CyberVein Whitepaper

Abstract

With humanity moving deeper into the Information Age, modern societies produce increasingly large amounts of data, while becoming ever more dependent on its on-demand availability, as well as its integrity. As individuals, organizations and even Nation States, we grew accustomed to and reliant on our ability to query information on any subject, at any time, and to freely use it as we see fit. In return, as a society we have de facto agreed to tolerate an increasing degree of transparency in terms of the metadata that describes our private and public lives.
This pay-off arrangement between data producers, accumulators, and consumers has proven itself immensely instrumental in terms of economic growth, public discourse, and the overall improvement of our quality of life. However, above this “New Deal of Data” looms the shadow of an inherent market failure that prevents our Information Economy from reaching its full potential, while allowing actors in privileged positions in the data economy to exploit our dependency on information to their own advantage.
While one side to this “New Deal of Data” finds itself subjected to an automatically and increasingly involuntarily extraction of information through countless applications, sensors, and algorithms dispersed throughout Cyber- and “Meat”-space alike, the other party to the deal expects to be blindly trusted when it comes to the handling of this enormous pool of information. Even more significantly, following a severe lack of economic incentives, the most valuable pool of data in existence has never actually reached the public domain to begin with. This pool includes the results of countless academic research projects, as well valuable economic data produced

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and accumulated
by private and public entities alike.

As a result, the overwhelming majority of the fuel that is supposed to power our Information
Economy remains siloed in isolated databases, where it is prone to malevolent manipulation, and
where its economic and cultural potential remains unutilised, if not downright weaponized.
At first glance it appears that Blockchain Technology is an ideal tool to solve both of the problems
stated above: the questionable trust-relationship between data producers, handlers, and consumers;
as well as the lack of economic incentives to maintain vast, resource intensive data sets in
the public domain.

In terms of facilitating trust and data-integrity, Distributed Ledger Technology has already proven
itself as immensely useful. The trillion dollar Bitcoin, Altcoin, and token markets have demonstrated
beyond any reasonable doubt that it is possible and useful to store crucial information publicly,
while ensuring that its integrity remains intact without any authority enforcing cumbersome
security measures.

The same crypto-economy with its tokenization schemes has also demonstrated that through
game-theoretical means, the pooling and sharing of computational resources as well as information
can be elegantly incentivised with spectacular results. Alas, to date fundamental technological hurdles
remain which prevent blockchain technology from playing a significant role in terms of securing
the integrity of complex databases, while incentivising the pooling and sharing thereof.
Blockchains were originally introduced to secure a single and fairly simple data stream, namely
the sequence of monetary transactions in a peer-to-peer (P2P) cash system. These transactions are
recorded in a monolithic public ledger, which is just that – an ever growing account of who sent
what to whom. This account can then serve as a “single source of truth” on which

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all network
participants can blindly agree upon.

Attempting to expand this “single source of truth” concept to complex databases that are capable
of recording and processing the vast amounts of data produced by 7.6 billion humans and
their cultural and economic activities would, for obvious reasons, result in a ghastly failure if based
on contemporary blockchains such as Ethereum and its progenies. To accommodate for such a
revolutionary new implementation of blockchains, CyberVein proposes a radically novel approach
to Distributed Ledger Technology, one able to record multiple datastreams in structured, highly
complex decentralized databases which can be processed, queried, and manipulated in real-time
by several parties in a trust-less global network. To achieve this, CyberVein improves on Directed
Acyclic Graph architectures by introducing a resource conserving consensus algorithm, as well as a
smart contracting language and virtual machine, optimised for the handling of massive amounts of
data. Additionally, the CyberVein contracting language comes with built-in monetization functions
which allow owners of data to define its value and to condition access to it through direct payments
or any other way they see fit.

CyberVein databases are stored and maintained as independent smart contracts, permissioned to
contract parties, yet potentially accessible to other network participants. All entries, modifications,
and amendments to CyberVein databases are stored as appended smart contract transactions. This
means that a CyberVein database automatically contains all previous versions of itself, expanding
immutability to the temporal dimension.

Consequently, the CyberVein network is built as a fractal network of independent yet interlocked
databases on which users only sync data that is relevant to them, protecting the network from congestion.
The result is a public network of immutable databases, comparable to the Internet as public network

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of networks. On this network information is protected from tampering, just like Bitcoin transactions
on the blockchain. No one, including the owners of a database, can corrupt its records,
delete it, or tamper with its processing history. This allows data to be securely interconnected, and
transformed into structured knowledge, while economic incentives for data sharing are baked into
the blockchain protocol itself.

With this CyberVein creates an entirely new market environment in which data sharing among
competing entities is not only made possible, but economically incentivised through crypto-economical
and game-theoretical means. With this, CyberVein allows for the maintenance of publicly accessible
data-sets which can be used by anyone and corrupted by no one, functioning as the infrastructure
for increasingly data-dependent information economies and smart infrastructures.

CyberVein Website
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