



UNIFICATION

UNIFICATION VISION PAPER

A Decoupled State Channel Architecture
for Unstoppable Applications

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Abstract

It is clear that no single force or development can drive the mass scale adoption of decentralized technology to the mass market. The spread of Decentralized Ledger Technology (DLT) to the common end consumer and for-profit enterprises will be driven by a decoupled architecture which allows for the scalable building, integration and deployment of unstoppable applications.

Such a framework is achieved by a generalized protocol for state channels which allows a perfect blend of off- and on-chain application of technologies.

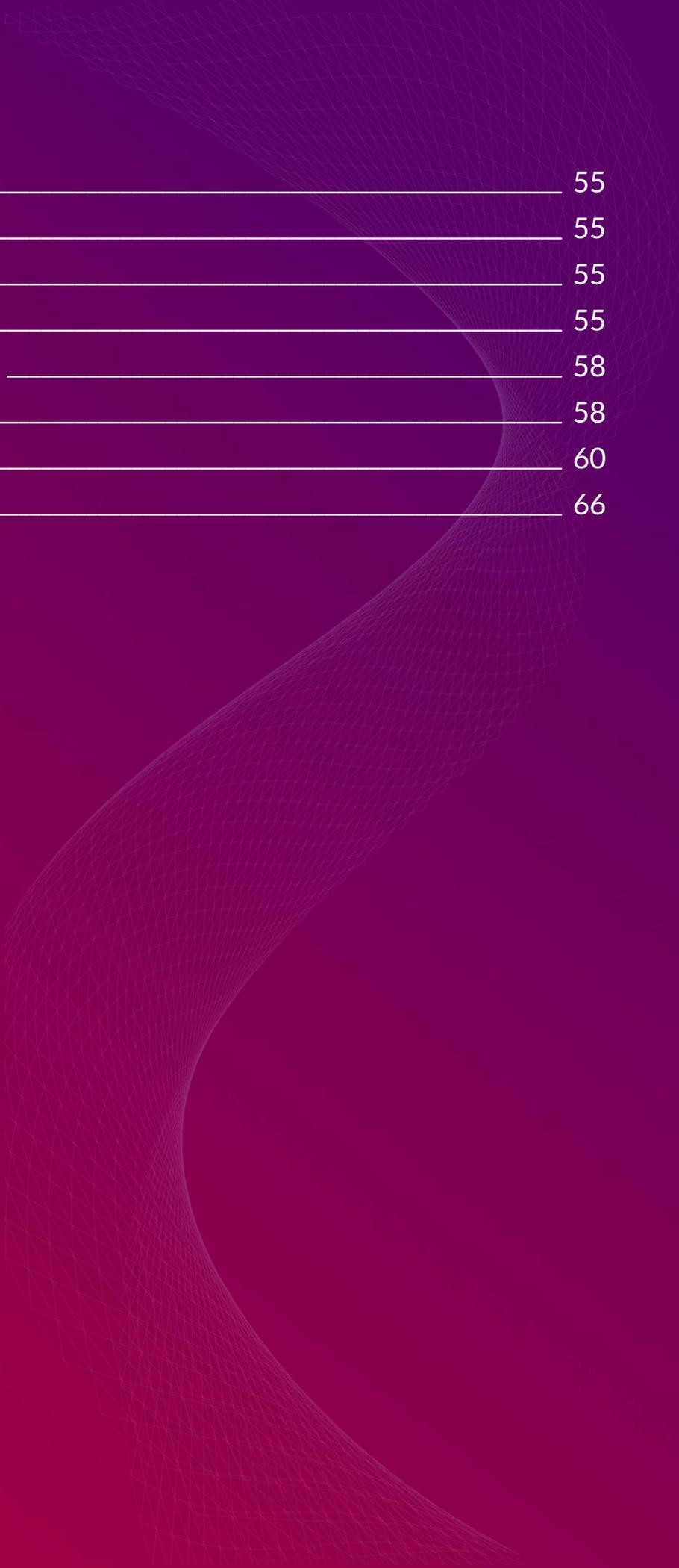
This hybrid method is required because it is clear that the blockchain is not needed for every single storage or transfer of data. Rather on-chain technologies are reserved for critical verification and auditing either real time or on a consolidated and selective basis.

To enable practical development and deployment of unstoppable applications a robust second layer, promising blockchain agnostic data interoperability, is mission critical.

This is actualized by providing a framework for not only new developments to be built on the ecosystem, but by more importantly allowing existing applications, enterprises and databases the toolkits and protocols to open state channels and seamlessly integrate with powerful decentralized technologies.

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The Challenges of Current Data Models

In the modern world, unilateral data collection is unavoidable in nearly every aspect of life. This presents a number of challenges for businesses, research institutions, and consumers alike.

For businesses, if they wish to buy data for use in their technology or sell data to another business, they lack standardized format in which the data can be exchanged. Data sets collected by one application rarely play nicely with data sets from another, meaning that businesses who wish to use outside data sets must spend significant time and effort to reformat data so it can be used effectively. Furthermore, these companies have no transparent marketplace to buy data from or sell data to other businesses or research institutions.

For research institutions, obtaining accurate and robust data sets remains a challenge. There is no easy way for willing consumers to easily opt in to sharing their data with institutions that are conducting life-saving research. If research institutions wish to purchase data for use in a study, much like businesses, they have no easily accessible marketplace through which they can purchase the information they seek.

For consumers, if they wish to use apps, websites or devices – the very technology upon which modern life depends – then the user must “agree” to a Terms of Service which effectively eliminates all notions of data ownership or privacy. Once they’ve agreed, their data is bought and sold in bulk by large entities, without input from, or compensation to, the end user that created it. There is no way for them to opt in or out of data collection, aside from refraining to use modern technology altogether.

The Need for Data Standardization

Data is the currency of the modern world, but as it currently stands, there is no easy way for it to be transmitted from one party to another in a format that can be readily used.

Presently, each app that collects data stores it according to different parameters. For instance, in the case of gender - “male” in one data set likely has different semantics than “male” in another data set. The data sets are not instantly interoperable and require significant manual effort to correlate them.

As the size and complexity of data sets grows, correlating various data points between various apps becomes a significant challenge. Reformatting data for use requires both manpower and know how, and is prone to human error.

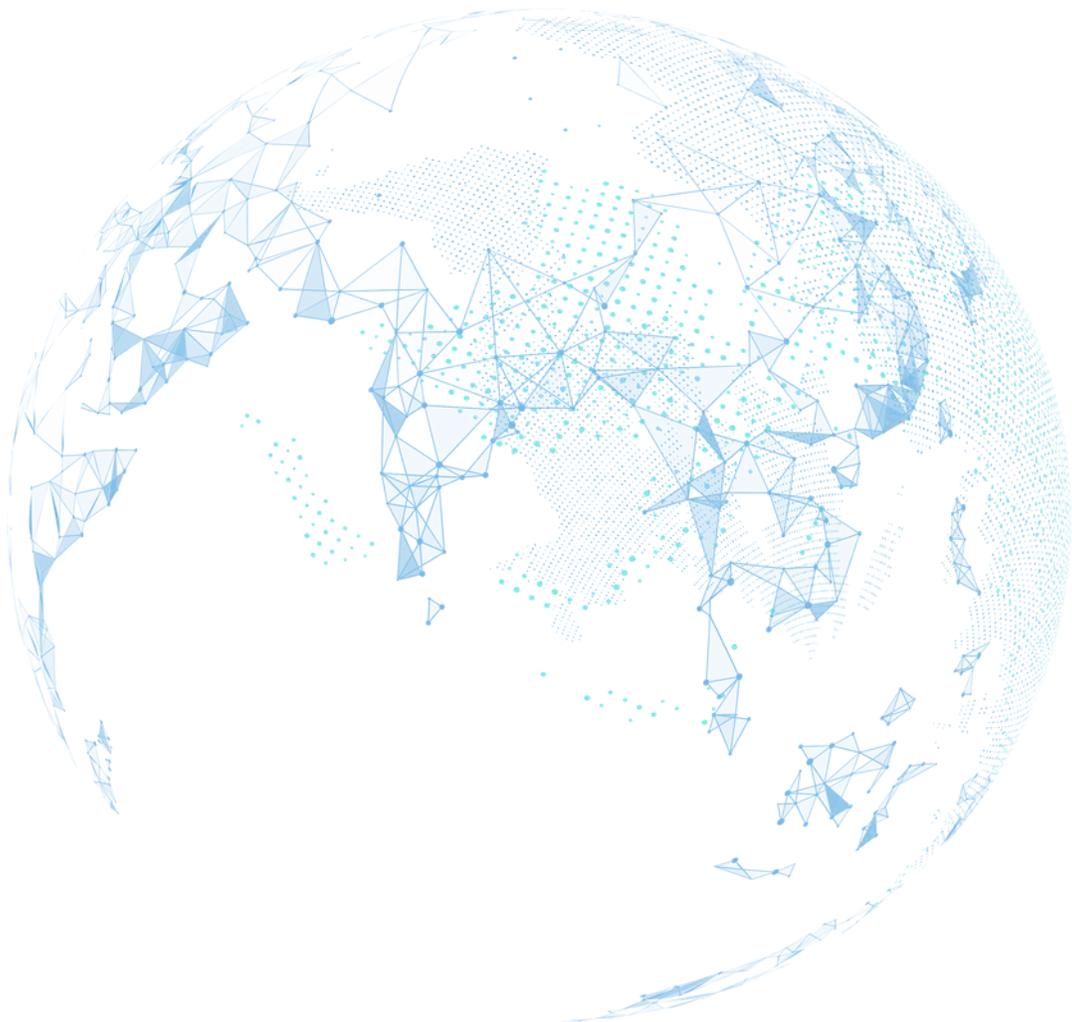
The difficulty inherent in interpreting and correlating data is causing a severe hindrance to the ability of businesses to make use of available data, and is thus stunting innovation.

If data were able to be used more effectively, it would lead to better functionality within apps, as they would be able to make use of available information to better understand users and refine their product. It would also reveal data correlations that could be used to produce potentially life-saving research.

The Unification Foundation believes that creating a standardized format for data is a crucial next step in the development of technology. Without it, we will not be able to continue to innovate at a rapid pace.

Unification's HAIKU protocol is a smart contract infrastructure written in C++ that is designed to solve the standardization problem. It seamlessly standardizes diverse data sets, so they can be incorporated immediately by businesses and research institutions, with little-to-no extra effort.

At Unification, we believe strongly that standardized data presents a massive opportunity for both rapid business development and groundbreaking research. We are proud to be leading the charge to change the way data is exchanged.



The Need for a Unified Marketplace

Compounding the challenges of non-standardized data is the fact that, at the present moment, data sellers and purchasers do not have access to an open marketplace for data exchange. Both buyers and sellers find themselves in a highly fragmented landscape where it is exceedingly difficult for one party to connect with another.

The result is that data purchasers, such as advertisers and research institutions, cannot readily cross-reference data points across various sets of information, cannot efficiently pinpoint specific data, and cannot negotiate directly with users or data collectors in an open marketplace.

Furthermore, data collectors cannot easily or uniformly sell their data to interested parties, nor can they effectively become data purchasers in exchange for the data they have curated.

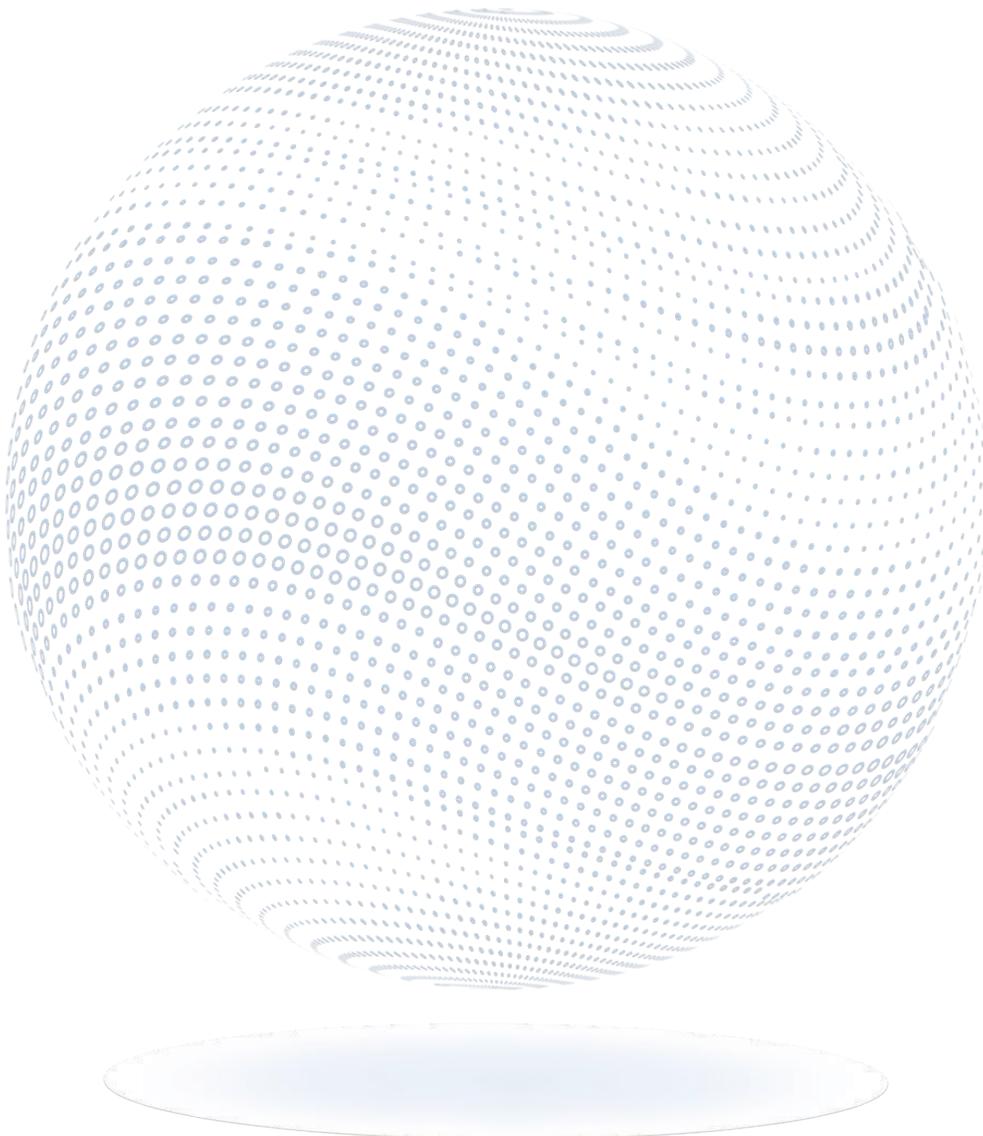
In short, there is no easily accessible marketplace where users, businesses, and research institutions can meet to buy and sell the data that is used to enhance our online experiences and make ground-breaking new discoveries.

The lack of a unified marketplace makes it difficult for businesses to acquire the data they need to improve their product for users, particularly for Small and Medium-sized Enterprises (SMEs). Additionally, it is nearly impossible for Machine Learning or Artificial Intelligence (AI) based firms to access the large amount of data necessary for industry advancements.

The current amount of user data that is not being properly utilized is vast in scope, both in terms of market value and research applications.

The data standardization enabled by Unification's HAIKU Smart Contract protocol enables a robust marketplace to form, where data sets can be seamlessly exchanged between diverse parties in a fair and open way.

At Unification, we believe that the groundbreaking effects of data standardization can only be realized once standardized data sets have a central venue to be bought and sold. Our data marketplace is thus a critical component of spreading Unification's impact to businesses and research institutions the world over.



The Need for Data Sovereignty

The current model of data collection creates a moral dilemma for consumers. How can we make use of the many benefits offered by in-depth data collection and analysis, while minimizing the very real threat to our liberty and autonomy presented by omnipresent surveillance?

Looking around our daily lives, it's easy to see many of the positive aspects of data collection. We appreciate when algorithms are able to predict an article we find interesting. We find it helpful to be suggested a new restaurant based on our friends' recommendations. Most people have no desire to turn back time and eschew the convenience provided by modern technology.

And yet, there is a dark side to our current system of managing data. Many people are becoming increasingly cognizant of the dangers of mass data collection that are inherent in the technology we use everyday. What we once saw as minor concessions in exchange for free tools have now begun to form, en masse, a formidable threat to our privacy and freedom.

At the core of the issue is the question of personal sovereignty. How much of our own information do we deserve to control? If we value our ability to operate independently as private citizens, what needs to shift in our approach to data management so that we maintain the freedom and privacy that we value?

At the Unification Foundation, we believe that individual sovereignty is a fundamental human right. Thus, it is crucial for us to depart from the way we currently collect, store, buy, and sell data to honor this need for ownership over our own personal information.

When data is collected, stored, and exchanged outside of the purview of users, as it is in most cases today, there is a real risk of that data being compromised and used in ways that threatens the freedom of users. It becomes susceptible to hacking, surveillance, and unauthorized purchase by advertisers.

Additionally, the traceability of every action we take, online and increasingly offline as well, creates a justifiable fear that our every move can and will be monitored by potentially malicious actors. Our ability to lead private lives outside of the purview of governments, corporations and authoritarian forces has evaporated before our very eyes.

To understand the alarming scope of the present state of data collection, consider this hypothetical scenario with “Alice”, which was highlighted by the Wall Street Journal in an April 2018 article.

Hungry after a long day at work, Alice decides to order a Domino’s pizza for dinner. To place the order, Alice uses the Domino’s app connected to her Amazon Alexa. With the simple act of placing a pizza order, Amazon collects her location, her full interaction history with Domino’s, and the last four digits of her credit card number.

Next, Alice orders a movie on her Apple TV to watch as she eats her pizza. In exchange for the movie, Apple collects data on Alice’s internet bandwidth and her purchase history.

When the pizza arrives, Alice snaps a selfie of her night at home and posts it on Facebook. By making this post, Alice (likely unknowingly) also provides more than 20 data points to Facebook, including a map of cell phone towers closest to her, a list of other apps that are installed on her phone, and notifications of which other devices are nearby.

All things considered, the mere act of ordering a pizza and watching a movie at home on a Friday night gives up a total of 53 data points which Alice has “agreed” to during a blanket acceptance of various Terms of Service.¹

This is alarming because Alice may not actually want to share this breadth of information with the apps she uses, but presently, there is no accessible method for her to view or control precisely which data is being shared with whom. The only way to abstain from sharing this data is to avoid using technology entirely, which is a severe hindrance to interpersonal communication and many other facets of modern-day life.

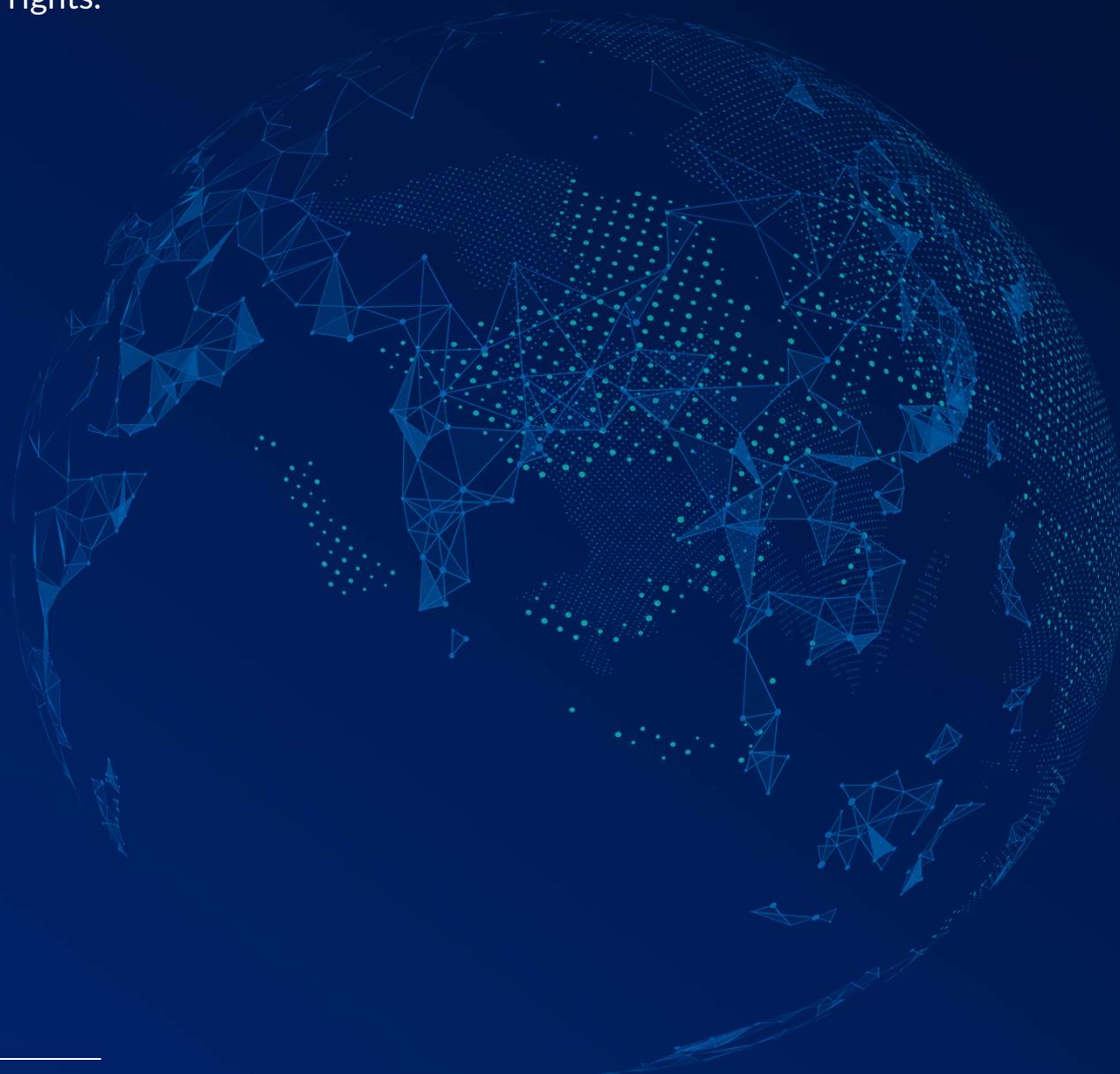
Further complicating matters is the fact that all of this data is being stored centrally on Amazon, Apple, and Facebook’s servers respectively, leaving it vulnerable to hacking or manipulation by bad actors. The centralized nature of this data storage means Alice’s personal and sensitive information is at risk of falling into the hands of someone who might wish to do Alice harm.

Layered on top of these potential privacy conflicts are legitimate economic concerns. As data increasingly becomes the currency of exchange for our tech-based society, users are producing the product that is bought and sold in a now multibillion-dollar-a-year industry. Despite being the value creators in this paradigm, users like Alice are not compensated for generating the data that is being exchanged.

¹ Stamm, Stephanie, et al. “How Pizza Night Can Cost More in Data Than Dollars.” The Wall Street Journal, Dow Jones & Company, 10 Apr. 2018, [wsj.com/graphics/how-pizza-night-can-cost-more-in-data-than-dollars](https://www.wsj.com/graphics/how-pizza-night-can-cost-more-in-data-than-dollars)

Fortunately, at the present moment, laws regarding collection and use of Personally Identifiable Information (PII) are becoming stronger in favor of the individual. In May 2016, The European Union passed General Data Protection Regulation (GDPR) laws, requiring any PII collected be only for legitimate reasons, processed lawfully and transparently, stored securely and only for as long as necessary.

GDPR laws also give individuals the right to access, correct, move or erase this data.² It can be expected that other jurisdictions will also move in the direction of individual user rights.



² “Data Protection in the EU.” European Commission, 14 May 2018, ec.europa.eu/info/law/law-topic/data-protection/data-protection-eu_en

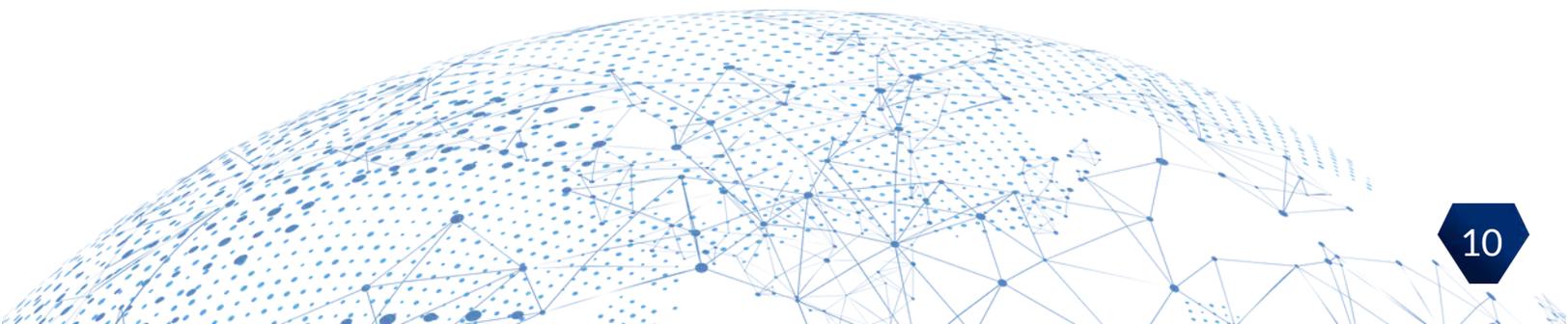
The Current Technological Context

To understand how Unification seeks to address the challenges of data exchange and user privacy, it is crucial to first examine where we are in the evolution of Distributed Ledger Technology (DLT), and how our current state impacts our ability to affect substantial change.

We presently find ourselves in the beginning of a phase of evolution commonly called Blockchain 3.0. There are distinct opportunities inherent in this new phase, of which Unification is primed to take full advantage.

In order to reach Blockchain 3.0, we have had to overcome a number of challenges tackled in phases 1.0 and 2.0, each of which has informed the direction blockchain technology is heading.

These innovations were critical to laying the foundation upon which Unification is built. Examining them enables us to continue to innovate and solve the most pressing problems that went unresolved with earlier iterations of blockchain technology.



Blockchain 1.0 (Bitcoin)

The emergence of Bitcoin marked an important shift in the ways that value was transmitted, through the revolutionary invention of Blockchain 1.0 technology.

Before the launch of Bitcoin by a pseudonymous figure called Satoshi Nakamoto, every instance of person-to-person exchange was vulnerable to breaches of trust.³ Each time value changed hands, there was a distinct risk that one side of the equation might not fulfill their end of the bargain. In order to ensure that every transaction was conducted fairly, people were forced to rely on a trusted third party to mediate the exchange.

The sole purpose of these third-party mediators was to maintain an accurate ledger of what rightfully belonged to whom, and to ensure that every transaction was completed in congruence with the agreed-upon terms. However, as society evolved, the heavy reliance on third parties led to a marked centralization of power and resources in the hands of these supposedly neutral institutions. This allowed them to acquire undue influence and to operate outside of the purview of the everyday people they purport to serve.

Bitcoin's introduction of blockchain technology changed this landscape. Because it relies on a distributed ledger where transactions were verified by an entire network of computers, rather than a singular third party, the Bitcoin blockchain created the possibility for digital stores of value to be transmitted person to person in a way that was never previously possible.

³ Nakamoto, Satoshi. "Bitcoin P2P e-Cash Paper." Satoshi Nakamoto Institute, 11 Jan. 2008, satoshi.nakamotoinstitute.org/emails/cryptography/1/



Not only did Bitcoin and its decentralized network generate the first true person-to-person digital transaction system, it also created an immutable and transparent record of ownership and network activity that is virtually impossible for a single actor to manipulate.⁴

However, while Bitcoin offered substantial innovation regarding its core issue of enabling trustless exchange of value, like any first mover it was not without gaps in its functionality. The protocol itself lacked the ability to automatically self-execute contractual agreements, a crucial missing piece that hindered the network's ability to transact outside of simple exchanges. Thus, uses of the Bitcoin blockchain are relatively limited outside of cryptocurrency itself. It remains largely a strong store of value, a “gold standard” upon which other cryptocurrencies are measured.

Furthermore, as a result of its decentralized ethos, Bitcoin lacks a clear governance structure, which has made it challenging to arrive at definitive decisions about how to evolve the technology. In order to survive, technologies must continue to innovate to meet ever-changing needs. In order to do that, there needs to be consensus about what innovations will best accomplish the network's goals.

The fact that Bitcoin has no clear decision-making body has caused rifts within the Bitcoin community as members debate what form the protocol should take going forward, resulting in “hard forks” of the network. From a sense of pure decentralization and communal ownership, this allows Bitcoin to remain the most valued, open, and democratic cryptocurrency. However, this lack of direction and decision-making power has slowed the potential growth of the network and made it increasingly difficult for Bitcoin to scale and meet increasing demands as it grows.⁵

⁴ Nakamoto, Satoshi. “Bitcoin: A Peer-to-Peer Electronic Cash System.” Bitcoin.org, 31 Oct. 2008, bitcoin.org/bitcoin.pdf

⁵ Rizzo, Pete. “Bitcoin Cash Hard Forks In Bid to Ease Mining Difficulties.” CoinDesk, CoinDesk, 14 Nov. 2017, coindesk.com/bitcoin-cash-hard-forks-blockchain-bid-ease-mining-difficulties?/

Blockchain 2.0 (Ethereum)

The challenges faced by Bitcoin were evident to many in the early cryptocurrency community, including a young developer named Vitalik Buterin, who in 2013 issued a whitepaper for a new protocol called Ethereum.

Ethereum built upon the immutability and security offered by Bitcoin's blockchain, with the addition of "Smart Contract" functionality, a revolutionary concept that dramatically increased the potential use cases for blockchain technology.⁶

Smart Contracts are, in essence, a programmable 'if this, then that' statement, which executes automatically without human interference. For example, let's say a car insurance company enables a Smart Contract. Every time a user drives a car, it activates the Smart Contract so that for every minute they spend driving over 5 miles per hour, the Smart Contract automatically charges them an agreed-upon amount. If the user stops driving the car, then the charges automatically stop accruing.

Where Bitcoin revolutionized one's ability to conduct financial exchanges without a third party, Ethereum's Smart Contracts expanded the range of functions that could be conducted without a middleman to actions stretching far beyond mere financial transactions. It became a decentralized programmable software platform upon which decentralized applications (DApps) could be built.

Yet for all the groundbreaking innovation that Ethereum added to blockchain technology, it is not without its limitations.

⁶ Buterin, Vitalik. "A Next-Generation Smart Contract and Decentralized Application Platform." Ethereum/Wiki, GitHub, 30 July 2015, github.com/ethereum/wiki/wiki/White-Paper

Chief among these reasons to be concerned about building on Ethereum is the question of scalability. Currently Ethereum is only capable of handling approximately 10-15 Transactions Per Second (TPS). At the time of this whitepaper's release, Ethereum's seven day average TPS is 9.361, with a record of 1,372,918 in one day, and 25,423 current unconfirmed transactions.⁷ Compare this to Visa, which handles on average 2,000 to 4,000 TPS, and claims to be able to process up to 56,000 TPS.⁸ With these relatively slow transaction speeds, building large-scale projects with real-world use cases on the Ethereum blockchain is virtually impossible.

There are also significant reasons to question Ethereum's ability to offer true security. Smart Contracts must be programmed, and are therefore subject to bugs and prone to human error. Auditing Smart Contracts is currently a painstaking process that cannot guarantee perfect efficacy. This is particularly true for Ethereum, as they developed a new programming language called Solidity that does not yet have the kind of widespread adoption that we see in other programming languages.

This problem was made abundantly clear in the 2016 hack of an Ethereum-based Decentralized Autonomous Organization (DAO), in which 15% of all ETH reserves were compromised through a vulnerability in the Solidity Smart Contract.⁹ The result of the hack was that the Ethereum community voted to roll back its ledger to a time before the hack, compromising the immutability that blockchains are designed to create. This moved the Ethereum network to a new ledger, and the original Ethereum ledger continued as Ethereum Classic, which a minority of users support and maintain to this day.¹⁰

⁷ "Block'tivity." Block'tivity, 22 May 2018, blocktivity.info/

⁸ "VisaNet | Electronic Payments Network | Visa>." Visa - Leading Global Payment Solutions, 2018, usa.visa.com/about-visa/visanet.html

⁹ del Castillo, Michael. "The DAO Attacked: Code Issue Leads to \$60 Million Ether Theft." CoinDesk, CoinDesk, 18 June 2016, coindesk.com/dao-attacked-code-issue-leads-60-million-ether-theft/

¹⁰ Hertig, Alyssa. "Ethereum's Two Ethereums Explained." CoinDesk, CoinDesk, 11 Dec. 2017, coindesk.com/ethereum-classic-explained-blockchain/



Furthermore, Ethereum's intention to preserve complete network decentralization comes at the expense of interoperability. Currently, Ethereum operates on the consensus algorithm Proof of Work (PoW), the same as Bitcoin, where the computers of "miners" solve complex mathematical problems to maintain the network and create new blocks. While many argue PoW to be the most secure, by design it can never scale and transaction rates cannot significantly increase.

Ethereum intends to eventually implement Proof of Stake (PoS), an idea discussed by Vitalik Buterin as early as 2014.¹¹ This network upgrade, known as "Casper," would move to "validators," who stake their coins to maintain the network and create new blocks through "minting." The intended results would be less energy wasted through computer processing, greater security from a "51% attack" requiring virtually the entire network, and faster block creation.¹² However, no official timeline has been given for PoS implementation.

Even if Ethereum adopts PoS, this still requires complete decentralization of the network, with any Ethereum address holding the set minimum staking requirement of ETH to be able to validate new blocks. Again, from a philosophical and decentralized viewpoint, this sounds like the most valid solution. However, this consensus mechanism lacks a democratic voting system to maintain the network and prevent foul play. Rather, it relies purely on the decentralized network itself, of which every staking member participates, which leaves the network without an efficient way to self-regulate and avoid manipulation. With a purely PoS system, "forging pools" could form and potentially hold the network hostage with a large enough minority, leaving the network open to "denial of service" or "double spending" attacks.¹³

¹¹ Buterin, Vitalik. "On Stake." Ethereum Blog, 22 July 2014, blog.ethereum.org/2014/07/05/stake/

¹² Hertig, Alyssa. "Where's Casper? Inside Ethereum's Race to Reinvent Its Blockchain." CoinDesk, CoinDesk, 2 Nov. 2017, coindesk.com/ethereum-casper-proof-stake-rewrite-rules-blockchain/

¹³ Ethereum. "Proof of Stake FAQ." Ethereum/Wiki, GitHub, github.com/ethereum/wiki/wiki/Proof-of-Stake-FAQ

Introducing BABEL

A Data Marketplace Based on Self-Sovereign Identity

The Unification Foundation is built on the idea that by utilizing the characteristics of Blockchain 3.0 technology we can fundamentally improve the exchange of data between interested parties. This creates a more efficient data marketplace while also ensuring increased privacy, security, and control for end users.

The core technology that Unification is using to accomplish this goal is BABEL, which is both a curated data marketplace designed to make it easier for businesses and research institutions to find and purchase relevant data, as well as a dashboard for users to view and control access to their data.

With the actualization of the BABEL marketplace powered by Unification, we provide the structure for a technological leap that allows merchants and consumers to access a data market in a meaningful, practical, and profitable way – all while ensuring consumer sovereignty.

One of the primary features of BABEL is its ability to standardize data received from apps. BABEL takes raw data and categorizes it in a way that conforms to a unified standard, no matter the data type or industry. This allows apps to more easily buy and sell data, and for end users to more easily view what data is being collected.

BABEL has three primary actors – data consumers, apps, and end users. Below we will explore BABEL's benefits to each of these groups.

BABEL for Data Consumers

(Advertisers, Businesses & Research Institutions)

Unification's curated data marketplace enhances the opportunities for data consumers to acquire data in an efficient, secure, and ethical way. Offering them the opportunity to increase product functionality and conduct groundbreaking scientific research while also using fewer resources, enhancing overall user privacy, and staying ahead of changing legal requirements such as GDPR.

Additionally, from a research perspective, we are confident that due to its unparalleled standardization, interoperability, and scale of data collection, BABEL unlocks the single biggest opportunity for scientific breakthrough in the history of human civilization.

With the rapid advancement in machine learning technology, data is fuel for discovery. The ability to collect large swathes of data in a standardized format allows scientists and researchers to make correlations and discoveries previously unavailable to the human race.

Currently, data collection efforts are extremely limited to specific, non-scalable outreach programs, locked within specific niches with no possibility for cross-niche interoperation, or are limited by the scope of a human's imagination.

At the present moment, for research institutes to gather data, it is a piecemeal process which requires much effort into collection and assembly. Without standardized formatting, we are not able to make use of computer correlation on much of the data that is already out there, stunting research discoveries.



The AdTech industry is also experiencing similar extreme fragmentation.¹⁴ Numerous private entities are compiling user profiles and ad-targeting information on various demographics, with little communication between them. Most of the time these organizations must deploy significant resources to find buyers and sellers for said data, as well as to reformat data sets for use by new applications.

BABEL changes the game by offering a level playing field, where data is presented in a standard format. This makes it far more efficient and seamless for data consumers to acquire and then utilize data for development and research purposes.

To understand what will be possible when we are able to use computers to standardize and correlate data, take the example of the AlphaGo supercomputer developed by DeepMind.¹⁵

AlphaGo was developed to play Go, an ancient strategy game involving black and white stones on a 64x64 grid. Up until the point when the program was developed, the best human Go players could easily defeat computer players, due to the seemingly endless possibilities of moves that needed to be programmed to match human reasoning capacity.

On the first released iteration of AlphaGo, the program trained its neural network using human-generated data points, compiling moves from tens of thousands of Go games played by masters throughout history. As a result of correlating such a vast data set, upon release in 2016, AlphaGo was able to beat the world champion Lee Sedol in four out of five games.¹⁵

¹⁴ Kim, Daniel. "6 Biggest Problems With Ad Tech." Marketing Matters Blog From Agency Spotter, Agency Spotter, 8 Nov. 2017, co.agencyspotter.com/6-biggest-problems-with-ad-tech/

¹⁵ DeepMind Technologies Limited. "AlphaGo." DeepMind, 2018, deepmind.com/research/alphago/



Not content with their results, the team at DeepMind decided to create AlphaGo Zero as an experiment. Instead of training its neural network against existing games in history (i.e. the limits of human innovation), AlphaGo Zero simply trained itself against the rules of Go itself.

The question this experiment posed was fundamental to the development of machine learning: Will a computer have more success building off of the full scope of human knowledge, or by using its own computational power to determine which course of action should be taken? Simply put, are we hampering the development of machine learning by believing that we can even understand exactly which questions should be asked?

To that point, AlphaGo Zero produced astonishing results. The computer started with just the board, the stones, capture rules, and win conditions — simple things that could be laid out in a few lines of code. It started to play against itself moving towards the “win condition.” Within 3 days, it had trained itself to beat the strongest simulation built off of historical game records.

*"Over the course of millions of AlphaGo vs AlphaGo games, the system progressively learned the game of Go from scratch, accumulating thousands of years of human knowledge during a period of just a few days. AlphaGo Zero also discovered new knowledge, developing unconventional strategies and creative new moves that echoed and surpassed the novel techniques it played in the games against [the world champions] Lee Sedol and Ke Jie."*¹⁶

¹⁶ Silver, David, et al. "AlphaGo Zero: Learning from Scratch." DeepMind, 2017, deepmind.com/blog/alphago-zero-learning-scratch/



What AlphaGo Zero proves is that even with the best human specifications and decisions on inputs, it is simply impossible for us to “know” which data needs to be analyzed to achieve specific results.

Imagine a test case where a machine learning engine such as DeepMind has access to millions of medical records, combined with DNA data, geo-location, web-browsing data, and spending habits.

The machine would be set to a “win condition” to determine which individuals developed certain diseases and to figure out what the correlating factors are between all of the individuals. Using its own deduction methods, the machine would almost certainly find correlating aspects that humans never even thought to consider. From there, it could create its own profiling mechanism, designed to indicate specific recommendations that could help prevent the disease. The data produced from this would be both world-changing and life-saving.

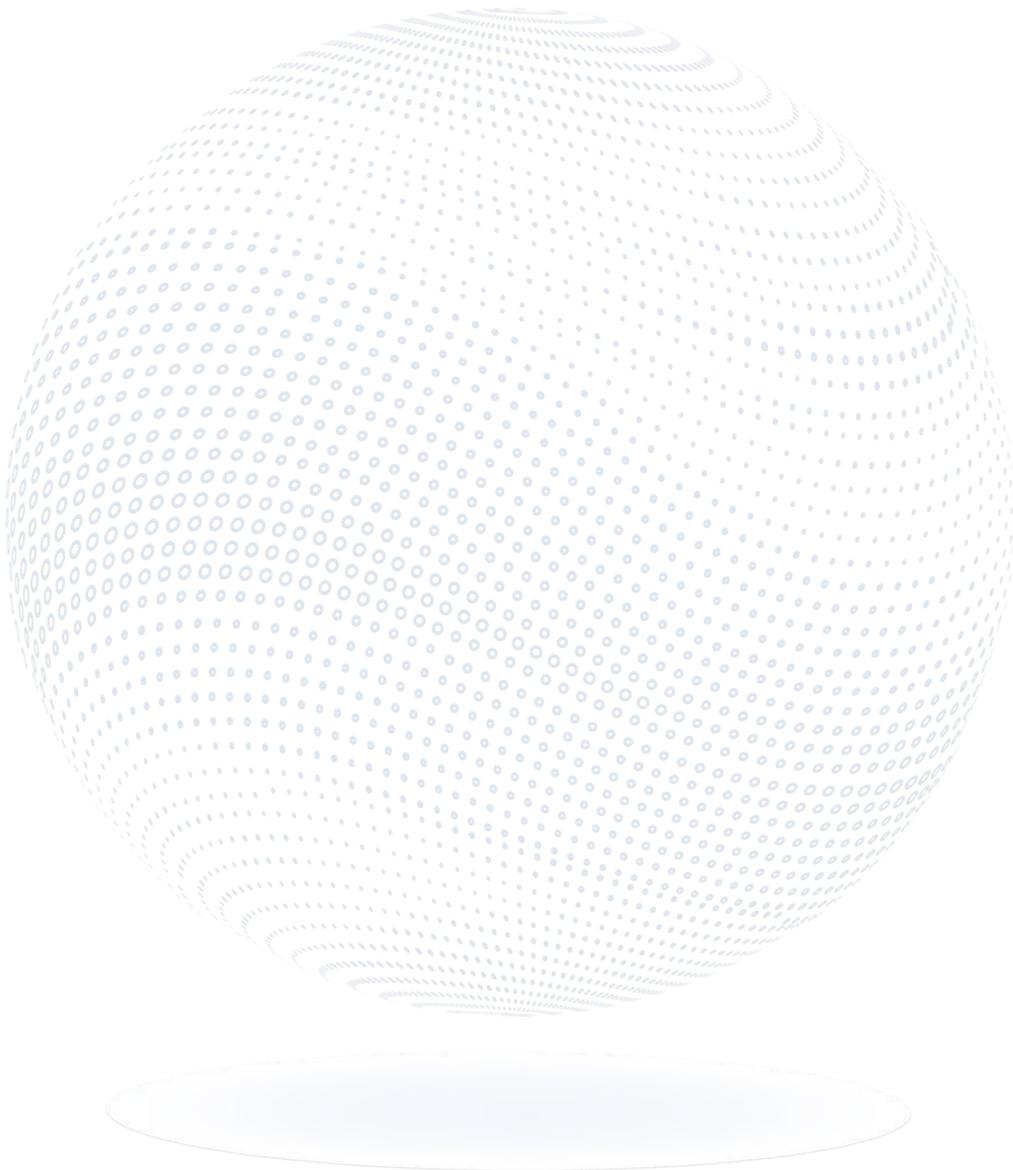
This is just one grand example of what will be possible once we have the conditions for the “machine to play against itself” – all enabled by the power of unified data.

Similar work is already being done on a small scale with limited data sets. For example, 23andMe has recently received FDA approval to provide analysis services to their genetic records for the possibility of certain types of cancer.¹⁷

¹⁷ “23andMe Granted First FDA Authorization for Direct-to-Consumer Genetic Test on Cancer Risk.” 23andMe Media Center, 6 Mar. 2018, mediacenter.23andme.com/press-releases/23andme-granted-first-fda-authorization-direct-consumer-genetic-test-cancer-risk/

The realization of unified data lays the groundwork for a future “app” that collects raw data from apps, and then packages that data into its own defined demographics. Using BABEL to present and sell said assets to data consumers thus increasing the efficiency of Unification’s system even further.

The development of this type of “Global Research Engine” is currently beyond the scope of the Unification core initiatives. However, we would expect organizations such as DeepMind, who already have developed the aforementioned machine-learning technology, to be able to seamlessly plug into the Unification ecosystem as an “app” and engage in research shifting the nature and future of civilization.



BABEL for Apps

The key advantage for apps on the platform is that their data is converted into a standard “tokenized” format and placed onto a marketplace where it is easily accessible to data buyers. This allows key monetization possibilities previously unavailable due to a fragmented market for data service providers.

At the present moment, small- to medium-sized apps and SaaS products with under 5 million active users have no singular location to monetize the data they collect. Current market options are available on an ad-hoc basis that involves individual relationships and enterprise outreach by data collection agencies. These typically involve much inefficiency and negotiation, or “suits and handshakes” as we like to say.

Typically, actualization in the case of mobile apps is with an “add-on” Software Development Kit (SDK) being installed to blanket collect all data. For this, the app creator receives pennies on the dollar for the actual packaged value.

With BABEL, data is bundled and presented in a standardized fashion, in an open auction format to be acquired by data and research organizations. Data transfer is regulated by HAIKU Smart Contracts, which guarantees via code that the data is tracked and both the original data producers (end users) and data curators (apps) are paid with UND via the Smart Contract network.

This fulcrum solves innumerable inefficiencies in the data collection industry while maintaining user control and immutability.

In terms of ease of use, we believe that the seamless integration and app onboarding offered by the Unification platform is another major advantage offered, and will be the key to solving one of blockchain's biggest problems— the challenge of getting actual end users to utilize blockchain technology.

It's no secret that the present state of the blockchain industry has a major problem with "empty houses." That is, numerous developments and ecosystems being built lacking the one thing that validates their existence: End Users.

As of Q2 2018, the market is flush with infrastructure and speculators with only a few merchants (who may be speculators disguising themselves as merchants) and nearly zero actual consumers. For the sake of this example, we would consider a consumer someone that gains practical function from technology that is not linked to speculation.

The reason for this is that while blockchain technology is becoming more effective, it seems locked in an ecosystem of "tool-building tools" and incremental improvements, with the practical implementation of end consumer usage moving further from sight.

For example, as of Q2 2018, the number one "usage" of blockchain applications besides exchanges and transferring currencies was creating ERC-20 tokens. This is essentially the process of using the computational power of Smart Contracts and the Ethereum supercomputer to "create more Ethereum" via an ever-increasing number of tokens.

We understand that it is necessary for these tools to refine themselves in a speculative market while defining true end consumer use cases; however, without real world use, it remains purely speculative.

In his original presentation “From Genesis to the Moon,” Litecoin founder Charles Lee spoke about the five stages of cryptocurrency evolution: ¹⁸

1. Miners
2. Speculators
3. Merchants
4. Consumers
5. Astronauts

For the sake of this argument we can say that miners equate to infrastructure, and when Mr. Lee referred to “Astronauts” he was referring to the concept of new and future innovations and not the currently prevalent view that “Astronaut = Moon = ICO/Coin price going upwards.”

Each one of these stages requires a technology jump in which the attempt for “incremental improvement” ceases with an assumption that the current level of technology is good enough or preferably, modular enough, to grow, and the focus moves towards the next step in evolution.

The process of Unification involves what we can consider a “technology jump” to the next implementation of blockchain, through its unique integration with apps that have existing robust user bases.

Most other companies promoting sovereign data identity are asking developers to build connected applications in a new “walled gardens” if they want to plug into their systems. ¹⁹

¹⁸ RackSpace Developer, director. Litecoin: From Genesis to the Moon by Charlie Lee. YouTube, RackSpace Developer, 29 Aug. 2014, [youtube.com/watch?v=P7jBwrVn-uA](https://www.youtube.com/watch?v=P7jBwrVn-uA)

¹⁹ Ali, Muneed, et al. “Blockstack.org Whitepaper” Blockstack.org, blockstack.org/whitepaper.pdf

They expect developers to create brand-new applications from the ground up in an arena with zero existing user bases, naively expecting that “if we build it, they will come.”

Unification is different. We are integrating existing technologies, apps, and SaaS products directly onto our platform. Our technology recognizes the necessity of combining the future we desire with the reality we currently live in. For instance, we would not expect self-driving cars to drive on highways of their very own, rather we understand the need to use the roads we’ve already built.

From the business perspective, apps are able to incorporate Unification’s data sovereignty platform with very little change in day-to-day operation. This is due to the fact that Unification has been consciously designed to integrate seamlessly with existing technology stacks and consumer protocols.

BABEL itself is designed in a way that it does not force any app or platform to use the token for things such as payment, allowing existing applications to keep most of their existing parts, such as payment gateways, and just “link into” the Unification platform for the critical components that need to be on blockchain. This allows the ecosystem around BABEL to rapidly expand without forcing apps to become locked into a proprietary system or payment method.

As a result, even after integrating with Unification’s data marketplace and sovereign identity capabilities, an existing app would be encouraged to continue their deployment on the Google Play or Apple Store. A Software as a Service (SaaS) website that accepts PayPal could continue with those protocols.

To join the BABEL marketplace, an app goes through a simple integration process designed to be as seamless as possible. This process creates a readily accessed “view” on all of the data collected, its permissions, and non-personally identifiable user information. After this conversion, the app is then referred to as a UApp or Unified App.

For instance, if the Fitbit team wished to look at its data within the BABEL dashboard, they would find a clear summary of the unique categories within the data that is collected by the Fitbit app. From there, they can dig down from a top-level category all the way to individual data fields. This view allows the app itself to approve or initiate requests for sharing with data consumers according to defined parameters.

We do not believe the market and technology is at a stage where a full-scale decentralized database is feasible for all data. As stated in the technical sections below, UApps continue to use their existing storage systems for all non-personally identifiable user information where it is held in an “encrypted lockbox” to be accessed via the end user’s permissions.

BABEL for End Users

The Unification Foundation believes that the most paramount issue in winning consumer sentiment is providing a unilateral view and immutable control of all data collected. With Unification, end users can access the full range of information about exactly what data they are generating and where it is being shared.

For end users, BABEL acts simultaneously as a marketplace where an end user can approve or submit requests for data sharing, a personal identity system, and a wallet for UND. The BABEL interface allows each individual user to transparently visualize and manage their information, toggling the transfer of data on and off at will.

If end users wish to gain greater functionality in the apps they use, support groundbreaking research, and/or gain monetary rewards, they can turn the data faucet 'on' with the click of a button. If they find a particular data set too sensitive to share, or are concerned with their privacy, it only takes one click to shut off that data faucet. This act guarantees that the information will never again be bought or sold without their explicit permission, as enforced immutably by the blockchain and not just a Terms of Service.²⁰

The result is that end users gain a transparent view of exactly what is happening with their data at all times and maintain unilateral control of how their data is exchanged. Over time, we believe that this type of data sovereignty will become an ingrained facet of everyday life that consumers will demand of all applications, websites and devices that collect user data.

²⁰ *Note: While data curators are able to use the data internally, and theoretically could copy a "snapshot" of the data, this is against Unification's Terms of Service. Additionally, revoking permissions prevents access to new data, which is far more valuable than old data. No user data can be bought or sold within the Unification marketplace without active permissions, and user data sold outside the Unification marketplace is also against Terms of Service.

According to the Unification Foundation's ethos, privacy is paramount. We believe end users need to have full transparency on all the components of any data collected while also being cryptographically protected so that this information cannot be shared against their will.

When end users interact with Unification-Integrated Apps (UApps), each user's ID is encrypted and unique to that UApp. Without a direct permission to share, multiple UApps cannot cross-identify users to complete a full profile.

Additionally, with this model, each end user benefits financially every time they opt into their information being sold on the Unification data marketplace. To this end, the BABEL Wallet functions like most other cryptocurrency wallets in that it is able to hold, send, and receive the UND token, with the addition of giving the end user full access to control their data on the Unification platform.

In the VersionAlpha release, BABEL functions via a password backed-up by a private key or recovery phrase. In this "minimum viable product" release it functions by the current standardized system in which a user = private key.

The Production release of BABEL is developed to move from "user = private key" to "user = human,"²¹ with the private key being a secondary-access mechanism that can be recovered via a unique consensus mechanism performed by delegated trusted parties. We feel this is a critical component in establishing a truly decentralized sovereign identity for end users.

²¹ *Note: As BABEL and society evolves we expect to include entities other than humans, however that should be considered a good starting point.

The identity system, in practice, is a series of locked data fields that hold a “human’s” immutable data which is personally identifiable. Things such as photograph, email, address, phone number, and government documentation are prepared for the Alpha release. Each of these fields is directly accessible only to the end user in an immutable way.

Not even the admins of BABEL can access this data as it is secured and encrypted by the blockchain and directly controlled by the end user, and only the end user. If the end user chooses to share this data with an individual UApp, they can grant access via individual permissions and revoke as requested via the same methods.

The difference between a normal data field that an app requests to collect and Personally Identifiable Information (PII) is that PII is collected and “stored” by BABEL in an encrypted decentralized matter.

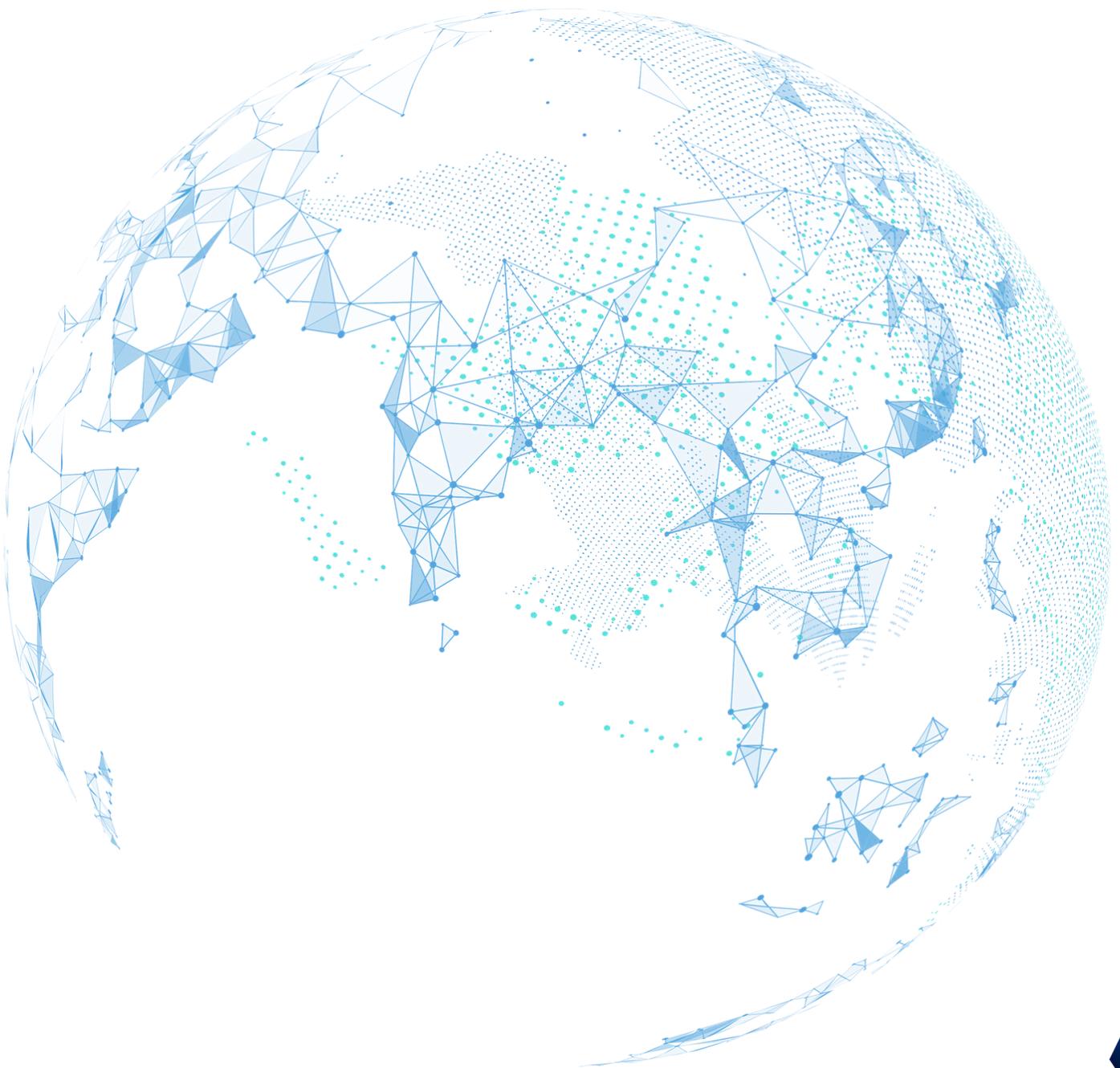
This means that even if BABEL ceases to exist or the end user chooses to port to another platform built on open-source protocols, the data can still be decrypted, accessed, and assigned permissions via the end user’s human access in the new protocol.

The technical process to this is similar to the decentralized database technology used by Interplanetary File System (IPFS) and ensures the two undeniable rights that:

- 1 – An end user unequivocally owns their own data and identity enforceable by both Terms of Service and immutable code.
- 2 – The “custody” of this data and identity is not tied to any single point of failure such as loss of a private key or a server crash.

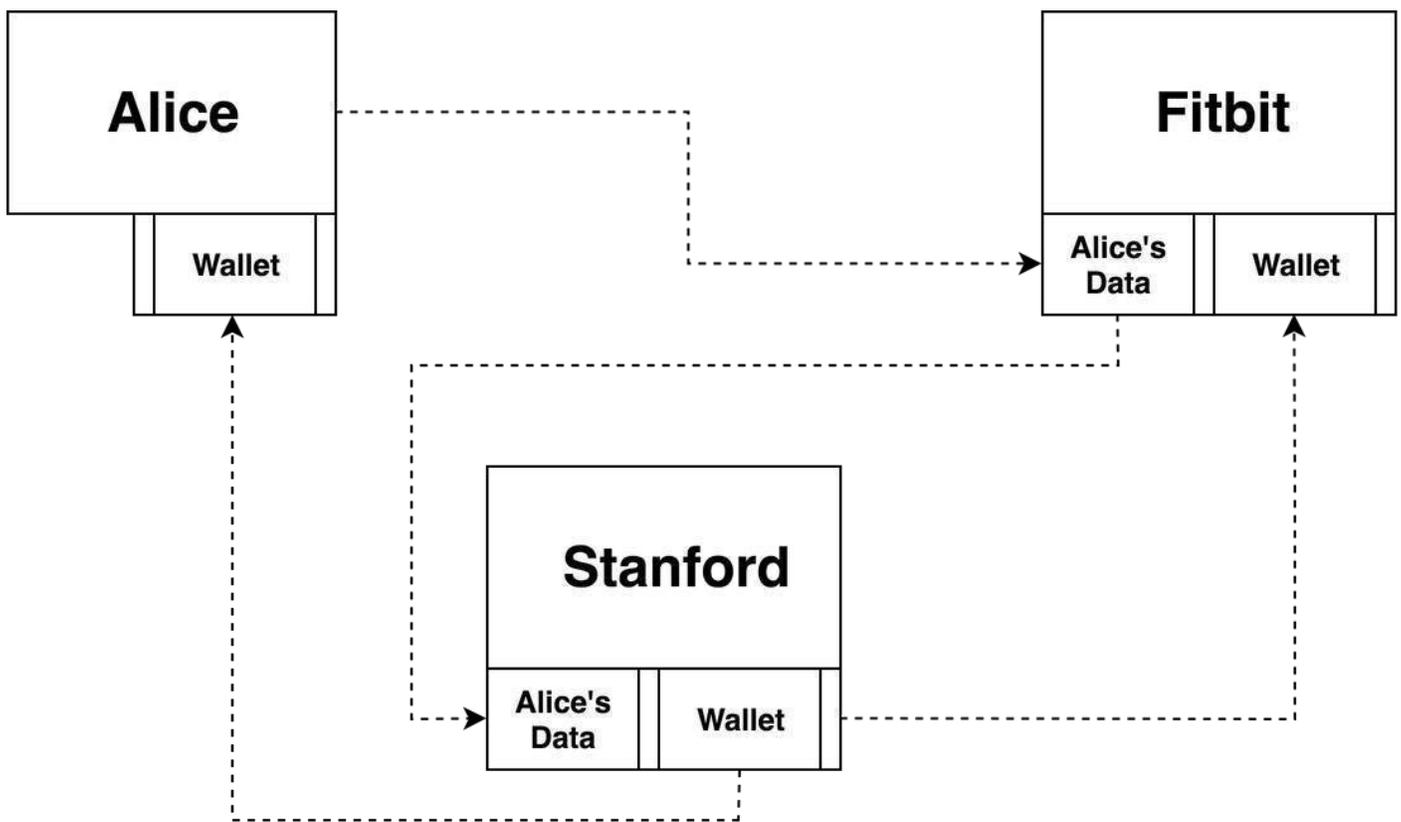
Example Use Cases for Unification

Because the Unification platform is inherently agnostic, and all configurations are technically possible, there are limitless opportunities for apps and data consumers to correlate data in ways which were never before possible – all with the explicit consent of the end users whose data is being exchanged.



Use Case #1

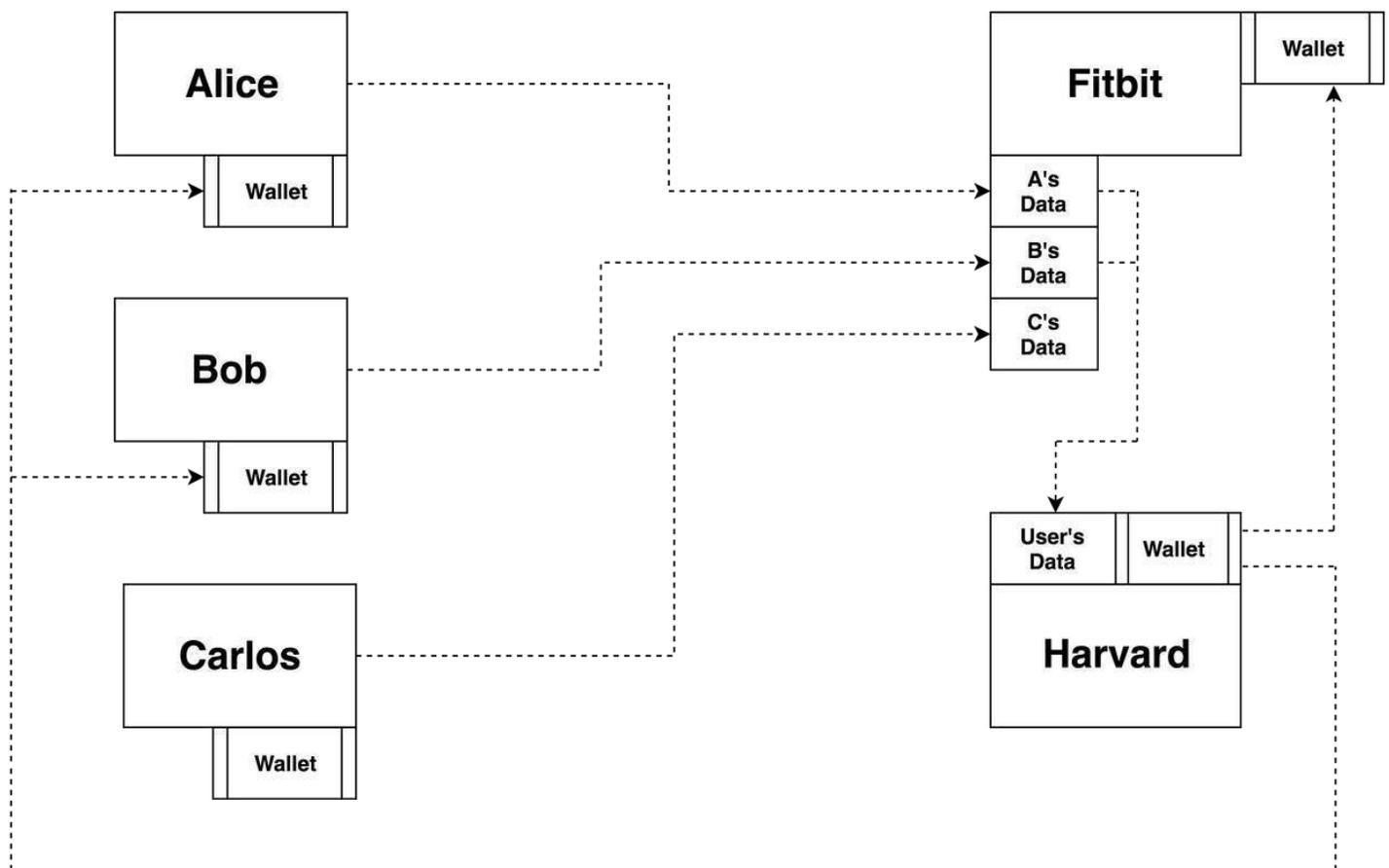
Alice has a Fitbit, which collects her health data. Through the Unification platform, Alice discovers that Stanford University is collecting health data on BABEL, and she decides to offer her Fitbit data to the study. Alice approves the share via the BABEL dashboard and Stanford receives the data. Alice and Fitbit receive payment for this data in the form of UND (United Network Distribution) tokens from Stanford per the executed HAIKU SmartContract.



Alice is allowed to execute this data share without receiving explicit permission from Fitbit because according to Unification's Terms of Service, she is the inherent owner of the data. Fitbit is also paid a percentage of UNDs, because they are the actual entity collecting and hosting the data. Stanford is able to conduct better, more accurate research.

Use Case #2

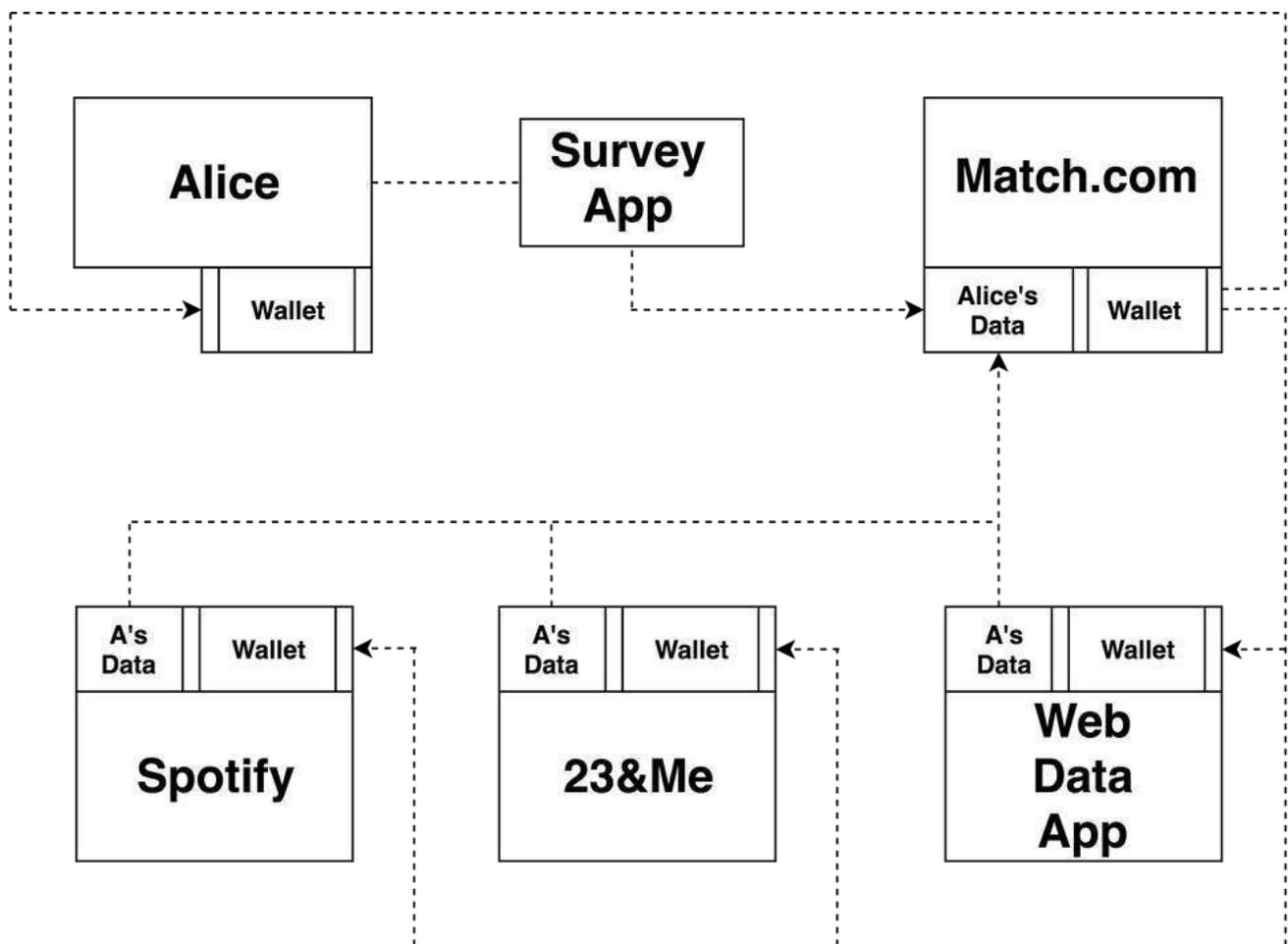
Fitbit has already collected health data from Alice, Bob and Carlos. Harvard wants access all of this health data and asks Fitbit directly for permission to access. Because Alice and Bob have already opted in when they signed up to have their data shared, Fitbit does not again need to receive their explicit permission to share the data. According to the HAIKU Smart Contract, Harvard will send UNDs to Alice, Bob and Fitbit in exchange for the data.



Alice and Bob are also able to visualize how and where their data is being shared and shut off the active stream of data to any recipient at any given time. Carlos never gave explicit permission for Fitbit to sell or share his data, so Fitbit can only use the data internally. Later, if Carlos changes his mind, he will be able to toggle on data sharing per requests made in his dashboard.

Use Case #3

Match.com is doing a specialized opt-in study on AI matchmaking which requires them to analyze musical tastes, DNA records, and web browsing data. They offer to pay a bounty of UNDs to anybody within the chosen demographic who will take their survey and also provide access to the shared data from their accounts at Spotify, 23andMe, and a web browser, all integrated with Unification.



Alice signs up and takes the survey and connects her accounts. According to the HAIKU Smart Contract, each of the data collectors (Spotify, 23andMe and the web browser) receive a portion of the UNDs in the contract since they collected the data, and Alice will receive UNDs plus have access to the results of the study.

Technical Process

Achieving Unification's Data Marketplace

The description below explains the technical framework and concept of HAIKU as it relates to business to business, and consumer to business implementations.

The simplest way to understand HAIKU is that it is a Smart Contract driven routing mechanism through which data — instead of going directly from a UApp to a server — is routed through the HAIKU, where it is encrypted, and stored in a locked box, before being forwarded to the UApp's server. The end user from whom the data was originally collected has the “key” to access this data and lends out that key to the UApp.

The de facto relationship is that UApps still collect data the same, with the exception that the end user has the ability to revoke the data flow at any time within the Unification ecosystem. In addition, due to the tokenized nature of the data, it can be traced, revoked, or charged as it flows to other sources.

Practically, a more advanced use of HAIKU is when an end user or a UApp wants to share data with another UApp. In this case, the HAIKU would be executed, and a temporary, revocable key generated to allow the UApp to access the data. The HAIKU is executed in a way that the currency of Unification, the United Network Distribution (UND) token, can be exchanged in return for access to the data on a one time or ongoing basis.

In order for data to run through the HAIKU effectively the following must first be deployed into the ecosystem:

- 1 Smart Contract enabled blockchain platform
- 2 UApp Smart Contract
- 3 Server-side software and SDK
- 4 Client-side SDK

While it is possible for any other entity to take the four points above open-sourced and make their own implementation independently, there are also two supplementary components of the BABEL ecosystem with which HAIKUs can interact.

These two are “optional” and are a result of Unification’s adoption initiative:

- 5 Unification controlled meta Smart Contract (MOTHER)
- 6 Blockchain Transaction Execution for Smart Contracts

Below we will go through each of these six prerequisites of implementation in detail.

Smart Contract Enabled Blockchain Platform

HAIKU is inherently blockchain agnostic with the majority of the critical operations happening off-chain. That being said, having an immutable blockchain with fast and cost effective transaction speeds is mission critical to success.

While asymmetrical cryptography alone would allow those granted access to encrypt/decrypt data, the addition of Smart Contracts on the blockchain offers the benefit of immutable records of who has accessed what data, payments received for allowing access, and a transparent view of what data (and metadata) is available within the ecosystem.

UApp Smart Contract

Each UApp to be included within the Unification Ecosystem will be required to implement and deploy a Smart Contract to enable Data and Access control. The final Smart Contract is verified and validated for standard compliance by Unification before the UApp is included in the Unification ecosystem (much like Apple's validation process prior to Apps being added to their App Store). For the majority of UApps, they use the standard templates given with little to no code modifications required. This ensures a secure contract that is not prone to expensive auditing.

There are two primary aspects to the Smart Contract, which are as follows:



1 – Smart Contract: Metadata Aspect

This aspect is required for all UApps and contains metadata about the underlying data (owned by the UApp) being made available within the Unification ecosystem, such as structure, data types, mapped pseudo field names, data sources, etc. Additionally, the metadata aspect of the Smart Contract will store scheduled, timestamped hashes of the data, allowing for validation of the underlying source data, ensuring that any UApp requesting data is receiving data that hasn't been altered or tampered with.

2 – Smart Contract: Access Control Aspect

The Access Control List (ACL) aspect is required for all UApps and is used to determine which end users have granted (or revoked) access to data within the UApp and across the ecosystem. It contains a mapping of all end user Unification account references who have explicitly granted or revoked access to another UApp. End user accounts and permissions cannot be arbitrarily added by a UApp— only the end users themselves can add or remove their own Unification account reference to the ACL Smart Contract. e.g. compulsory “require_auth(user_account)”.

Once an end user has interacted with a UApp's Smart Contract, a record of them remains in the Smart Contract, regardless of the permission state (granted or revoked), so that Unification, the UApp, and the end user are always aware of which UApps contain data about an end user, and who has access to what regardless of access permissions, an end user can always see what UApps hold data about them.

Server-Side Software & SDK

All UApps within the Unification ecosystem which access a data source (either their own relational database, filesystem, or a combination of data from other UApps, etc.) are required to install the HAIKU server-side software. This software is non-invasively installed, includes a suite of executable tools, and acts as the bridge between the blockchain and the off-chain underlying data source (RDBS, file system etc.).

This software handles all data requests from UApps, publishes data hashes to the blockchain, and communicates with the UApp's Smart Contract to ensure requesting UApps have access to an end user's data.

The SDK contains a set of tools to allow UApp developers to easily integrate their data, and the Server-Side Software into the Unification ecosystem. The tools will allow the developer, for example, to easily map their internal native database User IDs to the public Unification Account names of end users (ensuring that their native User IDs are never exposed, and that data request queries are always based on public Unification Account names).

Additionally (but not exclusively), the tools will allow the developer to easily map their source data to a metadata schema template, test and deploy their Smart Contract, update metadata within the Smart Contract, and submit their UApp to Unification for review and validation.



Data Sources

The data to be included in the Unification ecosystem can be structured (such as from a RDMS), or unstructured (such as documents, images, etc). The UApp's source data remains untouched, and is only made available within the ecosystem via an encryptable, standardized data store. Scheduled, timestamped hashes of the data are stored within the UApp's Smart Contract.

This “encrypted data store” then effectively acts as the data source for UApps within the Unification ecosystem. When an end user grants access to a UApp for gathering data, it is stored within this encrypted data store. The server side software captures any incoming data, and adds it to the encrypted data store. In-house data processing is unaffected by this process.

The original data source is not directly included within the Unification ecosystem.

Client-Side SDK

The client-side SDK is available to enable communication between the UApp's server-side software and the UApp itself. It also aids in linking the UApp's native User ID with their public Unification Wallet address when an end user first interacts with the UApp, via communication with the server-side software and SDK. The SDK can be configured to be deployed on a number of platforms including Android, iOS, and web/desktop based SaaS softwares.

Unification Controlled Meta Smart Contract (MOTHER)

MOTHER is owned and maintained by Unification, and contains a list of UApps' Smart Contracts, some metadata about the UApp, and a hash of the validated Smart Contract code (to allow for additional validation during data requests - see Validation section below). which have been validated and verified by Unification. It effectively acts as the master list of BABEL (the Unification UApp Wallet and Data Marketplace).

All apps wanting to be included in the Unification ecosystem must comply with specifications and requirements set out by Unification and be manually and machine reviewed before they are added to this Smart Contract. The server-side software cross references this Smart Contract when a UApp requests data to ensure that it is in fact included in the Unification ecosystem. Any data requests from UApps not included in, or valid according to MOTHER are automatically rejected by the server-side software.

Validation Process for MOTHER:

- 1** The UApp developer modifies (if required) and tests their Smart Contract using a Test Network. This allows them to fully develop and test their code at zero cost. It is likely in most cases that there is little to no code modification required from the template given by Unification. This allows UApps to integrate into the protocol without needing blockchain specific developers on staff.
- 2** The UApp developer then submits the Smart Contract source code to Unification for a pre-deployment code audit and review. If rejected, the UApp developer is expected to implement the recommended changes before testing and resubmitting the code for further review. These two steps continue until the code conforms to the Unification code standards.
- 3** Once Unification has approved the code, the UApp developer can deploy the Smart Contracts on the live network and submit the Smart Contract address to Unification for final review.
- 4** Unification will review the deployed Smart Contract to ensure it complies with the specifications and requirements before adding the Smart Contract address, along with a hash of the actual code to MOTHER. This final review step ensures that the UApp developer hasn't tampered with the approved code prior to deploying it on the live network.



Of course, any developer can write and deploy Unification based Smart Contracts and install the server-side software – there is little that can be done to prevent this. However, the UApp will not have access to, or be able to publish data to, any other apps in the Unification/BABEL ecosystem until they have been approved and added to MOTHER. The server-side software will always reference MOTHER to ensure a UApp requesting data is approved and included in the Unification ecosystem, ensuring a UApp's validity to access and publish data.

If a UApp developer wishes to modify any metadata held within their Smart Contract (for example, adding/removing data sources, data structure etc.), they will be required to go through a modified review process for each update. MOTHER keeps an up to date record of the latest valid metadata held within a UApp's Smart Contract.

Hashes of the deployed code are stored in MOTHER to ensure that Smart Contract code has not been tampered with and redeployed on the blockchain. The server-side software always checks the hashed code of a requesting UApp's deployed Smart Contract against the hash stored in MOTHER to prevent code tampering. If the code hash for the deployed Smart Contract for a UApp requesting data does not match the hash held within MOTHER, the data request is automatically rejected.

Uses of Decentralization & Centralization Within Unification

In order to balance integrity and privacy with scalability and efficiency, Unification combines both decentralized and centralized aspects. We believe that the core fundamentals of decentralization are paramount to long-term sustainable growth, integrity of data sovereignty, and transparency. However, for rapid commercial marketplace adoption, we also believe that a core centralized aspect must be implemented and nourished to create a flourishing marketplace.

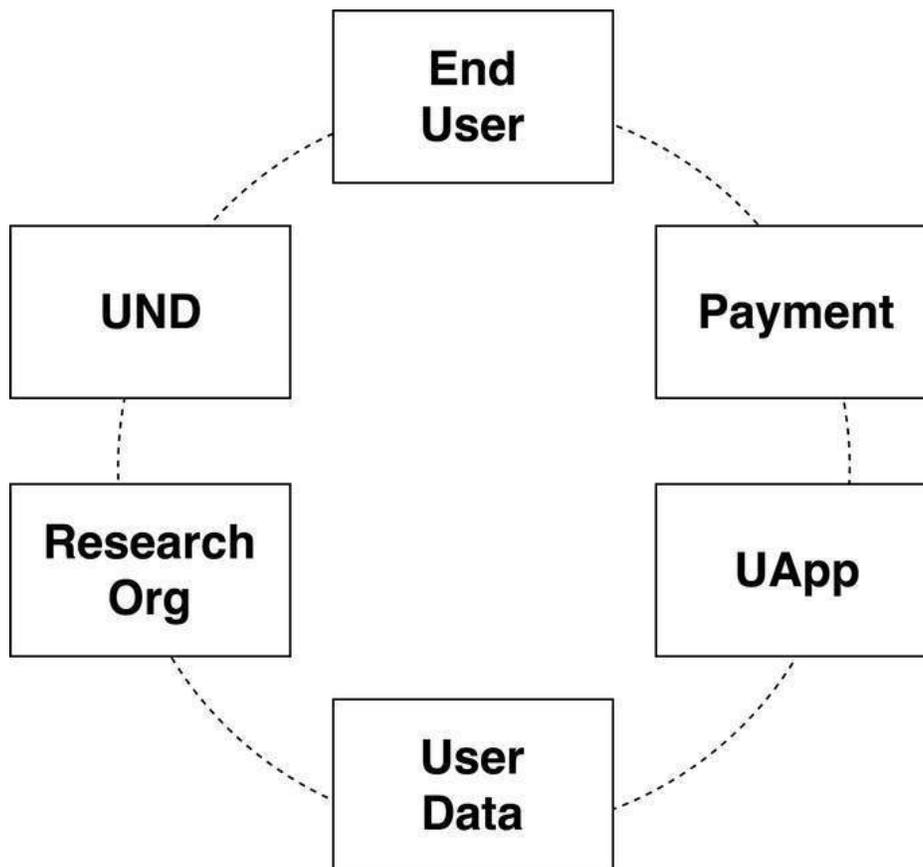
DECENTRALIZED

HAIKU is an Agnostic Smart Contract Layer and SDK specification for the server/client, providing a standard tokenized format for data and controlling access via unilaterally permissioned on and off faucets. HAIKU is a fully decentralized protocol of Smart Contracts that each individual UApp deploys. These HAIKUs allow the UApps to effectively tokenize their data both in a larger semantic categorization and in granular data points. This allows for the lossless exchange of data between UApps.

Any entity can develop or implement the HAIKU codebase in individual chains between UApps, or create a curated marketplace of their own. We have provided BABEL as an initial marketplace.

HAIKU is powered by the United Network Distribution (UND) token, which is built into the protocol as a method of transfer of value to allow data to be bought and sold, or as a payment for usage of resources in acquiring data.

The utility of the UND token can be seen in this diagram:



This allows an ecosystem to flourish in which specific entities can build their own protocols and marketplaces for rapid and lossless exchange of data. Specific information about the UND token utility can be found in the United Network Distribution Token section of this paper.

CENTRALIZED

There is an important quote from Kyle Samani, the co-founder of MultiChain Capital, in which he states:

“Given that all open-source code can be copied without permission, achieving network effects as quickly as possible is the only thing that matters. Achieving network effects is mostly a function of go-to-market strategy and execution.” ²²

The reality is that open source is free to copy. As we progress forward, most technologies are moving towards a homogenized state in which first-to-market creates a network effect that oftentimes cannot be challenged. At Unification we don't just want to build the best technology, we want people to use it. For that to happen it requires a moderately centralized effort.

This effort can come in the form of evangelism, community outreach and developer support. Similar to how Ethereum and its founder Vitalik Buterin continue to engage in a “centralized” outreach effort while leaving the codebase truly decentralized, we have done this with HAIKU. It can also function in a way that an initial viable product deployment is issued and nurtured.

²² Samani, Kyle. “Good Artists Copy. Great Artists Steal.” Multicoon Capital, 25 Apr. 2018, multicoon.capital/2018/04/25/good-artists-copy-great-artists-steal/

Roadmap for Mass Adoption

We intend that Unification will achieve widespread adoption by data consumers, apps, and end users. To accomplish this, the Unification roadmap entails three distinct parts:

I - PRODUCT DEPLOYMENT - Building BABEL, a curated marketplace of apps participating on the Unification platform and a dashboard for end user control of data.

II- ENTERPRISE OUTREACH – A concentrated Business-to-Business (B2B) outreach plan with North American, Asian and European offices for the specific purpose of assisting existing apps and SaaS products to onboard their user bases into Unification.

III - CONSUMER ADOPTION – A Business-to-Consumer (B2C) outreach agenda through direct response and social marketing in order to acquire and maintain a thriving user base through community engagement.

Phase I - Product Deployment

Building out a world-class asset happens over a multi-faceted roadmap involving many actors and strategic partnerships. We are sharing a general roadmap to the best of our knowledge that our community can use as a two-way street of accountability. This roadmap illustrates goals that are internally based.

Because these goals build upon each other, the roadmap may fluctuate. Additionally, we are only including specific actionable items, and would not for instance incorporate "acquire 10M users," even if we feel confident in our ability to do so.

- First presentation of Unification concepts at a private dinner in Tokyo
- Backend/Blockchain Dev Team recruitment, begin conceptual architecture
- Testnet Development begins
- Public presentation of Unification concepts at the Tokenomx Conference
- Final BABEL conceptualization, production begins with front-end dev team
- Early Stage Angel Funding
- HAIKU MVP Deployed on GitHub
- Private Seed Round
- Private Pre-Sale
- Public Crowdsale
- Token Generation Event
- HAIKU Testnet Deployed
- HAIKU Mainnet Deployed
- Enterprise Outreach Office Open

Phase II - Enterprise Outreach

Recently at a private-invitation dinner for blockchain royalty in NYC, a very prominent figure in the industry was quoted as saying:

“We all know that there are only three plays here: A better blockchain, data plays, and decentralized exchanges. None of these matter on tech because they will all just copy each other.”

We consider this to be a fairly nihilistic but accurate statement. Nailing the technology down could and should be the ticket to get in the door, but the reality is that network effect wins the day.

At Unification we understand that precise technology is just the starting point to success, and that even the best-built technology is irrelevant without end users. For that reason, we are focusing significant attention on enterprise outreach.

A relevant example can be found in Oracle, led by Larry Ellison, a database solution that grew to be one of the largest companies in the world, valued at \$200B.²³ To some degree, Oracle offered unique features that other competitors didn't, but at the end of the day, the reason that Oracle reached a point of industry dominance had little to do with the rarity of its product.

Rather, it succeeded because of its well-structured culture of global enterprise sales, in which they partnered with businesses to introduce Oracle databases where they could make the most impact — businesses with existing consumer bases.

²³Waters, Richard. “Oracle Is First Enterprise Tech Group to Hit \$200bn Valuation.” Financial Times, Financial Times, 22 June 2017, [ft.com/content/4c373644-56d1-11e7-80b6-9bfa4c1f83d2](https://www.ft.com/content/4c373644-56d1-11e7-80b6-9bfa4c1f83d2)

When we look at examples of how other blockchain players have acquired end users, typically we find that an initiative will take a two-pronged approach, onboarding developers and onboarding end users directly. We think that in the wild west of the blockchain industry, both of these strategies fall short if executed in their own vacuums.

The solution provided by Unification is that if we want end users on a platform, the tested and true method is to go to where the end users already live — i.e. existing apps. Looking at the state of the blockchain industry currently, we find literally dozens of “walled garden” ICO initiatives which claim “data sovereignty” and build out robust toolkits and Application Programming Interfaces (APIs) in a futile attempt to excite developers to their garden.

The reality is that having a successful enterprise comes from a network effect, where end users generate more end users. How can this best be accomplished? We believe that the key ingredient to success is to not “force” end users or apps to change their behaviors. The reality is that end users will not onboard onto any platforms just because it is there and it is a “good thing.”

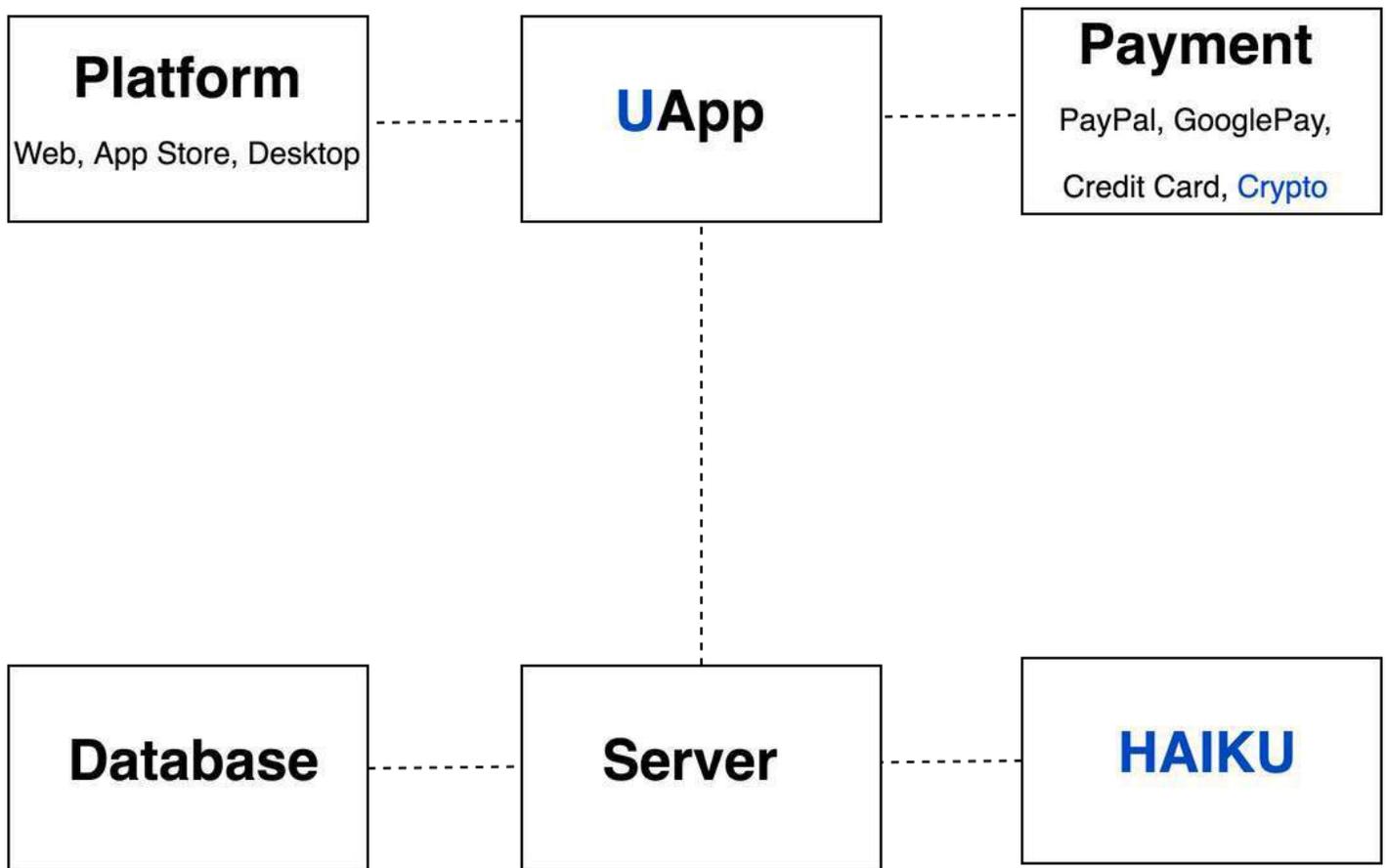
Instead, it is necessary to create a scenario where end users understand that other people they know and trust are already using the technology. We can see this evidenced by the fact that in 2009, over 30% of Facebook's organic user growth came from FarmVille.^{24,25}

²⁴ Eldon, Eric. “How Zynga Won The Facebook Platform In 2009.” TechCrunch, TechCrunch, 13 Dec. 2011, techcrunch.com/2011/12/12/zynga2009/

²⁵ Jahan, Neyma. “Building a Better CryptoKitty - An End User Vision for the Blockchain.” Medium, 18 Feb. 2018, medium.com/@Neyma/building-a-better-cryptokitty-an-end-user-vision-for-the-blockchain-549f1328fd18

It's also necessary that any new behavior required for use fits within models that don't stray too far from end users' comfort zones. To accomplish this ourselves, we have been careful to preserve as much of the current user experience as possible, with blockchain capabilities constituting only a layer on top of existing architecture, to be accessed when needed.

To this end, when integrating with Unification, an app keeps all existing platforms (Google Play, Web SaaS, AppStore, etc.) and payment methods (Apple Pay, PayPal, credit card, etc.) and plugs into the blockchain only where necessary – i.e. for the aspects that are required to provide data sovereignty.



Existing Ecosystems **Unification**

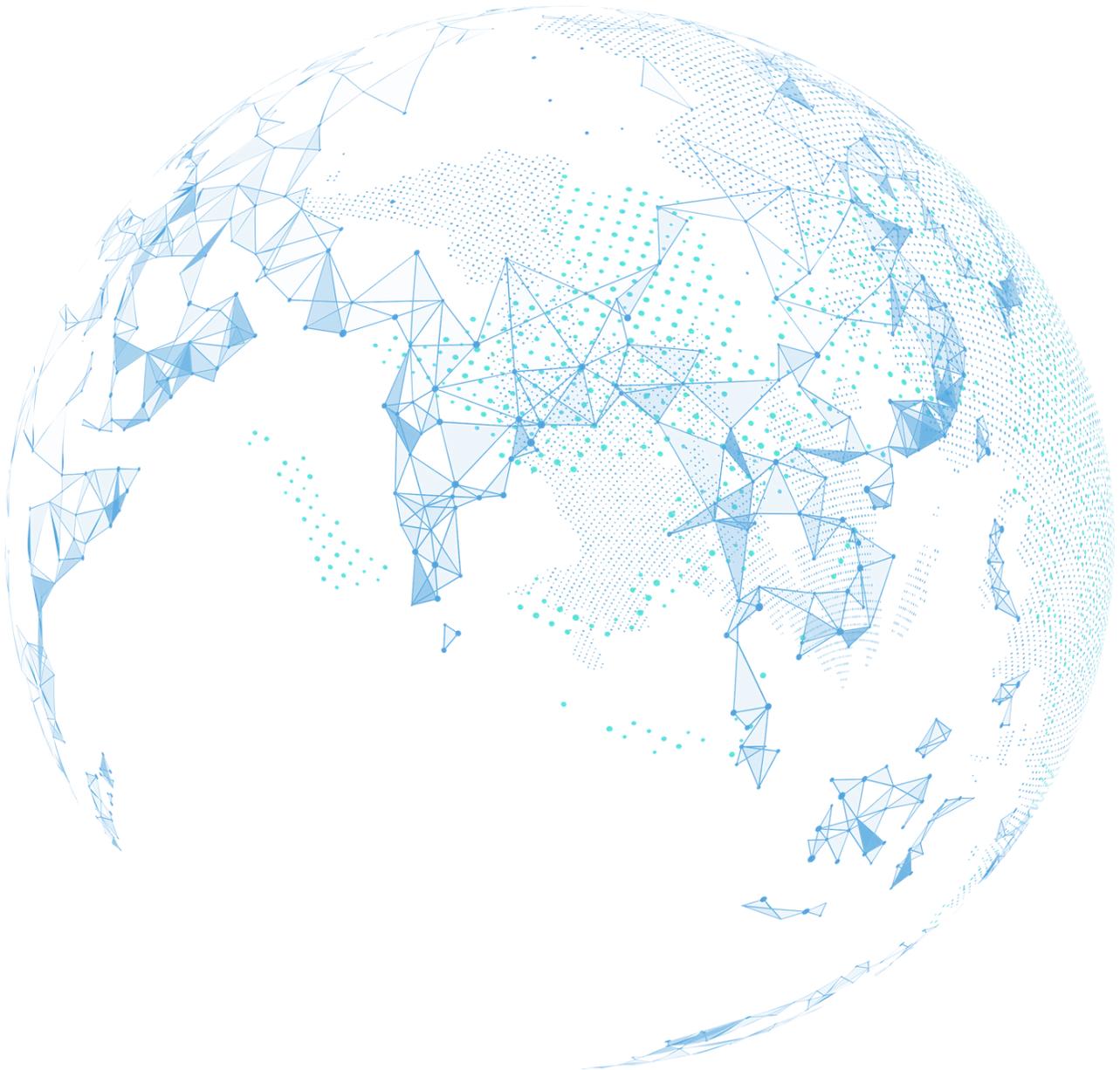
In order to pursue our strategy of acquiring existing apps and onboarding their user bases into the BABEL dashboard, we have a dedicated enterprise outreach initiative. This initiative is designed to show apps that it is a clear win-win for them to integrate with the Unification platform, according to the points outlined below.

By choosing to join the ecosystem, an existing app benefits in the following ways:

- 1 All data is packaged in a standardized method and placed on the BABEL marketplace, allowing for previously unavailable methods of monetization via selling user data with permission, as well as access to data for purchase for increased functionality.
- 2 We provide a turnkey protocol for GDPR compliance for data and users once onboarded onto Unification. This also allows apps to stay in front of other laws and regulations in other domiciles. All data on Unification is de facto compliant with GDPR and related regulations.
- 3 Currently 30% of UND tokens are held in reserve in order to incentivize new apps and research organizations to onboard onto the system. The allocation strategy of these tokens is described in detail in internal documentation and designed to create a “land grab” environment in which apps who join the ecosystem earlier will receive a larger proportion of tokens than those who wait and join later.
- 4 Allowing existing apps the ability to “be on the blockchain” in a turnkey manner gives them the option of accepting cryptocurrency as payment, and maintaining sovereign data identity for their end users.²⁶

²⁶ “KODAKOne Platform & KODAKCoin Cryptocurrency.” Kodak, 2018, kodak.com/kodakone/default.htm

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- 5 Our advisory team has created an “ICO process roadmap,” which provides templates, logistical support, and connections for existing apps that integrate with Unification to fully tokenize and execute their own independent ICO. This is interesting because being on the Unification platform does not necessarily mean that they need to ICO on UND or ETH/ERC-20 for that matter. The process of a company creating their own token is independent from integrating with Unification. This model of developing deep relationships and establishing Unification as provider and guide in the industry creates a plethora of win-win opportunities.



Onboarding Process for Apps

Seamless onboarding is key to the success of the Unification platform. After an app has agreed to integrate with Unification, there are three simple steps required to execute. These are completed with the support of detailed documentation and assistance from our engineering staff.

Assign semantic meta-data to each category. For instance, one app may define Male = 123 but another app may define Male = 456. Both of these are theoretically fine but we will have standardized recommendations that are not necessary to follow. We do not think it is practical to ask apps to restructure their entire databases for inclusion. However, it will at some point become apparent that following some standardized protocols will make data more easily accessible and indexable in BABEL in a commodified manner, increasing their attractiveness to data consumers.

Deploy HAIKU onto the network— This is a Smart Contract template provided by HAIKU on which defines their meta-data and regulates end user access control. Most apps will be able to deploy this in a primarily unaltered way, just changing the headers, hence avoiding the need for extensive and expensive auditing.

Apply to be accepted into MOTHER, the master Unification Smart Contract. MOTHER is merely an index of “trusted” apps that are accepted into BABEL. Trust by this definition is a technical trust, as BABEL conducts its own auditing protocols. Apps would theoretically be able to function on the platform if someone else took the HAIKU protocols and developed their own version of BABEL and MOTHER. This is the power of decentralization and hence why rapid network effect and enterprise outreach is paramount to success.

Process for Enterprise Outreach

In order to achieve massive network effect, Unification understands that Rome will not build itself. Instead, we are undertaking an active targeted operation divided into three parts.

Targeted B2B Outreach

Initially a North American-based office (later expansion to Asia and Europe), the express purpose of which is to directly reach out to existing apps with established user bases to show them the benefits of integrating with Unification. We have secured the advisory of an Oracle Global Sales Leader and have developed an internal B2B outreach plan with Global Integration Leaders incentivized and assigned by territory in order to conduct outreach to all existing apps, platforms and SaaS projects with prominent user bases. We expect this to be a “ground-up” operation, first focusing on key constituents in the 100K-2M Unique User ID (UUI) range, and later conducting outreach to larger entities with 5M+ UUI once foundations have been laid.

Research Organization Outreach

This key aspect of the foundation is a branch of the Global Integration Initiatives. We have secured the advisory of a prominent figure in the AdTech industry to support with this. The purpose is to structure and organize access to BABEL to the same standards as Data Service Providers (DSPs) in the AdTech and data industries. By providing a single platform with access to streams of previously unavailable indexed data, we are able to provide significant value and effectively disrupt the industry. This also includes a targeted outreach initiative via conferences and B2B in order to educate new data partners of the value of integrating with Unification.

Global Conference Presence

Establishing a presence in key conferences attended by the creators of apps is important. This is in addition to the standard “crypto world tour” as the cryptocurrency audience is not our end consumer, due to the fact that we are focusing on acquiring existing user bases. This is executed by a systemized conference blueprint led by our Global Integration Leaders that involves prominent booth locations, keynote speeches for Unification leadership, and private events. Currently there is allocation to exhibit and speak at CES, SaaStr Annual, Ad: Tech, Mobile World Congress, SxSW, and LaunchFestival.



Phase III – Consumer Adoption

There are three sides to the triangulation here: Unification, the app, and the end user. Acquiring the end user happens through four primary points of action:

App Onboarding

Plainly put, it is infinitely easier for apps with existing userbases to integrate with Unification than to recruit end users one by one. Once an app is onboarded, the end user receives a message that an account at BABEL has been automatically created for them and is given instructions on how to claim and control their data. This also enables a cross-identity login with other apps on the Unification ecosystem. Please note that using the Unification identity system is not exclusive and end users can still “login with Facebook” for example and still be on the ecosystem.

External Partnerships

As indicated in the Targeted B2B Outreach Section above, the Unification team is in discussion with many potential partners with user bases ranging from 100k-10M+ users, as initial SDK participants and testers.

We anticipate these partnerships to populate the Unification ecosystem with 40-50M unique users at the time of Babel’s commercial deployment, creating robust network effect for initial end users and UApps.

In-House App Development and Transition

The Unification core team’s background is in app and SaaS software development and we bring those assets of experience to jump start initial deployment. There are currently five initiatives in progress, three of which we can speak about publicly at this moment.

Current Initiatives

- 1 **CoinSparrow.io** is an in-house development targeted at the cryptocurrency industry. It is a website and Smart Contract escrow platform written in Solidity that allows end consumers to purchase fiat-based services (such as hotel/flight booking, concierge services or goods) in exchange for Ethereum. This is secured by a dual-approval escrow release and dispute system.

The Unification user identity system is used for CoinSparrow and the data collected is integrated into BABEL.

- 2 **SmartMat.com** is an interactive yoga mat. It's a very early-stage technology that is the first of its kind. It is effectively a yoga mat with a pressure sensor layer inside that connects to a Smart Device such as an iPad. SmartMat then provides interactive yoga classes in which the poses are evaluated and corrected in real time. This is powered by a machine-learning algorithm that learns about an individual's body and yoga poses and adapts as it learns more.

The SmartMat team, to which the Unification leadership are now advisors, raised a significant amount via crowdfunding and will be releasing v1 to the public in Q4 2018. This is exciting because SmartMat pre-sold via crowdfunding and all of those end users are instantly onboarded into BABEL as a primary identity system. This provides a template for organizing complex data, such as pixels assembling into yoga postures, and provides a standard template for onboarding fitness data into the ecosystem.

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- 3 **Private EHR Initiative**— Our key HealthTech Advisor is currently working on a revolutionary EHR (Electronic Health Records) platform and outreach plan in order to consolidate the fragmented industry. Public information is not yet available on this EHR initiative; however, it is scheduled to be initially released in Q1 2019 and will be using BABEL as a platform for storing and tokenizing user health records.

Unification understands that building the technology is not enough — the end users and use cases need to be populated and fueled before organic growth will be able to kick in to build momentum and form a life its own.

The EHR initiative is a clear example of the need for “defragmentation” in the blockchain space as currently there are numerous plays which aim to solve the many issues in storing and sharing health data. While these plays may work in a vacuum, ultimately, they stay there. What is better and what Unification provides is (for example), instead of an end user just controlling their health records, such records could be stored and cross referenced with their location data, their spending and eating habits, and what sort of websites they visit. The ability to make this type of cross-chain analysis and correlation has the potential to change the world dramatically.

User Onboarding and Experience

Once an end user joins Unification, they have access to an amazing environment of interactive data. The key will be education and, importantly, the concept of gamification. We understand that user behavior is fickle and end users must be “entertained” in order to deeply engage and take ownership of the platform. We are delighted that a core lead of the original Zynga technical team has joined Unification to develop the user experience and algorithms needed for ongoing and compelling gamification. This shows itself through micro-goals and achievements designed in such a way that the end user is constantly engaging and sharing with their community.

Direct User Acquisition

The Unification Core Team’s experience in direct response marketing and acquiring end users on a CPA (cost per action) basis is a key cornerstone to success for consumer access and also incentive to be able to build the audiences of existing apps on the platform. Take the Apple AppStore for example, where a number one listing in a category can be worth millions.²⁷ Apps build on the AppStore with the hope of getting featured and exposed to the wide swath of the userbase.

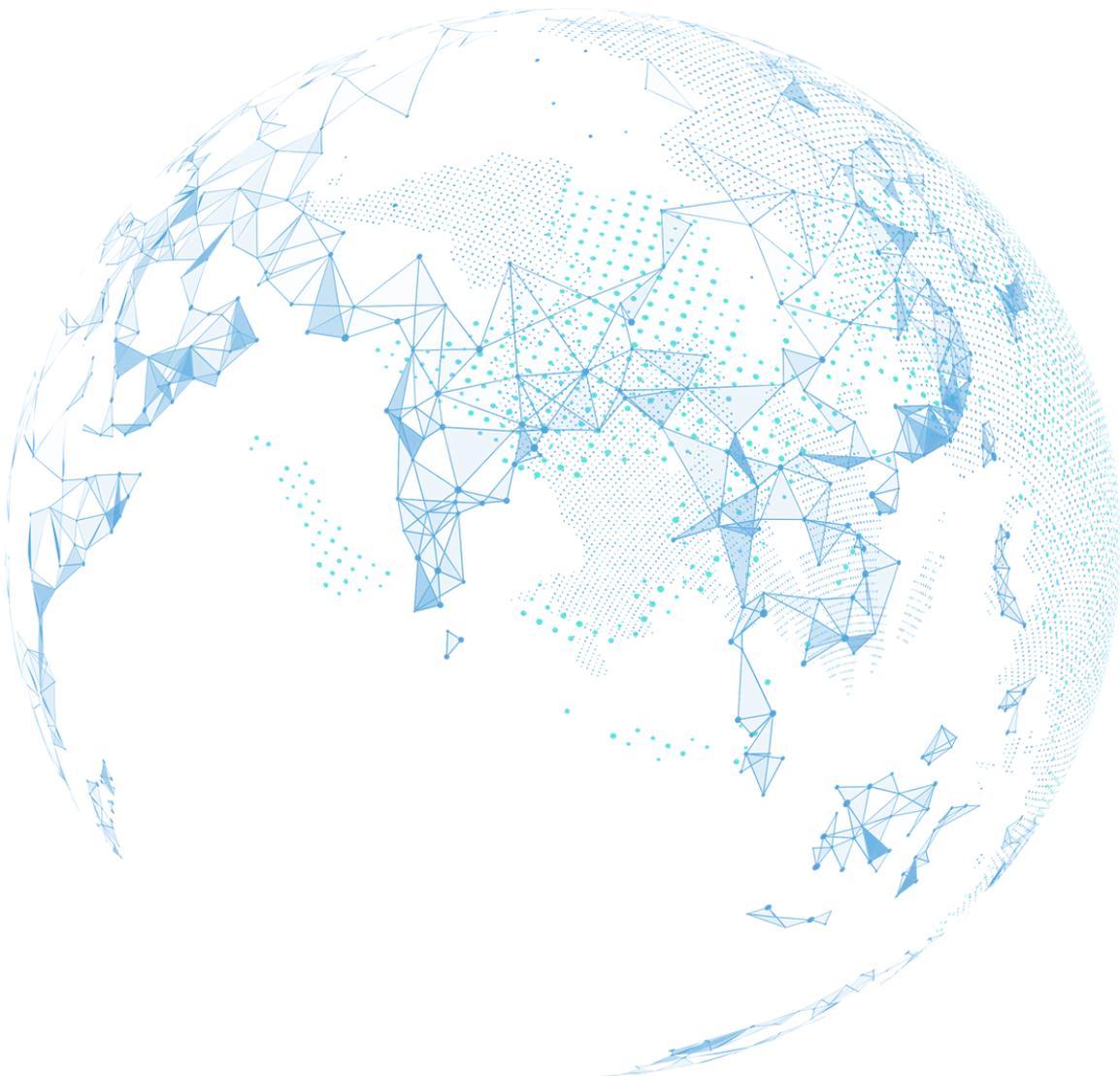
Apple has done their job correctly in seeding out the userbase so that all developers have to do is make an engaging product and the end users will come.

This is always a difficult task at the birth of a new platform because developers won’t develop apps without end users and end users won’t come without apps. Hence transferring over existing apps being the prime on-ramp of end users.

²⁷ “Top Grossing iPhone Games, Installs, Active Users & Revenue Estimates - United States.” Think Gaming, Aniplex Inc., 29 May 2018, thinkgaming.com/app-sales-data/

That being said, through our experience in online advertising, specifically with Facebook Ads and media placements, Unification has allocated resources to heavily incubate and acquire end users for certain flagship apps built on the platform.

The reason for advertising and acquiring flagship apps instead of onboarding end users directly is that Unification recognizes the mistakes made by almost every single data or sovereignty start-up on the blockchain. We clearly understand that having a playground with no equipment is not a playground. So using that metaphor, instead of saying “come to our playground,” we advertise to “come play on the new jungle gym.”



Importance of Team

In the wild west of exploratory and world changing blockchain technologies, we cannot always predict the movement of things. However, what we can do is ensure that the team in place to address these innovations is prepared to move the project towards its ultimate evolution. This preparation comes in many forms, such as exceptional foresight and other tools gained from past accomplishments. We are proud of the Unification Core and Advisory Team having the roadmap and executable skill sets to bring this project all the way from concept to actualization.

On the path to actualization we have identified four broad quality requirements that lead to end-success. Each of our team members have been strategically selected to appropriately meet these requirements.

1 – Business Execution Ability

2 – Technical Competence

3 – ICO Deployment Skillset

4 – Enterprise Outreach

It is very clear that in the current environment that just showing up and “being first to market” is not enough to achieve long-term success. Instead of playing for an end game of “a successful ICO and a good coin,” we are playing for the maximum impact end game of a successfully built and deployed end-consumer product, of which the “coin” is just an inherent part of the utility.

The “ICO” process, while still important, is just step one of hundreds to come. That being said, we have looked at building our team out from a 360 degree approach — not just to “do good ICO,” but rather to build out a platform that can drive forth human evolution.

At Unification we consider ourselves a circle of equals. We do not have traditional titles such as CEO or CMO, and do not conform to an old-paradigm, hierarchical structure. Rather we are united towards a higher ideal — bringing our collective talents and experience together to execute above the curve, and the passion to push it through to completion.

We believe that Vision does not necessarily arise from any single individual, rather it comes from shifts in group consciousness in which certain individuals will foresee and “grab onto” these ideas and drive them to actualization. Our philosophy is to create a container that provides the space for people to expand within, according to their passion and creativity.

In that spirit, this introductory list serves to establish the Unification Core and Advisory Teams (though there are many others involved in various orbits). We are very excited about this team and their experience and drive to bring this project to the front of human consciousness and adoption.



Neyma Jahan - Vision

With a lucrative background in direct response marketing, Neyma moved into the IoT space in 2013 and in 2017 stepped down as CEO of his company and made the full transition to Unification. With a deep understanding of consumer data and behavior, Neyma is the architect of the movement to establish Unification as the de facto data and identity platform on the Internet.

> [linkedin.com/in/neyma](https://www.linkedin.com/in/neyma)



Mazi Sadri - Product

Combining an MBA with years of Executive level Product & Marketing experience at Yahoo!, Mazi led 3 products to leadership positions in their category, including Answers, Messenger, and the Yahoo! Homepage. Previously he worked in Strategy & Analysis for Dow Jones, honing his craft by covering many venture-backed companies. Since Yahoo!, he has gone on to develop a leading app platform generating 70 million+ downloads by end users. Mazi is responsible for scaling and development of the software brains that will make up the feedback loop between Unification and the end user.

> [linkedin.com/in/mazisadri](https://www.linkedin.com/in/mazisadri)



Paul Hodgson - Data Science

With a background in “Big Data” having worked with the Data Warehousing of the Royal Mail in the UK, Paul moved into the IoT industry in 2013 working on a machine learning initiative to capture and analyze data in the HealthTech space. Paul is the architect behind the Unification Smart Contract Protocols which are currently being developed in C++.

> [linkedin.com/in/codegnosis](https://www.linkedin.com/in/codegnosis)

Technical Initiative Deployment Team



Shawn McLean - Architecture

Originally in AAA Game Development at studios such as LucasArts and EA, Shawn transitioned into the social media space by becoming part of the founding engineering team at Zynga, where his work accelerated the Facebook-enabled explosion in social gaming. Shawn also co-founded and built LVL Analytics, a technology company that created algorithmic IP rating tools for decision-makers looking to invest in innovation.

> [linkedin.com/in/stackcoder](https://www.linkedin.com/in/stackcoder)



Indika Piyasena - Integration

Immediately prior to Unification, Indika was working with a team building a world class data acquisition product, and later integrated it in into Bloomberg L.P. Now his perspective has changed to data distribution, and the underlying protocols that realise this. With a Masters in Engineering and a lifetime of software experience, he brings Unification to mass market.

> [linkedin.com/in/indikap](https://www.linkedin.com/in/indikap)

Key Advisory



Henok (Hen) Tekle - ICO

Hen is a blockchain angel investor, token sale advisor, and cryptoassets fund manager. He can be found speaking at conferences around the globe about the future of blockchains and cryptocurrencies. Hen is a Co-Founder at Alphachain Capital.

> [linkedin.com/in/henglobal](https://www.linkedin.com/in/henglobal)



Sishir Varghese - ICO

An avid proponent, investor and entrepreneur in the blockchain community, Sishir brings a diverse background to Unification. He has managed international development teams creating mobile apps, content marketing, and functional analytics. Sishir is a Co-Founder and Managing Partner at Alphachain Capital.

> [linkedin.com/in/sishir-varghese-47576b2a](https://www.linkedin.com/in/sishir-varghese-47576b2a)



Sam Marks - FinTech

With three multimillion-dollar exits in eight years, Sam is mission critical to integration with markets and regulatory environments to be a lasting prosperous player in the Unified ecosystem

> [linkedin.com/in/sammarks1](https://www.linkedin.com/in/sammarks1)



Nelson Chen - AdTech

Experienced in product analytics for portal and web properties, competitive intelligence and evaluation, Nelson is advising the rollout of the AdTech marketplace built on the Unification platform.

> [linkedin.com/in/nelsonchen](https://www.linkedin.com/in/nelsonchen)



Karim Z. Kanji - Enterprise

Karim is structuring the initiative for the enterprise sales deployment team for aggressive outreach to existing apps with user bases to convert them onto the Unification platform.

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Nikolay Savchuk - HealthTech

Nikolay is a serial entrepreneur, an international investor in healthcare and IT industries, and Co-Founder and Managing Partner at Torrey Pines Investment. Nikolay is building a revolutionary new Electronic Health Records (EHR) platform to consolidate the fragmented health record industry, utilizing Unification's data sovereignty ecosystem.

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Conclusion

From its inception, Unification has been a massive undertaking. We are not approaching this as “just an ICO to rush to market.” Rather, we seek to use the ICO platform and blockchain technology to call attention to the need to unify the fragmented market, and to position Unification as the next wave of technology deployed on the internet.

Unification is blockchain agnostic with generalized state channels that brings consolidation to the fragmented market. This ICO and token generation event is not a victory, but rather a very first step, one of many that upon completion will set the foundation for Unification becoming the de facto global infrastructure for data interoperability and self-sovereign identity as we move forward into the new era.

Welcome to the family.

Neyma Jahan

Singapore, Q2 2018

For more information on joining Unification as a developer, an app, or other means of support, please use the contact information listed on unification.com.