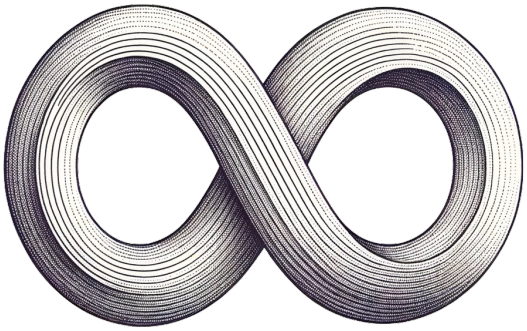
Institutional Adoption: many major American financial players like BlackRock or ARK have recently shown their institutional appetite, as evidenced by Fidelity's latest paper "Bitcoin First Revisited" in September 2023. In France, the TOBAM fund has been offering Bitcoin-related products since 2017.

Volatility and Stability: Bitcoin's volatility is zero because no more Bitcoin will ever be issued (1BTC = 1BTC). However, volatility in exchange rates with traditional "fiat" currencies is real. Now, mechanisms exist to force all or part of a portfolio of this internet-native currency to remain "stable" relative to a traditional currency without having to convert it (the concept of "stable sats").

Beyond its transactional function, a primary use case is Bitcoin itself, as a store of value. Saving is the ability to "store" the fruit of one's labor and move it through space and time without counterparty risk. Many individuals and now a growing number of companies integrate Bitcoin into their treasury. This usage is magnified by recent crises of inflation, debt, and the absence of alternative proposals by financial advisors. Bitcoin achieves all this without the need for higher protocol layers. However, the paradox is that the network effect from using these higher layers increases its intrinsic value, and vice versa.



Other "layers" (protocol layers) are also in the maturation phase. It's a thriving ecosystem of applications, e-commerce solutions, and B2B tools. For example, the Lightning Network layer (layer2) is functioning extremely well today and concentrates a strong part of this "construction" energy:

- A very rich ecosystem of actors and applications. From simple electronic wallets (wallets) for settling small or micro amounts of money to e-commerce integration solutions
- Good security
- Many improvements coming: a very rich « roadmap » (even though it’s not formal)

- Adoption by industry companies, for example, marketplaces ("exchanges")
- The emergence of B2B companies to provide solutions to businesses (e.g., BTCPay, River, Voltage)

Given this "Cambrian explosion," the majority of new applications to be built should probably be thought « on top of » the Lightning Network.

In conclusion, the era of Bitcoin being considered a niche project is over. It has established itself as a major player in the financial ecosystem, and with the dynamism of the superimposed protocols, the future looks bright. For those considering entering this space, there has never been a better time to consider new use cases and innovate.

Now, the task is to orchestrate all these existing products to build relevant solutions today.

4 - THE LOGICAL NEXT STEP: WHICH PATH TO CHOOSE?

When ?

After exploring recent developments and advances in Bitcoin and its associated protocols, we're left with the question: "Where do we go from here?" Several signs indicate a pivotal moment:

- Recognition of the maturity of Bitcoin's foundational layer and the relevance of diversifying "treasury" use cases.
- A burst of creativity and business solutions on Layer2, facilitating small, lightning-fast payments without intermediaries.
- The dawn of the Layer3 and apps era: with projects like Nostr, it's evident that the revolution extends beyond Layer2. These advancements will radically reshape entire sectors, from how we consume content to commerce practices (economic models, advertising). The critical question is who will lead this transformation? Who will be the pioneers and visionaries creating the next giants like Netflix or Amazon in this evolving ecosystem?

In conclusion, we are on the cusp of a new era. The potential is tangible, waiting for innovators to harness it. Each application and service we know today will likely have an equivalent or improved version in this evolving space. The remaining question is: which companies will be part of this revolution?

How to move forward ?

In the journey ahead, it's crucial for businesses to understand how to integrate new technology while focusing on their core operations and indirectly supporting the creation of a more desirable and resilient world (ESG).

Inspired by the internet example, some steps emerge:

Acculturation, training is key. Just as a company doesn't need to know exactly how the internet works to benefit from it, it's not necessary to be a technology expert to take advantage of these new protocols. However, basic understanding is essential. Organize informational sessions, workshops, or conferences to familiarize your team with the basics. On the other hand, internet companies that, for example, build complex multicloud workflows will definitely need strong internal expertise.

Learning by doing is key: just as we learned from the early days of the internet and its first websites, businesses can open up to these value exchanges. A retail business, for example, could consider accepting these new payment methods. Legal or financial firms could explore integrating trust contracts and data into their systems.

Defining specific use cases: It's time to think bigger. How can these technologies be used to transform a business model? Are there new market opportunities? After the ideation phase, innovating intentionally means focusing on specific, production-ready use cases.

Unleashing creativity: exploring this new value-cost frontier means imagining use cases related to your core business. For example, how to differentiate or capture new market shares, reduce operational costs, etc.

Designed for collaboration: seek partners, startups, and innovators in this field and collaborate to create new solutions.

Ethical commitment: as you explore this new frontier, remember the importance of corporate social responsibility (CSR) and Environmental, Social, and Governance (ESG) criteria. Use these technologies not only to increase profits but also to create a positive impact (a comprehensive article on this topic is in preparation).

Our Expertise, Your Strategy

We propose orchestrating existing products to build relevant solutions today. By merging our expertise with your vision, we can co-create scalable and robust solutions for the future. Depending on the use case and sophistication, we'll either prioritize simplicity and solidity or exploratory "bleeding edge" technology.

Here's how we envision the pillars of a winning strategy:

- Identifying the Right Goal: every company is unique, as are its challenges. We'll start by clearly defining the problem you're trying to solve or the opportunity you want to seize. The use case must be relevant to your business and offer real added value.
- Being Agile, Yet Wise: in a rapidly evolving technological world, it can be tempting to chase every new trend. However, we'll help you stay focused, prioritize initiatives with the greatest impact, and adopt a frugal approach to maximize resources.
- Optimizing ROI and the Future: calculate short-term ROI, minimize opportunity costs, and anticipate future developments. Build progressively on solid foundations and in the right direction.

- Smart Structuring: a good strategy is as solid as its execution. We'll guide you in setting up a robust architecture, making technical choices, and continuously evaluating ROI. We'll also consider cross-cutting aspects like legal, accounting, IT infrastructure, and security implications to ensure flawless implementation.

Together, we'll turn your vision into tangible reality.

CONCLUSION

Historically, humanity's trajectory has been marked by technological revolutions that transformed how we live, work, and connect. Today, we are at the dawn of such a transition with the rise of open value protocols. These protocols redefine economic interactions and the very notions of value, trust, and autonomy, offering a secure, universal means of exchange native to the internet.

The open technology gamble is winning, laying the foundation for unfettered innovation, constantly pushing the boundaries of the possible; minimizing long-term effort and costs, maximizing creativity, agility, and portability. Like the internet, scalability is achieved through a layered protocol structure.

The path to this "Protocol Economy" is filled with promise and challenges. It offers immense opportunities to create unique and efficient services, as well as the responsibility to build a digital world that respects the rights and dignity of every individual.

The internet of values is progressing slowly but surely. Trust-based and peer-to-peer exchange is not only an indispensable degree of freedom, but also a form of freedom of expression destined to succeed. Enabling control over one's data, freedom of identity, and a return to the fundamentals of consent creates a much more desirable user experience.

This journey is not just about technological innovation but also about vision, intention, contribution, and shared values. We invite you to join, explore, and co-create the next chapter.

Let's meet to explore this new space pragmatically.

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Protocols change the world

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