WorldThink White Paper

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June 2018

Abstract

WorldThink is an open blockchain protocol for problem solving. The protocol, built on the Ethereum blockchain, coordinates the collective intelligence of many participants to solve complex multi-step problems. The protocol serves as a generic framework for a wide range of Distributed Applications (DAPPs) that solve domain-specific problems. All DAPPs built using the protocol enable participants to generate reusable solutions which pay them royalties via smart contracts. Ethereum logs capture the exact sequence of steps for each solution in a common format, enabling re-usability, evidence-based participant reputations and transparent participant compensation. Crypto-economic incentives help ensure participant and solution quality via a Token Curated Registry (TCR). The protocol is supported by a world-class team, multiple patents, and a revenue generating business with 3.5 million existing users. In this White Paper, we describe the protocol and roadmap for protocol-enabling our existing applications to launch a scalable DAPP network.

Contents

*The author would like to acknowledge and thank the following people for their helpful comments and contributions to this whitepaper: Sid Dorr, Samantha Duncan, Mark Feldman, Justine Fenwick, Elie Galam, Jeanne Glasser, Fred Grauer, Raul Jordan, Calen Lopata, Trevor Marshall, Howard Morgan, Michelle Samis, David Taggart, and Peggy White-Warren.
Please see Important Disclosures/Disclaimers at end of this paper.

1. Overview

This paper describes the WorldThink protocol, some of the challenges it overcomes, initial and future distributed application (DAPPs) that will be built using the protocol, and a business roadmap for integrating the protocol into our existing businesses.

Figure 1 provides a simple framework for understanding the WorldThink protocol. At the top of the pyramid are Collective Intelligence Solutions. Clients pay for these solutions using tokens. The solutions are produced by harnessing the collective power of many human (and machine) intelligences. Clients use different DAPPs for different types of problems. Initially, we will build three financial services DAPPs and will partner with third parties to build many other DAPPs on a DAPP network.

The WorldThink protocol is the foundation of the pyramid. The protocol layer provides an Ethereum-based infrastructure that makes it much easier for developers to build and scale problem-solving DAPPs. The protocol enables re-use of solutions within and across DAPPs. It also handles payment of royalties via smart contracts, reputation metrics, and other functionality that assists DAPP developers and promotes network effects.

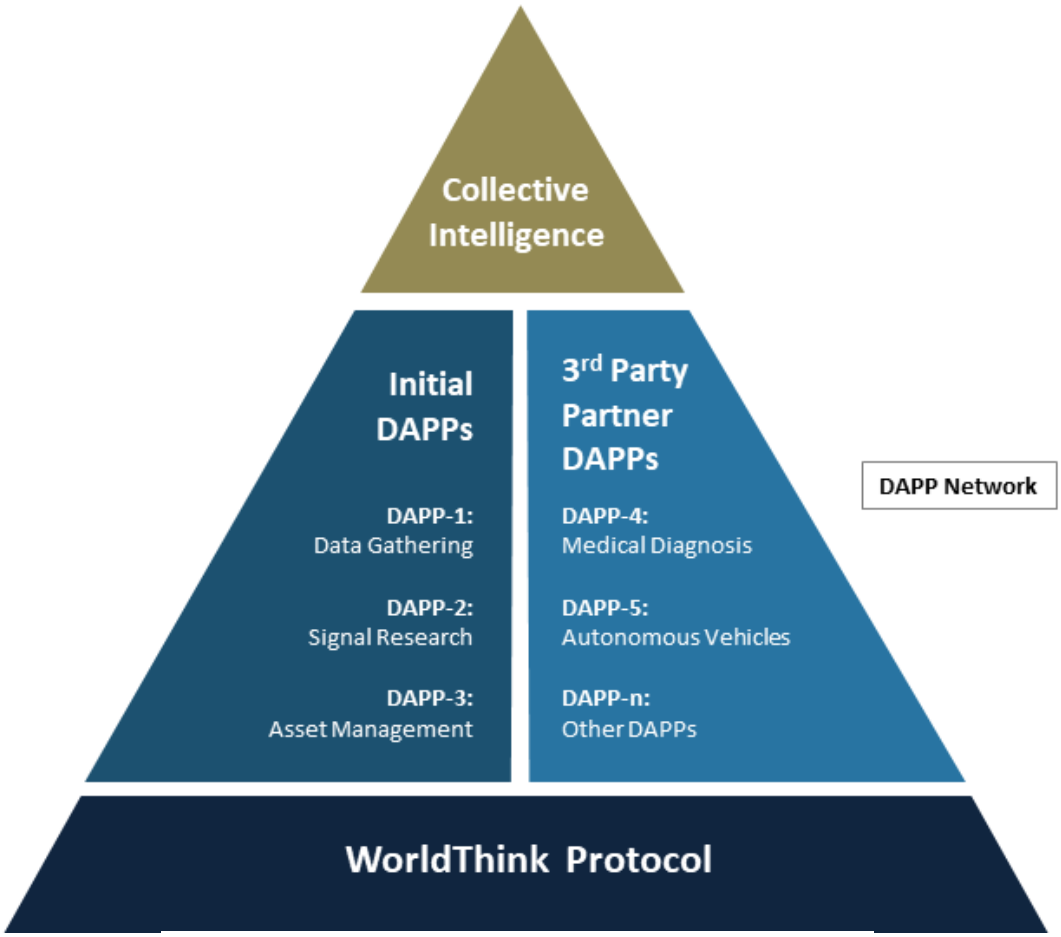


Figure 1: Simple Framework

The WorldThink team has been building custom systems to harness Collective Intelligence for more than two decades. Our existing applications harness the brainpower of more than 3.5 million participants to solve problems in the financial services space.

We designed the WorldThink protocol to address many of the critical challenges (described in Section 2) that we experienced over the years. Section 3 provides more technical detail on the WorldThink protocol itself, including incorporation of our issued US patents, the use of Ethereum logs and Token Curated Registries (TCRs), and thoughts on re-usability, royalties, reputation metrics, scalability, network effects, and automation. Section 4 describes the initial DAPPs that we will build using the WorldThink protocol once it is production-ready. We also describe potential third party DAPPs that illustrate the range of DAPPs supported by the WorldThink protocol. Section 5 highlights some of the world-class advisors and team members behind WorldThink. Because we have a veteran team, and an already established revenue-generating business, we are confident in our business milestones (described in Section 6). Section 7 references some of our patents, whitepapers, and published research to provide more detail and context for the WorldThink protocol.

2. Challenges Overcome by the WorldThink Protocol

Existing collective intelligence approaches to problem solving have been largely limited to simple one-step approaches, such as those used by question and answer (Q&A) systems (e.g., Quora[1], Google Answers[2], Yahoo Answers[3]). While such Q&A systems have had some success at simply aggregating the responses of many online participants, these systems are not designed to handle complex, branching, multi-step problems. Simple aggregation of responses (or even betting on outcomes as seen in prediction market approaches such as Augur[4] and Gnosis[5]) is quite different from coordinating the efforts of many respondents to solve complex problems. The WorldThink protocol is specifically designed to overcome the challenges inherent in coordinating many minds to represent and solve complex, multi-step problems in an automated way that fairly rewards participants.

2.1 Overcoming Coordination and Communication Challenges

The WorldThink protocol overcomes coordination and communication challenges by allowing problem solvers to work asynchronously in parallel. Every problem solver has access to the blockchain record of problem solving, which is updated automatically as progress is made. Complex problems are broken down into a hierarchy of sub-problems that can be tackled by individual (or groups of) problem solvers. The problem-solving process moves forward based on a “first to submit a valid solution to the sub-problem” basis.

2.2 Overcoming the Challenge of Problem Formulation

One of the toughest challenges for automated problem-solving systems is constructing the initial formulation of the problems and finding an appropriate way to break complex problems into simpler sub-problems. Although humans are relatively good at representing ambiguous or ill-defined problems, these types of problems are nearly impossible to automate.

The WorldThink protocol overcomes this challenge by using human participants to formulate problems and sub-problems recursively until the sub-problems are finally actionable enough that they can be solved by human (or machine) intelligences. The solutions to the sub-problems are then automatically

"rolled up" from the smallest sub-problems to higher-level sub-problems and ultimately into a total solution that can be presented to the client. The entire automated approach follows the rigorous scientific theory of human problem solving (created by Nobel Laureate Herbert A. Simon and Allen Newell[6], and reduced to practice in an issued US patent[7]).

2.3 Overcoming Assignment of Credit and Reputational Challenges

Any system capable of solving complex problems must have rigorous and effective ways of evaluating which problem-solving steps are advancing toward a good solution ("credit") and which steps are going in the wrong direction ("blame")[8]. Further, human problem solvers are unlikely to participate unless they feel credit is fairly assigned for their problem-solving efforts. Finally, a specific, accurate, and objective reputation system is needed to more efficiently and effectively match problems to those who are most likely to solve them.

Over time, participants earn problem-specific reputations enabled by our patented and patent-pending reputation technology that analyzes the auditable record of problem solving contributions.[9]

2.4 Overcoming the Challenge of Directing and Focusing Attention

All problem solving can be characterized as a search through a maze (technically a decision tree or "problem space") of possible steps that might lead to a valid solution. Rather than searching all paths, successful problem solvers evaluate the paths, determining which paths are most likely to lead to success, and then focus attention on exploring just the most promising ones.

The WorldThink protocol focuses attention via tokens. If there are multiple potential paths to explore, participants will tend to explore the paths that have the highest token rewards associated with them. Clients or other participants can directly influence the direction of problem solving by posting higher token rewards for exploring certain paths (e.g., paths they propose). By setting parameters in the WorldThink protocol, clients and applications can specify a range of different token compensation rules that focus attention in different ways.

2.5 Overcoming Challenges Related to Re-Use, Scalability, and Automation

Unstructured solutions are difficult to re-use, automate, and scale.[10] Fortunately, the WorldThink protocol provides a standard data structure for any online problem solution. This common standard enables re-using existing solutions either on their own or as components within larger solutions. Smart contracts enable paying the original Solver royalties, automatically and efficiently, each time his/her solutions are re-used in another solution. Royalties incentivize Solvers to produce solutions with an eye towards making them general, effective, re-usable, and scalable. Every Solver is competing for royalties to make his/her solution scale as widely and quickly as possible.

As human Solvers do the difficult work of representing and solving problems, they leave a highly auditable record of their solutions in Ethereum logs -- since storing data as records on-chain would be prohibitively expensive and inefficient. Eventually, the logs will grow to the point that the more common or repetitive problems can be automated. Machine learning techniques[11] can be used on the

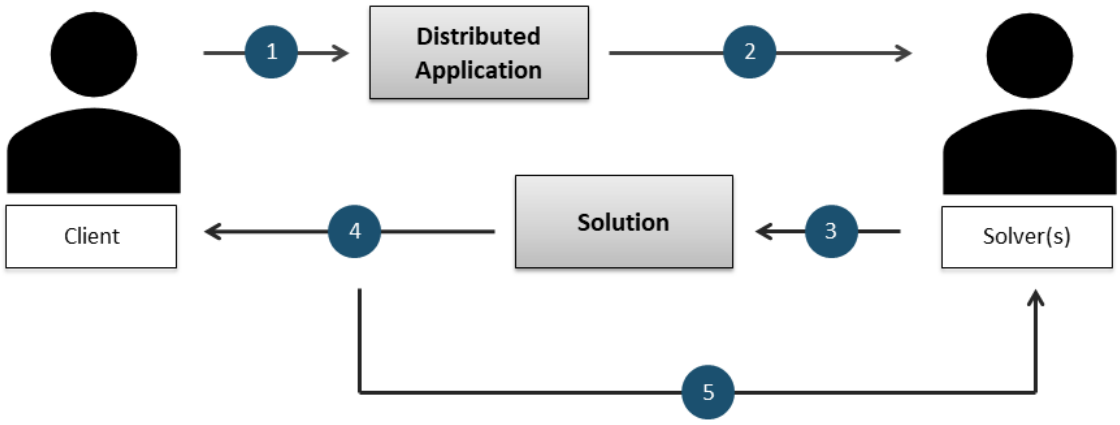
logs to bootstrap automated problem solutions. The WorldThink protocol incentivizes Solvers to create automatable solutions since they are an excellent means to ensure a steady royalty stream.

3. How the WorldThink Protocol Works

This section provides a high-level description of how the WorldThink protocol works. We describe basic functionality and some high-level design decisions – such as the decisions to base the protocol on the Ethereum blockchain, to use Ethereum logs to record problem solutions, to incorporate patented online distributed problem-solving technology in the protocol, to use Token Curated Registries (TCRs), and to incorporate patented reputation technology. We will release a detailed open specification for the protocol post-funding as our first milestone.

3.1 Simple Problem Solving Using the WorldThink Protocol

Figure 2 shows some of the basic problem-solving functionality supported by the WorldThink Protocol.



1. Client submits problem request through application.
2. Solver begin working on request.
3. Solver contributes solution
4. Solution delivered and accepted by Client
5. Rewards distributed.

Figure 2: Simple Problem Solving Using the WorldThink Protocol

Problem solving begins when a client uses a specific distributed application (DAPP) to submit a problem-solving request to the community of online participants (Step 1). All DAPPs following the protocol gather certain standard information from the client. A partial list of this information includes: the name

and description of the problem, the total reward (in tokens) that the client will pay for a successful solution to the problem, the criteria to determine whether a solution will be deemed successful, the time limit for solving the problem, the minimum and maximum number of problem solvers allowed to work on the problem simultaneously, qualifications required of participants working on the problem, which parts (if any) of the problem and solution will be confidential, whether the solution must be exclusive to the client or whether it can be re-used for others, and parameters relating to how to reward multiple problem solvers for their efforts and/or successful solutions.

The client can break complex problems down into a series of sub-problems or request that the community take on this task as part of the problem-solving effort. The client user-interface can be customized by the DAPP developer, but the data format is standard and specified by the WorldThink protocol. Once the client has submitted a problem, the DAPP can recruit participants using its own custom methods and/or leverage recruiting and reputational screening functionality that is built into the WorldThink protocol and thus shared by all DAPPs.

Solvers work on the problem following a rigorous structured problem-solving process that is common to all DAPPs and enforced by the WorldThink Protocol (Step 2). For example, each step in the problem-solving process must be in service of a named goal and must take a named action in order to transition the problem solving from the current state to the next state. Every problem-solving step is represented in a decision tree which is supported by the protocol (captured in Ethereum logs) and which participants can view via the DAPP.

When a Solver submits a complete solution (Step 3), it is timestamped and validated against the client's success criteria before being passed on to the client (Step 4) for final acceptance. Once the client accepts the solution, smart contracts automatically distribute tokens to the problem solver based upon the problem payment parameters (Step 5).

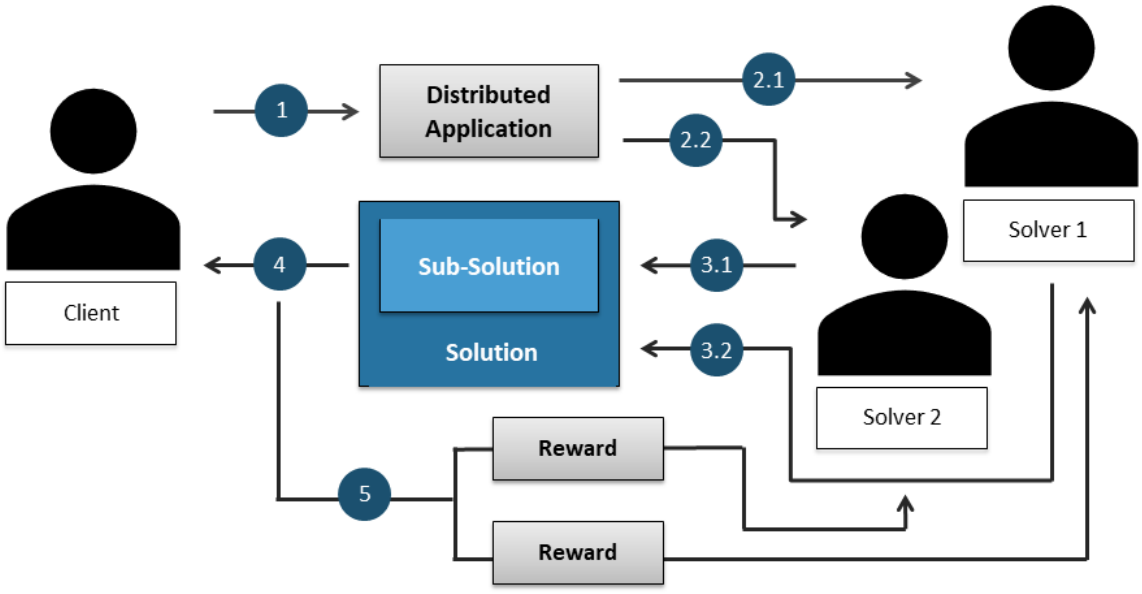
3.2 Collaborative Problem Solving Using the WorldThink Protocol

Figure 3 shows the same steps in an example where two problem solvers collaborate to solve a client problem. In this case, the overall problem has been broken down to include a sub-problem. Solver 1 has expertise in assembling an overall solution but cooperates with Solver 2, who provides a solution to the sub-problem (Steps 3.1 and 3.2). When the overall solution to the problem is submitted to the client (Step 4), rewards are paid to both Solvers (Step 5) based on the objective record of their contributions and the agreed upon payment parameters.

The WorldThink protocol supports breaking problems into sub-problems in several ways. First, the client may choose to specify sub-problems when submitting the overall problem (Step 1). Alternatively, Solver 1 might begin working on a problem and realize that the total solution requires solving a sub-problem outside of his/her expertise. Solver 1 could then create a sub-problem, offering up a share of the problem's total token reward to anyone who helps solve the sub-problem. Solver 2, who has the required expertise (and who can see the new sub-problem posted by Solver 1 on the decision tree maintained in Ethereum logs and visible via a DAPP user-interface), could then work on the sub-problem and submit a sub-solution as part of Solver 1's overall solution.

There can be many "Solver 1s" working on the client's problem in parallel, each of whom may be posting sub-problems to attract multiple "Solver 2s". Problem solvers are motivated by the rewards and payment rules associated with (sub) problems. They also care about the quality of work done so far

(which is timestamped, attributed, and recorded auditably in Ethereum logs to ensure transparency and fair assignment of credit) as they choose which (sub) problems to work on. Working on quality sub-problems is more likely to lead to token rewards. This market mechanism helps ensure efficient, fair, and cost-effective solutions.



1. Client submits problem request through application.
2. Solvers begin working on request.
3. Solvers contribute solution components
4. Final solution delivered and accepted by Client
5. Rewards distributed.

Figure 3: Collaborative Problem Solving Using the WorldThink Protocol

3.3 Royalties and Re-Usable Solutions

Re-usability of solutions is an important feature of the WorldThink protocol. Consider the case where the "Sub-solution" in Figure 3 already existed and is simply re-used by Solver 1. Because every solution is structured and "tagged" according the WorldThink protocol's standard problem-solving format, Solver 1 can search for all existing solutions that match a particular goal, or share certain features with the problem he/she is trying to solve. If Solver 1 decides to include an existing sub-solution in the overall solution, smart contracts automatically pay royalties to the author of the re-used sub-solution (Solver 2, in this example) if Solver 1's overall solution is accepted by the client. Royalties motivate Solvers to create high-quality solutions that are easy to re-use, which results in better, faster, more cost-effective solutions for clients.

3.4 Capturing Problem Solutions via Ethereum While Preserving Flexibility

The WorldThink protocol is firmly grounded in Cognitive Science[12] and a theory of problem solving that is applicable to both human and machine intelligence.[6,22,23,24,25] The theory states that all problem-solving behavior can be modelled as a search through a problem space (aka a decision tree). At any

instant in the problem-solving process, it is possible to characterize the state the problem is in, the goals that are active, the operators (or next steps) that might be taken, and methods for evaluating whether problem solving is getting closer or further away from the goal. This theory was refined into a technically feasible, patented system for online distributed problem solving.[7] That patented system is now being implemented, including smart contracts and other essential elements, as the WorldThink problem-solving protocol.

The scientific theory of problem solving has been established for nearly fifty years, with many applications by both human problem solvers and artificial intelligence. However, the specific implementation of the WorldThink protocol on Ethereum is a much less-tested proposition. Ethereum was chosen not only because ERC-20 has become somewhat of a de facto standard, but also because Turing completeness provides the flexibility needed to implement all aspects of the protocol, including smart contracts to automatically handle royalty payments. Another consideration was efficiency. Because storing large amounts of data "on chain" is both inefficient and costly, the WorldThink protocol is designed to store most information "off chain," specifically in Ethereum logs. As Ethereum continues to evolve, we intend to adapt the implementation of the WorldThink protocol to take advantage of additional improvements (e.g. sharding).

That said, blockchain is a rapidly evolving space and **there is no guarantee that Ethereum will maintain its current dominance and desirability. Because the WorldThink protocol is designed as a problem-solving protocol that resides one level above the underlying blockchain, it retains the flexibility to adapt to different underlying blockchain technologies** (if needed) in the future, while retaining its essential problem-solving rigor.

3.5 Token Curated Registries (TCRs) and Evidenced-Based Reputations

Token Curated Registries (TCRs) are blockchain-based lists managed via a voting mechanism. The WorldThink protocol uses TCRs to select the best next solution step, or problem (sub) solution, from a list of alternatives. For example, if multiple Solvers generate different competing solutions (or next steps) for a (sub) problem, the community of Solvers can vote on which solution they like best. To demonstrate their confidence in a particular solution (or solution step), Solvers can stake tokens when they vote. The solution chosen by the community is based on a proprietary weighted voting algorithm that takes the number of votes, the tokens staked, and the reputation of the voters into account. If Solvers vote for a solution that ultimately fails to meet the client's acceptance criteria, then their staked tokens are forfeit and added to the total reward for solving the problem. Conversely, Solvers who back the correct solution, gain an extra share of the rewards (proportional to the number of tokens staked). Since new Solvers have not yet developed an objective reputation, TCRs allow Solvers to compensate for a lack of reputation by putting more "skin in the game" (e.g. more tokens) when they vote.

Over time, all participants develop detailed reputations. The exact sequence of problem-solving steps, the number of tokens earned, and other information stored in the Ethereum logs become part of the auditable track record of each Solver and each client. Automated analysis algorithms can be run on these track records to produce objective, evidenced-based, reputation metrics.

For example, a participant may excel at applying certain mathematical techniques to problems in financial markets but might be less effective at applying the same techniques to problems in marine biology where different domain-specific knowledge is required. A reputation-based screen can detect

and use these types of differences to recruit and match specific Solvers to specific types of problems (e.g. at Step 2 in Figures 2 and 3). Together, TCRs and evidence-based reputations help DAPPs following the WorldThink protocol maintain a high level of quality in the solutions they deliver.

3.6 Scalability, Network Effects, Automation, and Artificial Intelligence

A network of DAPPs will be built on the open WorldThink protocol and scaled by communities of developers and problem solvers. Developers are incented to participate because they can charge clients who use their DAPPs a commission on every problem solved. Problem solvers are incented to participate because they are rewarded fairly for their efforts and earn additional royalties as others re-use their solutions. Finally, clients are incented to participate because they can get better solutions, more quickly and potentially at less cost, than other options.

Scalability is partly a function of network effects. The WorldThink protocol supports three powerful network effects:

1) **Participants.** The more participants (clients, developers, and Solvers) who participate, the more valuable the DAPP network becomes and the more it attracts new participants.
2) **Solutions.** The more solutions on the network, the more valuable the DAPP network becomes since solutions are reusable and can become part of new solutions.
3) **Automation.** The more structured solutions that exist, the easier it is to automate problem solving, which in turn produces more cost-effective solutions attracting more participants.

The first two network effects are fairly straightforward, but automation has a subtler aspect. Over the last three decades working in fields of artificial intelligence and machine learning, we have observed two principles that have withstood the test of time:

1) The more well defined a problem is, the easier it is to automate.

2) The more structured a training dataset is, the easier it is to get machines to learn from it.

Because the WorldThink protocol records every solution according to the same structured problem-solving format, over time, a large highly structured dataset of solutions accumulates. In our view, this structured dataset will facilitate automation and machine learning, ultimately resulting in a mix of human and machine problems solvers participating on the DAPP network. This automation will take time, but the WorldThink protocol provides the necessary foundation.

4. Distributed Applications (DAPPs) Using the WorldThink Protocol

Currently we have many clients in the financial services space who are looking for new datasets and trading signals that provide them with an edge in the stock market. The problem facing our clients is so difficult that most professional asset managers fail and underperform their benchmarks. For example, citing statistics from Dow Jones, the *Financial Times* recently reported that, "99 percent of actively managed US equity funds sold in Europe have failed to beat the S&P 500 over the past 10 years, while only two in every 100 global equity funds have outperformed the S&P Global 1200 since 2006. Almost 97 percent of emerging market funds have underperformed."[13]

To serve our clients, we have built a custom distributed polling application that harnesses the collective intelligence of more than 3.5 million retail investors. Over the last decade, we have gathered more than

85 million individual opinions, processed them using proprietary algorithms, and produced aggregated datasets and trading signals that we license to clients – both directly and via re-sellers like NASDAQ.

The success of our existing collective intelligence business is reflected in the premium licensing cost of our datasets and the excellent performance of our trading signals. For example, in 2017, our quantitative asset management system beat its relevant benchmark in live trading by a factor of 10X by harnessing the intelligence of many human brains.[14] Similarly, a series of whitepapers, released over several years, has documented the out-performance of the signals and datasets we license to clients.[15,16,17,18]

4.1 Initial Financial Services DAPP

Initially, we will build three new DAPPs on the WorldThink protocol to solve problems for which we already have paying clients. All DAPPs generate solutions that can be open and re-usable, or confidential and exclusive, depending on client preferences and budget. Our initial DAPPs will solve the three problems that led to excellent 2017 performance cited above:

1) A data gathering problem: Gather opinions anonymously from millions of individuals.

2) A signal research problem: Aggregate and convert opinions into alpha-rich trading signals.

3) An asset management problem: Create market-neutral (hedged) portfolios from the trading signals.

Compared to our existing applications and competitive approaches, benefits to clients include:

- Gathering much more alternative data, in more markets, more quickly.
- Producing more trading signals, more quickly, with better out-of-sample performance.
- Producing better portfolios, with less correlation to existing portfolios, more quickly.

Each DAPP stands on its own. For example, we have clients who will pay just for new sources of raw data (DAPP-1), other clients interested only in new signals produced from data the clients supply (DAPP-2), and still other clients who just want well-constructed asset management portfolios (DAPP-3). However, Figure 4 shows how the three initial DAPPs can also be linked together in an overall solution.

DAPP-1 will allow clients to specify different types of alternative data that they would like to gather – e.g. opinions from individual investors, opinions from market professionals, opinions from groups of individual and professionals, opinions from working groups that justify their opinions with market research and/or technical analysis. Gathering the different types of data is a multi-step process, sometimes involving thousands or even millions of participants. The WorldThink protocol will handle the coordination and payment of participants in the data gathering sub-problem, while DAPP-1 will provide an easy-to-use interface for clients and participants.

DAPP-2 will allow clients to purchase and/or provide data (in encrypted, non-encrypted but confidential, or open formats) to researchers. Some of the data provided can come from DAPP-1. The researchers will solve the problem of creating uncorrelated, profitable trading signals from the data. Because every solution step is recorded in Ethereum logs, the solutions submitted by the researchers to the client include not only the final result (trading signals with performance metrics in this case) but also a detailed record of the research process. Comparing the final results and research process with

performance benchmarks and best research practices can help clients estimate how well the trading signals will perform in live trading. This approach is not only superior to existing in-house research processes, but also to other "crowdsourced" research approaches that do not rigorously document the research process behind each result.

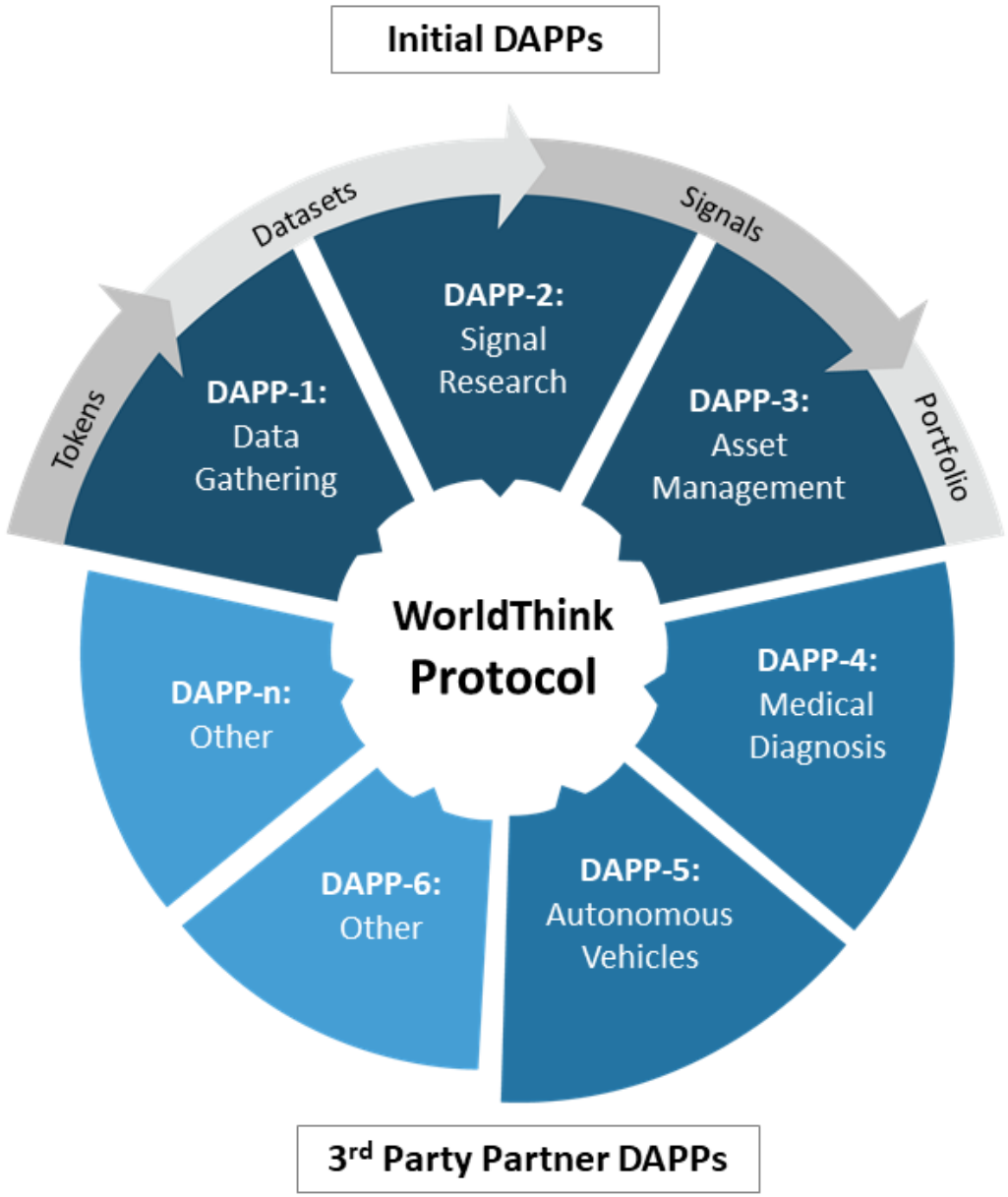


Figure 4: DAPP Network

DAPP-3 will enable clients to submit portfolio construction problems to many online researchers simultaneously. The portfolio construction problems may have many different types of constraints (e.g., must be market neutral, can only trade US equities, must not use more than 2X leverage, etc.) that may be specific to the client's needs. Researchers work with signals supplied by clients, signals they derive themselves, and/or signals from DAPP-2. As with DAPP-2, having an objective record of the

portfolio construction research process helps clients better evaluate how portfolios will perform out-of-sample.

Without the WorldThink protocol, we would have to hand-craft each of these collective intelligence applications in a relatively inflexible way. With the WorldThink protocol, constructing DAPPs to handle these types of problems is much easier, and more flexible. Because all relevant information is stored in Ethereum logs, it is possible to automate analyses that identify the best problem solvers, best research methods, best data sources, and best signals. Because the overall problem of beating an asset management benchmark is so valuable, clients are willing to offer large rewards to the most successful problem solvers. Royalties paid for re-use of the most successful data gathering, signal research, and portfolio construction methods help attract the best minds to these problems.

The WorldThink protocol scales well because it enables setting sub-goals such as "find new sources of data that meet the following criteria," which can tap the power of millions of minds working in parallel to seek data sources that provide an edge. Importantly, we (or clients) do not need to have ideas in advance of where the best data sources might be or how to go about tapping them. The community will figure that out as part of the problem-solving process. When a Solver has an idea for a next step that the community thinks is good, other Solvers will flock to the sub-problem because, in their judgement, it seems a likely candidate for producing rewards.

4.3 Examples of Future DAPPs

The bottom half of Figure 4 depicts a network of DAPPs built by third parties that wish to take advantage of the common problem-solving infrastructure, re-usable solution format, smart contracts for royalties, objective reputations, talent pool, and automation capabilities enabled by the WorldThink protocol. While our initial DAPPs will launch the network by successfully solving valuable financial problems, the WorldThink protocol is well-suited to any research problem that benefits from focusing many minds on solutions. Medical diagnosis and autonomous vehicle research are just two examples of possible DAPPs.

4.3.1 Medical Diagnosis DAPP

Consider the following scenario. A patient has a serious respiratory illness that is difficult for her local physicians to diagnose. Instead of the existing time-consuming process of getting a secondary or tertiary opinion -- via more hospital visits that only aggravate the patient's condition -- the patient authorizes release of anonymous test results and medical history on a diagnostic DAPP built using the WorldThink protocol. Multiple pulmonologists worldwide see her test results. Using their collective medical experience, which in aggregate is greater than any one physician might acquire over many lifetimes, dozens of potential allergen triggers are proposed. Ruling out each proposed allergen represents a sub-problem on the way to solving the problem of diagnosing the patient. Solutions that worked for other patients can be re-used, with royalties going to the physicians who came up with them. Physicians can help many more patients as their best solutions are re-used. Insurance companies are able to provide better care, faster, at less cost. Patients experience life-changing outcomes resulting from the power of collective intelligence. In fact, a low-tech version of harnessing collective intelligence for diagnosis was recently reported by the *NY Times*.[21] However, a DAPP built on the WorldThink protocol would make the solution easier, more scalable, and more cost-effective.

4.3.2 Autonomous Vehicle Training DAPP

One of the problems faced by self-driving cars has been colorfully described as the *Zombie Kangaroo Costume Challenge.*[19] The idea is that although human drivers have no problem understanding unusual situations that might occur – such as teenagers dressed up as zombie kangaroos on Halloween crossing the road – an artificial intelligence system that is driving an autonomous vehicle would have no idea how to interpret an unusual situation like this. The WorldThink team envisions a DAPP where thousands of humans all contribute a wide range of potentially hazardous driving situations that can be used to train artificial intelligence agents. Inventing scenarios for self-driving cars is a problem whose solution steps can be recorded in Ethereum logs. Royalties would be paid for solution scenarios that are re-used in new combinations by other problem solvers.

There are other problems that are essentially impossible for autonomous vehicles to solve using current technology. For example, self-driving cars have to make the same difficult ethical decisions that human drivers are sometimes required to make.[20] Does the artificial intelligence swerve to avoid hitting a child even if it means risking the lives of the passengers? No logical answer is possible without first assuming a set of values. But whose values to use? Using a DAPP built on the WorldThink protocol to capture the decisions of millions of human drivers in a structured way, and then looking for patterns, provides one way of grounding an artificial intelligence's decisions in a value-system that human drivers consider appropriate. With billions of investment dollars and life-and-death consequences at stake, we believe autonomous vehicle research is an exciting area for a future DAPP.

5. Team and Advisors

The WorldThink team and advisors have worked together for years. Collectively, we have many decades of business experience. We are a veteran team, experienced in inventing new systems, deploying them, and generating both revenue and profits.

- **Dr. Craig Kaplan**, CEO, is a world leader in the field of collective intelligence with more than 25 years of CEO-level experience designing and building collective intelligence systems. He held a visiting professorship in computer science at the University of California. Dr. Kaplan has authored and co-authored more than 40 publications, including research with a Nobel-Prize winning economist, a book, and more than 20 patents in the fields of cognitive science and software development. He earned MS and PhD degrees from Carnegie Mellon University.
- **Calen Lopata**, VP of Development, has more than 15 years of software development and entrepreneurial experience including running an internet technology and consulting company, founding an online educational service, and developing proprietary and patented technologies related to collective intelligence systems in the financial services space.
- **Michelle Samis**, Director of Business Operations, has over 30 years of entrepreneurial and management experience, including more than 12 years of experience in applying collective intelligence to financial services. She holds a Master's degree from Chapman University.
- **David Aronow**, Global Head of Sales & Marketing, has 30 years' Wall Street experience in sales, operational and management roles, including 19 years at Barclays and Lehman Brothers.
- **Stacy McDaniels**, Head of Database Operations, has over 20 years of database experience including operating her own IT consulting firm.
- **Justine Fenwick**, Head of Partnerships, is an entrepreneur and veteran of multiple technology startups. A co-author of patents and academic research, Justine earned a BA from UC Santa Barbara and a post-graduate degree from Harvard University.

- **Mario Albuquerque,** Research, holds a MFE from UC Berkeley and a CFA. He has 10 years' experience in asset management and applying collective intelligence to financial services.
- **Dr. Vince Matsko,** Research, has taught advanced mathematics and consulted for 25 years. He holds MS, and DA degrees from Carnegie-Mellon University.

5.1 Board and Advisors

Our Board/Advisors include luminaries in financial services, media, investment, and blockchain.

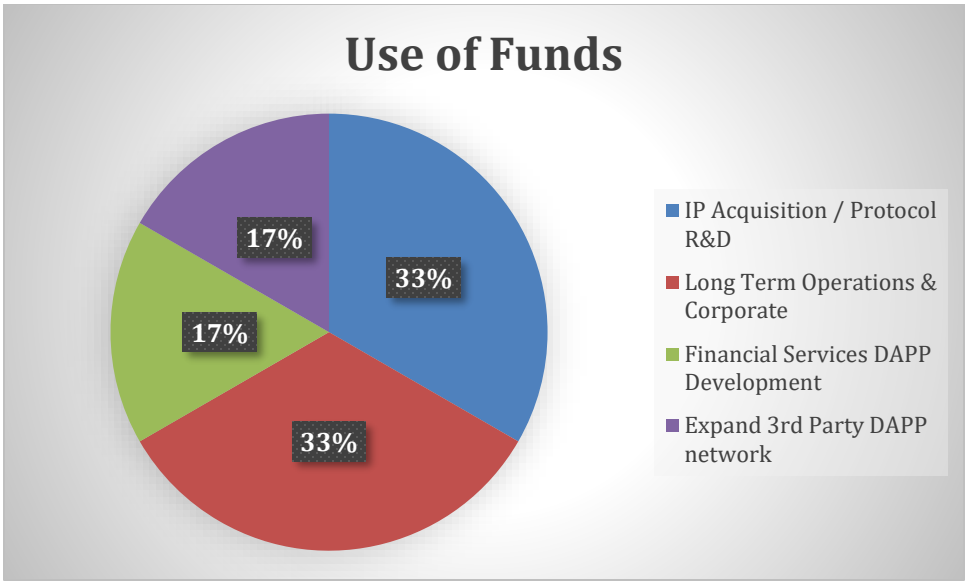
- **Dr. Howard Morgan** co-founded the quantitative hedge fund, Renaissance Technologies. He was a founding partner at First Round Capital, a venture capital fund that made early investments in Uber, Abra, Blue Apron, Bright, Mint, and many other successful companies. Currently, Dr. Morgan is an investor and serves on PredictWallStreet's Board of Directors.
- **David Taggart** served as the President at CTB/McGraw-Hill, an early-adopter of collective intelligence technology in the educational testing space. Currently Mr. Taggart is an investor and serves on PredictWallStreet's Board of Directors and on the Board of the Read to Me Project – an educational non-profit.
- **Dr. Fred Grauer**, grew Barclays Global Investors (BGI) into an asset management giant, overseeing ETFs and many other areas. Fred was Executive Chairman at BGI. Fred is senior strategic advisor to PredictWallStreet and is a Board member and investor in Course Hero.
- **Dr. Mark Feldman** is senior strategic advisor to PredictWallStreet. He is presently on the Board of Directors of Course Hero and, as a former Partner at PricewaterhouseCoopers, has over 33 years' experience in international merger and acquisition consulting.
- **Sid Dorr,** former Head of Institutional Trading at Charles Schwab, is a veteran trader with more than 30 years of expertise in the US equities market. After Schwab, he ran his own institutional trading firm for several years, prior to advising PredictWallStreet.
- **Peggy White Warren** is Founder of the White Warren Co, a consulting agency specializing in strategic marketing. Previously, she was VP and General Manager of Yahoo!Finance. Prior to Yahoo!, she was VP and General Manager of McGraw-Hill Business Week.
- **Raul Jordan** is a co-Lead at Prysmatic Labs, a Thiel Fellow, and Partner at zk CAPITAL, a research-based, crypto investment fund. An expert in Ethereum, Raul holds a B.S in Biomedical Engineering and Computer Science from Harvard University.
- **Trevor Marshall** is CTO at Current. Prior to Current he pioneered blockchain ideas at Morgan Stanley. He holds a BA in Mathematics and Computer Science from Columbia University.

6. Business Roadmap

Developing the WorldThink protocol and scaling the DAPP network is our main goal. Our milestones:

ASAP	+ 6 months	+ 12 months	+ 18 months	+ 24 months
WorldThink Initiatives Funded	**WorldThink Protocol Released**	**DAPP-1 Launches Network**	**DAPPs-2and3 Live on Network**	**3rd Party DAPPs Live on Network**

Funding will be allocated to IP acquisition and protocol development, long term operations and corporate purposes, development of financial services DAPPs, and development of the third party DAPP network.



7. Patents and References

A patent can only be issued in the US if the patent examiner determines that the patented invention is technically feasible. The core WorldThink patent (US Patent No. 7,155,157) was invented by our CEO and issued in 2006. The WorldThink team has developed more than 20 additional global patents, patents-pending, and proprietary technologies. Some of this additional intellectual property will be incorporated in the WorldThink problem-solving protocol.

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