



Dragonsbane

A decentralized anonymous resource for maximum personalization of health and wellness for all

White Paper

System v0.1.0

Document v20

Project Goal

The Dragonsbane Project seeks to create a decentralized anonymous resource based on an ERC20 token to provide maximum personalization of health and wellness for all individuals using the system. Imagine a healthier world where you are in charge of your own healthcare data. Dragonsbane is not a company seeking to profit from your life; it is a project seeking to increase the profit of your life.

Need and Vision

Dragons to Slay

We envision a future where each person's wellness is so optimal as to require very little in the way of traditional healthcare. The approach to that singular moment will be characterized by increasing health and wellness at lower and lower cost until the singularity is reached. At that point wellness costs will be so small as to eliminate the need for any non-individual funding mechanism for almost all health-related services required from others. But, there are dragons in the way.

The **first dragon** is the deliberate containment of what would otherwise be free-flowing knowledge. Current healthcare data is sequestered by those who say

they own it by virtue of their having paid for the care. Examples are insurance companies or state-run institutions that fund care. Their argument ignores the fact that the people whose lives created the data paid for the care through insurance premiums or taxes. This knowledge is treated as an asset of the owner rather than a commons and is not easily available to all wishing to advance people's health and wellness. This is akin to a social media company utilizing unpaid-for, uploaded content to create a revenue stream from advertisers without the contributors benefiting in any way other than casual use of the network.

The **second dragon** stems from the historical limits of knowledge and the slowness of learning. We currently name disease states with low-granularity diagnoses such as diabetes or hypertension. These names become evocative of the research and assumptions attached to them as if they were monolithic, while, in fact, each person has a unique set of genetic, physical, and environmental factors that often change the meaning of their diagnosis and the most appropriate options. Such diagnoses are internalized by patients, without their being told the greater context, and become part of their identity. This makes them more susceptible to simplistic marketing of medications and treatments not optimized for them. With limited computing power and limited time, it is understandable how this system developed, but a better way is available now.

The **third dragon** to slay is the current vision of cutting edge research produced by the scientists and those who fund them. Medicine identifies proper treatments for low-granularity diagnoses as described above. Where our current system does attempt greater granularity in diagnosis, it is usually done along lines having nothing to do with the underlying biology. This leads to massive amounts of wealth being spent to develop simple treatments for diagnoses that require more of a complex system of treatment. An example is probably required here. Say we study 200 people diagnosed with Illness X. Half are given treatment A and half treatment B. The results show that to a statistically significant degree 60% of those given treatment B were better while only 40% of those who got treatment A were improved. The results are published in premier journals saying that B is better than A for diagnosis X. But what we don't hear about the subjects who got better with A and who didn't with B. We never learn which subjects would have done well with the opposite treatment. In short, the current model of science gives us the better between two treatments when in fact what we each want to know is, "what do I need, along with what else, in what order and for how long?" This work requires great numbers (a large N) not generally accessible to funded studies. This funding limit illuminates the next dragon.

Currently funding, the **fourth dragon**, for medical research is mostly from government programs or for-profit pharmaceutical companies. The latter group

requires a return on investment (ROI), and increasingly the former group is being asked to provide one as well. This ROI is generally seen as coming back in the form of profits or savings and requires, in most for-profit cases, that the information be corralled and controlled for best business use. For those not for profit, the ROI is sometimes quantified by successfully published studies. These publications are not controlled by new bright innovative thinkers, but by the established members of the field who don't accept work that questions their own[1]. This same group largely inhabits the funding boards of the federal grantors. This system inhibits the breakthrough in favor of the slow evolution with little change to the status quo.

Finally, the **fifth dragon** is our intermittent disease oriented method of care that has come about as the historical outcome of all we've discussed above. Physicians are mostly paid by insurance companies to provide treatment for illness states during compensated visits. These visits have become shorter and more disease focused as physician reimbursement has fallen. Attempts at other cost structures have been met with "unforeseen" negative feedback loops that have actually increased cost, lowered availability of care, or degraded the quality of the physician/patient relationship.

It is important to note that the current situation is not the result of any nefarious intent. We have these dragons, not because someone sent them to plague us, but because this is the best we could have done with what we had. But we can now do better.

Another Way Forward

We live in a time of immense information flow and processing power. This gives us the capacity to solve large problems in shorter periods of time than ever before. However, data is segregated into pools mined by the owners for monetary value regardless of where the data came from. This privatization of individual data is akin to a single person gaining control of a commons. We can revitalize the commons so that those whose lives create the data can gain the benefit themselves.

Dragonsbane is a global, distributed AI ecosystem designed to produce highly individualized health and wellness options for its users. Dragonsbane is what will slay the dragons that currently prevent us from gaining progress toward our goal. By being decentralized, the system will be constructed so that those who create the data benefit not only by the immediate answer but also by gaining further access to the system in the form of Dragonsbane Tokens (BANes). Further, those sharing successful models and computing power for the system will also

be rewarded with tokens for their work. This will incentivize the network to grow. As the system becomes larger, the AI will become more accurate, and deliver more value to each of its members.

Initial Development

First Implementations

The first use case derives from another dragon that requires slaying[\[2\]](#). The founder's experience is in the world of addiction treatment and he believes that there is not only good treatment but that it's possible to end the problem of addiction within his lifetime. One step on the way to that goal is to democratize and personalize addiction treatment, and that requires making people aware of their genetic individuality as they assess treatment options.

The founder created a genetic testing algorithm for sequencing medical treatment for addiction and previously sold it[\[3\]](#). He is developing a new, better system via a different method for implementation on Dragonsbane that will be published in a future version of this white-paper. The seed model in the first instance will be the founder's model that he will place in the Dragonsbane network. After the network is opened, a model registry will be created, discussed below, and all other models that meet criteria will be accepted.

Other potential use cases are fertility tracking for women, diet customization for people wearing continuous glucose monitors, and weight loss options for people wishing to lose weight.

Envisioned System Interactions

The Dragonsbane network will be limited in the sense that only holders of BANE will be able to participate, but unlimited in the sense that everyone can join and earn BANE. Users can upload their data to the network via their anonymous wallet and receive a nominal payment in BANE for doing so. The BANE is the only payment the network accepts for the right to receive the options generated, so there will be economic give and take. Users will also be able to earn BANE by giving feedback on the network regarding the options they and their treatment teams chose and the results of those efforts. Those results will feedback into the AI engine improving performance of the network. Users can re-query the network, using Bane, at any time to see if options have changed.

With the initial governance by the founding team, followed within a few years by ~~the Dragonsbane Foundation~~ smart contracts, the table will be set for a transition to a fully autonomous user governed network within 5-10 years of the first submission. With governance by users, paid for by users, Dragonsbane will have created a more responsive system of individual health and wellness with costs limited to those necessary to operate the system. It should be noted that it is not envisioned that governance and token ownership will coincide. Within the network, all members will have equal say.

The BANE Token

Supply and Creation

One billion BANE, divisible to 18 non-integer decimal places will be created as an ERC20[4] compliant contract. No additional BANE will be created.

Distribution

Dragonsbane development will retain 10% (100,000,000) of the BANE tokens for building the networked application and transitioning it to an ever-more decentralized system.

The Founder / Interim CEO (Howard Wetsman) will receive 1.5% (15,000,000) of BANE tokens immediately upon creation. 1% (10,000,000) will be immediately activated while .5% (5,000,000) will be activated over 5 years quarterly (250,000 BANE activated at the beginning of each quarter).

The Chief Architect / Interim CTO (Brian Taylor) will receive 1% (10,000,000) of BANE tokens immediately upon creation. .5% (5,000,000) will be immediately activated while .5% (5,000,000) will be activated over 5 years quarterly (250,000 BANE activated at the beginning of each quarter).

The resulting 7.5% left in development is for additional development resources needed by Dragonsbane.

The current state of token sales within the space is in flux. Dragonsbane expects this flux to be stabilized within the next two years of development. Options for distribution of BANE are, but are not limited to:

1. Bulk sales to members for their own use within the system
2. Public bulk sale should the regulatory systems derived be favorable

3. Bulk sales to individuals for their own purposes (creating systems within the Dragonsbane ecosystem)
4. Airdrop or promotional distribution within the network
5. Direct spending of Dragonsbane for services should any developer wish to take such payment

Initially tokens are handed out in exchange for users' health data and model creations from the token supply. As the supply of tokens dwindles and the network grows, the network will consist of users desiring to use the health AI creating a demand for BANE. This will support the transition from paying out from the BANE supply to ~~paying out from purchasers of the health AI exchange between users.~~ This may in the future result in the tokens exchanged on a decentralized exchange and/or exchanged directly through the BANE token contract.

Model Registry and Evolutionary Change

The Dragonsbane AI will be seeded with original sets of assumptions called a "model." These essentially can be drawn by anyone from anywhere, but will likely be submitted most often by experts in the healthcare arena or healthcare companies wishing to join the network. These models will be subjected to evolutionary change and continuous alteration by the AI engine so that even if someone tried to seed an inaccurate model, it would not have much effect for long in the output of Dragonsbane. Further, as all models entered into the registry are assumptions, whether meant well or not, they will all be subjected to the same empirical machine learning process.

Original models will be published as open source (AGPL v3) within the model registry. As new inputs and attachments are discovered by the AI engine, these will be published as well.

While the word infinite should be used with caution with regard to token scaling, Dragonsbane is close to being infinitely scalable. With 10^{27} indivisible fractions of BANE multiplied by their velocity, the network will eventually allow a future population of 10 billion people worldwide to make 10^{17} transactions ~~each if the value of each token scales to that degree.~~ This can easily be expanded in the future if necessary by increasing the number of decimal places.

Transactions within Dragonsbane

The BANE token is the embodiment of the right to use the functions of the Dragonsbane Network. It is provided as a reward for using the system in the following ways:

- Users who submit their data inputs into the network will be rewarded with BANE.
- Users who allow the network to use their computing power for the Dragonsbane AI will be rewarded with BANE (accomplished using Synaptic Celerity foundation).
- Users who submit feedback on Network derived options to improve the network will be rewarded with BANE.
- Users who submit models that successfully survive evolutionary feedback will be rewarded with BANE.
- Users who wish to receive and use the options produced by the Network will pay for that exclusively with BANE.

Dragonsbane does not set a value on BANE with regard to any other good or service outside of the network. Dragonsbane considers BANE to be worthless outside the network. It may be that in the future those providing medical care or advice outside the Network may also accept BANE in exchange for their services. Such decisions on personal transfer of rights for services is beyond the scope of Dragonsbane to comment on.

Regulations

Many regulations abound regarding personally identifiable information (PII) and health care information. This product must be compliant with all legal jurisdictions in which this product operates unless those conflict with an individual's' natural rights including privacy. The following are the current jurisdictions and their regulations known and being addressed.

United States

- **Health Insurance Portability and Accountability Act (HIPAA)**

- Personal Health Information (PHI): any information held by a covered entity that concerns health status, provision of health care, or payment for health care that can be linked to an individual.
 - Must disclose PHI to the individual within 30 days upon request. Accomplished by providing access to all PHI in real-time.
 - Must disclose PHI when required to do so by law such as reporting suspected [child abuse](#) to state child welfare agencies. This must not conflict with natural privacy rights.
- Health Information Of Deceased Individuals
- Attributes
- Anonymization
- De-identification
- Health Information Technology for Economic and Clinical Health Act (HITECH)
 - Electronic Health Record (EHR)
 - Health Information Exchange (HIE)
 - Data Breach Reporting
 - Affecting ≥ 500 People

Other Potential

- European Union
- United Kingdom
- India
- Brazil
- China
- Japan
- Korea
- South Africa
- Australia
- New Zealand
- Canada
- Russia
- UAE

Standards

Fast Healthcare Interoperability Resources (FHIR)

A draft standard describing data formats and elements (known as "resources") and an [application programming interface](#) (API) for exchanging [electronic health records](#). The standard was created by the [Health Level Seven International](#) (HL7) health-care standards organization.

Risks

Systemic Attacks

Fake Information

This attack is the result of an entity submitting data not their own for a purpose other than to receive options from the system. It may take the form of adding someone else's data to the system in order to learn something about them or it may take the form of adding useless false data to the system either to earn BANE or to disrupt Dragonsbane entirely.

We'll discuss the first attack first. It is possible for someone to open a wallet and submit another person's data. But for that to happen the member must have access to that person's data. Assuming they did and put the data in, they would only get out the options Dragonsbane saw as potentially useful for the other person. There's very little one can gain from that over what is available on the internet once one has another person's data. The true power of Dragonsbane is the improvement of the options given feedback from the individual members over time. The person putting in such data on others would likely not give correct feedback and would not get meaningful answers. Some people may do this, but it will not be practical or profitable and will be overwhelmed by legitimate users.

There may be some who want to put in false data, and we can think of two motives for this. The first is to disrupt the system to gain a competitive advantage over Dragonsbane or prevent Dragonsbane from competing with a legacy system. The second is to benefit from the reward one gets in uploading data to the system. Both attacks, we feel will not succeed for the following reasons. The rewards for adding data will be small, and unique to each upload. So if someone

manually uploads their serum sodium level or uploads their entire genome, it will be rewarded at the same level. It is possible to create a bot that would “manually” upload data, so we’ll have “proof of humanity” safeguards. These rewards will not justify a human spending their day earning a living from uploading to Dragonsbane especially when BANE have no value outside the network.

Drowning the System

Some might consider that even with proof of humanity safeguards it could profit a legacy system owner to pay people to overload the system with false information in an effort to discredit Dragonsbane. One of the dragons we’re slaying is the current state of AI requiring human input or confidence in the data. Humans have an ability to parse data and “sandbox” it if it doesn’t seem to fit into the model. Dragonsbane AI will also do that.

It is possible that a very deep pocket player would be able to hire enough people to overcome the legitimate users of Dragonsbane. But this seems like the 51% problem in Bitcoin to us. While it might profit someone to be able to achieve 51% of the BTC blockchain so that they could spend their BTC twice, once before they were found out, we don’t see any legacy player being so foolish as to risk their reputation in such a way.

Identity Attacks

It is a well known truism of technology that the easiest part of any system to hack is the user. The Dragonsbane Public Key (address) is not expected to be shared with others outside the system. Instead, a one time addressed will be created when a member wants to request a payment in BANE from outside the system. However, individual users will have the right to publish their public key and thereby lose their anonymity assuming that public key has been correlated to their identity. In this way each person can consent to the world reading their blockchain data by releasing their public key and attaching additional personal information. Personal encryption and security measures are highly encouraged.

Regulatory Attacks

Regulatory capture is a well recognized phenomenon and legacy players in the field who stand to lose greatly should Dragonsbane succeed are companies that are highly regulated. These companies may use their large resource base and regulatory capture to induce regulators of certain jurisdictions from blocking

Dragonsbane. Also, it is possible that regulators themselves, seeing their jobs at risk from losing anyone to regulate, may see Dragonsbane as a threat. These attacks will likely take the form of paternalistic complaints of a lack of protection of those using Dragonsbane. To counter this threat we will use only open source, freely available software and encourage community auditing and examination of our processes.

Anonymity

Dragonsbane's mobile nodes are built on top of Synaptic Celerity which provides an anonymous overlay network among mobile nodes within the network and with external clearnet nodes. This ensures that anonymity can be accomplished as a base level service while allowing it to be relaxed by the end user as desired, just like in the physical world.

Scaling

Scaling is an important predictor of success. Long term, we will provide a fully operating system on mobiles alone and expect mobiles to evolve into biologically embedded devices. This provides the most extreme scale possible as, of 2017, smartphones are the most widely used computer in the world and purchased by individuals themselves.

Mobiles currently don't have near the advanced software support as server hardware so this will take time to develop, hence the need to keep some BANE for the foundation to use for development. In the short term, this will require distributing processing and persistence to server-like hardware balancing it with mobile phone resources. Initial scale will come through using a peer-to-peer desktop/server level blockchain for tokenization (Ethereum) and cloud services for AI analytics (e.g. BurstIQ). The first is funded by the blockchain network yet requires payment for processing (gas in Ethereum). The latter requires funds to pay the cloud provider. In the long term, they are both expected to be replaced with mobile-only solutions.

Development Road Map

The First Years

As Dragonsbane receives enough funding, it will set to work on the following milestones:

- Build an initial product (NeuroCog).
- Continue fleshing out the governance board
 - Experts on AI
 - Experts on health and wellness
 - Experts on economy and social structure
 - Experts on security and blockchain
- Development of a model integration registry
 - What is envisioned from the beginning is a standard form for models to be added so that each model will be integratable with all the others.
- Development of the AI engine
 - According to the needs of specific products in the short-term
 - Pulled together into a more general self-learning AI long-term
- Public work to promote the Dragonsbane Network
 - Marketing in essence, direct to consumer in our case

Years 5-10

It is envisioned that Dragonsbane will grow a great deal in the first 5-10 years. There inevitably will be situations that will require hands-on management that cannot be foreseen. But what cannot be foreseen with no users or even the first

1 million users, will likely be foreseen after the first 1 billion users. By the 10 year point, we think it likely that Dragonsbane will have expanded to the point where the directors can foresee most future problems. At that point, the directors' role can be downgraded from governance to consultation.

After that transition, directors' will be able to suggest to the users changes that they see required, but governance will be in the hands of the users through proof-of-stake voting. There will also be an ability for the network users to put forward their own proposals on how to change the network.

Community

Executive

Founder / Interim CEO - Howard Wetsman, MD, DFASAM

Dr Wetsman has over 25 years of experience in treating addiction, and more importantly has been an innovative voice in moving addiction treatment into the 21st century. In 2009 he co-founded Townsend, which, along with its associated companies, sold in 2016 for \$21 million dollars. Dr Wetsman's singular vision regarding how our medical establishments have grown to actually make our medical problems worse rather than better inspired the Dragonsbane Project.

Chief Architect / Interim CTO - Brian Taylor, Resolving Architecture

Brian has been developing software since 1997 and worked as a Software Architect since 2000, from bootstrapped startups to Fortune 100 enterprises, with specializations in distributed computing, scalability, and real-time analytics, focusing on decentralizing and open sourcing all aspects of computing to promote voluntary and transparent yet private lifestyles for all.

AI Lead

Brian Taylor as lead until replacement found, Howard as backup until replacement found.

Smart Contract Lead

Alexander Wormbs as lead with Brian as backup until replacement found.

Security / Blockchain Lead

Brian Taylor as lead until replacement found, Alexander Wormbs until replacement found.

Android Development Lead

Brian Taylor as lead until replacement found, no backup yet.

Full Stack Web Development Lead

Brian Taylor as lead until replacement found, no backup yet.

Partners

Synaptic Celerity

AI Assistance for Humanity - Decentralized Intelligence Assistance

Synaptic Celerity is a secure decentralized AI mobile application platform for creating easy to use secure decentralized smart mobile apps that can be used around the world by any person for personalized AI while looking to protect their communications and personal data from unjust intrusion, interception and monitoring.

This partner is working on the mobile foundation to support a mobile-only platform to maximize scalability and security. Initially they will provide the mobile application platform for maximizing anonymity as a foundation while continuing to support the evolution to a full mobile only solution able to communicate through a mesh network.

BurstIQ

Big Data Healthcare Analytics Blockchain

BurstChain - seamless sharing, end-to-end data rights management, secure data storage, an indisputable chain of custody and advanced security protocols.

Roadmap

NeuroCog

POC - 2nd Quarter 2018

A minimal implementation focused on the greatest risks that threaten the success of the first product.

Prototype - 4th Quarter 2018

A fully working example of the overall concept with minimal AI. It will consist of a functioning mobile application, solidity smart contracts, a basic appropriate ML/AI algorithm, and marketing site.

General Availability - 2nd Quarter 2019

A fully functioning AI appropriate to the problem to solve in this version.

Monetization Application - Ethereum

The set of smart contracts for managing the token supply and automated monetary workflows. It ensures token currency functions follow agreed upon rules as the system operates.

- Further details TBD.

Model Repository

Models for initializing the AI Engine. These are likely to be very specific initially to solve particular problems but are expected to evolve into more evolutionary algorithms. Not many standard formats exist, although PMML can be used for Rete rules engine based models if this type of engine will be part of the solution.

- Specifics for this version are TBD.

AI Engine – BurstIQ

Model execution environment. This is the neural network of the system. This version will be boot-strapped using a cloud provider's capabilities. Current selection is BurstIQ.

- Further details TBD.

Mobile Application - Android

Anonymous network to maximize base level privacy accomplished using a garlic routing distributed hash table (DHT) end-to-end encrypted TCP/UDP overlay network. It will act as the primary end-user interface for managing a person's profile including identity, health information, biometrics, and access. It interacts with the server and monetization applications ensuring PII is maintained with the server and monetization applications. The following are the components, as of 4th Quarter 2017:

- Profile Management
- Health Information Management
- Biometrics I/O
- Anonymity Routing - Synaptic Celerity
- End-to-End Encryption - Synaptic Celerity, Ethereum API, BurstIQ API
- Identity Management -?

Feedback

Please comment on dragonsbaneproject.org, Decstack (<https://hub.decstack.com/projects/channels/dragonsbane>), GitHub (<https://github.com/DragonsbaneProject>), or on other sites on which we're active to help us along in this quest to make us all healthier.

Version Notes

V20 Added NeuroCog to First Years under Roadmap.

V19 Added NeuroCog to Roadmap.

V18 Changed team compensation plan, broadened funding options for Dragonsbane, minor grammatical corrections, broadened foreseen risks

V14 Edited BANE details and removed crowdfunding.

V13 Added long-term scaling inputs, Synaptic Celerity & BurstIQ partner information, Roadmap, Additional Community resource info

V12 Math corrections. An expansion of the time line and vision. Additions to the team. Additions to governance vision. Inclusion of partners.

V11 An attempt to simplify language and put the purpose up front. Also note that there isn't a way to show exponents so exponents are shown in parentheses after 10. Minor grammatical corrections and clarifications. 8/19/2017

V1 First version published 8/17/2017.

References

[1] Kuhn, TS. The Structure of Scientific Revolutions. University of Chicago Press, 1962. Chicago, IL.

[2] White, W. Slaying the Dragon. Chestnut Health Systems; 2nd ed (July 2014)

[3] http://www.theadvocate.com/baton_rouge/news/business/article_7ea28bb8-f3f1-5077-8703-6c716b9e2e30.html

[4] <https://github.com/ethereum/EIPs/issues/20>